## Moray and Aberdeenshire Forest District

# Lossie

## Land Management Plan

Including:
Spey Bay SSSI
Lower River Spey and Spey Bay SAC

Plan Reference No: LMP 07

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: | Lossie |
| Nearest town, village or locality: | Lossiemouth |
| OS Grid reference: | NJ 280 674 |

**Areas for approval**

| | Conifer | Broadleaf | Open |
|---|---|---|---|
| Clear felling | 39.2ha | | |
| Selective felling | 11.9ha | | |
| Restocking | 19.9ha | 7.6ha | 8.5ha |
| 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 Feb 2017

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 Lossie 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**……

# Environmental Impact Assessment – Screening Opinion Request Form

| **Proposed work** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Please put a cross in the box to indicate the type of work you are proposing to carry out. Give the area in hectares and where appropriate the percentage of conifers and broadleaves. | | | | | | | |
| Proposed work | select | Area in hectares | % Conifer | % Broad-leaves | Proposed work | select | Area in hectares |
| Afforestation | | | | | Forest roads | | |
| Deforestation | X | 8.5ha | 80 | 20 | Forest quarry | | |
| Location and District | | | Lossie Forest, Moray & Aberdeenshire FD | | | | |

| **Description of Forestry Project and Location** |
|---|
| Provide details of the forestry project (size, design, use of natural resources such as soil, and the cumulative effect if relevant).<br>Please attach map(s) showing the boundary of the proposed work and other known details. |
| Dune restoration (See appendix 5) |

| Provide details on the existing land use and the environmental sensitivity of the area that is likely to be affected by the forestry project. |
|---|
| Currently the site is under a crop of productive Corsican and Scots pine and the environmental quality will be improved by restoring it to its pre-planting habitat. |

| **Description of Likely Significant Effects** |
|---|
| Provide details on any likely significant effects that the project will have on the environment (resulting from the project itself or the use of natural resources) and the extent of the information available to assist you with this assessment. |
| This will have a positive effect on the environment by restoring the original habitat, which is a priority habitat - sand dunes. |

| Include details of any consultees or stakeholders that you have contacted in order to make this assessment. Please include any relevant correspondence you have received from them. |
|---|
| See consultation record – appendix 1 |

| Mitigation of Likely Significant Effects |
|---|
| If you believe there are likely significant effects that the project will have on the environment, provide information on the opportunities you have taken to mitigate these effects. |
| No significant impacts expected |

| Sensitive Areas | |
|---|---|
| Please indicate if any of the proposed forestry project is within a sensitive area. Choose the sensitive area from the drop down below and give the area of the proposal within it. | |
| Sensitive Area | Area |
| None | |

| Property details | | | |
|---|---|---|---|
| Property Name: | Lossie Forest | | |
| Business Reference Number: | | Main Location Code: | |
| Grid Reference: (e.g. NH 234 567) | NJ 280 674 | Nearest town or locality: | Lossiemouth |
| Local Authority: | | Moray | |

| Owner's Details | | | |
|---|---|---|---|
| Title: | | Forename: | |
| Surname: | | | |
| Organisation: | Forest Enterprise Scotland | Position: | |
| Primary Contact Number: | | Alternative Contact Number: | |
| Email: | | | |
| Address: | Moray & Aberdeenshire FD<br>Portsoy Road<br>Huntly | | |
| Postcode: | AB54 4SJ | Country: | Scotland |
| Is this the correspondence address? | | Yes | |

| Agent's Details | | | | |
|---|---|---|---|---|
| Title: | Mr | Forename: | Mark | |
| Surname: | Reeve | | | |
| Organisation: | Forest Enterprise Scotland | Position: | Planning forester | |
| Primary Contact Number: | 07990 802879 | Alternative Contact Number: | | |
| Email: | mark.reeve@forestry.gsi.gov.uk | | | |
| Address: | Moray & Aberdeenshire FD<br>Portsoy Road<br>Huntly | | | |
| Postcode: | AB54 4SJ | Country: | Scotland | |
| Is this the correspondence address? | Yes | | | |

| Office Use Only | |
|---|---|
| GLS Ref number: | |

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## Appendices:



## Maps

# Land Management Plan Summary

This plan is a review of Forest Enterprise Scotland's management of Lossie Forest.

The purpose of the plan is to set out management objectives and prescriptions for the forest for the next ten years in detail, and in more broad terms for future years, which will fulfil the requirements of the UK Forestry Standard.

The forest is a single block of predominantly coniferous woodland, of plantation origin with pine (Scots and Corsican), currently being the primary species. The forest area is flat and runs along the coast. The sea shore is located to the north of the forest.

The primary objectives for this block are the continued production of high quality timber and the preservation of the biodiversity and heritage value of the site. The secondary objective for the future management of the woodland is to maintain the quality of the site for recreation.

The production of quality timber will be under low impact silvicultural systems (LISS) which will also enhances the recreational and biodiversity of the environment as Lossie forest is ideally suited to LISS.

The Lossie plan area contains part of two designated areas. Spey Bay SSSI and Lower River Spey / Spey Bay SAC.

In addition a number of sensitive plants and animals are located within the forest and surrounding area which will require special consideration. There are also forest and non-forest habitats within the LMP area. Management operations will be planned to ensure that these species and habitats are not put at risk, and where practical, work will be undertaken to encourage them and will be executed as per relevant guidelines.

Restoration of sand dunes, one of Lossie's open habitats, continues to be a priority for FES. It is planned to enlarge the restoration area by felling an area 8.5ha of mature Corsican and Scots pine in Phase 1 of the LMP, (2017 – 2021) that will not be restocked. We will keep this area open in the future.

# 1.0 Introduction

Refer to location map.

## 1.1 Setting and Context

Lossie Forest covers a total area of 818ha and extends along the Moray coast between the settlements of Lossiemouth to the West and Kingston to the East. The area is rural and of medium population density for Moray. The main access to the forest is taken from the B 9103 leading to Lossiemouth or along the coastal footpath from Lossiemouth or Kingston.

The forest is a single block of predominantly coniferous woodland, of plantation origin with Pine (Scots and Corsican), currently being the primary species.

The forest area is flat and runs along the coast. The sea shore is located to the north of the forest.

The main stays of the local economy being the RAF base in Lossiemouth, agriculture and distilling, while tourism also plays an important role.

The existing design plan is characterised by large areas utilising Low Impact Silviculture Systems (LISS) taking advantage of the mature pine species and the suitability of the site for natural regeneration.

In terms of the Moray & Aberdeenshire Forest District Strategic Plan, Lossie Forest is located in an area identified with potential for:

- Having a high environmental value.
- Recreational issues and tourism contributing to local economy.
- Prioritise recreational facilities maintenance.
- Having a high number of visitors.
- Block with good populations of the FCS biodiversity programme priority species.
- Developing and enhancing cultural heritage opportunities.

## 1.2 History of the forest

The Forestry Commission acquired the forest from Innes Estates in 2 lots in 1937 and 1940 with planting beginning almost immediately. The oldest remaining trees were planted in 1910 with the forest block being continuously restocked by planting or natural regeneration.

