Moray and Aberdeenshire Forest District

Culbin

Land Management Plan

Including:
Culbin Sands, Culbin Forest and Findhorn Bay SSSI plan
Moray and Nairn Coast SPA & RAMSAR plans.

Plan Reference No: LMP 1

Plan Approval Date:

Plan Expiry Date:

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

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

The mark of responsible forestry

FOREST ENTERPRISE - Application for Forest Design Plan Approvals in Scotland

Forest Enterprise - Property

Forest District:	Moray & Aberdeenshire FD
Woodland or property name:	Culbin
Nearest town, village or locality:	Forres
OS Grid reference:	NH977616

Areas for approval

	Conifer	Broadleaf	Open
Clear felling	52.3ha		
Selective felling	101.0ha		
Restocking	34.4ha	23.2ha	5.0ha
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 July 2014

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

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

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

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

Signed …… Forest District Manager

Signed …… Conservator

District Moray & Aberdeenshire FD

Conservancy Grampian

Date ……

Date of Approval ……

Date approval ends: ……

FOREST ENTERPRISE - Request for Approval of Thinnings

To: Conservator

Grampian Conservancy
Portsoy Road
Huntly
Aberdeenshire
AB54 4SJ

I apply for Authority to carry out a programme of thinnings within Culbin forest in Moray & Aberdeenshire Forest District during the 10 years commencing from the date of approval.

I undertake to identify any statutory designations which apply to any of the land to be subject to thinning, and to obtain the necessary permissions from the appropriate statutory body before commencing work under any approval which is granted.

Signed…….. Signed……..
Forest District Manager Conservator

District Moray & Aberdeenshire Conservancy Grampian

Date …….. **Date of Approval**……..

Approvals, agreements & signatures

I confirm that the following land management plan which covers the section of SSSI "Culbin Sands, Culbin Forest and Findhorn Bay" (Site code 478) within land management plan "Culbin" contains the necessary detail, content and mitigation measures to comply with the statutory requirements contained within the Nature Conservation (Scotland) Act 2004 and in particular in relation to Part 2, Chapter 1, Section 14 (d), which covers consents via an agreed management plan (i.e. "SNH's consent under section 13 is not required in relation to carrying out an operation of the type described in subsection (1) of that section – …….(d) in accordance with the terms of a management agreement between SNH and the public body or office-holder carrying out the operation").

SNH Signature …… Date ……..

SNH Name ……..

SNH Job Title ……..

Address……..

Email ……..

Contact telephone number ……..

FCS has a corporate requirement under UKWAS (3rd edition) and under the FCS Framework Document for FES (2010) to manage <u>all</u> designated sites in accordance with plans approved by the statutory authority, I therefore sign below to approve the contents of this plan in relation to the designated sites Culbin Bar SAC, Moray and Nairn Coast SPA and Ramsar that fall within its boundary on the NFE.

SNH Signature …… Date ……..

SNH Name ……

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Land Management Plan Summary

This plan is a review of Forestry Commission Scotland's management of Culbin Forest on the Moray coast.

The purpose of the plan is to set out the 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 land management plan balances our obligation to provide an economically viable, sustainable, quality timber resource while providing creative measures for health and well being, coherent landscape design and the environmental and ecological improvement of the land we manage.

This plan also covers the management of Culbin Sands, Forest and Findhorn Bay SSSI, notified for its geological and biological features. The SSSI comprises of four distinct areas; Culbin Sands where marine processes and weather still influence the dunes and shingle deposits; the area of windblown sand and relict dune systems, now afforested, known as Culbin Forest; Findhorn Bay; and the Maviston and Lochloy section where the semi-natural woodland along with Cran Loch and Loch Loy are important features. Our proposed management of the LMP area includes the aim of maintaining and where practical enhancing the SSSI's notifiable features.

The majority of the timber production from Culbin Forest will come from managing the block under Low Impact Silvicultural Systems (LISS) of uniform shelterwood, group shelterwood or selection; largely relying on natural regeneration to establish the next rotation. LISS conversion periods (from even aged to uneven aged stands) will vary for different coupes according to tree species and growth rate but we expect the average to be 100 to 150 years using 7 to 10 year intervention cycles.

1.0 Introduction

Refer to Map 1: Location.

1.1 Setting and context

Culbin forest is situated on the Moray coast (NH977616) overlooking the Moray Firth. Nairn is 3 km to the west, also on the coast, Forres is 4 km in land and Findhorn is 1.5 km east, across the mouth of Findhorn Bay. The plan area is mostly within the Moray council area, with a small proportion crossing the boundary into the Highland council area.

The plan area consists of seven separate blocks. Culbin main block forms the vast majority of the area, the remainder is made up of Hardmuir wood, Inshoch wood, Inshoch moss, Downie hillock, Hugh wood and Kilnhill wood.

Block	Area (ha)
Culbin main block	3133.5
Hardmuir wood	43.2
Inschoch wood	97.2
Inschoch moss	57.6
Downie hillock	14.2
Hugh wood	18.1
Kilnhill wood	48.7
Total	3412.5

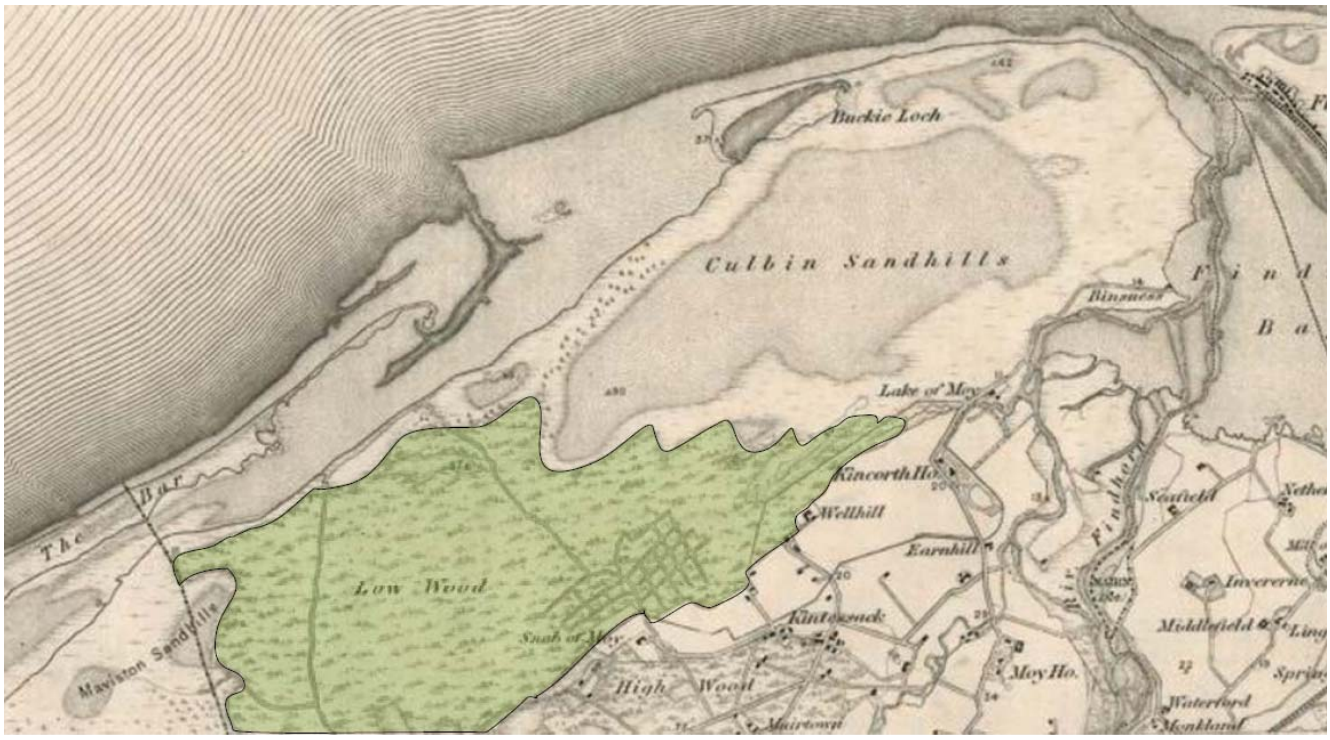
Culbin main block is not surprisingly in the coastal forest zone of the SNH landscape character assessment, while the smaller outliers are within the coastal farmlands zone. The main block is also adjacent to the Culbin bar area of great landscape value.

The main stays of the local economy are agriculture and distilling, while tourism also plays an important role.

The existing design plan is characterised by large LISS areas to take advantage of the mature pine species and the suitability of the site for natural regeneration.

1.2 History of the forest

The land on which Culbin Forest now stands was bought by the Forestry Commission between 1922 and 1931 in nine lots. One of the main reasons for the acquisition was to stabilise the extensive sand dune system which had covered some areas of agricultural land and contributed to seasonal sand storms. Initially the open dunes were stabilised with Marram grass but it was later found that stabilisation and successful afforestation could be accomplished by "thatching" the sand with branch wood, if necessary pegged down with wires. Stabilising dunes by afforestation was completed by the late 1960's, when the earliest plantings were maturing and under which some areas of interesting vegetation had developed.



The extent of Culbin Forest in 1878

…and again in 1929.

1.3 Land management objectives

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

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

Analysis of the available information has led to two **primary objectives** for these blocks:

- management of these blocks being to create woodlands with high environmental value for species, habitats and landscape.
- the production of a quality crop of timber.

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

- management of the woodland to provide a key recreational resource for Nairn, Forres and the surrounding area.

2.0 Analysis of previous plans

The previous plan was approved in Nov 2003. It is rather brief, with the majority taken up with the SSSI management plan, which formed an integral part of it. In this iteration the SSSI management plan can be found in appendix 4. However the main objectives stated in the previous plan are included in the table below, along with the progress made to date on their achievement and how this will be carried forward into this new plan.

Theme	Priority (in current approved plan)	Objective (in current approved plan)	Management indicator	Progress to date 1 – Nominal progress 2 – Some progress 3 – Progress as per FDP	Proposed action (in this plan)
Climate Change	Medium	Manage suitable areas under LISS.	Thinning of all accessible areas.	3 – All thinning coupes have been worked.	Continue to thin all areas that have been previously worked.
Timber	Medium	Producing wood and marketable timber.	Post fell figures recorded in SRP tally with those produced in PF.	3 – All felling coupes identified in FDP completed. All thinning coupes have been worked.	This will continue to be a major driver in the new plan.
Business development	Medium	Produce timber to sustain local employment.	As per 'Timber' above	As per 'Timber' above	This will remain a minor objective for the current plan.
Community development	None	No objective listed.			

Access & health	High	Providing public recreation and access.	Maintaining and encouraging free and open access to the forest on foot, horse and cycle where this will not compromise the environmental and silvicultural aspects of the forest.	3 – Work has been carried out on the recreation routes to improve their quality and marketing. Tower 99 has also been constructed.	This will continue to be a major driver in the new plan within the limit of available resources.
Environmental quality	High	Conserve archaeological features.	Preserve all known sites and promote awareness so that others may be discovered when carrying out operations.	3 – All known features have been preserved. All new features discovered have been recorded on the GIS system for future reference.	This will continue to be a major driver in the new plan.
Biodiversity	High	Conservation of important habitats and species.	Forest and non-forest habitats, which include sand dunes, lichen beds, coastal salt marsh and freshwater ponds will be maintained, safeguarded and enhanced along with their important associated species.	3 – All known habitats and species have been preserved. All new features discovered have been recorded on the GIS system for future reference.	This will continue to be a major driver in the new plan.

