



Moray and Aberdeenshire Forest District

## Newtyle Area

Forest Design Plan



Approval date: \_\_\_\_\_

Plan Reference No: \_\_\_\_\_

Plan Approval Date: \_\_\_\_\_

Plan Expiry Date: \_\_\_\_\_\*

\* Text in grey to be filled in at the final stage of approval – not important for public consultation

# Newtyle Area Design Plan 2014-23

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

### Forest Enterprise - Property

Forest District:	Moray & Aberdeenshire FD
Woodland or property name:	Newtyle
Nearest town, village or locality:	Newtyle
OS Grid reference:	NJ 05

### Areas for approval

	Conifer	Broadleaf
Clear felling	62.4 ha	--
Selective felling		
Restocking	24.7	1.2 ha
New planting (complete appendix 4)		

1. I apply for Forest Design Plan approval\*/~~amendment approval\*~~ for the property described above and in the enclosed Forest Design Plan.
2. \* I apply for an opinion under the terms of the Environmental Impact Assessment (Forestry) (Scotland) Regulations 1999 for ~~afforestation\*~~ /~~deforestation\*~~/ roads\*/ ~~quarries\*~~ as detailed in my application.
3. I confirm that the initial scoping of the plan was carried out with FC staff on
4. I confirm that the proposals contained in this plan comply with the UK Forestry Standard.
5. I confirm that the scoping, carried out and documented in the Consultation Record attached, incorporated those stakeholders which the FC agreed must be included.
6. I confirm that consultation and scoping has been carried out with all relevant stakeholders over the content of the of the design plan. Consideration of all of the issues raised by stakeholders has been included in the process of plan preparation and the outcome recorded on the attached consultation record. I confirm that we have informed all stakeholders about the extent to which we have been able to address their concerns and, where it has not been possible to fully address their concerns, we have reminded them of the opportunity to make further comment during the public consultation process.
7. I undertake to obtain any permissions necessary for the implementation of the approved Plan.

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

Forest District Manager Conservator

District ..... Conservancy .....

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

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

## Contents

Forest Design Plan Summary

### 1.0 Introduction :

- 1.1 Setting and context
- 1.2 History of the woods

### 2.0 Analysis of previous plans.

### 3.0 Background information

- 3.1 Physical site factors
  - 3.1.1 Geology, soils and landform
  - 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 Statutory requirements and key external policies
- 3.7 Pathogens and disease

### 4.0 Analysis and Concept

- 4.1 Analysis
- 4.2 Concepts of the plan

### 5.0 Forest Design Plan Proposals

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

# Newtyle Area Design Plan 2014-23

---

- 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

## Support documents:

- Map 1: Location.
- Map 2: Key Features.
- Map 3: Current Species
- Map 4: Analysis and concept.
- Map 5: Management.
- Map 6: Thinning.
- Map 7: Future habitats and management.
- 3D Visualisations

## Appendices:

- Appendix 1 – Consultation record
- Appendix 2 – Tolerance table
- Appendix 3 – LISS prescriptions
- Appendix 4 – LISS management

## Forest Design Plan Summary

This plan is a review of Forestry Commission Scotland's management of Newtyle Forest

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

The main priority for these woodlands is the production of a sustainable timber crop and therefore the areas managed through thinning will continue to be maximised. Areas not considered for commercial management include permanent woodland and open habitats.

Stands selected for LISS management generally have crops of conifer species suitable for LISS on suitable site types.

The occurrence of Dothistroma Needle Blight has had an impact on the felling phases and the species choice for restock. These will predominantly be mixed conifer with Larch species. Other species will be restricted to the sites with suitable soil conditions.

Newtyle lies in a core **Capercaillie** area, with the Romach Hill supporting one of the largest Capercaillie population in Moray for many years. **Black Grouse and Crested Tit** have been seen as well. Since all bird species are on the UKBAP list, the design plan will address the development of specific forest structures and compositions for their benefit.

## 1.0 Introduction

Refer to Map 1: Location

### 1.1 Setting and context

Newtyle FDP area is made up of one forest block. The woodland is located to the south of the village of Rafford between the A940 towards Granton on Spey and B9010 towards Elgin, and it covers approximately 722 hectares.

Newtyle is a forest of transition, straddling the watershed between the Findhorn to the west and the Lossie drainage to the east; between the well-established forest landscape of Altyre and Darnaway and the more mixed and moorland landscapes to the south and east; between the coastal plain and the uplands.

### 1.2 History of the forest

Ordnance Survey maps for the vicinity of the early 19th century, and especially the 1905 edition of "Bartholomew's Half Inch to the Mile Maps of Scotland", confirm the existence of plantation parcels within the woodland as it exist today (around the Romach Loch and Romach Hill). However, most of the old woodlands must have been harvested between the beginning of the last century and WWII, because the 1947 Ordnance survey map shows only fragments of mature wooded parcels left in today's plan area.

Newtyle was purchased by the forestry Commission in two acquisitions. The northern half of the forest was acquired in 1931 with (re-)planting taking place between 1932 and 1945 (not yet visible on the 1947 Ordnance survey map) The Southern section of the forest was acquired in 1952 and was planted by 1956.

## 2.0 Analysis of previous plans

Following the amalgamation of Moray Forest District with Aberdeenshire Forest District in 2008 the forest design plan programme was rationalised. This will allow us to take account of the wider impact of the woods on the local landscape and watersheds.

The following table highlights the main priorities set out in the previous plans. It describes how and if those aims were met and what the proposed management intent is to carry these objectives forward in this plan.

National Theme	Priority	District Strategic Plan	Forest Design Plan Objective	Cross-Reference - Current Plan	Proposed Measures
Climate Change	Medium	Adapting to climate change	Restore moorland areas	<p><b>0</b> – No objective in current plan</p> <p><b>1</b> – objective, but only nominal progress</p> <p><b>2</b> – objective, and some progress</p> <p><b>3</b> – objective, progress as per FDP</p>	Visual assessment of the plan area through teams did not reveal any opportunity for moorland creation.
			Restore forest habitat networks	<p><b>2</b>- Some burns/gullies were opened up through clearfelling</p>	<p>Manage riparian zones to maintain and improve existing habitat networks and take opportunities to extend the area where appropriate.</p> <p>Open up the main watercourse by selectively removing conifers to allow development of native riparian plant communities</p> <p>Increase open space and create a more gradual transition between grassland/heath/agricultural field and conifer plantations (e.g. through scattered loosely planted stands – see Map 5 and 7)</p>
			Select and plant appropriate species	<p><b>2</b> – The removal of poor quality crops of LP, including their replacement with more suitable species has been started.</p>	<p>The removal of poor quality crops of LP, including their replacement with more suitable species has been started, but will reach the peak in the upcoming term through the massive removal of diseased LP stands in the plan area</p> <p>Restock of broadleaves will be carried out as per FDP, except where site conditions dictated an alternate productive species was more appropriate. Amendments will be prepared if changes exceed tolerance tables.</p>

# Newtyle Area Design Plan 2014-23

<b>Climate Change</b>	<b>Medium</b>	Renewable Energy	Woodfuel	<b>0</b>	The removal of RBNB infected LP will produce woodfuel in fairly large quantities
			Windfarms	<b>0 - potential</b>	No concrete plans of windfarms in and around Newtyle. Liaison officer will be updating planning about any new proposed development, the design plan process will continue as usual in the interim.
		Flood & catchment management	River catchments	<b>3</b> – Romach Loch Waterline guidelines apply	The West side of the site is in the Burn of Mosset catchment which drains to Findhorn Bay. The East, including Loch Romach is drained by the Black Burn which forms part of the River Lossie catchment.
			Riparian woodland	See “Forest habitat networks” above	See “Forest habitat networks” above
<b>Climate Change</b>	<b>Medium</b>	Carbon sequestration	Choose CCF sites and natural reserves where site conditions allow	<b>3</b> - Sites identified as LISS, LTR or CCF recorded in FDP-GIS layers. Work plans produced and operations undertaken to retain/manage sites as appropriate.	Plant appropriate species for site type to allow the future adoption of alternative to clearfell (ATC) or low impact silvicultural systems (LISS) where practicable to mitigate the effects of climate change.  There are large areas of this design plan currently showing potential for management under LISS (Low Impact Silvicultural Systems). 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.  The main species in Newtyle that is suitable for LISS management is Scots Pine that has been well thinned in the past. There are areas of Scots Pine / Larch that have not been thinned due to the steep or wet ground that will not be suitable for this management type.
			Increase provision of deadwood habitat.	<b>2</b> – Appropriate levels of deadwood retention agreed in work plans and checked at 75% visits Process lead by conservation team.	Where appropriate, ensure the retention of deadwood at levels appropriate to site conditions observed and recorded at 75% visits.

# Newtyle Area Design Plan 2014-23

			Restocking	<p><b>0</b> – Hardly any restocking of clearfelled areas needed, since large areas of this design plan are currently under CCF management, and will continue to undergo a continuous thinning cycle</p> <p><b>3</b> Establishment surveys have been carried out for natural regeneration under CCF.</p>	<p>Plan and develop monitoring protocols for natural regeneration establishment. First drafts of these protocols have been discussed within district CCF working group; final draft will be included in next review.</p> <p>Identify sites lacking natural regeneration and propose action plan. These processes will be covered with future monitoring protocols as well.</p>
<b>Timber</b>	<b>High</b>	Timber supply	Maintain a sustainable level of timber production from felling and thinning.	<p><b>1</b> - Phase 1 felling coupes identified in last FDP not completed, due to Capercaillie meeting in June 2004. Some of identified proposed coupes were dropped.</p> <p><b>3</b> – Majority of thinning coupes identified in FDP completed.</p>	<p>This will continue to be a major driver in the new plan.</p> <p>The district’s DNB amendment will dictate the identification of most of the phase-1 felling coupes in the Romach Hill area.</p> <p>Not many future clearfell areas expected beyond phase 1, since the majority of the forest block will be managed under CCF. The Romach Hill and (maybe) Romach slopes will remain as a clearfell and replant systems.</p> <p>Identify coupes and their felling dates based on production-optimization, change existing felling dates accordingly, provided other objectives are not seriously compromised.</p> <p>Undertake thinning where possible, to produce a sustainable timber supply.</p>
<b>Timber</b>	<b>High</b>	Timber quality	Restock favouring commercially productive species; look for species diversity wherever suitable	<p><b>3</b> – Restock carried out as per FDP, except where site conditions dictated an alternate, more appropriate productive species. Amendments were prepared if changes exceeded tolerance tables.</p>	<p>This will continue to be a major driver in the new plan. Coupes identified for stocking with productive species will have an ESC assessment to determine the most appropriate species for the site conditions. Additionally, the operating plan process will also add to a localised optimisation of site-specific species choice. In the Romach Hill area, emphasis is on Capercaillie management with subsequent creation of low density woodland areas, mixed in with commercial crops (SP managed on a commercial rotation creates very good caper habitat).</p>

