Forestry and Land Scotland
Coilltearachd agus Fearann Alba

Garadhban LMP 2025-2035

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.

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Version History

Version	Date	Comments
0.1	15/07/2025	Initial draft
0.2	22/07/2025	Planning Manager comments
0.3	11/08/2025	Final Internal comments

Forestry and Land Scotland
Coilltearachd agus Fearann Alba

A Description of Woodlands

A.1 Property Details

A.1 Property Details			
Property Name:	Garadhban		
Grid Reference: (e.g. NH 234 567)	NS 4797 9067	Nearest town or locality:	Drymen
Local Authority:		Stirling County Council	
LMP Plan area (hectares):		441	
Owner's Details			
Organisation:	Forestry and Land Scotland	Position:	Central Region
Primary Contact Number:	0300 067 6600	Alternative Contact Number:	N/A
Email:	planning.central@forestryandland.gov.scot		
Address:	Five Sisters House, Five Sisters Business Park, West Calder, West Lothian		
Postcode:	EH55 8PN	Country:	Scotland
Approval - to be completed by Scottish Forestry staff:			
LMP Reference Number:			
Plan Period: (ten years) (day/month/year)	From:	To:	
Operations Manager Signature:		Approval Date: (dd/mm/yyyy)	

Declaration

I hereby apply for a permission to fell the trees described in this application and I certify that:

- I am the landowner or an occupier of the land with written permission of the landowner;
- Where the landowner is a business, I am authorised to sign legal contracts on behalf of that business;
- If I am an acting on behalf of the landowner or occupier, I have been mandated to do so;
- Any necessary consents from any other person(s) if required, have been obtained;
- I have made the necessary checks with the local planning authorities regarding Tree Preservation Orders and Conservation Areas;
- I have notified all stakeholders that may be affected by the felling in this application and sought their views prior to submitting this application;
- I hereby acknowledge that Scottish Ministers may process any of my personal data contained in or relating to this application in accordance with the terms of Scottish Forestry's Privacy Notice, a copy of which is available at www.forestry.gov.scot;
- Where applicable and appropriate I have submitted an EIA screening opinion form for operations contained within this application under the Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017;
- I have read and understand this application fully and, to the best of my knowledge and belief, the information given in this application is complete, true, and accurate;
- I accept that any false or misleading information provided in this application constitutes an offence and may result in any felling permission based on this application being revoked at any time, and

I have read and understand Scottish Forestry's Privacy Notice, a copy of which is available at https://forestry.gov.scot/privacy-complaints-freedom-of-information-and-requests-for-information

Do you give consent for Scottish Forestry to access your land? Delete as appropriate.	**YES**	
You are not obliged to give us consent to enter your land, however if we are denied access to your land, and cannot carry out an assessment because of this, we may reject your application. **This consent is for access to assess this application as well as monitor compliance with any subsequent approval, where applicable**		

Signed:		Print:		Date:	

A.2 Location and Background

The Garadhban LMP area lies to the south of the Highland Boundary fault, overlooking Strathendrick, and has a largely southerly aspect. The forest is about 2km north of Drymen and covers an area of approximately 441 hectares. The A811 and B837 are to the south and the unclassified road linking Drymen and Gartmore bisects the forest. It is situated within the Loch Lomond and Trossachs National Park, its southeastern corner coincides with the Park boundary.

A.3 Existing Schemes & Permissions

Table: Existing Schemes & Permissions		
Type (e.g. Felling Permission)	Ref. No.	Details
Garadhban LMP 2014-2024	033/CT/G/12(6)	Expired 13/03/2024

A.4 Stakeholder Engagement

Table: Stakeholder Engagement Summary	
Scoping – Main Points	**LMP Reference (section/page):**
Lot of the roads are overgrown and unwalkable	B.1
There is a chambered cairn in the north-west of the block	A.6.8; C.2.13
The plan should aim to maximise opportunities to improve the riparian zone along main rivers and buffer small watercourses.	B.1

A full record of comments raised during public consultation is available in Appendix I.

A.5 Long Term Vision and Management Objectives

The majority of the LMP area has been a productive plantation woodland since at least 1863, as identified through first edition Ordinance Survey maps. It is this legacy that Forestry and Land Scotland seek to continue, whilst deploying Low Impact Silvicultural Systems (LISS) and species diversification where site conditions allow.

In this way, the management vision for Garadhban is a productive and economically viable forest that is simultaneously managed to the benefit of both biodiversity and public users.

Management Objectives		
No.	**Objectives (including environmental, economic and social considerations)**	**Indicator of objective being met**
1	Continue to manage a significant proportion of the forest as productive conifer	Area of productive conifer is equal to, or more than, 50% of the total plantable area by the end of the 10-year LMP period.
2	Remove areas of concern to tree health	Removal of all Larch and windblown Spruce by the end of the 10-year plan
3	Increase woodland resilience to mitigate future climate risk and enhance biodiversity	Continue to diversify productive species by planting in mixtures where appropriate as well as moving towards LISS management by completing first thinnings.
4	Improve herbivore management capacity to enable use of natural regeneration as a reliable restocking method	Establishment and maintenance of strategic deer glades throughout the block
5	Improve infrastructure for operational access	Maintenance of arterial forest roads to ensure access for timber and wildlife management operations
6	Enhance and increase Black Grouse habitat	Restock the northern edge of the block with low-density native species suitable to Black Grouse where felling occurs as part of the management cycle of the woodland

A.6 General Site Description

A.6.1 Topography and Landscape

Elevation ranges from about 60m in the southwest to 216m in the more exposed parts to the northeast. The land falls in a series of gentle to moderate slopes from open moorland to the north to enclosed agricultural ground to the south. The topography is slightly uneven with low knolls interspersed with shallow drainage lines. Some of the latter become increasingly incised as they flow south and out of the forest. Though bedrock occasionally comes close to the surface it rarely forms outcrops.