3.0 Background information

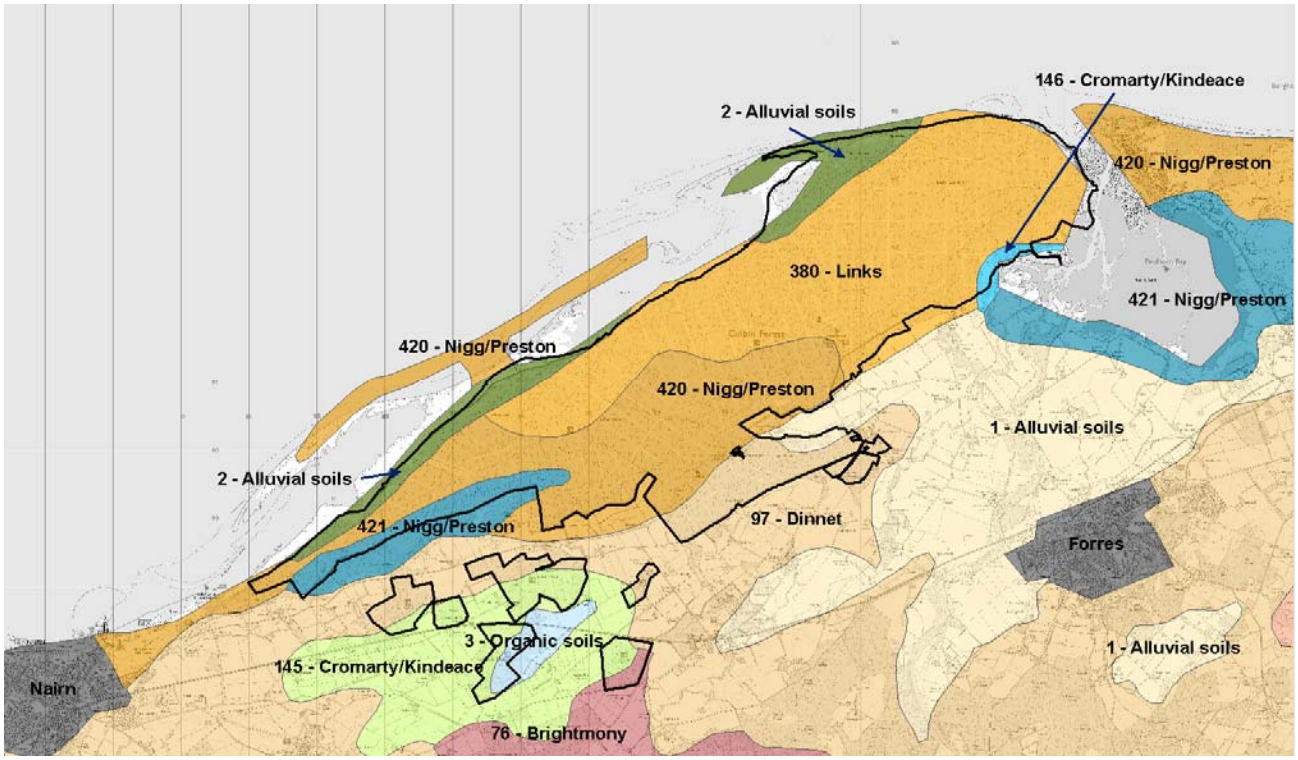
3.1 Physical site factors

Refer to Map 2: Key Features.

3.1.1 Geology, Soils and topography

Culbin is a site of exceptional interest for the scale, complexity and diversity of its coastal geomorphology. The features of major significance include the complex history of post-glacial landform evolution, the long history of sand movements and the range of dune and sand hill landforms that rest on a platform of shingle deposits. The ancient dunes, now stabilised by afforestation, form one of the largest areas of blown sand in Britain. Furthermore, the spectacular erosional features and rapid retreat of the eastern coastal foreland, together with the highly dynamic spit and bar environments to the west whose changes are well documented, provide excellent examples of a whole range of coastal landforms which can be clearly linked to coastal processes. Culbin is therefore a site of outstanding importance for studies in coastal geomorphology and is of importance on a national scale. It contains a series of shingle beds, sand dunes, (including what is thought to be the largest parabolic fixed dune in Europe) raised beaches, butte dunes, and a previous bed of the river Findhorn. In 1993 a report was commissioned by Scottish Natural Heritage from The Coastal Research Group, Department of Geography and Topographic Science, University of Glasgow (Comber, Hansom and Fahy, 1994). This report aimed at providing a comprehensive background of the geomorphological interest of the site.

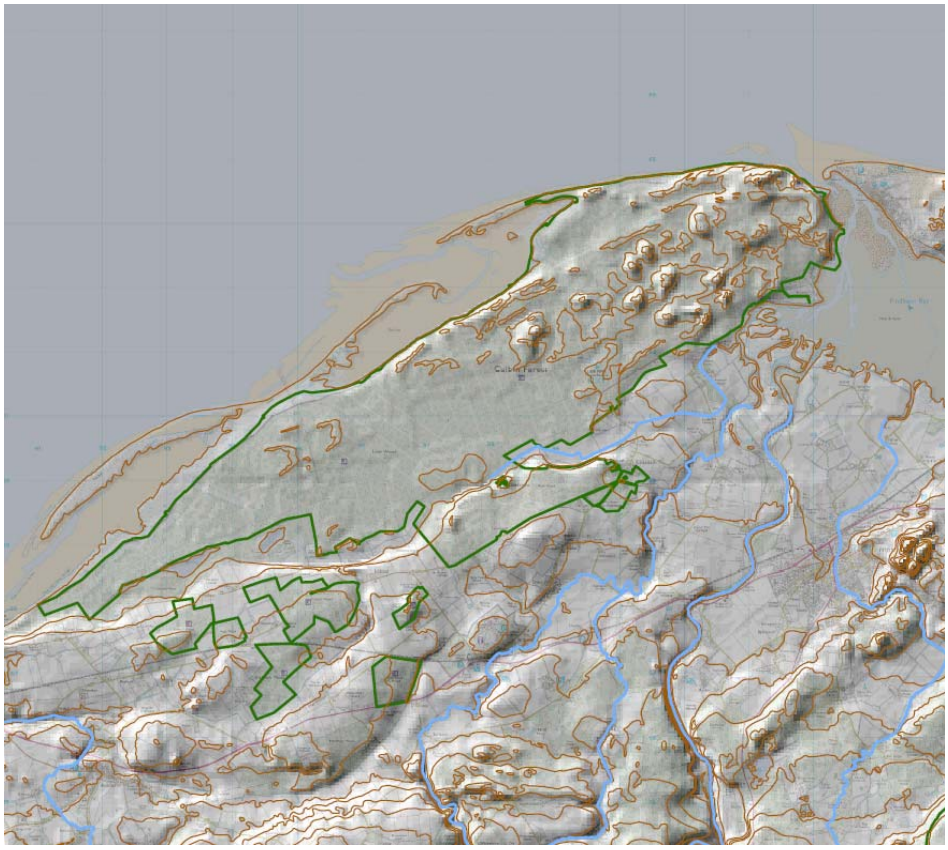
According to the British Geological Survey Geological Map of the UK this land management plan area is underlain by Upper Old Red Sandstone of the Orcadian Basin formation, formed during the Devonian period. These tend to lead to the production of soils with low nitrogen availability.



Extract from the Soil Survey of Scotland map with the soil associations underlying Culbin.

The Links association (380) consists mainly of noncalcareous regosols, with some gleys and minor areas of forest brown earth, occurring on beaches and dunes with gentle and strong slopes. The dunes are moundy and unstable and merge seawards with the tidal sand. Under coniferous woodland podzolic profiles have developed.
The Nigg association (420) is associated with a flat or gently undulating topology with widespread humus-iron podzols. Gleys can be on local significance. Within the areas of windblown sand, high steep-sided dunes occur and noncalcareous regosols form the dominant soil type. The lesser Nigg association (421) occupies an extensive depression and delta. Noncalcareous gleys are dominant with lesser areas of calcareous and peaty gleys, whose wetness results from a high ground-water table.
The alluvial soils (2) consist of salt marsh. This is restricted to the lowest raised beach around the high-water mark of ordinary spring tides. Slopes are negligible and non-rocky. The soils are exclusively poorly or very poorly drained saline alluvial soils. As they are derived from marine sands they are immature and constantly subject to erosion and accretion. Depending upon their position relative to the tides, the degree of flooding and salinity vary widely.

The Dinnet association (97) is predominantly free-draining, cultivated podzols with noncalcareous and peaty gleys restricted to small localised hollows and depressions. There is no physical impedance to root development except fot the occasional dark-brown, cemented, humus-iron B horizon, the "Moray Pan". The natural profile is normally a humus-iron podzol with some iron podzols and humus podzols.
The Cromarty/Kindeace association (145) consists of humus-iron podzols with some gleys and is found on undulating lowlands and foothills with gentle and strong slopes. The parent material is a partially water-sorted morainic drift overlaying a till. The podzols are imperfectly drained with an indurated B horizon. Normally the soils are stony, the stones being acid Moine schists. Peatynd noncalcareous gleys occupy hollows and receiving sites. Peaty podzols occur locally at higher elevations.
Finally the organic soils (3) consist of basin peat underlain by gleys. Sandy clay loam to clay textures, coupled with the massive structure of these soils effectively impede internal drainage and lead to the waterlogged conditions necessary for peat formation. The thickness of the peat varies enormously from 1 to 8 metres with the average around 5 metres.



Topology of Culbin and the surrounding area.

3.1.2 Water

There are no major water courses within the forest, but several minor water courses cross the site, particularly towards the western end, 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.

In addition there are three ponds within the central area of the main block that have a high value for biodiversity, recreation and education.

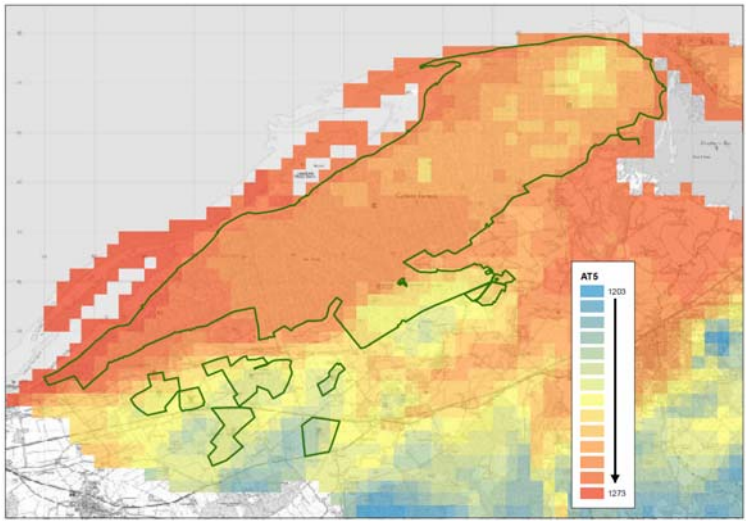
Otter pond

Gravel pit ponds

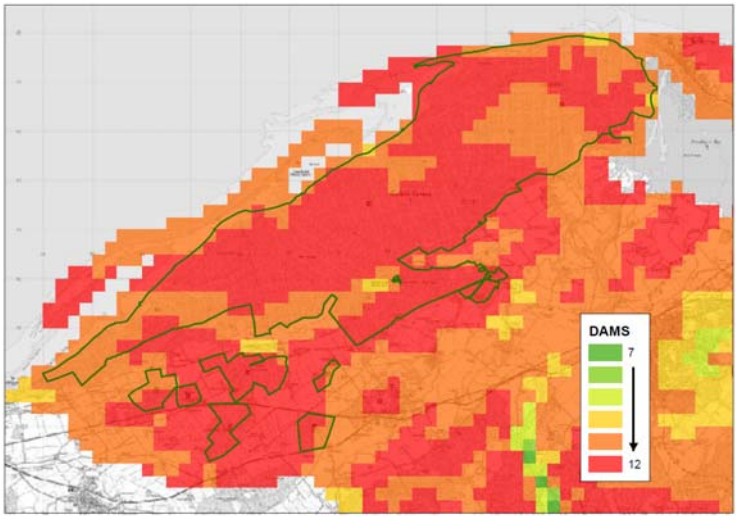
3.1.3 Climate

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.

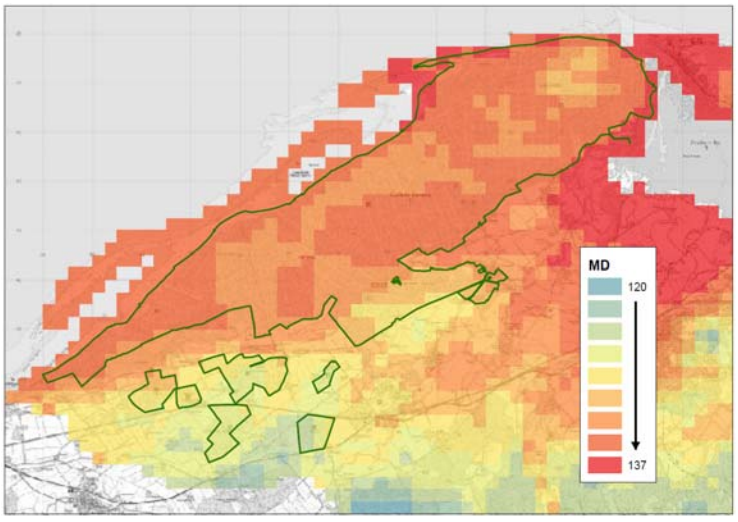
AT5	DAMS	MD
1220 - 1273	10 - 12	124 - 137



AT5 is the accumulated total of the day-degrees above the growth threshold temperature of 5º, which provides a convenient measure of summer warmth. The results for AT5 place these blocks 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 the 10 – 11 score for these blocks put them in the "sheltered" category.



