



Central Region

Stirling Forests

Land Management Plan

Approval date: ***

Plan Reference No: ****

Plan Approval Date: *****

Plan Expiry Date: *****

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

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





Land Management Plan Details

LMP Name:	Stirling Forests		
Grid Reference:	Garshellach–NS 7350 9329 Pendreich–NS 8070 9819	Nearest town or locality:	Garshellach–Gargunnoch Pendreich–Bridge of Allan
Local Authority:	Stirling		
Land Management Plan area (hectares):	250		

Owner's Details

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Approval - to be completed by Scottish Forestry staff:

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Operations Manager Signature:		Approval Date: (dd/mm/yyyy)	



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Version History

Version	Date	Comments
0.0		Initial Draft layout
1.0	02/07/2021	1 st draft of LMP
1.1	19/07/2021	Update after FLS regional comment
1.2	19/10/2021	Update following FLS public consultation
1.3	04/11/2021	Updated following Scottish Forestry Public Register comments.
1.4	03/12/2021	Updated following late comment from consultation.



1.0 Summary of Proposals

The Stirling Forests serve as multifunctional woodlands within Central Region with the potential to produce high quality soft and hardwood timber, provide biodiversity with areas of each woodland dedicated to minimum intervention management, natural reserve and where areas of conifer plantation have been returned to the native woodland that in the past they once were. 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 and Douglas fir.

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, maintain biodiversity value, attractive woodlands and recreation opportunities.

Table 1 - Woodland changes

Species Breakdown	2021	2031	2041
Primary species: Scots pine	42.8	36.7	33.2
Secondary species: other conifers	50.5	54.0	49.6
Broadleaves	110.4	113.5	114.6
Open space, felled awaiting restock	46.9	46.2	53.1
Total Plan Area:	250.4	250.4	250.4

LMP Objectives

1. Design and manage the woodland using sound silvicultural practice (including both clearfell and a range of alternative to clearfell systems) and site specific species selection to ensure long-term viability, practicality, productivity and sustainability of the forests.
2. Manage for production of high quality soft and hardwood timber (targeting the best ground), conducive to the good soils and relative shelter the sites provide.
3. Protect establishing planted/naturally regenerating crops from herbivore browsing through active mammal management.
4. Maintain biodiversity value through appropriate design e.g. conifer retention for Red squirrel and Pine marten habitat to discourage greysquirrel.
5. Maintain and encourage good development of native broadleaves on areas of former Plantations on Ancient Woodland Sites (PAWS)
6. Protect heritage features
7. Protect and enhance views from within and of the site sympathetic of the landscape contributing to Stirling's historic setting
8. Protect water quality and plan to mitigate/manage flood prevention
9. Maintain attractive woodlands and trails and other recreational opportunities to promote fun in the outdoors for all.
10. Promote responsible access and use of the forests.



2.0 FCS Regulatory Requirements

2.1 Summary of planned operations

Table 2 - Summary of planned operations

Planned Operations	Area (Ha)
Clearfelling (afforested area)	11.45
Thinning	39.69
Restock (replanted area)	11.27

2.2 Proposed felling in years 2021-2031

Table 3 – Clearfelling Phase 1 & 2

Coupe No	Total Area (Ha)	Spp by Ha (Larch)	Spp by Ha (NS)	Spp by Ha (SS)	Spp by Ha (SP)	Spp by Ha (MC)	Spp by Ha (MB)	Open land by Ha
64030	12.31	3.4		1.39	6.28	0.38		0.86

2.3 Proposed thinning in years 2021-2031

Table 4 – Thinning Areas

Woodland species	Area (Ha)
Native broadleaves	13.9
Other broadleaves	13.14
Scots pine	5.95
Larch	3.97
Norway spruce	1.67
Sitka spruce	0.6
Other conifers	0.42
Total	39.69

2.4 Proposed restocking in years 2021-2031

Table 5 – Restocking of felled areas 2021-2031

Coupe No	Total Area (Ha)	Spp by Ha (NS)	Spp by Ha (DF)	Spp by Ha (MB)	Open (Ha)	Year	Restock Method & Density (Restock/Nat Regen/Alt Area/Coppice/Open)	Monitoring Comments (including and reason not to restock)
64030	12.31	4.51	4.51	2.25	1.04	2026/27	Restock	SDA

2.5 Departure from UKFS Guidelines

This LMP adheres to UK Forestry Standard Guidelines.



2.6 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://scotland.forestry.gov.uk/managing/plans-and-strategies/land-management-plans/links>



2.7 Tolerance table

Table 6 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 2 nd 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 EIA Screening Determination for forestry projects

3.1 Proposed deforestation

n/a

3.2 Proposed forest road works

n/a

3.3 Proposed forest quarries

n/a

3.4 Proposed afforestation

n/a



4.0 Introduction

This management plan will revise the previous Forest Design Plans for these 2 forest blocks under one Land Management Plan. This new plan will synchronise the management approval for these forests into a single new 10 year plan, associated not only by their geographic proximity to each other but also due to their similar attributes such as their lowland hill and fringe character and relatively fertile soils.

4.1 The existing land holding

See [Appendix II: Supporting Information sections 1.0 & 3.0](#)

The current land matrix is as follows:

Table 7 – Current LMP Area Land Use

Land use	Area (Ha)
High Forest	203.4
Open	46.9

4.2 Setting and context

The Stirling Forests are made up of Garshellach (~174 Ha) and Pendreich (~ 76 Ha) totalling an area of approximately 250 Ha. As the name suggests the sites lie around the city of Stirling, which of course is located within the Stirling Local Authority Area. The Forests lie on the lowland hills and lowland hill fringes of the Touch and Ochil Hills, with Stirling the largest settlement. The forests complement the wider diverse land cover of arable and open improved and unimproved pasture land, interlocking with woodland and forestry. (see [Map 1 – Location](#)).

A primary function of the forest is to produce high quality saw logs as well as pallet, small round wood and firewood from commercial conifer and broadleaved species for local and national markets.

4.3 LMP Presentation

The Stirling 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 II/2.0](#)) and consideration of the initial scoping internal FLS responses, [Appendix III](#) details the key issues and challenges faced as well as the management objectives identified for the Stirling Forests.

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

Our experience from managing these woodlands demonstrates that Alternative to Clearfell (ATC) methods are suitable and should succeed in these woodlands although the areas proposed for this management are relatively young and therefore management here at this stage will be restricted to maintenance and thinning interventions to facilitate future transformation.

7.1.1 Clear Felling

The size of the one clearfell coupe within the plan period (64030 at Garshellach) is in keeping with the scale and topography of the surrounding landscape. For plant health purposes this coupe shape has been chosen to include areas of formerly pure and mixed Larch retentions in line with our Larch Strategy (see [Maps 7 – Management](#) and [Maps 10 – Timber Haulage](#)).

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, each 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 [Maps 9 – Thinning](#)).



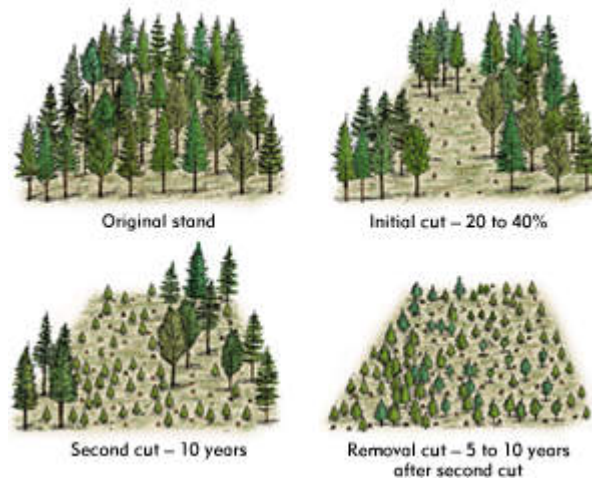
7.1.3 Alternative to Clearfell Forestry (ATC)

As mentioned previously each site is generally suited for thinning with various areas previously thinned although records are scant. Going forward coupes will be managed using Low Impact Silvicultural Systems (LISS). The proposed management for these areas during this plan period is generally to continue to thin (see **Maps 8 – Silviculture**). ATC silvicultural systems envisaged to be used in future include:

Group shelterwood system – Small gaps (one to two tree lengths in diameter) are created in the thinned and wind firm stand. The adjacent trees can shelter the new regeneration growing in the gaps. Openings may comprise 20-40% of the stand area during a given entry. Further cuts expand existing openings or create new openings.

The regeneration period for the coupe is concentrated at the beginning of the rotation over 20-30 years, creating an even-aged naturally regenerated stand (see Figure 1 below) . This system is proposed for areas of relatively recent plantings of Spruce species and Douglas fir.

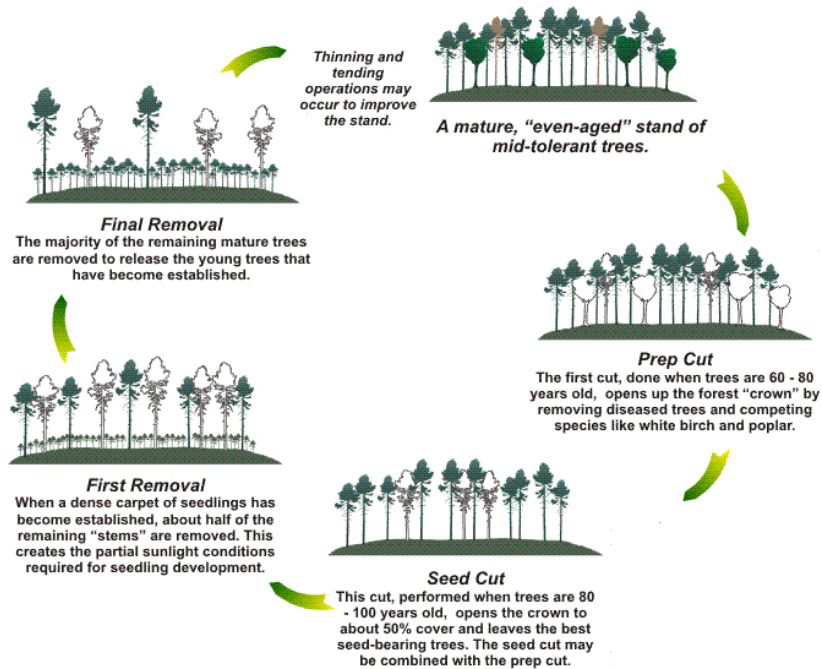
Figure 1 – Group shelterwood system



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 remaining old crop (see Figure 2 below). This is proposed as a system to eventually be employed in the areas of relatively recent Scots pine planting.

