Forestry and Land Scotland
Coilltearachd agus Fearann Alba

Central Region
SW Fife Forests
Land Management Plan 2021-2031

Approval date: 27 /05/2021
Plan Reference No: 032/21/04
Plan Approval Date: 27/05/2021
Plan Expiry Date: 26/05/2031

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.

FSC www.fsc.org FSC® C011771
The mark of responsible forestry

PEFC PEFC/16-40-1002 Promoting Sustainable Forest Management www.pefc.org

Forestry and Land Scotland
Coilltearachd agus Fearann Alba

Land Management Plan Details

LMP Name:	SW Fife Forests		
Grid Reference:	NS 9747 9004	Nearest town or locality:	Kincardine Saline Blairhall Gartarry
Local Authority:		Fife	
Land Management Plan area (hectares):		1,309	

Owner's Details

Title:	Mrs	Forename:	Carol
Surname:	McGinnes		
Organisation:	Forestry and Land Scotland	Position:	Regional Manager
Primary Contact Number:	0131 370 5622	Alternative Contact Number:	07917271577
Email:	carol.mcginnes@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:	032/21/04		
Plan Period: (ten years) (day/month/year)	From: 27 May 2021	To: 26 May 2031	
Conservator Signature:	KWShaw	Approval Date: (dd/mm/yyyy)	27/05/2021

Contents

Version History

Version	Date	Comments
0.0		Initial Draft layout
0.1	08/11/2019	Amended layout
0.2	14/09/2020	Updated text
1.0	24/11/2020	Internal FLS Consultation Draft
1.1	13/01/2021	Updated after internal FLS staff comment
1.2	27/01/2021	Accessibility update
1.3	12/02/2021	Updated after SF comment
1.4	29/03/2021	Updated after consultation
1.5	21/04/2021	Updated after comments from SF

1.0 Summary of proposals

The South West Fife Forests, in particular Devilla, serve as important productive areas within Central Region, producing significant volumes of relatively high quality timber. The intention is to maintain this purpose whilst continuing to diversify the structural and biological makeup of the block. Recent tree health concerns over various pine and larch species have necessitated a re-evaluation of the use of these species to succeed the current rotations and therefore future species diversification in conifer crop will utilise site suited alternative conifer species such as Norway spruce, Douglas fir and other ecologically site suited conifer species often in mixture with Scots pine.

The proportion of native broadleaves within the forest will be increased with semi natural Forest Habitat Networks along the riparian corridors.

The objectives of the plan are listed below but the primary objectives for the plan area are to manage for the production of high quality timber, protect and enhance native forest habitat networks and to maintain high quality access and recreation infrastructure.

Table 1 - Woodland changes

Species Breakdown	2021	2031	2041
Primary species: Scots pine*	457.5	423.4	395.3
Secondary species: other conifers	257.4	253.8	255.5
Broadleaves	265.5	269.6	284.8
Open space, Agricultural, Mineral, Archaeology, Successional, Felled, Other	328.8	362.5	373.7
Total Plan Area:	**1309.3**	**1309.3**	**1309.3**

** Figures don't account for the remnant over storey pine which will be retained in coupes already containing mature Scots pine.*

LMP Objectives

1. Manage for production of high quality soft and hardwood timber
2. Continue to work with Patersons (who lease part of Devilla Forest to quarry for Silica Sand) to restore Sootrie Wood
3. Pre-emptively remove larch
4. Protect and enhance forest habitat networks and priority habitats (including Preybrae Wood Planted Ancient Woodland Sites (PAWS) restoration)
5. Continue to control rhododendron
6. Protect historical features
7. Mitigate against excessive water runoff in catchments
8. Maintain attractive woodlands and trails and other recreational opportunities to promote fun in the outdoors for all.
9. Retain mature Pine character of Devilla where appropriate

2.0 SF Regulatory Requirements

2.1 Summary of planned operations

Table 2 - Summary of planned operations

Planned Operations	2021-2031
Clearfell/Clearfell with seed tree (afforested area)	80.6 Ha
LISS Felling (afforested area)	1.0 Ha
Thinning	380.1 Ha
Restock (replanted area)	83.9 Ha
LISS Restock (replanted area)	1.0 Ha
Woodland Creation	n/a
Road Construction	50 m spur

2.2 Proposed felling in years 2021-2031

Table 3 – Clearfelling Phase 1 & 2

	Coupe No.	Total Area (Ha)	Spp by Ha (SS)	Spp by Ha (SP)	Spp by Ha (NS)	Spp by Ha (Larch)	Spp by Ha (X con)	Spp by Ha (BLeaf) (B'LVS)	Open Land by Ha
Clearfelling (Phase 1)									
Devilla	9018	5.89*		2.9		2.06	0		0.93*
↓	9046	1.63		0.92		0.68	0.01		0.02
	9056	6.59*		3.1		1.87	0.58		1.04*
	9089	7.78*		2.77		1.66			3.35*
	9116	8.27		2.81	0.08	4.43		0.24	0.71
Balgownie	9011	8.48	8.48					0	0
Gartarry	13001	4.72		2.76	0.61			0.67	0.68
	Totals	43.36*	8.48	15.26	0.69	10.7	0.59	0.91	6.73*
Clearfelling (Phase 2)									
Devilla	9002	5.76	0.55	2.18	3.03				0
↓	9022	7.20*	1.49	1.78		0.4		0.38	3.15*
	9031	12.84	0	7.08	0				5.76
	9035	3.63*	1.64	0.18		0.01			1.8*
	9054	14.25*		12.25		0.61		0.15	1.24*
	9058	8.43*		6.24		1.01		0.03	1.15*
	9121	7.32*			0.54	0.37	4		2.41*
	Totals	59.43*	3.68	29.71	3.57	2.4	4	0.56	15.51*