# Newtyle Area Design Plan 2014-23

		Timber quality	Increase restock of commercially productive broadleaf's	0 – Broadleaf areas were only identified and restocked for biodiversity reasons, no specific commercial designation	In some group selection areas there is heavy natural regeneration of birch. Potential of growing a next generation of commercial mixed pine / birch woods in the northern part of the forest block.
			Limit deer browsing	2 – Browsing detected in unfenced areas on Romach Hill on sitka spruce.	Plant species that need protection (Douglas fir, pine, broadleaf) in fenceable units;
<b>Timber</b>	<b>High</b>	Timber transport	Develop an efficient and effective timber transport network	0	Use preferred timber haulage route to minimise potential damage to public roads.  Road network is in well maintained and in place. No major upgrading necessary. One forwarder track on the east side of the Romach Hill might have to be put in place to provide an extraction route.
<b>Timber</b>	<b>High</b>	Hardwood Timber	Niche marketing	0	Optimise the potential of products for niche markets where appropriate. Communicate with adjacent land owners that have sawmilling capacities.
			Commercial hardwoods	0	Optimise the current hardwood resource and plant appropriate species at commercial spacing on appropriate broadleaf sites which are present in the plan area
<b>Business Development</b>	<b>Low</b>	Skills	Offer learning and career chances to volunteers	0	Due to limited resources Newtyle ranks low regarding the provision of opportunities to work with volunteer organizations such as the Scottish Association for Mental Health (SAMH)
			Encourage development of new local contractors	0	There are a very limited number of contractors local to the plan area
<b>Business Development</b>	<b>Low</b>	Tourism	Attract more visitors and users	1 – Horse riding and informal walks have been the only recreational activities. Further increase in interest was discouraged	Due to limited resources, and its fairly remote location Newtyle will be considered ranking low regarding visitor attractions and recreation improvement. Main focus will be to keep providing a pleasant environment for the existing activities

# Newtyle Area Design Plan 2014-23

<b>Business Development</b>	<b>Low</b>	Income Diversification	See “Renewable Energy”	<b>0</b>	Good opportunities for woodfuel due to the removal of RBNB infected LP
		Contribution to Rural Development	Partnership with local communities and business	<b>0</b>	Be open for new opportunities. However, due to limited resources, there won't be much proactive exploration of future opportunities to work in partnership with local communities and businesses in the forest plan area.
<b>Community Development</b>	<b>Low</b>	WIAT	partnership activities with towns	<b>0</b>	There are no WIAT-designated blocks within the plan area. Only little opportunity to identify new ones.
<b>Community Development</b>	<b>Low</b>	Community engagement	Engage communities in the forest design plan process	<b>3</b> – Rafford Community Association, Forres Footpath Trust and the Environmental Panel were consulted.	Maintain and enhance the relationship with both statutory and non-statutory consultees. Initial consultation carried out. Next stage of consultation will be in the final design-draft stage
<b>Community Development</b>	<b>Low</b>	Learning	Engage with urban schools for outdoor education opportunities	<b>0</b>	Little opportunity to use the forests in this design plan area for learning events due to their location, size and current state of management.
<b>Community Development</b>	<b>Low</b>	Partnerships	Maintain and increase work with partners	<b>0</b>	Little opportunity for partnerships to be established in the plan area.
<b>Access &amp; Health</b>	<b>Low</b>	Recreation	Maintain and enhance existing recreational facilities.	<b>3</b> - The Rafford Community were keen that Newtyle remain quiet. They were reassured FR had no plans for any formal recreation facilities.	There will continue to be a need for a planned maintenance regime for access to established routes Little opportunity to promote, create and maintain new routes or recreational facilities No core paths identified in the forest plan area

# Newtyle Area Design Plan 2014-23

<b>Access &amp; Health</b>	<b>Low</b>	Making access easier	Keep access open	<b>0</b>	Continue to allow informal access via the forest roads.
<b>Access &amp; Health</b>	<b>Low</b>	Health	Promote access for health benefit	<b>0</b>	Little opportunity to work with health providers or support groups on specific projects to address health issues
<b>Environment. Quality</b>	<b>Medium</b>	Soil water & air quality	Always take into account the potential impact on watercourses, forest soils, and air quality	<b>3</b> – Best management practices and guidelines have been followed in conjunction with SEPA and other environmental stakeholders	This will continue to be an important objective in the new plan. Continue undertaking all operations in accordance with UKFS Water Guidelines to meet EU water framework directive objectives.
			Adopt alternatives to clearfell (ATC) or low impact silvicultural systems (LISS) where practicable	<b>2</b> – CCF areas were identified. Group selection and shelterwood thinnings have been carried out. Natural regeneration has occurred in the groups in the northern part of the block	There are large areas of this design plan currently showing potential for management under CCF The main species in Newtyle that is suitable for LISS management is Scots Pine that has been well thinned in the past, and will continue to be thinned in the future. There are areas of Scots Pine / Larch that have not been thinned due to the steep or wet ground that will not be suitable for this management type (Romach slopes, wet areas on Romach hill).
<b>Environment. Quality</b>	<b>Medium</b>	Landscape	Improve landscape value through well-designed coupes And appropriate silvicultural systems	<b>0</b> - Current plan identified Newtyle as not very prominent in the countryside.	As stated in current plan, Newtyle is not very prominent in the countryside and tends to blend in with the surrounding forested areas. The forest is seen from a number of single track roads only and due to the designation of much forest area within Newtyle to Continuous Cover forestry, clear fell scenarios can be ruled out for the majority of the forest block. Only the Southern part (Romach Hill), situated on higher ground is somewhat prominent in the landscape. However, only small parts of the actual hill can be seen from minor roads, due to the lay of the land and the layout of the roads in the area. At no time is the whole hill visible

# Newtyle Area Design Plan 2014-23

<b>Environment. Quality</b>	<b>Medium</b>	Cultural heritage	Maintain all designated scheduled ancient monument sites in accordance with management plans	<b>0</b> – no scheduled monuments	No need for management plan
			Continue to work with partners to safeguard/enhance /interpret features of cultural or historic interest	<b>3</b> - Several unscheduled sites of archaeological interest across the plan area have been identified for protection during forest operations	Adhering to the newest version of UKFS Forests and Historic Environment guidelines, the plan will aim to protect any heritage features within the planning area and preserve any landscape features. Upstanding features will be maintained as open ground with a buffer zone around them, and any trees growing on these features will be carefully removed and the roots treated to prevent regrowth. If anything new comes to light during forestry operations, the Aberdeenshire Archaeology service will be contacted.
<b>Biodiversity</b>	<b>High</b>	<b>Species &amp; Habitats</b>	Incorporate provisions for habitat networks	<b>0</b>	Manage riparian zones, natural reserves and moorland to maintain and improve existing habitat networks and take opportunities to extend the area where appropriate. Encourage broadleaved regeneration, augmented by planting where necessary.  Since 2002, permanent network areas have been identified and located along burn sites. Some burns have been opened up already (e.g. the Black Burn); however, there will continue to be a need for interlinking habitats through riparian restoration along other burns.
			Address the needs of priority species	<b>2</b> - The Institute of Terrestrial Ecology identified Newtyle within the core caper	Red squirrel as well as Goshawk, Crested Tit and Capercaillie are all priority species within the FDP area. The plan will aim to improve the

# Newtyle Area Design Plan 2014-23

			<p>by utilising prescriptions from habitat action plans and species action plans</p>	<p>area. Newtyle has supported the second largest Capercaillie population (lek) in Moray for many years. Current plan recommends a clearfell- strategy and a development of low density pinewoods in Newtyle to improve habitat for Capercaillie.</p> <p>Presumptions against any large scale fencing in the plan area.</p> <p><b>3</b> - Red Squirrels are well established in Newtyle and a the plan recommends to plan for a consistent conifer seed supply from a variety of conifer tree species</p>	<p>Red squirrel as well as Goshawk, Crested Tit and Capercaillie are all priority species within the FDP area. The plan will aim to improve the ecological condition and habitat quality for these species.</p> <p>Current FC policy for dealing with the current scale of DNB infections especially in the Northern districts is to fell heavily infected DNB stands of LP as soon as possible. The intent is to minimise the risk of infection to the surrounded uninfected (SP) pine crops on both NFE and private forest estates in the surrounding area.</p> <p>As result, the large portion of DNB-infected LP on top of Romach Hill should be removed within phase 1 of the new design plan, possibly extending slightly into phase 2. After consulting with Kenny Kortland, species ecologist with the FC, about the correct compromise/balance between disease issues and Caper, it was agreed that the removal of the DNB-infected LP stands takes priority, supported by the fact that the capercaillie population had declined to a very small size across the whole district (for reasons out with the FC's control). The remaining individuals will still have enough habitat, even with the DNB-infected LP stands gone.</p> <p>At the site meeting (March 28), a multiple strip clearfell approach was favoured, removing several approx.100m – wide strips of LP every year against the prevailing wind direction, connecting up with the already existing clearfell strips at the east side of the hill. Within these clearfell strips, 20-40% of SS will be left as seed trees. Another mitigation suggestion for capercaillie will be to leave some groups of felled LP trees as cover, since extensive areas of brash has appeared to have benefitted capercaillie.</p>
--	--	--	--	---	--

# Newtyle Area Design Plan 2014-23

					<p>The maintenance and increase of appropriate habitat needs to be addressed in the newly planned forest structure and composition. Coupes will be assessed for suitability re stocking with appropriate species, such as SP/NS for Red Squirrel or SP/Juniper for Capercaillie / Black Grouse. Additional suitable areas will be highlighted where appropriate.</p> <p>Measures will also include the planning of forest operations to minimise damage to BAP species populations, such as the location / protection of red squirrel dreys through survey work prior to felling operations.</p>
<b>Biodiversity</b>	<b>High</b>	Invasive Species	Restrict and eradicate invasive species	<b>0</b> – although not mentioned in current plan, some Rhododendron eradication work has been done approx. 5 years ago	There are no invasive plant species in this plan area that currently need eradication; however, this will have to be kept under review, since the neighbouring estate Altyre has a significant presence of Rhododendron, which will eventually lead to new encroachment into Newtyle. All Rhododendron, if detected in Newtyle, will be removed.
			Control grey squirrel	<b>0</b> – no grey squirrel in Newtyle	New plan to look into the need of an active control operation for the plan area, in order to slow down the spread of the species
<b>Biodiversity</b>	<b>High</b>	Ecosystems	Consider requirements of species & HAP	<b>2</b> - Current plan has carried out habitat creation and restoration of HAP species through the designation of CCF areas and open ground.	<p>New plan to continue management of existing CCF/LTR areas. Add suitable areas where appropriate. The removal of lodgepole pine at Romach hill will create opportunities for Caperceillie habitat improvement.</p> <p>New plan to highlight habitat creation along the burns, see Map 7.</p>