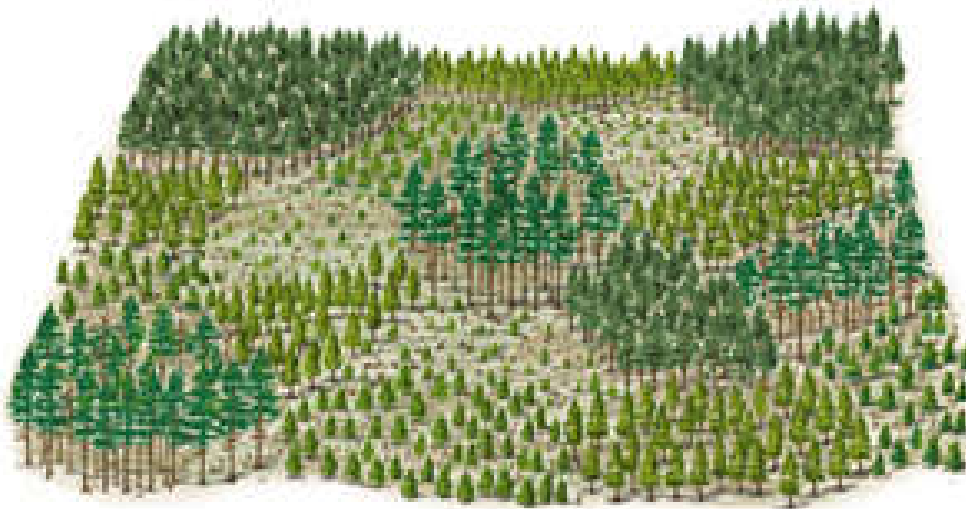


Figure 2 – Uniform shelterwood system



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 (see Figure 3 below). Proposed as a system to manage the more recent broadleaf plantings.

Figure 3 – Group selection system



7.1.4 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.

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

7.1.5 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 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.



7.1.6 Restructuring

As described in the previous sections phasing the remaining clearfell coupes will gradually diversify the species and age structure allowing them to be managed as ATC in the next rotation. Concurrently the continued management toward transformation of areas managed using LISS will also provide similar outcomes.

Table 8 – Predicted Age Structure Changes

Age Class	Area (Ha) Current	Area (Ha) Year 10	Area (Ha) Year 20
0-10 years	63.8	30.5	25.9
11-20 years	50.2	55.6	30.5
21-40 years	12.2	56.5	88.9
41-60 years	3.5	1.6	2.7
61+ years	73.9	59.8	49.3
Total	203.4	204.1	197.3

Table 9 – Predicted Species Composition Changes

Species	Area (Ha) Current	Area (Ha) Year 10	Area (Ha) Year 20
Scots pine	42.8	36.7	33.2
Sitka spruce	29.4	28.2	21.9
Larch	11.4	7.8	4.8
Norway Spruce	3.1	7.2	9.5
Douglas fir	2.7	7.5	10.5
Other conifers	3.9	3.3	2.9
Native broadleaves	42.7	42.5	42.5
Other broadleaves	67.7	71	72.1
Total	203.7	204.2	197.4

7.1.7 Minimum Intervention and Natural Reserves

For various areas of the forests biodiversity will be the primary objective and we are prepared to commit such areas of land to minimum intervention (MI) management or leave as natural reserves (NR). Some areas of larch previously identified within the previous plan for retention will now either fall within a designated felling coupe or remain as Minimum Intervention to allow us flexibility to fell should we receive a statutory plant health notice (SPHN) despite this further areas have been identified to become MI or NR with the area of both increasing by approx. 7% and 23% respectively. The areas have been chosen based on FLS Guidance on assessing and assigning MI and NR's.

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

Table 10 – Proposed Restock Species

Species	Net area (ha)	%
Norway spruce	4.51	36
Douglas fir	4.51	36
Mixed broadleaves	2.25	18
Open ground	1.04	10
Total	12.51	100

Detailed restocking information is available in [Section 2.4 Table 5 – Restocking of felled areas 2021-2031](#) and [Map 12 - Future Habitats & Species](#).

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

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/3.4.5](#) there will be no further planted restocking using Scots pine or larch although some natural regeneration may arise. Norway spruce and Douglas fir as well as



several other alternative conifers are variously all very well suited and will be among the species mixtures planted going forward.

7.4 Biodiversity & Environment

7.4.1 PAWS Restoration

From 2010 to 2020 the ancient woodland sites in both Garshellach and Pendreich have been restored from conifer woodland to productive native tree species. These plantation on ancient woodland sites have been planted to increase the biodiversity value of the sites while allow future economic management through crop thinning as detailed in [section 7.1.2](#). These sites will be maintained until the trees are established.

7.4.2 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.

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 m³/ha, although it is expected that actual concentrations will vary widely across the site.

Overall, as these sites have significant areas managed as minimum intervention, natural reserves as well as LISS, there is a high deadwood Ecological Potential within the woodland; which will exceed the UKWAS average

7.4.3 Invasive species

Continued follow up control will be the main delivery towards the conservation of habitats going forward in the woodland.

7.4.4 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 Stirling 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 OGB 4.
- The Regional 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 SNH guidelines).
- To maintain a sustainable deer population.
- To slow the expansion of Red deer heading south.

To protect the native flora and improve the condition of the ancient and native woodlands particularly in Pendreich. These woodlands contain priority habitats such as Lowland mixed deciduous woodland and upland birch woodland. If required, any future perimeter fencing bordering on to open ground at Pendreich will be clearly marked with strike marker tape.

7.4.5 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 and the screening effect of both FLS and other neighbouring woodland (see [Appendix II section 3.3 Landuse](#)).

7.4.6 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.

7.4.7 Geology

A section of Garshellach lies within a Geological Conservation Review (GCR) site. Within these areas, potential impacts on the GCR will be considered at the work planning stage and further advice sought from FLS environment staff.

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 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 Social Factors

7.6.1 Recreation

FLS will maintain and enhance access opportunities where sustainably viable. Recreation facilities will be managed in line with OGB 42 Managing Recreation or any subsequent Standard Operating Procedures.

Garshellach offers informal access via the forest road network used by local dog walkers and those wanting to access onto the Touch hills, there is an aspiration for a link to the forest from the Gargunnoch community.

Pendreich provides formal car parking with one circular loop around Black Hill and a path linking to the Dumyat hill path. This now offers walkers and cyclists the opportunity to extend their outing around the neighbouring Cocksburn reservoir with the option of exploring informal routes to return to the car park.

7.6.2 Community

FLS staff will engage with local communities and groups to facilitate access and activities on site. This may include education, health and greenspace programmes to encourage users to access Scotland's national forests and land. This will be in accordance with Scottish Government's National Performance Framework, FLS Corporate Plan 2019-2022 and FLS National Visitor Services and Community Strategy (TBC). Opportunities identified for the Stirling forests include Stirling University and the recently opened Stirling Health Care Village.



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 III Land Management Plan Brief](#) are achieved. The table which forms [Appendix IV: 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.



Appendix I: Land Management Plan Consultation Record

Table 11 – LMP Consultation Record

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest Region Response
Anonymous Web Consultation Respondents (5 responses)			<p>Question: What aspects of the Stirling Forest Land Management Plan are you most interested in?</p> <p>Recreational access 60% Wildlife 20% Tree species choice 0% Landscape impacts 0% Forestry operations 0% Water quality 0% Silviculture 20%</p>	
			<p>Question: What do you like most about the plan, and why?</p> <ol style="list-style-type: none"> 1. More forests is always a good thing. The coupe shapes look good and will fit in well with the landscape. 2. Not clear in the plan what additional recreational access would be provided 3. Active management 4. The fact that such a broad outlook has been taken on the 	<ol style="list-style-type: none"> 1. Thank you for your comment. We have sought to create a design that fits with the local landscape. 2. Thank you for your comment. None are identified at this time for these sites however, the sites are fully accessible under the Scottish Outdoor Access Code.



Statutory Consultee	Date contacted	Date response received	Issue raised	Forest Region Response
			<p>impact that woodland can have both negative and positive on local communities and the wider world. The reason I like this is because it displays that FLS do not</p> <p>Question: Is there a part of the plan that you would like to see improved, if so how?</p> <p>1. The area of SS at Pendriech should be changed to mixed broadleaf. Why have a very small area of SS that will blow in an inaccessible area with such high public use. Surely your 'strategic reserve' should be in Garshellach. Garshellach - You mention that one of the 'primary objectives' is to manage for the production of high quality timber this in my mind means that the primary species should be SS not NS and the amount of birch/OG should be reduced to allow for this.</p>	<p>3. Thank you for your comment. We are pleased active management of these forests for a range of objectives is seen positively.</p> <p>4. Thank you for your comment. Our planning process aims to identify and address a wide range of constraints and opportunities through sound consultation and analysis to prescribe management which achieves multiple objectives.</p> <p>1. Thank you for your comment. We haven't been able to find any reference to a 'strategic reserve' in the plan text or maps, however, this plan has identified a new Natural Reserve at Pendriech. Natural Reserves (NRs) are predominantly wooded areas managed in perpetuity by minimum intervention and where natural processes are allowed to predominate. Conservation of biodiversity is the primary objective and the function of NRs is to provide a continuity of</p>



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			With current harvesting practices this birch will never be touched and ultimately not contribute to your 'quality timber production'.	permanent habitat to allow sedentary species to establish and thrive and from which more mobile species can expand into adjacent managed forests. The selection and designation of such areas is a requirement of the UKWAS and UKFS. Although shown as Sitka spruce on the plan maps, the Natural Reserve at Pendriech contains a mixture of species, including a significant element of native broadleaves dating as far back as 1885. Our Planners do not consider this to be at high risk of windblow, and the area experiences relatively low levels of public access compared with the rest of the block. The plan maps incorrectly identified this area being managed as a Visitor Zone and we have updated our final maps to reflect this. There are also a number of Natural Reserves designated in Garshellach. Although the production of high quality softwood and hardwood timber is a primary objective for these forests, it must be balanced against several other objectives, as set out in



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			<p>2. Support - work with local Mountain bikers to provide responsible access and trail development.</p> <p>3. Pendreich The smaller parking area at the north west corner is close to the reservoir. This is not a car park but a passing place. Lately with increased numbers just parking here and also on the road edge has caused problems for agricultural machinery and HGV delivery and collection from Pendreich Farm at the end of the road. The road has also become badly damaged due cars parking on verge and edge. This area requires access to the Pendreich farm and walkers and</p>	<p>Appendix III/3. Species diversification will help to meet these objectives while maintaining opportunities for future timber production and improving forest resilience to climate change and pest and disease outbreaks. All species choices are carefully considered based on site suitability and management objectives and are supported by the Ecological Site Classification Decision Support System. FLS have a broadleaf management program which will allow future opportunities for supplying broadleaf timber to various markets.</p> <p>2. Thank you for your comment. FLS are happy for approaches from local groups to see what can be done. We are regularly working with local groups and DMBiS.</p> <p>3. Thank you for your comment. Improper parking should be reported to the Police and local authority. We regularly work with partners to see what can be resolved. We</p>