67 % of the trees were planted in the 50's. Lossie forest is therefore fairly uniform with mainly 60 year old stands. This also means that most of the stands are "mature" and are producing a good seed source for natural regeneration. Indeed, the age of maximal seed production for Pines starts at 60 years old onwards.

According the extracts of the Ordnance Survey (OS) maps published in 1874 the now forested area was an extensive area of partly wooded dry heath known as The Innes Links (See map below).

## 1.3 Land Management Objectives

The purpose and objectives for managing this land have been identified following a review of:

- the physical context and existing land use;
- the land management objectives already established by statutory bodies;
- the physical capability of the land;
- the locational objectives identified in the Moray & Aberdeenshire Forest District Strategic Plan;
- the views expressed by the public and statutory stakeholders

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

- Continue to produce high quality timber.
- Preserve the heritage value of the site.
- Preserve and enhance (dune restoration) the biodiversity value of the site.

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

- To maintain the quality of the site for recreation.

# 2.0 Analysis of previous plan

The previous Forest Design Plan was approved in 2006.

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 2006 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** (in current approved plan) | **Progress to date** **1** – Nominal progress **2** – Some progress **3** – Progress as per LMP | **Proposed action** (in this plan) |
|---|---|---|---|---|---|
| Access & health | High | Provide an open and accessible forest area, for a wide variety of recreational pursuits. | Expansion of recreational facilities was under consideration for the site. Open the site to vehicular access and expand the formal forest walks in and around the area. | **1 –** Maintenance of roads and exiting tracks has been carried out. However, no tracks have been added to the existing network. | Tracks and roads maintenance is frequently carry out. However, there is no plan to expand the track and road network at the moment. |
| Timber | High | Produce wood & marketable timber. | Actively manage stands to produce quality timber. | **3** –The felling programme has been respected and is still ongoing. LISS stands have been actively thinned producing timber and improving crop quality. | Continue to produce a good quality timber across the site. Actively manage LISS areas which are widely spread throughout the site. |

| | | | | | |
|---|---|---|---|---|---|
| Environmental quality | High | Conserve scheduled monument. | Scheduled Monument (SM) monitored yearly/5 yearly and work undertaken where necessary. Regularly recording archaeology/historical interest features. | **2** – The scheduled areas were regularly monitored during the period of the plan. FES environmental staff were involved in the planning of all operations in the vicinity of the scheduled area. | This will continue to be an objective in the new plan. |
| Environmental quality | High | Continue to manage the Natural reserve (SSSI, SAC) | A large proportion of Lossie forest is covered by official designations designed to protect and enhance biodiversity and natural habitats (SSSI, SAC etc.). These areas are all managed as Natural Reserves with appropriate management and action plans. | **3** – Clearfells have been undertaken for sand dunes and shingle area restoration. The term Natural reserve is not valid anymore, as the "natural reserve" designation only concerns wooded areas. However, the conservation designation remains identical. | Further meetings with Scottish Natural Heritage will be organised in order to decide the management direction for the SSSI, SAC and dune restoration areas. The objective will be to maintain/increase the environmental quality of these areas. |
| Biodiversity | High | Create permanent habitat networks focussing on the limited riparian areas. Maintain habitats that support specific species of interest on the site. | Establish new Native Broadleaf areas along riparian zones. Seek continuity of forest cover with good light levels at ground level. Retain Scots pine for the benefit of red squirrels. | **2 –** There are riparian areas where conifers remain. Scots pine is the dominant species across the forest. | The majority of the forest will be managed with Low Impact Silvicultural Systems with Scots pine being the main species as it is well adapted to local soil and climatic conditions. However where native broadleaves naturally regenerate they will be maintained as a component of a mixed crop. |

# 3.0 Background information

## 3.1 Physical site factors

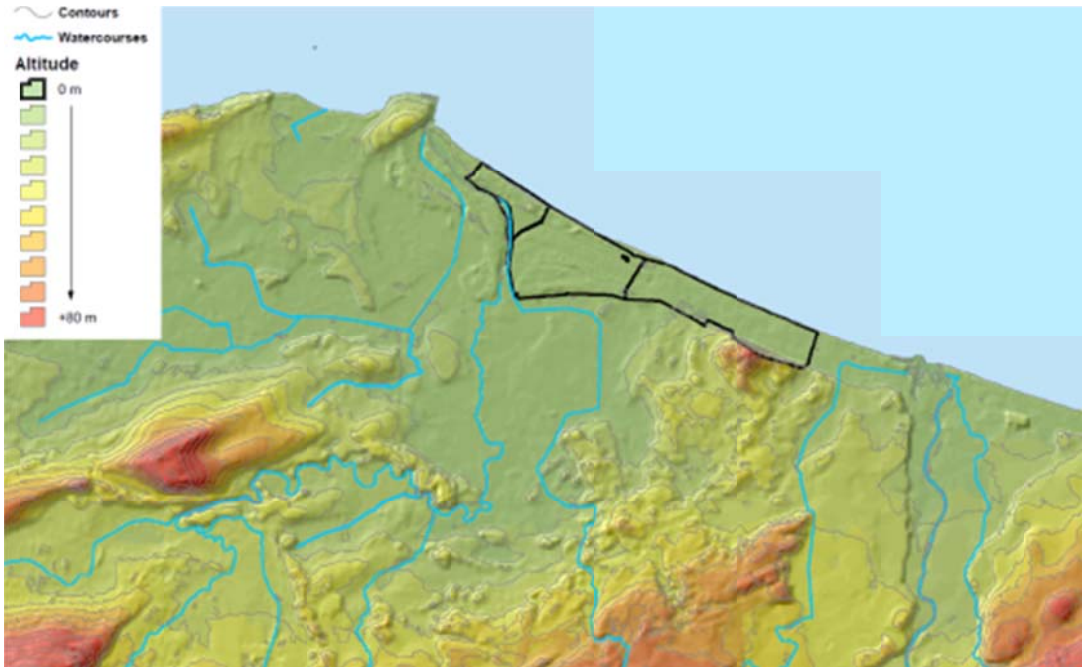
Refer to Map 2: Key Features.

### 3.1.1 Geology, soils and topography

**Geology** - According to the British Geological Survey Geological Map of the UK the plan area is underlain by upper old red sandstone rocks which generate poor nutrient overlying soils.

**Soils** – The soils in Lossie are poor nutrient soils. 50 % of the area is covered with shingle which extends across the site. A further 30 % is made up of a sandy soil. The other dominant soil material is just sand which forms the Dunes in the North of the forest (see map below).

**Topography** – Lossie has an altitudinal range of 0 - 85 m (see map below). The highest area of the site is located on the slope of the Binn Hill.




### 3.1.2 Water

Lossie Forest is located in the Moray coastal catchment. The forest is located along the Coast, facing the North Sea.

The forest is adjacent to the Lossie Estuary water body which is classified as in 'good' status. The Innes Canal/Lhanbryde Burn which runs through the western end of the forest is classified as being in 'poor' status due to its hydromorphology and the physical condition. The biological elements are 'high' and the chemistry hasn't been recorded or calculated for this waterbody. Except for this canal there are no major watercourses within the block.

