Dunnet Forestry Trust
Dunnet Forest LTFP

2020-2039

March 2020

A. Description of Woodlands

A.1 Property Details			
Property Name:	Dunnet Forest		
Business Reference Number:	162744	Main Location Code:	73/285/0026
Grid Reference: (e.g. NH 234 567)	ND220698	Nearest town or locality:	Dunnet
Local Authority:		Highland	
LTFP Plan area (hectares):		104.61 ha	

Land Manager's Details				
Title:	Mrs	Forename:	Anna	
Surname:	Graham			
Organisation:	Dunnet Forestry Trust		Position:	Director
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Address:	Castlehill Heritage Centre, Harbour Road, Castletown, Caithness			
Postcode:	KW14 8TG		Country:	Scotland

Agent's Details				
Title:	Mr	Forename:	Jon	
Surname:	Hollingdale			
Organisation:	Community Woodlands Association		Position:	CEO
Primary Contact Number:	01309 674004		Alternative Contact Number:	
Email:	jon@communitywoods.org			
Address:	Steading Cottage, Craigfield Farm, Kintessack, Forres, Moray			
Postcode:	IV36 2SP		Country:	Scotland

A.2 Location and Background

Provide details on the wider context of the LTFP area. Append a 1:25,000 or 1:50,000 map with contours and the grid reference of the main forest entrance. The map should show the estate boundary based on the Business Reference Number (BRN) and the woodland boundary, if different.

The location of the forest is shown on Map 1. The grid reference of the car park and main forest entrance is ND220698.

Dunnet Forest is located in north Caithness, approx. 6km south of Dunnet Head (the most northerly point on the GB mainland), the western edge of the forest is just 200m inland from Dunnet Bay. The A836 Thurso – John O'Groats road (part of the North Coast 500 route) runs along the SW edge of forest, which is otherwise bounded by grazing land. The nearest significant area of woodland is at Castletown, ~3km away.

The forest is in an exposed location on old dune links and covers 104.61 ha. It was established in 1954 by the Forestry Commission using a range of conifer species, often as monocultures but sometimes in mixture. Difficult conditions, including drought and rabbits, ensured that the plantings required repeated beating up: this and differential growth rates produced a forest with more structural diversity than might have been expected.

The forest, which lies within the Dunnet Links SSSI[1], was sold to the then Nature Conservancy Council in 1984. Since 2003 the forest has been managed by Dunnet Forestry Trust (DFT), a company limited by guarantee (SC 231402) with charitable status (SC 033096) and a community membership of ~480 under a 25 year lease from the current owners, Scottish Natural Heritage (SNH). DFT has begun the process of restructuring the forest, clearing windthrow and introducing a range of broadleaves, whilst enhancing public recreation provision and developing a woodfuel business.

A.3 Existing Schemes & Permissions

Provide details on any existing forestry permissions, grants, EIA approvals, previous plans, or cases in progress.

Type (e.g. Felling Licence)	Ref. No.	Details
LTFP Prep grant	19FGS40643	FGS Long Term Forest Plan Preparation Grant
Management grant	19SAF01612	Public Access / LISS

[1] The SSSI, which extends to 792ha, is designated for its nationally important sand dunes and associated links grassland. See https://sitelink.nature.scot/site/572 for more information.

A.4 Stakeholder Engagement

Include a summary of the main points from Scoping and where they are addressed in the plan. Append pre- and post- scoping maps, and the full Scoping Report.

Scoping – Main Points	LTFP Reference (section):
Management of grassland habitats – encroachment of natural regeneration	C.2.11
Management of grassland habitats – rank vegetation in grassland	C.2.11
Management of grassland habitats – great yellow bumblebee	C.2.11
Management of grassland habitats – kidney vetch / small blue butterfly	C.2.11
Management of grassland habitats – Scottish primrose	C.2.11
Disturbance of over-wintering geese & swans	C.2.1, C.2.2, C.2.3
Disturbance of breeding birds	C.2.1, C.2.2, C.2.3
Species choice when restocking	C.2.5
Public access for all abilities	C.2.9

A.5 Long Term Vision and Management Objectives

Tell us how you intend to manage the forest in the long term and your goals for its development.

Vision

Describe your long term vision for the LTFP area.

Dunnet Forestry Trust's vision is that 20 years from now Dunnet Forest will be owned and managed by the community to provide a place for recreational use, volunteering opportunities and habitat protection, within the natural environment.

Management Objectives

Give your objectives of management and also how you will manage the forest area sustainably. Your objectives should be specific and you should also be able to measure their outcomes.

No.	Objectives (including environmental, economic and social considerations)	Indicator of objective being met
1	To progressively restructure the forest, increasing species and structural diversity.	Felling 15.02ha of p1954 stands Increased structural diversity (age,

No.	Objectives (including environmental, economic and social considerations)	Indicator of objective being met
		forest types) Increased diversity of species composition Increased broadleaved %age to 20.4%
2	To maintain a sustainable supply of fuel wood, substituting for fossil fuels and reducing local carbon footprint, and other forest products.	Felling / clearance of 15.02ha lodgepole pine and other p1954 conifers. Woodfuel sales maintained Sales of other forest products maintained
3	To maintain and enhance access provision for all to a community woodland that provides a pleasant, sheltered and interesting natural environment.	2km of all-ability access provision maintained and upgraded to current standards where appropriate 15km of other paths maintained Increased number of other recreation facilities (e.g. benches, features of special interest)
4	To provide opportunities for greater community involvement through volunteering, leading to mental and physical health benefits.	Increased number of volunteers. Range of tasks undertaken maintained
5	To maintain and improve habitats for species of conservation importance and contribute to maintaining the Dunnet Links SSSI in favourable condition.	Management regime for grassland agreed and delivered Surveys for key species undertaken Favourable condition of designated site maintained.

A.6 General Site Description

Provide details under each of the headings below. Append maps if appropriate for each subsection.

A.6.1 Topography

The forest itself is generally flat with little in the way of distinct topographical features. It is situated within a flat (in places very gently undulating) landscape. It is just below 10m above sea level at its lowest point (ND220702, on the western boundary) rising to nearly 40m at its highest point in the north-east corner.

A.6.2 Geology and Soils

Base geology is Middle Old Red Sandstone type of the Caithness flagstone series. The drift

geology over most of the site consists of either shallow layers of peat, or small areas of boulder clay especially near burns where it is occasionally exposed. This material is overlain by deposits of windblown sand.

The majority of the soils are of the Fraserburgh association. They are poorly drained calcareous ground-water gleys which frequently develop on the flat areas between fixed dunes, with impeded drainage due to a buried layer of peat and/or glacial till at depths ranging from 40cm to 1m.

The soils are characterized by their sandiness and the presence of shell fragments. The soils are all calcareous, but the pH values at the surface are variable and depend on the balance between loss of calcium through leaching and gain by the further addition of wind-blown material; with increasing distance from the sea addition of wind-blown sand is less, and the surface horizon is more leached. At Dunnet recorded pH values range from 8.1 at the shoreline through 7.5 400m inland to 6.3 and 5.4 3km inland.

Coniferous forest cover has resulted in the development of a mor humus layer mainly composed of partly decomposed needle litter.