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

Culbin contains a wide variety of habitats associated with the largest sand dune system in Britain. These include inter tidal flats, sand and shingle bars, dunes, dune-slacks, salt marsh, heath, freshwater bodies, freshwater marshes and scrub woodland. Although large areas of dune and dune heath have been afforested, much of the original interest survives and other habitats are intact. Two areas (to the west of the Buckie Loch and by the Maviston Dunes) have been identified as requiring action in relation to the "UK Coastal Sand Dunes Habitat Action Plan".

The range of plant communities associated with the various habitats are of special interest in the study of plant succession and contain an exceptional variety of species (over 550 flowering plants have been recorded). A large number of rare or local plants occur and Culbin lies on a phytogeographical boundary with 48 species at their northern limit on the east coast and three at their southern limit. The diversity of fungi and lichens is also outstanding. Some species are nationally rare e.g. fungi like *Laccaria maritima*, Some areas are especially rich in species. These areas may require specialist management. The non-tree plantlife is of great interest to botanists, partly because there is a mosaic of very different habitats close together, such as pinewoods, saltings and freshwater marsh. Within the woodland the flora is that of pinewood on sand, but as the forest matures it appears to get closer to the flora of native pinewoods although there is some doubt that it will ever become the same. Much of the heather growing along the coast and inside the forest is the local grey hairy variety, adapted to the dry climate of the Moray Firth. Some plants are nationally rare such as the single flowered wintergreen, *Moneses uniflora*. A comprehensive list of lichens was produced by Coppins etal in 1987. In excess of 130 species of lichen have been identified and the lichen communities area was identified by Lusby *(1990)* as "one of the finest

examples of lowland, acidic heath in the British Isles in both luxuriance and diversity".

The coastal saltings and Findhorn Bay host many waders and other estuarine and coastal birds, and the forest contains those associated with northern coniferous pine forests, including Crossbill and Crested tits, plus several raptors including the Osprey, which sometimes nests in the forest. Liaison is maintained with RSPB who frequently conduct studies in the forest.
The site is of national importance for its exceptionally diverse entomological interest including several rare species, including rarities such as the Dingy Skipper butterfly.

Additionally, the foreshore and Findhorn Bay are components of the internationally important Moray Firth group of estuaries and hold significant numbers of feeding and roosting wildfowl and waders for much of the year. Offshore areas hold nationally important concentrations of wintering sea duck. Two wildlife ponds were created at the western end of the forest in 1991 followed by a larger pond at Cloddymoss during early 1993. These ponds support breeding populations of Common Frog, Common Toad, Palmate Newt and Great Crested Newts. The later species being subject to special protection and is listed on Annex 1 of the EC habitats and species directive. Common Lizards occur in more open areas of the forest. Additionally Culbin contains red squirrels, wild cat, otter and pine marten.

Designated Sites covered by this LMP

Designated Site Name	Site code	Site Type	Total Area of designated site (ha)	Area within this FDP (ha)	% With in this FDP	Annex containing SNH site documentation
Culbin sands, Culbin forest and Findhorn bay	478	SSSI	5016ha	2799ha	56%	Appendix 6
Moray and Nairn coast	8550	SPA	2326ha	67ha	3%	Appendix 6
Moray and Nairn coast	8447	Ramsar	2412ha	67ha	3%	Appendix 6
Culbin bar	8238	SAC	581ha	19ha	3%	Appendix 6

Refer to the map in Appendix 5 which highlights the location of the above designated sites in relation to the LMP boundary and the NFE management boundary.

Features on the NFE and condition

N.B. this table lists only those features of protected areas that occur on the NFE and not all features of the protected areas.

Site Type	Site code	Feature description	SCM Condition (Date assessed)	Condition on NFE
SSSI	478	Coastal geomorphology of Scotland	Unfavourable declining	Unfavourable declining
		Fungi assemblage	Favourable Maintained (September 2014)	Favourable Maintained
		Invertebrate assemblage	Favourable Maintained (March 2017)	Favourable Maintained
		Lichen assemblage	Unfavourable No Change (March 2012)	Unfavourable no change
		Sand dunes	Unfavourable Declining (Nov 2012)	Recovering due to management
		Shingle	Favourable Maintained (Feb 2016)	Favourable Maintained
		Vascular plant assemblage	Favourable Maintained (March 2015)	Favourable Maintained
SAC		Shifting Dunes	Unfavourable declining	Unfavourable declining
		Coastal Shingle Vegetation outside the reach of waves	Favourable maintained	Favourable maintained
SPA		Wintering Birds Assemblage*		

*Only 3% of the SPA designation on NFE and management by Forest Enterprise Scotland unlikely to relieve pressures or contribute to changes

Coastal geomorphology of Scotland - Culbin is of national importance for the exceptional scale, complexity and diversity of its coastal landforms. The oldest are shingle features which provide a detailed record of relative sea level change over at least the last 8,000 years. Before it was stabilised by afforestation, the sand dune complex capping the shingle comprised the largest windblown sand area in Britain, and was renowned for its extremely dynamic landforms. The afforested dunes include the largest parabolic dune forms in Europe. Other superb examples of dune system reworking by wind are identifiable within the site, including high sandhills, formerly transgressive waves of bare sand and butte dunes. The sea's transport of sand along the coastal edge has created spit and bar complexes whose scale, extreme dynamism and well-documented history make them nationally important. Spectacular high scarp faces also occur along the coastal edge, forming evidence of coastal recession into the afforested sandhills.

Fungi assemblage - Culbin's lichen and fungal floras are each of national importance with over 450 species recorded respectively. One fungus species, the sand deceiver, has not been found at any other site in Britain.

Invertebrate assemblage - The site is of national importance for invertebrates with a number of rare and noteworthy species recorded. These include the bumblebee robberfly, Kentish glory moth, narrow-bordered bee hawk-moth, small blue butterfly, dingy skipper butterfly and the southern hawker dragonfly. The fly *Tetanocera freyi*, the larvae of which are predators of water snails, has been found at Loch Loy, its only site known in Scotland.

Lichen assemblage - Culbin's lichen and fungal floras are each of national importance with over 450 species recorded respectively. Rare lichens include the matt felt lichen.

Sand dunes - Culbin Sands has the largest area and most complete range of sand dune habitats in Moray with a range of other coastal communities including extensive saltmarsh and sheltered intertidal flats. Areas of dune heath are also found.

Shingle - Culbin Bar is a 7 km-long shingle bar with an exceptional series of shingle ridges running parallel to the coast. These support the best and richest examples of northern heath on shingle with heather, crowberry and juniper growing on stable ridges. The natural westward movement of the bar continues depositing new ridges for future colonisation.

Vascular plant assemblage - The assemblage of vascular plant species at Culbin is of national importance with a number of nationally or regionally rare or scarce species occur, some at or near the limits of their range in Britain. These include single-flowered wintergreen, marsh clubmoss, twinflower, the eyebright *Euphrasia foulaensis*, coralroot orchid, oysterplant, seaside centaury, sea aster, lesser tussock sedge, black bog-rush, sea rush , dwarf eelgrass, narrow-leaved eelgrass and eelgrass .

Pressures and proposed actions

N.B. this table lists only those features of protected areas that occur on the NFE and not all features of the protected areas.

Site Type	Feature description	Pressures	Proposed action	Timescale
SSSI	Coastal geomorphology of Scotland	Invasive species – presence/changing extent of invasive species (native)	Monitoring and regular programme of removal of trees, scrub and INNS.	Throughout the life of the LMP
		Recreation/disturbance	On-going review of interpretation and working with stakeholders to address recreational disturbance. Use of signage.	Throughout the life of the LMP
	Fungi assemblage	Forestry operations	Pre-operational coupe checks will identify fungi rich areas and appropriate mitigation will be detailed in workplans.	Throughout the life of the LMP
	Invertebrate assemblage	No negative pressures	N/A	

	Lichen assemblage	Forestry operations	A survey has been carried out in 2017. The results of this will be used to focus management on reducing shading and other management required.	By 2020 and subsequently throughout the life of the LMP
		Invasive species – presence or changing extent of invasive species	Remove gorse and other shrub / conifer regeneration from open lichen areas.	By 2020
		Recreation/disturbance	FCS will continue to monitor and use signage as required.	Throughout the life of the LMP
	Sand dunes	Invasive species – presence /changing extent of invasive species (non-native)	INNS will be controlled.	Throughout the life of the LMP
		Invasive species – presence /changing extent of invasive species (native)	Ongoing programme of scrub removal from open dune areas.	Throughout the life of the LMP
	Shingle	Invasive species – presence or changing extent of invasive species	Ongoing programme of scrub and INNS removal from open dune areas.	Throughout the life of the LMP
	Vascular plant assemblage	Forestry operations	Pre-operational coupe checks will identify plant rich areas and appropriate mitigation will be detailed in workplans. Monitoring of wintergreens and twinflower is ongoing.	Throughout the life of the LMP

SAC	Shifting Dunes	Invasive species – presence /changing extent of invasive species (non-native)	INNS will be controlled.	Throughout the life of the LMP
		Invasive species – presence /changing extent of invasive species (native)	Ongoing programme of scrub removal from open dune areas.	Throughout the life of the LMP
	Coastal Shingle Vegetation outside the reach of waves	Invasive species – presence or changing extent of invasive species	Ongoing programme of scrub and INNS removal from open dune areas.	Throughout the life of the LMP
SPA	Wintering Birds Assemblage*	Recreation/Disturbance	Use of interpretation to inform and educate public about importance of site. Monitoring of permissions to ensure compliant with wildlife legislation and minimise disturbance.	Throughout the life of the LMP

*Only pressures attributable to NFE landholding listed here

Inshoch wood, one of the outlying woods is a plantation on an ancient woodland site (PAWS). This extends to 94ha and is of medium ecological potential. The long term aim is to fully restore the woodland to native pinewoods although this is currently a low priority site for work compared to other PAWS areas within the district. However the opportunities presented by forest operations such as thinning will be used to gradually restore the site

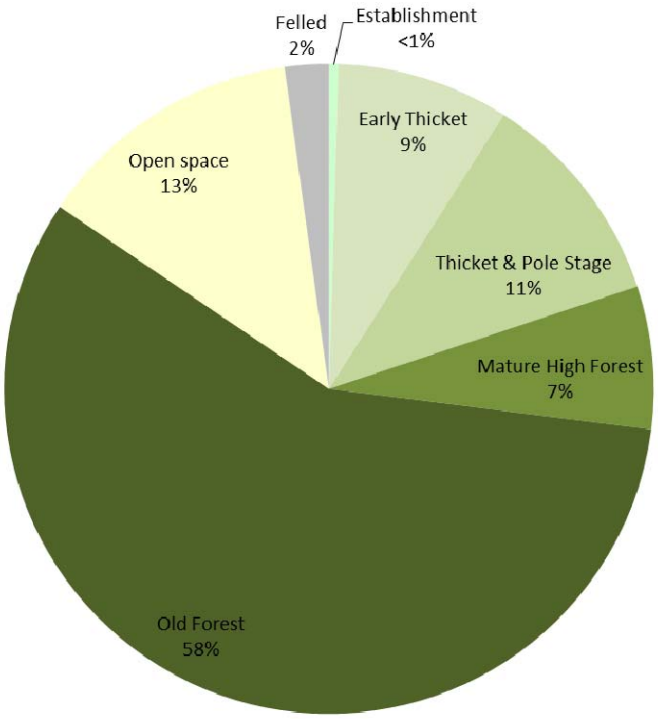
3.3 The existing forest

3.3.1 Age structure, species and yield class

Age Structure

The majority of the plan area is currently covered with old forest. This is a consequence of the species and the management regime being used. The use of LISS in pine crops means that longer rotations are required to allow the standing trees to reach an age the means they are capable of producing a good crop of seeds on a regular basis to ensure natural regeneration.