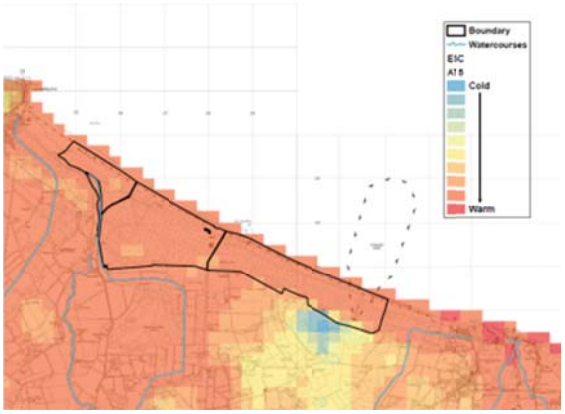
The forest has a number of man-made ponds left over from gravel quarry operations that are now turning into valuable open water habitats for wildlife. The water in these ponds varies seasonally.

### 3.1.3 Climate

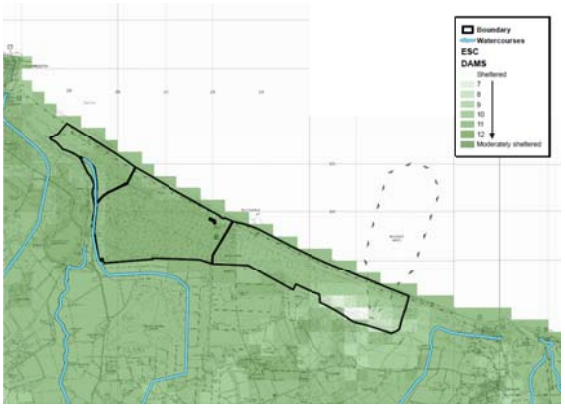
According to the Ecological Site Classification (ESC) protocol, the climate at Lossiemouth is classed as warm, moist and Sheltered. Four climatic factors are used to define the climate for any given location. These are warmth, wetness, continentality and windiness. Continentality has the least impact so is dropped from the overall climate zone designation.

The climate data for Lossiemouth from interrogating the ESC is:

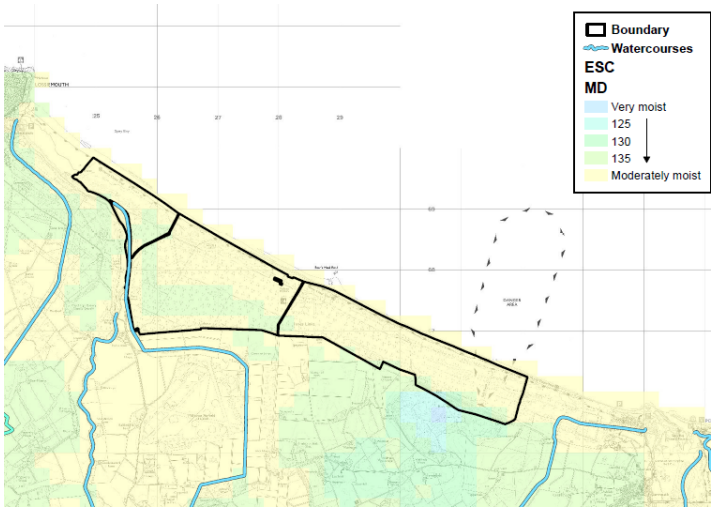
| AT5 | DAMS | MD |
|---|---|---|
| 1207 - 1259 | 6 - 12 | 125 - 142 |




**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 Lossiemouth in the warm zone. Therefore, temperature is not a major limiting factor for the site for species suitability.




**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. The results place Lossiemouth in the sheltered zone. This is backed up by the lack of windblow found on site.




**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 Lossiemouth is in the “moist” zones.

These results will be used to help assist in the choice of tree species in the land management proposals for the site. 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

Lossie plan area contains part of two designated areas. Spey Bay SSSI and Lower River Spey / Spey Bay SAC (see appendix 6).

In addition a number of sensitive plants and animals are located within the forest and surrounding area which will require special consideration. There are also forest and non-forest habitats within the LMP area. Management operations will be planned to ensure that these species and habitats are not put at risk, and where practical, work will be undertaken to encourage them and will be executed as per relevant guidelines.

**Habitats**

Coastal Vegetated Shingle (UK Priority Habitat)

An area of Coastal Vegetated Shingle (15 ha) lies in the east of Lossie Forest and is a feature of the Spey Bay SSSI and Lower River Spey – Spey Bay SAC (459 ha and 179 ha within the forest block).
Shingle structures take the form either of spits, barriers or barrier islands formed by long-shore drift, or of cuspate forelands where a series of parallel ridges piles up against the coastline. Some shingle bars formed in early post-glacial times are now partly covered by sand dunes as a result of rising sea levels leading to increased deposition of sand.

The origin of coastal shingle varies according to location. In southern England, much of it is composed of flint eroded out of chalk cliffs. Shingle deposits of Ice Age origin lying on the sea bed may be reworked by wave action and redeposited or moved by longshore drift along the coast. In northern and western Britain, shingle may derive from deposits transported to the coast by rivers or glacial outwash.

Shingle structures may support breeding birds including gulls, waders and terns. Diverse invertebrate communities are found on coastal shingle, with some species restricted to shingle habitats. Shingle structures sufficiently stable to support perennial vegetation are a comparatively rare feature even in the UK.

Sand dune (UK Priority Habitat)

An area of sand dune exists at the north-western edge of the forest close to the mouth of the River Lossie. A large section of this was felled and left unplanted in previous years to increase the dune area. The resulting habitat is at risk from tree regeneration, (birch, pine, spruce), which was cut approximately five years ago. Regeneration is an ongoing issue and further clearance works undertaken in 2018 and more planned for 2019.

This area is one of the best two areas of open dunes known on the NFE and has a good transition from semi-fixed marram dunes to decalcified fixed dunes. It hosts nationally scarce species such as Small Blue Butterfly and Grey Hair-grass. It is also important as one of the first forest to undertake dune restorations in the UK and one of the largest areas restored of this habitat. The vegetation is establishing really well with a high cover of dune plants.

Fen

In the eastern half of the forest there occurs narrow areas of open water/fen habitat formed from former dune slacks. The edges have been colonised in part by willows and these water bodies are used by wildfowl species such as Mallard and Teal.

The water level fluctuates from season to season with some areas drying out for a time. In order to keep areas of open water and preserve flight lines for wildfowl, the willow growth will be monitored and some clearance work carried out as and when considered necessary.

Artificial open water

Within Lossie Forest there is an area which is leased for quarrying of sand and gravel. The original lease covered approximately 9 hectares. The lease for this area will shortly end with the site returning to FES management. Due to the extraction of aggregates it is not possible to restore the site to plantation but an opportunity exists to create a wetland area which will be beneficial to a number of species. Lagoons have already formed in the depressions which have been formed where aggregates have been removed and are used by bird species such as Mallard, Teal, Grey Heron, Mute Swan etc.

**Species**

As well as managing forests to take account for the presence of protected species, FES species conservation plan is also being targeted towards species for which the organisation can make a meaningful difference.
Six species have been identified as priorities for conservation action in Forestry Commission Scotland's *Woods for Nature* biodiversity programme. These are: capercaillie, black grouse, red squirrel, pearl-bordered fritillary, chequered skipper and juniper.

In Lossie Forest only two species are known to occur from this list, these are Red Squirrel and Juniper.