(Soils information from Futty & Dry: "The soils of the country round Wick" (1977))

A.6.3 Climate

The forest experiences a mild (for the latitude) oceanic climate with frequent, strong winds.

Annual rainfall is between 800 & 850mm. Distribution at Dunnet is relatively even throughout the year with October and November marginally the wettest months and May the driest.

Mean temperature is ~8 degrees Celsius, with a relatively low annual range in mean monthly temperatures of around 9.5 degrees Celsius, from 3.5 degrees in January to 13.0 degrees in July.

The Forest Research decision support tool (http://www.forestdss.org.uk/geoforestdss/) provides the following climatic data for the site:
Accumulated temperature ranges from 1134 (W edge) to 1112 (NE corner).
Moisture deficit ranges from 132 (W edge) to 127 (NE corner).
Exposure (DAMS) ranges from 15 (W half of forest) to 16 (E half of forest).

A.6.4 Hydrology

The forest drains from east to west. Four small streams cross the western boundary of the forest, only the northernmost is named: the Burn of Helshigrow.

This burn runs through a pond excavated in c. 2001 (and cleared more recently) at ND224703. There is a significant wetland area upstream of this at ND225703, and some smaller marshy areas, but generally the surface drainage is good.

There is a network of drainage ditches (presumably dating from establishment) in some compartments, notably Cpts 9a, 10a and 10c. These ditches will be assessed when silvicultural operations are carried out in these compartments and disconnected from watercourses if necessary.

There are several fireponds across the site, presumed to date from establishment, at ND221698, ND221700, ND220702 and ND228704.

A.6.5 Windthrow

Windthrow has had a major impact on Dunnet Forest over the last 20 years. Concern over the potential loss of forest amenity if SNH were to clearfell the forest in response to then-incipient windthrow was a significant contributing factor in the community's decision to take on management of the forest in 2003, and much of the silvicultural work since then has been in clearing up the damage from major storms in 2008, 2011 and 2015 as well as smaller losses from typical winter storms.

DAMS scores range from 15 to 16 across the site. Reasonable growth rates mean that the 1950s plantings have reached 25m (Sitka) and 20m (lodgepole) respectively, which in conjunction with shallow rooting depth and localised waterlogging makes these stands very susceptible to windthrow. South coastal provenance lodgepole pine has been particularly prone to wind damage.

Other species, such as Corsican pine, Scots pine and sycamore have been less prone to windthrow, reflecting lower growth rates and top heights.

Strong westerly winds carry salt spray off the sea and this can frequently be seen to scorch trees on the seaward edge of the plantation.

A.6.6 Adjacent Land Use

Dunnet Forest is a plantation in a landscape otherwise lacking woodland cover, especially native woodland (see Map 1). There are some remnant clumps of conifer on the back slopes of dunes on the west side of the A836, and some garden trees in Dunnet village, but the nearest significant woodland is 3km away at Castletown.

The land across the A836 is unmanaged sand dunes, otherwise the forest is surrounded by unimproved and improved grazing land occupied by cattle and sheep. Prior to community management and the replacement / repair of the surrounding stock fence there was some cattle and sheep ingress to the forest.

A.6.7 Access

The maintenance and enhancement of public access at Dunnet Forest has been a major objective of DFT. The forest welcomes over 60,000 visitors each year and is used regularly for educational visits from schools and the Highland Council countryside ranger service,

which has a base at the adjacent Seadrift Visitor Centre.

There are two main access points to Dunnet Forest, the car park at the south-western corner of the forest (ND220698) which has been expanded and surfaced by DFT, and the works access approximately 400m to the north (ND 220702) which was created to provide a hardstanding for timber extraction and is now the base for DFT's woodfuel business.

The car park is the main entrance point for visitors to the forest, who can access a path network of 17km which has been progressively improved and upgraded to cater for a wide variety of abilities. Several features of interest including a sculpture trail and log cabin have been created through the forest.

Paths leading from the car park are unsuitable for horses, and equestrian access to the forest is only available via the works access. For security and operational reasons it is not possible to open the works access for public parking; parking for horse boxes is available at the large car park adjacent to the Ranger Station approximately 250m north.

6.2km of paths in Dunnet Forest are recognised as core paths by Highland Council[2] (as is the 1.1km roadside path from Dunnet village to the works entrance).

A.6.8 Historic environment

There are no scheduled monuments within the forest.

Historic Environment Scotland's Canmore database records four sites within the forest: a hut circle at ND 22349 70022, which has been cleared of trees and has an associated interpretation board, two mounds at ND 22427 69997 and ND 22503 69902 and a stone wall at ND 22461 70238, considered to be a remnant of a possible Home Guard ammunition store.

A.6.9 Biodiversity

Designated sites

Dunnet Forest lies within the Dunnet Links SSSI, which extends to 792ha, and is designated for its nationally important sand dunes and associated links grassland. See https://sitelink.nature.scot/site/572 for more information.

The site management statement notes: "The forest still maintains an interesting grassland flora in some of the more open glades, particularly along the forest rides." Key species are kidney vetch, Scottish primrose, small blue butterfly, great yellow bumblebee and moss carder bee.

The forest is ~1km from the Loch Heilan SSSI (see https://sitelink.nature.scot/site/989), which forms part of the Caithness Lochs SPA designated for its non-breeding (overwintering) Greenland white-fronted geese, greylag geese and whooper swans.

[2] See https://www.highland.gov.uk/downloads/download/199/core_paths_in_caithness map 3 for details

UK BAP Priority Species

Juniper is found at several locations within the forest: a large, partially fenced clump in the power line wayleave (Cpt 6a) and several smaller bushes in Cpt 8a.

Native Woodland Survey of Scotland

The NWSS records some areas of broadleaved restock in Cpts 1-4 as native woodland: note however that in practice these restocked area employ a range of native and non-native species (e.g. including sycamore and Swedish whitebeam).

A.6.10 Invasive Species

Four shrub species present in the forest are potentially invasive.

- Sea buckthorn occurs in one discrete area under the power lines near the southern end of Cpt 6a
- Snowberry occurs along the western fringes of Cpt 5
- Cotoneaster occurs along the western fringes of Cpts 5, 7 and 8
- Gorse occurs along the southern boundary of Cpt 9a

The existing distribution of these shrubs is tolerated as providing shelter and fruiting / flowering habitat but DFT policy is to prevent further spread of these species.

A.7 Woodland Description

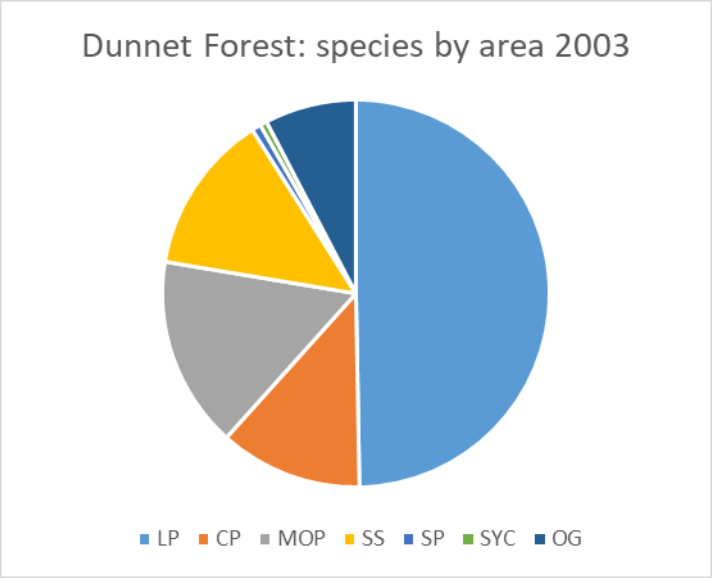
Provide a brief description of woodland types and any relevant past management.