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			<p>swimmers to the Cocksburn reservoir have increased due to better path access. With limited passing places on the single track road, car parking on road side and in the passing place should be discouraged. There is parking at the sherifmuir side and also at Drumbrae farm.</p> <p>4. The section on Community 7.6.2 - although it is wonderful to see that FLS will continue to facilitate communities and groups to have access to the woodlands, it would be good to see a greater emphasis and recognition of the health benefits that being amongst woodland can have for people. A positive aspect of the plan is that specific mention is made of Stirling Health Care Village, but I would like to see something added about specific targeting of people who face the greatest health inequalities</p>	<p>shall monitor this issue going forward and will erect signage at the reservoir/passing place to discourage inappropriate parking.</p> <p>4. Thank you for your comment. As part of FLS Corporate Plan Outcome 3: 'National forests and land for visitors and communities', we are committed to Actively encouraging the participation/visits to the national forests and land by people who are care experienced, of low socioeconomic status and/or from protected characteristic groups.</p>



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			<p>Please add any further comments relating to the plan here.</p> <ol style="list-style-type: none"> <li data-bbox="1240 475 1646 895">1. The passing place at the track on Pendreich road to the Cockburn reservoir has never been designed for car parking...this requires some signage and prevention measure to prevent cars being inappropriately left here. There are 7 houses at the end of Penreich road plus the farm steading and the use of the passing place and road side for car parking has really got out of hand over the last 18 months. <li data-bbox="1240 932 1646 1415">2. I won't pretend to understand much of the technical details of the plans or the exact reasons behind choices that have been made around environmental impact and biodiversity. I have total trust in FLS to use their expertise to determine this. I was a little surprised to see the total hectares of Scots Pines reducing by approx 10 hectares over the time of the plan as I would have thought that the plan would have been to increase this species. However 	<ol style="list-style-type: none"> <li data-bbox="1673 475 2076 831">1. Thank you for your comment. Improper parking should be reported to the Police and local authority. We regularly work with partners to see what can be resolved. We shall monitor this issue going forward and will erect signage at the reservoir/passing place to discourage inappropriate parking. <li data-bbox="1673 868 2076 1415">2. Thank you for your comment. As outlined in section 3.4.5, Dothisroma Needle Blight (DNB) has been found in both Garshellach and Pendrieich and for this reason the decision has been taken to utilise other site-sited conifer species, due to the impact of DNB on Scots pine. A significant proportion of the pine will be replaced with Norway spruce, which can provide similar biodiversity benefits for target species such as red squirrel. Scots pine is not considered native in this area as it lies outwith the pinewood



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			as I have said I trust FLS and feel that there must be sound reasons for doing this.	zone; however significant proportions of the plan area have been restored to native woodland and will be managed as such going forward. In addition, the plan commits to retaining significant areas of coniferous species (including Scots pine) as areas of minimum intervention or natural reserve which will benefit the red squirrel population.
Historic Environment Scotland	11/09/2021	07/10/2021	... I can confirm that there are no scheduled monuments, category A listed buildings, Inventory battlefields or Inventory gardens and designed landscapes within the woodland boundaries at Pendreich or Garshellach. We therefore have no comments to make regarding this consultation. If you have not done so already, you should consult the local authority archaeologist for advice on any unscheduled archaeology which may lie within the area of the proposed Land Management Plan. ...	Thank you for your comment, we note there are no designated historic features or sites within these woodlands. The Local Authority have been consulted on this plan. In the past, the Local Authority Archaeologist has carried out surveys at Garshellach and information recorded has been logged in our GIS system. As stated below, any relevant archaeological constraints and necessary protection will be identified in more detail at the work plan stage of any operations.
NatureScot	11/09/2021	07/10/2021	... Protected sites	



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			<p>The location of the plan covers two forests in the area, Garshellach between Canbusbarron and Gargunnock and Pendreick north of Bridge of Allan. There are no SSSIs or European protected sites within this proposal but there are Geological Conservation Review (GCR) sites. I advise that future land management plans take into consideration any impacts on GCR sites, as these are protected sites too. We advise that a reference to GCR sites is added in section 3.4.1 of the plan. You can search for GCR site from NatureScot's sitelink and I have attached a link showing the those involved with this plan here</p> <p>Pendreick does not involve any protected sites but it is next to Sheriffmuir Road to Menstrie Burn GCR site. We note that there is only re-planting planned for Pendreick. It is unlikely that any significant effect from this proposal would affect that GCR site.</p> <p>Garshellach at Gargunnock overlaps part of the Touch, Fintry and Gargunnock Hills GCR site.</p>	<p>Thank you for your comment. We note there are no statutory protected sites within the Land Management Plan area.</p> <p>Reference to the CGR sites has been added to the relevant sections of the plan.</p>



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			<p>We note that the plantings at Garshellach are either re-planting or planting new areas of broad leaves. Compartments 17 to 28 are within the GCR site. From aerial images, there seems to be quite a bit of open ground around Craigbrock Hill and Little and Mickle Inderlade. We advise that in this area you only replant in areas previously planted. For areas that are to be felled and restocked we advise that you do not replant within 10m of any outcrops that you find when felling. We advise that you ensure that access to outcrops is possible e.g. along fire breaks or other access routes.</p> <p>Species</p> <p>The plan mentions the presence of blackgrouse at Pendreich. It does not mention if there will be any fences installed to accommodate the planting of broad leaves. We advise that if fencing is installed that it has markers to help prevent strikes by flying birds.</p>	<p>No areas of new planting are proposed at either Garshellach or Pendreich; all areas will be on former/existing woodland cover (i.e. restocking). We will take advice from the FLS environment team on this and any required mitigation will be considered in more detail during the work planning process. All areas of the forest will remain fully accessible under the Scottish Outdoor Access Code</p> <p>As outlined in section 7.4.4, one of the main objectives for deer management within Stirling Forests is to enable restocking to take place without the need for deer fencing. We have only a single record of a lone female blackgrouse in this block on 25/02/2014. There was no follow up on this sighting and we do not consider this sighting to be robust enough to confirm blackgrouse presence within the block. We will however aim to survey the</p>



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			<p>We are supportive of the deer management plan as explained in section 7.4.4 of the plan. As suggested in the plan, we advise liaising with the Flanders Moss DMG and other local land managers so that there is a coordinated local effort to manage the red deer population that is moving south.</p> <p>We note and agree with the appropriate management guidance that is listed in section 7.1 of the plan.</p> <p>...</p>	<p>areas of restock, new planting and open ground adjacent to the LMP area within the timespan of the next LMP period to confirm the presence/absence of blackgrouse within this area. If required, any future perimeter fencing bordering on to open ground will be clearly marked with strike marker tape. Existing fencing is already marked in this way.</p> <p>Noted. Movement of deer both in and out of the Flanders area is monitored on a regular basis with any changes in movements recorded.</p> <p>Noted</p>
Stirling Council	11/09/2021	07/10/2021	<p>...</p> <p>1. Summary of Proposal [summarises LMP text, objectives etc.]</p>	<p>Thank you for your comments, please see response to relevant comments below:</p>



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			<p>2. Stirling Council Internal Service Comments</p> <p>To inform the current response the Council's access, archaeological and biodiversity officers have been consulted on the LMP.</p> <p>Their responses are summarised below:-</p> <p>i) Guy Harewood - Sustainable Development Project Officer</p> <p>The Gars hellach site partly overlaps with Touch Hills potential LNCS, including the riparian area along the Touch Burn. It is also directly adjacent to (and may overlap with Cragnaise Hill potential LNCS to the east. Neither of the sites have been surveyed or assessed, some general information below:-</p> <p>NS732915 Touch Hills/Reservoirs Scrub, moorland, birds, mammals. Ancient junipers NS743932 Millburn Wood (Cragnaise Hill) Mixed woodland, birds, mammals.</p>	<p>Noted. Reference to these sites is included in the plan.</p>



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			<p>The Pendreich site is adjacent to the Cocksburn Reservoir potential LNCS which has been assessed and is awaiting designation.</p> <p>It would be worthwhile referencing the Council's adopted Climate and Nature Emergency Plan and draft Alive with Nature in our responses. It seems though the objectives of the LMP align with these Plans in that they are looking to maintain biodiversity whilst producing a timber crop.</p> <p>ii) Dr. Murray Cook - Archaeologist</p> <p>The document and policies are fine. However, with regards Garshellach this has an unscheduled archaeological monument which is tacitly acknowledged in the appendix (see below) but not explicitly noted on any of the maps, i.e. Baston Burn, Scout Head, Stirlingshire: Archaeological Evaluation, Data Structure Report - Murray Cook, Ross Greenshields and Michelle MacIver 2018.</p> <p>I think it should be marked on the maps with all the other constraints.</p>	<p>Noted – we are pleased the LMP aligns well with the Council's strategic plans and objectives.</p> <p>As Land Management Plans are produced at a strategic level, not all constraints will be covered in detail. However, these are recorded in our GIS system and will appear as a constraint in the work plan stage should any operations be planned within the vicinity. As stated in section 7.5.1 appropriate buffers will be applied and maintained around pertinent non-scheduled archaeological features where required and all operations in the vicinity of such features will be conducted in accordance with UK</p>



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			<p>iii) Angela Simpson, Access & Sustainable Travel Officer Garshellach This area does not have any designated core paths, however the main access track to Scout Head is highly used access route. See Pic 1 showing the predominately used routes: Pic 1 Officer recommends that a access is maintained on these popular routes during any felling, planting or timber haulage movements Pendreich Core path 9078Ba/28 and Public Right of Ways CS0201 & CS0202 cross this area. Under the Land Reform (Scotland) Act 2003 these paths are protected for access. Any temporary closures that may be required must be applied for through the local authority and agreed beforehand. The map below shows the alignments – Core path is marked in pink and Right of Way in dash blue.</p>	<p>Forestry Standard Guidelines on Forests and the Historic Environment.</p> <p>Visitor safety is paramount on all FLS sites and access will be managed in accordance with Managing Woodland Access and Forest Operations in Scotland guidance, including consultation with the Local Authority Access Officer as appropriate. FLS are happy to work with partners and neighbours to improve routes where this is sustainably viable.</p>



