

Moray and Aberdeenshire Forest District

Roseisle Forest

Land Management Plan



Plan Reference No:

Plan Approval Date:

Plan Expiry Date:

Roseisle Land Management Plan 2015-24

FOREST ENTERPRISE - Application for Forest Design Plan Approvals in Scotland

Forest Enterprise - Property

Forest District:	Moray & Aberdeenshire FD
Woodland or property name:	Roseisle
Nearest town, village or locality:	Burghead
OS Grid reference:	NJ 113646

Areas for approval

	Conifer	Broadleaf
Clear felling	31.1ha	
Selective felling		
Restocking	24.1ha	7.0ha
New planting (complete appendix 4)	None	None

1. I apply for Forest Design Plan approval*/~~amendment approval*~~ for the property described above and in the enclosed Forest Design Plan.

2. ~~* I apply for an opinion under the terms of the Environmental Impact Assessment (Forestry) (Scotland) Regulations 1999 for afforestation* /deforestation*/ roads*/ quarries* as detailed in my application.~~

3. I confirm that the initial scoping of the plan was carried out with FC staff on

4. I confirm that the proposals contained in this plan comply with the UK Forestry Standard.

5. I confirm that the scoping, carried out and documented in the Consultation Record attached, incorporated those stakeholders which the FC agreed must be included.

6. I confirm that consultation and scoping has been carried out with all relevant stakeholders over the content of the of the design plan. Consideration of all of the issues raised by stakeholders has been included in the process of plan preparation and the outcome recorded on the attached consultation record. I confirm that we have informed all stakeholders about the extent to which we have been able to address their concerns and, where it has not been possible to fully address their concerns, we have reminded them of the opportunity to make further comment during the public consultation process.

7. I undertake to obtain any permissions necessary for the implementation of the approved Plan.

Signed
Forest District Manager

Signed
Conservator

District Moray & Aberdeenshire

Conservancy Grampian

Date

Date of Approval

Date approval ends:

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Land Management Plan Summary

This plan is a review of Forestry Commission Scotland's management of Roseisle.

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 Forestry Standard.

The forest is one of the primary recreational facilities within the district, and as a consequence access and health has a high priority.

The proximity of the sea, the woodland path network and biodiversity are considered key elements of the recreational experience by site users.

A small outlier adjacent to Kinloss called Blackstob wood is included in the plan area. At 15.62Ha the small size of the wood belies its impact as a key recreational resource for local residents.

The production of quality timber under low impact silvicultural systems (LISS) not only enhances the recreational environment, but also provides a valuable commodity produced in a sustainable manner. Roseisle forest is ideally suited to LISS.

The forest also plays a key role as a protection forest by significantly reducing the impacts of windblown sand on surrounding farmland and infrastructure.

While a wide range of species grow well on the site, pines are best suited to the sandy soils, and this has been reflected in the current stocking. Past management favoured a gradual shift to an ever greater proportion of pine species.

The potential impacts of Dothistroma Needle Blight (DNB) is a new and important factor to consider. While the susceptibility of pine (both Corsican Pine (CP) & Scots Pine (SP)) to the disease in coastal environments appears less than at inland sites, a widening of tree species diversity would seem to be pragmatic at this point in time. Active management, with traditional thinning cycles, can also play a role in reducing disease susceptibility and impacts. Roseisle has a long history of active silvicultural management which increases the resilience of the forest.

1.0 Introduction

Refer to Map 1: Location.

1.1 Setting and context

Roseisle Forest is located on the coast roughly midway between the towns of Elgin and Forres. The forest area is immediately adjacent to the communities of Burghead and Kinloss, and is located close to the A96.

The forest is a much valued recreational asset both locally and regionally.

The site is dominated by conifers with SP and CP being the primary species. The potential impact of DNB is an important consideration within the plan. Lodgepole pine (LP) stands within the forest are infected with DNB and will be systematically removed.

The site is a true multi-purpose forest, delivering access and health, timber, biodiversity and environmental quality via erosion protection.

Roseisle is suited to the adoption of LISS, and substantial areas have been managed in this way for a number of years.

2.0 Analysis of previous plans

The previous Forest Design Plan was approved in 2003.

The main objectives stated in this plan are included in the table below, along with the progress made to date on the achievement of the objective and how this will be carried forward into the new plan.

Since the last plan was approved in 2003 policy themes have been updated and as a consequence previous objectives have had to be categorised to fit with current policy theme descriptions.

Theme	Priority (in current approved plan)	Objective (in current approved plan)	Management action	Progress to date 1 – Nominal progress 2 – Some progress 3 – Progress as per FDP	Proposed action (in this plan)
Climate Change	High	Manage areas of LISS to achieve low impact sustainable regeneration. Produce a sustainable supply of quality timber and biomass. Convert all areas to LISS over time.	Implement active silvicultural management of existing LISS areas. Bring new areas into LISS management. Thin to raise timber quality.	3 – Sites identified as LISS recorded in FDP and GIS layers. Coupe plans produced and operations undertaken to manage sites as appropriate. Regeneration/enrichment planting within the group selection areas has been successful, and has expanded species & age diversity.	Continue the active management of existing LISS areas. Actively thin young pine stands at the earliest economically viable age in order to ameliorate the impacts of DNB. Continue to produce timber and biomass to substitute for energy intensive products. Use species with good growth rates to sequester carbon and reduce the potential impact of disease on sub-optimal species choice. Seek to maintain or expand species diversity during the plan period to avoid an over dependence on pine species given the current uncertainties over DNB. Improve air flow through stands, and reduce the proportion of stressed trees by thinning management.

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Timber	Medium	Produce wood & marketable timber.	Actively manage stands to produce quality timber. Remove low quality LP.	3 – LISS stands have been actively thinned to produce timber, and improve crop quality.	The production of quality pine logs under LISS is an integral part of the identity of the forest, and provides a recreational environment appreciated by visitors. The well managed open stands, characteristic of much of the site, are also potentially more resistant to DNB, and these areas will continue to be managed as previously. Given the potential impact of DNB on growth rates and timber production, then a further shift to pine dominance may reduce diversity, and in future potentially lead to reduced timber increment across the forest. While pine species are best suited to the site, a wide range of species grow well, partly due to better organic soils trapped underneath the windblown sand, but still accessible to most tree species.
Access & health	High	Maintain & enhance a forest structure conducive to a high intensity recreational environment.	Manage areas as LISS to reduce the perception of radical change that often accompanies clearfelling.	3 – Where it is present, mature forest cover has been largely maintained. Restocks have established well, and have reduced the negative impacts associated with harvesting debris on popular sites.	Continue the past LISS management. Clearfells are required in key areas as part of disease management. This will include the removal of LP at the earliest opportunity. Clearfells as part of a diverse matrix of silvicultural systems can add to diversity and open up new viewpoints on a temporary basis.

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		Maintain and enhance the recreational infrastructure.	Regular maintenance of the sites infrastructure has maintained a functional, and highly valued recreational resource. All abilities paths have been extended and linkages with long distance and local core paths facilitated.	3 – Anti-social incidents have declined over the plan period. Links with the local core path network and the long distance networks (Moray Coast Trail & North Sea Trail) have been facilitated. All abilities paths and facilities have been expanded.	<p>Visitor survey work suggests that most visitors are content with the current access provision. Maintenance of the existing infrastructure and wardening are essential activities to be continued.</p> <p>DNB, storms or other climate related factors may degrade the forest environment from a recreational perspective. Encouraging vigorous and healthy trees and a diverse mix of tree species, age classes and stand structures can help to reduce the risk of adverse impacts.</p> <p>In the longer term coastal erosion is a factor that may require the relocation of some of the recreational infrastructure.</p>
		Enhance and link path network with wider core paths.	Improve signage at some woodland entrances.	2 – Signage for long distance path networks and internal routes is good.	Maintenance of the existing path infrastructure and signage will be undertaken. Follow the FC guidance: “Managing Woodland Access and Forestry operations in Scotland” in relation to temporary path closures during harvesting operations.