Also complete the Tables below, with reference to Appendix 2 of the Long Term Forest Plan – Applicant's Guidance.

Woodland types

The first rotation plantings were primarily of exotic conifers, often in monoculture, but sometimes in mixtures, with initial failures and repeated beating up resulting in a relatively complex forest composition, e.g. most lodgepole stands have a minority component of other pine species. In some cases one element of the mixture has almost completely suppressed the other (e.g. Sitka spruce and mountain pine), elsewhere both components have persisted.

The approximate species breakdown prior to the community taking over management in 2003 was as follows: lodgepole pine 52.0ha, mountain pine 16.7ha, Sitka spruce 14.0ha, Corsican pine 12.5ha, Scots pine 0.8ha, sycamore 0.6ha, open ground 8.0ha. This is illustrated in the chart below:



Most of the lodgepole pine is of south coastal provenance, but there are some areas of other provenances in the forest, e.g. the southern part of Cpt 1c.

Sitka spruce, lodgepole pine, Scots pine and sycamore areas have developed into high forest, whereas the Corsican pine stands are generally low density and slow growing and the mountain pine is typically multi-stemmed, shrubby and rarely more than 6m high.

There are a very small number of open grown western hemlock in Cpt 8a and larch in Cpt 2a.

Yield classes are fairly consistent across the site (albeit with some exposure and salt-related suppression of growth on the western and northern edges of the plantation), with Sitka spruce clearly the most successful species, averaging YC 12. Growth rates for south coastal lodgepole pine have been relatively good (YC 8), although form is often poor.

Previous Management

Prior to establishment the site was treeless and used for grazing. The northern part of the site had at one time been part of a golf course.

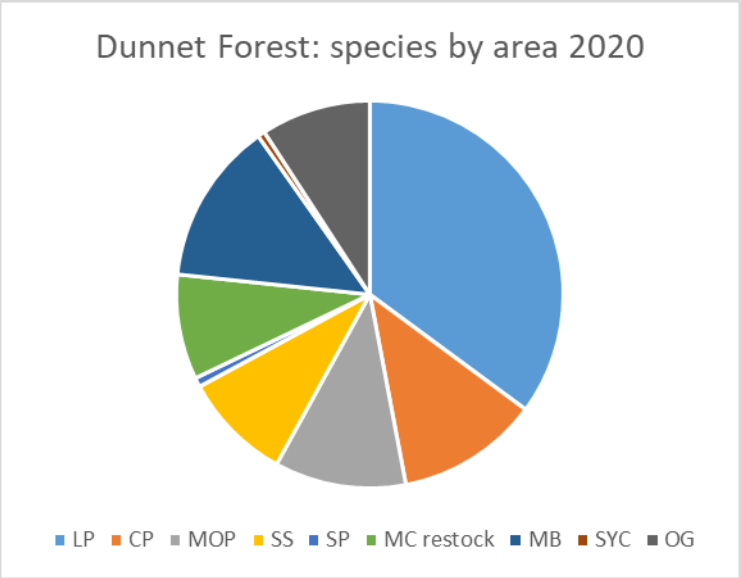
Post-establishment, there was little or no forest management undertaken by the Forestry Commission, or, for 10 years, by SNH. A limited thinning operation in lodgepole pine stands in Cpts 1 & 2 was carried out by SNH in the late1990s, along with tree clearance from the hut circle in Cpt 7 and some public access improvements.

After an initial clearfell operation undertaken in 2003/4, where timber was transported to Norbord at Ardersier and James Jones' mill at Mosstodloch, DFT has carried out harvesting operations in-house, with the majority of produce sold as firewood and smaller volumes as woodchip and round poles for a variety of uses (pergolas, jumping poles, fence posts).

DFT inherited a forest that was dominated by conifer species,, with broadleaves restricted to small areas of sycamore from the original planting plan and some very limited enrichment planting from the late 1990s. Since 2003, restructuring work and enrichment planting has significantly diversified the species mix, and in particular has increased the broadleaved

component of the forest.

The current species makeup of the forest is shown in Map 3 and presented in the chart below.



Conifer restocking has largely been by Sitka and lodgepole, incorporating both planting and natural regeneration, with very limited use of noble fir and larch. A much wider range of broadleaves has been employed, notably alder, rowan, willow, sycamore and birch, with smaller proportions of oak, hazel, hawthorn, ash, elder, Swedish whitebeam and others.

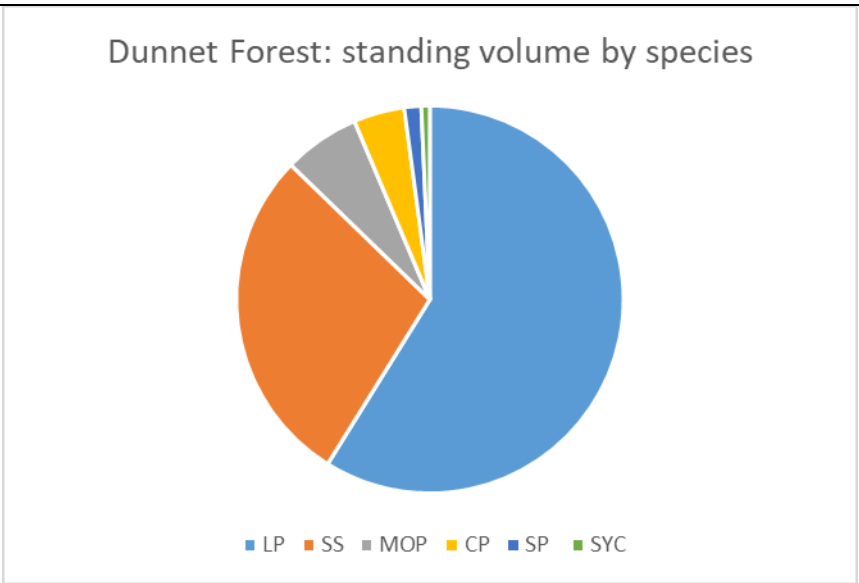
Early indications are that restocked Sitka stands have a better yield class than those of the first rotation, presumably reflecting the improved soils and shelter available for the second rotation.

Amongst the broadleaved species the most successful have been alder and sycamore, with ash and oak growing well from deer shelters in sheltered sites.