Red Squirrel

From observations in the field, such as sightings, feeding signs, presence of dreys, Red Squirrel, *Sciurus vulgaris*, are established in the forest, but to what extent is unknown. Conifer forest is not the optimum habitat for this species with populations usually not exceeding 1 squirrel per hectare. We do not believe that the population in Lossie is likely to exceed this.

Juniper

There are only a few Juniper, *Juniperus communis,* which occur in Lossie forest as individual shrubs rather than in colonies. These are identified during pre-operational surveys and shrubs protected from damage.

Other species

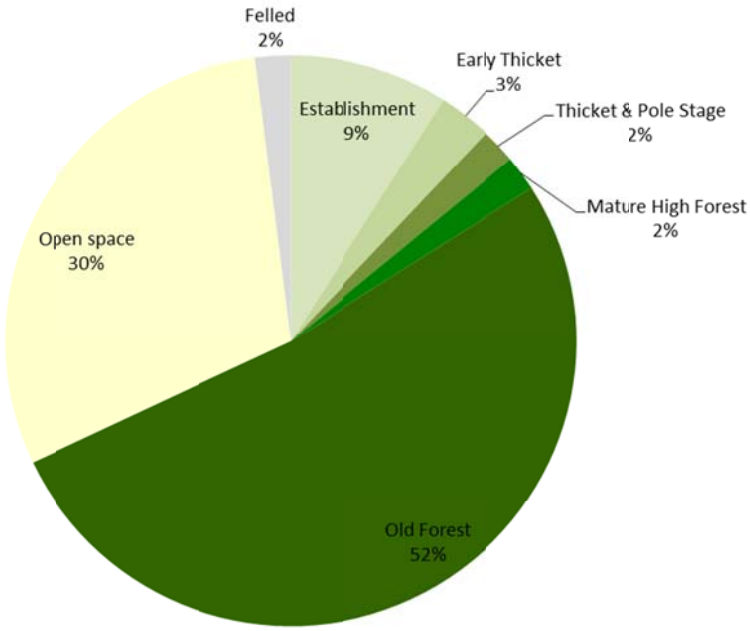
The district maintains a database of all other known species (flora and fauna) in the forest, made up from sightings and previous surveys. In addition FES have access to public biological records and datasets from both statutory conservation bodies and NGO's such as the Botanical Society of the British Isles. These records and sightings are used along with pre-operational site checks to ensure mitigation or habitat improvement is written into the districts work plans and budgets. Where necessary, operations can be scheduled to take place outside the relevant breeding season or, (in the case of protected species), carried out under licence conditions from SNH.

## 3.3 The existing forest

### 3.3.1 Age structure and species

#### Age structure

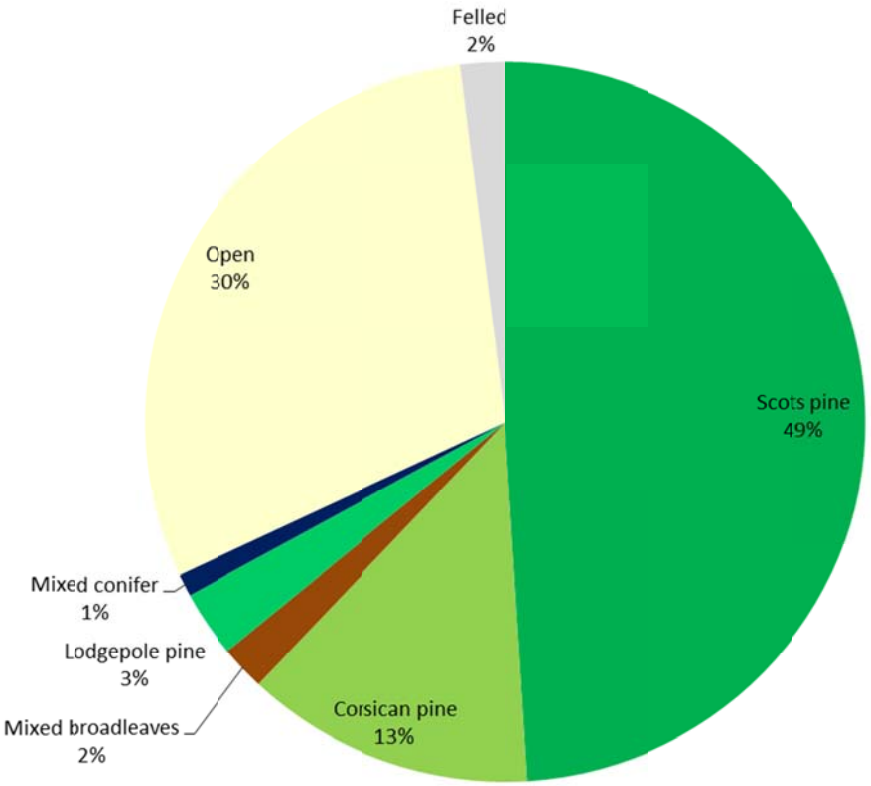
| Age of trees (years) | Successional Stage | Current distribution |
|---|---|---|
| 0 -10 | Establishment | 9% |
| 11 – 20 | Early Thicket | 3% |
| 21 – 40 | Thicket & Pole Stage | 2% |
| 41 – 60 | Mature High Forest | 2% |
| 61+ | Old Forest | 52% |
| | Open space | 30% |
| | Felled | 2% |




The most represented age class is above 61 years old followed by the 0 -10 years old one. The majority of the forest can therefore be classified as old and is ready to enter its second rotation.

## Species

| Species | Current proportion |
|---|---|
| Scots pine | 49% |
| Corsican pine | 13% |
| Mixed broadleaves | 2% |
| Lodgepole pine | 3% |
| Mixed conifer | 1% |
| Open | 30% |
| Felled | 2% |




The site is dominated by Scots pine and Corsican pine. These species are well adapted to the site as they grow well on mineral soils.

Areas of pines have shown good growth, and there is evidence of successful natural regeneration all over the site. Windblow is not a problem for the site and soils are usually quite dry which suits the pine.

Pine is a species appreciated for the quality of the timber produced and for recreation as they create a nice atmosphere for outdoor activities. As Lossie is fairly well visited by the public this makes pine an appropriate species to encourage for this site.

The area of broadleaves is low for the block although species such as sycamore and birch appear to grow very well in some parts such as Bin Hill for example where the soils are better.

### 3.3.2 Access

Access throughout the forest for management and harvesting is generally good with a fit for purpose road network and public road links. There is not expected to be any road building needed for the next plan period.

### 3.3.3 LISS potential

Low Impact Silviculture Systems (LISS) 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. Scots pine, Corsican pine, Birch and Sycamore are the main species that regenerate naturally across the site. Therefore, they present good potential for LISS. The site is very suitable for LISS which will be the main silvicultural approach employed to regenerate the crops throughout the forest.

Some additional actions such as scarification of the soils might need to be undertaken in order to encourage the establishment of future natural regeneration. If done successfully this is also financially attractive as this would cost less than clearfelling and restocking entire coupes. It is also an opportunity to use the local seed source which has already proven its ability to grow on the site.