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			<p>In addition to the Core paths and Right of Way the area of Black Hill is a popular mountain biking and walking destination. There is a network of popular routes which cross the site. See Pic 2 which highlights the most heavily trafficked areas.</p> <p>Pic 2: Officer recommends that access is maintained on these popular routes during any felling, planting or timber haulage movements. Officer notes that improvements are being sought from the Drumbrae Riding Centre and is supportive and also notes that improvements will be undertaken in line with felling</p> <p>3. The Stirling and Clackmannanshire Forestry and Woodland Strategy (FWS)</p> <p>The FWS supports the principle of multiple benefits woodland expansion subject to proper account being taken of site characteristics and identified constraints. With reference to Map 6 - Potential for Woodland Expansion both Garschellach and Pendreich are identified as an existing woodland,</p>	<p>Noted. No woodland expansion is proposed within this LMP, the GCR site is covered in more detail in the comment and response above.</p>



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			<p>where the Council also expects LMP's and LTFP's to take account of 'sensitivities' within or on surrounding land, such as priority species and habitats, landscape, the cultural and historical environment, and interactions with the water environment and soils.</p> <p>Whilst the LMP considers the majority of these in sufficient detail the FWS includes a specific reference to Geological Conservation Review (GCR) sites and states the following:-</p> <p>'Where appropriate it may be necessary for woodland expansion proposals to take account of impacts on the geo-diversity value of GCR sites and also consider where woodland planting could improve understanding, access and interpretation.'</p> <p>A map extract showing the GCR covering part of the Garshellach block is attached, and the Council would be grateful if due consideration could be given to this matter.</p> <p>4. Concluding Comments</p>	



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			<p>The Council notes with interest the merging of the previous Forest Design Plans for these 2 forest blocks under one Land Management Plan, and their designation as 'Stirling Forests.', thus synchronising management through a single new 10 year plan. Subject to the above noted provisos the LMP objectives accord well with the FWS, as confirmed by the analysis and proposals in sections 7.4 Biodiversity & Environment; 7.5 Heritage and 7.6 Social Factors, whilst at the same time continuing the primary function of the forest to produce a significant volume of high quality softwood.</p> <p>The LMP also aligns with the Councils adopted Climate and Nature Emergency Plan and supporting Alive with Nature Plan, in particular:-</p> <p>Objective 4 Optimise Biodiversity and increase the Carbon Storage Potential of Nature and Objective</p> <p>Relevant Priorities</p>	<p>Noted – we are pleased the LMP aligns well with the Council's strategic plans and objectives</p>



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			<p>B01 • Protect, restore and enhance existing ecosystems, habitats and species.</p> <p>B02 • Maximise the carbon absorption potential of our natural environment.</p> <p>B03 • Ensure that everyone can access and enjoy nature.</p> <p>Following from the above could you advise if the carbon sequestration potential for the LMP has been assessed? The Council would also welcome Forestry and Land Scotland's views on raising the profile of Stirling Forests and its contribution to this objective and priorities.</p>	<p>Carbon sequestration potential is not routinely calculated for LMPs so unfortunately we can't provide accurate data in this regard. FLS Planning Manager in regular contact with Stirling Council regarding potential projects and would be happy to receive any proposals.</p>
Scottish Wildlife Trust	11/09/2021	07/10/2021	<p>... General comments regarding both sites.</p> <p>There are a lot of positives about your proposals. For both sites, we would like to see more Glades created within woodland, and the creation of Ponds in suitable locations. The value of woodland glades is the sheltered, sunny habitats they offer, which are</p>	<p>Thank you for your comments.</p> <p>A significant area of Pendrieich will be managed under low-impact silvicultural systems (LISS) going forward – the LISS intervention which has been identified for these sites is 'group selection' which will</p>



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			<p>beneficial to many plant species, but especially to a range of invertebrates including butterflies, bees and other pollinators. Regarding Ponds, you will probably know that Ponds are a Priority Habitat on the Scottish Biodiversity List, under the Category 'Conservation Action Needed'. So many ponds have been lost that conserving those which currently exist is not an adequate response. Newly created ponds in suitable locations can quickly add a wide range of species to these Forest / Woodland areas, including Amphibian Species, Damselflies, Dragonflies etc, plus giving wildlife somewhere to drink / bathe.</p> <p>We would also like to see more shrub and scrub habitats, which could either be on the periphery of native woodland areas or elsewhere. Bird species like Stonechat and Whinchat are specialists for scrubby areas but do not favour woodland itself. Neither of these species is on the Scottish Biodiversity List, but Whinchat is regarded as 'Near-threatened' in the UK. Whinchat are especially</p>	<p>create small temporary glades within a permanent broadleaved woodland. There are no plans to create new ponds in these areas going forward however all operations will adhere to relevant regulations and guidance with regards to protecting the water environment.</p> <p>Scrub habitats fall outwith the scope of this LMP and, as a condition of felling approval from Scottish Forestry, all areas need to be restocked with woodland of appropriate tree species, which typically may include a small element of native shrubs. Managing these forests as productive woodland with regular thinning and felling interventions results in structural diversity at various scales</p>



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			<p>vulnerable when scrub habitat is lost to afforestation and therefore are more at risk at present due to significant increases in local afforestation.</p> <p>Native woodland ground flora. We recommend it is also valuable to consider introducing woodland species like Wood Anemone and Native Bluebell into suitable Native Woodland sites currently without these species.</p> <p>Garshellach We know this area less well than we know Pendreich. We note the large proportion of the site which is on the Ancient Woodland Inventory of Scotland, either as Ancient Woodland of Semi-Natural Origin, or as Long-Established of Plantation Origin. We note you are aware of the Touch Hills potential LNCS, which overlaps with the Garshellach Site, including the riparian area along the Touch Burn. There is also Craignaise Potential Local Nature Conservation Site, which overlaps with the North East part of Garshellach Site. We only hold the Boundary Map of Touch Hills and</p>	<p>as outlined in section 7.1.3 and the various growth stages can support a variety of bird communities as the stand develops. No afforestation is proposed within this LMP.</p> <p>As these species are already present in the woodlands, there are no plans to further introduce native ground flora to these sites at this time. Restoration of the Plantations on Ancient Woodland Sites (PAWS) to broadleaf LISS woodlands should benefit native flora in these areas.</p> <p>Stirling Council were consulted at the same time as other statutory consultees and have provided feedback from their Biodiversity Officer (see comments above).</p>



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			<p>Craignaise LNCSs, no further information. We request that you liaise with the Stirling Council Biodiversity Officer about Craignaise LNCS Site, as well as the Touch Hills LNCS site. Another source of information you could contact is The Wildlife Information Centre (TWIC) which is contracted by Stirling and Clackmannanshire Councils to gather and hold biodiversity data on LNCSs. Contact details here (there may be a charge for the data): http://www.wildlifeinformation.co.uk/contact.php</p> <p>From NBN Atlas, within the site and in the near area around Garshellach, there are the following species of note:</p> <p>Mammals Beaver records on the R Forth nearby, and they are likely to expand their numbers / territories in future years. They tend to prefer smaller tributaries rather than large rivers. Protected Species. Otter in the area, including recently, though probably passing through</p>	<p>Through the LMP and work planning process, we aim to identify and highlight any species and habitats of conservation concern within or adjacent to this land management unit. We will aim to mitigate against the impacts of forestry operations by following best practice guidance and adhering to all relevant legislation and policy. We will further aim to identify, protect and enhance habitats and species of conservation value through-out the length of this LMP period. We will work with relevant statutory agencies, external</p>



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			<p>rather than breeding on Site. Protected Species Red Squirrel on site. (There are Grey Squirrel sightings, but most are from 1996 and further back - only a few recently) Protected Species</p> <p>Birds Goshawk consistently recorded in the near area over recent years. A Schedule 1 Bird. Breeding site not known. Care needed to check for breeding Goshawk before any work on the site and act to protect any Goshawk / their nest-site, as for all Schedule 1 birds Crossbill on-site most years. Can breed virtually all year round. Lesser Redpoll. On Scottish Biodiversity List under categories 'Conservation Action Needed' and 'Avoid Negative Impact'.</p> <p>Insects Small Pearl-bordered Fritillary recorded on-site. A butterfly of damp grassland. On Scottish Biodiversity List under category 'Watching Brief Only'. Grassland along Woodland Edge and Woodland Glades can offer suitable habitat for them.</p>	stakeholders and conservation bodies in order to ensure positive conservation outcomes for priority species and habitats within our landholdings.



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			<p>Amphibians There are a few records of these amphibians, which are always very under-recorded. Common Frog Common Toad Pond creation is always helpful to them.</p> <p>Pendreich We note that the entire site is designated as Ancient Woodland – Ancient Semi-Natural predominates to the south & LEPO to north. We welcome the overall plans for the Pendreich Woodlands which are generally consistent with what we would like to see. Our comments about glades, ponds, scrub, shrubs and ground flora at the very top of our overall response apply to the Pendreich site too. In addition, it would be good to include some Oak and some Scot Pine as part of the woodland, where soil conditions allow, as both of these species are of high biodiversity value. The adjacent Cocksburn Reservoir and the area around it is a Potential Local Nature Conservation Site, for its assemblage of native plants /</p>	<p>See comments above re. glades, ponds and scrub. Both oak and Scots pine are already present in Pendreich, and oak has been planted as part of the PAWS restoration. See above response and section 3.4.5 in relation to planting Scots pine and tree health.</p>



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			<p>shrubs, birds, invertebrates and other species. An Osprey has been visiting in recent years, though there is often too much disturbance by people and dogs for successful fishing, except very early on summer mornings.</p> <p>We make more detailed comments below on the Northern Half of Pendreich, an annotated map and bullet points below:</p> <ul style="list-style-type: none"> Your plan of the 'interactive zone' to the north of the unmade road to the Dam (East to West and in beige) shows an old track (pink line) that goes through some dense, spindly birch woodland. We could not find the track, and Mountain Ash have been planted in the area. It seems unlikely that anybody would take this route when there is the unmade road to follow. We suggest the area is left to nature. To the south of the unmade road to the Dam, the 'interactive zone' shows an old track which no longer seems much used (pink line). A new path has been formed along the deer fence surrounding the new plantation 	<p>This visitor zone appears to have been incorrectly mapped and has now been removed</p> <p>Noted – as above.</p>



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			<p>(zone 02 Black Hill) (pinkdashes). This presumably is walkers and cyclists making a circular route from White Hill car park. We suggest this new route is also made an interactive buffer zone. This would help balance the area of woodland and more open habitat.</p> <ul style="list-style-type: none"> Just to the south of the unmade road to the Dam there is an area shown as part of Black Hill, zone 02 in the plan, but which is outside the deer fence (within the dotted line). The area is quite distinct and the difference is obvious on the Google Earth image. There are scattered re-generated commercial conifers over it with several dense clusters. These should be removed and the native broadleaves allowed to develop. Between the footpath and the deer fence on the south-west of Cocksburn Reservoir some Sitka Spruce have been left that have seeded from the old plantation. We would welcome the removal of them before a woodland re-establishes. These grass verges contain over 200 Chickweed-Wintergreen plants. This plant is not rare, nor on the Scottish Biodiversity 	<p>As outlined on the maps “Stirling Forests LMP Key Features Opportunities and Constraints” and Stirling Forests LMP Concept”, we are aware that there are is regeneration of exotic conifers and Rhododendron in these areas. Rhododendron and other INNS will be managed and controlled in line with current FLS guidance throughout the length of this LMP. Ongoing control of non-native conifers and rhododendron will continue in areas of PAWS woodland in order to protect and preserve remnant features and allow native flora to establish within these areas.</p>