Standing volume

A full inventory has not been undertaken, but our estimate of standing volume is ~14,100 m3, as per the table and chart below:

Species	**Volume**
Lodgepole pine	8300
Sitka spruce	4000
Mountain pine	900
Corsican pine	600
Scots pine	200
Sycamore	100
Total	**14100**



59% of the standing volume is lodgepole pine, whilst the Sitka spruce stands, which account for only 9.1% of the stocked area, hold 28% of the standing volume.

Note that the table and chart above do not include any volume estimate from post 2005 restocking areas.
Note also that some of the lodgepole stands are actively blowing so "standing" may not always be 100% correct. Any future increment in these stands is likely to be offset by losses through windthrow.

Table 1 - Area by species

This shows the current and future species composition within the entire Long Term Forest Plan area.

Area by species						
Species	**Current***		**Year 10***		**Year 20***	
(Add relevant species groups, or OG/OL)	**Area (ha)**	**%**	**Area (ha)**	**%**	**Area (ha)**	**%**
LP (see note 1)	36.73	35.1%	24.33	23.3%	17.43	16.7%
CP (see note 2)	12.45	11.9%	12.45	11.9%	12.45	11.9%
MOP	11.50	11.0%	9.50	9.1%	7.50	7.2%
SS	9.54	9.1%	8.92	8.5%	5.12	4.9%
SP	0.80	0.8%	0.80	0.8%	0.00	0.0%
MC (SS/LP restock - see note 3)	9.18	8.8%	16.46	15.7%	23.61	22.6%
MB	14.18	13.6%	21.32	20.4%	27.27	26.1%
SYC	0.63	0.6%	0.63	0.6%	0.63	0.6%
OG	9.60	9.2%	10.20	9.8%	10.60	10.1%
Total	**104.61**	**100**	**104.61**	**100**	**104.61**	**100**

* Of whole Forest Plan area (including open ground (OG)). Any mixtures such as Mixed Conifer (MC) should be broken down and included as an individual species component where a species occupies more than 10%.

Note 1: Lodgepole pine stands typically contain minority components of other pine species.

Note 2: Corsican pine (p1954) is low density and slow growing (YC 2-4), it has, and will continue to be, under-planted with a range of predominantly broadleaved species, which will eventually become the dominant species in these compartments.

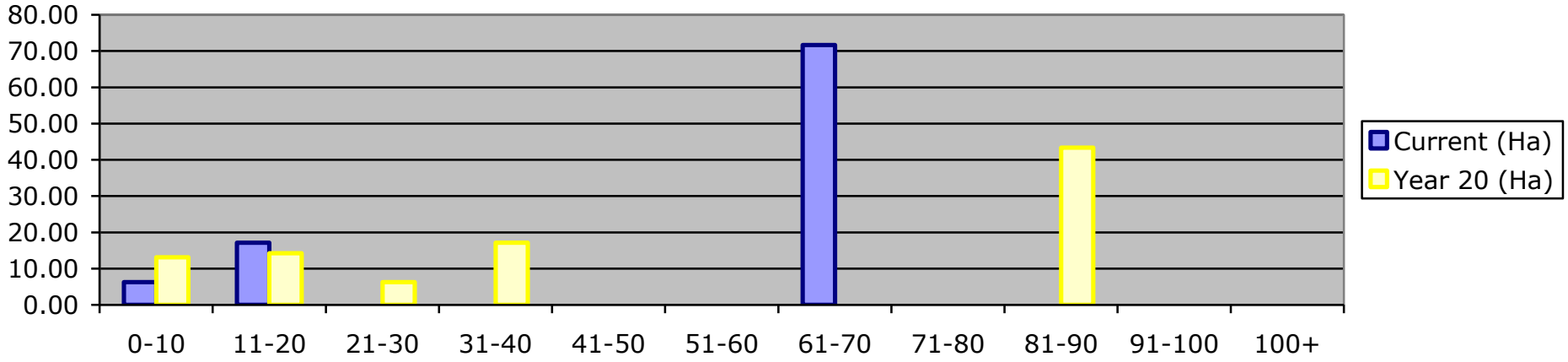
Note 3: MC: Primarily SS & LP, with very small components of other species (NF, CP, EL). These areas have been restocked post 2005 with a mix of planting and natural regeneration, with varying proportions of the two main components – the estimated overall proportion is 60% SS, 40% LP.

Table 2 – Area by age

This table and the chart on the following page show the woodland area broken down by age class and how well the woodland is distributed across the age classes.

Age class (years)	Current Area (ha)	Year 20 Area (ha)
0-10	6.25	13.10
11-20	17.11	14.22
21-30		6.25
31-40		17.11
41-50		
51-60		
61-70	71.65	
71-80		
81-90		43.33
91-100		
100+		
Total	95.01	94.01

NB Current open ground: 9.60 ha, 20 year open ground: 10.60ha


80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
0-10
11-20
21-30
31-40
41-50
51-60
61-70
71-80
81-90
91-100
100+
Current (Ha)
Year 20 (Ha)

A.8 Plant Health

Provide details on any known plant health issues within the LTFP area and their effect on the forest plan.

There are no known plant health issues within the LTFP area.

The potential spread of Dothistroma needle blight is a matter of some concern, given the dominance of pine species in the forest: DFT is seeking to diversify as rapidly as possible.

There are a small number of ash trees (<20 years old) in the forest which will be monitored for signs of Chalara fraxinea. The current moratorium on movement of ash seedling and seed material means that ash will not be employed in restocking or enrichment planting.

B. Analysis of Information

B.1 Constraints and Opportunities

Identify constraints and opportunities. Append maps as appropriate and provide map reference.

Factor	Constraint	Opportunity
Soils	Thin, sandy soils, prone to seasonal desiccation. Limited rooting depth Occasional waterlogging	Second rotation crops benefit from increased organic matter in soils. Some pockets of better soils reflecting past stock management. Wet areas are opportunity for increased open ground and wider species range (willows, etc)
Crop stability	Dunnet forest is a highly exposed site and the predominance of mature crops (especially LP) brings an ongoing risk of windthrow.	Restocking benefits from shelter from existing stands. Second rotation stands can be managed to minimise windthrow risk.
Water courses	Several small watercourses run through the forest.	Crossing points will be bridged to provide access for operations and public.
Landscape	Dunnet Forest is adjacent to and highly visible from the A836 and Dunnet village. On-going windthrow is impacting on visual amenity of the forest	Felling operations will remove badly blown stands, especially along northern boundary of the forest. Restocking with a mixed of conifer and broadleaved species will enhance visual impact internally and externally.