**includes areas of young crop being retained rather than felled.*

Table 4 – CCF Felling Phase 2

	Coupe No.	Total Area (Ha)	Spp by Ha (SP)	Spp by Ha (LP)	Spp by Ha (Larch)	Open Land by Ha	Silv.Method	Monitoring Comments
CCF Felling (Phase 2)								
Devilla	9097	0.21	0.21				irregular shelterwood	SDA & CCF Monitoring
↓	9098	0.82	0.82				irregular shelterwood	SDA & CCF Monitoring
	Totals	1.03	1.03					

Table 5 – Thinning

Thinning (Phase 1 & 2)	
Woodland	**Total Area (Ha)**
Scots pine	280
Sitka spruce	7.5
Norway spruce	26.2
Larch	22.2
Other conifers	2.1
Broadleaves	42.1
Totals	380.1

2.3 Proposed restocking in years 2021-2031

Table 6 – Restocking of felled areas 2021-2031

	Restocking										
	Coupe No.	**Total Area (Ha)**	**SS (Ha)**	**SP (Ha)**	**NS (Ha)**	**Other Con. (Ha)**	**Native Mixed B/Leaf (Ha)**	**Open (Ha)**	**Year**	**Restock Method & Density (Restock/Nat Regen/Alt Area/Coppice/Open)**	**Monitoring Comments (Including any reason not to restock)**
Phase 1											
Devilla	9018	5.89		1.59		3.71		0.59	2026/27	Restock apart from SP which is retention	SDA
↓	9046	1.63		0.19		0.44	0.37	0.63	2026/27	Restock apart from SP which is retention	SDA
	9056	6.59		2.26		3.39		0.93	2025/26	Restock	SDA
	9089	7.78	4.33	1.85			0.60	1.00	2026/27	Restock apart from SP which is retention	SDA
	9116	8.27		1.25		2.92	0.67	3.43	2025/26	Restock apart from SP which is retention	SDA
Balgownie	9011	8.48	1.70				5.09	1.70	2029/30	Nat Regen	SDA
Gartarry	13001	4.72			1.95	1.95	0.82		2026/27	Restock	SDA

	Coupe No.	Total Area (Ha)	SS (Ha)	SP (Ha)	NS (Ha)	Other Con. (Ha)	Native Mixed B/Leaf (Ha)	Open (Ha)	Year	Restock Method & Density (Restock/Nat Regen/Alt Area/Coppice/Open)	Monitoring Comments (Including any reason not to restock)
Phase 2											
Devilla	9002	5.76		0.93	1.86	1.86		1.10	2027/28	Restock	SDA
↓	9022	7.20		1.36		3.16	1.51	1.17	2030/31	Restock	SDA
	9031	12.84	2.15	2.31		3.23	2.89	2.25	2029/30	Restock apart from SP which is retention	SDA
	9035	3.63	1.02	0.44			1.11	1.06	2027/28	Restock apart from SP which is retention	SDA
	9054	14.25		4.57	1.96	6.12		1.60	2027/28	Restock	SDA
	9058	8.43		2.86		4.29	0.10	1.18	2031/32	Restock	SDA
	9121	7.32		1.66		3.44		2.22	2030/31	Restock	SDA

2.4 Departure from UKFS Guidelines

This LMP adheres to UK Forestry Standard Guidelines. Whilst there are some phase 1 and 2 felling coupes in close proximity the fact that these coupes will retain a mature Scots pine seed tree element means that there will be continued woodland cover. In addition the coupes in question are not easily visible within the wider landscape.

2.5 Standards and guidance on which this LMP is based

This land management 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/links

2.6 Tolerance table

Table 7 Tolerance Table

	Map Required (Y/N)	Adjustment to felling period	Adjustment to felling coupe boundaries	Timing of restocking	Change to species	Wind throw response	Adjustment to road lines	Designed open ground
Scottish Forestry (SF) Approval not normally required (record and notify SF)	N	Fell date can be moved within 5 year period where separation or other constraints are met	<10% of coupe size.	Up to 5 planting seasons after felling (allowing fallow periods for hylobius).	Change within species group E.g. Scots pine to birch, Non-native conifers e.g. Sitka spruce to Douglas fir, Non-native to native species (allowing for changes to facilitate Ancient Woodland policy).			Location of temporary open ground e.g. deer glades if still within overall open ground design Increase by 0.5 ha or 5% of area - whichever is less
Approval by exchange of letters and map	Y		10-15% of coupe size.	5 years +	Change of coupe objective that is likely to be consistent with current policy (e.g. from productive to open, open to native species).	Up to 5 Ha	Departures of greater than 60 m from the centre of the road line	Increase of 0.5 ha to 2 ha or 10% - whichever is less Any reduction in open ground
Approval by formal plan amendment	Y	Felling delayed into second or later 5 year period Advance felling into current or 2nd 5 year period	>15% of coupe size.		Major change of objective likely to be contrary to policy, E.g. native to non-native species, open to non-native,	More than 5 Ha	As above, depending on sensitivity	More than 2 ha or 10% Any reduction in open ground in sensitive areas Colonisation of open Areas agreed as critical

3.0 Environmental Impact Assessment (EIA) Screening Determination for forestry projects

3.1 Proposed deforestation

N/A

3.2 Proposed forest road works

N/A only requirement a 50 m spur to provide a maintenance area for machines, hard standing for a welfare unit and parking for caravans to coupe 31.