The SNH Landscape Character Assessment shows Garadhban to be within Landscape Character Type 257 - Plateau Moor and Forest. This Landscape Character Type's key characteristics include gently undulating upland landscapes, open grass and heather moorland at higher elevations, dense forest, and semi-improved pasture.

Though the LMP area does sit within the Loch Lomond and the Trossachs national park, it falls outside of the national scenic areas within the park, the closest being that of Loch Lomond. In the landscape capacity study for trees and woodland, commissioned by the national park, it is noted that the capacity of the area for more productive conifer planting is low-medium. The landscape characteristics listed for this area are "Immensity of loch and landscape"; "Two lochs in one"; "a multitude of beautiful islands"; "distinctive mountain groups"; "Ben Lomond, widely known, popularly frequented"; "banks of broadleaved woodland"; and "peaceful side glens".

It is stated in the landscape capacity study that the main limiting factor is the loch shore where planting should be avoided, and the obscuring of the distinctive surrounding hilltops. As Garadhban lies between these zones – 3km from the loch shore at the boundary's nearest point and far below the closest ridgeline of Conic Hill – forestry in the LMP area is unlikely to negatively impact the special landscape qualities of the national park. Additionally, the lack of new planting areas prescribed in this LMP means that all conifer planting sits within the historic boundary of the forest which has remained a constant since the middle of the 19th century and, as such, means that the management of the block will not negatively impact the special landscape qualities of the national park.

A.6.2 Geology and Soils

A detailed soil survey of the site was carried out by the Forestry Commission in 1967. The dominant soil type is a loamy surface water gley. The degree of gleying is also variable and is often masked by the reddish hues of the parent material. There are subtle gradations into better drained brown earths on the one hand and wetter peaty gleys on the other. More distinct areas of typical and upland brown earths are found on steeper slopes separating the higher moorland areas from the arable land to the south. Some of these are associated with more freely draining

fluvio-glacial deposits. The presence of upland brown earths indicates a tendency to slight podzolisation and possible iron pan formation. Even in areas classified as iron pan, there is little evidence of a continuous pan. Deeper peaty gleys, flushed and unflushed deep peat are associated with flatter benches on hillsides and other areas across site where it is wettest.
The resulting effect of the soils and topography on silvicultural options is that there is a wide variety of timber species to choose from across the whole block. With the exception of the wettest areas in the block, the soils in the block have the capacity for thinning and LISS management.
The southwestern corner of the block intersects with the edge of the Geological Conservation Review site Gartness (Quaternary of Scotland, 484). This area has been designated as a natural reserve to prevent any negative effect forestry operations may have on the condition of the site.

A.6.3 Climate

Using the measures of warmth and wetness defined in the Ecological Site Classification, most of Garadhban can be described as warm and moist. At higher elevations this becomes cool and wet. In addition, the annual temperature range is relatively small and precipitation is evenly distributed throughout the year.

A.6.4 Hydrology

The Garadhban LMP area falls entirely within the Loch Lomond water catchment. As the average annual rainfall for the area is high for Scotland at 2015mm, it is important to consider the implications of tree removal on flooding in the surrounding area. The total LMP area is ~441 ha, making up just 0.49% of the water catchment area which covers 89,383 ha. Generally, where tree removal occurs on less than 20% of the overall water catchment area, its impacts on flooding will be neglible. With a felling area far smaller than the total LMP area, the management prescriptions outlined in this document are well within the current standards set out in the Forest and Water Guidelines to mitigate against flood risk.
Numerous small burns flow through the forest and are more or less incised into the surrounding land. There are also several springs and the uneven landscape results in a network of narrow, wet seepage lines. Where there are more extensive areas of flat land these seepage lines may coalesce into wet and boggy ground.
There is one private water supply source within the forest block which feeds into Coldrach Cottage.

A.6.5 Windthrow

The degree of exposure at Garadhban varies from moderately exposed, in the most sheltered southern sections, to highly exposed at the highest, more open elevations. DAMS scores for the area only exceed 17 at the most northerly raised points.

There has been significant windthrow damage in the last decade, largely due to a combination of extreme storm events and late management interventions on mature conifers. Most recently, Storm Éowyn caused a moderate amount of damage in mature Sitka Spruce areas. Any future management would benefit from early thinning interventions to ensure crop stability.

A.6.6 Adjacent Land Use

To the north and west, Garadhban borders land of Montrose Estate which has recently excluded grazing from the area with a view to potential woodland establishment. The forest block is surrounded by farmland on all other sides with the village of Drymen lying just beyond this to the south.

A.6.7 (Public) Access

See M4 – Analysis Map (Recreation)

The West Highland Way is one of two long distance routes, along with the Rob Roy Way, that run through the forest block. The former is Scotland's most popular long-distance walking route with over 35,000 users each year.