Archaeology	4 sites identified, no direct impact from harvesting operations expected.	Hut circle will be kept clear of natural regeneration, with vegetation management (e.g. mowing nettles) to ensure continued public access.
Power line	11kv volt overhead line runs north-south through Cpt 6a – roughly parallel to A836	Area under power line maintained as largely open ground habitat – grassland management to favour key species: great yellow bumblebee, moss carder bee etc
Open ground habitats	Areas of open ground are important for remnants of links vegetation	Protection from encroachment by natural regeneration. Restructuring will increase area of open ground.
Protected species	Protected mammals may be present in the woodlands including otter and bats	Carry out surveys and follow regulations as appropriate. Increase woodland diversity and age structure to benefit species.
Deer	Roe deer are present in the forest in limited numbers.	DFT will monitor deer population and impacts, and – in conjunction with neighbours – cull if required.
Over wintering birds	Swans and geese may forage in adjacent fields.	Minimum stand-off distance of 300m maintained by harvesting machinery
Public access	The forest is an important recreational resource for north Caithness and maintenance and enhancement of public access is a key objective of community management.	Maintain and enhance recreation provision, including all-ability access provision. Appropriately located and worded warning signs will be displayed during all operations.
Internal roading	Extensive internal path network but very little suitable for large harvesting machinery	Use of small-scale machinery and little-and often motor manual felling model supports local woodfuel business and removes need for export of timber on public road network
Timber traffic	Dunnet Forest is adjacent to and has access onto the A836, which is an approved timber transport route, however it is a very considerable distance from conventional timber processing markets	Good vehicular access at the “works entrance" facilitates community firewood sales.

Outline how you intend to incorporate the constraints and opportunities into the management objectives.

The planned felling and restocking programme has been shaped by several of the constraints and opportunities:

- The felling will further the progressive restructuring of the forest, removing the most damaged and most-at-risk p1954 lodgepole pine stands and clearing up some small pockets of windthrow in the areas of highest public use.
- The small-scale, little-and-often, motor manual felling model will limit disturbance in any given year and small scale extraction methods can use the existing path network with limited impact. This will ensure a regular supply of material for DFT's woodfuel business, removing the need to export timber to distant markets.
- Restocking design will address landscape issues through development of softer edges to replace geometric conifer blocks.
- Species selection – a mix of broadleaves and conifers - will contribute to enhancing diversity whilst maintaining a future supply of woodfuel and providing shelter from the elements for recreational users, and reflect the need to limit deer impacts.
- Restock species will be better matched to localised soil and exposure conditions.
- Felling and restocking small coupes in the mountain pine stands and enrichment planting in Corsican pine stands will contribute to restructuring the forest without large-scale clearfelling, reducing impact on visual amenity and wildlife.
- Over the course of the plan the total area of open ground will increase from 9.6ha (9.2%) to 10.60 ha (10.1%)

Management of open ground habitats will be shaped by several of the constraints and opportunities:

- The area under the power lines will be managed to maintain and enhance the grassland sward for the benefit of key species.
- Other areas of open ground will be protected from encroachment by natural regeneration, and managed as appropriate for biodiversity and public amenity.

Public access will continue to be a key management objective for DFT, who will maintain and enhance access for all.

Operations around water courses, archaeology or protected species, or potentially impacting over-wintering birds foraging in adjacent fields, will all be managed in accordance with best practice and the provided guidance so as to meet required legislation.

C. Management Proposals

C.1 Silvicultural Practice

Outline silvicultural practice and management prescriptions. Include any past management practice that is relevant and the strategies to address the issues identified during the analysis phase.

Following planting there was minimal silvicultural intervention at Dunnet for almost 50 years. Since taking on management responsibility in 2003 DFT has begun the process of restructuring the forest, felling mature conifer stands and restocking with a wider range of broadleaved and conifer species, seeking to enhance the environmental value of the forest whilst delivering a range of social and economic benefits.

DFT's long-term intention is to manage the entire forest under Low Impact Silvicultural Systems (LISS) principles, however, the legacy of p1954 conifer monocultures ensures that there are some first rotation stands, totalling ~40ha, where LISS management is not feasible and, in some cases, windthrow has already begun, which must be clearfelled, with LISS only implemented in the second rotation.

Dunnet Forest, whilst adjacent to the A836, which is an approved timber transport route, is a long way from conventional timber processors. Additionally, whilst the forest has a very extensive internal path network, it does not have forest roads and/or timber extraction routes suitable for large harvesting and forwarding machinery. Harvesting will therefore be motor-manual, with extraction by ATV-type vehicle, primarily using the existing path network with extensions, upgrades and repairs as required. The proposed extraction routes and projected harvest volumes are shown on Map 6.

Given the extensive and varied public use of the forest, DFT's policy is to prioritise windthrow clearance to maintain public amenity, and to match harvesting rates to local sales demand for woodfuel and small round roundwood: this is currently 4-500m3 per year (primarily woodfuel, with small volumes of spruce roundwood sold as pergolas, jumping poles, etc). The proposed felling regime and local usage ensures that "export" of material by timber lorries on the public road network is not anticipated.

A total of 24.54 ha of mature LP and SS has been identified for clearfelling in the 20-year plan period. These stands have been selected on the basis that they are already experiencing considerable windthrow, or are considered to be at the highest risk in the future (see Map 4 and section C.2.1 below for more details).

Restocking will be with a mix of conifer and broadleaved species (see section C.2.5 below for more details) to improve the amenity and environmental value of the forest whilst maintaining an on-going supply of material for the woodfuel business and providing shelter from the elements for recreational users. Ground preparation will be hand screefing, with a range of protection measured used for species most vulnerable to deer.

Additional windthrow clearance for safety management purposes (e.g. across paths) will take place as the need arises, with priority given to the p1954 stands in cpts 6b, 6c, 7a and 8a, which see the highest public use (see Map 8). If additional windthrow requires significant

clearance then approval will be sought from Scottish Forestry as an amendment to the plan.

DFT will continue to restructure the mountain pine stands in Cpts 5b & 9a, cutting ~10 small coupes totalling ~2ha over the next decade (with similar operations expected in future 10-year periods). Felled areas will be restocked with broadleaves.

Mixed conifer (SS/LP) restock from 2005 has grown well and an initial thinning will be undertaken across 7.22ha as part of the process of initiating LISS management in these stands.

Corsican pine stands in Cpts 6c, 7b and 8b are low density and slow-growing, and have been progressively under-planted with a wide range of predominantly broadleaved species. No felling is anticipated in these stands in the plan period, but there will be some continued enrichment planting to continue the conversion of these stands.

Over the course of the plan period the open ground proportion of the forest will increase from the current 9.60ha (9.2%) to 10.60ha (10.1%).

A five-year review of the LTFP will be carried out.

C.2 Prescriptions

Please provide maps as set out in Appendix 2 of the Forest Plan Applicant's Guidance and complete the associated Tables. Provide any further details required along with the map references.

C.2.1 Felling

A total of 24.52 ha of mature (p1954) LP and SS has been identified for clearfelling in the 20-year plan period. These stands have been selected on the basis that they are already experiencing considerable windthrow, or are considered to be at the highest risk in the future.

The areas identified for felling area is shown on Map 4, whilst Table 3 below shows the breakdown by 5 year phases. Note that whilst Map 4 uses the conventional demarcation of felling into 5 year phases, harvesting operations at Dunnet are anticipated to be more or less on-going, with an annual cut matched to demand for woodfuel, rather than carried out in distinct tranches at five year intervals. For the first ten years the anticipated year of harvesting operations is shown on Map 4 (note that this also include the LISS felling in MOP areas detailed in C.2.3 below).

Harvesting operations will be motor-manual, and carried out throughout the year. As harvesting products are primarily intended for woodfuel, material is typically cut to 2m length and stacked for ~18 months prior to extraction. Larger diameter material may be cut to shorter length for ease of handling.