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Environmental quality	High	<p>Create permanent habitat networks focussing on the limited riparian areas and open ground. Maintain habitats that support specific species of interest on the site.</p> <p>Retain forest cover to reduce the impacts of erosion, and the problems created by windblown sand.</p>	<p>Establish new NBL areas along riparian zones. Link areas of open ground. Seek continuity of forest cover with good light levels at ground level.</p>	<p>2 – LISS by its nature reduces the options for a radical change of species over short time spans. The process of creating networks of broadleaves has been started, and the areas of group selection fellings have increased the broadleaved element regenerating within the small group fellings. Enrichment planting within these areas has also helped to increase species diversity.</p>	<p>An expansion of broadleaved cover, both as part of a network and as a more diverse element through the standing crop will continue to be encouraged. LISS offers the best scope for constraining sand movement by reducing ground wind speeds, while at the same time retaining ground vegetation cover. Maintaining the diversity of the forest in terms of species, age class and structure can all help to enhance forest resilience and help to maintain the forest cover that provides a key protection role in this locality.</p>
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Biodiversity	High	<p>Maintain the pinewood habitat for key species such as crested tit & red squirrel. Maintain the existing habitat that supports areas of single flowered wintergreen Moneses and Twinflower. Enhance the riparian zones.</p>	<p>Use LISS to maintain forest cover in particular on pine areas. Convert areas of alternative conifers to pine. Favour SP over CP to achieve a progressive conversion to more native species.</p>	<p>3 – The pinewood areas have been generally managed under LISS and forest continuity has been maintained. Areas of alternative conifers could not have been viably felled within the previous plan period.</p>	<p>Maintain LISS management. Accept regeneration of broadleaved species including sycamore and beech. This will allow the potential impacts of DNB to be assessed, in order to establish the future viability of pine species on the site. Review this approach at the next plan review.</p>
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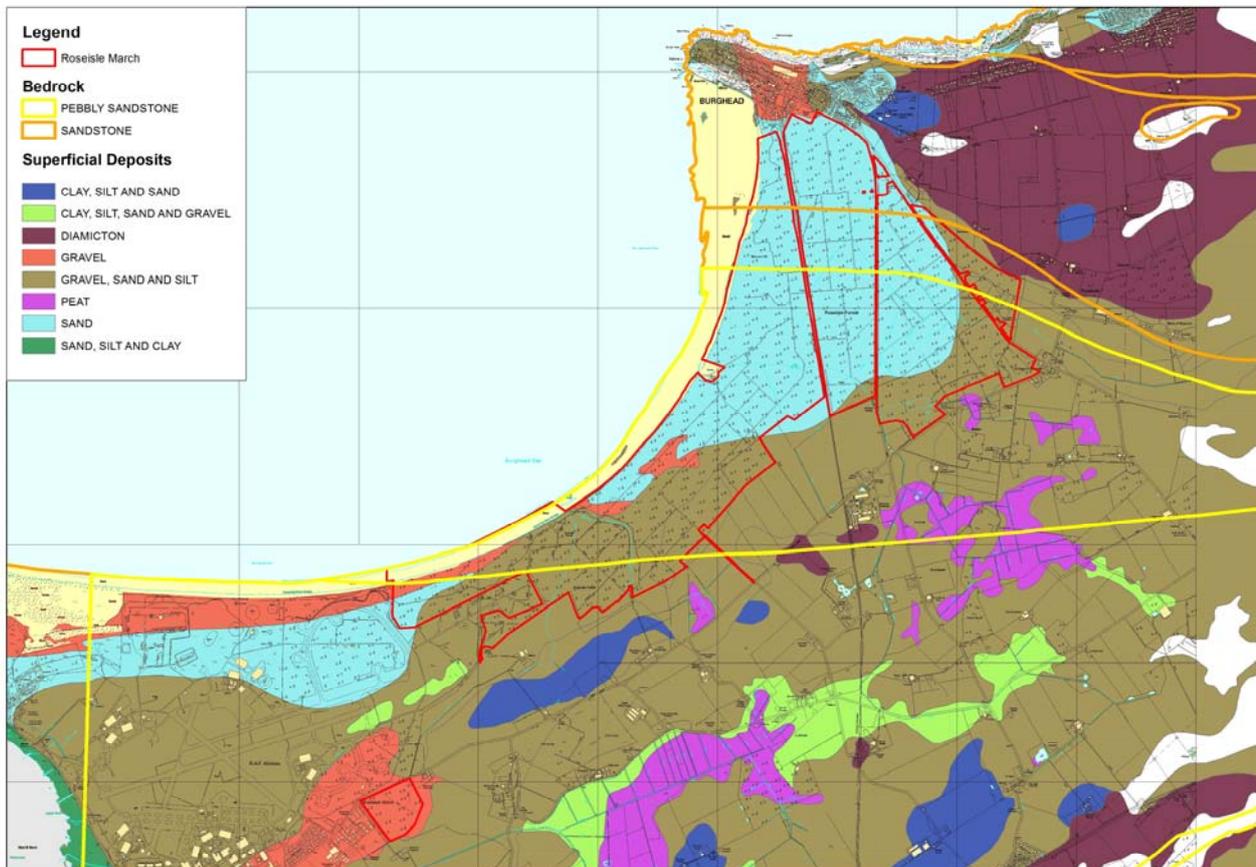
3.0 Background information

3.1 Physical site factors

Refer to Map 2: Key Features.

3.1.1 Geology, Soils and Landform

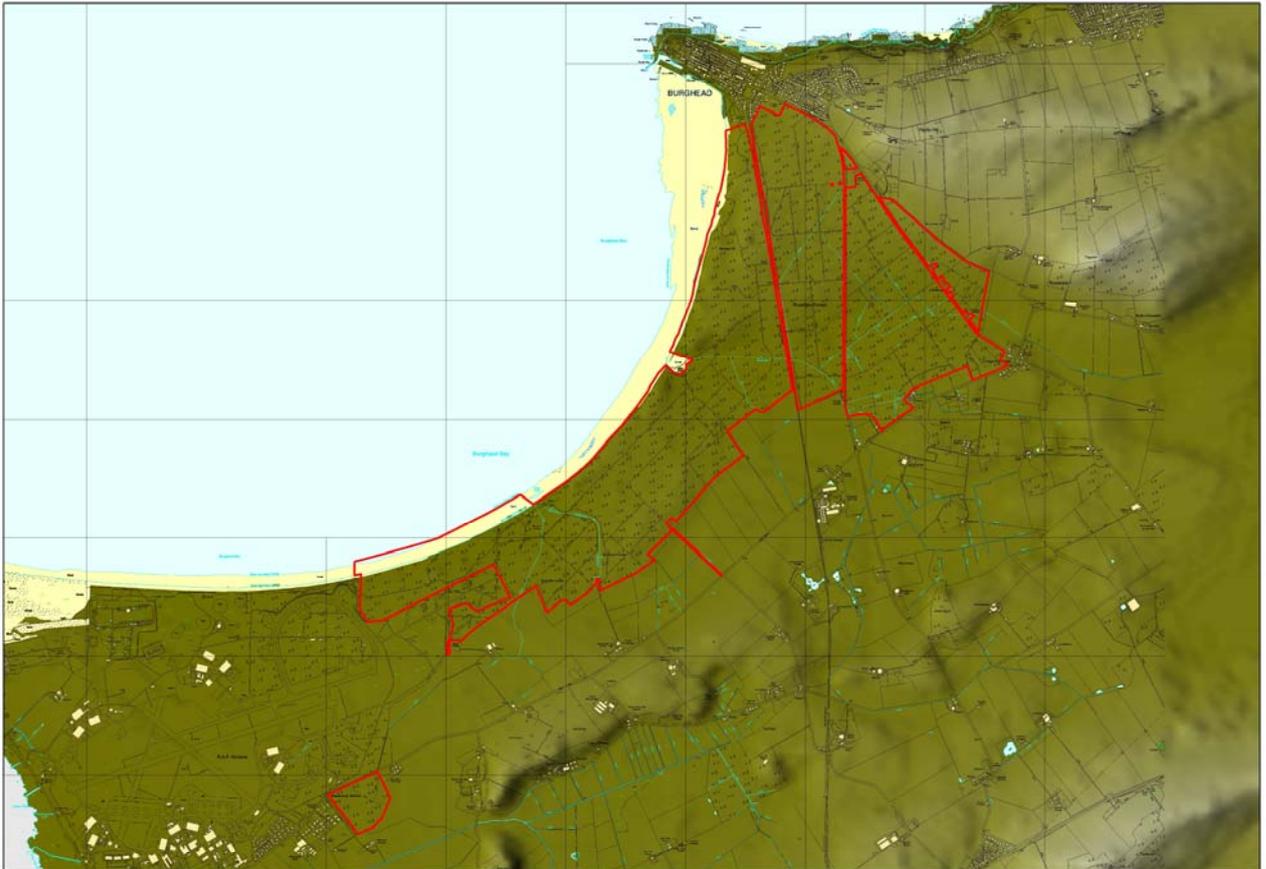
Geology and Soils – The solid geology of the site comprises sandstone overlain with glacial drift deposits of sand & gravel. The resulting soils are well drained sandy soils of moderate fertility. Areas adjacent to the coast also comprise areas of static sand dunes with the characteristic undulating, small scale terrain. Exposed soil profiles also suggest areas of more organically rich soils beneath the superficial sandy deposits. Given the potential for deep rooting on this site, then these organic layers may play a key role in tree growth, and may widen the species options available.



Geology map of the site.

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Landform – The forest is a low lying coastal forest ranging from 0 to 20m above sea level. The static dune feature across parts of the forest offers some variation in terrain, and this adds interest to the site. While the dune features are small scale, there may be localised impacts on tree growth in terms of the microsite variation across the dune profile.



Terrain map of the site with forest outline in red.

3.1.2 Water

There are no major water courses on the site, but two minor water courses cross the site, and perform a drainage function for the upstream low lying farmland area. While the nature of the water courses limits their biodiversity value, they are locally significant due to the lack of water courses in the vicinity.



Water course/drainage ditch running through mature SP stand

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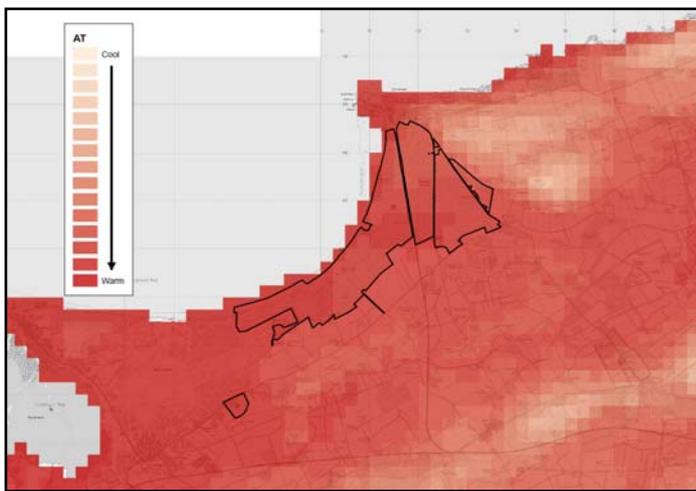
3.1.3 Climate

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

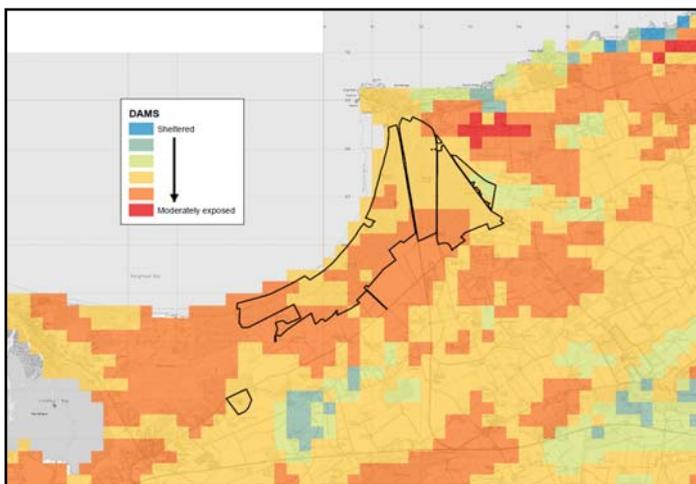
The results of interrogating this system gave the following data.