# Newtyle Area Design Plan 2014-23

			Deer management strategy	0	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.
<b>Biodiversity</b>	<b>High</b>	Designated sites	Manage designated sites in accordance with agreed management plans	0	The West side of the Newtyle Block is in the Burn of Mosset catchment which drains to Findhorn Bay. The East, including Loch Romach is drained by the Black Burn which forms part of the River Lossie catchment. Incorporate the information and recommendations contained in fisheries and catchment plans, like the North Highland Area Management Plan and the River Lossie Fisheries Management Plan.
			Manage PAWS in accordance with agreed plans	0	There are no PAWS areas within this plan
<b>Biodiversity</b>	<b>High</b>	Increasing awareness and improving knowledge	Interpretation, surveys, inspections, training opportunities	0	There are no plans to increase the amount of interpretation within this plan area

## 3.0 Background information

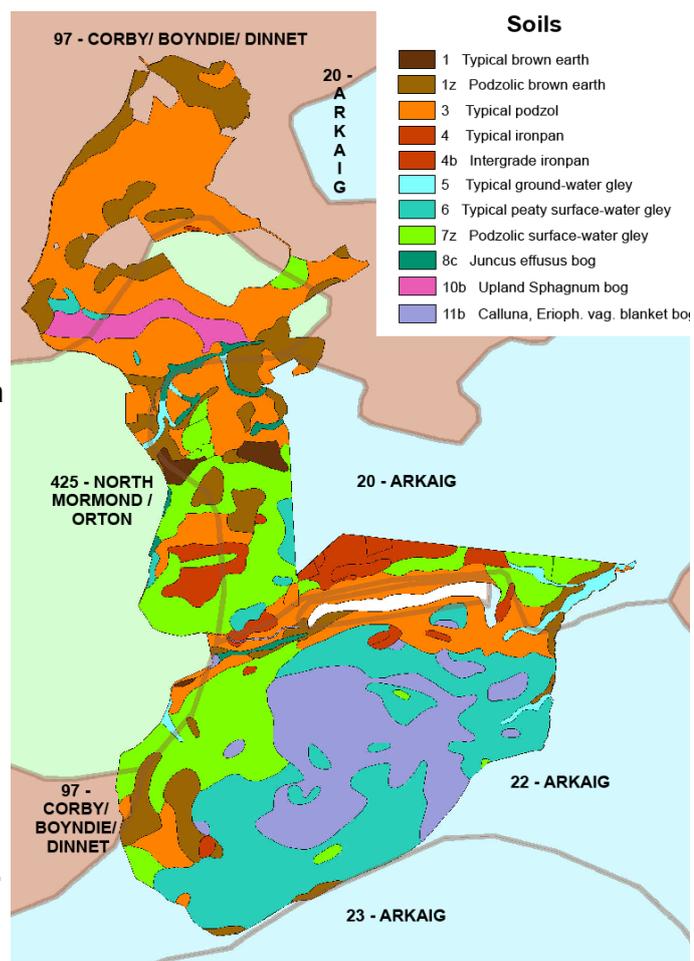
### 3.1 Physical site factors

Refer to Map 2: Key Features.

#### 3.1.1 Geology, Soils and Topography

**Geology** - Geology - According to the British Geological Survey, Geological Map of the UK, a small portion of the northern part of the Newtyle block is underlain by late Devonian sediments, assigned to the Stratheden Group. Mostly fluvial in origin, they consist of red sandstone and siltstone with some conglomerate. The bigger portion of Newtyle rests above sediments of the Dalradian Supergroup, consisting mainly of quartzofeldspathic psammite with locally occurring quartzite units. This gives rise to overlying soils that have a low level of nitrogen available.

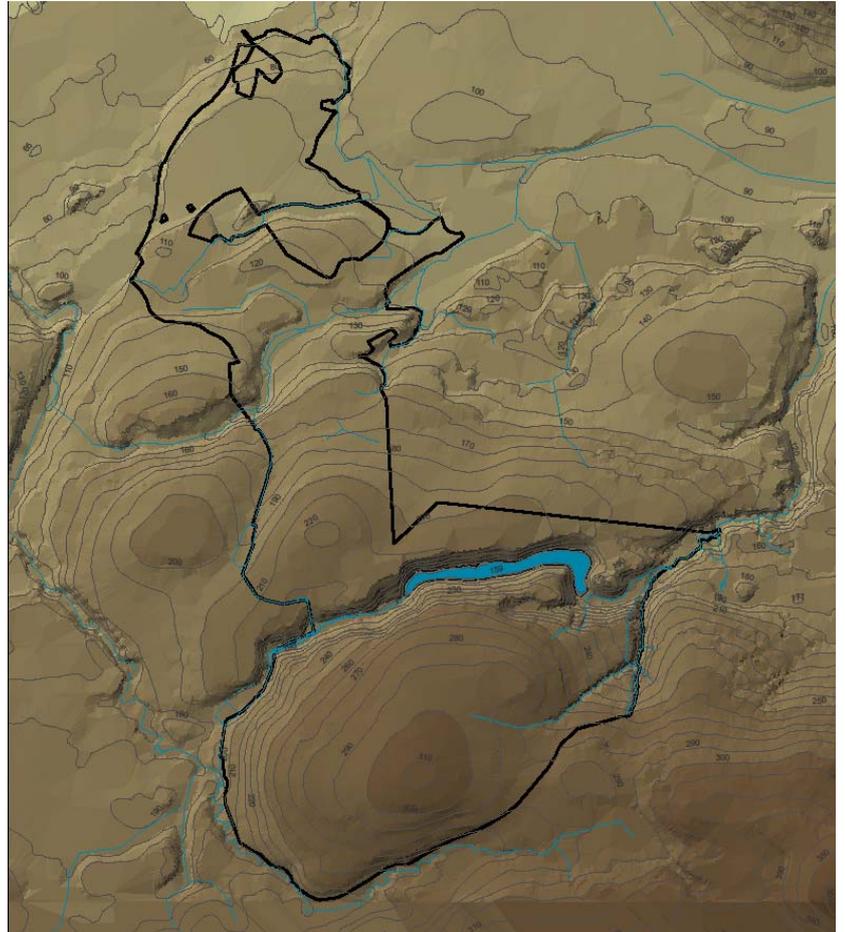
**Soils** – according to the Soil Survey of Scotland, most of the southern and central part of Newtyle is underlain with two soil units of the ARKAIG Association. Both units include predominantly wet soils (podzolic soil types and gleys), with a slightly higher percentage of drier soils in the central part of the block. The south and central eastern edges as well as parts of the northern section of the block are covered by the NORTH MORMOND / ORTON Association. The edges show fairly wet soils, whereas the northern part becomes drier with leading podzolic soils. The northern tip of Newtyle is underlain with the CORBY/BOYNDIE/DINNET Association, including dry soils (podzols and podzolic brown earth).



# Newtyle Area Design Plan 2014-23

---

**Topography** - The elevation of the design plan area runs from about 60 m in the north towards Rafford (light-brown) to approximately 310 meters on top of Romach Hill. Newtyle has all-round aspects.



## 3.1.2 Water

The West side of the Newtyle Block is in the Burn of Mosset catchment which drains to Findhorn Bay. The East, including Loch Romach is drained by the Black Burn which forms part of the River Lossie catchment.

The Romach Loch is the only body of water in the forest and is all the more significant as it is a public water supply. Management around the Loch has to be extremely sensitive to maintain both the water quality and “the spirit of place” which the Loch enjoys. There are a number of small watercourses running through the forest and some private water supplies which rise in the forest.

To protect these features the UKFS Forests and Water Guidelines will be followed during all operations and private owners consulted as appropriate.

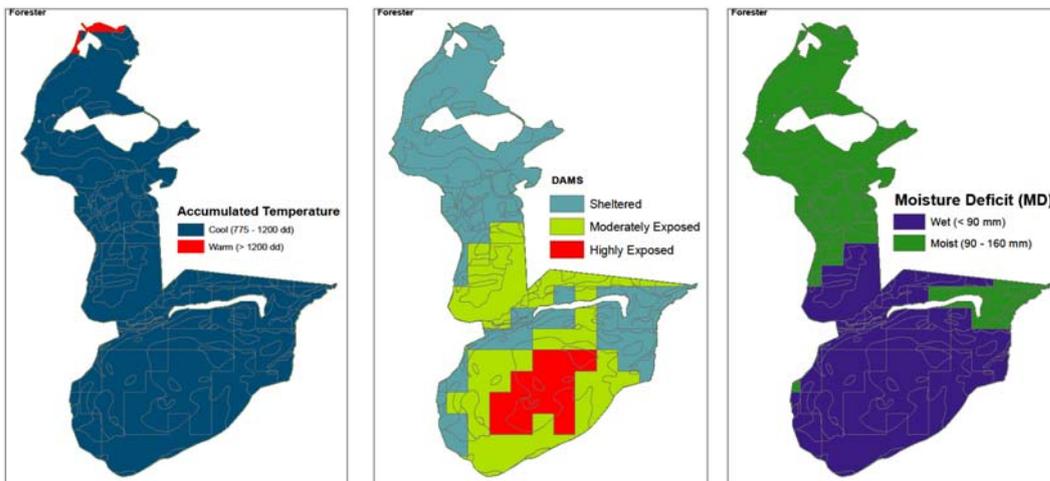
# Newtyle Area Design Plan 2014-23

## 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
Low ground	1133.4	13.0	108.0
High ground	959.9	15.7	70.0



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

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

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

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

# Newtyle Area Design Plan 2014-23

---

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

## 3.2 Biodiversity and environmental designations

There are currently no environmental designations in place over the Newtyle Forest block

There are several UK BAP (Biodiversity Action Plan) animal and birds species that either have been seen or are highly likely to be found in these woodlands. These woods will be managed assuming that these species are present and are discussed below:

**Red Squirrel** (also one of the six key species identified in the FCS Biodiversity Action Plan) are present in the woods and operational practice will be undertaken to benefit red squirrels. This will include planning forest operations to minimise damage to red squirrel dreys and populations, including survey work to locate dreys prior to felling operations and the planning of the forest structure and composition specifically to suit red squirrels. Pine-dominated stands are suitable habitat for Red Squirrel, and represent a very high conservation value, especially when they are relatively small isolated from other pine stands. The aim is to retain these isolated stands beyond normal rotation and to manage them by minimum intervention as long as current tree cover exists. Other suitable species such as Norway Spruce will be considered when site conditions are appropriate.