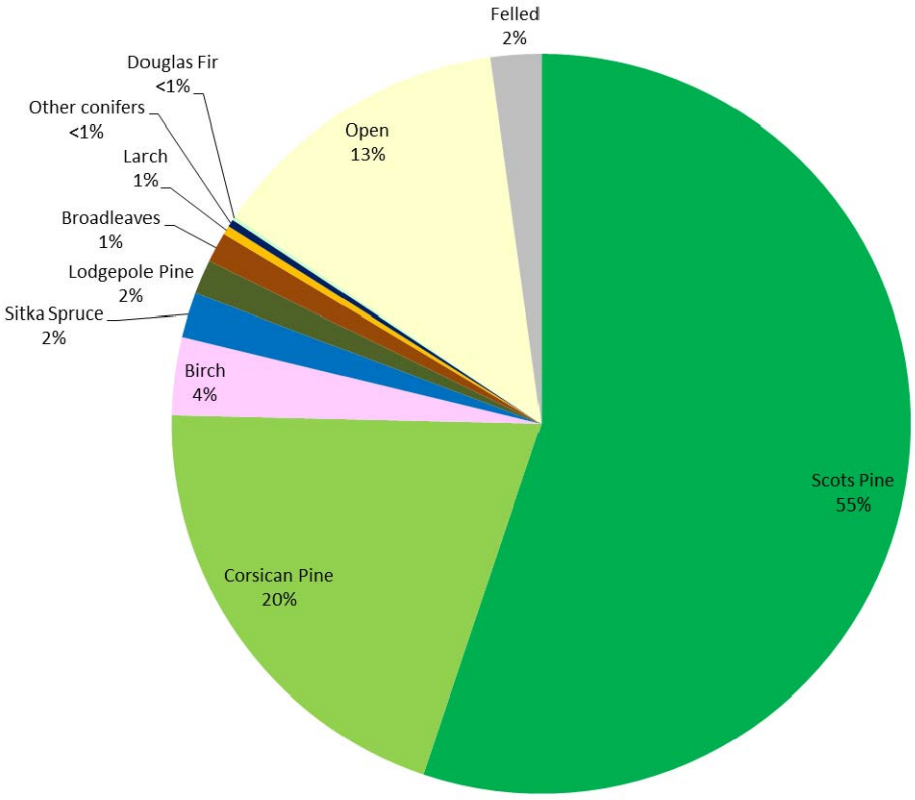
Ages of Trees (years)	Successional Stage	Area	%
0 -10	Establishment	15.8	0.5%
11 – 20	Early Thicket	292.6	8.6%
21 – 40	Thicket & Pole Stage	370.6	10.9%
41 – 60	Mature High Forest	242.2	7.1%
61+	Old Forest	1961.1	57.5%
	Open Land	455.5	13.3%
	Felled	74.7	2.2%



Species

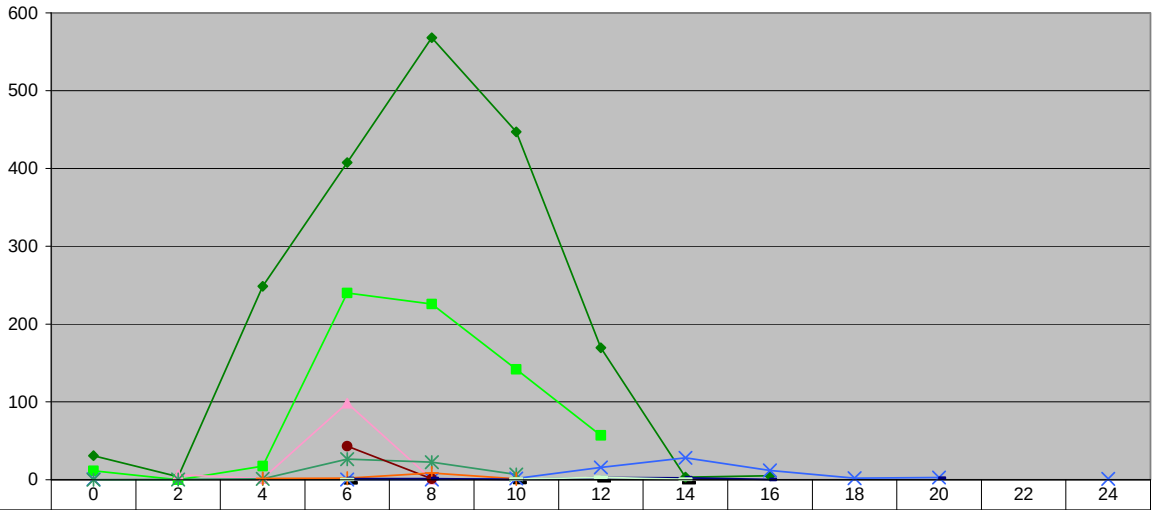
Over three quarters of the plan area is stocked with pine species (Scots & Corsican). The lack of species diversity is due in most part to the very poor soil conditions, and the limited range of species suited to the conditions.

Species	Area (ha)	Percentage
Scots Pine	1882.4	55.2%
Corsican Pine	689.6	20.2%
Birch	116.6	3.4%
Sitka Spruce	66.9	2.0%
Lodgepole Pine	51.3	1.5%
Broadleave	45.4	1.3%
Larch	13.2	0.4%
Other conifers	11.3	0.3%
Douglas Fir	5.6	0.2%
Open land	200.7	13.3%
Felled	74.7	2.2%



Yield Class

The yield classes for the pine species are low which is not unexpected in a block with such poor soil conditions. There are few crops with yield classes greater than 12. The average yield class is about 8.



	0	2	4	6	8	10	12	14	16	18	20	22	24
Scots Pine	30.75	3.78	248.56	407.61	568.05	447.19	169.53	3.24	5.12				
Corsican Pine	11.39	0.06	17.41	239.93	225.81	141.86	57.03						
Birch		6.28	1.36	98.53	0.53								
Sitka Spruce	0.44			0.31	0.23	1.76	15.9	28.07	11.96	2.02	2.76		1.06
Lodgepole Pine	0.05	0.32	1.2	26.43	22.56	6.81							
Broadleave				43	1.1								
Larch			1.55	1.88	8.55	1.22							
Conifer				1.4	1.48	0.3	2.83	2.39	0.36		1.91		
Douglas Fir				0.17		0.8	3.03	0.43					

3.3.2 Access

Access to and within the blocks in the plan area is fairly good. The A96 runs to the south of the blocks which are access from it via minor rural roads. The block has a good forest road network and there are no plans for further roading.

3.3.3 LISS potential

There are large areas of this plan that are currently being managed under LISS (Low Impact Silvicultural Systems). The site conditions and crops mean these are suitable systems to use with a high expectation of success.

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 Culbin that is suitable for LISS management is Scots Pine that has been well thinned in the past.

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
Woodfuel	Firewood, biomass	5%
Short roundwood	Chip board, Orientated strand board (OSB), Paper	15%
Fencing	Posts & rails	5%
Short log	Pallets & slats	15%
Log	Construction	60%

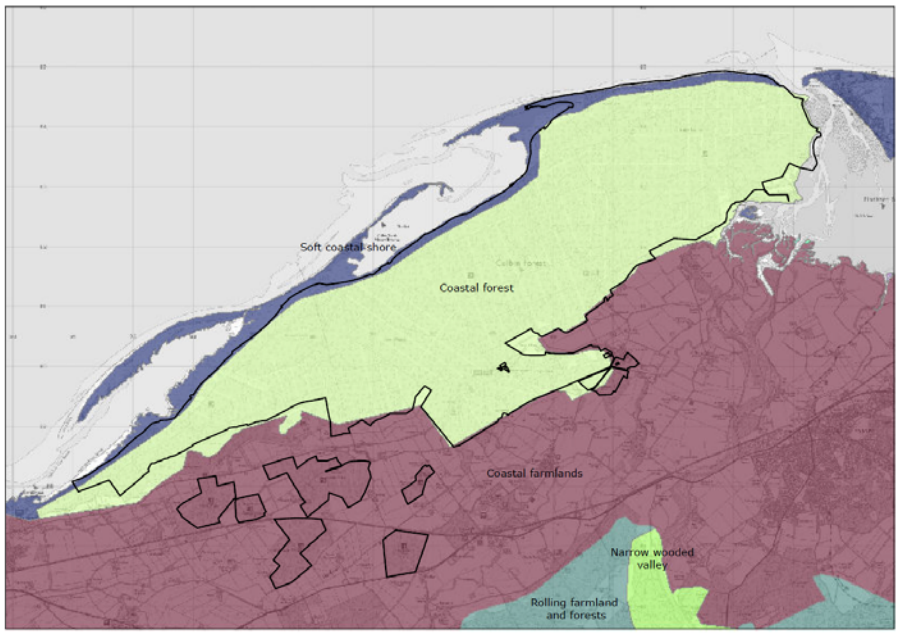
The vast majority (95%) of this production is sold into markets in the north east of Scotland, with very little travelling more than 50 miles to the processing facility.

3.4 Landscape and land use

3.4.1 Landscape character and value

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 LMP 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, produced in 1998 by Turnbull Jeffrey Partnership. This is now out of date and a revised assessment is being undertaken and will inform our plans when it is available.



The vast majority of the main Culbin block is in the coastal forest landscape character type while the small outlying blocks are in the coastal farmland zone.

The coastal forest area is described as being "dense stands of mature conifers of single species and age". The forests mask the complex and small scale irregularities of the underlying landform and dune pattern. They create a

dense, dark backdrop to the neighbouring zones. The forest forms a barrier to views both to and from the coast and to the wider land and seascape.

Guidelines for this landscape character type include:

- Restructuring should reflect the underlying topography.
- Restocking should aim to significantly increase both age and species diversity and open space within the forest.
- The design of funnelled views to increase the apparent "depth" of the forest and add visual diversity to the views from the well populated coastal farmland.
- Vary the shape of the edge to include subtly curving margins in undulating landforms, whilst fitting with the geometry of strong field boundaries in flatter landform.
- Grading of the margin by including lighter coloured deciduous shrubs and tree species.
- Varying the size of felling coupes to accord differences in scale to the landscape.
- The long term retention of mature belts of trees and the creation of naturalistic forest structure against the coast.

The coastal farmland is a flat to gently undulating coastal plain with wide horizons. The fertile soils are intensively farmed. Long bands of coniferous plantation and shelterbelts create a backdrop to large, smooth, arable fields and create a simple pattern of vegetation. This is a densely populated landscape zone in the Moray & Nairn report area.

The large scale of this landscape needs to have a strong structure of forestry to complement it.

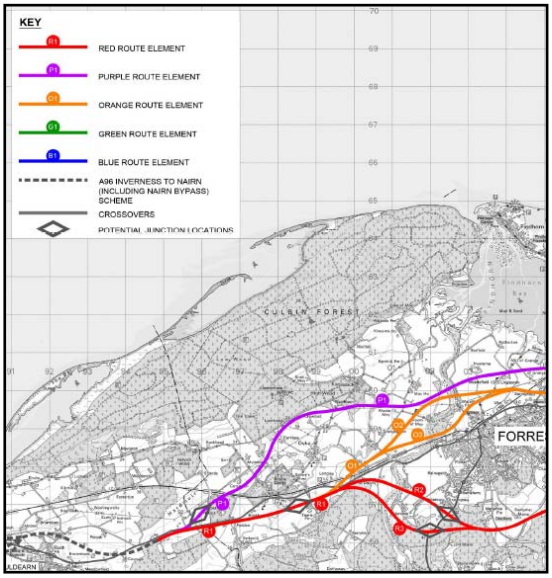
3.4.2 Visibility

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

Culbin is located on the coast which makes up the northern boundary of the main block. Most of the rest of the neighbouring land is intensive agriculture, mostly arable with some wet woodland to the south west around the Cranloch area.

The area between the woodland and the sea is a RSPB reserve. The proximity of Culbin Forest to the reserve has an impact on the way it needs to be managed. In particular trees are naturally seeding onto Culbin Sands with the consequence that part of the reserve is in unfavourable condition and requires ongoing management. Opportunities for FES and RSPB to work together to tackle this problem will be discussed and agreed.