AT5	DAMS	MD
1223 - 1264	10 - 12	130 - 138

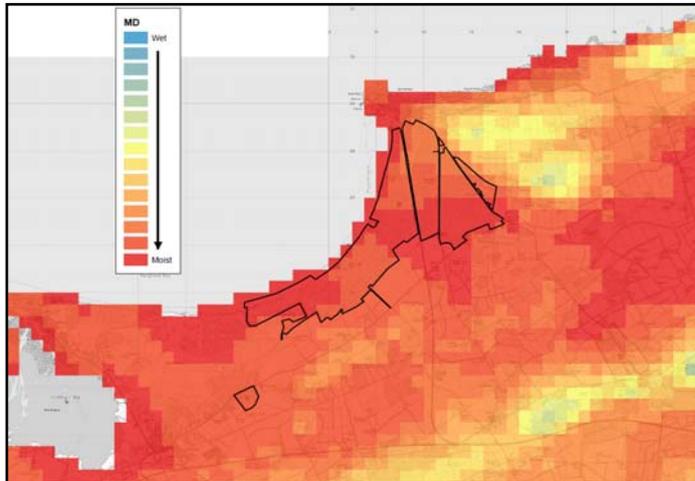
These figures place Roseisle in the warm, moist, sheltered zone.



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

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

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

3.2 Biodiversity and environmental designations

The Moray Firth (Marine) SAC lies to the SW of the forest. While the two environments are linked by erosive forces the capacity of the forest to influence the condition of the SAC is negligible.

The cetacean & sea bird interests linked to the SAC add value to the recreational value of the forest, and complement sea watching opportunities available from Burghead. The coastline has been identified as an Important Bird Area by the RSPB.

The only FCS priority species known to be resident in these blocks is the Red Squirrel, which is also a LBAP species. Pine martin may be present in the forest.

Crested tits and Crossbills also use the forest and small populations of the single

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flowered wintergreen Moneses (*Moneses uniflora*) and the nationally scarce UK Biodiversity Action Plan (BAP) species Twinflower (*Linnaea borealis*) have been identified.

There is potential for bats, a protected species, to be living in some of the mature pine, or within structures within the forest.

With sea eagle introductions along the east coast, the forest may provide future nesting/roosting habitat for this species.

The forest performs a vital protective role for agriculture and local infrastructure by slowing the transit of windblown sand. This is primarily achieved by reducing wind speeds at ground level, although the forest root system and flora also helps to bind the soil in most places. Fire sites and the open nature of CP stands can reduce this positive impact.

Drifting sand may impact adversely in terms of biodiversity on specific inland sites.



Blown sand on the B9013 just outside Burghead

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3.3 The existing forest

3.3.1 Age structure, species and yield class

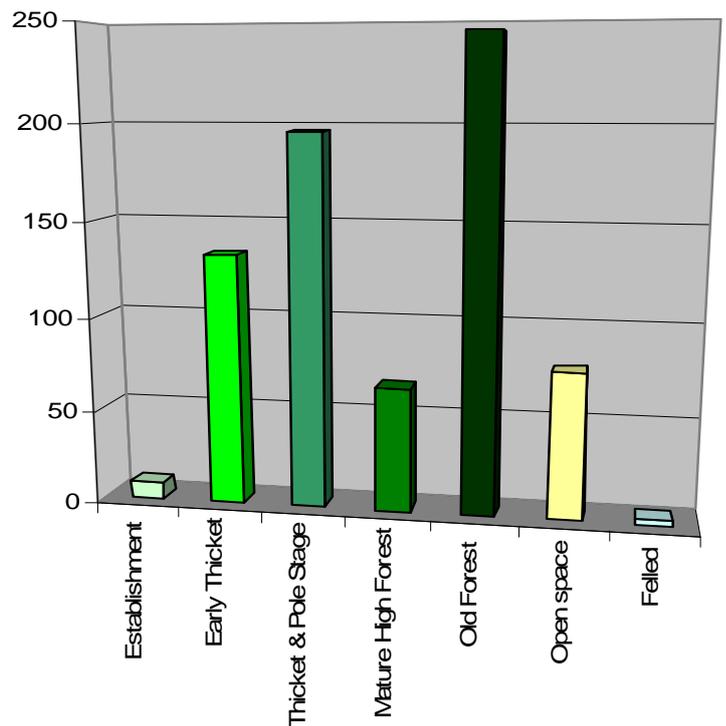
i. Age Structure

Ages of Trees (years)	Successional Stage	Area (ha)	%
0 - 10	Establishment	8.54	1%
11 – 20	Early Thicket	133.5	18%
21 – 40	Thicket & Pole Stage	196.25	27%
41 – 60	Mature High Forest	66.38	9%
61+	Old Forest	245.14	34%
	Open space/Felled	81.22	11%

The forest displays a range of age classes dating back to the initial plantings in the 1930s. Past management focussed on traditional thinning and clearfelling which, in practice, was not dissimilar to a LISS uniform shelterwood approach. This active clearfell management has broken up the age class across much of the forest.

An expansion of LISS based on the existing diverse age class structure will enable this age class diversity to be scaled down within blocks that are currently of uniform age. As they develop diversity, LISS can however complicate monitoring and evaluation of age class diversity on a forest scale.

Increasing age class diversity increases the forest resilience to disease, storms and climatic changes.



ii. Species

The site is dominated by Scots Pine and Corsican Pine. These are species well adapted to the site. Pines are also the signature species for recreational users of the forest.

Both pine species have shown the ability to regenerate on site, although light levels on the forest floor may currently limit CP regeneration where the ground flora is developed.

The open ground is fairly limited, but the impacts of this are mitigated by the open nature of many of the LISS stands.

Areas of SS have shown good growth, and regeneration is widespread. Timber quality may be affected by drought, although the deep rooting possible on site, and the deeper profiles of organic material, may reduce this risk.

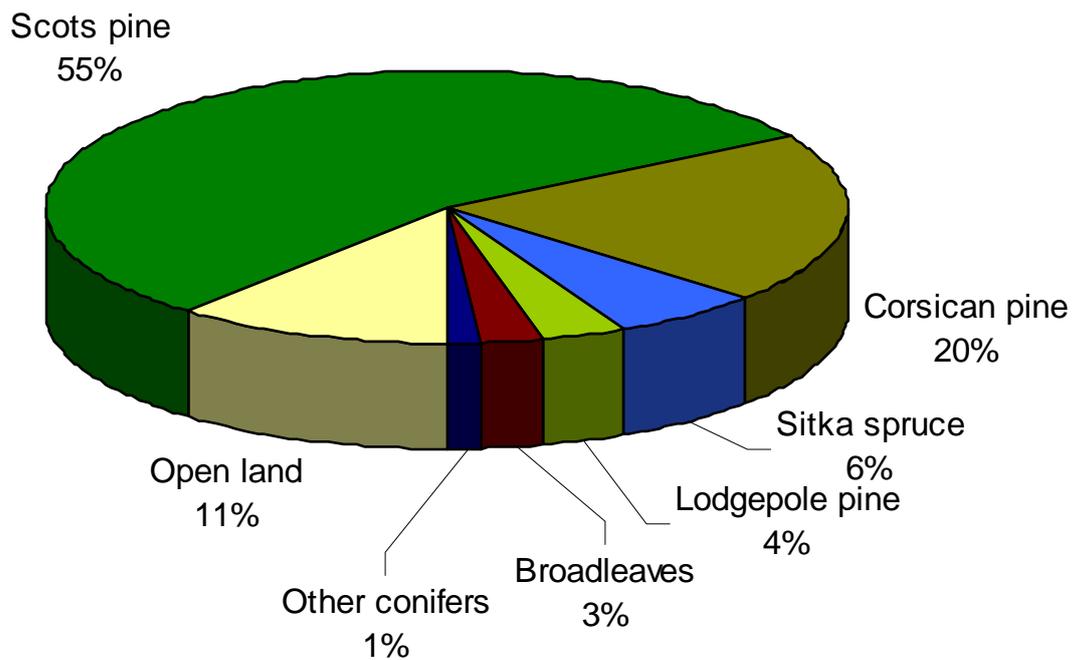
DF has grown well on site but form is moderate.

A range of hardwoods including birch, rowan, beech and oak have grown well in the forest, with birch and beech regenerating well even in the proximity of the shore. Fire damaged sites near the shore demonstrate the potential for birch to maintain woodland cover following pine mortality, and this may provide a mechanism for maintaining the amenity value of the woodland if DNB develops aggressively.

While pines are the ideal species for the site, a wide range of species, including productive broadleaves, are capable of growing on the site.

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Species	Area (ha)	%
Scots pine	403.3	55.2
Corsican pine	148.6	20.3
Sitka spruce	44.5	6.1
Lodgepole pine	25.6	3.5
Broadleaves	18.3	2.5
Other conifers	10.4	1.4
Open land	80.3	11.0