3.3 Proposed forest quarries

N/A

3.4 Proposed afforestation

N/A

4.0 Introduction

4.1 The existing land holding

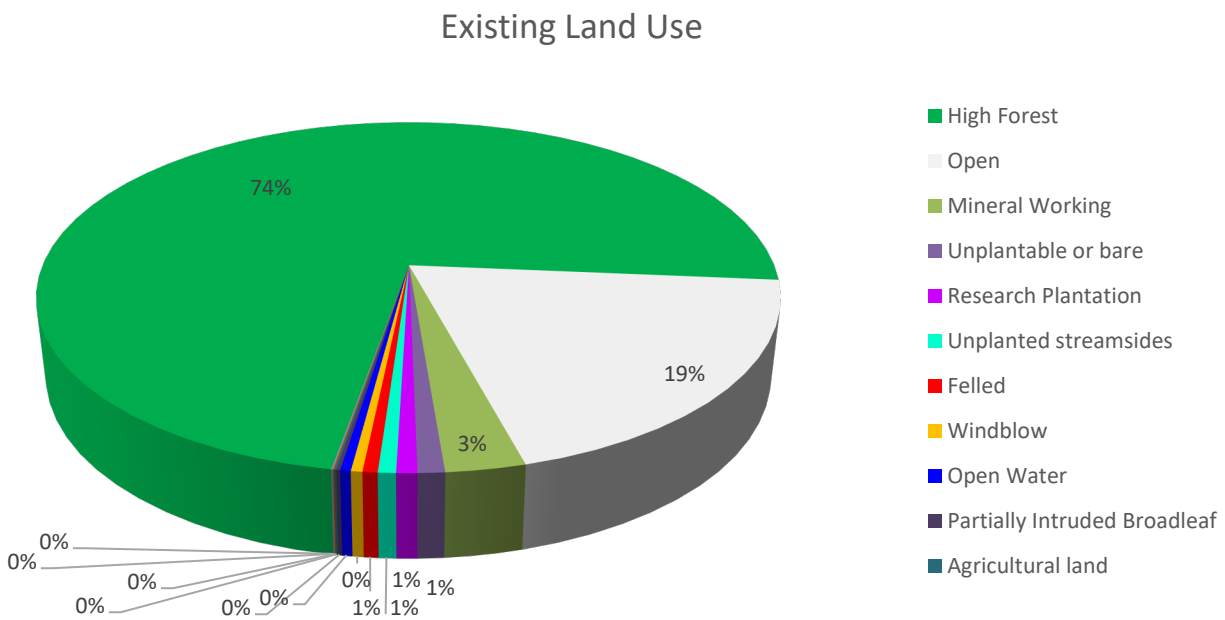
See **Appendix I: Supporting Information** sections 1.0 & 3.0

The current land matrix is as follows:

Table 8 – Current LMP Area Land Use

Land use	Area (Ha)
High Forest	962.58
Open	254.3
Mineral Working	38.28
Unplantable or bare	12.87
Research Plantation	9.93
Unplanted streamsides	8.55
Felled	7.12
Windblow	5.45
Open Water	4.98
Partially Intruded Broadleaf	1.79
Agricultural land	0.98
Car Parks/Picnic Areas	0.69
Archaeological sites	0.6
Other Built Facility	0.23

Figure 1 – SW Fife Forests Current Land Use



4.2 Setting & Context

The South West Fife Forests are a collection of several forests and woodlands covering an area a little over 1309 Ha located primarily within the Tulliallan, Culross and Saline areas of Fife although a small part of Gartarry sits within Clackmannanshire. The main woodlands covered within this LMP are - Devilla Forest (~771 ha), East Grange (~197 Ha), Muirside (~150 Ha), Cadgerford (~123 Ha), Balgownie (~44 Ha), Shires Mill (~14 Ha) and Gartarry (~11 Ha). The forests lie on the lowland hills and valleys on the northern banks of the Firth of Forth to the south of the Ochil Hills, with Kincardine and Saline the largest settlements. The forests complement the wider mixture of woodlands and agricultural fields. (see **Map 1 – Location**).

The forest primarily functions to produce high quality saw logs as well as pallet, small round wood and firewood from commercial conifer species for local and national markets.

4.2 LMP Presentation

The SW Fife Forests LMP has not been divided into any particular zones and therefore the objectives relevant to the whole plan are referred to in Section 5 with Sections 6 to 8 presenting the analysis of key issues and challenges and the management proposals for the site as a whole.

5.0 Plan Objectives

Following the review of the previous plan (See **Appendix I** Section 2) and consideration of the initial scoping internal FLS responses, **Appendix II** details the key issues and challenges faced as well the management objectives identified for the South West Fife Forests.

6.0 Analysis & concept

6.1 Analysis

Through survey work and research, a broad range of factors have been identified which are potentially relevant to the future makeup and management of the land. These have been analysed in order to better understand the way these interact, and to draw out the most important features and trends (see **Map 5 - Key Features Opportunities & Constraints**).

6.2 Concept

The analysis was used to develop an initial design concept highlighting general themes and outlining key considerations and activities which are likely to be most relevant during the plan period, and which formed the basis for these plan proposals for consultation with both the general public and key stakeholders (see **Map 6 - Initial Design Concept**)

7.0 Long Term Land Management Plan Proposals

7.1 Management

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 FC edition of Forest & Water Guidelines. This plan has considered the natural and historic environment as well as green network opportunities.

A recent history of Low Impact Silvicultural Systems (LISS) at Devilla and Gartarry has demonstrated that Alternative to Clearfell (ATC) methods are suitable and can succeed however some shortcomings have also been realised. A series of mini clear-fells throughout the previous plan period have created a patchwork quilt of establishing crops of various alternative conifer species predominantly in mixture with no clear silvicultural objective for their future. Concurrently, thinning of the mature pine and larch continues to open up the forest and natural regeneration of birch is prolific with limited regen of the over-story species. The resultant complex crop of small mixed stands and wider heavily thinned pine and larch with a developing birch understory provides both challenges and opportunities. The challenge is how to cohesively manage these areas using ATC methods and manage them at a scale that is practical, economical and less complex. The opportunities that are provided are the majority of the forest has been well thinned and therefore relatively wind firm and we have a good understanding of which alternative species work on the site. Armed with this information we propose to pause the extensive application of LISS throughout the blocks and reset in order to more appropriately manage these sites using ATC in the future. To achieve this we propose to manage most of Devilla as clearfell with seed tree coupes, where there are well thinned mature Scots pine, along with regular clearfellling in coupes containing other conifers not suitable for LISS. We will also continue to manage appropriate areas as minimum intervention, natural reserves and LISS where appropriate. This approach will allow us to structurally and biologically diversify the forest over many decades, it will also concentrate management efforts and approaches more appropriately and more practically and allow us to then strategically manage the proposed future forest appropriately using ATC methods. (see **Maps 7 – Management, 8 – Felling Approval Areas & 9 – Silvicultural Systems**)

7.1.1 Clear fell/Clear fell with seed trees

The size of clearfells will be in keeping with the scale and topography of the landscape, with smaller coupes in the more visually prominent areas, and larger coupes located in less visible areas of the site or where a larger scale approach is more appropriate. For plant health purposes phase 1 & 2 coupes include pure and mixed Larch stands in line with our Larch Strategy.