## 3.4 Landscape and land use

### 3.4.1 Landscape character and value

The Scottish Natural Heritage (SNH) Landscape Character Assessment (LCA) (Turnbull Jeffrey Partnership, 1998) places the forest in the Coastal Forest Landscape Character Area. The LCA describes the Coastal Forests as being "dense stands of commercial conifers of single age, having been planted on the gently undulating coastal sand dunes and poorer gravel's of the coastal margins".

The forest has been established on a series of raised beaches and sand dunes between the Moray Firth and the farmland to the south. The landform is relatively flat with views to the outside from within the forest only possible from the beach, the slope on Binn Hill and along the southern edge of the forest. The forest forms a dark backdrop to the soft Coastal Shore and the Coastal Farmland Landscape Character Areas to the south. Where the forest edge is indented it tends to enclose agricultural land and has the effect of breaking down the large scale of the open flat coastal farmland.

### 3.4.2 Neighbouring land use

To the West flows the river Lossie and beyond that we have woodland. To the south we have farmland and to the south east/east we have woodlands and open ground. The fields and woodlands belong to either private individuals or private Estates.

They are no particular issues identified concerning the neighbouring landuse and the future management of Lossie forest.

## 3.5 Social factors

### 3.5.1 Recreation

Lossie is a well-known site for recreation. Indeed, the atmosphere created by pine creates a pleasant place with an open understorey for the public to walk, cycle, run or ride. Maintaining the quality of the site for recreation being the secondary objective for this site, we will aim to keep the forest pleasant for public use. This will mainly be done utilising LISS: this avoids the use of a clearfell system which has a bigger impact on the landscape.

There is no particular larger infrastructure for recreation except the car park located to the West of the forest at Inchbroom. There are no plans to extend the track network of the forest.

### 3.5.2 Community

The closest being Kingston to the East (1.8km), Lossiemouth to the West (4km) and the largest is Elgin to the South (10km).

### 3.5.3 Heritage

The forest contains one scheduled monument, the Innes Links, anti-invasion defences, Kingston to Lossiemouth (SM13572). The monument comprises the well-preserved remains of a Second World War Defence Sector, constructed between 1940 and 1941 with the intention to protect various airfields within this section of coast against seaborne and airborne invasion from occupied Norway. It consists of reinforced concrete pillboxes and anti-tank blocks, centred on an Emergency Coastal Battery at Innes Links. At over 8km in length, the coastal defences in Lossie Forest comprise the longest and best preserved length of anti-invasion 'coastal crust' in Scotland.

In addition there are several non-scheduled archaeological features including the Flagstaff Fishing Station and associated Ice House (at NJ 281 678), and the Innes Canals. The latter were built for drainage purposes around 1808, the same time the nearby Spynie Canal, designed by Thomas Telford, was built to drain the Spynie Loch. This made available to agriculture an extensive low-lying area of land between Elgin and the coast.

A number of archaeological finds have been recorded in the area including a Bronze Age Axe Head found near Boars Head, medieval pottery and a belt buckle thought to be from a ruined settlement just outside the forest and a possible Barrow just inside the forest boundary.

All forestry works around these locations will comply with the UK Forestry Standards Guidelines.

## 3.6 Pathogens and disease

### 3.6.1 Hylobius

Hylobius weevils can cause extensive feeding damage to young trees used to restock clearfell and LISS managed restock sites. Lossie forest has in the past had high levels of damaged reported but this may change as we move over to LISS managed systems. Methods of control include the use of a fallow period, using treated trees or by top up spraying of planted trees or a mixture of both.

### 3.6.2 Dothistroma needle blight

Dothistroma Needle Blight (DNB) will be addressed differently depending on the level of current infection in the crop. The severity of infection and crop symptoms produced range from reduced growth rate 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. Clearfells are programmed to fight against DNB and the spread of the disease. The main clearfell is located in the west of the forest where Lodgepole pine is infected by the disease.

# 4.0 Analysis and Concept

The information gathered in the previous section has been analysed for its relevance to the plan. This has informed the design concept plan which is based on the land management objectives.

The results of this process are presented in the table below. This has been set out against the national themes of the FES strategic directions document and the issues highlighted in the Moray & Aberdeenshire strategic plan.

| Theme | Key Commitments | Analysis | Concept |
|---|---|---|---|
| Healthy | We are committed to high quality silviculture and increasingly, to using alternatives to clearfelling. | The site presents a good potential for LISS. It is also a very high recreation area and clearfells should be avoided when possible. | Find the most appropriate areas for LISS. Limit the use of clearfelling and use it only when necessary. |
| | We will help the Estate adapt to climate change and become more resilient to pressure. | The climate of the site is predicted to change in the future. DNB has already been identified within Lossie. | Use the ESC and its' built in predicted future climate models to help guide the selection of species suitable for planting. Further action and felling will be undertaken in order to fight DNB when the level of infection is considered as a threat for the forest. |
| Productive | We aim to provide at least three million cubic metres of sustainable softwood timber every year. | The site has potential to grow or maintain softwood trees. | Identify the most appropriate areas for planting or maintaining soft wood trees. |
| | We are committed to maintaining the | The Dunes and shingle belts are | Monitor and maintain the ecological condition |

| | | | |
|---|---|---|---|
| | best open habitats in good ecological condition. | protected habitats. | of priority open habitats. |
| Treasured | We are committed to creating more uniquely special places across the Estate and to delivering benefits to an increasingly diverse range of Scotland's people. | The site is well known by the public even if there are no waymarked trails. Lossie Forest with its road network and extensive informal trails is well used by the local community and beyond. | Maintain/create the most appropriate habitat in order to increase their value where appropriate. Consider carefully the impact of the forest management on the landscape. |
| | We will identify particularly vulnerable species for which the National Forest Estate is important and take specific conservation action. | Lossie Forest is an area identified to have good populations of the FCS biodiversity programme priority species. | Identify the breeding areas of raptors and ensure their protection. Maintain and encourage the creation of habitats favourable to red squirrels and limit as much as possible the propagation of grey squirrels. |
| Cared For | We are committed to maintaining the best open habitats in good ecological condition. | There are opportunities to restore / maintain the quality of habitats such as the Dunes and SSSI interest in Lossie. | A dune restoration project has already been started in collaboration with SNH in Lossie as well as in the SSSI. FES will continue to work in collaboration with SNH to undertake future works, beneficial to the designated sites. |

| | | | |
|---|---|---|---|
| | We will safeguard archaeological sites through our planning and management, and recognise special places and features with local cultural meaning. | There are significant archaeological sites in Lossie with a high heritage value. | We will follow the UK forest for the management of the lands around the archaeological sites. |

# 5.0 Land Management Proposals

## 5.1 Management

### Refer to Map 5 Management.

### Specific features of the site

The objectives of the plan are used as the main guidance along with the UK Forestry standard guidelines. However, other local issues have to be taken into account in order to reach these objectives. Some issues will be identified in each forest block in Moray and Aberdeenshire forest district such as windblow, wetness / poorness of soils or natural regeneration.

In Lossie, poor soils are a key constraint. Indeed, most of the soil layers present on the site are made of sand or shingle, which are very poor substrates. The choice of the future species is therefore very limited to pine, which is adapted to grow on poor and well drained soils. Another constraint is that most of the trees in Lossie forest have been planted over the same short period.