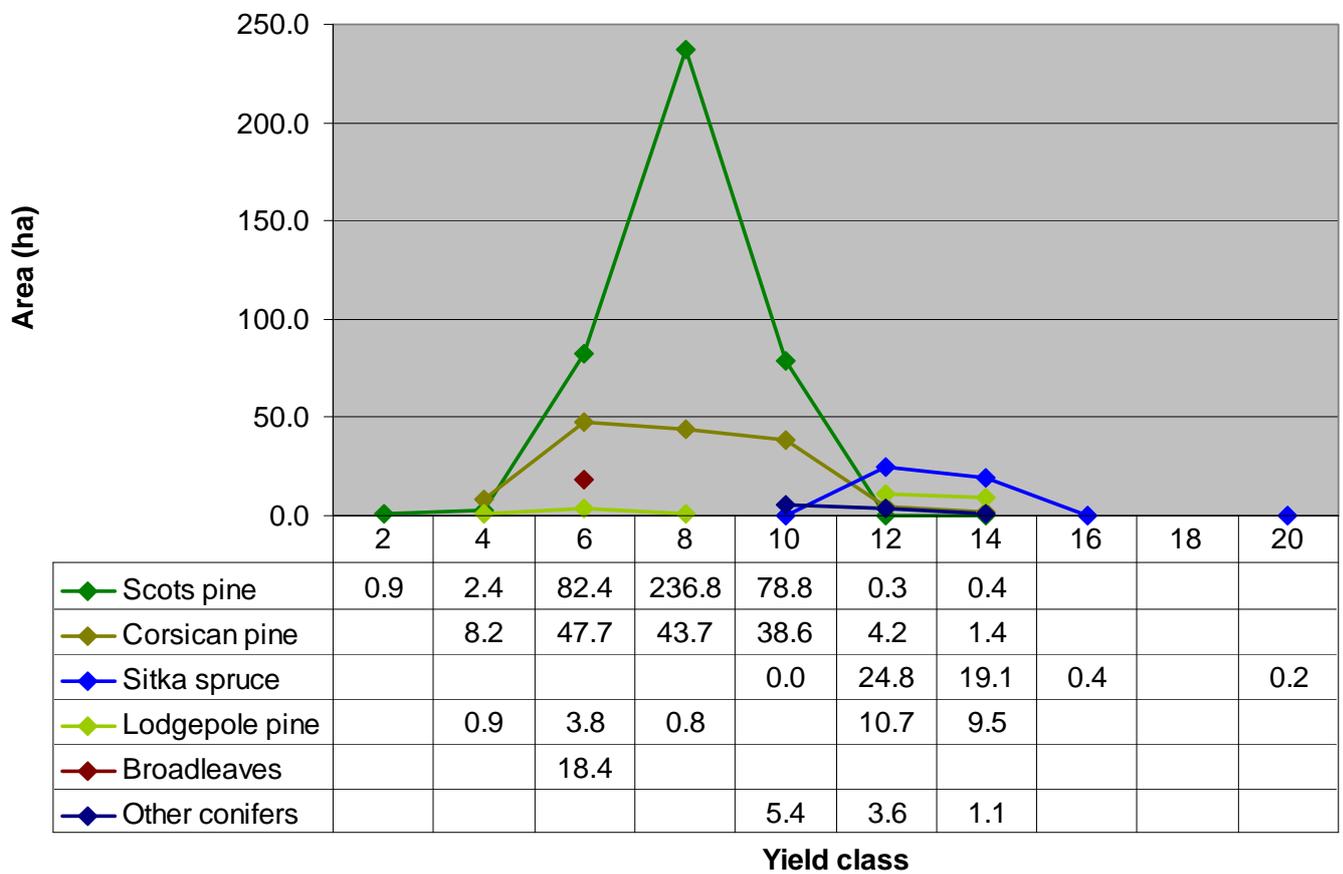
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iii. Yield Class

Pine yield classes range from 6 to 14, although there are very limited areas of severely checked SP.

SS has shown moderate growth with yields classes of around 14 and up to 20 in places.

Second rotation and subsequent crops may show better growth as the sites organic matter builds progressively. Crop residue management/harvesting (harvesting residues not proposed) would affect this build up of soil fertility.



3.3.2 Access

Access throughout the forest for management and harvesting is good and fit for purpose, with a good road network and good public road links.

The well drained soils and the proactive thinning management also facilitate access within the stands.

Slope is not a constraint, although harvesting on any static dunes should be undertaken carefully to avoid destabilising the dune structure.

There is some risk that harvesting operations open up the site to wind erosion by breaking the mat of surface vegetation. In practice this has not been a problem due to the dispersed access routes and the brash residues.

3.3.3 LISS potential

Under the current design plan only 5% of the area is designated for clearfelling. Of the remaining area 54% is under LISS and the bulk of the young crop (33%) would be managed under a LISS system as it matures.

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

LISS normally implies that no clearfell areas larger than 2 ha will be undertaken.

While the dominant system is uniform selection, a regular group selection approach has been successfully implemented in the central core of the forest. This has led to increased diversity within the key recreational area. Enrichment planting was used to supplement regeneration.



Mixed regeneration and enrichment planting under a group selection.

The potential for CP to regenerate varies with ground flora and light levels, many of the other species regenerate freely on site. While SP regeneration is strong in places, birch regeneration can be dominant where light levels increase abruptly. Beech regeneration is also widespread where light levels are lower, and this species is often well placed to show rapid growth once established as the canopy opens up progressively.

While this widening species range complicates management and marketing, it is a welcome development in terms of increasing the forests resilience. Subsequent management in light of the prevailing disease situation can be adjusted to favour higher value species.

One of the critical factors for LISS is protection from browsing pressure. Roe deer, hares and rabbits are present on site, but the high level of public use and active control keep damage to acceptable low levels. Vole damage is reduced by the open nature of the ground flora in places.

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
Small roundwood	Chip board, Orientated strand board (OSB), Paper, fencing	20%
Firewood/woodfuel	Posts & rails	5%
Short log	Pallets & slats	15%
Log	Construction	60%

The proposed early felling of LP areas for DNB control will reduce these figures for the forest as a whole as this programme is implemented.

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

3.4 Landscape and land use

3.4.1 Landscape character and value

Roseisle has significant intimate landscape impacts due to the high level of recreational use of the forest, and the fact that the B9089 and B9013 run directly through the forest.

The forest also plays a key role as the gateway to Burghead.

The flat terrain and the emphasis on LISS reduce the impact of coupe design, with internal views and edge profile impact being the most significant impacts.

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 Land Management Plan reviews and where appropriate all efforts are made to follow the guidance given, where it matches with current FCS policy.

The plan area is covered by Scottish Natural Heritage Landscape Character Assessment No101, Moray & Nairn, produced in 1998 by the Turnbull Jeffrey Partnership.

The area is described as "Coastal Forest", and the assessment highlights the importance of the forest margin in terms of landscape impacts. The forest also plays a key role in screening manmade features, including MOD facilities, to the benefit of the wider landscape. Creating greater diversity along the road margins where these pass through the forest will create a more interesting landscape experience for passers-by, and this diversification process has been underway for a number of years. Work has also taken place to diversify the forest margin when viewed from longer range views, but there are still significant sections of the south facing margin which create a repetitive visual impact despite the beauty of the individual trees at close range. Increasing species and structural diversity along the margin can be achieved by sporadic group felling or heavy thinning to create a margin brightened by variations in light and shade. The subsequent regeneration of a range of species could be

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supplemented with enrichment planting of light coloured species with autumnal and winter impact.

The guidelines for forest restructuring describe the significance of the subtle landform in places derived from static sand dunes. Under LISS systems there may be a tendency for this effect to arise naturally as species and growth rates respond to the microclimate across the dune profile; however this may be a slow process.



Main access road to car park showing landscaped road edge

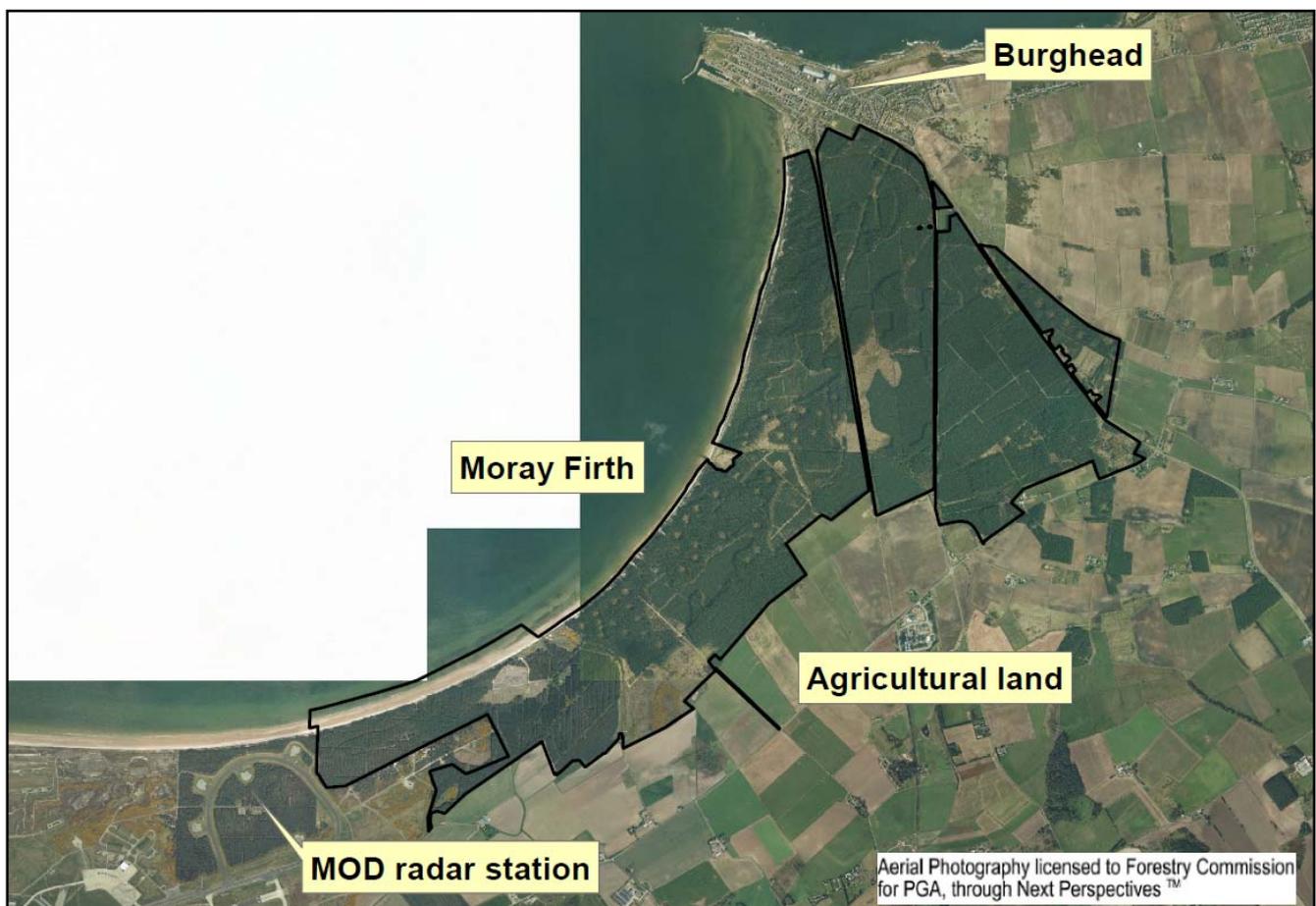
At specific points the forest plays a role as a gateway to a destination. The entrance to Burghead on the B9013 is the most significant, but the drive to the main car park is also framed by the forest and is an integral part of the visitor experience. The transition from open farmland to woodland is particularly important.