Some phase 1 and 2 coupes are in close proximity however where this is the case felling/restocking timings are staggered to allow the crops to achieve a difference in crop height of at least 2 metres (i.e. 5 years +)

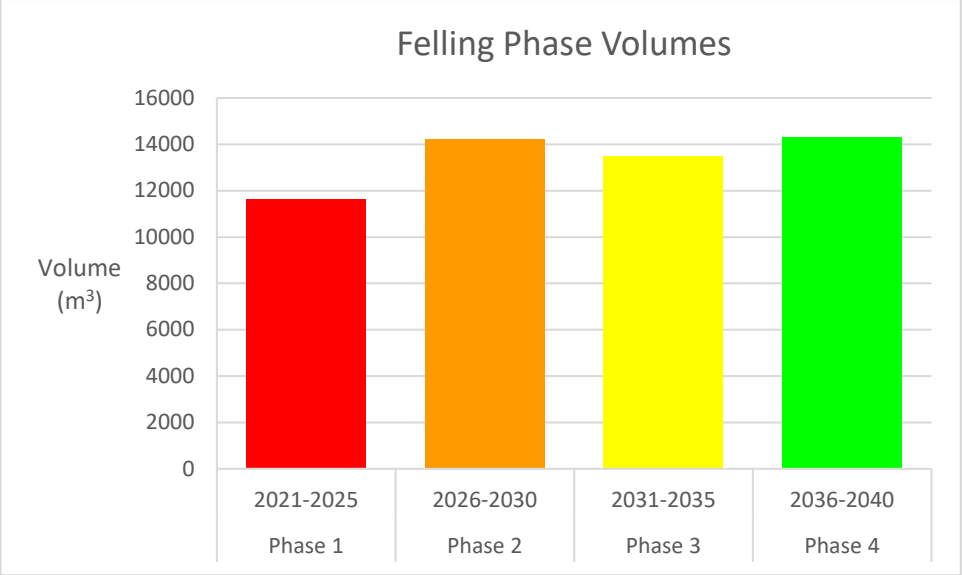
Clear fell with seed tree coupes is a management type which allows us to retain a proportion of the mature over story, in this case predominantly Scots pine. The reason we propose this form of management is not

actually to benefit from the pine seed source as the name would suggest but to retain part of the important character and aesthetic of the woodland for visitors who enjoy these popular sites as well as for the retention of important Red squirrel and Pine marten habitat and corridors of movement. It might be expected that some natural regen might arise from the pine but this has not been greatly evident in the site so it is not expected to significantly impact on the establishment of other planted species.

Various new coupes have areas of relatively recent restocking as part of the former mini-coupe LISS approach. These will be retained and incorporated into the subsequent surrounding restocking as far as possible and have been excluded from felling volume figures. The reason these retention areas aren't represented as coupes in their own right is that due to the sheer number of them and micro scale it would not be appropriate to show them as individual coupes. These remaining crops will be the pioneer components of what will eventually be future ATC coupes.

During the 10 years of the plan period, a total of 80.6 ha, with a projected volume of 25,851 m^3, are designated for clear felling/clear fell with seed trees (**Figure 2** below).

Figure 2 – Projected Felling Phase Volumes



7.1.2 Thinning

FLS policy generally assumes that all productive crops will be thinned, unless:

- Thinning is likely to significantly increase the risk of wind blow;
- Operations are likely to require an unacceptably large investment in relation to the potential benefits due to access or market considerations;
- Thinning is unlikely to improve poorly stocked or poor quality crops.

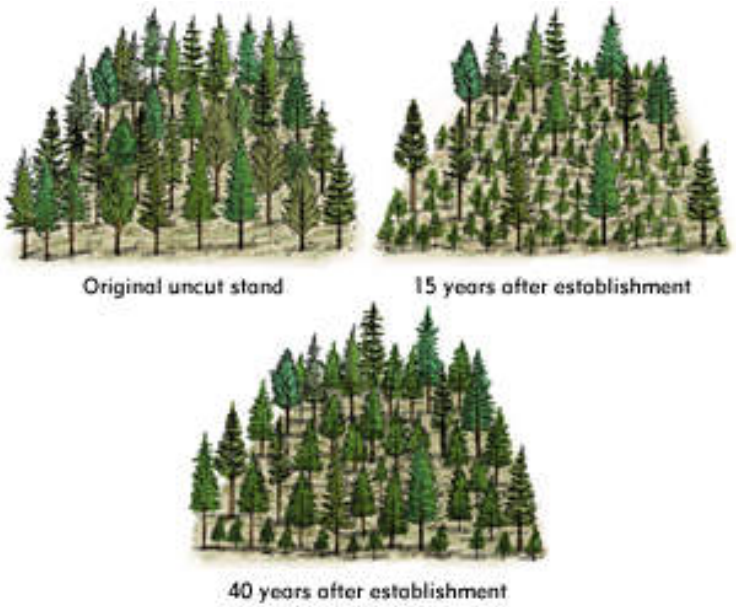
Given the sites range from sheltered or moderately exposed, some with a history of thinning, this is envisaged to continue where appropriate.