Therefore, one of the management objectives will be to diversify the age class by spreading clearfells and seed felling operations over time.

Windblow is not a major issue in Lossie Forest, as the site is not very exposed to wind, except along the beach.

The landscape has also been considered in the management of the site. However the flatness of the terrain in Lossie means any felling operations will not have a major impact in the wider landscape. The

impact will be very local and a small scale, for example affecting the views from forest roads. This is considered when choosing the different phases of clearfell for example.

## Clearfell

The main silvicultural system employed in British forestry is 'patch' clear-felling followed by planting or occasionally natural regeneration. In this forest the quantity of planned clearfells is very low. Indeed, the main sylvicultural system that will be used in the area will be LISS (see below).

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. During the control of the Hylobius beetle 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 such as Kestrel, Buzzard and Goshawks in this area.

Where possible the scale of clearfells will be in keeping with the scale and topography of the local landscape. Therefore in some instances large clearfells will be appropriate in terms of scale.

## Low impact silvicultural system (LISS)

'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.

Instructions will be written up for each area managed under LISS. Each instruction will be included in the site management plan (work plan) before any operation commences.

Restocking by natural regeneration will be the aim in some areas. All areas identified for restocking by natural regeneration have been recorded and programmed for inspect on a five yearly basis. If after 10 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, targeting key recreational/visual areas, or to ensure the rapid establishment of ground cover.

### Thinning

Wherever possible the district will continue to maximise the area managed through thinning. FES 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;
- Thinning is unlikely to improve poorly stocked or poor quality crops.

An active thinning programme is essential for LISS.

Due to its often poor form 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.’

## 5.2 Future Habitats and Species

Refer to Map 8: Future habitats and species.

As described previously, the predominant species in Lossie Forest is Pine – either Scots or Corsican pine. The forest will mainly be managed under LISS and therefore, we do not expect to have a big change within the species composition of the forest in the future. Indeed, using LISS as a management method, we use the existing seed source already present in the forest which is mainly composed of Pines in this case. Therefore, we expect to mainly have natural regeneration of Pines in the future accompanied with a low percentage of Birch regeneration that we will encourage to increase the broadleaf resource of the forest (which is currently low).

For the few areas where a clearfell treatment will be used, the choice of species for restocking by planting in this plan has been guided by the environmental value of these designated areas.

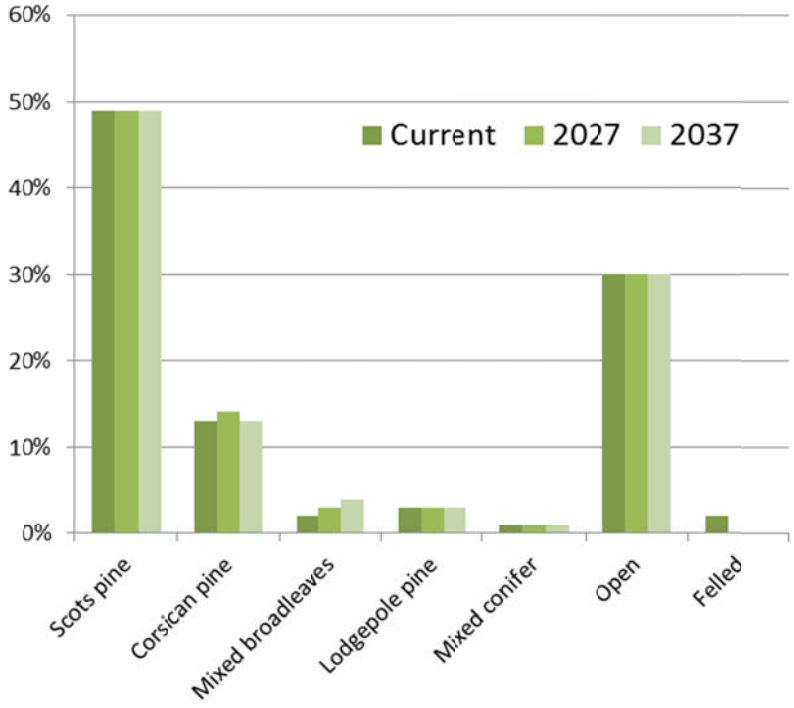
The quality of the Scots pine growing in this area is poor but needs to be felled before it starts to become susceptible to windblow, which would damage the underlying geomorphology, one of the designated features. However due to the conservation status of the area it will be replanted with Scots pine and birch but at wide spacing. This will create a woodland structure but it will minimise future management on steep slopes helping to minimising potential damage to a designated feature.

Further diversification within the block will also be achieved through increasing the area of broadleaves, where this will allow the forest itself to surpass the 5% UKFS threshold and also contribute to both national and forest district policy objectives. Most of the broadleaf resource will be acquired using natural regeneration in the LISS area. We will aim to obtain and accept about 10 % of broadleaf natural regeneration.

Restocking will be undertaken, or regeneration will be managed to achieve a spacing that will allow a commercial approach (except in the SAC/SSSI highlighted above). This will usually be 2500 trees/Ha and in some cases higher depending on the objective of the stand and the condition of the local area.

## 5.3 Species table

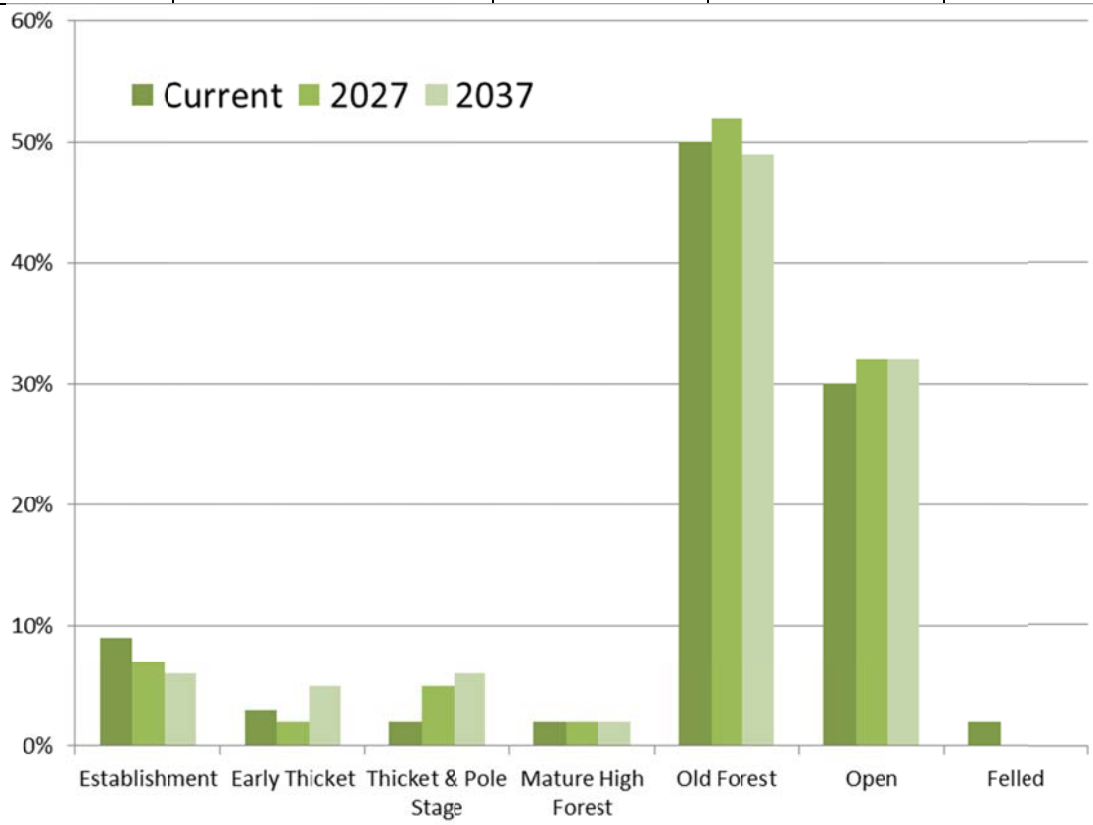
| Species | Current species | Projected species 2027 | Projected species 2037 |
|---|---|---|---|
| Scots pine | 49% | 49% | 49% |
| Corsican pine | 13% | 14% | 13% |
| Mixed broadleaves | 2% | 3% | 4% |
| Lodgepole pine | 3% | 3% | 3% |
| Mixed conifer | 1% | 1% | 1% |
| Open | 30% | 30% | 30% |
| Felled | 2% | 0% | 0% |