Depending on the route selected the duelling of the A96 could have an impact on the outlying blocks of the Culbin LMP area. See the route options map to the left.

The route options are subject to development and further assessment and several engineering and environmental considerations will influence the final route selection. Once this decision is made its impact on the Culbin forest area will be assessed and the appropriate amendments to this plan made with approval from FCS.

3.5 Social factors

3.5.1 Recreation

Culbin is a well-known and popular forest for recreation, with an estimated 65 000 visitors per year (FCS 2013). The main recreational uses of Culbin are walking, dog walking, cycling and horse riding. The main access point to Culbin forest for visitors is via Wellhill car park, where there is a large modern toilet block, information / interpretation panels, a well-stocked leaflet dispenser, rock sculpture and some picnic furniture. There is parking for 60 cars. The only waymarked trail in Culbin, the Hill 99 trail, starts from here.

Wellhill car park and toilet block.

Hill 99 tower.

There is also a small FCS car park at Cloddymoss, which has more room for larger vehicles. There are information / interpretation panels also in this car park.

Cloddymoss car park and interpretation.

There is a large Highland Council owned & managed car park at Nairn East Beach, accessed through the Lochloy holiday park, from which visitor can walk or cycle into Culbin. There are toilets and information / interpretation panels about Culbin in the car park, and a small child's play structure.

There is a small Highland Council managed car park at Kingsteps which gives closer access to Culbin via the foreshore or through a section of woodland managed by trustees of the Brodie estate. There is a Culbin information / interpretation panel in the car park.

There are a number of low key access points including pedestrian access across Nairn Dunbar golf course to the East Beach car park, access through Lochloy wood, access from the track at Binsness and access by boat (including water taxi in the summer months) from Findhorn. Visitors may also walk into Culbin along the beach from Nairn harbour.

A visitor experience plan has recently been completed and is included in appendix 3. This contains details of a survey of visitors and a number of recommendations for action that will be undertaken during the period of this plan.

FES are working with forest user to reduce the amount of vehicle access within the forest and to encourage responsible access under the Scottish outdoor access code. We are also working with the police to try to control the amount of illegal motorised vehicle access which is causing damage to the designated features of the SSSI, SAC and Ramsar site.

3.5.2 Community

Forres and Nairn are both sizable settlements close (approx 4 km) to the woodlands in this plan. Other communities are made up of scattered homes and small villages, including Kintessack and Dyke.

Despite the high level of recreation usage there does not appear to be a strong community desire to become involved in the day to day management of the forest.

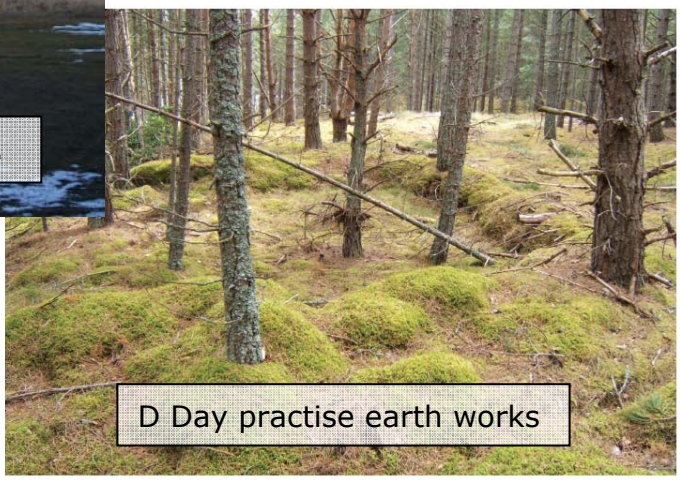
The LMP area sits in the Dyke landward community council area who have been consulted about the contents of this plan and their comments are recorded in the consultation record in appendix 1.

3.5.3 Heritage

There is part of one scheduled monuments within the plan area. The monument is the remains of an anti-landing obstacle, built in 1940 in response to the threat of a German invasion of Scotland. The obstacle comprises an extensive network of wooden poles, located on the beach and in the inter-tidal zone. The obstacle covers a distance of just over 9 kilometres across The Gut at Culbin Sands and covers 488ha. 109ha of the monument is within the plan area but the vast majority is within the open ground. Only 0.3ha has any trees on it. This tiny area is mostly designated as Long Term Retention with the objective of retaining the current tree cover beyond its economic maturity for their conservation and landscape value. However if any work is proposed in this area the presence of the SM will be recorded in the work plan document by our conservation and heritage colleagues and any impacts this may have on the planned operation discussed and agreed.

In addition there are 92 non-scheduled monuments are currently known to exist. A check of both internal records and the SMR has been undertaken to establish the location of these features. The details of these will be included in the work plan that is drawn up for every operation carried out within the plan area.

Culbin forest anti-landing obstacle.



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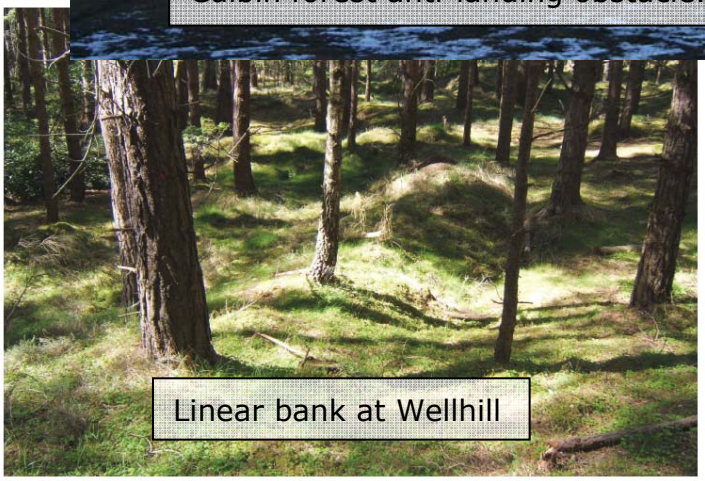


Linear bank at Wellhill

3.6 Pathogens and diseases

3.6.1 Hylobius

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

3.6.2 Dothistroma needle blight (DNB)

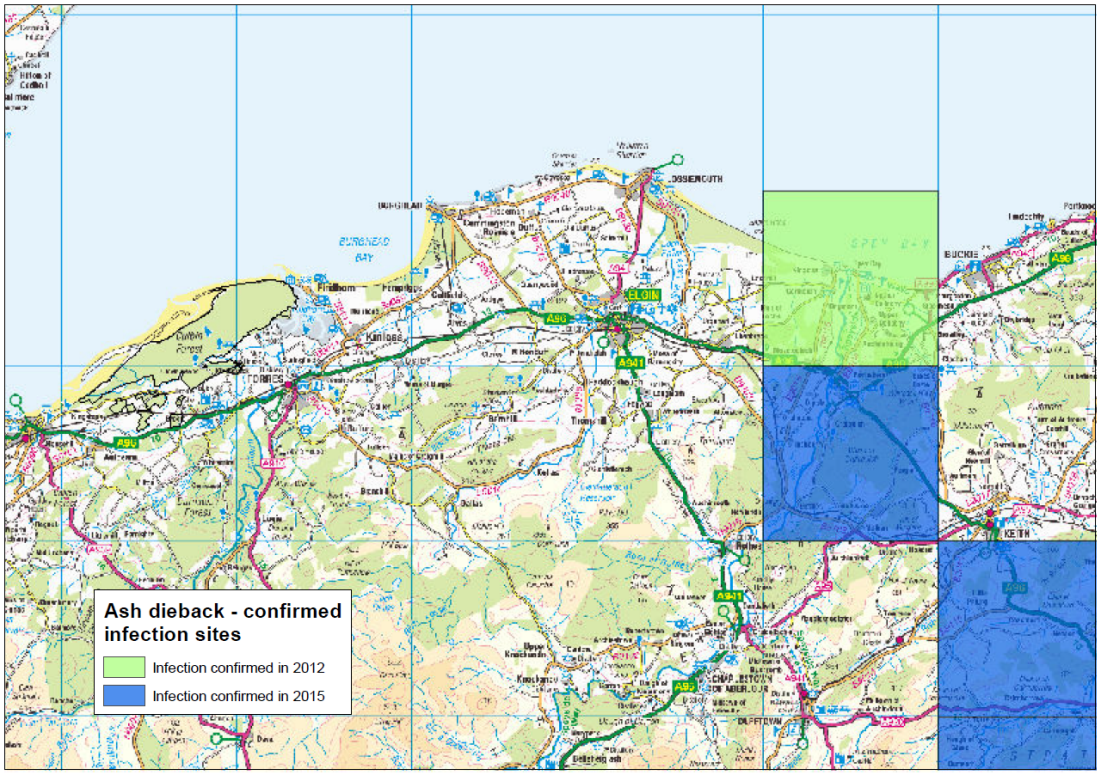
Dothistroma needle blight is a fungal pathogen affecting the woods within Moray & Aberdeenshire forest district. It is present within Culbin and with the high proportion of pine species this could have a major effect on the forest.

Dothistroma needle blight is an economically important disease affecting a number of coniferous trees, pines in particular. The disease has a world-wide distribution but until recently was mainly of concern in the southern hemisphere. In much of the world, including Britain, it is caused by the fungus Dothistroma septosporum. Dothistroma needle blight causes premature needle defoliation, which results in the loss of timber yield and, in severe cases, tree mortality. Since the late 1990s the incidence of the disease has increased dramatically in Britain, particularly on Corsican pine. More recently the disease has caused significant damage and death to Lodgepole pine and Scots pine. Due to the extent and severity of the disease there is a moratorium on the planting of Corsican Pine on the national forest estate.

The reasons for the increase in the incidence of this disease are unclear but could be due to increased rainfall in spring and summer, coupled with a trend towards warmer springs, optimising conditions for spore dispersal and infection. Such conditions may become more prevalent in Britain over the next 20 years if current trends in climate change continue. On the national forest estate disease management is currently focused on silvicultural measures to reduce inoculum loads and the use of alternative, less susceptible species in future rotations.

3.6.3 Hymenoscyphus fraxineus (previously Chalara fraxinea)

Ash dieback is an aggressive fungal disease and is caused by Hymenoscyphus fraxineus (previously Chalara fraxinea). The disease causes leaf loss and crown dieback in affected trees, and usually leads to tree death. Ash trees suffering with the infection have been found widely across Europe since trees believed to have been infected with this newly identified pathogen were reported dying in large numbers in Poland in 1992. These have included forest trees, trees in urban areas such as parks and gardens, and also young trees in nurseries. The map below shows the confirmed infection sites based on the OS 10km grid squares and is based on information obtained of 3 August 2016.



3.6.4 Phytophthora ramorum

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

Although European and hybrid larch are also susceptible to P. ramorum, current evidence indicates that the impact of the disease is greatest on

Japanese larch which can die within one to two seasons, with consequential economic, environmental and amenity impacts. The disease on larch showed a significant expansion in 2013 with a core area of some 5-6000 ha of larch within South West Scotland showing extensive signs of infection. Further, smaller and more sporadic infections have also been identified along the western seaboard of Scotland principally in the Argyll and Cowal areas. There have also been four isolated outbreaks in the north east of Scotland but none within the Culbin plan area to date. The total infected area within Scotland is estimated to be now in excess of 6,500 ha.

3.6.5 Peridermiun pini

The stem-rust fungus *Peridermium pini*, which is common only in north-eastern Scotland and East Anglia, attacks Scots pine and, rarely, Corsican pine. It is a bark pathogen that infects young shoots to cause small, swollen cankers, though these may be barely noticeable in the early stages of infection. *Peridermium* infection gradually spreads down the shoot and branch, extending the canker towards the main stem. The distal part of the branch stays alive for some years and when it dies it often remains recognizably swollen and covered in a blackened exudate of resin. In May or June the fungus may produce unmistakable pale yellow or orange pustules, about 5mm across. As these occur only on live bark, they are typically produced around the margin of large cankers. Old pustules leave crater-like marks which, when they are numerous, impart a roughened appearance to the dead bark of older cankers. If the fungus reaches the main stem, it can girdle it and so kill the tree above that point; cankers below the live crown can kill the tree completely. Main stem cankers are extremely resinous and, when old, usually exhibit a central blackened area of dead, cracked and resinous bark from which pieces may fall to leave areas of exposed wood. Old cankers that have almost girdled the stem are often made noticeable by a rope-like swelling along their length resulting from callus growth produced by the narrow, surviving part of the stem circumference.