Newtyle lies in a core **Capercaillie** area, with the Romach Hill supporting one of the largest Capercaillie populations in Moray for many years. **Black Grouse and Crested Tit** have been recorded as well. Since all bird species are on the UKBAP list, the design plan will address the development of specific forest structures and compositions for their benefit, which will be specified further and applied to site-conditions in the work plan process. The main actions would seem to relate to ensuring conditions, especially field layer vegetation, remain suitable for Capercaillie or are enhanced. Black grouse and Capercaillie prefer a fine-scale mosaic of habitats, where relatively small areas of woodland, moorland and grassland/meadow meet. A good mitigation suggestion for Capercaillie will be to leave some groups of felled LP trees as cover, since extensive areas of brash has appeared to have benefitted capercaillie. Also, planting of clumps of denser restocks within the wider more open pine forest helps increase the amount of cover available to allow shelter from potential predation and from wet weather. Finally, thinning SP benefits the ground

# Newtyle Area Design Plan 2014-23

---

vegetation and allows blaeberry to grow. Crested Tits should benefit from the retention of large dead stumps within restock areas.

**Bats** – although no FCS records of bats (records in area according to North East Biological Record Centre) exist, it is assumed that there are potential bat roots. Where possible we will survey and retain these trees before felling. Additionally, veteran tress and deadwood (< 20 cm dbh) will be identified, and marked for retention during the work plan process (see FES guidance for deadwood, available on request)

**Specially protected raptors** - There are several raptors that nest in the woodlands. Where identified, theses nest sites and an area surrounding these nests will be retained so as to reduce the disturbance to these birds and the Forestry Commission Guidance note 32 will be followed during forest operations.

**Wildcats** - a general walk over survey will be undertaken as per “Forest operations and wildcats in Scotland” guidance note prior to any forest operations that could affect wildcats. As these woodlands border agricultural or moorland ground this is potentially good habitat

The district has undertaken open habitat surveys to aid in the management and understanding of these habitats. The survey maps can be viewed at the M&A office in Huntly.

There are no significant **UKBAP habitats** within the design plan. All currently open areas were visited with the conservation ranger responsible for this block. Many of these areas currently identified as open show various levels of regeneration (between approx. 10% and 40%<sup>m</sup>, mainly conifers). The decision was made that none of the open areas will be actively managed by the conservation team.

**Watercourses/Riparian zones** in west Newtyle are in the Burn of Mosset catchment which drains to Findhorn Bay. Findhorn Bay is a designated SSSI (Sites of Special Scientific Interest), SPA (Special Protection Areas) and RAMSAR site. Maintenance of water quality is therefore a priority, which will be managed through following the UKFS Forest & Water Guidelines and improvements to the riparian habitat to work towards creating more natural riparian woodland.

# Newtyle Area Design Plan 2014-23

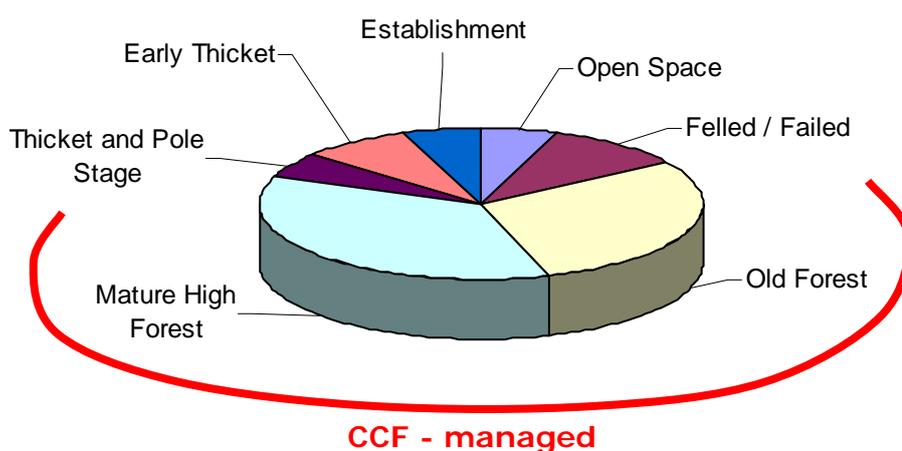
## 3.3 The existing forest

### 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 "old forest" make up the largest proportions, with almost two thirds of the design plan area, while there is very little in the other phases. This is mainly due to the CCF management approach in most of the forested area in Newtyle that leads to older mature trees with regeneration usually appearing only at the end of the rotation. This plan will still aim to increase the structural diversity through upcoming DNB clear fells which will help shift the age-class diversity for the next plan period from mature high forest more towards establishment phase.

Ages of Trees (years)	Successional Stage	Area/ha	%
0 - 10	Establishment	42.1	5.9
11 - 20	Early Thicket	57.7	8.1
21 - 40	Thicket & Pole Stage	37.7	5.3
41 - 60	Mature High Forest	257.2	35.9
61+	Old Forest	211.3	29.5
	Felled / Failed Areas	70.3	9.8
	Open Space	40.4	5.6



#### Species

# Newtyle Area Design Plan 2014-23

---

Scots Pine is currently the largest components of the forest area. The remainder is composed of Sitka Spruce, Lodgepole Pine and different types of Larch, with small percentages of other conifer species. Broadleaves are under-represented with less than 2.5 %, and an aim of this plan will be to increase the area of broadleaves, linking in with adjacent woodlands, and managing these wherever practical on a commercial basis.

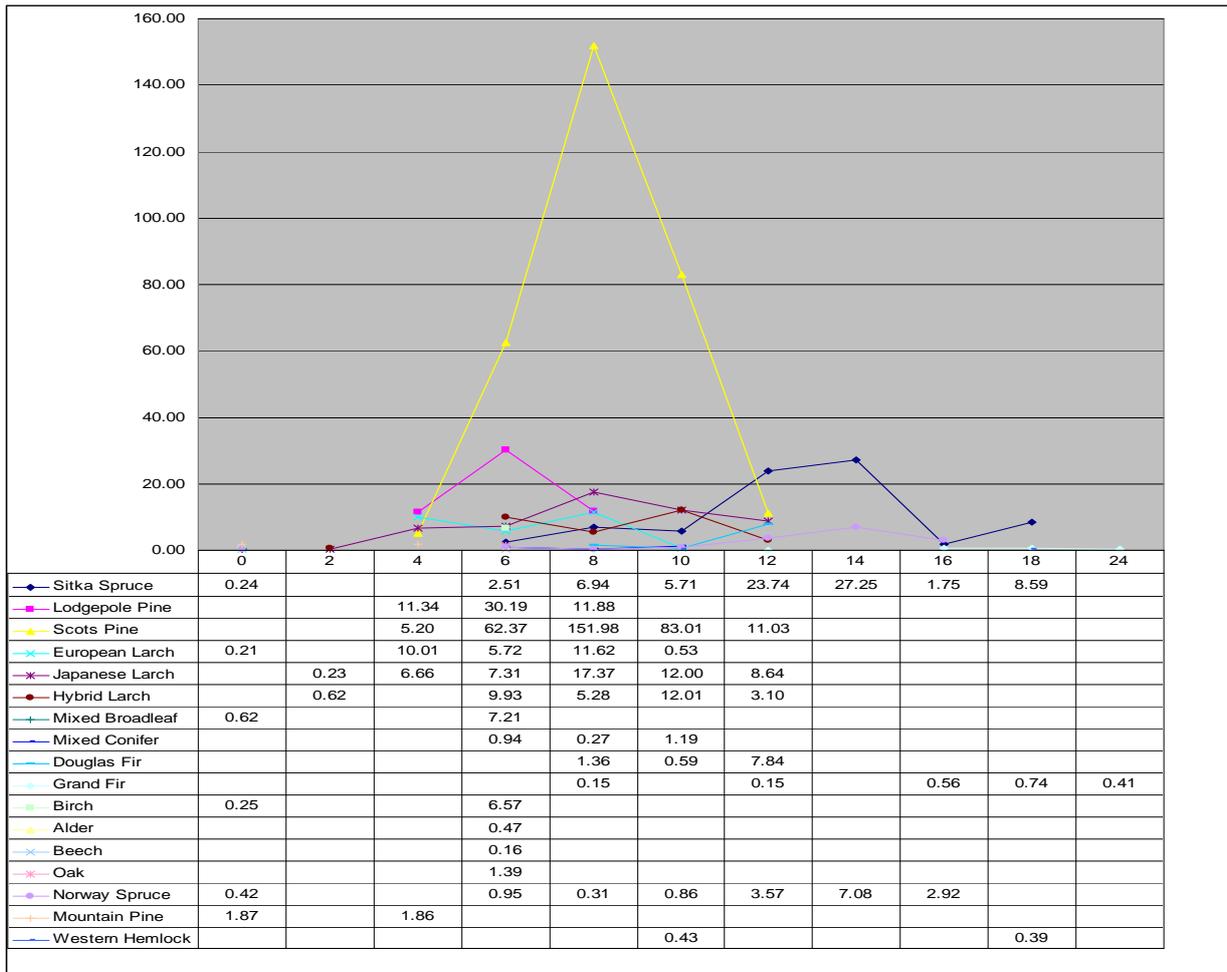
This lack of species diversity is due in most part to the poor and wet soil conditions, and thus the range of commercial species suited to the conditions is limited. Additionally, the majority of the southern and central part is being managed under CCF regime (group selection), which does not allow a more radical change in species composition, as clearfell scenarios would. In some of the regeneration groups in the southern block, however, a good proportion of the established new generation is birch. The aim of this plan will be to increase the species diversity (especially broadleaves), if conditions allow - associated with a substantial reduction in Lodgepole pine, due to the District's large-scale clear fell program of DNB infected stands.

Species	Area (ha)	Percentage %
Sitka Spruce	76.74	10.71
Japanese Larch	52.22	7.29
Scots Pine	313.59	43.76
Birch	6.82	0.95
Lodgepole Pine	53.41	7.45
Mixed Broadleaves	7.83	1.09
Norway Spruce	16.10	2.25
Douglas Fir	9.79	1.37
Hybrid Larch	30.94	4.32
European Larch	28.09	3.92
Beech	0.16	0.02
Mixed Conifers	2.41	0.34
Grand Fir	2.01	0.28
Alder	0.47	0.07
Oak	1.39	0.19
Mountain Pine	3.74	0.52
Western Hemlock	0.82	0.11
Non-Forested	110.07	15.36

# Newtyle Area Design Plan 2014-23

## Yield Class

The yield classes for the species vary, as would be expected, across such a large area with a number of soil types, but there are few crops with yield classes greater than 14. This is mainly due to the poor soil conditions. The average yield class is about 8. The average yield class of Scots Pine, the dominant species, is about 8, thus average at best.