3.4.2 Visibility

The terrain limits the visual impacts from distant views, but the forest size, layout and proximity to settlements increases the significance of close views.

3.4.3 Neighbouring land use

Land use around Roseisle is shown in the aerial photograph below.



The woodlands in the plan area are surrounded by either the Moray Firth or open agricultural land with scattered small woods. The town of Burghead is situated on the northern boundary and an MOD radar station on the western boundary.

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There are some areas of adjacent woodland particularly around the MOD holding to the west where a joined up approach to management will be beneficial, however given the low landscape impacts this is not a crucial factor, and the MODs objectives may differ from those of the FES.

The drains running through the forest are essential for the upstream farmland, and this may constrain options to improve the water course ecological value, such as creating meanders.



View of the forest from Tappoch Hill to the east.

3.4.4 Environmental Protection

The entire sea frontage of the forest is subject to constant erosive pressure. In addition windblown sand can bury structures and cover fertile soils inland depleting the agricultural resource.

A coastal erosion study commissioned by the MOD in 2002 concluded that an erosion rate of between 0.6m and 2m per year was ongoing. An adaptive management approach was proposed as an alternative to hard engineering solutions.

Currently the erosion has limited impacts on the forest, although in the long term recreational infrastructure may need to be relocated. Coastal erosion also affects the archaeological record by exposing and destroying features. As compensation this process does give the opportunity to locate and identify unrecorded archaeology.

The forest along the shoreline plays a role in preventing dune collapse and localised inundation during storms, but this role is limited. The main protective role of the forest is to limit the windborne movement of sand by creating a

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physical barrier, reducing wind speeds at ground level and creating a continuous vegetation layer. In places Corsican Pine can create a poor ground flora which exposes the forest soil surface to erosive forces; a mixed woodland of native Birch and Scots Pine would provide more protection in the longer term. The forest plays an important role in protecting arable farmland inland, as well as roads and other infrastructure from sand inundation. LISS will tend to maximise the advantages of the forest in terms of protection.



Coastal erosion at the forest margin.

3.5 Social factors

3.5.1 Recreation

The forest is a major recreational facility in the area being easily accessible from a number of towns, villages and the main A96 trunk road. The site provides a range of facilities from car parking, picnic areas, barbecue sites and toilets, to formal waymarked trails and a network of informal access routes.

The proximity of the beach and seascape is an important reason for the forests popularity, and again the gateway theme of the forest opening out to the sea is emphasised by the landscaping of the all abilities beach access.

Public consultation during an open day in Spring 2013 established that visits to the beach was the primary purpose of the majority of the respondents (70%). This is not to say that the same facilities would be delivered by an open windswept car park and a beach, as there is considerable emotive and practical synergy in a coastal forest opening out onto a spectacular coastal vista. The forest delivers contrast, shelter and the practical benefits of branded FES facilities such as car parking, notice boards and walks. This forest/beach synergy was indicated by further responses looking at the appreciation of different elements, which rated woodland walks as being the top feature appreciated by respondents ahead of the beach.

The survey identified that the mature forest was a feature that was appreciated by the majority of respondents, and that the vast majority (70%) of respondents would like the forest to remain as it is now. While the sample size was low, these results correlate with other work which identifies people's innate behavioural conservatism in relation to forests and landscape issues. This feedback suggests that LISS is an ideal management approach to meet these aspirations, and that if DNB has a dramatic impact on the forest in terms of pine mortality, then this will be to the detriment of users in the short term, as they adapt emotionally to the new environment.

Some respondents would like to see more broadleaves on the site, and more species diversity along the path network. Small group with supplementary plantings could achieve this result.

Dog walking and picnicking were also important reasons for visiting, and this would cover both the beach and forest areas.

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The forest is also the setting for a variety of outdoor events and has been host to a successful outdoor concert, all of which has further promoted it as a key area for recreation.

This level of use and the proximity of the forest to settlements have caused some conflicts. These have included vandalism, fly tipping at entrances, illegal use of scrambling bikes and small fires, both deliberate and accidental. The intensity of these activities varies across the years with different generations. Active site management and on site presence maintains a pleasant and tidy site for users, and this fosters an environment which discourages anti-social behaviour. The site is managed to a high standard and this is appreciated by the public.

Blackstob wood on the edge of Kinloss is a highly valued, low maintenance, recreational asset for the local community. Its recreational significance is increased because the MOD holding to the north constrains wider countryside access (out of necessity). The woodland is accessed directly from the settlement on foot, and via an informal car parking area along the public road. The existing path network is informal and consists of desire lines through the forest. These fit well with the woodland character, and are fully functional in their present condition.



Recreational facilities at main forest car park

3.5.2 Community

There is a history of working with local communities in the area, in particular at Burghead. This has mainly been in relation to the path.

Members of the Elgin based "Greenfingers" horticultural project have worked with forest rangers on a number of activities over the past few years. The "Greenfingers" project offers opportunities for adults with learning and physical disabilities to enjoy practical work in the natural environment, and the forest is the ideal venue for this.

A wildlife pond, insect feeding area and bird hide have been created with the help of the "Greenfingers" volunteers.

In addition a very well attended Easter event is put on by FES each year in association with several local groups and organisations including Moravian orienteers, Moray sled dog group and local scouts.

3.5.3 Heritage

There are no scheduled ancient monuments in the Forest, although there are a number of unscheduled monuments. Recent archaeological work along the north east edge of the forest has identified a large number of artefacts and potential structures in this locality, and it is very likely that these extend into the forest.

The deep sand deposits across the site have acted to preserve the archaeological record. The widespread use of LISS, which involves minimal ground disturbance, should also aid the continued preservation of the archaeology beneath this sand deposit.

The Archaeology Service for Aberdeenshire, Moray & Angus Councils have provided detailed site information for unscheduled ancient monuments in the area.

Further information on the non-scheduled monuments is held in the Forestry Commission S.M.R.sheets and will be used during the planning of operations.

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Millie Bothy (NJ16NW0091) is located just behind the dunes in the centre of the forest.



Second World War defences along the beach indicate the impact of progressive coastal erosion

3.6 Pathogens and diseases

The upsurge in the disease threat over the last decade has a range of causes linked to globalisation and associated climate change. Disease risk management has always been an integral part of forestry management; however the pace of recent events has created a great deal of uncertainty. While specific outcomes for species are hard to predict, the general principles for creating resilient forests are well known, and these include such actions as promoting diversity in all its forms.

The previous plan understandably focussed on creating a pine dominated forest in the long term. This approach would have a number of benefits for a range of specialist woodland species, while at the same time meeting the demands for timber and recreation.

Given the dynamic nature of the disease threat it is proposed to focus on creating a more diverse forest during the plan period. The management of Roseisle has been proactive to meet a range of demands, and selective thinning can be adapted to achieve a range of outcomes if the disease horizon clarifies.

On a national scale, creating a diverse forest could also extend to the human capital involved in the forest. A diverse range and scale of end users creates economic resilience, and the marketing of timber to a wide variety of outlets can facilitate this process.

The major disease threat to Roseisle is currently *Dothistroma* needle blight (DNB) (*Dothistroma septosporum*) which can kill young trees very quickly and mature trees over time. Even where the disease fails to kill the trees, it can have very adverse impacts on timber production and vigour over a number of years. The importance of pine to the forest from a recreational, ecological and productive perspective can't be overestimated.

Since the late 1990s the incidence of the disease has increased dramatically in Britain, particularly on Corsican pine. More recently the disease has caused significant damage and death to Lodgepole Pine and Scots Pine. Reasons for the increase in incidence of this disease are unclear but could be due to increased rainfall in spring and summer coupled with a trend towards warmer springs, optimising conditions for spore dispersal and infection. Such conditions may become more prevalent in Britain over the next 20 years if current trends in climate change continue. On the National Forest Estate disease management is currently focused on silvicultural measures to reduce

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inoculum loads and the use of alternative, less susceptible species in future rotations.

Specific measure to reduce the impact of DNB include heavy thinning and the removal of Lodgepole Pine (which is particularly vulnerable). Even with these measures the volume production of pine stands may be uneconomic, although these actions may maintain a pine element for amenity purposes. The costs associated with these measures include lower volume production, lower timber quality and higher costs. Should this management be required in the long term to produce pine, then a whole scale switch to alternative species may be required.

This process of species substitution may happen naturally in many of the pine stands managed as LISS, as the light levels increase on the forest floor (either from the disease impact or thinning management) alternative species will regenerate, in particular birch. The pine regeneration may tend to be eliminated early on as the mature trees infect them, and the microclimate associated with dense regeneration could facilitate this process. The ability of birch to colonise pine killed by fire is already evident on site.

A progressive reduction in CP by substituting with more resistant Scots Pine may prove prudent over time, and this may provide biodiversity benefits.



Birch regeneration in a fire damaged CP stand close to the coastal margin.

3.7 Statutory requirements and key external policies

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

Biodiversity

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

Climate Change

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

Historic Environment

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

Forests & People

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

Soils

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

4.0 Analysis and Concept

Refer to Map 4: Analysis and concept.

Theme	Issue	Analysis	Concept
Climate change	Adapting to climate change	LISS and an increase in structural and species diversity are proposed to meet this challenge.	Continue LISS management. Advance heavy early thinning of younger pine areas.
	Adapting to climate change	The quality of the soils in the area means that a wide range of species are suitable to a number of the sites.	Select a wide range of suitable species for planting to maximise the species diversity in the blocks.
Timber	Timber supply	Current crop age and condition allows a planned programme of production to be undertaken across the area.	LISS management across the easily accessed site gives the flexibility to react to a range of market opportunities as they rise.
	Timber quality	The ground condition in this plan area allows thinning to be undertaken across most of the area. Select timber species suited to the site and able to meet the multiple demands of this site, including timber production.	Undertake thinning to improve timber quality wherever possible. Use ESC together with the practical experience of what grows well on this site. Accept regeneration of species that prosper on the site and deliver economic benefits.