Extraction will be by ATV, primarily using the existing path network with extensions, upgrades and repairs as required. Watercourses will be bridged where necessary (in most cases bridges are already in place). Map 6 shows timber extraction routes.

DFT will adhere to Scottish Forestry's guidance notes on wildlife and forestry operations during all operations. For felling during the bird breeding season, guidance and processes as set out in Forest Operations and Birds in Scottish Forests will be adhered to.

A minimum stand-off distance of 300m will be observed from geese and whooper swans using fields adjacent to the forest for foraging during the wintering/migratory season (1 October to 30 March).

Additional windthrow clearance for safety management purposes (e.g. across paths) will take place as the need arises, with priority given to the p1954 stands in cpts 6b, 6c, 7a and 8a, which see the highest public use (see Map 8). If additional windthrow requires significant clearance then approval will be sought from Scottish Forestry as an amendment to the plan.

C.2.2 Thinning

Mixed conifer (SS/LP) restock from 2005 has grown well and an initial thinning will be undertaken across 7.22ha (see Map 5). This initial and relatively early thinning is intended as the first step in the process of initiating LISS management in these stands.

Restocking was at 2,500 stems/ha, this has been supplemented in many areas by significant natural regeneration. Species mix is estimated at SS60 / LP40 (with very minor components of other conifers such as larch and noble fir), but there is considerable localised variation within compartments. The thinning regime will seek to reduce stocking density to ~2,000 stems/ha. It is anticipated that the LP proportion will be reduced after thinning.

Cpt	Area	Species	Current density	Post-thin density
1a	1.30	MC	2,500 – 10,000	2,000
2a	0.52	MC	2,500 – 10,000	2,000
3b	2.30	MC	2,500 – 10,000	2,000
4b	3.10	MC	2,500 – 10,000	2,000

Harvesting operations will be motor-manual, and carried out throughout the year. As harvesting products are primarily intended for woodfuel, material is typically cut to 2m length and stacked for ~18 months prior to extraction.

Extraction will be by ATV, primarily using the existing path network with extensions, upgrades and repairs as required. Watercourses will be bridged where necessary (in most cases bridges are already in place). Map 6 shows timber extraction routes.

DFT will adhere to Scottish Forestry's guidance notes on wildlife and forestry operations during all operations. For felling during the bird breeding season, guidance and processes as set out in Forest Operations and Birds in Scottish Forests will be adhered to.

A minimum stand-off distance of 300m will be observed from geese and whooper swans using fields adjacent to the forest for foraging during the wintering/migratory season (1 October to 30 March).

C.2.3 LISS

DFT's long-term intention is to manage the entire forest under LISS principles, as far as possible, although as noted previously in some compartments this can only be implemented in the next rotation.

DFT will continue to restructure the Mountain pine stands in Cpts 5b & 9a, cutting ~10 small coupes totalling ~2ha over the next decade (with similar operations expected in future 10-year periods).

Harvesting operations will be motor-manual, and carried out throughout the year. As harvesting products are primarily intended for woodfuel, material is typically cut to 2m length and stacked for ~18 months prior to extraction.

Extraction will be by ATV, primarily using the existing path network with extensions, upgrades and repairs as required. Watercourses will be bridged where necessary (in most cases bridges are already in place). Map 6 shows timber extraction routes.

DFT will adhere to Scottish Forestry's guidance notes on wildlife and forestry operations during all operations. For felling during the bird breeding season, guidance and processes as set out in Forest Operations and Birds in Scottish Forests will be adhered to.

A minimum stand-off distance of 300m will be observed from geese and whooper swans using fields adjacent to the forest for foraging during the wintering/migratory season (1 October to 30 March).

Corsican pine stands in Cpts 6c, 7b and 8b are low density and slow-growing, and have been progressively under-planted with a wide range of predominantly broadleaved species. No felling is anticipated in these stands in the plan period, but there will be some continued enrichment planting to continue the conversion of these stands.

C.2.4 Long Term Retentions (LTR) / Natural Reserves

The mature sycamore stands in Cpts 3b, 7b and 8b and the conifer stands in Cpts 10a, 10b and 10d have been identified as long-term retentions for amenity and biodiversity.

The sycamore stands are the only mature broadleaved trees in the forest and are highly valued for amenity.

The conifer areas in Cpt 10 have no paths other than around the perimeter and provide a refuge for wildlife which is being left to develop naturally. Cpt 10a (LP p1954) has largely windblown already and is regenerating naturally.

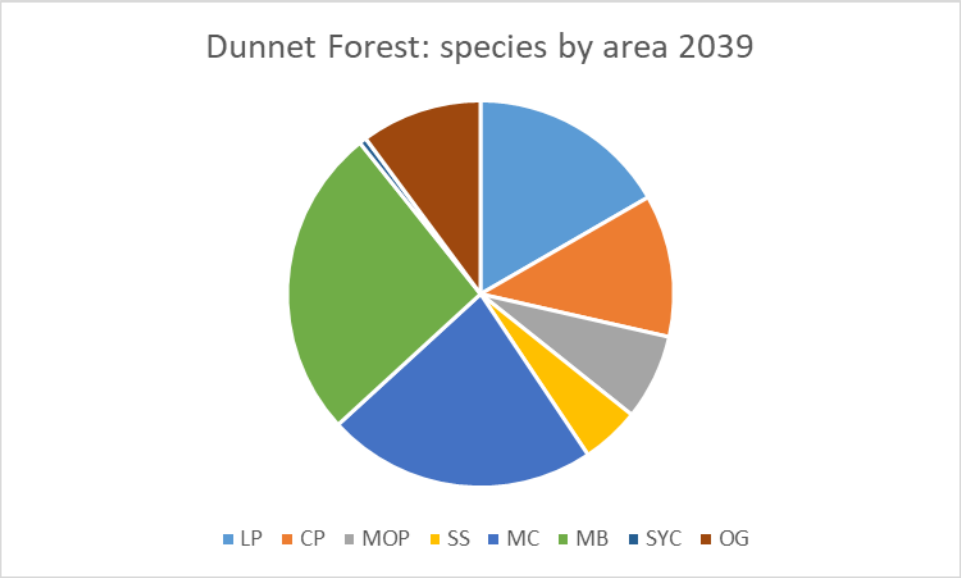
C.2.5 Restocking Proposals / Natural Regeneration

DFT will continue to seek to diversify the forest, increasing the broadleaf proportion but

retaining a significant conifer component to ensure a sustainable timber supply for the woodfuel business timber, and providing shelter from the elements for recreational users.

The anticipated species mix at the end of the plan period is shown in the chart below. Note that the Corsican pine area has being progressively underplanted since 2003 and it is likely that by 2039 much of this area will be dominated by broadleaves.

It is intended that restocking will take place within 2 years of felling. If there are pressing reasons for delay, such as high weevil populations, approval will be sought from Scottish Forestry.



The long-term restocking plan is shown in Map 7. The design is intended to soften the external appearance of the forest through the development of a more uneven edge whilst maintaining a perimeter of conifer stands which can provide shelter for the internal broadleaved areas.