### 3.3.2 Access

Access both to and within much of the design plan area is good. The B9010 runs close by the design plan area, is an agreed transport route\* and is connected to the forest blocks through minor roads. The forest road network is in well maintained and in place. Consequently, no major upgrading necessary. One forwarder track on the east side of the Romach Hill might have to be put in place to provide an extraction route.

\* <http://www.timbertransportforum.org.uk>

# Newtyle Area Design Plan 2014-23

---

## 3.3.3 LISS potential (see Map 5)

ATC and the UKWAS term LISS are synonyms and basically conglomeration of approaches that cover several distinct and diverse silvicultural approaches. These range from minimum intervention to small coupe felling (up to 2 hectares in size). Therefore, by definition, forest canopy is not maintained at one or more levels in *all* these systems. The strip clearfells proposed for some areas of the forest block in this plan are a typical example of LISS/ATC.

This is distinct from **Continuous Cover Forestry (CCF)**. One key principle in CCF is to maintain some element of canopy cover without clear-felling (smaller than 0.25 ha) at all times. Consequently, silvicultural systems appropriate for CCF are **only a subset of LISS/ATC**. Selection and shelterwood systems (as identified for the majority of the plan area) fall under this category.

The main species designated under LISS in Newtyle are Scots pine and Larch. It will be one task of the new plan to look and extend CCF designations into other areas and alternative species where suitable soil conditions and crops allow.

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

## 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, <b>Fuelwood</b>	40%
Fencing	Posts & rails	15%
Short log	Pallets & slats	25%
Log	Construction	20%

Most of this production is sold into markets in the north east of Scotland, with very little travelling more than 50 miles to the processing facility. The

# Newtyle Area Design Plan 2014-23

---

exception to this is the short pine and spruce roundwood which usually are exported. Roundwood of other species goes to either Cowie or Dalcross.

An increasing proportion of mainly roundwood material has gone into the local fuelwood market (approx. 10-15%), and this upward trend will likely to continue. The production of hardwood will likely to increase in the long term as well. Despite the increase, both these markets will be of a very limited scale and will have only minor impacts on the current product percentage breakdown.

## 3.4 Landscape and Land Use

### 3.4.1 Landscape character and value

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

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

The design plan area is covered by Scottish Natural Heritage Landscape Character Assessment No101 Moray and Nairn landscape assessment, produced in 1996 by Scottish Natural Heritage.

The northern part of Newtyle (approx. 2/3 of the block) is in the "Rolling Farmlands and Forests" Landscape Character Type. It has a complex landform of gently rolling hills, and broad and narrow incised valleys which are often contained and divided by smooth stepped ridges. The gently, often enclosed landscape has a visual balance of open farmland and predominantly coniferous woodlands, with native woodlands and scrub often bounding small, irregular undulating fields. The mix of native and coniferous woodlands, often edged by scrub and dotted with small irregularly shaped rolling pastures, creates a colourful and diverse landscape, this diversity being accentuated by the many traditional buildings, often partially set within woodland backdrops.

# Newtyle Area Design Plan 2014-23

---

The southern part is in the "Upland Farmland" Landscape Character Type and consists of some contracting topography (Romach Hill). The landform comprises broad, gently undulating slopes rising in close proximity to the coast. Simple vegetation patterns prevail, and the woodlands are usually less integrated with farmlands, forming large scale coniferous plantations of uniform height.

## 3.4.2 Visibility

Newtyle is not very prominent in the countryside and tends to blend in with the surrounding forested areas. The forest is seen from a number of single track roads only and due to the designation of much forest area within Newtyle to Continuous Cover forestry, clear fell scenarios can be ruled out for the majority of the forest block. Only the Southern part (Romach Hill), situated on higher ground is somewhat prominent in the landscape. However, only small parts of the actual hill can be seen from minor roads, due to the lay of the land and the layout of the roads in the area. At no time is the whole hill visible.

## 3.4.3 Neighbouring land use

Land use around the woodlands in the plan area is predominantly agricultural. There are also some large areas of private woodland surrounding Newtyle (Altyre).

## 3.5 Social factors

### 3.5.1 Recreation

There are no formal recreation facilities, but a network of informal trails within most of the woodlands. These routes are mainly used by local dog walkers and horse riders, people that know the area and do not need way-marking to find their way around.

There is space for a car park at the entrance to some of the woods but nothing on a formal basis. There are no plans to establish any car parking facilities and we welcome the continued use of the woods in the design plan area for informal recreation.

### 3.5.2 Community

Apart from the small village of Rafford, there are no distinct settlement areas close to the woodlands in this plan. Communities are made up of scattered homes and farms rather than specific villages. As a result, the forest does not have a strong community usage.

## 3.5.3 Heritage

There are also a large number of non-scheduled monuments across the plan area that have been located and recorded. Details are held by the district and will be added to the work plan system when appropriate. The non-scheduled monuments will be managed according to the newest edition of the UKFS Forests and Historic Environment guidelines.

## 3.6 Statutory requirements and key external policies

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

### Biodiversity

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

### Climate Change

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

### Historic Environment

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

### Forests & People

- Control of Substances Hazardous to Health Regulations 2002
- Employers Liability (Compulsory Insurance) Act 1969
- Equality Act 2010
- Health and Safety at Work Act 1974

- Management of Health and Safety at Work Regulations 1999
- Occupiers' Liability (Scotland) Act 1960
- Provision and Use of Work Equipment Regulations 1998
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995
- The Highways Act 1980

## Soils

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

## 3.7 Pathogens and diseases

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

A major fungal pathogen affecting the woods within Moray & Aberdeenshire forest district is *Dothistroma Needle Blight*. This is an economically very important disease affecting a number of coniferous trees, in particular pines. 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 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

## Newtyle Area Design Plan 2014-23

---

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. As a result, the large area of DNB infected LP on top of Romach Hill will be removed within phase 1 (possibly extending into phase 2) using a multiple strip clearcut approach against the prevailing wind direction. Within these clearfell strips, healthy mature SS will be left as seed trees. This was agreed on at the site meeting on March 28, 2013 between forest operations, conservation, and Kenny Cortland (species ecologist).

The healthy mature LP stand in the northern part of Newtyle (on drained Upland Sphagnum Bog) shows exceptional quality and should be maintained as an example of successful establishment and high yield performance.

## 4.0 Analysis and Concept

Refer to Map 4: Analysis and concept.

Theme	Issue	Analysis	Concept
Climate change	Renewable energy	<p>Few areas of broadleaves within the block</p> <p>DNB-infected LP stands will be removed within the next five years</p>	<p>Continue opening up water courses and use these riparian zones to plant areas of appropriate native broadleaves</p> <p>The removal of RBNB infected LP will produce woodfuel in fairly large quantities</p>
Climate change	Adapting to climate Change	<p>The northern and central areas have been managed under Continuous-Cover-Forestry silviculture systems, extending the rotation, creating structural diversity, but also shifting the structural diversity more towards old and mature forest.</p>	<p>Develop site descriptions for CCF areas and implement monitoring protocols to measure and encourage natural regeneration establishment.</p> <p>Increase the area managed under CCF or LTR to minimise impact and increase rotation lengths.</p> <p>Manage identified areas to maintain or create a habitat that requires little or no further intervention.</p>
Timber	Timber supply	<p>The district's DNB amendment will dictate the identification of DNB-infected clearfell areas for phase 1.</p>	<p>Following on from clearfelling, select and plant species more appropriate to the site conditions to maintain the overall</p>

# Newtyle Area Design Plan 2014-23

			productivity of the area.
Timber	Timber quality	The ground condition in this plan area allows thinning to be undertaken across most of the area (except very wet and steep sites).	Undertake thinning to improve timber quality wherever possible with subsequent conversion to CCF systems if appropriate.
Community development	Community engagement	There is currently a very low level of community involvement within the plan area.	Continue current level of involvement with the various user communities to maintain their interest in the area.
Access & health	Recreation	There is currently little formal provision of formal recreation facilities, but informal access is widely taken across the plan area.	Maintain the provision of recreation facilities at its current level and standard.
Environmental quality	Soil, water & air quality	Some of the soils have a poor nutrient regime and their structure is liable to damage and subsequent erosion.	Plan management regimes and operations to minimise inputs and maintain productivity on these soils.
Environmental quality	Landscape	The plan area provides a positive contribution to the local landscape.	Opportunity for long-term retention and the use of alternative systems to clearfell will be identified to increase landscape value.
Biodiversity	Species & habitats	A number of priority species (Capercaillie, Goshawk and Crested Tit and Red Squirrel, are present across the plan area.	Plan management regimes and operations to improve the ecological value of the plan area for the identified priority species)

## 5.0 Forest Design Plan Proposals

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

### 5.1 Management

Refer to Map 5: Management.

#### **Thinning**

Wherever possible the district will continue to maximise the area managed through thinning and utilise the staff and 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 Newtyle this means that much of the area can be thinned in order to improve timber quality. It is assumed that the only commercial areas, which will not be thinned, are those with stability or terrain issues (e.g. Romach Slopes). All the blocks are split into thinning coupes, which will be worked on a 7-year cycle. This may vary in Continuous Cover areas and details of these will be in the coupe prescriptions. See Map 6 – Thinning.

Where Lodgepole pine occurs in mixtures with other crops it will be targeted for removal during thinning operations.

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

#### **Low Impact Silvicultural Systems (LISS)**

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

Clearfelling is defined as the cutting-down of all trees on an area of more than 2.0ha. LISS is defined as the use of silvicultural systems that don't create clearfells more than 2 hectares in size (e.g. small strip-clearfells). 'Continuous

# Newtyle Area Design Plan 2014-23

---

cover' is defined as the use of silvicultural systems whereby the forest canopy is maintained at one or more levels, which means that "holes" in the canopy should not exceed 0.25 ha.

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

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

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

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

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

LISS has been the main silvicultural approach used in Newtyle for two decades, and will continue to play a major role in managing the majority of the commercial forest stands.

## **Clearfell**

As stated above the main silvicultural system employed in British forestry is 'patch' clear-felling followed by planting or occasionally natural regeneration. There will be areas of woodland in the plan stocked with fast growing conifers on soils which are not stable enough for continuous cover systems. In order that the timber in these areas is harvested before the onset of windblow, clearfell will remain an appropriate silvicultural system.