3.7 Statutory requirements and key external policies

This land management plan has been drafted to ensure that planning and operations functions comply with the following legislation and policies:

Biodiversity

- Conservation (Natural Habitats) Amendment (Scotland) Regulations 2007
- Nature Conservation (Scotland) Act 2004
- Wildlife and Natural Environment (Scotland) Act 2011
- Land Reform (Scotland) Act 2003
- The Water Environment and Water Services (Scotland) Act 2003
- Water Environment (Controlled Activities)(Scotland) Regulations 2011
- UK Woodland Assurance Standard 2008
- UK Forestry Standard 2004
- Deer (Scotland) Act 1996

Climate Change

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

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
Healthy	DNB infection of pine crops	Extensive areas of Corsican Pine are affected by DNB.	The degree of DNB infection varies annually, possibly dependent on the prevailing weather conditions, However take the opportunity to reduce the proportion of Corsican pine within the block during thinning operations.
	Resilience to climate change	Ongoing coastal erosion is washing away up to 1m of the coastline along with the trees growing on it.	A strip of approx. 10m along the seaward side of effected areas of the block has recently been felled. The root systems will continue to give some degree of stability to the sand but the timber will removed to prevent it causing coastal issues.
	Resilience to climate change	The water table at the west end of the block is very close to the surface. Extensive drainage was employed during the original planting to achieve successful establishment.	Potential to designate this area as a natural reserve and allow natural process to take their course.

Productive	Timber production	The well drained soils with low risk of extensive windblow give rise to stable crops.	The stable crops that are suited to the site conditions allow LISS to be used to manage most of the crops to benefit biodiversity and recreation while still producing significant volumes of quality timber. Regular thinning of crops will allow diseased trees to be removed.
Treasured	High biodiversity value	Culbin has a high biodiversity value. It is a major component of an extensive SSSI and is adjacent to areas designated as an SPA, SAC and Ramsar.	Continue to manage the block to ensure the geomorphology, botany and rare habitats that are the reasons for the designations, are maintained and brought into favourable condition.
Accessible	High recreation value	Culbin is well used for a range of recreational activities. The topography of the site makes it suitable for all abilities access.	Continue to maintain and further develop Culbin as one of the main recreational facilities within Moray & Aberdeenshire FD.

5.0 Land Managment Plan Proposals

5.1 Management

Refer to Map 5: Management.

Thinning

See Map 6 – Thinning.

Wherever possible the district will continue to maximise the area managed through thinning. 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 Culbin as much of the area as possible will be thinned in order to improve the timber quality. There are few limiting factors to the thinning of the crops in this block.

Where Lodgepole pine occurs in mixtures with other crops, and is infected with DNB, it will be targeted for removal during thinning operations.

All thinning decisions will be guided by Operational guidance Booklet No 9 'Managing thinning' and the recent district Thinning Plan.

Low Impact Silviculture (LISS)

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 almost all of the forest within the plan area is suitable to be managed under LISS at the present time.

'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 5). 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 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, or natural regeneration establishment, also creates transient open habitat that is exploited by several species such as voles, deer and raptors.

5.2 Future Habitats and Species

Refer to Map 7: Future habitats and species.

Restocking

Where clearfelling is undertaken 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 CP 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 LMP area.

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 range of regenerating species will be accepted including birch, scots pine, beech and other broadleaved and conifer species. However in particular areas where biodiversity is the priority the species of natural regeneration will be manipulated to ensure they are suitable to the site and will create the habitat required by the biodiversity interest.

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.

The main area designated as permanent woodland is the natural reserve at the west end of the main block. In this area the water table is very close to the surface. Extensive drainage was employed during the original planting to achieve successful establishment. Recent thinning operations in this area caused an unacceptable level of

ground damage and it is clear that ongoing thinning and ultimate clearfelling is not sustainable. Therefore it is appropriate to designate this area as a natural reserve and allow natural process to take their course. There are already areas of extensive holly natural regeneration already taking place.

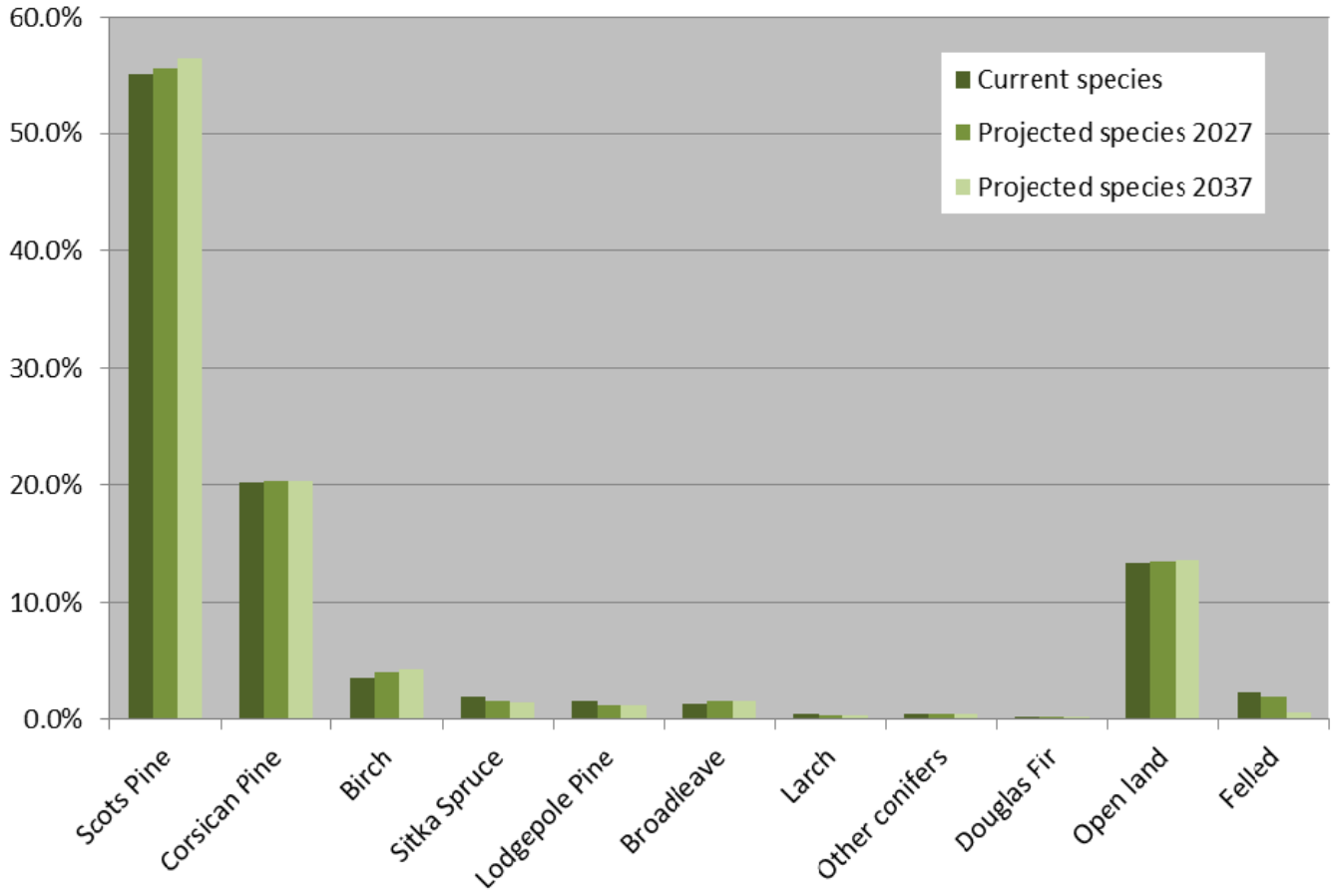
Areas designated as permanent open space are mainly associated with the boundary of the forest and the coastline. This contrast between the enclosed forest and the open seascape is part of the attraction of the forest.

Open ground

Culbin forest has a very low proportion of internal open ground. Most of the open ground in on the periphery of the forest block. FES will explore the possibility of restoring sand dune and shingle habitats in the longer term before considering other options within the forest. The reason is that potential for restoring other habitats in Culbin are not obvious, and would certainly not create any habitats that are as valuable as mobile or fixed sand dunes and shingle habitats. In addition, these could be even more expensive to create and maintain over the long term.

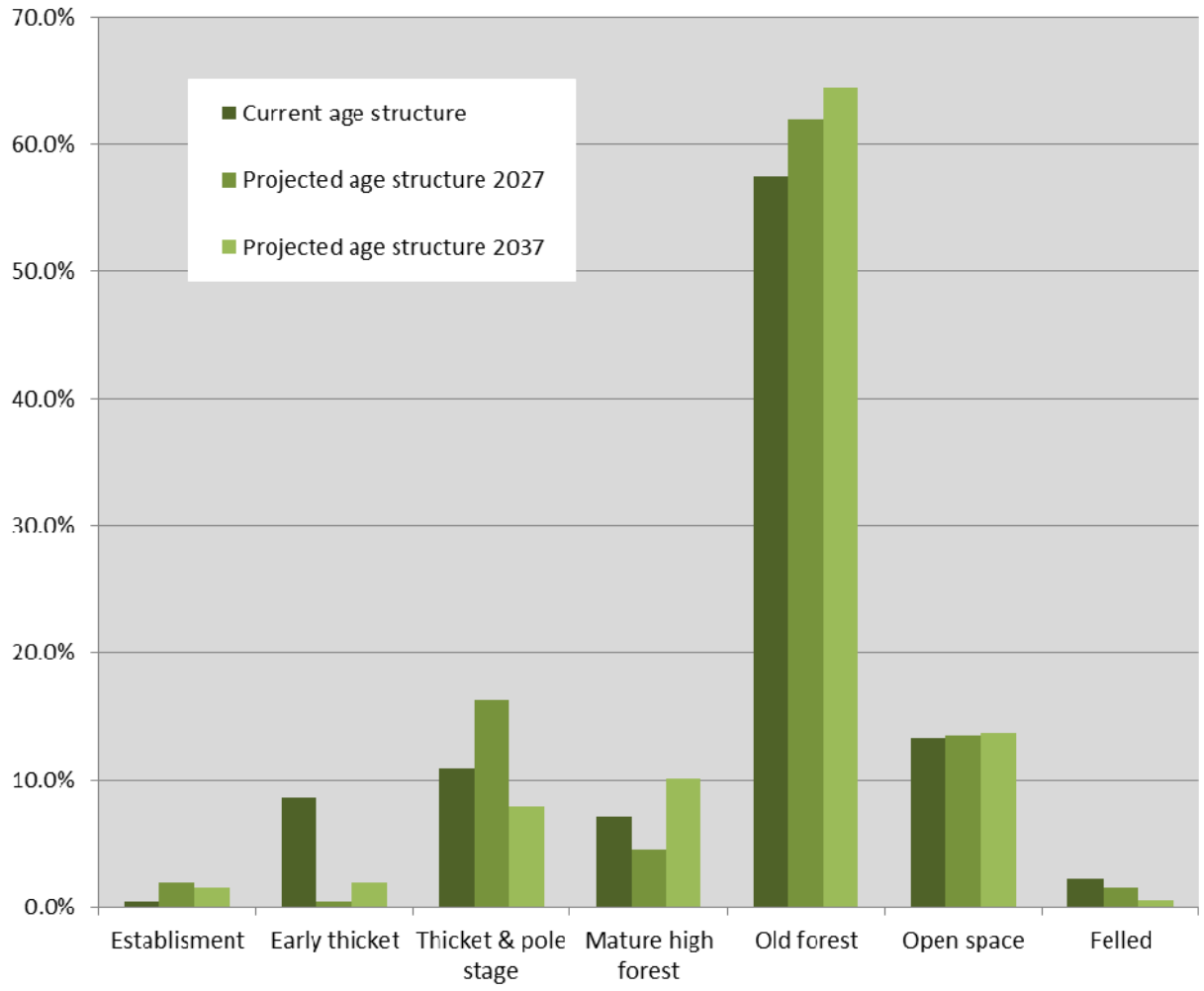
5.3 Species tables

Species	Current species	Projected species 2027	Projected species 2037
Scots Pine	55.2%	55.6%	56.5%
Corsican Pine	20.2%	20.3%	20.3%
Birch	3.4%	4.0%	4.2%
Sitka Spruce	1.9%	1.6%	1.4%
Lodgepole Pine	1.5%	1.2%	1.2%
Broadleave	1.3%	1.5%	1.6%
Larch	0.4%	0.3%	0.3%
Other conifers	0.4%	0.4%	0.4%
Douglas Fir	0.2%	0.1%	0.1%
Open land	13.4%	13.5%	13.7%
Felled	2.2%	1.9%	0.6%