Future restocking and enrichment mixtures will be more selective in terms of species choice and protection, learning from experience to ensure higher survival rates and reflecting the need to limit deer impacts.

1 ha of the 28.54 ha (including 4ha LISS felling) will be left unplanted as designed open ground to assist with soften the external edges and as internal glades

Most felled areas will be restocked with a mix of conifers and broadleaves (as enumerated in Table 5), the exceptions being the LISS felling coupes in Cpts 5a and 9b which will be restocked with MB, and the small windthrow clearance coupes in Cpts 6b, 6c and 7a: coupes in 6c will be MC, the other two coupes of MB. In all cases the minimum stocking density will be 2500 stems/ha for conifers and 1600 stems/ha for broadleaves.

Sitka spruce and lodgepole pine will remain the primary conifer species for restocking, for reasons of proven suitability and productivity on the site and (in the case of Sitka) unpalatability for deer; these two species will be planted in intimate mixture, with the

expectation that the LP proportion will be reduced through thinning.

In Cpts 5b and 5c SS & LP will be planted in 60/40 mix. Elsewhere the mix will be 60/20 with the remaining 20% comprising alternative conifers, including Scots pine, larch, noble and grand fir, Douglas fir, Norway spruce, western red cedar and western hemlock. These other conifers, will be planted in discrete small groups, targeted at the best ground conditions, and DFT will trial the use of small temporary fencing exclosures to facilitate establishment.

A wide range of broadleaved species will be employed, the most important being common alder and sycamore, based on their proven success to date. Other broadleaved species such as oak, birch, rowan, willows, aspen, hazel, hawthorn, cherry and Swedish whitebeam will be used in varying proportions according to localised grounds conditions (soils, moisture, exposure) as detailed in Table 5. 120cm treeshelters will be used to protect the most highly palatable species (oak, hazel, cherry, whitebeam, etc), and temporary fencing exclosures will be trialled for other species.

Ash is not currently included in the species mixture for restocking, because of the moratorium of the movement of plant material due to Chalara fraxinea. Should this situation change DFT may seek to incorporate ash in the restocking mixture as previous plantings have demonstrated good growth.

Experience from previous clearfelling / restocking operations has shown that ground preparation needs are limited, with manual screefing usually sufficient, although weeding is necessary in the most fertile areas. In clearfelled areas stacking of harvesting debris into windrows has proved an effective means of ground preparation (and provide some shelter for young trees).

All native broadleaved species will be sourced from the appropriate seed zone: 102. Should the preferred seed zone not be available permission will be sought from Scottish Forestry to use stock from an appropriate neighbouring zone. It is anticipated that planting will use a combination of trees grown in the forest and acquired from commercial nurseries.

Table 3 – Felling

This shows the scale of felling within the felling phases in the context of the whole Forest Plan. This includes any areas of 'LISS – Fell' (i.e. removal of final overstorey).

SCALE OF PROPOSED FELLING AREAS (including LISS final fell areas)												
Total Forest Plan Area:		104.61	hectares									
Felling	Phase 1	%	Phase 2	%	Phase 3	%	Phase 4	%	Long Term Retention	%	Area out-with 20yr plan period	%
Area (Ha)	8.37	8.0%	6.65	6.3%	7.00	6.7%	6.50	6.20%	10.25	9.8%	65.84	62.9%

Table 4 – Thinning

This shows the area of thinning over the first 10 years of the Forest Plan.

Species	**Thinning (ha)**
MC (SS/LP restock post 2005)	7.22
Total	**7.22**

Table 5 – Restocking

This table provides information on the restocking proposals for the first 10 years of your Forest Plan. Restocking should be listed on a coupe by coupe basis.

Felling Phase	Map Identifier(s)	Species to be planted	Area (ha) to be planted
Phase 1	1c	MC (SS 60%, LP 20%, other conifers 20%)	1.30
Phase 1	1c	MB (CAR 30%, SYC 30%, BI 10%, ROW 10%, HAZ 10%, other broadleaves 10%)	0.30
Phase 1	2a	MB (CAR 50%, WL 40%, ASP 10%)	0.42
Phase 1	3b	MC (SS 60%, LP 20%, other conifers 20%)	0.25
Phase 1	3b	MB (CAR 30%, SYC 30%, BI 10%, ROW 10%, HAZ 10%, other broadleaves 10%)	0.10
Phase 1	4a	MC (SS 60%, LP 20%, other conifers 20%)	0.60
Phase 1	4a	MB (CAR 30%, SYC 30%, BI 10%, ROW 10%, WL 10%, other broadleaves 10%)	0.30
Phase 1	4c	MC (SS 60%, LP 20%, other conifers 20%)	1.50
Phase 1	4c	MB (CAR 30%, SYC 30%, BI 10%, ROW 10%, HAZ 10%, other broadleaves 10%)	1.60
Phase 1	6b	MB (CAR 30%, SYC 30%, OK 20%, other broadleaves 20%)	0.25
Phase 1	6c	MC (SS 60%, LP 20%, other conifers 20%)	0.43
Phase 1	7a	MB (CAR 30%, SYC 30%, OK 20%, other broadleaves 20%)	0.22
Phase 2	3c	MC (SS 60%, LP 20%, other conifers 20%)	2.70
Phase 2	3c	MB (CAR 30%, SYC 30%, BI 10%, ROW 10%, HAZ 10%, other	1.30

		broadleaves 10%)	
Phase 2	5b	MC (SS 60%, LP 40%)	0.30
Phase 2	5b	MB (CAR 40%, SYC 40%, BI 10%, ROW 10%)	0.25
Phase 2	5c	MC (SS 60%, LP 40%)	0.40
Phase 2	5c	MB (CAR 40%, SYC 40%, BI 10%, ROW 10%)	0.20
LISS fell	5a	MB (CAR 30%, SYC 30%, OK 20%, other broadleaves 20%)	0.80
LISS fell	9c	MB (CAR 30%, SYC 30%, OK 20%, other broadleaves 20%)	1.20
		Total Restocking Area	17.79

Notes:

Other conifers: Scots pine, Noble fir, Grand fir, Douglas fir, Norway spruce Western hemlock, Western red cedar, larch.

Other broadleaves (1c, 3b, 3c, 4c): Swedish whitebeam, hawthorn, oak, willow spp, aspen.

Other broadleaves (4a): Swedish whitebeam, hawthorn, oak, hazel, aspen.

Other broadleaves (5a, 6b, 7a, 9c): Swedish whitebeam, hawthorn, rowan, birch, hazel, aspen, cherry.

C.2.6 Protection

As noted in section C.2.5 above, 120cm treeshelters will be used to protect the mostly highly palatable species (oak, hazel, cherry, whitebeam, etc), and temporary fencing exclosures will be trialled for other species.

C.2.7 Fence erection / removal

Other than the small scale fencing exclosures to protect restock areas mentioned previously there are no plans for fence erection or removal.

The forest has a boundary stock fence, this will be maintained as required.

C.2.8 Road Operations

No forest road operations are planned.

Timber extraction will be by small, ATV-type vehicles using the existing forest path network, with new extensions, upgrades and repairs as necessary. Map 6 shows timber extraction routes.