Thinning will normally be carried out at, or below, the level of marginal thinning intensity (i.e. removing no more than 70% of the maximum Mean Annual Increment (MAI), or Yield Class (YC), per year). Higher intensities (no more than 140 % of maximum MAI, or YC, per year) may be applied where thinning has been delayed, larger tree sizes are being sought or as part of a LISS prescription. In all cases work plans will define the detailed thinning prescription before work is carried out and operations will be monitored by checking pre and post thinning basal areas for the key crop components. (see **Map 10 – Thinning**).

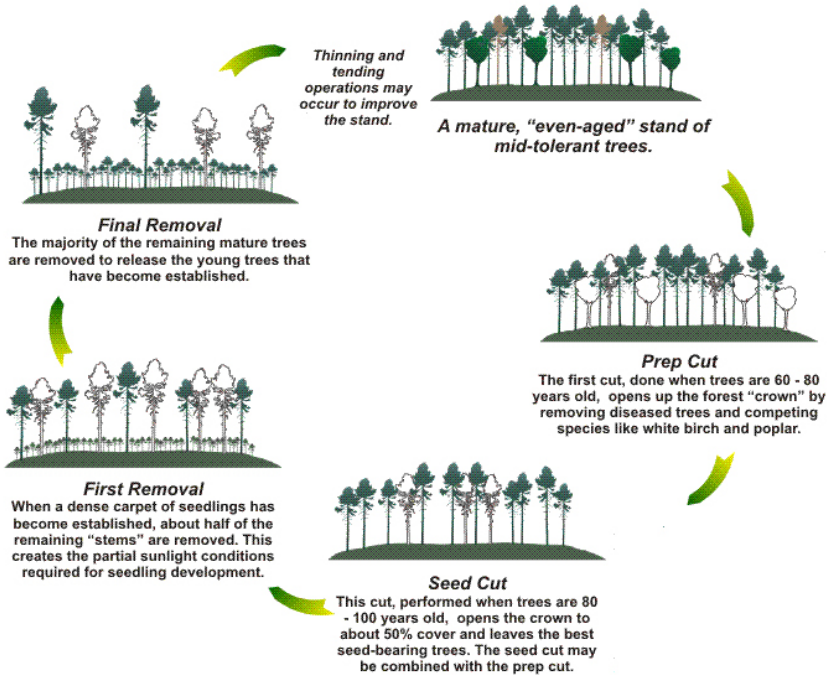
7.1.3 Alternative to Clearfell Forestry (ATC)

As mentioned previously the majority of the site is suited for thinning and has been subject to Low Impact Silvilcultural Systems (LISS) management. Going forward various areas of Devilla and Gartarry will see this paused in favour of a system of fell/restock to effectively reset and start again with a view to more effectively managed these areas as Continuous Cover Forestry (CCF) or LISS going forward. Despite this there are several areas which will remain as managed under LISS. These areas are those generally more visible or moderately used for recreation purposes. The proposed management for these areas is generally to continue to thin and supplement the crop under planting alternative site suited conifer species. ATC silvicultural systems to be used include:

Irregular shelterwood system – This is usually used to promote structural diversity while maintaining the simplicity of even-aged management. This system is compatible with the objectives for aesthetics, wildlife, biodiversity in the areas it is applied which are the areas of high recreational use or high visibility containing mature pine such as the Waas Plantation (both running alongside the A985) and Castle Hill Wood with Sustrans 764 Cycle route/West Fife Way adjacent.



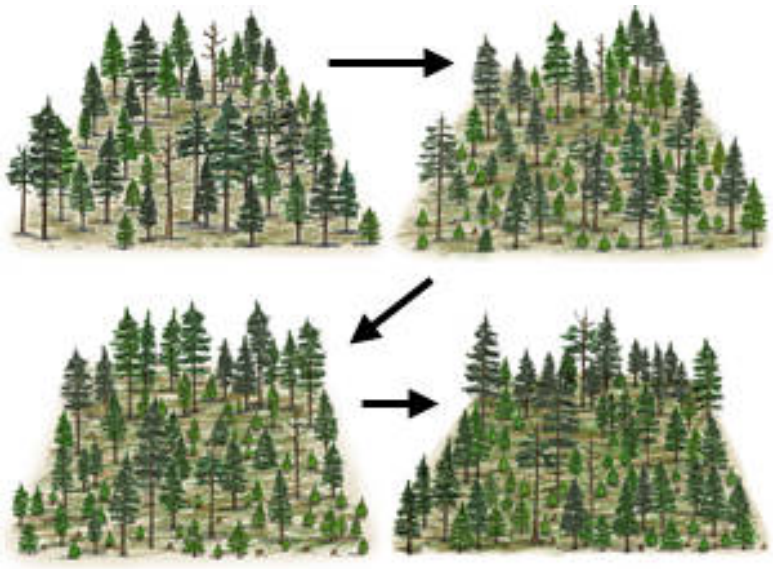
Uniform shelterwood system – Whereby the canopy is uniformly opened up over the whole area of the stand to obtain uniform regeneration under the shelter of the remianing old crop which is proposed as a system to eventually be employed in the areas of relatively recent Sitka spruce planting in Muirside.



Group selection system – Small gaps or openings are created on short intervals to develop into a mosaic of at least three or more age classes throughout the stand. Proposed as a system to manage the more recent broadleaf plantings across various sites.

Single tree selection system – This system removes individual trees of all size classes more or less uniformly throughout the stand to maintain an uneven-aged stand. The single tree selection system generally produces

a complex mixture of small, even-aged clumps which are thinned over time to theoretically produce one mature tree. In theory these clumps should yield at least one mature tree of the specified maximum diameter, although in practice these clumps are often larger. New regeneration develops in small scattered openings created theoretically in small gaps with an area equivalent to the crown spread of a single mature tree. In practice these gaps are often larger, created through the removal of several mature trees. This is proposed as a suitable system to manage the more mature stands of broadleaves in Balgownie.