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			<p>List, but it is a most attractive plant, with a delicate white flower, and lovely to see while out walking. More information on this plant is here: https://www.plantlife.org.uk/uk/discover-wild-plants-nature/plant-fungi-species/chickweed-wintergreen</p> <ul style="list-style-type: none"> • More generally, there is invasion from the site of Birch and regenerated Sitka into areas of grassland and native plants in the Cocksburn LNCS which are important for Butterflies. It would be helpful if these could be removed. • Red Squirrel are present and these used often to feed on Larch. It would be helpful if some Hazel, Holly and Hawthorn was 	<p>The existing crop margins bordering the LNCS site are a mixture of broadleaved species. We would not look to amend the composition or species selection in these areas as they are suitably diverse and provide habitat components and ecological functions otherwise lacking in the landscape. In regards to Sitka regenerating on to the LNCS site, we are actively working to remove non-native conifer components from the PAWS woodlands and broadleaved crop, this should act to mitigate and prevent any further spread of Sitka in to the LNCS site.</p> <p>Many of these species are already present. In addition, the plan commits to retaining significant areas of coniferous species as areas</p>



Statutory Consultee	Date contacted	Date response received	Issue raised	Forest Region Response
			<p>planted among the Mixed Broadleaf as food sources.</p> <ul style="list-style-type: none">• The only Juniper left in the Western Ochils is at NS 8035 9859. It would be valuable for this species if some female Juniper could be added to this area of Pendreich. Juniper is on the Scottish Biodiversity List as a priority species, though under category 'Watching Brief Only'. However, it is on the Stirling LBAP list as 'needing active conservation measures'.• There was recent verge clearance along both sides of the unmade road to the reservoir, by brush-cutter and lopping, around early August 2021. We were concerned that a 4-5m strip along each side of the unmade road was brush-cut / lopped, including the loss of many wildflowers, loss of many fruiting Wild Raspberry plants and loss of Buddleia shrubs, which although an INNS is also really important for late-season pollinators. This seems to us an excessive width of clearance, and	<p>of minimum intervention or natural reserve which will benefit the red squirrel population. Where larch is being removed this is primarily for plant health reasons.</p> <p>Noted. There are no plans to introduce juniper to the site at this time.</p> <p>Our Civil Engineering team have confirmed we did not carry out this work, however we have noted your comments for future operations.</p>



Statutory Consultee	Date contacted	Date response received	Issue raised	Forest Region Response
			<p>unhelpful timing, significantly reducing wildflower availability for pollinators and preventing native wildflowers / plants / shrubs from setting seed. We do not know if this work was carried out by Scottish Water or yourselves or some other body. It would be valuable for biodiversity if the width of verge clearance could be reduced to cause less damage to biodiversity in the area, and if more attention was paid to the time of year for verge-clearing work, for the same reason.</p> <ul style="list-style-type: none"> The Rhododendron eradication work carried out in recent years has made some inroads, but there is re-growth that needs further attention. (You probably know this.) 	Noted.
British Horse Society	11/09/2021	01/12/2021	<p>We have no objection to the forest plans other than to ask that equestrians are included wherever access rights are considered. We note Drumbrae Ridding school is in the vicinity of Pendreich. The BHS would like to emphasise the importance of access to woodland and forestry which can offer some of the safest and most pleasant places for us to ride and drive our horses. We take our</p>	<p>Thank you for your comment, all Forestry and Land Scotland sites are accessible under the Scottish Outdoor Access Code. Forestry and Land Scotland will maintain access opportunities and are happy to work with partners and neighbours to improve routes where sustainably viable. Visitor safety is paramount on all FLS sites and access will be managed in accordance with Managing</p>



Statutory Consultee	Date contacted	Date response received	Issue raised	Forest Region Response
			<p>responsibilities to land managers, the environment and other users of the forest very seriously and are keen to do all we can to help walkers, cyclists and horse riders share the forest safely and enjoyably. BHS Scotland has produced the attached advice note to educate horse riders on responsible riding and carriage driving in woodland.</p> <p>The forest is popular with local horse riders and carriage drivers so please can you take the following points into consideration;</p> <ol style="list-style-type: none">1. In line with the National Access Forum's guidance, please ensure that paths and tracks are only closed during active timber operations, reopening over weekends and in the evenings when felling and/or extraction is not underway.2. Please ensure that horse riders (and where appropriate carriage drivers) are taken into account when identifying and signing temporary diversions during forest operations.3. Please ensure that access points to the forest remain open, and where any fencing is necessary,	Woodland Access and Forest Operations in Scotland guidance.



Statutory Consultee	Date contacted	Date response received	Issue raised	Forest Region Response
			<p>include gates or allow gaps with minimum 1.2m (ideally 1.5m) opening width to accommodate all legitimate users. We appreciate that in some locations it may be necessary to lock gates across the main forest road or track to restrict illegal vehicular access. Where this is necessary, please leave a minimum 1.2 m wide gap alongside, or install a horse stile to ensure access is maintained for legitimate users, including horse riders. A Kent gap may be an alternative solution. The Outdoor Access Design guide includes recommended specifications, but we would be happy to discuss further if this would help.</p> <p>https://www.pathsforall.org.uk/mediaLibrary/other/english/outdoor-access-design-guide.pdf</p> <p>4. BHS would be happy to pass on relevant information to local horse riders if you let us know when diversions are necessary during forest operations.</p> <p>We understand the importance of managing the forests well, therefore you have our full support – so thank you for ensuring that multi-use</p>	



Statutory Consultee	Date contacted	Date response received	Issue raised	Forest Region Response
			access to the forest is protected as part of your work. I attach some pertinent information for your forest managers and again apologise for being late.	



Appendix II: Supporting Information

II/1.0 The existing forest and land

II/1.1 History of the land holding

Garshellach was purchased in 1953 from Touch Estate with a wide range of conifers planted soon after which resulted in an attractive mix, well-fitted to the site, with Sitka and Norway spruce on wetter ground, Douglas fir, Western Hemlock and Japanese Larch on fertile drier ground and Scots pine on the poorer soils and crags. On the more fertile slopes, this mixture included a range of mature broadleaves, which kept pace with the conifers. Subsequent felling and restock have kept a varied mix of species with an increase in broadleaves.

Pendreich was purchased in 1958 from the Airthey Estate, part of which now contains the University of Stirling campus. It was part of a Designed Landscape of woodlands and fields, although the exact boundaries have changed over time, as improvements were carried out to the estate. Historically most of the site has been wooded at least since the 1780s and Scottish Natural Heritage (SNH) has included the area in its classification as Ancient Semi-Natural Woodland (ASNW), which interprets information on the Roy maps of 1750 and other evidence. A survey was carried out in 2008 to catalogue Veteran Trees, which give an indication of the age of the trees and the part played in development of the woodland. Unfortunately, many of the older trees were felled during and after the Second World War, but there are several significant and interesting remnants. Relatively recently work to restore the site back to native woodland has been carried out and remains ongoing.

II/2.0 Analysis of previous plan

As previously stated the proposed new plan area was covered by 2 previous plans; **Garshellach** (SF File Ref: 033/SL/G/09(3)) and **Pendreich** (SF File Ref: 033/SL/P/10(1)). The general objectives of both plans was to maintain productivity through sound silvicultural practice including Alternative to Clearfell methods and, restore PAWS and improve biodiversity value.

Further detail and progress on the aims of the previous plans are provided below.

II/2.1 Aims of previous plan and achievements



Table 12 – Analysis of previous LMP

Objective	Proposed management actions	Progress to date 1 - Little/No progress 2 – Some progress 3 – Progress as per LMP
Garshellach		
Maintain conifer and broadleaf productivity through sound silvicultural practice and species selection. See also landscape.	More fertile soils have faster growing crops and these have been thinned where accessible, but some have missed the correct period for thinning. They will eventually have to be clearfelled, with an expectation that the next rotation will be thinned on time, as the roads are now in place. Poorer soils, particularly on crags and steep slopes, have a more open canopy with Birch as a component. They are difficult to reach and are now showing that retention is likely to provide greater biodiversity benefits than felling. Standing and fallen deadwood will increase, which will benefit insects, fungi and birds, and the remaining mature trees will provide food and shelter for Red squirrels.	3
Restore PAWS sites		3
Protect and expand priority habitats		3
Manage forest to improve habitat for LBAP species, prioritising for Red Squirrel	Retention of mature Scots pine on crags and areas with difficult access maintains a source of food in the short term. Replanting with Scots pine, Larch and Norway spruce, selected to match the soil type, will provide continuity of habitat in the long term. Norway spruce will replace Sitka spruce as it provides better feeding for Red squirrels and has a growth rate more compatible with the other two species.	3
Ensure safe access to pipelines		3
Encourage use for orienteering		3



Objective	Proposed management actions	Progress to date 1 - Little/No progress 2 – Some progress 3 – Progress as per LMP
Integrate PAWS restoration with felling coupes and neighbouring estate	PAWS restoration will involve clearance of the conifers and non-native broadleaves in stages from the lower slopes, with retention of native broadleaves and Scots pine, where planted on soils more suited to it.	3
Pendreich		
Maintain tree productivity through sound silvicultural practice including Continuous Cover Forestry and species selection.		3
Restore PAWS area	Clearfell two conifer coupes	3
Protect and expand woodland priority habitats	Broadleaves are expected to establish by natural regeneration and no enrichment is likely at present.	3
Control rhododendron	The remaining areas of rhododendron will be mulched and any regrowth treated with chemicals or cut.	3
Seek partnerships to encourage increased access and opportunities		2
Continue to improve routes through the forest	The main path between the two roads is in very poor condition and will be upgraded within the next couple of years. We also aim to upgrade the route from the Riding Centre at Drumbrae. Clearance of rhododendron will make many areas much more accessible. Opportunities will be assessed when the sites are clear and the best routes developed for continued use. Existing rides through conifer crops are also likely to remain as paths and will be improved when the conifers are felled.	3
Develop PAWS restoration to produce diverse broadleaf woodland	if (broadleaf regeneration) ..does not appear to be successful, further measures will be taken to ensure broadleaves grow. These may include	3



Objective	Proposed management actions	Progress to date 1 - Little/No progress 2 – Some progress 3 – Progress as per LMP
	planting, or ground scarification to create a seedbed suitable for regeneration. The native woodland is likely to remain for a very long time, so development of other tree species can take place by long-term management, including timber production.	