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

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

Clearfell will not be the main silvicultural system employed in Newtyle. Clearfells will be used only in areas that demand a quick management response to current disease threats such as the DNB diseased LP stands on top of the Romach Hill, sites too wet and/or too steep for (regular) thinning, and other sites that are suitable and are therefore scheduled for a complete change in species composition due to existing conditions, such as areas with brown earth and podzolic brown earth soils that will be transformed into commercial broadleaved stands. The scale of clearfells will be in keeping with the scale and topography of the local landscape. See "3.4.1 Landscape character and value" above for landscape justification.

## 5.2 Future Habitats and Species

Refer to Map 7: Future habitats and species.

### Restocking

Species choice in the design plan area is principally guided by production, as the main priority for these woodlands is production of a sustainable timber crop. This does not preclude the needs of biodiversity or landscape. The impact of Dothistroma Needle Blight (**DNB**) will also have to be taken into account. This plan will act as a guide for species choice, based on soil, climate and other data, however the operational foresters will make the final decision based on the characteristics of individual sites. Where this may result in a major change from the plan, consultation with the appropriate staff and external bodies will be instigated before a final decision is made.

In this particular plan the occurrence of DNB will have an impact on species choice in some areas. In light of advice from Forest Research the Forest Enterprise Management Board has placed an ongoing moratorium on the planting of pure stands of Lodgepole pine (interior and coastal) on areas which have been infected. The Alaskan provenance of Lodgepole Pine is approved for planting, but it is the District's decision not to use Alaskan Lodgepole Pine for the time being. Similarly, the District has decided - although the moratorium on planting Scots Pine in infected areas within the immediate vicinity (500 metre zone) has been lifted for the whole district - to plant Scots Pine only on specific infected sites within the 500 metre zone (reasons being inappropriate site conditions for other species, historically always a pine-site etc...). This decision of taking a cautious approach to re-plant pine in former infected DNB-areas has been made due to the fact that the impact of DNB on Scots Pine hasn't been clearly determined yet, and natural regeneration on young Scots pine trees show symptoms of the disease in some areas. The main species for restock in the DNB-infected areas in Newtyle will be Sitka spruce, Larch species, broadleaf species, and trial plantations of European Fir, mixed with Western Red Cedar.

In common with the majority of Forest Enterprise Scotland estate, most restocking in the design plan area has traditionally taken place within two years of sites being clearfelled. However, many seedlings were badly damaged or killed by an endemic forest pest known as the Large Pine Weevil, *Hylobius abietis*. 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

# Newtyle Area Design Plan 2014-23

---

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

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

## **Broadleaves**

The district will strive for a significant increase of broadleaf plantations on suitable sites within the planning period for reasons of diversity, which has become a major objective in the design of new plans.

Most of these broadleaf woodlands will be managed as commercial productive woodlands where the site and access are appropriate and this does not compromise other objectives set for the area, such as Capercaillie (fencing will be avoided in core Capercaillie areas, and the broadleaf plantations require fences)

Commercial management will range from the production of birch, alder, willow, and/or aspen on wet sites for fuel wood (and quality timber, if possible), to the production of high quality timber of mountain ash and other broadleaf species on drier and nutrient-richer sites. Therefore restocking will be undertaken, or regeneration will be managed to achieve a spacing that will allow a commercial approach. This will usually be 5,000 – 8,000 stems per hectare if quality timber is the objective, otherwise an average stocking of 2500 stems per hectare across 50% of the area will be acceptable.

Thinning will be carried out as appropriate for the crop and the final objective.

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

## **Non Commercial Areas (see Map 5, called “Open Areas”)**

Areas not considered for commercial management will include permanent woodland, riparian areas and managed open habitats.

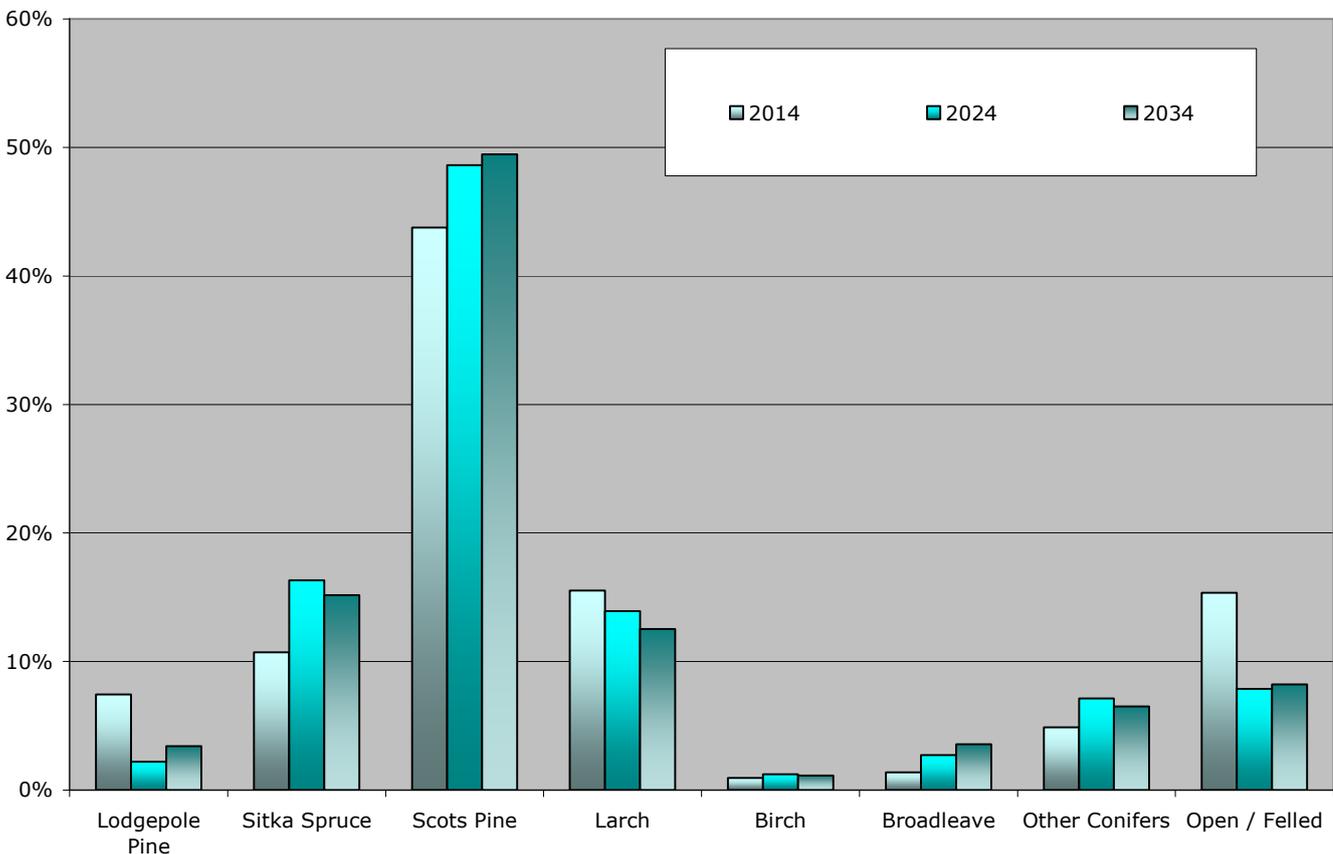
# Newtyle Area Design Plan 2014-23

Permanent woodland and riparian areas will require monitoring to ensure it is delivering the required objectives. Non-desirable species, such as non-native conifer regeneration, may require removal.

Areas designated as permanent open space may require management to maintain their integrity and value. Areas for open space have been chosen so as to provide the maximum biological benefit (see 5.6).

## 5.3 Species tables

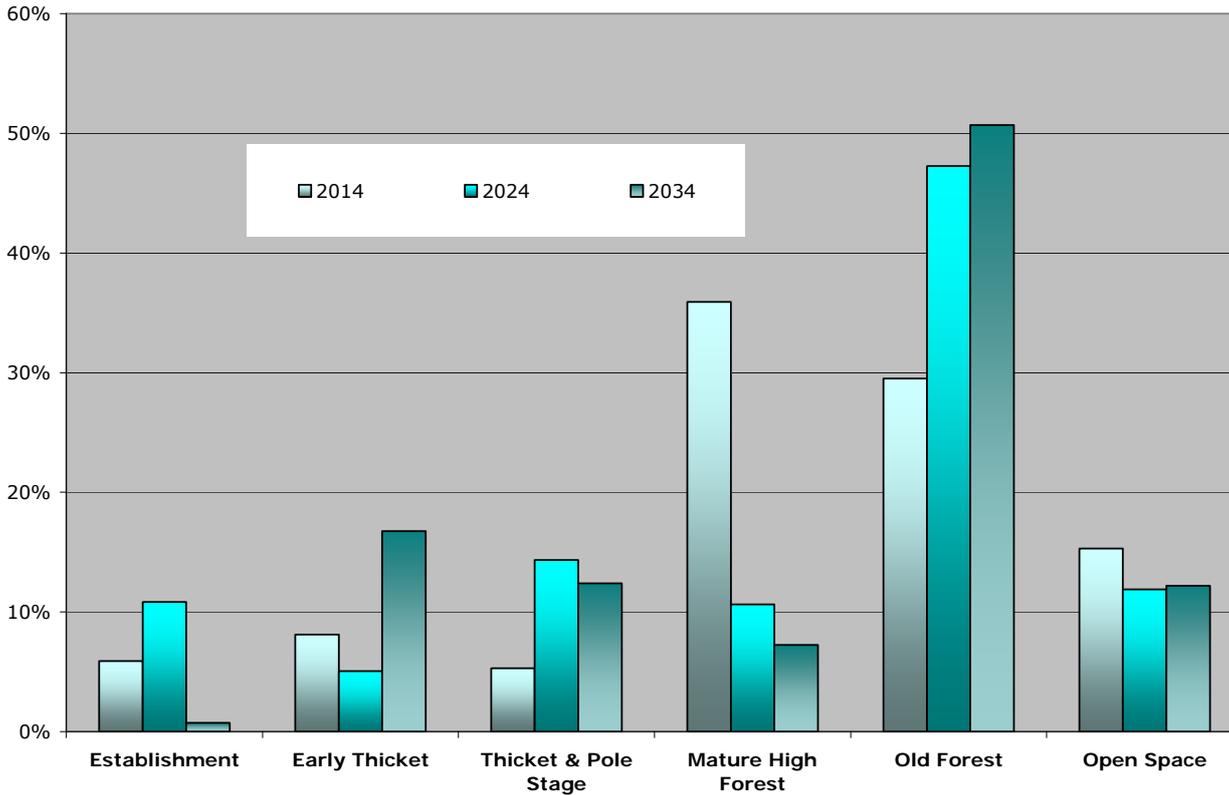
Species	Current species	Projected species 2024	Projected species 2034
Lodgepole Pine	7.45%	2.21%	3.41%
Sitka Spruce	10.71%	16.31%	15.17%
Scots Pine	43.76%	48.62%	49.47%
Larch	15.53%	13.93%	12.53%
Birch	0.95%	1.22%	1.13%
Broadleaves	1.37%	2.71%	3.56%
Other Conifers	4.87%	7.11%	6.50%
Open/ Felled	15.36%	7.87%	8.20%



# Newtyle Area Design Plan 2014-23

## 5.4 Age Structure

Age of Trees (years)	Succession Stage	Current Distribution 2014	Projected Distribution 2024	Projected Distribution 2034
0 -10	Establishment	5.9%	10.83%	0.73%
11 - 20	Early Thicket	8.1%	5.05%	16.76%
21 - 40	Thicket & Pole Stage	5.3%	14.33%	12.39%
41 - 60	Mature High Forest	35.9%	10.63%	7.23%
61+	Old Forest	29.5%	47.27%	50.70%
n/a	Open space	15.4%	35.40%	38.36%



## 5.5 PAWS restoration

There are no PAWS in this design plan area.