7.1.4 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 40 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.

7.1.5 Restructuring

As described in the previous sections creating a long term phasing of mostly clearfell with seed tree coupes along with regular clearfell will gradually diversify the species and age structure of the Devilla and Gartarry allowing these to be managed as ATC in the next rotation. Simultaneously the continued transformation of areas managed under LISS will also provide similar outcomes.

7.1.6 Minimum Intervention and Natural Reserves

For various areas of the forest biodiversity will be the primary objective and we are prepared to commit such areas of land to minimum intervention management or leave as natural reserves. Significantly 56.81 Ha of forest heavily used for recreation around the Red squirrel trail in Devilla next to the main entrance will now be managed as minimum intervention. This minimum intervention classification need not apply in perpetuity and these areas may be reviewed and revaluated for alternative management in future plans. In addition to the previous areas of Natural reserve at Muirside in Coupes 09063, 09065 and 09067 this plan proposes to add 0.77 Ha of extra area in Devilla in coupe 09118. The reason for its inclusion is to retain the relatively undisturbed veteran p1928 Scots pine for their biological value.

7.2 Restocking proposals, future habitats and species

Taking into account all the survey and analysis information, and the objectives set out in the brief, a mix of productive conifer, productive and semi-natural broadleaved woodlands are proposed, along with areas of open ground.

This plan has considered the design and location in relation to the natural and historic environment and green network opportunities.

The woodlands will be matched to the soils and ground vegetation, using the guidelines set out in the Forestry Commission's Ecological Site Classification (ESC) Bulletin 124, which uses climatic zone, exposure, soil moisture, and soil nutrient levels to inform the type of woodland most suited to particular areas within the site. All planted species will be restocked within 2 years as standard or up to 5 years where Hylobius management or natural regeneration is employed.

7.2.1 Proposed Restock Species

The previous plan proposed restocking with Scots pine, larch and birch, whether through natural regeneration or planting, to replace what was felled however more latterly other site suited alternative conifers e.g. Macedonian pine and Serbian spruce have been planted due to the plant health issues onsite. This plan differs in that it will continue to use alternative conifer species but now in mixture with Scots pine.

In coupes where Scots pine is proposed it will generally form 30-40% of the mixture depending on the coupe location and site conditions. Scots pine will be planted in intimate rather than blocky mixtures to help reduce any DNB inoculum build up between individual Scots pine trees.

Ideally Scots pine will feature significantly as part of any given final crop component but this will depend on how well it develops within any given coupe given the uncertainty around any potential future impact from DNB.

This plan also proposes a more strategic planting design, locating species or species mixtures where they are ecologically best suited, at a scale which makes their future management more efficient, practical and effective. This plan also improves the habitat network links chiefly through the development of semi-natural woodland along the riparian corridors. These forest habitat networks will be comprised of a matrix of native broadleaves and open space.

This plan continues the process of diversification of the forests' age structure albeit in an altered way. This will now be achieved using Clearfell with seed tree/Clearfell and planted restocking alongside LISS management. The design facilitates future wind firm green edges to increase the stability of neighbouring coupes and therefore builds in flexibility to retain a range of options for future management decisions (see **Map 12 – Future Species & Habitats**).

Table 9 – Proposed Restock Species

Species	Net area (ha)	%
Scots pine	21.28	25
Norway spruce	5.77	7
Douglas fir	7.26	9
Sitka spruce	9.2	11
Other conifers	27.27	32
Broadleaves	13.15	16

Detailed restocking information is available in Section 2.3 Table 6 – Restocking of felled areas 2021-2031

7.3 Prescriptions

7.3.1 Productive Conifers

The primary function of the forest is to produce a significant volume of high quality softwood timber for the saw log market, also providing for the pallet, small round and fire wood markets.

As such and as per the Regional restocking strategy the management input will generally be:

- standard ground prep 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
- standard SDA process

The primary components of the productive conifer in the Devilla and Gartarry will move away from larch, due to its plant health issues, towards other site suited alternative conifer species in mixture with Scots pine. Norway spruce, Douglas fir and various other alternative conifers are variously all very well suited and will be among the species mixtures planted going forward.

Despite the previous LMP prescribing Scots pine and larch as predominant restock/natural regeneration species, due to the threat posed by (respectively) DNB and *P. ramorum* detailed in Appendix II: Supporting Information Section 3.2.5 there will be no further planted restocking using larch although some natural regeneration may arise however Scots pine will still be used in mixture with other site suited conifers for their benefit to local biodiversity. Planting Scots pine in mixtures will hopefully reduce the DNB inoculum load between individual pine trees which has seen other relatively recent Scots pine restocks heavily impacted by DNB.

7.3.2 Semi-natural woodland

Various areas of the sites are potentially suitable to support Native woodland (as classified in *FC Bulletin 112 Creating New Native Woodlands*), the woodland type, locations and species are listed in Table 10 below:

Table 10 – Native Woodland Type

Woodland Type	Location	Species
W4 (Upland birch woodland)	Poorest ground, typically along riparian corridors.	Downy birch, grey willow
W7 (Alder wet woodland)	On less fertile, predominantly mineral soils where there is little peat accumulation	Alder, silver birch, grey willow, hazel, hawthorn
W9 (Upland mixed broadleaved woodland)	On more fertile soils.	A wide range of broadleaved species including oak, birch, rowan, hazel elm.

Planted broadleaves will be restocked within 2 years to achieve a minimum final target density of 1600 stems/Ha although areas with productive potential will be planted at higher densities. Riparian areas will generally be lower density incorporating around 30% of open space. It is expected that a conifer component may develop in these areas through natural regeneration; this can be accepted however should be managed to ensure it remains a minor component.

We prescribe restocking coupe 09011 at Balgownie through natural regeneration and therefore we would expect to achieve a target density of 1,600 for the birch/MB by year 5 inspecting at year 4 and beating up or planting at year 5 if required to achieve the target density.