II/2.2 How previous plan relates to today’s objectives

This new revision of the plan generally follows on from the objectives of the previous plans to manage a multi-purpose forest. (see [Appendix III](#)).

II/3.0 Background information

II/3.1 Physical site factors

3.1.1 Geology Soils and landform

Garshellach

The underlying geology is Old Red Sandstone below the northern slope, while the shelf and the crags to the south are of volcanic origin from the Carboniferous period, with basalt and spilite, which make much harder bedrock. They are rich in nitrogen and have adequate phosphate for tree growth, while potassium availability is poorer.

The lower slopes and the shelf above it are overlain with glacial till of variable depth. This has formed soils with poorer drainage, which has led to some of the windblow problems. The material is generally fertile, so there are no limitations on species choice. Some of the steeper slopes have less of the till and trees are more stable.

On the upper slopes, depth of soil varies mainly with the gradient and the overall fertility is lower. There is little restriction on drainage, but in many places the bedrock comes to the surface, forming the characteristic crags. These are not just along hilltops, but also beside many of the watercourses, where deep gullies have been carved, forming some dramatic features, often hidden by the woodland cover.

Pendreich

Most of the forest lies on rocks formed from Andesitic and basaltic lavas and tuffs. These are of volcanic origin and more resistant to erosion. From Cocksburn Reservoir Northwards the



rocks are of Old Red Sandstone. Both types are reasonably fertile, with good Nitrogen availability, but tend to be poorer in Phosphate and Potassium.

From Black Hill to the north the rocks are overlain by glacial till, which is made up of material which could have been moved long distances. It is generally fertile, but often poorly drained. On the steeper faces, some of the underlying rock shows through as crags and rock outcrops.

Depth of soil varies mainly with the gradient, with the flatter areas having the deepest soils. There is sufficient nutrient to grow tree crops, but soils tend to be mildly acidic. Some of those on the lower slopes of Black and White Hill are richer and deeper.

The landform is generally rounded and smoothly sloping, but with a few crags on the south facing slopes. The land sits high above the surrounding area.

3.1.2 Hydrology

Garshellach

All water from the forest drains to Baston and Touch Burns running directly into the River Forth nearby. There are no known public water supplies.

Pendreich

All water from the forest drains to Cock's and Forglen Burns running directly into the Allan Water for a short distance before meeting the River Forth in its tidal reaches near Stirling. There is a private water supply on the west side of Black Hill.

The Forth runs through two of Scottish Environment Protection Agency (SEPA)'s Target Flood Areas: Bridge of Allan and Stirling; however according to SEPA's Flood Risk Map these burns are not identified as of high risk of flooding and no significant surface flooding risks are identified.

Natural Flood Management Opportunity (NFM) – The various watercourses mentioned previously which Garshellach and Pendreich may directly impact, feed into the Forth. Scottish Environment Protection Agency (SEPA) have identified Stirling and Bridge of Allan as the main downstream Objective Target Area (or Drainage point) which could be impacted by activities within the Stirling Drainage Area.

Forestry Activity – Given that both sites are within the Stirling drainage area within which woodland cover forms ~28% of the land use with FLS managing ~14% of the land use the potential impact of forestry felling activity and short term reduction in canopy cover (potentially leading to less evaporation of the water) won't have a significant impact on the peak flow.



3.1.3 Climate

The climate across the sites is 'Warm' and 'Wet/Moist' (see Map 3 – Climate).

Detailed Aspect Method Scoring (DAMS) is a measure of windiness of a site using the angle to the horizon in the eight compass points, weighted towards the prevailing wind direction. Scores range from 0-24: The higher the score the greater the exposure, with scores below 13 regarded as sheltered and above 22 as too high for commercial forestry. DAMS on the sites range from sheltered to moderately exposed

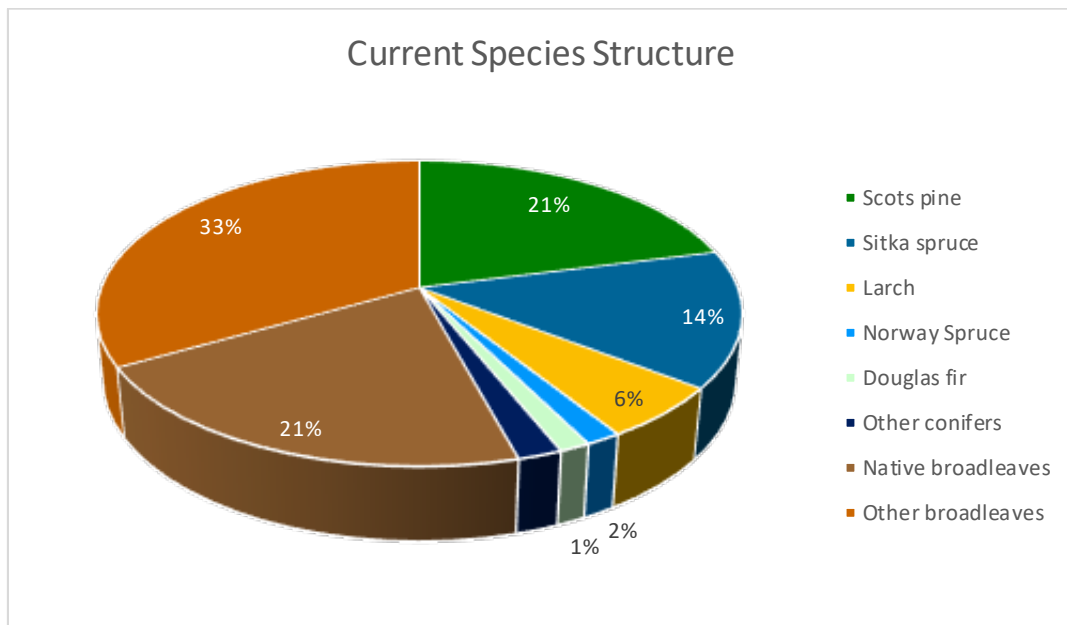
The predominant climate and exposure across the forest allow for good conifer tree growth with few limitations on silvicultural options although some areas of shallow soils and localised wind funnelling present issues. Within Garshallech in particular, the variation of slope and aspect provides different micro-climates, from deep shelter to highly exposed. This gives a wide range of planting choices, unusual in many of the other forests of Central Scotland.

II/3.2 The existing forest

3.2.1 Age structure, species and yield class

The pie chart below illustrates that the existing species makeup of the forest is predominantly broadleaved with Scots pine forming the largest conifer component. There is likely a higher native broadleaf proportion than this chart shows as much of the other broadleaves will be native species but are captured in our database simply as Mixed broadleaves.

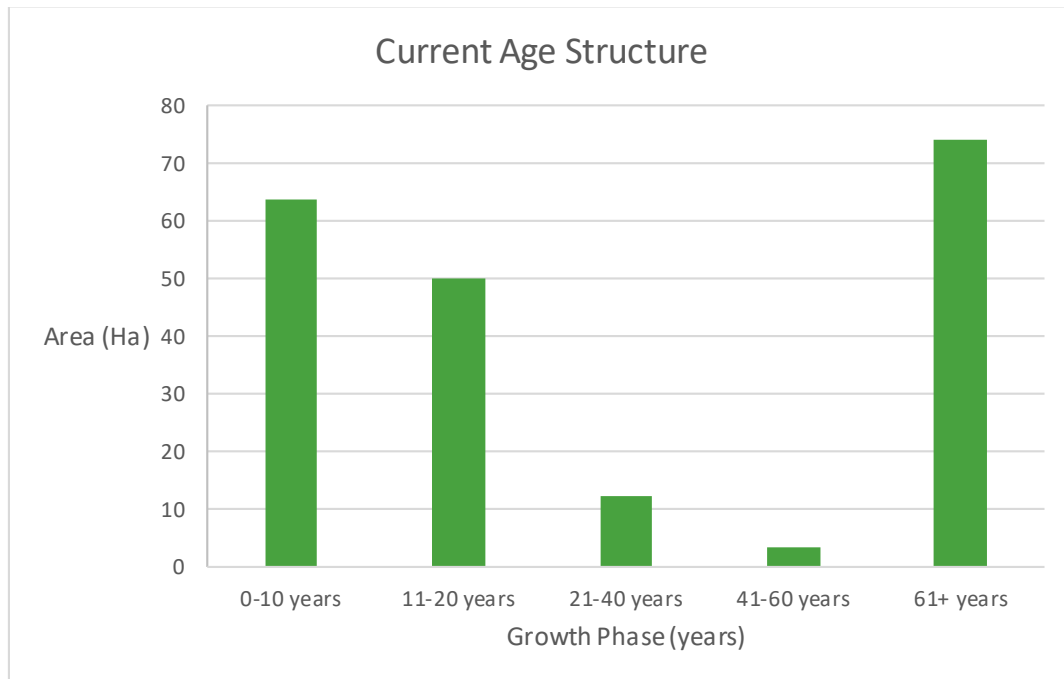
Figure 4 – Current Species Structure Chart





The clustered column chart below illustrates the existing age makeup of the forest showing that there is a relatively good spread of older and younger crops however a scarcity of pole – mature stage trees.

Figure 5 – Current Age Structure Chart



Yield classes for conifer reach 18 however the majority of the crop being broadleaves Yield class are generally around 4.

3.2.2 Operational Access

The forests have a road network totalling approx. 5 km, allowing economic operational access (i.e. 500 m or less) for proposed felling and thinning operations.

3.2.3 Low Impact Silviculture Systems (LISS) potential

Much of the remaining mature Scots pine crop at Garshellach has previously been thinned however historic thinning records are scant and thinning interventions sporadic resulting in much of the remaining crop exhibiting underdeveloped crowns and reduced dbh. Some of these pine areas are suitable as biological retentions however other areas it will meet our objectives to fell and restock. Areas of pole stage Spruce at Pendreich has missed crucial windows to begin thinning and therefore will also be clearfelled in future. The relatively sheltered nature of the sites and predominantly mineral soils suggest all the sites are suitable for management by ATC methods in practice including areas of recent broadleaf planting.

3.2.4 Thinning potential

Given the favourable soils, climate and relative shelter of the forests there is good potential for future thinning of both previously thinned older crops and establishing and thicket stage crops.



3.2.5 Current and potential markets

Future conifer clearfells and thinnings will provide saw logs, pallet wood, small round wood and chip as well as wood fuel and firewood. Hardwood thinnings will provide firewood and wood fuel as well as developing some crops for more niche products such as furniture.