Garadhban has two moderate level multi-user trails, both of which can be accessed from the main car park. This car park is one of the main access points to the block for the public along with other entrances from Milton of Buchanan, Conic Hill, and the West Highland Way from Drymen.

National Cycle Route 7 runs along the Old Drymen Road which bisects the block and has many users. The block is also well used by the local community in the form of pedestrians, cyclists, and horse riders.

A.6.8 Historic Environment

See M3 – Analysis Map (Constraints)

Garadhban is the site of several heritage features, some of which relate to its long history as a plantation woodland. This includes two bridges which both can be dated to at least 1863 as they can be found on the first edition Ordinance Survey maps.

One notable exception to this shared history lies in the northwest corner of the block where a chambered cairn was discovered in 2005 during felling operations. This feature has since been buffered from new planting and is now in a location of non-productive woodland; however, the

West of Scotland Archaeology Service have advised that there is the potential for more undiscovered heritage features to be discovered across the block during future forestry operations.

A.6.9 Biodiversity

Due to the extent of windthrow throughout the block in the last 15 years, there is relatively little age class diversity of trees within the block and, consequently, limited potential habitat for predatory bird species. Despite this, there are notable positives for biodiversity in the area include a wide range of species used for restocking where this windthrow has occurred – something this LMP aims to build upon.
Notable species sighted within the block include Black Grouse (*Lyrurus Tetrix*), Red Squirrel (*Sciurius Vulgaris*), and Red Deer (*Cervus Elaphus*).

A.6.10 Invasive Species

There are no known areas of non-native invasive species in the woodland block; however, there is a significant amount of *Rhododendron Ponticum* ~800m south of the block boundary which has the potential to seed into the block.

National Biodiversity Network Trust has a recorded sighting of Grey Squirrel (*Sciurus Carolinensis*) in 2010. Local residents provided background to this at consultation, recalling it as a highly unusual occurrence that was quickly dealt with.

A.7 Woodland Description

Much of Garadhban has been designated as Long Established woodland of Plantation Origin dating back to at least the mid-19th century. The nature of the plantations is uncertain but broadleaved species are thought to have played a prominent role and there were more extensive stands of Scots pine than at present. Small areas of Scots pine were planted in the 1920s and 1930s alongside stands of European larch and Norway spruce. Another rotation of plantation conifers, Sitka Spruce on this occasion, was planted in the 1980s.

Due to the combination of storm events and several late thinning interventions aimed at restructuring the forest, as well as felling due to Larch trees becoming infected with *Phytophthora Ramorum*, much of the 20th century crop has been clearfelled and restocked in the last 15 years. This has resulted in much of the LMP area's age class being focussed in the 11-15 year range.

One of the benefits of this restocking has been the diversification of species with the woodland boasting a wide range of alternative conifers in the centre of the block, as well as an expanded total area of broadleaves, which have moved away from a plantation dominated by Sitka Spruce. This mixed woodland is now fit to become more structurally diverse through use of LISS where conditions are suitable.

A.8 Plant Health

There are no active plant health concerns within the LMP area; however, there have been instances of *Phyophthora Ramorum* in the LMP area in recent years which have resulted in removal of Larch after the serving of Statutory Plant Health Notices.

The remaining larch accounts for 14.9 ha of the forest canopy which equates to around 3% of the total woodland cover within the LMP area.

The LMP area falls entirely within the Priority Action Zone (PAZ), designated by Scottish Forestry in an effort to slow the spread of *P. Ramorum*. As part of FLS' commitment to the PAZ, all Larch will be removed in the first two felling phases of any new LMPs within the zone.

Evidence of *Dendroctonus Micans*, also known as Great Spruce Bark Beetle, has been found within the Loch Lomond and the Trossachs National Park. As damaged and unhealthy Spruce trees have an increased likelihood of becoming hosts to this pest, Garadhban is potentially at risk of this species although there is no current evidence of its presence.

Table 1 - Area by species

This shows the current and future species composition within the entire Land Management Plan area.