## 5.6 Management of open land

There are no areas designated as permanent open space within the plan area. As a result, all currently open ground will eventually fill in with regeneration and become part of the surrounding woodland. Open habitat will likely be created with the establishment of many broadleaf areas. In order to guarantee survival, they will have to get fenced. Fence lines will be laid out following the lay of the land, thus providing ample opportunity of corners and niches not being planted. Subsequently, there will also be a network of transitional open space between the felling and establishment operations. These will provide suitable habitat for several species.

## 5.7 Deer management

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

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

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

It is therefore FCS deer policy to;

- Prevent adverse deer impacts on commercial tree crops and the wider habitat. In doing so to carry out deer culling in an exemplary and humane way.
- Work closely with relevant organisations and neighbours to make sure that there are integrated deer management plans which seek to recognise the interests of all parties.
- Take opportunities to optimise income from venison from sporting where this does not conflict with our primary objective of maintaining deer impacts at an acceptable level, in line with Quality Meat Scotland accreditation in the form of The Scottish Quality Wild Venison (SQWV) Assurance Scheme

# Newtyle Area Design Plan 2014-23

---

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

All deer management will be carried out in accordance with OGB 5 - Deer management. The aim is to manage deer density safely and humanely at a level which is consistent with acceptable impacts on forests and other habitats. This is likely to be at a density level of 5 to 7 deer per 100 hectares.

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

## 5.8 Access

There are no access issues that need to be addressed in the period of this plan (see 3.3.2).

## 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.

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

Dothistroma Needle Blight 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

# Newtyle Area Design Plan 2014-23

---

mortality within the stand. The levels of mortality is the key concern as once dead the integrity of the tree quickly deteriorates to a state where it can not successfully be harvested. Categorisation of infected crop will allow us to prioritise the harvesting of such areas.

The following scale and categorisation has been agreed upon:

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

From this the priorities for felling are as follows:

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

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

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

This has 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.

## 5.10 Critical Success Factors

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

## Appendix 1 – Consultation record

Consultee	Date of contact	Response Received	Issues Raised	Forest District Response to Issues
<b>Statutory Consultees</b>				
Aberdeenshire Council Archaeology Service Caroline Palmer	15/02/2013	22/03/2013	Please find attached details of archaeological sites recorded on the SMR within the Newtyle Forest area. Not all will raise significant management issues; the main principle is to adhere to the UKFS Forests and Historic Environment guidelines (2011).	Addressed in text, 3.5.3
Moray Council	15/02/2013	22/03/2013	I have passed to my colleague Jane Clark, e-mail jane.clark@moray.gov.uk.	
Scottish Environmental Protection Agency (SEPA) Henderson Graeme	15/02/2013	12/06/2013	<p>The forest in question straddles two waterbodies in addition to a number of non-classified streams and ditches. The waterbodies (Burn of Mosset and Black Burn) are both classed at Moderate status, with hydromorphology causing the downgrade. We would therefore welcome any actions which would improve this e.g. introducing a natural riparian corridor and allowing the burns room for natural morphological process (channel movements etc.). Water quality is currently High and we would expect this to be maintained through good practice i.e. adherence to the Forest and Water guidelines.</p> <p>The West side of the site is in the Burn of Mosset catchment which drains to Findhorn Bay. The East,</p>	<p>Burns will be opened up over the period of the plan by selectively removing conifers, allowing development of native riparian plant communities</p> <p>The newest version of the Forest &amp; Water guidelines will be followed.</p> <p>Addressed in the plan.</p>

## Newtyle Area Design Plan 2014-23

---

		<p>including Loch Romach is drained by the Black Burn, which forms part of the River Lossie catchment.</p> <p>The CAR Practical guide has been updated to reflect changes in the legislation, this has led to some changes in the General Binding Rules, please ensure any operator is aware of these changes. The current version is 6.2 May 2013 and is available here:</p> <p>EPA have recently introduced guidance on forestry operations and compliance with Waste Management regulation.</p>	<p>Road Engineering unit has been aware of the newest version of CAR.</p> <p>Guidance has been passed on to operation team. However, all felling scenarios will be approved by the Forestry Commission (no windfarm or hydroscheme proposal for the plan area), so the guidance will not have to be applied. Should such developments be approved in the future, the guidelines will be in place.</p>
--	--	--	---

## Newtyle Area Design Plan 2014-23

<p>Scottish Natural Heritage (SNH) Jonathan Agnew</p>	<p>15/02/2013</p>	<p>20/02/2013</p>	<p><b>SNH advice</b></p> <p><u>Protected species</u></p> <p>The Newtyle forest is know to support a capercaillie population including lek sites. Capercaillie and their leks are protected under Scottish and EU legislation and the species is a UK Biodiversity Action Plan Priority Species and is on the Scottish Biodiversity List. Such protection is warranted because the capercaillie is currently at risk of extinction due to suffering a rapid population decline, so it is important to maintain suitable habitat where this is possible. For advice on how to best support the continued use of the forest by capercaillie, Timothy Poole the capercaillie project officer can be contacted at <a href="mailto:timothy.poole@rspb.org.uk">timothy.poole@rspb.org.uk</a></p> <p><u>Access</u></p> <p>The forest is well used by members of the public for recreational purposes. In addition to this, the Dava Way runs along the north-western edge of the block. We would encourage you to manage the forest in such a way to maintain access and facilitate recreational use.</p>	<p>Section on UK BAP species included in plan.</p> <p>Management of Capercaillie is a focus in the Newtyle plan, guidelines developed with the help of Kenny Kortland, FES Species Ecologist.</p> <p>Section on recreation included in plan</p>
---	-------------------	-------------------	---	---

## Newtyle Area Design Plan 2014-23

Non Governmental Organisations				
Royal Society for Protection of Birds (RSPB) Ian Francis	15/02/2013	20/02/2013	<p>The three main birds of conservation interest here are Capercaillie, Goshawk and Crested Tit. With regard to the former, we understand that there was one recorded last spring and that two cock carcasses were found, possibly predated by Goshawks. Crested Tits are undoubtedly still present at low densities, especially in Romach Hill.</p> <p>The main actions would seem to relate to ensuring conditions, especially field layer vegetation, remain suitable for Capercaillie or are enhanced. It may be worth exploring how patches of cover could be created, perhaps using localised piling of felled trees or brash, and planting of clumps of denser restocks within the wider more open pine forest, to increase the amount of cover available to allow shelter by Capercaillie from potential predation (and from wet weather). You are probably aware of the exact locations of the Goshawks, as well as the Capercaillie, from various staff including Al Young.</p> <p>Crested Tits should benefit from the retention of large dead stumps within restock areas.</p> <p>Otherwise, we have no other comments to offer about this forest.</p>	Principles incorporated into plan
<b>Other organisations/individuals</b>			To be completed	