5.4 Age structure

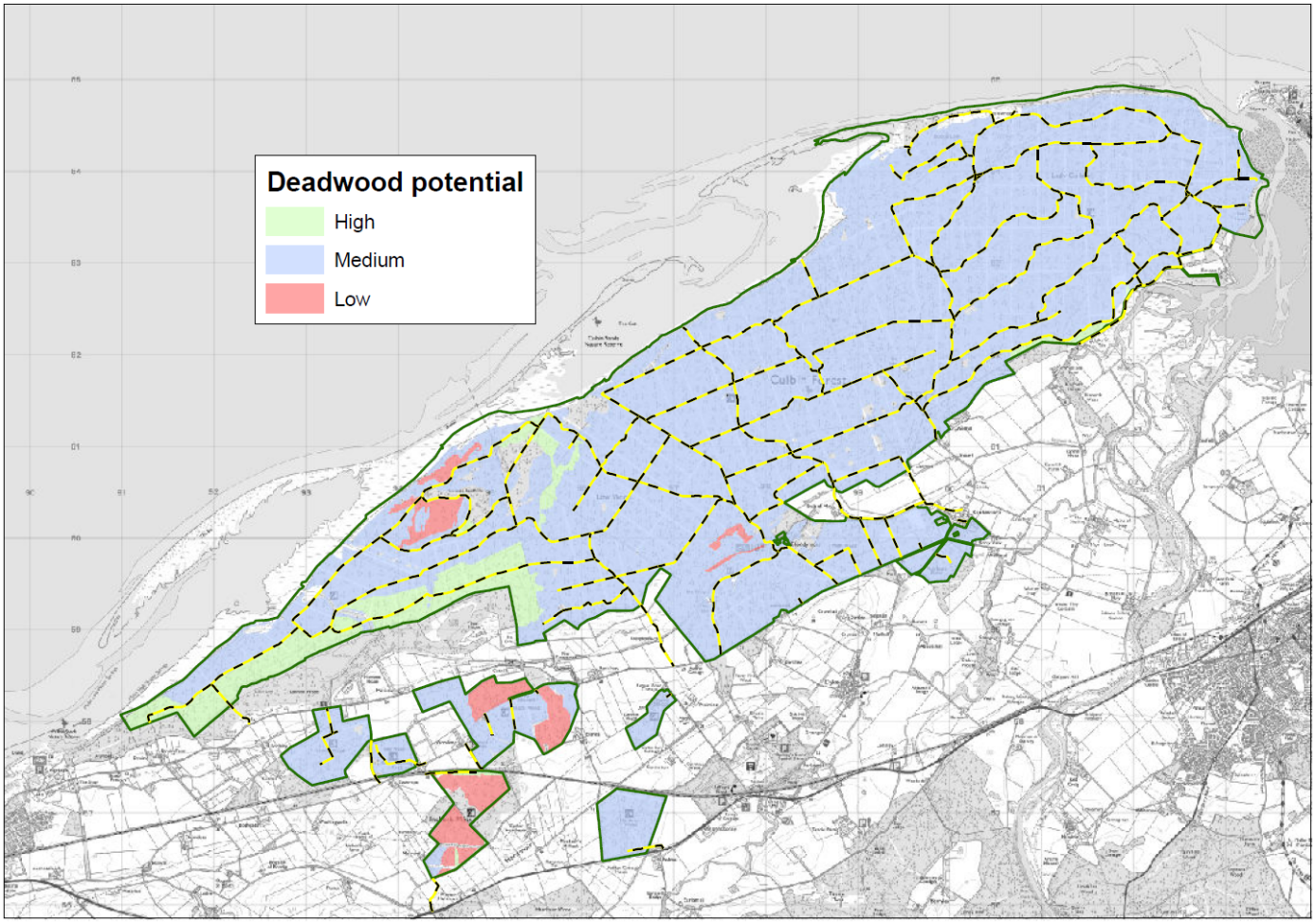
Age of trees (years)	Successional stage	Current age structure	Projected age structure 2027	Projected age structure 2037
0 - 10	Establisment	0.5%	1.9%	1.5%
11 - 20	Early thicket	8.6%	0.5%	1.9%
21 - 40	Thicket & pole stage	10.9%	16.3%	7.9%
41 - 60	Mature high forest	7.1%	4.5%	10.1%
60+	Old forest	57.5%	61.9%	64.4%
	Open space	13.3%	13.5%	13.7%
	Felled	2.2%	1.5%	0.6%



5.5 PAWS restoration

Inshoch wood, one of the outlying woods, is a plantation on an ancient woodland site (PAWS). This extends to 94ha and is of medium ecological potential. The long term aim is to fully restore the woodland to native pinewoods although this is currently a low priority site for work compared to other PAWS areas within the district. However the opportunities presented by forest operations such as thinning will be used to gradually restore the site.

5.6 Deadwood management



When an operation is to take place in an area the appropriate deadwood management prescription (High, Medium or Low shown in the following table 2 will be applied.

	Deadwood management prescription
High	1. Retain all existing veteran trees and deadwood apart from that which is a health and safety risk 2. Retain all wind blow apart from that which is a health and safety risk 3. Deadwood distributed throughout the coupe 4. Seek opportunities to create particularly valuable deadwood e.g. import some large-diameter logs from nearby coupes when they are thinned or clear felled
Medium	1. Retain all existing veteran trees and deadwood apart from that which is a health and safety risk 2. Only harvest wind blow of significant value or which poses a health and safety risk 3. Seek opportunities to create particularly valuable new deadwood e.g. when felling big trees, retain some large diameter logs at the edge of the coupe 4. Where wind blow is harvested, retain some blown trees in a group as 'future deadwood' [b]
Low	***During thinning*** 1. Retain all existing deadwood apart from that which is a health and safety risk 2. Take obvious opportunities to create particularly valuable new deadwood e.g. when felling big trees, retain one or two large diameter logs at the edge of the coupe 3. Where wind blow is harvested, take opportunities to retain a few blown trees in a group as 'future deadwood' in a location that will not restrict future operations e.g. in the corner of a coupe ***During clear felling*** 1. Retain all deadwood and living trees in areas that are uneconomic or too difficult to harvest (e.g. wet, steep or rocky areas) 2. Where an obvious opportunity arises, create new deadwood in a location that will not restrict future operations e.g. a pile of logs and brash in the corner or along the edge of a coupe ***Additional notes for Low DEP class areas*** 1. Deadwood should only be retained in areas that will not restrict future operations 2. Standing deadwood (snags) should not be retained on clear fells, except in areas that will not restrict future operations and that do not pose a health and safety risk e.g. in the corner of a coupe 3. Large diameter (>20cm) deadwood logs and snags are particularly scarce on the NFE. Take opportunities to retain this kind of deadwood. When harvesting large diameter trees, seek opportunities to retain some standing deadwood, if safe to do so, and consider retaining a few large-diameter logs on site in a location that will not restrict future operations. 4. Large diameter deadwood from native broadleaves is particularly scarce. When harvesting large diameter native broadleaves, retain standing deadwood, if safe to do so, and retain some large diameter logs on site in a location that will not restrict future operations.

5.7 Management of Protected Forest and Non-Forest Habitats

5.7.1 Coastal

FES and the forest district are currently continuing to work through the development of a Sand Dune Restoration Strategy. This will be developed during the lifespan of this plan. In the interim, the following management will be undertaken:

- The coastal fringe will be left largely unmanaged and left to develop naturally
- Existing dunes areas will be maintained as open space. Dunes will be monitored and works undertaken as required to clear trees, scrub and INNS. FES will liaise and work with RSPB to achieve this. Vegetation will either be cut and the stumps treated with glyphosate or if small enough, sprayed/weed wiped with glyphosate.
- Saltmarsh – although most of this is below the high water mark and therefore not in FES ownership, access to and across the saltmarsh is from the NFE. FES will continue to work with RSPB, Highland Council and Police Scotland to tackle illegal vehicular access and use on-site interpretation (both permanent and temporary) to manage visitor behaviour.

5.7.2 Dune Systems in the Forest

Within the forest, there are a number of planted relict dunes and shingle ridges, some of which have seen work undertaken throughout the period of the last plan to open up views.

- Continue to monitor Maviston sandhills for recolonization of trees and remove as required. Maintain views onto Maviston dunes from surrounding tracks
- Retain Butte dunes as unmanaged
- Through thinning, maintain views onto Lady Culbin
- Manage other areas as LISS ensuring that operations are planned to prevent damage to dune systems and shingle ridges

5.7.3 Lichen

Culbin is of international importance for the terricolous lichen assemblages that have developed on the stabilised dunes and shingle. Common lichens are widespread but notable lichens exist along forestry tracks, under mature conifer where the canopy is open and in areas of failed plantation and in

glades and rides. The lichens were recorded as being in unfavourable condition and following a recent survey in 2017, management prescriptions will be delivered during the lifespan of the this LMP to help maintain the high lichen interest in the long term.

- Management for lichens will be targeted towards the main shingle areas and within suitable buffer zones and habitat networks
- During thinning operations across Culbin, consider the requirements of lichen and open up glades, expose areas of shingle and open up track edges
- Monitor large glades and remove tree regeneration/scrub as required
- During thinning operations take opportunities to widen smaller glades by 10-15m. Remove all scrub and tree regeneration from glades (specific methodology to be agreed)
- Further thinning prescriptions to be developed in 17/18 following discussion with SNH to manage those lichen areas under tree cover (failed/checked SP/CP, pole stage and mature stands)
- During 2018, finalise prescriptions based on recommendations in recent Andy Acton report and site discussion with SNH
- Instigate a monitoring programme to include full repeat of baseline monitoring established by Fryday et al. (1996), monitoring the recolonization by *S. condensatum* and *P. malacea* following track grading/widening, monitoring any sites where shingle has been exposed and carrying out further surveys/monitoring of potential lichen areas.

5.7.4 Fungi

The SSSI management statement states that "The fungal flora of Culbin is… of national importance with over 450 species recorded including one species (*Laccaria maritima*) not found at any other site in Britain."
Mycologically, the site is known for its:

- Macrofungi of pinewoods, including the UKBAP species of tooth fungi as well as other mycorrhizal genera
- Being the only British location for the species Sand Deceiver
- Small areas of semi-natural broadleaved woodland
- The overall condition for the fungal interest in Culbin is favourable maintained. However, the following management will be carried out during the lifespan of this plan to preserve and enhance the fungal interest.
- In line with the deadwood policy for the FD, all veteran, decaying and dead trees will be retained (except where a health & safety risk), retain windblow where safe to do so and seek opportunities to create further deadwood (particularly large diameter)

- During forest operations and roads maintenance ensure that the locations of notable fungi species are detailed in workplans, site plans and marked on the ground. Extraction routes and timber stacks must not affect these locations
- Where practical, ensure that cut material from flailing operations is removed

5.7.5 Vascular Plants

Over 550 species of flowering plants have been recorded in Culbin with a rich array of species associated with different habitats across the site from saltmarsh, freshwater marsh and sand dune through to pinewood on sand and maturing to pinewood more akin to the native pinewood of the Scottish Uplands. A number of rare or local plants occur including the nationally rare One-flowered wintergreen (moneses uniflora) but other pinewood species including Twinflower also exist.

- Ensure operational workplans reflect rare plant interest and any specific management actions required. In general, forest operation will avoid rides, stack timber away from important floral interests and take direct action as required (e.g. removing shading from Juniper)
- Continue to monitor and record populations of wintergreens, twinflower etc

5.7.6 Freshwater Habitats

Two wildlife ponds were created at the western end of the forest in 1991, followed by a larger pond at Colddymoss during early 1993. There are also a large number of fire dams / small ponds throughout the forest. These ponds support breeding populations of Common Frog, Common Toad, Palmate Newt and Great Crested Newt. They are also important for dragonflies, damselflies and invertebrates. A number of these are becoming overgrown and shaded by trees and scrub.