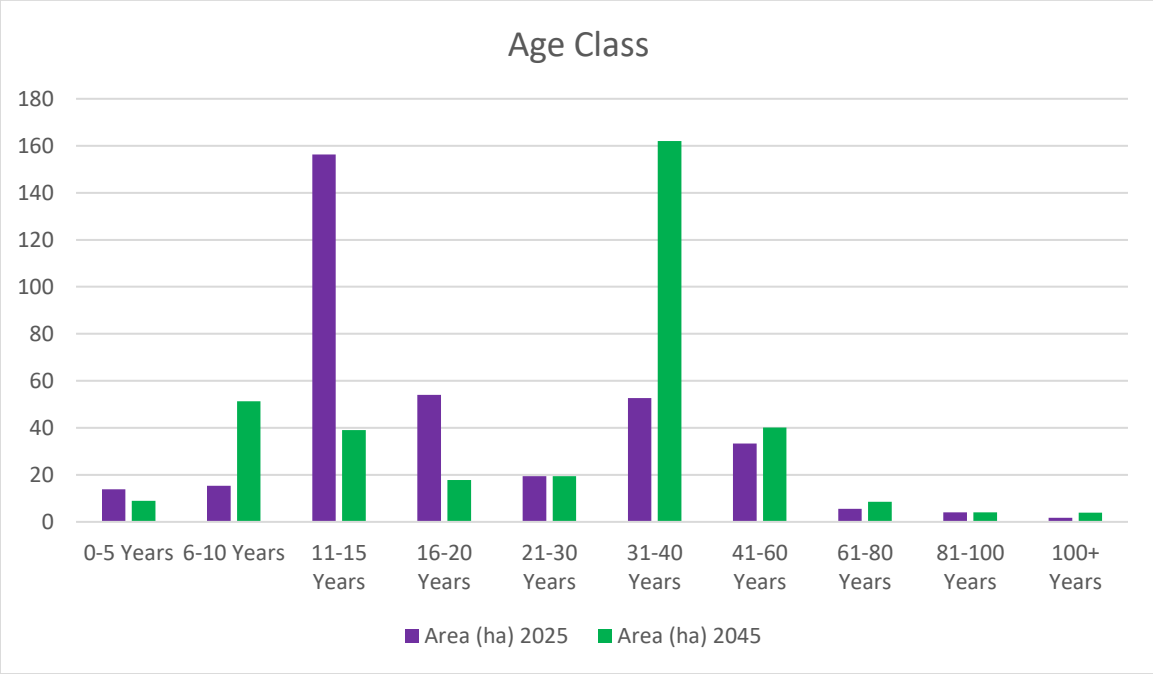
Area by species						
Species*	**Current****		**Year 10***		**Year 20***	
(Add relevant species groups, or OG/OL)	**Area (ha)**	**%**	**Area (ha)**	**%**	**Area (ha)**	**%**
Sitka Spruce	144.8	33%	105.3	24%	104.5	24%
Scots Pine	30.9	7%	37.8	9%	38.7	9%
Norway Spruce	23.8	5%	31.8	7%	32.5	7%
Douglas Fir	17.7	4%	25.4	6%	26.4	6%
Larch (various sp.)	14.9	3%	0	0%	0	0%
Pacific Silver Fir	2.6	1%	5.2	1%	8.8	2%
Western Red Cedar	3.1	1%	5.7	1%	6.2	1%
Other Conifers	16.3	4%	14.3	3%	13	3%
Native Mixed Broadleaves	68	15%	72.3	16%	76.5	17%
Mixed Broadleaves	34.4	8%	46.6	11%	49.1	11%
OG	84.8	19%	96.9	22%	85.6	19%
Total***	**441.3**	**100%**	**441.3**	**100%**	**441.3**	**100%**

* Native broadleaf area does not include Mixed broadleaves which are mostly also native species
** Of whole LMP 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%.
*** Differences between report and LMP area are due to presence of multiple storeys in the sub-compartment database resulting in a correct double count of species. Difference between current and Year 10 and Year 20 areas are due to inability to account for multiple storeys in the future restock areas layer.

Table 2 – Area by age

This shows the woodland area broken down by age class and will show how well the woodland is distributed across the age classes.

Age class (years)	Current Area (ha)	Year 20 Area (ha)
0-5	13.8	8.9
6-10	15.4	51.3
11-15	156.3	39.1
16-20	54	17.8
21-30	19.4	19.4
31-40	52.7	162.1
41-60	33.3	40.1
61-80	5.6	8.6
81-100	4.1	4
100+	1.8	3.9
Total*	**356.4**	**355.2**



* Differences between report and LMP area are due to presence of multiple storeys in the sub-compartment database resulting in a correct double count of species. Difference between current and Year 20 areas are due to inability to account for multiple storeys in the future restock areas layer.

B. Analysis of Information

B.1 Constraints and Opportunities

B.1 Constraints and Opportunities		
Factor	**Constraint**	**Opportunity**
Biodiversity	Limited age class diversity within the block has reduced the area of potential habitat for predatory species. Non-native conifer regen alongside burns throughout the forest within the habitat network.	Lack of predators increases the chances of successfully establishing Black Grouse habitat. There is also the potential to keep stable areas of mature conifer as long term retention. Potential to maintain these areas by removing non-native conifer during adjacent thinning operations.
Tree Health	Areas of Larch which were planted just over 10 years ago are now at risk from *Phytophthora Ramorum*. Windblow of mature Spruce crop is a higher level of risk for *Dendroctonus Micans*.	Removing the young Larch proactively may have a positive effect on the age class diversity of the forest blocks. Remove unstable conifer areas and ensure early first thinnings for stability are carried out on new crops.
Access	Overgrown forest roads require maintenance in order to be usable for operations.	Thinning operations provide justification for continuous infrastructure maintenance around the forest.
Visitor Experience	High number of visitors to the block, particularly due to the West Highland Way, pose a potential constraint to operations.	Ensure all operations are clearly communicated to the public ahead of time, and that appropriate diversions are available to minimize disruption to users.