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	Hardwood timber	There are areas in these blocks that have soils and climates suitable for quality hardwood timber production. Sycamore and beech grow well on the site, although drought stress may impact on timber quality.	Accept beech and sycamore regeneration as part of the aim to diversify the forest. Monitor timber quality, use woodfuel markets as a fallback market if long term quality issues arise.
Access & health	Recreation	There is currently a good provision of recreational facilities in the plan area.	Maintain the level of provision at its current level and standard.
Environmental quality	Soil, water & air quality	Windblown sand and coastal erosion are factors in this locality that impact on both the forest and the wider landscape/infrastructure. The forest plays an important role in reducing the quantity of windblown sand delivered inland.	Use LISS management to maintain forest cover. Monitor forest floor vegetation cover as thinning operations progress in order to reduce exposed sand and open windswept areas.

5.0 Forest Design Plan Proposals

5.1 Management

Refer to Map 5: Management.

Thinning

Wherever possible the district will continue to maximise the area managed through thinning. 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.

An active thinning programme is essential for LISS.

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 system (LISS)

The main silvicultural system employed in British forestry is 'patch' clearfelling followed by planting or occasionally natural regeneration. However, Roseisle offers the opportunity to manage the entire forest under LISS as younger crops are converted. Areas of LP that are to be clearfelled as a priority for DNB management will require traditional restocking with species designed to limit the risk of DNB in following rotations.

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

The attraction of low impact 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, low impact forestry is seen as a means of reducing the impact of clearfelling and the associated changes that this produces in forest landscapes and habitats.

Detailed prescriptions have been written up for each area managed under LISS (see appendix 3). 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. All areas identified for restocking by natural regeneration have been recorded and programmed for inspect on a five yearly basis. If after 20 years, or at any preceding inspection, it is apparent that natural regeneration is not going to be successful then replanting with appropriate species will be undertaken. Enrichment planting may also be used to increase species diversity, target key recreational/visual areas, or to ensure the rapid establishment of ground cover.

Clearfell

As stated above the main silvicultural system employed in British forestry is 'patch' clear-felling followed by planting or occasionally natural regeneration.

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

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

The main areas proposed for clearfelling will be the LP areas as part of the DNB management programme.

The restocking of these clearfells will be with site appropriate species, with the aim of creating woodlands with diverse species and structures. This should mean they are more robust to face the future and the potential issues caused by future climate change and pathogens.

5.2 Future Habitats and Species

Refer to Map 7: Future habitats and management.

Restocking and Regeneration

The choice of species for restocking by planting in this plan has been guided by the ESC results for this climatic zone and soil types, the primary areas for large scale restocking activity are the clearfells associated with the removal of LP stands. To achieve the best results ESC needs to be used as a guide in conjunction with local site specific knowledge and experience. The base data used in the ESC process can be fairly broad brush and can overlook the opportunities and pitfalls presented by small scale site characteristics and microclimate. Site specific planting plans following a restock site survey will guide the final species choice.

Typically LISS seeks to perpetuate tree cover by natural regeneration which is aided and manipulated by managing the seed sources available and light levels on the forest floor. It is anticipated that this method will apply to most of the FDP area. However enrichment planting can also play a key role in LISS systems. In the case of Roseisle this specifically relates to increasing species diversity and creating points of interest along paths, woodland edges and dune features.

In LISS there is an element of having to make do with what the site delivers in terms of regeneration and using adaptive management to achieve the desired outcomes. In the short term a wide range of regenerating species should be accepted including spruce, beech and sycamore.

As mentioned above, enrichment planting should also be actively considered to increase species diversity and to increase the density of the ground cover.

Many of the open CP areas offer a very distinctive and iconic internal landscape that contrasts with some of the inland SP areas. An open windswept forest floor potentially has advantages for DNB management by impacting on the stand microclimate, however the protection function of the forest and biodiversity may be negatively impacted by this approach.

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 this has left them vulnerable to *Hylobius* attack. See section 5.9 Pathogens for details of how this threat will be dealt with.

Non Commercial Areas

Areas not considered appropriate for commercial management will include permanent woodland and open habitats, which will require monitoring to ensure they deliver the required objectives. Non-desirable species, such as non-native conifer regeneration, may require removal.

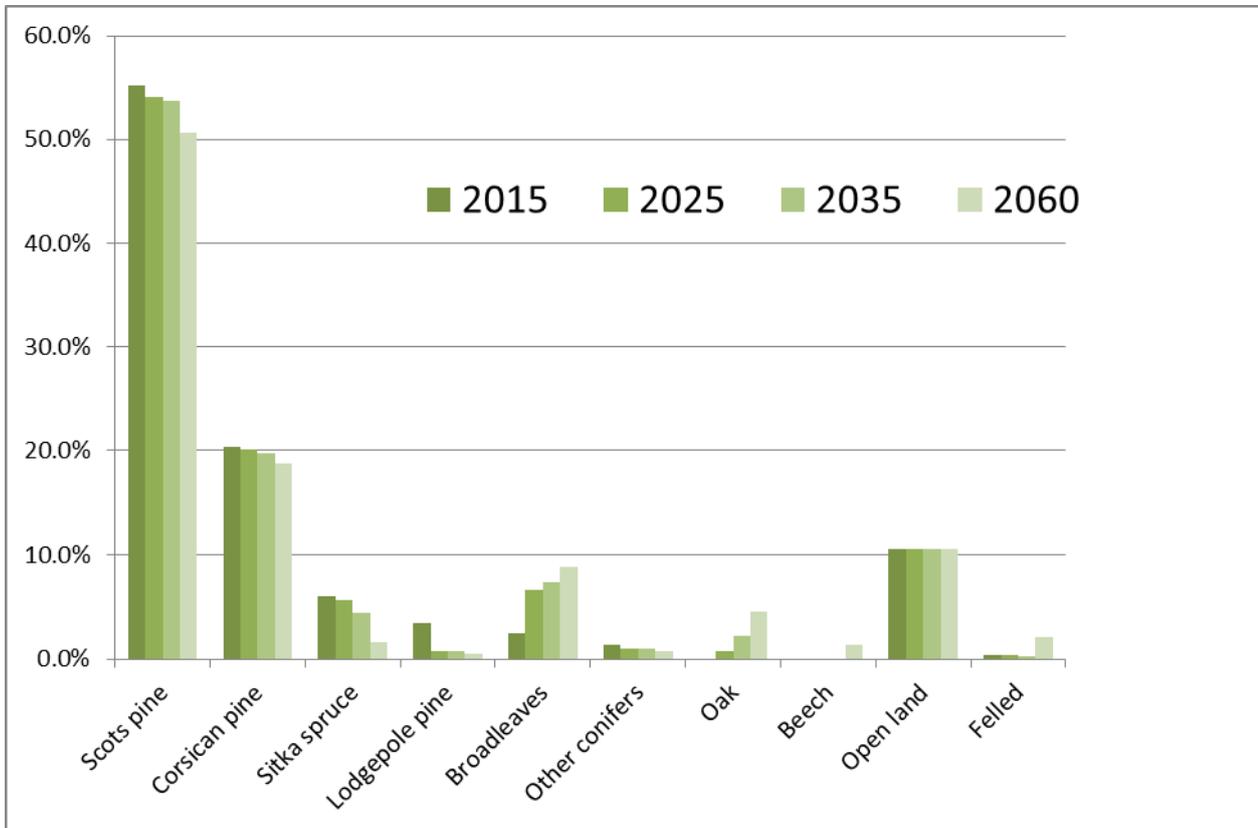
Areas designated as permanent open space are limited. LISS with areas of high thinning intensity can deliver many of the benefits derived from open ground habitat.

The contrast between the enclosed forest and the open seascape is part of the attraction of the forest, and open ground may facilitate the movement of sand inland. For these reasons extensive areas of open ground are undesirable.

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5.3 Species table

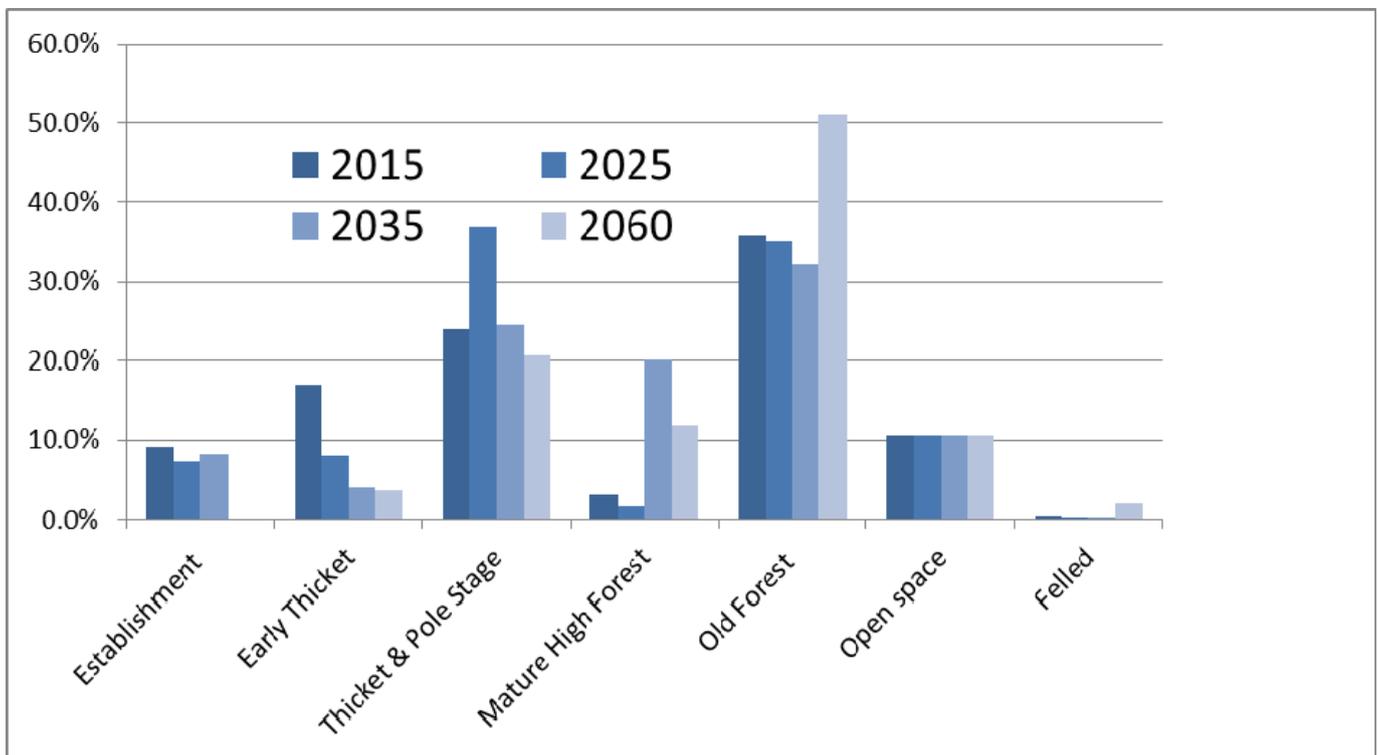
Species	Current distribution 2015	Projected distribution 2025	Projected distribution 2035	Projected distribution 2060
Scots pine	55.2%	54.1%	53.7%	50.7%
Corsican pine	20.3%	20.0%	19.8%	18.8%
Sitka spruce	6.1%	5.7%	4.4%	1.6%
Broadleaves	2.5%	0.7%	0.7%	0.5%
Lodgepole pine	3.5%	6.7%	7.4%	8.9%
Other Conifers	1.4%	1.0%	1.0%	0.7%
Oak	0.0%	0.8%	2.3%	4.6%
Beech	0.0%	0.0%	0.0%	1.4%
Open land	10.6%	10.6%	10.6%	10.6%
Felled	0.4%	0.3%	0.2%	2.1%