The future management of the forest will tend to maintain the current proportion of species in the site. Natural regeneration from existing species will be used to renew the crops and therefore the proportion of these species will be maintained. There is a slight increase in the broadleaf proportion as some will be planted in the plan period. We will also encourage the establishment of broadleaves within the LISS areas in order to diversify the site and reach the UKFS requirements of having a minimum of 5 % of broadleaves. In Lossie this will happen over a time scale that exceeds the 10 years period of this LMP.

## 5.4 Age class

| Age of trees (years) | Successional stage | Current age structure | Projected age structure 2027 | Projected age structure 2037 |
|---|---|---|---|---|
| 0 -10 | Establishment | 9% | 7% | 6% |
| 11 – 20 | Early Thicket | 3% | 2% | 5% |
| 21 – 40 | Thicket & Pole Stage | 2% | 5% | 6% |
| 41 – 60 | Mature High Forest | 2% | 2% | 2% |
| 61+ | Old Forest | 50% | 52% | 49% |
| | Open | 30% | 32% | 32% |
| | Felled | 2% | 0% | 0% |



Lossie is generally composed of old forests. A lot of the trees in Lossie have mainly been planted during the 40s. Therefore most of the trees are already able to produce a good seed source. Pines reach their maximum seed production at the age of 60 years old. Selective felling process can start and continue in some areas of the forest to regenerate the existing crops. The soils being very poor in Lossie, the trees are growing very slowly. This means that even being an old forest; some of the trees have not reached yet their ideal commercial value.

## 5.5 Non-woodland habitats

Open water, wetland and water courses

The River Lossie estuary runs along the edge of the forest and the status of this waterbody has been identified as “good” by SEPA. The Innes Canal/Lhanbryde Burn is classified as ‘poor’ due to its hydromorphology and the physical condition.

The district will follow the UKFS water guidlines during all operations. We will limit the use of chemicals including pesticides and herbicides by using a fallow period and accepting natural regeneration where possible.

Artificial open water – Quarry

Before the area is returned to FES the quarry company, (Tennants of Elgin), in consultation with FES, will carry out works to link the separate lagoons to form a larger body of water with a gently sloping shore and islands suitable for nesting.
Tenants have moved operations to a newly leased area immediately to the east of the original site. In future this will give the opportunity to enlarge the wetland site further following the cessation of quarry operations.

Fen
The fens within Lossie forest can suffer from shading from adjacent mature trees and from scrub encroachment. During the lifespan of this plan, work will be undertaken to clear back mature trees and to cut scrub and willow and treat cut stems with glyphosate to prevent regrowth.

Coastal Vegetated Shingle
Gorse encroachment, along with some Birch regeneration is a negative pressure on the coastal vegetated shingle. Core areas previously cleared will be maintained as open. In 2018, gorse will be cut from this area and the cut stumps painted with glyphosate. See appendix 6, section 4 for detailed methodology and mitigation. Should further funds/resources become available then further clearance of gorse will be carried out from other areas.

Sand dune
This area has been published in previous reports on FES action on open habitats and continues to be a priority for FES. Tree and scrub was cleared from the existing open areas in 2010 and the rest of the area is due for clearing within the next couple of years. It is also likely that next year, we will be using machinery to remove the litter layer following a trial of this method at Morrich More in North Highland.

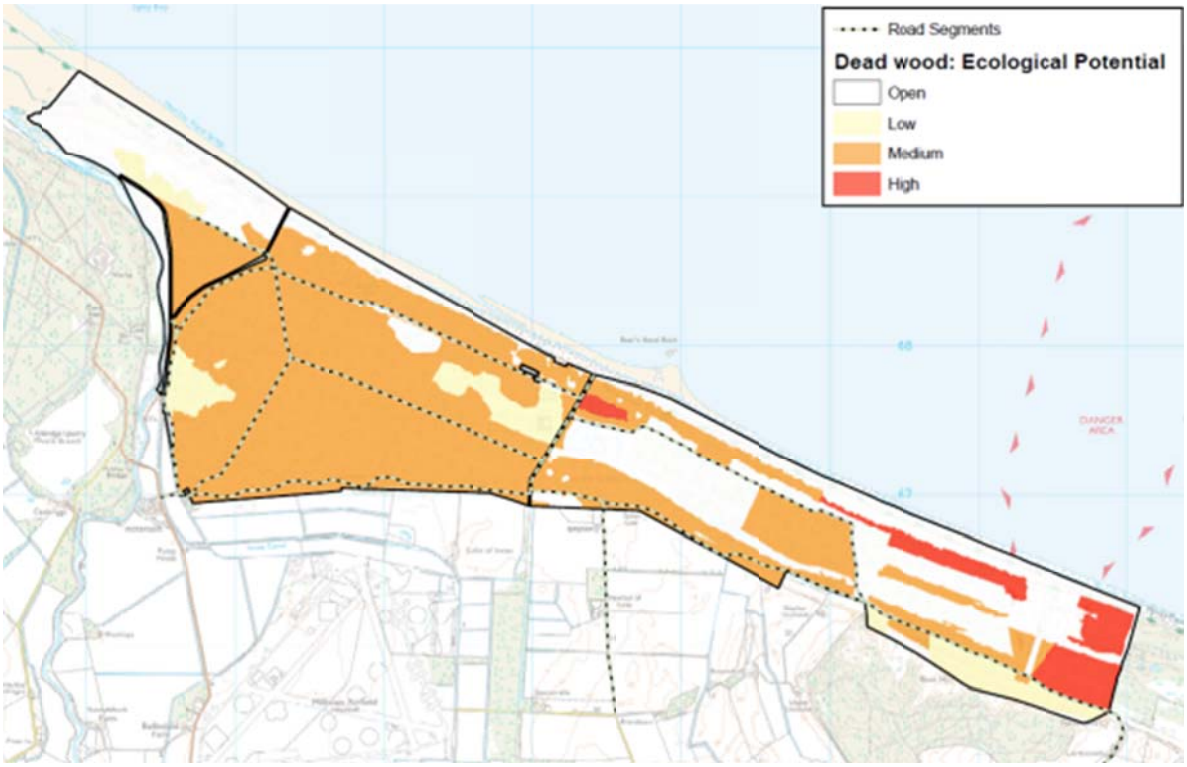
It is also planned to enlarge the restoration area by felling an area 8.5ha of mature Corsican and Scots pine in Phase 1 of the LMP, (2017 – 2021) that will not be restocked. We will therefore aim to keep this area as open in the future. See appendix 5 for the sand dune restoration plan.