	Residents have voiced concerns about forest tracks becoming overgrown and unusable.	Maintain forest roads as part of operations which would also benefit the public by opening up previously walkable routes.
Wildlife Management	Dense, young conifer crop across the forest block is negatively impacting ability to manage herbivores across site.	Maintain deer glades strategically across the block to safely manage levels and create the opportunity for natural regeneration across site.
Heritage	Potential for unsurveyed monuments throughout the forest block when considering discoveries on adjacent land.	Historic use as a productive plantation forest should be continued. Felling and thinning operations could lead to further heritage discoveries.
Timber Transport	Timber transport restrictions on the Old Drymen Road and difficult for lorries to exit via Milton of Buchanan.	Remove all timber from the block via the exit in the east onto the B858 to minimize the area timber transport could affect.
Landscape	The LMP area lies within the national park and, consequently, is highly visible to many public users.	The LMP area lies outwith the national scenic area and the areas of special landscape qualities as outlined by the national park. Utilising LISS throughout the block will reduce change caused by operations which is detectable at landscape level.

Concept

- Manage significant proportion as productive conifer
- Remove remaining Larch in LMP period
- Diversify tree species mix using alternative conifers
- Improve infrastructure for operational access
- Enhance and increase habitat for Black Grouse
- Develop recreational potential of the forests
- Manage herbivore numbers to encourage natural regen for LISS

C. Management Proposals

C.1 Silvicultural Practices

All proposals have been designed in accordance with sound silvicultural and environmental principles, falling within the framework outlined by the UK Forestry Standard, the UK Woodland Assurance Scheme, FC Bulletin 112 Creating New Native Woodlands, FC Bulletin 115 Alternative Silvicultural Systems, FC Bulletin 124 Ecological Site Classification for Forestry and the current SF edition of Forest & Water Guidelines. This plan has considered the natural and historic environment as well as green network opportunities.
The plan has been produced in accordance with a range of government and industry standards and guidance as well as recent research outputs. A full list of these standards and guidance can be found here: https://forestryandland.gov.scot/what-we-do/planning

C.2 Prescriptions

C.2.1 Clearfelling

See M6 – Management Map
A clearfell approach has been selected for areas of the block that are a tree health risk and have been identified as unstable.

There are several clearfell coupes that contain young Larch trees that were planted circa 2013. Due to the LMP area falling within Scottish Forestry's Priority Action Zone, designated in order to slow the spread of *P. Ramorum*, these stands will be proactively cleared at the beginning of phase 2 providing that no Statutory Plant Health Notices are served prior to this.

Coupe 61037 has been created to remove accessible windblown material that was created in Storm Éowyn at the beginning of 2025, with other coupes which were planted at a similar time being felled at a later date to diversify forest structure.

C.2.2 Thinning and Respacing

See M7 – Thinning Map
Thinning coupes 61505 and 61503 are both first thinnings of predominantly Sitka Spruce. These areas have been identified for thinning to increase stability, as well as to begin work towards

becoming CCF stands. 61501, 61507 and 6108 have the same objectives and reasons for thinning, except the species in this coupe are all alternative conifers.

61504 and 61506 are also both first thinnings, though these are made up of alternative conifers and mixed broadleaves. There is also a small area of Larch within 61506 that will be removed in accordance with tree health policy.

Though 61701 lies in an area of high exposure which would not usually be thinned, this coupe is designed to allow the removal of young Larch that was planted in mix with spruce trees. By conducting this operation at an early stage in the stand's lifecycle, stability should not be compromised by the operation which will remove at-risk trees.

61601 is a mixed broadleaf coupe that has an ingress of Sitka Spruce regeneration. Through respacing, it is the aim of operations to improve the condition of this area whilst also creating an opportunity for the production of quality hardwood timber in the future.

C.2.3 LISS/CCF

See M6 – Management Map
The majority of Garadhban's productive area has been designated as LISS/CCF due to favourable site conditions and species present. Furthermore, LISS management can contribute towards LMP objectives by improving individual tree stability and overall forest resilience. Most of the area outlined contains stands that are still at thicket stage (3m-10m tall) and, as such, are not yet of timber producing size.

The thinning operations outlined above are designed to increase stability and move towards an irregular shelterwood stand structure. This will involve regular selective crown thinning from a height of 10m, selecting the trees with the best form to become frame or seed trees which will act as a long-term overstory and niche timber production.

The specifics of management will depend on species. In the mixed productive zone (**See M5 – Concept Map)**, the aim will be to produce both joinery grade and sawlog Douglas Fir timber – the former being of the overstory where the target size will be >80cm DBH in 80-140 years, and the latter being crop harvested at 60-100 years with a target DBH of >60cm. The alternative conifers in this zone will also be managed for sawlogs. The primary conifer zone will aim to produce sawlogs from both Sitka Spruce and the shade tolerant conifer secondary species with the target size of >40cm DBH in 50-70 years.

The intention is to utilize natural regen to restock LISS/CCF areas by gradually thinning down to a basal area of 30m2/ha once trees are approaching target DBH. This basal area can then be reduced further once regeneration has established. If natural regen is not found to be present then underplanting will be considered.

C.2.4 Long Term Retentions (LTR) / Minimum Intervention (MI) / Natural Reserves (NR)

See M6 – Management Map

Coupes 61004 and 61039 have been designated as LTR to maintain some degree of age class diversity in the block. These areas have been selected due to their relative, as well as their recreational value.

MI designations across the block have been used for areas in which habitat and amenity are the primary objectives. Thinning will aim at forming a more irregular canopy structure, as well as creating viewpoints and small glades in order to cultivate a semi natural habitat that can be appreciated by members of the public.

Coupe 61036 is a NR within the block. This has been created as the size and placement is ideal for a variety of bird species, as well as potential habitat for badger setts.