7.3.3 Restored former sand quarry

Burrowine Moor Quarry to the north of Devilla has recently been partially restored by the owner Patersons returning the former Sootrie wood area back to native mixed broadleaved woodland. This area will have minimum intervention management.

7.4 Biodiversity & Environment

7.4.1 Habitat & Species Management

The various woodland and open priority habitats as well as the species they support will continue to be conserved and developed as per the management detailed below.

Woodland – FLS will maintain semi-natural and new native broadleaved woodlands, and maintain areas where rhododendron has been removed. In Devilla much of the Long Established Plantation Origin (LEPO) is retained far beyond its standard rotation within LISS or Clearfell with seed tree coupes. While natural reserves and minimum intervention areas provide a diverse canopy and structure for species diversity. Continued thinning of existing crops and future thinnings of areas to be felled in future will continue to provide habitat for the wide variety of species currently found particularly at Devilla.

Ponds, and Lochs – the woodlands contain various ponds, lochans and wetlands. FLS would welcome interested volunteer groups to assist in the survey and management of these habitats and associated species such as dragonflies.

Lowland raised bog – the Site of Scientific Interest at Lochshaw is a Lowland raised bog, during the period of the last plan, the bog was restored through felling, drain blocking, rhododendron and tree scrub removal and finally fencing and low level grazing. The site will be monitored and management continued. Species such as Green hair-streak butterfly and Emperor moth use the edge of the bog that transitions into a valuable bog woodland habitat.

Red Squirrel and Pine marten – anecdotal evidence over the last 5 years, through sightings by staff, neighbours and visitors, is that there are more red squirrels and pine marten in the woodlands. The main block at Devilla will continue to be managed as predominantly conifer to allow red squirrels a competitive advantage over grey squirrels. The large number and mix of conifer species will provide a variety of food sources benefitting the red squirrels, as conifers produce different amounts of seed in anyone year. The shelterwood management system will be maintained to encourage large tree sizes that will provide denning sites for pine marten. Pine marten will benefit the red squirrels by preying more heavily on the greys.

Following national guidance we will continue to mitigate the effects of forestry operations on protected species throughout the length of this plan following Scottish Forestry Guidance Note 31: Forest operations and wildlife protection. Ongoing monitoring of populations and habitats will inform and direct operations through the work plan process, allowing site specific mitigation to be developed and implemented. We will develop and implement strategies to promote regional priorities such as raptor and water vole conservation throughout the length of this plan.

Raptors – Our proposed management including the long term phasing and spread of coupe phases, retention of significant mature canopy, low impact silvicultural areas and areas of minimum intervention will have neutral impact on raptors. FLS will continue to follow Scottish Forestry Guidance Note 32: Forest operations and birds in Scottish forests and as such we will continue to carry out systematic Pre operational checks to search for active nests of important birds at least two weeks before operations start.

7.4.2 Riparian Areas

We will establish or maintain appropriate riparian buffers along watercourses providing an open woodland canopy with half the watercourse open to sunlight and the remainder under dappled shade. Distribution and management of the taller vegetation elements will reflect the stream orientation, ensuring that sufficient light reaches the stream and banks to support the development of a vigorous cover of ground and marginal vegetation. Conifer natural regeneration may also establish within these buffers which we will accept as a minor species component.

7.4.3 Deadwood

The aim is to use natural processes by retaining dead, windblown or snapped stems or those created during previous operations. Deadwood can be trees or limbs in the early stage of decomposition, e.g. veterans or dying individual trees. These should be retained wherever possible to create an even mix of standing, fallen or stacked deadwood. In addition to this the clearfell with seed tree system employed across much of Devilla will promote the development of veteran trees which as they fall into senescence will further enrich deadwood habitat. Deadwood Ecological Potential in Devilla and Gartarry has been considered medium to high although with the proposed change to clearfell/clearfell with seed trees systems this should see this fall in line with the other blocks at generally low to medium with the exception of area of mature woodland and LISS where it is remains high.

Deadwood will be concentrated in areas where it will provide the highest ecological benefit, such as;

- Riparian and wet woodland areas
- Natural reserves and long-term retentions
- Ancient semi-natural woodland
- Areas of significant existing deadwood

The UK Woodland Assurance Standard (UKWAS) target is for an average of 20 m^3/ha, although it is expected that actual concentrations will vary widely across the site.

Table 11 – Assessed Deadwood Ecological Potential (DEP)

Assessed DEP	Area (ha)	Future Volume Estimate (m^3/ha)	Total Future Volume (m^3)
High	189	100	18,900
Medium	174	30	5,220
Low	946	15	14,190

Total future potential is thus estimated at **29** m^3/ha.

Given that a relatively high total volume of deadwood is expected to come from Low DEP areas, in line with FLS Deadwood Policy the following additional actions should be adopted in the remaining High and Medium DEP areas:

- Retain small groups of live trees and/or single large trees to develop into deadwood, identify these from trees lacking commercial value or areas with bryophytes.
- Leave one very large fallen stem if possible on each site (>20cm diameter at breast height (dbh)).

7.4.4 Invasive Species

Grey squirrel (*Sciurus carolinensis*) – are an invasive non-native species and are present in areas where there are also red squirrels (*Sciurus vulgaris*). Grey squirrels can infect red squirrels with Squirrel Pox virus a fatal disease. Squirrel and pine marten feeders are not used to ensure that the species minimise contact. The plan aims to provide a competitive advantage to red squirrels by having a larger amount of conifers than broadleaves. That being said reds do seem to be cohabiting with the greys which is likely due to the presence of pine marten controlling grey numbers. Tree species with the potential to be affected by grey squirrel currently only form a minor component of the forest however with the intended increase in planting of Norway spruce, Pacific silver and Douglas fir and newly planted productive broadleaves at East Grange, future grey squirrel control may be required should their numbers increase.