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5.4 Age structure

Age of Trees (years)	Successional Stage	Current distribution 2015	Projected distribution 2025	Projected distribution 2035	Projected distribution 2060
0 -10	Establishment	9.1%	7.3%	8.2%	0.0%
11 – 20	Early Thicket	17.0%	8.0%	4.2%	3.7%
21 – 40	Thicket & Pole Stage	24.0%	36.9%	24.4%	20.6%
41 – 60	Mature High Forest	3.2%	1.7%	20.1%	11.8%
61+	Old Forest	35.7%	35.1%	32.3%	51.1%
	Open space	10.6%	10.6%	10.6%	10.6%
	Felled	0.4%	0.3%	0.2%	2.1%



5.5 PAWS restoration

None of the small PAWS areas on the site falls within the 1a & 2a categories that are priorities for restoration. The sites are all categorised as 2b (Long established of plantation origin). The LISS management proposed is an ideal management tool for achieving continuity in these areas.

5.6 Management of open land

The open ground element required as part of the recreational infrastructure (paths, access tracks and the event site) will be maintained. In other areas successional vegetation will generally be accepted. INNS vegetation will be controlled as it arises.

5.7 Deer management

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

Our 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 deer 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.

At present there are no requirements for deer fencing. High levels of public use can modify and limit deer grazing/browsing behaviour.

5.8 Access

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

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.

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 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.

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.

The impact of DNB has been considered previously.

5.10 Critical Success Factors

- Continue with an active thinning programme to ensure the ongoing success of the LISS areas.
- Use adaptive management of the LISS regeneration to achieve greater species diversity.
- Expand species and structural diversity to increase forest resilience.

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- Maintain the current recreational infrastructure.
- Follow the guidelines in relation to DNB with heavy thinning and LP removal being priority actions.
- React positively to any disease impacts; seek to use any dramatic change in forest structure to deliver un-anticipated benefits. For example open transient views and greater species/structural diversity.

Appendix 1 – Consultation record

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
Moray Council – I M Douglas	16/07/13 By email.	18/07/13 By email.	<p>The path network is considered more than sufficient to meet the current access needs in Roseisle Forest. The plan should consider the core path status of some of these paths.</p> <p>The plan should consider FC guidance "Managing Woodland Access and Forestry operations in Scotland" during harvesting operations. Potential for additional promotion of the path network via additional map boards at the College of Roseisle and Burghead entrances.</p>	<p>Maintenance of the current recreational infrastructure will enable the forest to continue to meet the recreational demand. Core paths identified in plan maps.</p> <p>Management of H&S and public access during harvesting operations is an operational consideration. The relevant FC guidance note is identified in the plan text.</p> <p>Additional map boards will be considered subject to budget and a more detailed site assessment.</p>
Scottish Natural Heritage – Jennifer Heatley	16/07/13 By email.	23/07/13 By email.	<p>Roseisle offers a valued recreational resource that enables visitors to engage with the natural environment and a range of iconic species. The marine/beach habitat and the forest in close</p>	<p>Maintain access infrastructure.</p> <p>List of known protected species included in plan.</p> <p>Follow guidance in relation</p>

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			proximity offers a wide range of wildlife watching opportunities. The recreational infrastructure enables a very wide range visitors to engage with nature. Impacts on the Marine SAC are not anticipated. Red squirrels specifically should be considered during harvesting operations in relation to EPS legislation.	to EPS.
Scottish Environment Protection Agency – Planning service	16/07/13 By email.	23/07/13 By email.	Millie Burn is the only watercourse on the WFD Measures database within the FDP area. While the burn is defined as at “bad ecological status for heavily modified water bodies” none of the causal factors are associated with forestry or the FDP area. Agricultural factors are a major determinant of the burns condition. Nether the less improving the burns margins in line with UKFS “Forest & Water” guidelines would be beneficial. Monitor & control INNS.	All operations will be undertaken in accordance with the UKFS “Forests and water” guidelines. Measures to diversify the riparian margins have been undertaken, and the process will continue. Options for encouraging meandering are limited due to the role the burn plays in relation to the drainage of adjacent arable land. No INNS are identified on site.

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Royal Society for the Protection of Birds – Ian Francis	16/07/13 By email.	29/07/13 By email.	No comments on the plan area.	EPS guidance will be followed.
Findhorn & Kinloss Community Council – Tim Negus	16/07/13 By email	16/07/13 By email.	Members of the local community enjoy the amenity provided by the forest. Further response may be provided post the Community Councils subsequent meeting. No response forthcoming.	
Aberdeenshire Council, Infrastructure Services – Caroline Palmer (Archaeological Assistant)	16/07/13 By email	18/07/13 By email.	WW2 and other features identified in forest. Recent excavations on adjacent land suggest the potential for well preserved remains located under the sand deposits in some areas. Protect archaeology from forestry operations, enhance the setting and report any finds to AC. Post clearfelling may give the opportunity to undertake further archaeological surveys.	Follow UKFS “Forests & Historic Environment” guidelines. Proposed LISS management limits the site disruption associated with clearfells and also the opportunity for further investigation. Where specific areas are clearfelled in the proximity of adjacent sites then the potential to investigate these areas in more detail will be evaluated.
Burghead & Cummington Community Council - Mr John Gordon	16/07/13 By email	No response to date.		

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Burghead Footpaths Group – Cath Millar	16/07/13 By email	No response to date.		
Greenfingers – Evelyn Flett	16/07/13 By email	No response to date.		
MOD – Keith Anderson	16/07/13 By email	Phone call	Currently working on proposals for woodland management within the MOD area. Radar issue now not relevant.	Provide copy of FDP to MOD, liaise in relation to forestry operations.
Moray Council – Planning – Gary Templeton	16/07/13 By email	No response to date.		

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Appendix 2 – Tolerance table

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

Appendix 3 – LISS prescriptions

- The size and number of groups in the group selection is indicative only. The actual size will depend on the conditions found in each coupe.
- The shape of the groups in the group selection coupes do not have to be circular. Oval shaped with the long axis orientated to receive the most light is preferred.
- The location of the felling areas in the group selection coupes will be located to reflect the conditions in each coupe. Felling areas will be located to:
 - expand existing groups,
 - start new groups taking advantage of existing natural regeneration,
 - start new groups in areas where there is currently no natural regeneration.

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Coupe ref. (See map below)		Management objective/Reason for selection	Long-term structure and desirable species	Age Trans. period and return time (years)	Regeneration and ground flora	Observations (e.g. likely barriers to achieving objective)	Next treatment required	Other useful information
1	Group selection 15.6ha	Diversify age and species structure. Timber production.	Complex structure. SP 70%, BI 30%	Age - 81 years. Trans period - 90 years. Return time – 10 years.	Some advanced regeneration present in patches. Thick ground flora elsewhere. (Aug 2015)	Weed competition and appropriate light levels. (Aug 2015)	Matrix thin with 1.5ha of group felling (5 x 0.3ha).	Felling groups to target existing regeneration. (Aug 2015)
2	Uniform shelterwood 17.5ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 80%, BI 20%	Age - 18 to 35 years. Trans period - 110 years. Return time – 10 years.	None (Aug 2015)	No issues yet. (Aug 2015)	First thin at or before 12m top height.	Road structure needs developed. (Aug 2015)
3	Uniform shelterwood 43.7ha	Timber production. Use natural regeneration for restocking.	Simple structure. CP 80%, BI 20%	Age – 64 years. Trans period - 140 years. Return time – 10 years.	None (Aug 2015)	Still to dark for pine regen, needs more time. (Aug 2015)	Crown thinning.	Variable YC across site, all low or very low. Long trans period due to low YC. (Aug 2015)
4	Uniform shelterwood 7.1ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 80%, MB 20%	Age – 8 and 32 years. Trans period – 150 years. Return time – 10 years.	None – too young. (Aug 2015)	None at moment. (Aug 2015)	First thin at or before 12m top height.	Poor road structure, pure sand. (Aug 2015)
5	Group selection 5.3ha	Diversify age and species structure. Timber production.	Complex structure. SP 35%, CP 35%, BI 30%	Age - 74 years. Trans period – 90 years. Return time – 10 years.	None – too dark. (Aug 2015)	SP area quite rich with grass/bracken ground flora. CP area no ground veg. (Aug 2015)	Matrix thin with 0.5ha of group felling (2 x 0.25ha).	Very poor SP, will only produce firewood, CP better form. (Aug 2015)