C.2.5 Other Tree Felling in Exceptional Circumstances

FLS will normally seek to map and identify all planned tree felling in advance through the LMP process. However, there are some circumstances requiring small scale tree felling where this may not be possible and where it may be impractical to apply for a separate felling permission due to the risks or impacts of delaying the felling.

Felling permission is therefore sought for the LMP approval period to cover the following circumstances:

- Individual trees, rows of trees or small groups of trees that are impacting on important infrastructure (as defined below*), either because they are now encroaching on or have been destabilised or made unsafe by wind, physical damage, or impeded drainage.

  **Infrastructure includes forest roads, footpaths, access (vehicle, cycle, horse walking) routes, buildings, utilities and services, and drains.*

The maximum volume of felling in exceptional circumstances covered by this approval is 75 cubic metres per Land Management Plan per calendar year. A record of the volume felled in this way will be maintained and will be considered during the five-year Land Management Plan review.

C.2.6 Woodland Management in Visitor Zones

Visitor Zones have been identified in areas where FLS encourage and manage access or where the woodland managed by FLS interacts with popular visitor sites or access routes. Visitor Zones are shown on **M4 – Analysis Map (Recreation)**.

In these areas, single trees or small groups of trees will be removed when necessary to protect facilities, infrastructure and trails, or to enhance the setting of features, or to maintain existing views.

Woodland in these zones will also be thinned, or trees re-spaced, for safety reasons (including to increase visibility to ensure that sites are welcoming and feel safe), and where it is necessary to enhance the experience of the forest setting; such as through the development of large trees, or preferential removal of trees to favour a particular species.

C.2.7 Restocking Proposals / Natural Regeneration

Productive area -
Productive restocking on site will be with the primary aim of quality timber production; as such, and as per the Regional restocking strategy, the management input will generally be:
• Low disturbance ground prep methods where LMP objectives are not compromised by said methods
• restocking at full initial density of 2,700 stems/ha to achieve a final density of between 2,250 and 2,500 stems/ha with an emphasis on achieving overall stocking
• standard top-up spraying and weeding as required
Where possible and practical, productive areas should be planted in appropriate mixtures. These mixtures should aim to have a minor broadleaf component with a quick rate of growth to help maintain soil health.

Amenity Broadleaves –
Broadleaf planting will add landscape value, merging existing areas of similar species, and will be planted to achieve a final target density of 1600 stems/Ha.

Black Grouse habitat planting –

The black grouse management zone was initiated to create a transition between productive forest and open moorland that would benefit woodland grouse. The concept was to create a zone, approximately 100m wide, in which stocking density gradually decreased from about 2500 stems per hectare to open ground with only scattered trees (see below figure). Some work has already been done towards creating this zone with planting in groups with open space between as well as ponds. The opportunities afforded by clearfelling operations outlined in this plan will allow for more area to be restocked with species in accordance with this management zone where trees will be predominantly Scots Pine and native winter berry trees such as Hawthorne.

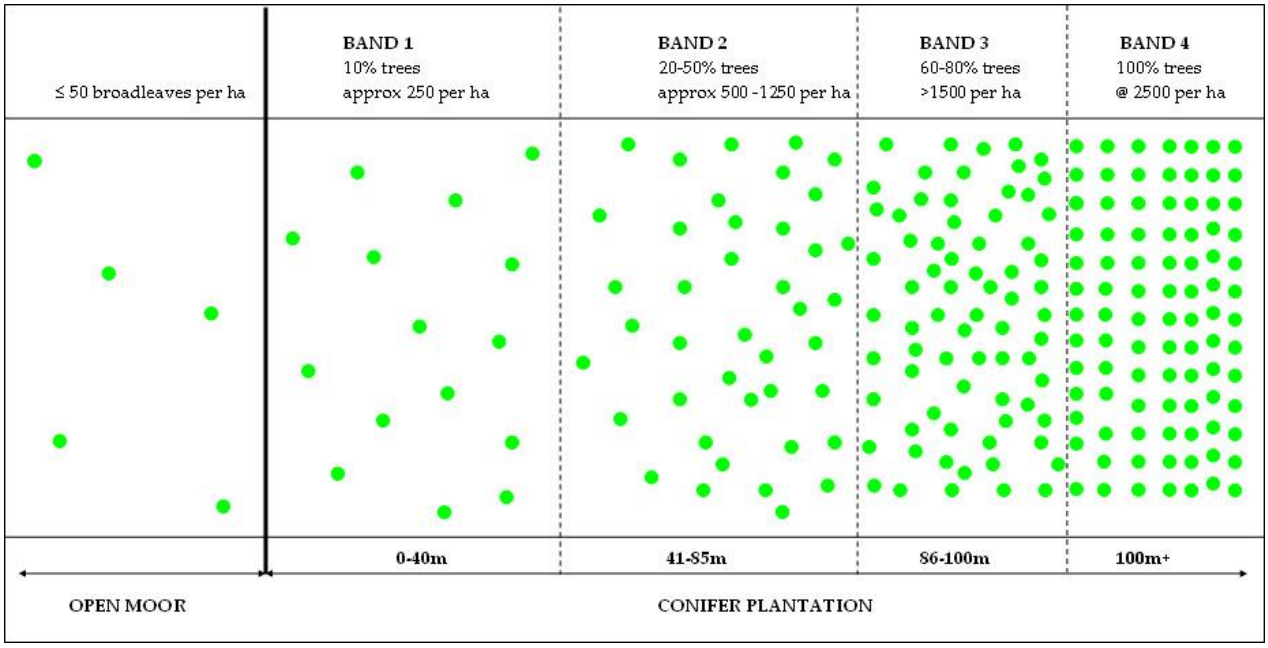


Table 3 – Felling

This shows the scale of felling within the felling phases in the context of the whole LMP. This includes any areas of 'LISS – Fell' (i.e. removal of final overstorey).* See map **M6 - Management**.