C.2.9 Public Access

Maintenance and enhancement of public access is a key objective of DFT. The forest has over 17km of paths and trails, of which 6.2km are recognised as core paths. A people counter has been installed at the main car park entrance and it is estimated that the forest attracts >60,000 visitors per year.

Key challenges for DFT in managing the forest are the need to cater for a wide range of users and user-groups and to integrate recreation provision and biodiversity enhancement with other forest management objectives and constraints.

DFT's approach is to use informal zoning to help structure future management, recognising that certain management objectives will have a higher priority in certain areas of the forest. Map 8 shows the existing recreation infrastructure and the proposed zones, which are described below. It must be stressed that zoning is not intended to provide hard and fast rules but to guide DFT thinking and planning (and investment decisions) as to which areas are best suited for particular types of activity, infrastructure provision and management.

Zone A (Cpts 6, 7, much of 8 and small parts of 1 & 2)

This zone, in the SW of the forest, includes the car park and main amenity features, including the log building, bird hide and sculpture trail, and sees the most intensive recreational use. Management emphasis will remain on family and all-abilities access, with paths maintained to an appropriate standard, and, particularly in Cpt 6, continued maintenance and investment in "forest furniture" – picnic tables, benches, interpretation. Some of the 2km of "all-abilities" trail in this area needs additional work to meet modern specification.

Horse access from the main carpark will continue to be discouraged in favour of use of the northern entrance. Forest management intervention will be limited to the clearance of small areas of windthrow and the continued underplanting of Corsican pine stands. Clearance of

future windthrow across paths for safety management purposes will have a high priority in this zone.

Zone B (Cpts 3 & 4 and most of 1 & 2)

This zone, which includes much of the northern part of the forest, has seen the bulk of restructuring work: clearfelling, thinning and replanting since 2003. These operations provided an opportunity to redesign compartments, and considerable new provision in this zone was made for walkers and runners, and also for new user groups: horse riders and sport cyclists. This provision will be maintained and enhanced where possible, but to a standard suitable for more active forest users (this zone is at least 500m from the main carpark).

This is the part of the forest where the majority of harvesting and restocking work will take place in the plan period, continuing the task of felling and clearing lodgepole pine stands, and restocking with a mix of conifer and broadleaved species.

Zone C (Cpts 5, 9 and 10, and part of 8)

The eastern end of the forest has a very limited path network, mainly confined to the compartment boundaries, and consequently sees very limited public access. Significant areas of compartments 5 & 9 were deeply ploughed and planted with Mountain Pine, and are largely impenetrable, whilst initial plantings of compartment 10d failed, leaving a large area of open space habitat. Existing public access will be maintained but not extended or upgraded.

There will be some small scale felling in the mountain pine stands, creating or extending small glades which will be restocked with mixed broadleaves and conifers, and Cpts 9a and 9b will be felled and restocked in the third phase of this plan. The currently inaccessible sub-cpt 10a has been almost flattened by windthrow, recovery is unlikely to be cost effective, so it will be left for nature to take its course.

C.2.10 Historic Environment

The hut circle and adjacent area will be maintained as open space with invasive vegetation controlled, other historic environment features will be protected during operations.

C.2.11 Biodiversity

In addition to the more general activities of significantly increasing the broadleaf proportion of the woodland, and increasing the area of open ground, DFT will carry out a number of specific activities to conserve and protect biodiversity.

Existing areas of open ground, and Cpts 1a and 10d in particular, will be monitored for any encroachment through natural regeneration of conifer species, which will be removed, to preserve remnants of links vegetation.

The grassy sward in the wayleave area under the power line in Cpt 6a is a key resource for great yellow bumblebees and other species. DFT will, in conjunction with SNH and the Bumblebee Conservation Trust, agree and institute a mowing regime to prevent the

development of rank vegetation and benefit key species (Scottish primrose, kidney vetch, small blue butterfly); this is expected to involve cutting and removing cut material, provisionally at the end of September / early October (subject to SNH approval).

All open areas will be protected from negative impacts from harvesting operations.

C.2.12 Tree Health
Routine inspections of the forest will include a visual check for any general signs of plant health issues. If issues relating to plant health are found within the forest, DFT will follow the most recent guidance relating to the particular disease. If necessary and where appropriate, DFT will (following approval from Scottish Forestry) amend restocking plans to utilise alternative species.

C.2.13 Invasive species
The existing distributions of sea buckthorn, snowberry, cotoneaster and gorse will be tolerated but these species will be monitored and cut back if they appear to be spreading.

C.2.14 New Planting
There is no new planting planned.

C.2.15 Other:	

C.2.16 Other:	

C.3 Environmental Impact Assessment and Permitted Development Notifications

Please indicate the total area (hectares) for each project type and provide details as requested by sensitive or non-sensitive area.

Type of Project	Sensitive Area		Non-sensitive Area		Total
Afforestation	%Con	%BL	%Con	%BL	0ha
Deforestation	%Con	%BL	%Con	%BL	0ha
Forest Roads		ha		ha	0ha
Quarries		ha		ha	0ha

Provide further details on your project if required.

C.4 Tolerance Table

	Map Required (Y/N)	Adjustment to felling period*	Adjustment to felling coupe boundaries**	Timing of Restocking	Changes to Restocking species	Changes to road lines	Designed open ground ***	Windblow Clearance* ***
FC Approval normally not required	N	Fell date can be moved within 5 year period where separation or other constraints are met	Up to 10% of coupe area	Up to 2 planting seasons after felling	Change within species group e.g. evergreen conifers or broadleaves		Increase by up to 5% of coupe area	
Approval by exchange of email and map	Y		Up to 15% of coupe area	Between 2 and 5 planting seasons after felling subject to the wider forest and habitat structure not being significantly compromised		Additional felling of trees not agreed in plan Departures of more than 60m in either direction from centre line of road	Increase by up to 10% Any reduction in open ground within coupe area	Up to 5 ha
Approval by formal plan amendment may be required	Y	Felling delayed into second or later 5 year period Advance felling into current or 2nd 5 year period	More than 15% of coupe area	More than 5 planting seasons after felling subject to the wider forest and habitat structure not being significantly compromised	Change from specified native species Change between species group	As above, depending on sensitivity	More than 10% of coupe area Colonisation of open areas agreed as critical	More than 5 ha

Note

*Felling sequence must not compromise UKFS in particular felling coupe adjacency. Felling progress and impact will be reviewed against UKFS at 5 year review.

** No more than 1 ha, without consultation with FCS, where the location is defined as 'sensitive' within the Environmental Impact Assessment (Forestry) 1999 Regulations (EIA).

*** Tolerance subject to an overriding maximum of 20% designed open ground.

****Where windblow occurs, FCS must be informed of extent prior to clearance and consulted on clearance of any standing trees.

D. Production Forecast

Append your production forecast.

Appendices

Provide a list of appendices:

Item number	Title
Map 1	Location
Map 2	Concept map
Map 3	Current Species
Map 4	Felling
Map 5	Thinning
Map 6	Timber Extraction
Map 7	Restocking
Map 8	Zoning
Annex 1	Scoping Report
Annex 2	Production Forecast
Annex 3	Heathsfield Management Plan