# Newtyle Area Design Plan 2014-23

## Appendix 2 – Tolerance table

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

# Newtyle Area Design Plan 2014-23

## Appendix 3 – LISS prescriptions

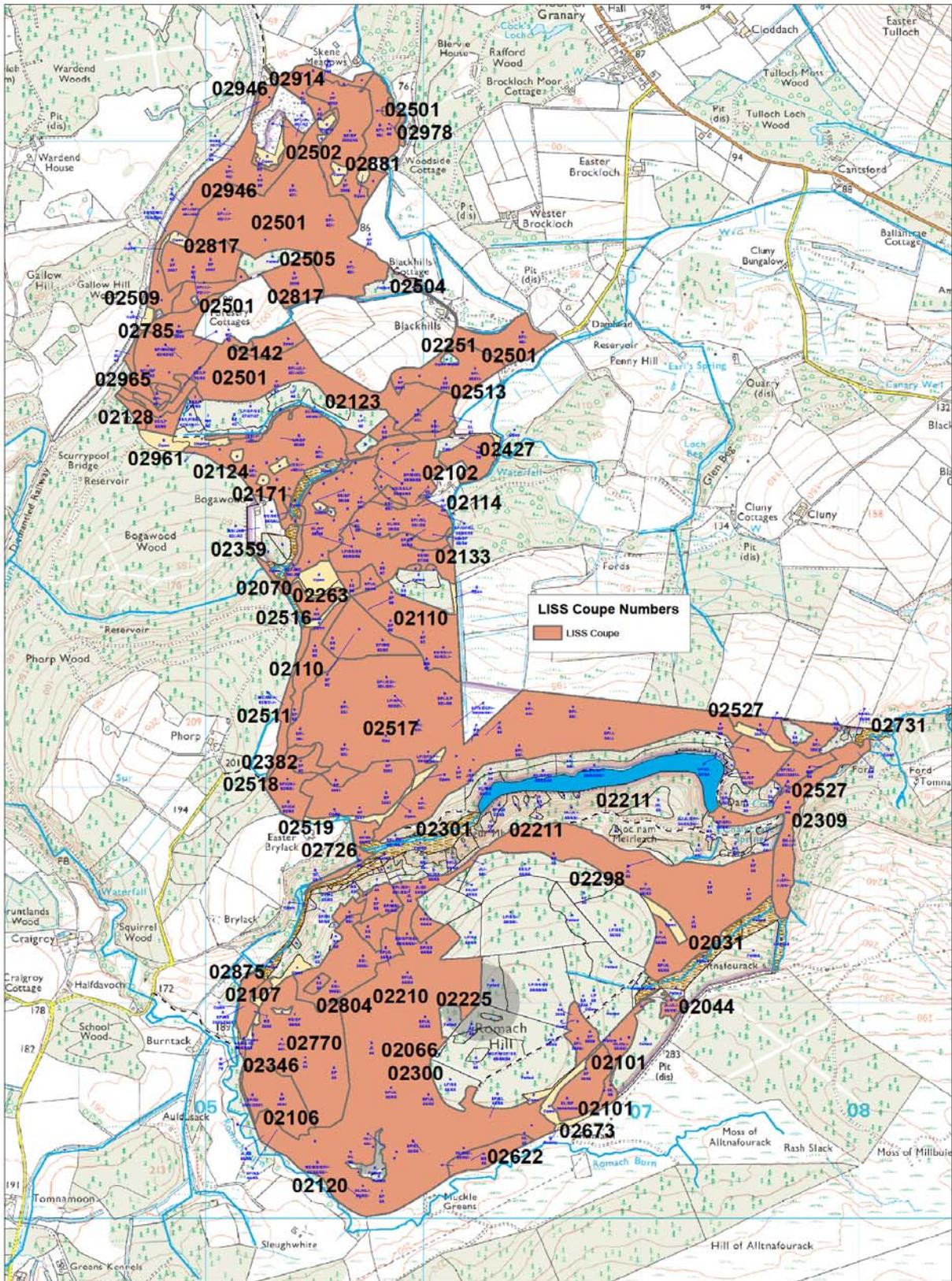
Coupe no. (See map 1 below)	Management objective/Reason for selection	Long-term structure* and desirable species	Age Trans. period and return time (years)	Regeneration and ground flora	Observations (e.g. likely barriers to achieving objective)	Next treatment required**	Proposed monitoring	Other useful information
02946 02914 02785	Landscape & backdrop for recreation. Mixed stand of predominantly SP with Larch, SS, GF, DF and MB (mainly Birch).	Simple. 70% 7 & 30% MB	Mixed age (20 – 75 years) 100 10	In some groups good birch and pine regeneration In the other parts regeneration is sparse due to current light levels.	Deer browsing & weed competition.	Crown thin to MT.	Thinning control. Open up gradually around successfully regenerated groups. Birch regen in the groups will assist in increasing the broad-leaf element. At the final transformation stage consider underplanting of additional broadleaf trees.	See appendix 5 LISS management, section 3 (transformation in older (>40yrs) stands).
02502	Landscape & backdrop for recreation. Mixed stand of predominantly SP and DF.	Simple 50% SP 50% DF	Mostly 8 years old (some 70 year-old SP) 100 10	Young plantation	Deer browsing & weed competition.	Crown thin to MT.	Thinning control.	See appendix 5 LISS management, section 3 (transformation in older (<40yrs) stands).
02501	Landscape &	Simple	Approx.	In some groups	Deer browsing &	Crown thin to	Thinning control.	See appendix 5 -

# Newtyle Area Design Plan 2014-23

02124 02517	backdrop for recreation. Mixed stand of predominantly SP and Birch in regeneration groups.	70% Sp 30% MB	70 years 100 10	good birch and pine regeneration In the other parts regeneration is sparse due to current light levels.	weed competition.	MT.	Open up gradually around successfully regenerated groups.  Birch regen in the groups will assist in increasing the broad-leaf element. At the final transformation stage consider underplanting of additional broadleaf trees.	LISS management - Section 3. Transformation in older (>40yrs) stands
02817	Landscape & backdrop for recreation. Young stand of SP	Simple 70% Sp 30% MB	6 - 7 years old 100 10	Young plantation	Deer browsing & weed competition.	Crown thin to MT.	Thinning control.	See appendix 5 LISS management, section 3 (transformation in younger (<40yrs) stands).
02513 02513 02128 02122 02228	Landscape & backdrop for recreation. Young stand of SP, SS and some	Simple. Different components and percentages of mixed conifers and mixed broadleaf.	13-20 years old 100 10	Young plantations	Deer browsing & weed competition.	Crown thin to MT.	Thinning control.	See appendix 5 LISS management, section 3 (transformation in younger (<40yrs) stands).
02471 02102 02427 02717	Landscape & backdrop for recreation. Young and old mix	Complex 50% MB 50 % MC	20-75 years old 50-100 10	Mosaic of old and young stands. Ground flora sparse due to current light levels	Deer browsing & weed competition.	Strip clearfell	At the final trans-formation stage consider (under) planting of additional broadleaf trees.	See appendix 5 LISS management, section 3 (transformation in older (>40yrs) stands).
02114 02171 02112	Landscape & backdrop for recreation. Open, old mixed stand of SS, SP, EL	Complex 70% MC 30 % MB	75 years old 50 10	Some regeneration; ground flora relatively well developed in	Deer browsing & weed competition.	Strip clearfell	At the final trans-formation stage consider (under) planting of additional broadleaf trees.	See appendix 5 LISS management, section 3 (transformation in older (>40yrs) stands).

# Newtyle Area Design Plan 2014-23

				places due to open canopy structure				
02133 02110	Landscape & backdrop for recreation. Open, mixed stand of SS and SP	Simple 60% MC 40% Birch	19- 27 years old 50 10	Young plantation	Deer browsing & weed competition	Crown thin to MT.	Thinning control Birch regen will assist in increasing the broadleaf element. At the final transformation stage consider under-planting of additional broadleaf trees.	See appendix 5 LISS management, section 3 (transformation in younger (<40yrs) stands).
02210	Landscape & backdrop for recreation. Open, mixed stand of SS and SP	Simple 80% SP 20% Birch	Approx. 60 years old 50 10	Regeneration is sparse due to current light levels.	Deer browsing & weed competition; water levels in some places	In drier places crown thin to MT. In wetter places skip one or two thinning cycles to have enough brush available for machinery. Alternatively, don't thin in wetter places at all, and schedule for strip-clearfells in the later stages of the rotation.	Thinning control in drier places, to an extent in wetter places.	See appendix 5 LISS management, section 3 (transformation in older (>40yrs) stands).



## Appendix 4 – LISS management

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

The word 'approach' is important because:

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

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

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

There are two main types of structure:

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

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

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

- Early crown thinning will be heavier (10-20%) than management table intensity and aim to develop 100 equally distributed 'frame' trees per hectare.
- 'Frame' trees are well-formed dominant trees with good crowns at reasonably even spacing.
- When the trees begin to cone (see table 1 below) stands will be thinned to the basal areas shown in table 2 to develop good conditions for regeneration to establish.
- If/when natural regeneration occurs it will be more variable than on a planted site, giving more variability in age, density and species.
- Canopy removal will aim to maintain a leader-to-lateral ratio of >1 in the regeneration (see figure 1), generally this will be achieved using the basal areas in table 2.
- The final removal of the overstorey may not involve all the trees depending on management objectives and windthrow considerations (green tree retention).
- If natural regeneration is only partially successful in terms of number and species mix planting will be undertaken. Planting will be concentrated so the location of trees is

# Newtyle Area Design Plan 2014-23

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

# Newtyle Area Design Plan 2014-23

Table 2. Basal area guidance for natural regeneration

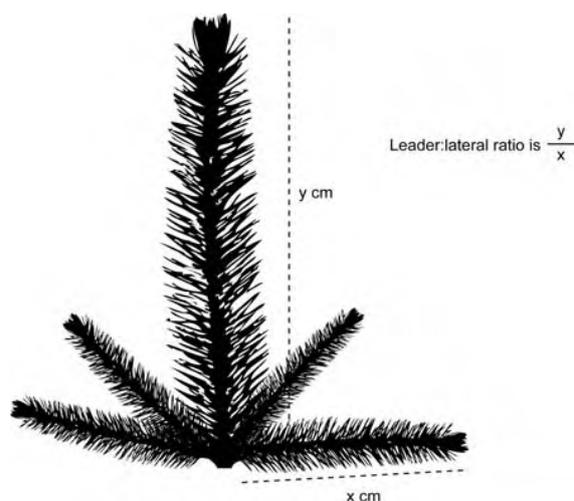
Species/ group	Shade tolerance of seedlings	BA (m2 ha-1) Establishment*	BA (m2 ha-1) Seedling growth**
Larches	Intolerant	20-25***	15-20
Pines	Intolerant	25-30***	20-25
Sitka spruce	Intermediate	30-35	25-30
Douglas fir	Intermediate	35-40	30-35
Norway spruce	Tolerant	40-45	35-40
Western hemlock	Tolerant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

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

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

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

Figure 1. Leader-to-lateral ratio.



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

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

- retaining small trees; and
- encouraging fast growth of selected frame trees
- The pattern of regeneration will be different to a simple structure, and will be arranged in groups that only cover up to 20% of the area at any one time.
- Up to 50 'Frame' trees will be selected per hectare and these will be crown thinned so as to keep as many small trees as possible.
- 'Frame' trees are stable, well-formed dominant trees. They may need to be present on the site for a long time; spacing should be 'clumpy' and not regular. Stable trees will have a larger diameter for a given height.
- The stand will be thinned to a residual basal area of about 18-25 m<sup>2</sup> per ha for larches and pines, and 25-35 m<sup>2</sup> per ha for spruces and Douglas fir. The choice within this range will depend upon the site and the balance between the overstorey and any regeneration. If there is little or no regeneration a higher value will be chosen to provide suitable conditions for seedlings to establish. If there is enough regeneration, which needs to be released, then a lower value will be favoured. The aim at each thinning is to remove enough trees to achieve the chosen residual basal area.
- If there is too much regeneration thinning will be concentrated on releasing the best regeneration and attempting to hold it back in other areas.
- Planting in complex structures will be considered to increase chances of success.
- Trees will be planted in canopy gaps of 0.1 ha minimum size.
- Trees will be planted in half the area of the gap in the centre.
- Close spacing (1.5 m x 1.5 m) will be used to make the groups robust. For example, when planting a canopy gap of 0.1 ha 200 trees will be planted at 1.5 m spacing on half the area in the middle of the gap. Close spacing will ensure rapid canopy closure and planting only half the area ensures minimal competition from the canopy trees, allowing opportunities for natural regeneration and increasing operational access.

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

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

The main implications of this are:

- for simple systems there will be reduced opportunities for developing the crowns of 'Frame' trees and the window for natural regeneration is reduced. Therefore more 'frame' trees will be retained and a longer regeneration period used.
- in complex systems the main risks are that 'Frame' trees will become too large to be marketable, and the stand will still be quite uniform when windthrow starts. The aim is to establish groups of regenerating seedlings under an irregular overstorey while older trees are progressively felled.