SCALE OF PROPOSED FELLING AREAS (including LISS final fell areas)												
Total LMP Area:			hectares									
Felling	Phase 1	%	Phase 2	%	Phase 3	%	Phase 4	%	Long Term Retention*	%	Area out-with 20yr plan period	%
Area (Ha)	43.4	9.9	64.2	14.6	0	0	0	0	6.5	1.5	24.5	5.5

* As all areas of proposed LISS management will have some overstorey trees retained over the next 20 years, no areas of 'LISS – Fell' are listed.

Table 4 – Thinning

This shows the area of thinning over the first 10 years of the LMP (see map **M7 – Thinning Map**).

Species*	**Thinning (ha)****
Sitka Spruce	32.2
Norway Spruce	2.1
Scots Pine	7.1
Larch (EL/HL/JL)	3.5
Douglas Fir	13.4
Other Conifers	3.6
Birch	17.9
Other Broadleaves	3.9
Total	83.7

* Percentages are given for the respective sub-compartment areas and not representative of the proportion of each species being removed in thinning prescriptions.

** Gross coupe areas given where net area of thinning operations is likely to be significantly less.

Table 5 – Restocking

This table provides information on the restocking proposals for the first 10 years of the LMP listed on a coupe by coupe basis (see map **M8**).

Felling Phase	Map Identifier(s)	Species *	Area (ha) to be planted
Phase 1	61037A	NS	2.55
Phase 1	61037A	DF	1.7
Phase 1	61037A	NMB	0
Phase 1	61037B	NS	1.76
Phase 1	61037B	NF	0.5
Phase 1	61037B	NMB	0.25
Phase 1	61037D	NMB	0.37
Phase 1	61037E	SS	0.31
Phase 1	61037E	RF	0.15
Phase 1	61037E	MB	0.05
Phase 1	61037F	NMB	0.07
Phase 1	61021A	SS	6.21
Phase 1	61021A	RF	3.11
Phase 1	61021A	MB	1.04
Phase 1	61021B	SP	3.85

Felling Phase	Map Identifier(s)	Species *	Area (ha) to be planted
Phase 1	61021B	SS	3.85
Phase 1	61021B	MB	1.92
Phase 1	61021C	SP	1.22
Phase 1	61021C	MB	1.22
Phase 1	61021D	NS	2.24
Phase 1	61021D	DF	1.49
Phase 1	61021D	NMB	0
Phase 1	61021F	NMB	0.95
Phase 1	61021G	NMB	0.83
Phase 1	61021H	NMB	0.97
Phase 1	61021I	MB	0.16
Phase 1	61021I	RSQ	0.1
Phase 2	61013A	DF	2.24
Phase 2	61013A	RC	1.35
Phase 2	61013A	MB	0.45
Phase 2	61017A	DF	3.29
Phase 2	61017A	RC	1.97

Felling Phase	Map Identifier(s)	Species *	Area (ha) to be planted
Phase 2	61017A	MB	0.66
Phase 2	61017B	NS	0.59
Phase 2	61017B	DF	0.39
Phase 2	61017B	NMB	0
Phase 2	61017D	NMB	0.28
Phase 2	61017D	SS	0.04
Phase 2	61019A	NS	0.55
Phase 2	61019A	DF	0.37
Phase 2	61019A	NMB	0
Phase 2	61028A	SS	15.12
Phase 2	61028A	RF	10.08
Phase 2	61028B	MB	3.37
Phase 2	61028B	MC	1.12
Phase 2	61028C	MB	3.63
Phase 2	61033A	MB	7.99
Phase 2	61033C	NMB	0.21
Phase 2	61034A	SP	1.3

Felling Phase	Map Identifier(s)	Species *	Area (ha) to be planted
Phase 2	61034A	BI	0.65
Phase 2	61034B	NMB	1.11
Phase 2	61034D	SS	0.4
Total Restocking Area			60.1

*Establishment is expected to be by planting unless otherwise stated.

C.2.8 Hydrology

All operations will follow best practice as detailed in current Forest and Water Guidelines. Timber extraction will normally avoid crossing burns or main drains, but, where necessary, each crossing point will be piped or bridged. Branches will be kept out of watercourses and trees will generally be felled away from the watercourses.

Additionally, operations will be planned with an awareness of the legacy drains across the site that connect to watercourses to minimize the risk of pollutants entering watercourses.

C.2.9 Protection

Herbivore management will occur in accordance with the regional deer management plan, found in **Appendix II**.
All new planting will be monitored for herbivore damage throughout the establishment period. Should damage be identified, methods appropriate to the context will be deployed as additional measures to ensure successful establishment.