II/3.3 Land Use

3.3.1 Neighbouring landuse

Garshellach

The woodlands of Touch Estate form an integral part of the forested landscape of Garshellach covering the entire eastern boundary and extend south beyond Garshellach. There is a range of woodland types, from open woodland with mature trees singly and in small groups, to fully stocked woods of mainly native broadleaves and conifer plantations. The flood plain to the north of Garshellach is fertile agricultural land, with hedgerows and mature trees in small shelterbelts or singly. The A811 trunk road between Stirling and Loch Lomond passes close by, with traffic moving generally at high speed. There are some larger broadleaf woodlands on the sloping ground to the west, but above this on the hilltops is rough grazing with large areas of bracken and rocky heathland.

Pendreich

Pendreich is almost entirely surrounded by grazing land however there are a number of important woodland links to larger areas of woodland around and into Bridge of Allan and the University of Stirling, less than 1 km away. These woodlands are mostly mature with broadleaves as the main component and are of very high value for biodiversity and amenity. The Ochil Hills to the E rise steeply with poorer quality grassland, but the rest of the surrounding fields have been improved by drainage and fertilising.

II/3.4 Biodiversity and environmental designations

3.4.1 Designations

No statutory designations fall within the sites however, three non-statutory designations sit partly within the two sites. Touch Hills and Craignaise Hill Local Nature Conservation Sites (LNCS) are partially within Garshellach block while Cocksburn Reservoir LNCS sits within Pendreich. In addition, two Geological Conservation Review (GCR) sites lie within Garshellach, partially overlapping with the Touch Hills LNCS site.

3.4.2 Habitats and species

Priority habitats contained in Garshellach woodland are small neutral grassland and upland heathland. Native woodlands at the site include the rare upland mixed ashwood and more common lowland mixed deciduous woodland. The native woodlands have been extended through the recent felling and restocking at both Pendreich and Garshellach.



Pendreich in particular has many veteran trees and large broadleaves were left in the recent Garshellach fellings to allow development to a larger size class.

Priority species common to both blocks are red squirrel and pine marten. Additionally at Pendreich, black grouse have been noted. Although the site does not contain large open areas it is adjacent to open habitat and the recent conversions to native woodland will provide future shelter and new food sources.

The strategy in these woodlands for red squirrels is to maintain conifer as a major element to ensure they have the competitive advantage to grey squirrels. Although the conversion to native broadleaved woodland has taken priority over this.

Pine marten are also present in the woodlands and the veteran trees will benefit them as suitable denning sites.

Bluebells are a priority species present at Garshellach and their habitat is preserved in the recent conversion of the conifer woodland to broadleaved woodland.

3.4.3 Riparian habitat

The recent felling at Garshellach retained some native and broadleaved trees to ensure the long term protection and management of the ditch feature on the northern edge of the block. The resilience to flooding and improvement of the riparian habitat will have increased through the recent conversion from conifer to native and broadleaved woodland.

3.4.4 Invasive species

Rhododendron is the main invasive species present at both sites, mostly at Pendreich and a small amount at Garshellach. There has been extensive initial control and follow up spray at Pendreich over the last 10 years.

3.4.5 Pests and diseases

3.4.5.1 Dothistroma Needle Blight (DNB)

DNB (also known as Red Band Needle Blight because of the colourful symptoms it shows on pine) causes premature needle defoliation, resulting in loss of yield and, in severe cases, tree mortality. DNB has been found in both blocks and therefore the previous Garshellach plan's proposal to restock using Scots pine has more recently shifted toward using other site suited conifer species.

3.4.5.2 *Phytophthora ramorum* (*P. ramorum*)

P. ramorum is a fungus-like pathogen of plants that is causing extensive damage and mortality to trees and other plants in parts of the United Kingdom. Larch in particular is extremely vulnerable, and high infection and mortality levels are currently causing significant issues in



South Region. Several isolated instances of *P. ramorum* have been detected within Central Region forest blocks. The Stirling Forests fall within Zone E (formerly Zone 3), the SF Less Vulnerable Area, where current research suggests is less climatically suited for *P. ramorum* infection. Although larch only makes up 6% of the woodland cover it is relatively extensive at Garshellach and is planted in mixture with other conifer and therefore any infection resulting in a Statutory Plant Health Notice to remove all larch within the affected stand as well as a 250m buffer surrounding the affected stand could result in significant areas of woodland being felled.

II/3.5 Landscape

3.5.1 Landscape character

The sites sit predominantly within the - Lowland Hills – Central Landscape Character Type and Lowland Hill Fringes – Central Landscape Character Type both described in NatureScot’s Landscape Character Assessment of 2019.

Key Characteristics of both character types relevant to the sites are:



Table 13 – Landscape Character Analysis

Landscape Type	149 LOWLAND HILLS - CENTRAL	150 LOWLAND HILL FRINGES - CENTRAL
Key characteristics and features	<ul style="list-style-type: none"> • Prominent, open, large scale character, of predominantly smooth, gently rounded upper slopes and hill summits. • Occasional, widely scattered blocks of coniferous forest. • Recreational use is mainly restricted to the fringes of the hills and higher tops, which provide greater visual interest. • Important close visual interrelationships between the hills and escarpments, and neighbouring lowland and carseland areas. • Open character, absence of current settlement and limited penetration by roads or hill tracks create a refuge of remoteness in close proximity to densely settled areas. • Hills often act as a buffer between more intensively used and populated areas. They create a strong contrast to these areas, and provide a sometimes dramatic backdrop. 	<ul style="list-style-type: none"> • Undulating, rolling topography rising to larger scale hill landforms. • Gradation of topography creates transitional landscape linking the open hills of more pronounced relief and the neighbouring settled valley landscapes. • Diverse landcover of arable and open improved and unimproved pasture land, interlocks with woodland and forestry, with some estate landscapes with frequent beech hedgerows and shelterbelts. • High proportion of woodland cover including large coniferous blocks, mixed shelterbelts and broadleaf tree clumps. • Strong interrelationship between stepped escarpment and lower foot slopes in Gargunnoch/Fintry and East Touch Fringe. • Estate and designed landscapes give distinctive character to East Touch Fringe area. • Hill fringes offer important panoramic views to neighbouring hills, valleys and straths, as well as large settlements such as Glasgow and Falkirk.
Summary of relevant key characteristics	Pendreich and Garshellach sit within a relatively large scale landscape. Woodlands feature throughout this landscape character type ranging in size, scale and type from shelterbelts, small woodland to extensive areas of forestry.	Garshellach's northern portion interacts with the lower foot slopes leading to the floodplain beyond
How the key characteristics will be maintained/enhanced	Respect the historic land use pattern. It is appropriate for woodland boundaries, shape and scale to reflect the pattern of existing fields and woodlands across the local area.	Respect the historic land use pattern. It is appropriate for woodland boundaries, shape and scale to reflect the pattern of existing fields and woodlands across the local area.



3.5.2 Landscape designations

Each site sits with a different Local Landscape Area (LLA) Garshellach in Southern Hills LLA and Pendreich in Western Ochils LLA.

3.5.3 Visibility

Generally these sites are viewed at a large scale being part of the hills which rise from the flood plains of the River Forth around Stirling. Despite being part of wider landscape views, in relation to the scale of those view these woodland contribute only a small proportion.

Garshellach

The north face of the forest is very prominent above the flat flood plain and has a wide range of colours and texture, changing through the year, as many of the trees are deciduous. Previous felling is well integrated, with no harsh boundaries and well-established ground vegetation. A single row of mature Poplar along the bottom edge of the forest makes a significant feature, as the trees are taller than the plantation behind.

Pendreich

The slopes rise steeply from Bridge of Allan, with the forest placed prominently on the hilltop, as part of a wider wooded landscape. Most of the ground is gently sloping, but there are a few crags and short steep slopes.

II/3.6 Social factors

3.6.1 Recreation

Garshellach

There is a regular low-key use of the forest, mainly for walking. Most people will use the tracks and paths as a link to the wider landscape, accessing the Touch Hills and beyond and there are no waymarked routes. Forest roads provide access to the surrounding hills.

The small area used for parking at the forest entrance is not FLS property, but rubbish dumped there and by the gates is cleared regularly to keep an attractive appearance.

There are few links directly with local settlements due to the limited access facilities, but the forest is good for Orienteering and several events have been held.

Pendreich

The main car park at the south east corner provides good access to the forest for walkers, cyclists and horse-riders. The smaller parking area at the north west corner is close to the reservoir. There are also paths around the forest, linking to the Sheriffmuir Road to the east and the Sunnyslaw Road to the west and the Riding School at Drumbrae, which caters for people with disabilities, uses the gate close by to reach the forest rides.



A core path from Bridge of Allan to just below the riding school includes a car park on the Drumbrae road.

3.6.2 Community

Garshellach's nearest community would be Gargunnock with interest fairly modest, Pendreich has wider appeal with no particular community involvement but visitors coming from further afield mainly for dog walking or to access Dumayat.

3.6.3 Heritage

There are no scheduled monuments or designed landscapes at the sites. However, recent heritage surveys at Garshellach carried out by FLS and the local authority have discovered new heritage features that will be conserved. A broch like structure with possible outworks and evidence of a later medieval structure was excavated in 2017. Previous woodland management features such as banks and sunken ways have also been identified.

The main heritage features at Pendreich are the veteran trees which have been surveyed and mapped to ensure they are appropriately conserved.

II/3.7 Statutory requirements and key external policies

In addition to those already referenced within the main text the following key policy or guidance documents which have influenced this plan are listed here:

- Central Scotland Green Network Vision
- Stirling and Clackmannanshire Forestry and Woodland Strategy 2014
- Stirling Local Development Plan (LDP) 2018
- NatureScot Landscape Character Assessments Type 149 Lowland Hills – Central and Type 150 Lowland Hill Fringes - Central
- Baston Burn, Scout Head, Stirlingshire: Archaeological Evaluation, Data Structure Report - Murray Cook, Ross Greenshields and Michelle MacIver 2018
- SEPA Flood Risk Management Maps
- SEPA Water Environment Hub
- Scottish Forestry Bulletin 62 – Silviculture of Broadleaved Woodland
- Scottish Forestry Practice Guide 14 – Restoration of Native Woodland on Ancient Woodland Sites
- Scottish Forestry Practice Guide 21 – Choosing stand management methods for restoring planted ancient woodland sites
- Scottish Forestry Guidance Note 31: Forest operations and wildlife protection
- Scottish Forestry Guidance Note 32: Forest operations and birds in Scottish forests
- Scottish Forestry Guidance Note 34: Forest operations and European protected species in Scottish forests
- Scottish Forestry Information Note 40 - Transforming Even-aged Conifer Stands to Continuous Cover Management
- Natural Reserves - Guidance for their selection and management on the NFE in Scotland
- Minimum Intervention Areas - Guidance for their selection and management on the NFE in Scotland
- Long-Term Retentions - Guidance for their selection and management on the NFE in Scotland



Appendix III: Land Management Plan Brief

Contents

1. Key Background Information
2. Strategic Drivers
3. Draft Management Objectives



Key Background Information

Introduction

- The Stirling Forests are made up of Garshellach (~174 Ha) and Pendreich (~76 Ha) totalling an area of approximately 250 Ha. As the name suggests the sites lie around the city of Stirling, which of course is located within the Stirling Local Authority Area.
- The Forests lie on the lowland hills and lowland hill fringes of the Touch and Ochil Hills, with Stirling the largest settlement. The forests complement the wider diverse land cover of arable and open improved and unimproved pasture land, interlocking with woodland and forestry.
- This management plan will revise the previous Forest Design Plans for these 2 forest blocks under one Land Management Plan. This new plan will synchronise the management approval for these forests into a single new 10 year plan, associated not only by their geographic proximity to each other but also due to their similar attributes such as their lowland hill and fringe character and relatively fertile soils.