- Develop a management plan to ensure a cycle of monitoring and works to ensure all ponds are maintained and enhanced to provide good habitat for wildlife
- Operations to be planned and timed to ensure compliance with relevant wildlife legislation in relation to GCN.
- Maximise deadwood provision around ponds
- Ensure views onto ponds are maintained and excessive shading is removed

5.8 Deer management

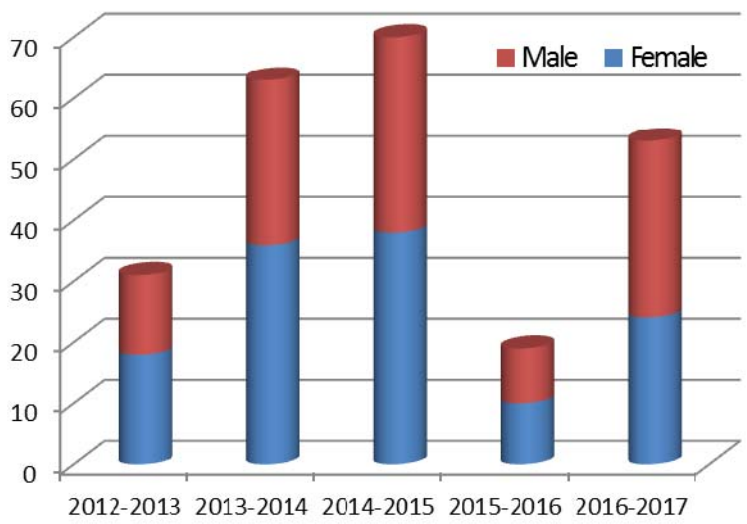
Wild deer are managed in accordance with the 2014 Deer Management on the National Forest Estate, current practice and future directions document.

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

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

It is therefore FCS deer policy to:

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



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

Over the past few seasons there has been a big variation in the numbers of deer being culled from the Culbin forest. This has been recognised and additional contractor time has been allocated to the area to ensure a more stable cull level is sustained. This is required as more of the forest enters the conversion phase of LISS and we need to ensure natural regeneration has an opportunity to become successfully established.

In addition as more areas are thinned there will be improved lines of sight for culling and less hiding places for deer.

5.9 Access

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

5.10 Pathogens

Large Pine Weevil (*Hylobius abiatis)*

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 majority of restock sites with certain limited exceptions.

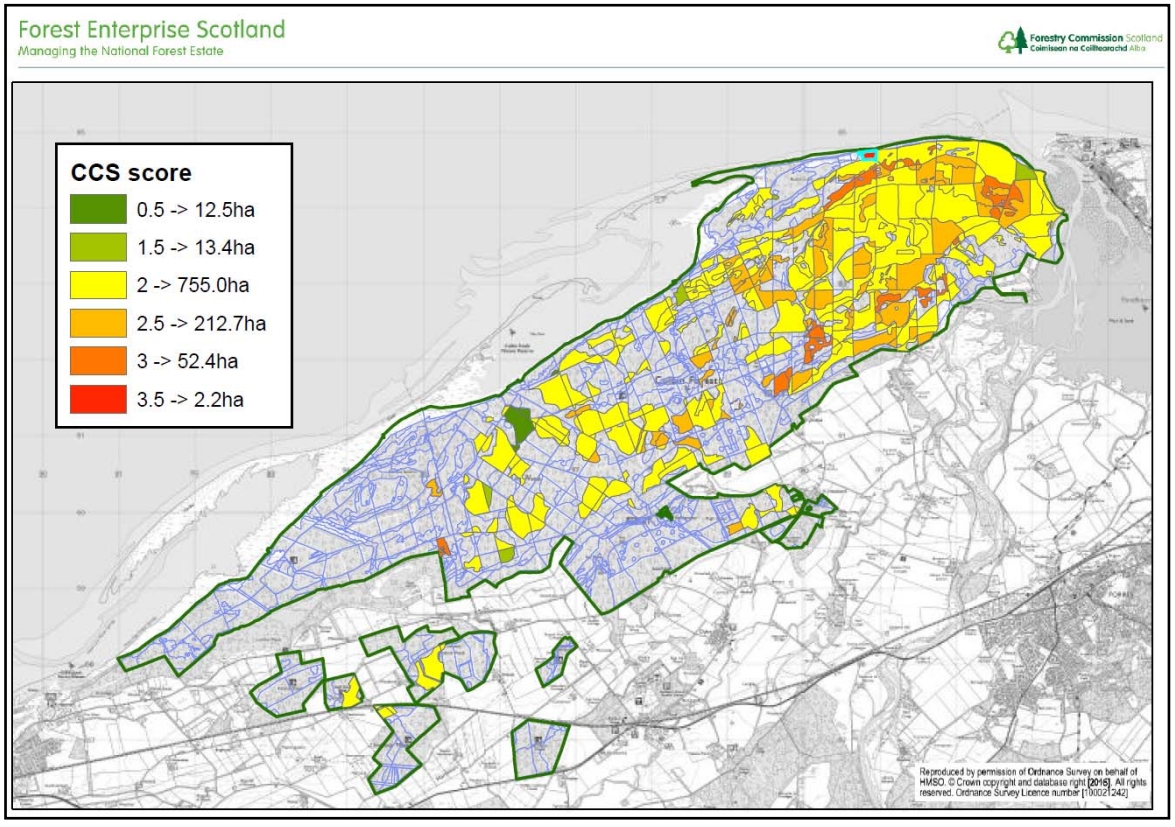
Due to the expected high level of Hylobius and the adopted policy for environmental management to "reduce the use of Insecticides where feasible" restocking is planned to take place at the end of year 4. Restocking may take place before then if monitoring, using Hylobius MSS, shows that it is safe to do so.

Dothistroma Needle Blight (DNB)

Dothistroma Needle Blight will be addressed differently depending on the level of current infection in the crop. The severity of infection and crop symptoms produced range from the dropping of a couple of yield classes to high levels of mortality within the stand. The level of mortality is the key concern as once dead the integrity of the tree quickly deteriorates to a state where it cannot

successfully be harvested. Categorisation of the infected crop will allow us to prioritise the harvesting of such areas.

The following Crop Condition Survey (CCS) protocol has been developed by Forest Research. The crop is graded using a seven point scale based on a visual assessment of needle retention, mortality, crown density, bark condition and light levels/ground vegetation abundance.



1 - Healthy Crop. No evidence of infection.
1/2 - Intermediate between 1 and 2.
2 - Evidence of early stages of infection (e.g. some needle loss, thinning of crowns, early signs of mortality).
2/3 - Intermediate between 2 and 3.
3 - Clear evidence of infection (e.g. significant needle loss, 'lion's tail' effect, clear sight lines through the crop, presence of vegetation cover on forest floor, possible bark splitting, mortality is evident).
3/4 - Intermediate between 3 and 4.
4 - Crop is dead or is very likely to die (e.g. will die within the next few months, high mortality and is unlikely to recover).

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

- prioritise infected areas to be felled by swapping felling coupes of non-infected crops in the current program;
- include into thinning operations the felling of any infected crops within the area to minimise costs. Amendments to the land management plan will be required as specified in the tolerance table for felling such areas;
- reassess badly affected blocks and consider if a full review of the land management plan is required;
- planting programs will need to be amended to include replacement species suitable for the site.

In the plan area there are currently 1047.9ha of pine confirmed as having DNB infection in the range of 1/2 to 3/4 on the above scale. The main specific measures within this plan area to reduce the impact of DNB are to undertake heavier than normal thinnings to allow more air movement within the crop and the targeted removal of Lodgepole and Corsican pine during thinning operations. Both these species are more susceptible to DNB than Scots pine and it is hoped these actions will reduce the overall inoculum loading in the block are therefore improve the chances of Scots pine surviving the DNB infestation.

There appears to have been a reduction in the severity of infection in recent years within Culbin. It is not clear whether this is due to the proactive management of the disease that has been undertaken or simply due to environmental factors. Whatever the cause the progress of the disease will continue to be monitored closely.

Peridermium pini

In an attempt to control this fungus all trees exhibiting symptoms will be removed during thinning operations. In some areas this means thinning more heavily than marginal thinning intensity to remove all trees with visible symptoms. The levels of infection will continue to be monitored and additional measures will be considered, under the guidance of forest research, if this becomes appropriate.

5.11 Critical Success Factors

- Undertake the planned thinning and felling programme in order to increase the quality of the timber within the plan area and to meet the production targets.
- Undertake the thinning planned for the LISS areas in order to manage the light levels to allow the development of the appropriate ground vegetation and natural regeneration.
- Continue with the maintenance of the forest road network to allow forest operations to be successfully completed.
- Control of deer populations to allow natural regeneration within LISS areas.
- Undertake the programme of biodiversity actions detailed within the plan.
- Undertake the programme of recreation actions detailed within the plan.

5.12 Potentially damaging operations

The table below lists the operations within the LMP that could impact on the designated features.

Operation Type	Detailed description of operation and method	Mitigation measures to be applied	Timing	Map reference & other relevant comments
Mechanised harvesting (Culbin predominately managed as LISS, therefore mostly thinning and small group fellings)	Harvester/Forwarder to fell, process and extract trees during thinning operations.	Existing extraction routes to be utilised where practical but these routes and new routes not to run across dune ridges, dune hillocks or shingle ridges. Exact management of lichen beds to be agreed with SNH after receipt of recent survey report and prior to first operation. Deadwood to be retained and enhanced during operations. Pre operation coupe checks and specialist survey/monitoring will be utilised to ensure that plant communities are identified and protected and any specific management incorporated into planned operations Site plans to identify agreed	Throughout the lifetime of the plan	Map 5 Management Coupes

		stacking locations for timber – these to avoid key fungi locations and other sensitive features		
Roads maintenance	Extraction of minerals and stones from Cloddymoss and Wellhills and the use of machinery to construct, repair, spread materials and grade and roll.	Preoperation coupe checks and operations carried out in line with best practice. Sensitive areas marked on site plans, taped on the ground to ensure protection.	Throughout the lifetime of the plan	No new roads planned
Footpath maintenance, associated infrastructure & visitor management	Use of machinery to repair, spread materials, grade and roll footpaths. Removal and replacement of interpretation panels etc (see VEP). Use of hand tools to remove and replace signs, posts and panels.	In the main most replacement will be like for like in the same location. Risk assessment and checks done to ensure no disturbance to habitats or species. Trained and competent operators. Interpretation panels, leaflet and website to include messages on sticking to paths/formal trails, importance of Culbin (SSSI, plants, fungi, species), taking responsible access, illegal activities (4x4, motorbikes). Temporary signage also used as required (nesting seasons, during specific operations to target illegal activity)	Throughout the lifetime of the plan	
Restocking & Regeneration	Species as per map 7. Restocking by natural regeneration. No planned ground preparation	Scots Pine favoured in areas rich with pinewood flora.		

Control of INNS	Use of chainsaws, scrubsaws and knapsack sprayers/weedwipers to apply glyphosate to cut stumps and regeneration to control non-native scrub/trees, rhododendron and giant hogweed	Full compliance with relevant guidelines and trained and competent operators. All operations to be planned in discussion with SNH in advance.	Throughout the lifetime of the plan	

The table below lists operations within the LMP or aspects of the national forest estate within the LMP that could impact on designated sites adjacent to national forest estate

Operation Type / Aspect of forest	**Detailed description of issue or operation**	**Proposed action &/or mitigation**	**Timing**	**Map reference & other relevant comments**
Recreation/Public Access	The network of trails and car parks, facilitate public access through the NFE onto the coastal areas outwith the NFE. Designated areas of salt marsh beyond the FES boundary are damaged by illegal vehicle activity and by people walking, cycling or riding across it.	FES will continue to use interpretive panels, temporary signs and work with stakeholders and partners to educate and inform members of the public and work with neighbours and Police Scotland to tackle anti-social behaviour.	Throughout the lifetime of the plan	

Forestry management	Productive management of stands adjacent to Cran Loch and Loch Loy could have a detrimental effect on areas of designated areas of mesotrophic lochs and hydromorphological mire range. Forestry drainage operations and conifer planting could impact on water table.	Large area of woodland that is waterlogged has been identified as natural reserve. This area will be allowed to naturally succeed to wet woodland which will complement the adjacent habitats. No drains maintenance will be carried out for forestry purposes.	Throughout the lifetime of the plan	