C.2.10 Fence Erection / Removal

N/A

C.2.11 Road Operations and Timber Haulage

See M9 – Timber Transport Map
There are no new forest roads as part of this LMP as an extensive forest road network already exists within the block and only requires regular maintenance.

All timber will be extracted from the block via the south-eastern entrance and the B858.

C.2.12 Public Access

FLS welcome responsible public access in accordance with the Scottish Outdoor Access Code.

Where trails are affected by forestry operations, appropriate temporary closures will be implemented and, where possible, suitable diversions provided to maintain access while ensuring public and operator safety. Access to key routes such as core paths and rights of way

will be maintained and restored as required after operations. Liaison with the Local Authority Access Officer will continue to be carried out as appropriate.

C.2.13 Historic Environment

Our key priorities for archaeology and the historic environment are to undertake conservation management, condition monitoring and archaeological recording at our significant historic assets; and to seek opportunities to work in partnership to help to deliver *Our Place in Time: the Historic Environment Strategy for Scotland* and *Scotland's Archaeology Strategy*. Significant historic environment features will be protected and managed following the UK Forestry Standard. Harvesting coupes, access roads and fence lines will be surveyed prior to any work being undertaken in order to ensure that upstanding historic environment features can be marked and avoided. At establishment and restocking, work prescriptions exclude relevant historic environment features from ground disturbing operations and replanting.

The *Regional Historic Asset Management Plan* includes conservation management intentions for those designated historic assets in Scotland's national forests. Details of all known historic environment features are held within the *Forester Web Heritage Data* (built using national and regional historic environment records) and included within specific operational *Work Plans* to ensure damage is avoided. Significant historic environment features will be depicted on all relevant operational maps."

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*.

C.2.14 Biodiversity

All forestry operations to be conducted within the lifetime of this plan will comply with current best practice guidelines and conform with statutory regulations relating to the protection of species and habitats.

FLS as a partner in the "Scottish Raptor Monitoring Scheme" (SRMS) will continue to protect and support raptor populations within our land holdings. Working with local conservation organisations opportunities will be identified to protect and bolster priority species through habitat creation, modification and the monitoring of populations during the lifetime of this plan.

Existing mature broadleaf trees within the felling areas will be retained and incorporated in to the mosaic of recently afforested areas, the retention and inclusion of mature trees within the wider forest habitat will provide increased biodiversity value within a relatively young woodland and contribute to age class diversity in the area.

During all felling operations deadwood will be retained in line with the UK Woodland Assurance Standard (UKWAS) targets, average of 20 m3 per hectare (both standing and fallen deadwood).

A range of management tools will be utilised to increase deadwood resource and these will be included in operational workplans:

- Broadleaved deadwood will be prioritised for retention;
- Veteran trees will be retained and protected where safe to do so;
- Deadwood will be concentrated where it will provide the highest ecological benefit and in areas less likely to be disturbed by future operations, such as riparian and peat edge woodland, broadleaved long-term retentions and minimum intervention areas;
- Where conifer stands are clear felled or thinned, a proportion of windblown stems will be made safe and left in situ;
- In long-term retention and LISS thinning areas, a proportion of standing injured or dying trees will be retained - where away from visitor zones, roads and march boundaries.

C.2.15 Tree Health

Several of the operations outlined in this document are in order to improve tree health throughout the block. All Larch will be removed from the LMP area over the next 10 years as part of the proactive management of *P. Ramorum*.

Early thinnings of productive conifer crop to ensure stability, as well as the clearing of windblow, are also aimed at improving the health of the trees by reducing the amount of viable material for bark beetle establishment.

C.2.16 Invasive Species

Forestry and Land Scotland will explore opportunities to work with local conservation organisations, adjacent land owners and stakeholders to achieve common objectives to protect and enhance priority species and habitats wherever possible.

Control of invasive non-native specie will be carried out as budgets and resource allocation allows with areas for control being identified and prioritized by FLS Planning and Environment staff on a Regional basis.

C.2.17 Wildfire

FLS work closely with the Scottish Fire and Rescue Service (SFRS) to ensure a safe and consistent approach to help tackle wildfires on Scotland's national forests and land.

The general approach to managing fire risk will be to maintain suitable access to key areas of the woodland for fire control purposes and to avoid management actions which would further exacerbate fire risk, especially where the threat to key assets is particularly high. Fire risk has been assessed in accordance with *Forestry Commission Practice Guide 22: Building Wildfire Resilience into Forest Management Planning*; including consideration of forest management and restocking proposals.

C.3 Environmental Impact Assessment and Permitted Development Notifications

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	ha
Deforestation	%Con	%BL	%Con	%BL	0ha
Forest Roads	0ha		0ha		0ha
Quarries	0ha		0ha		0ha

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 Scottish Forestry, where the location is defined as 'sensitive' within the Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017.

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

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

D. Production Forecast

N/A – FLS provide this nationally to Forest Research as per agreement with Scottish Forestry.

Appendices

Item number	Title
I	Land Management Consultation Record
II	Cowal and Trossachs Deer Management Plan

Maps

Item number	Title
M1	Location Map
M2	Current Species Map
M3	Analysis Map (Constraints)
M4	Analysis Map (Recreation)
M5	Concept Map
M6	Management Map
M7	Thinning Map
M8	Future Species and Habitats Map
M9	Timber Transport Map