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6	Uniform shelterwood 14.4ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 80%, MB 20%	Age – 12 years. Trans period – 140 years. Return time – 10 years.	None – too young. (Aug 2015)	None at moment. (Aug 2015)	First thin at or before 12m top height.	None (Aug 2015)
7	Uniform shelterwood 3.2ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 35%, CP 35%, BI 30%	Age – 8 years (with some overstorey). Trans period – 130 years. Return time – 10 years.	None – too young. (Aug 2015)	None at moment. (Aug 2015)	First thin at or before 12m top height.	None (Aug 2015)
8	Single tree selection 5.8ha	Diversify age and species structure as backdrop to main recreation access point.	Complex structure. MB 100%	Age – 18 years. Trans period – 180 years. Return time – 10 years.	None – too young. (Aug 2015)	None at moment. (Aug 2015)	First thin at or before 12m top height.	CRT visitor zone. (Aug 2015)
9	Group selection 19.7ha	Diversify age and species structure. Timber production.	Complex structure. SP 35%, CP 35%, BI 30%	Age – 69 to 77 years. Trans period – 80 years. Return time – 10 years.	Some good regen in felled groups but little in matrix. (Aug 2015)	Matrix needs more light for pine regen. (Aug 2015)	Matrix thin with 2.5ha of group felling (5 x 0.5ha).	Target felling groups to expand existing groups where regeneration has already been successful. (See note above on felling group location) (Aug 2015)
10	Single tree selection 6.8ha	Diversify age and species structure as backdrop to main recreation infrastructure.	Complex structure. SP 35%, CP 35%, BI 30%	Age – 77 years. Trans period – 130 years. Return period – 10 years.	Very little. (Aug 2015)	Matrix needs more light for pine regen. (Aug 2015)	Crown thinning.	Main CRT visitor zone. Aim to retain some specimen trees beyond trans period. (Aug 2015)
11	Group selection 35.1ha	Diversify age and species structure. Timber production.	Complex structure. SP 35%, CP 35%, BI 30%	Age – 79 to 83 years. Trans period – 70 years. Return period – 10 years.	High levels of BL & Con regen across site. (Aug 2015)	Dense veg in some areas, may cause problem, scarification will help. (Aug 2015)	Matrix thin, targeting SS, plus 5ha of group felling (10 x 0.5ha).	SS could become dominant so target removal in thinnings. Target felling groups to expand existing groups where regeneration has already been successful. (See note above on felling group location) (Aug 2015)

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12	Group selection 26.9ha	Diversify age and species structure. Timber production.	Complex structure. SP 35%, CP 35%, BI 30%	Age – 53 to 77 years. Trans period – 80 years. Return period – 10 years.	Too dark for Con regen, some BL present. (Aug 2015)	Rich site, ground veg will be a problem. Scarift when correct light levels are achieved. (Aug 2015)	Matrix crown thin.	Trees of poor form on rich site with grass & bracken ground veg. (Aug 2015)
13	Uniform shelterwood 12.7ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 80%, BI 20%	Age – 19 to 25 years. Trans period – 130 years. Return period – 10 years.	None – too young. (Aug 2015)	None at moment. (Aug 2015)	First thin at or before 12m top height.	None. (Aug 2015)
14	Uniform shelterwood 28.1ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 80%, BI 20%	Age – 15 years. Trans period – 140 years. Return period – 10 years.	None – too young. (Aug 2015)	None at moment. (Aug 2015)	First thin at or before 12m top height.	None. (Aug 2015)
15	Group selection 21.1ha	Diversify age and species structure. Timber production.	Complex structure. SP 35%, CP 35%, BI 30%	Age – 79 years. Trans period – 70 years. Return period – 10 years.	Good regen across site. (Aug 2015)	Should be a successful LISS coupe. (Aug 2015)	Matrix thin with 3 ha of group felling (6 x 0.5ha).	Some windblow since last thinning. Target felling groups to expand existing groups where regeneration has already been successful. (See note above on felling group location) (Aug 2015)
16	Uniform shelterwood 15.0ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 70%, MB 30%	Age – 15 to 23 years. Trans period – 130 years. Return period – 10 years.	None – too young. (Aug 2015)	None at moment. (Aug 2015)	First thin at or before 12m top height.	None. (Aug 2015)
17	Group selection 46.5ha	Diversify age and species structure as backdrop to main recreation route from Burghead.	Complex structure. SP 35%, CP 35%, BI 30%	Age – 67 to 78 years. Trans period – 130 years. Return period – 10 years.	None yet. (Aug 2015)	No ground veg, needs more time. (Aug 2015)	Matrix thin with 3.5 ha of group felling (7 x 0.5ha).	Slow growing crop needs more light for CP regen, maybe more time for seed development. Try some groups at next intervention, plan to plant felled areas if no regen occurs. (Aug 2015)
18	Uniform shelterwood 8.9ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 80%, MB 20%	Age – 25 years. Trans period – 105 years. Return period – 10 years.	None – too young. (Aug 2015)	None at moment. (Aug 2015)	First thin at or before 12m top height.	No access for machines. Need to reinstate access to south or create permanent crossing of large drain. (Aug 2015)

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19	Group selection 5.8ha	Diversify age and species structure. Timber production.	Complex structure. SP 60%, BI 40%	Age – 84 years. Trans period – 70 years. Return period – 10 years.	Limited Con and BL regen. (Aug 2015)	More light required. Very mossy ground veg. (Aug 2015)	Matrix thin with 1 ha of group felling (3 x 0.3ha).	Good regen in south of coupe, more heavily thinned at last intervention. North side of drain heathery ground veg, south side grass & bracken. (Aug 2015)
20	Uniform shelterwood 29.3ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 80%, BI 20%	Age – 11 to 20 years. Trans period – 115 years. Return period – 10 years.	None – too young. (Aug 2015)	None at moment. (Aug 2015)	First thin at or before 12m top height.	None. (Aug 2015)
21	Group selection 19.9ha	Diversify age and species structure. Timber production.	Complex structure. SP 35%, CP 35%, BI 30%	Age – 82 years. Trans period – 70 years. Return period – 10 years.	Some SS regen but not enough light for SP. (Aug 2015)	Ground veg OK but very mossy. (Aug 2015)	Matrix thin with 3 ha of group felling (6 x 0.5ha).	Trees of poor form. Sporadic windblow following last intervention. Future interventions to focus on improving crop stability. (Aug 2015)
22	Uniform shelterwood 21.4ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 70%, BI 30%	Age – 19 to 25 years. Trans period – 130 years. Return period – 10 years.	None – too young. (Aug 2015)	None at moment. (Aug 2015)	First thin at or before 12m top height.	None. (Aug 2015)
23	Group selection 18.7ha	Diversify age and species structure. Timber production.	Complex structure. SP 35%, CP 35%, BI 30%	Age – 80 years. Trans period – 70 years. Return period – 10 years.	Patchy regen. (Aug 2015)	Ground veg mossy in places and grassy in others. (Aug 2015)	Matrix thin with 3 ha of group felling (6 x 0.5ha).	Good regen along corridor felled for pipeline. More light needed to encourage in other areas. Western section main entrance from Burghead. Windblow following last intervention so need to focus on crop stability in future.(Aug 2015)
24	Uniform shelterwood 21.9ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 80%, BI 20%	Age – 25 years. Trans period – 125 years. Return period – 10 years.	None – too young. (Aug 2015)	None at moment. (Aug 2015)	Crown thinning.	First thinning (rack only) recently completed. (Aug 2015)
25	Single tree selection 16.0ha	Diversify age and species structure as backdrop to public roads.	Complex structure. BI 60%, SP/NS 40%	Age – Mostly 17 years with some 50 year NS & BI. Trans period – 150 years. Return time – 10 years.	None – too young. (Aug 2015)	None at moment. (Aug 2015)	Crown thinning.	Significant road upgrade required prior to thinning operation. (Aug 2015)

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26	Group selection 3.5ha	Diversify age and species structure. Timber production.	Complex structure. SP 70%, BI 30%	Age – 25 years. Trans period – 175 years. Return period – 10 years.	None – too young. (Aug 2015)	None at moment. (Aug 2015)	Matrix thin with 0.25 ha of group felling (1 x 0.25ha).	Significant road upgrade required prior to thinning operation to allow access across large drain. (Aug 2015)
27	Uniform shelterwood 6.3ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 70%, BI 30%	Age – 85 years. Trans period – 75 years. Return period – 10 years.	None (Aug 2015)	None at moment. (Aug 2015)	Crown thinning.	Tree form is poor in this coupe. Significant road upgrade required prior to thinning operation. (Aug 2015)
28	Uniform shelterwood 52.3ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 70%, BI 30%	Age – 11 to 20 years. Trans period – 135 years. Return period – 10 years.	None (Aug 2015)	None at moment. (Aug 2015)	First thin at or before 12m top height.	Many large drains making access difficult so rack layout at first thinning critical. Significant road upgrade required prior to thinning operation. (Aug 2015)
29	Uniform shelterwood 11.5ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 80%, BI 20%	Age – 27 to 29 years. Trans period – 120 years. Return period – 10 years.	None (Aug 2015)	None at moment. (Aug 2015)	First thin at or before 12m top height.	Many large drains making access difficult so rack layout at first thinning critical. Significant road upgrade required prior to thinning operation. (Aug 2015)
30	Uniform shelterwood 14.5ha	Timber production. Use natural regeneration for restocking.	Simple structure. SP 35%, CP 35%, BI 30%	Age – 16 years. Trans period – 135 years. Return period – 10 years.	None (Aug 2015)	None at moment. (Aug 2015)	First thin at or before 12m top height.	Many large drains making access difficult so rack layout at first thinning critical. Significant road upgrade required prior to thinning operation. (Aug 2015)
31	Group selection 8.0ha	Diversify age and species structure. Timber production.	Complex structure. SP 70%, MB 30%	Age – 84 years. Trans period – 70 years. Return period – 10 years.	None (Aug 2015)	None at moment. (Aug 2015)	Matrix thin with 1.2 ha of group felling (3 x 0.4ha).	Significant road upgrade required prior to thinning operation. (Aug 2015)
32	Group selection 7.6ha	Diversify age and species structure. Timber production.	Complex structure. SP 70%, MB 30%	Age – 80 years. Trans period – 70 years. Return period – 10 years.	Prolific BL regen. (Aug 2015)	Rich site with grass & bracken ground flora. (Aug 2015)	Matrix thin with 1.2 ha of group felling (3 x 0.4ha).	Target felling groups to expand existing groups where regeneration has already been successful. Stacking area required. (Aug 2015)

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