Rhododendron ponticum – Targeted rhododendron control will be considered and actioned where necessary through the period of this plan, improving habitat and potential for natural regeneration of tree species. We will continue to seek agreement with our neighbours to prevent it spreading back into the forest.

7.4.5 Wildlife (Deer Management)

Full details of proposed deer management can be found within Central Region Deer Management Strategy (in conjunction with the Deer Overview Map), but the main objectives within the South West Fife Forests are:

- To enable restocking to take place without the need for deer fencing and to achieve a stocking density of 2500 stems per hectare at year five in accordance with Operational Guidance Booklet (OGB) 4.
- The District aim for damage allowance is to keep leader damage levels below 10% on all commercial plantations.

- Ensure all Biological resources on the National Forest Estate remain in favourable condition (as per NatureScot guidelines).
- To maintain a sustainable deer population.
- Inhibit the spread of Sika westwards from Devilla forest.
- To protect the native flora and improve the condition of the ancient and native woodlands particularly in Balgownie PAWS, and the Site of Special Scientific Interest (SSSI) at Lochshaw with additional focused effort at Cadgerford and Muirside.

To facilitate these aims vegetation control after ground prep and restocking is vital. Birch and willow natural regeneration is prevalent and outcompetes the planted crops making for poor visibility and shooting conditions. Good communication between Forest Management team and Wildlife Team to highlight areas of concern should be ongoing .

7.4.6 Landscape

In producing this LMP FLS has considered the landscape character of the area and the features outlined in NatureScot's landscape character assessment. FLS has also considered the impact our proposals would have on the wider landscape and it is our view that this impact would not be significant given the relatively small coupe sizes, LISS management and the screening effect of both FLS and other neighbouring woodland (see **Appendix II section 3.3 Landscape & Landuse**).

7.4.7 Hydrology

All operations will follow best practice as detailed in the 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.

Natural Flood Management Opportunity (NFM) - Devilla Forest sits within the Kincardine Drainage Area. Keir Burn, which Devilla Forest may directly impact, feeds into the Forth. Scottish Environment Protection Agency (SEPA) have identified Kincardine as the main downstream Objective Target Area (or Drainage point) which could be impacted by activities within the Kincardine Drainage Area.

Forestry Activity - Given that this particular drainage area has 61% woodland cover with Devilla contributing all of this, the impact of any potential forestry felling activity and short term reduction in canopy cover (potentially leading to less evaporation of the water) could potentially have a significant impact on the peak flow. However such potential impact will be mitigated by employing a combination of relatively small area clearfell coupes phased over many decades and LISS management.

NFM Opportunity - We recognise that Devilla Forest sits within a catchment which is subject to NFM studies (in FRM) for Kincardine. If NFM is indicated as a solution and if there is a part for FLS to play in that (inside Local FRM plan actions), then FLS will be happy to work with other agencies and partners to be part of the flood solution.

7.5 Heritage

The forest design illustrated in **Map 12 - Future Habitats & Species** considered the various heritage features, many under woodland cover and our future management.

Appropriate buffers have been applied by our Environment Forester to all the different features across the sites e.g. banks, dykes, standing stones, wells etc., which are recorded within our heritage database. This is done in accordance with the guidance provided in the Forests and Historic Environment guidelines (2011), the SF policy document: Scotland's Woodlands and the Historic Environment (2008) and the supporting FLS Historic Environment Planning Guidelines. Features generally have buffers ranging from 5-10 metres depending on their nature but these can be wider or even have no buffer. Such constraints are identified and surveyed by Forest Regional staff prior to any work being undertaken in order to ensure that upstanding historic environment features can be marked and avoided. For operations, work prescriptions protect relevant historic environment features apportioning appropriate buffers clear from ground disturbing operations and planting. Opportunities to enhance the setting of important sites are considered on a case-by-case basis.

The following sub-sections provide further detail as to some features which will see specific management or work on them during the life of this plan.

7.5.1 Scheduled Archaeology

Devilla Forest

- Keir Wood Fort – FLS will continue to monitor the condition of the site and ensure the removal of all intrusive scrub vegetation and regeneration.
- Castle Hill enclosure (Bogside wood) - FLS will continue Rhododendron and birch tree regeneration control.

Muirside

- Kinnedar Mains (enclosed settlement) FLS will continue to monitor the condition of the monument and ensure the removal of all bracken, intrusive scrub vegetation and regeneration.

7.5.2 Non-scheduled Archaeology

Appropriate buffers will be applied and maintained around pertinent non-scheduled archaeological features, these will be kept open and free of trees. All operations in the vicinity of such features will be conducted in accordance with UK Forestry Standard Guidelines on Forests and the Historic Environment, with suitable steps taken to ensure their protection.

7.6 Operational Access

7.6.1 Forest Roads

The only new roading required is a small spur of approx. 50 m for coupe 31 to provide a maintenance area for machines, hard standing for a welfare unit and parking for caravans etc. no other new roading is envisaged for this plan period however some may new operational access may be required for thinnings early in the next plan period (see **Map 7 – Management**)

7.7 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 (see **Map 11 – Woodland Management in Visitor Zones**).

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, through the development of large trees, or preferential removal of trees to favour a particular species. Other general maintenance, in Devilla particularly, will be as per the Devilla Maintenance Plan (see **Appendix IV**).

There is an aspiration to increase the capacity of the car park at Devilla in the plan period which would not significantly increase the existing footprint but allow more vehicles access to the site at any given time.

8.0 Critical Success Factors

The success of this plan will be based on whether the objectives set out in Section 1.0 Summary of Proposals and in **Appendix II Land Management Plan Brief** are achieved. The table which forms **Appendix V: Objective Appraisal, Monitoring & Evaluation** details how each objective will be appraised, where and when each objective will be monitored; by who and where it will be recorded. This will enable an evaluation of success as part of the mid and end of plan reviews.