Fixed point photography and vegetation surveys/monitoring will be carried out on the sand dune restoration site to monitor invasive tree/vegetation regrowth and colonisation of dune habitat.

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

## 5.6 Deadwood management

Current analysis of the deadwood provision in Lossie forest identifies that it is currently below the target of 20m3/ha across the woodland management unit. As per the local deadwood policy all deadwood and uneconomic windblow on high and medium sites (see map below) will be retained where practical and safe to do so. On clearfell sites, the low prescription will be applied to include the retention of one small stand of trees per 20ha. More detailed information on the provision of deadwood will be assessed and included in the work plan for each site regarding the map below.




High – Areas with high potential to retain dead wood such as natural reserve;
Medium – Areas with an intermediate potential to retain dead wood such as LISS areas;
Low – Areas with low potential to retain dead wood such as clearfells.

## 5.7 Species of interest

There is a wide range of guidance available when working with species and habitats, see Appendix 5, these will be followed within this plan and whilst undertaking forest operations. Forest Operations will be planned to ensure that these species are not put at risk, and where practical, work will be undertaken to encourage them.

**Juniper**
In thinning, an attempt will be made to open up the area around any Juniper to prevent it being shaded out.

**Red squirrel**
In terms of management the majority of the forest is managed under continuous cover systems which will maintain canopy cover over much of the existing forest while encouraging coning through thinning to allow increased crown size. At an individual operation level, harvesting sites are surveyed in advance and dreys identified. Operations can then be scheduled to avoid the breeding season, (February – September inclusive), but if necessary work can be carried out under licence conditions from SNH in order to protect individual dreys if worked between February - September.

**Raptors**
The district will continue to work with Royal Society for the Protection of Birds (RSPB) and North East Raptor group (NERG) to secure breeding populations and where possible safeguard habitat.

## 5.8 Heritage

| Objective | Opportunities | Constraints | Concept |
|---|---|---|---|
| Caring for the Historic Environment | We will ensure positive conservation management at significant historic assets, undertaking scrub control, condition monitoring and archaeological recording where necessary. | We will undertake suitable work practices on operational sites with known historic assets (and those discovered during operations). | We will ensure that historic assets (both designated and un-designated) are included within our land management and operational plans and are managed in line with *UK Forestry Standard*. |

**Scheduled Monument – Innes Links, Anti-Invasion Defences, Kingston to Lossiemouth**

Conservation management of this historic asset can be difficult due to scrub encroachment and shifting sands.

FES will continue to monitor the site annually and control encroaching gorse, scrub and trees. Previously cleared panoramic views from the searchlights and battery's will be maintained clear from trees. During thinning operations opportunities will be taken to sympathetically open up features whilst maintaining the authenticity and character of the site.

Annual monitoring by regional staff will be carried out and a full structural survey will be repeated 5-yearly.

Scheduled monument consent will be sought from HES prior to any operations within the scheduled area.

FES will continue to promote educational access to the site, inform good-practice and continue to highlight the site in articles and on the web, utilising the resources developed from on-going measured surveys. (See Appendix 7)

**Unscheduled Monuments**

Details of all known historic environment features are held within the *Forester Web Heritage Data* and included within work plans for specific opera-

tions to ensure damage is avoided. Significant historic environment features will be depicted on all relevant operational maps. Pre-operations surveys will be undertaken in advance of all forest operations to note any new features and to ensure all sites are marked on the ground and on constraints maps to ensure their protection in line the UK Forestry Standard guidelines.

## 5.9 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 monitored by the Wildlife Ranger Manager.

Deer fences will be sometimes required when planting palatable species. High levels of public use can modify and limit deer grazing/browsing behaviour so fencing is not required in all cases.

Fences might have a short term impact on the landscape and access to restock areas as they will be kept until the woodland is established (usually a period of 10 years). However, by planting trees the landscape will be improved in the long term as well as the benefits that woodlands provide to the public.

## 5.10 Access

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

## 5.11 Pathogens

***Hylobius***

Hylobius weevils can cause extensive feeding damage to young trees used to restock clearfell sites but damage is often highly variable. In the past the most cost effective control has been in the use of chemicals through purchasing chemically treated trees along with chemically spraying the trees in the following seasons after planting. In an attempt to minimise the amount of chemicals used in forestry an alternative method of control is being used developed by Forest Research (research agency of the Forestry Commission) where the gap between felling and planting is varied (fallowing) through the use of the Hylobius Management Support System (HMSS).

The Hylobius Management Support System 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 often allowing us to restock using untreated trees and without follow up spraying.

The aim for this plan area is to replant all sites, that are not being managed under LISS, within two years of them being clear felled unless the Hylobius MSS predicts an alternative timescale is more appropriate.

If the feeding damage by Hylobius is predicted to be high then a four year fallow period will be used. This allows the Hylobius population to peak and then drop to acceptable levels before replanting is carried out. However if the prediction is that Hylobius population levels, and thus feeding damage, will be low then hot planting will be considered i.e. replanting in the season immediately following the felling of the site.

On all occasions the predictions from the Hylobius MSS will be combined with the local knowledge and experience of the forest management forester to reach the final decision on the replanting timescale.

***Dothistroma Needle Blight (DNB)***

Dothistroma Needle Blight will be addressed differently according to the level of current infection in the crop. The severity of infection and crop symptoms produced range from the dropping of a couple of yield

classes to high levels of mortality within the stand. The 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 infected crop will allow us to prioritise the harvesting of such areas.

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

From this the priorities for felling are as follows:

**Highest: Category 4** - Once crops reach category 4 there is a marked reduction of marketable products.

**Medium: Category 3** - Category 3 still produce high proportion of timber before its value drops significantly.

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

This has led to the following action plan for dealing with DNB infection:

- Prioritise infected areas to be felled by swapping felling coupes of non-infected crops in the current program.
- Include into thinning operations the felling of any infected crops within the area to minimise costs. Amendments to the forest design plan will be required as specified in the tolerance table for felling such areas.

- Reassess badly affected blocks and consider if a full review is required.

- Due to the moratorium on planting CP and LP on all sites and SP on previously infected areas, plus a 500m buffer zone, planting programs will need to be amended to include replacement species suitable for the site.

There is no area planned to be fell within the plan period which are correlated to the disease.

## 5.12 Critical Success Factors

- Continue with an active thinning programme to ensure the ongoing success of the LISS areas as described in this plan;

- Management of the LISS regeneration will be mainly used to regenerate the crops in Lossie;

- Continue to monitor and work actively in collaboration with SNH to monitor and maintain the quality of conservation areas.

- The current recreational infrastructure will be maintained;

- 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.