Silvicultural Potential

- Garshellach is situated on the Touch Hills overlooking Stirling to the east and Pendreich on the far western slopes of the Ochil Hills overlooking Stirling to the south west. Elevations for Garshellach range from around 20m above sea level to the north rising to 215m around Scout Head. At Pendreich elevations range from 110m south of White Hill to 225m around Black Hill. The sites sit elevated from the flat estuarine Forth Valley on Devensian till overlying volcanoclastic sedimentary rock formations resulting in basic brown earth soils.
- The climate is generally warm/moist and ranges from sheltered to moderately exposed and therefore are all conducive to good conifer and broadleaved tree growth with few limitations on silvicultural options. Climate change predictions suggest that the climate will become generally warmer, with drier summers and wetter winters.

Current Management Approach

- Approximately 81% of the sites are under woodland cover, with the majority of the remaining 19% given over to open ground concentrated primarily on the shallower soiled rock outcrops in Garshellach. Broadleaves currently account for approx. 53% of the woodland area. Scots pine accounts for 21% of the woodland, Sitka spruce 14%.
- The current split in terms of age classes structure is approximately 31% establishing crop (0-10 years), 25% thicket (11-20 years), 6% pole stage (21-40 years), 8% mature (41-60 years) and 30% old forest (61+ years). Age diversification is therefore reasonably good, although there is a noticeable absence of pole and mature stage crops currently.
- PAWS restoration is advanced at both Garshellach and Pendreich with most of the conifer around Black Hill



at Pendreich felled and restocked with native broadleaves and the conifer north of the pipeline at Garshellach similarly broadleaved. Much of the pine and larch around Craigbrock Hill at Garshellach has been replaced with Sitka spruce due to the threat of DNB & Phytophthora ramorum. The relatively sheltered nature of the sites and mineral soils is conducive for ATC management although some areas are still due for clearfell and others either suitable or inaccessible have been retained and assigned as Minimal intervention/Natural Reserve.

- The forests have a road network totalling a approx. 5 km, allowing economic operational access (i.e. 500m or less) to all of the sites.

Main Considerations

- A claimed Right of Way and a Core Path runs through the north of Pendreich as well as a formal parking area at the entrance 2 forest roads accesses and several grass and gravel footpaths. Garshellach is only served with a forest road. Pendreich is relatively well used by various users such as walkers, cyclists using both the forest roads and informal paths, Garshellach less well so.
- INEOS have an oil and gas pipeline running through Garshellach
- Notable species present include red squirrel, pine marten, black grouse and badger, priority habitat include upland heathland, upland mixed ashwood, lowland mixed deciduous woodland, upland birch woodland and acid grassland. There are no Statutory designated areas within the sites. Veteran trees are found within the sites and there are areas of Ancient Semi-Natural Woodland on the northern slopes of Garshellach with a surrounding area of Long Established Plantation Origin LEPO as well as the majority of Pendreich being ASNW again with an area of LEPO. PAWS restoration has been a feature of both sites in recent years with rhododendron control also carried out at Pendreich. Touch Hills and Craignaise hill LNCS lie partially with Garshellach with Cocksburn reservoir LNCS similarly partially within Pendreich.
- There are no scheduled monuments within the plan area although there are various undesignated features across the sites are recorded in the heritage layers such as ditches, dykes, lades etc. Touch Garden & Designed Landscape very slightly overlaps into less than 4 Ha of Garshellach's south eastern edge.
- Situated predominantly within the Central lowland hills fringes and its diverse land cover which includes a high proportion of woodland cover including large coniferous blocks, mixed shelterbelts and broadleaf tree clumps the forests provide an important context to the wider environment and are part of the Central region LCA areas of the western end of the Ochils and the East Touch Fringe.
- Baston and Touch Burns drain from Garshellach and Cock's and Forglen Burns drain out of Pendreich; all flowing into the River Forth. The Forth runs through two of SEPA's Target Flood Areas, Bridge of Allan and Stirling however according to SEPA's Flood Risk Map these burns are not identified as of high risk of flooding and no significant surface flooding risks are identified.
- Roe deer are the primary herbivore species present. Deer and other damaging herbivore numbers are



monitored and controlled by one FLS Wildlife Ranger and one contractor.



2. Strategic Drivers

To succeed in realising the vision as set out in the Scottish Forestry Strategy 2019-2029, Six priorities for action have been identified for implementation:

- 1. Ensuring forests and woodlands are sustainably managed**
- 2. Expanding the area of forests and woodlands, recognising wider land-use objectives**
- 3. Improving efficiency and productivity, and developing markets**
- 4. Increasing the adaptability and resilience of forests and woodlands**
- 5. Enhancing the environmental benefits provided by forests and woodlands**
- 6. Engaging more people, communities and businesses in the creation, management and use of forests and woodlands**

In order to demonstrate how we will have regard to the Forestry Strategy in our work, we have identified the relevant Forestry Strategy 'Priorities for Action' in our Corporate Outcomes section of the FLS Corporate Plan 2019-2022. Our Corporate Outcomes and the associated Operational Actions to deliver them have informed the objectives for this LMP illustrated in Table 14 below.



3. Draft Management Objectives

Table 14 – Relevant Corporate Outcomes and Operational Actions informing the LMP Objectives

Corporate Outcomes Relevant to LMP	Operational Actions To Deliver Outcome Relevant to LMP	Draft LMP Objectives
<p>Outcome 1: Supporting a Sustainable Rural Economy</p> <p>FLS supports a sustainable rural economy by managing the national forests and land in a way that encourages sustainable business growth, development opportunities, jobs and investments.</p>	<ul style="list-style-type: none"> • Managing the national forests and land in accordance with the UK Woodland Assurance Scheme (UKWAS) to ensure that timber and other products produced by FLS are guaranteed to be from a sustainably managed resource • Developing our forest planning processes to ensure long-term sustainable productivity of the national forests and land • Providing a sustainable supply of timber to Scotland's timber processing sector • Implementing the Restocking Strategy for the national forests and land and develop a new plant and seed supply strategy • Supporting Scottish tourism and the visitor economy through the provision of visitor attractions • Support the venison processing sector through our deer management 	<ul style="list-style-type: none"> • Design and manage the woodland using sound silvicultural practice (including both clearfell and a range of alternative to clearfell systems) and site specific species selection to ensure long-term viability, practicality, productivity and sustainability of the forests. • Manage for production of high quality soft and hardwood timber (targeting the best ground), conducive to the good soils and relative shelter the sites provide. • Protect establishing planted/naturally regenerating crops from herbivore browsing through active mammal management.



Corporate Outcomes Relevant to LMP	Operational Actions To Deliver Outcome Relevant to LMP	Draft LMP Objectives
<p>Outcome 2: Looking after Scotland's national forests and land</p> <p>Scotland's national forests and land are looked after; biodiversity is protected and enhanced; and more environmental services are provided to people.</p>	<ul style="list-style-type: none"> • Managing the national forests and land to further the conservation and enhancement of biodiversity • Taking specific conservation action for vulnerable priority species (e.g. red squirrel) • Continuing to implement the Larch Strategy in order to reduce the rate of expansion of Phytophthora ramorum 	<ul style="list-style-type: none"> • Maintain biodiversity value through appropriate design e.g. conifer retention for Red squirrel and Pine marten habitat to discourage Grey squirrel. • Maintain and encourage good development of native broadleaves on areas of former Plantations on Ancient Woodland Sites (PAWS) • Protect heritage features • Protect and enhance views from within and of the site sympathetic of the landscape contributing to Stirling's historic setting • Protect water quality and plan to mitigate/manage flood prevention
<p>Outcome 3: National forests and land for visitors and communities</p> <p>Everyone can visit and enjoy Scotland's national forests and land to connect with nature, have fun, benefit their health and wellbeing and have the opportunity to engage in our community decision making.</p>	<ul style="list-style-type: none"> • Maintaining walking and biking trails to promote fun in the outdoors, focussing on improving entry level experiences for everyone to enjoy and gain health benefits • Continuing to remove barriers to ensure that people from all backgrounds can and do access the full range of benefits of the national forests and land. 	<ul style="list-style-type: none"> • Maintain attractive woodlands and trails and other recreational opportunities to promote fun in the outdoors for all. • Promote responsible access and use of the forests.



Appendix IV: Objective Appraisal, Monitoring & Evaluation

Table 15 - Objective Appraisal, Monitoring & Evaluation

Objective	Assessable Criteria	Appraisal Method	Monitoring Method	Monitor Where	Monitor When	Monitor Who	Record Monitoring Where	Evaluation. <i>How does the Appraisal and Monitoring method inform current & future proposals? If you cannot answer this question then the methods may not be appropriate.</i>
Manage for production of high quality soft and hardwood timber (targeting the best ground), conducive to the good soils and relative shelter the sites provide.	Timber volumes	Forester Web Query against LMP	Production Forecast SPR	SRP	After operations and at appropriate intervals e.g. mid-term and 10 year reviews	Programme Manager / Harvesting Forester	Against the LMP	Monitoring the volumes and quality of timber produced and levels of income received will allow the Programme Manager & Harvesting Manager to gauge what returns might be expected from future interventions and which customers would most likely be interested. This monitoring also allows the Planning Forester to gauge the quality of conditions and whether future crops might fetch improved revenues if managed differently.
Design and manage the woodland using sound silvicultural practice (including both clearfell and a range of alternative to clearfell systems) and site specific species selection to ensure long-term viability, practicality, productivity and sustainability of the forests.	Tree species & Timber production	Changes in species types, ages, proportions & distributions Production Forecast	Site survey SCDB Query Record post thin figures	Onsite SCDB Sales Recording Package	After operations and at appropriate intervals e.g. mid-term and 10 year reviews	Planning Forester / FM Forester	Against the LMP	Monitoring the diversity of species and structure of the canopy and timber volumes will allow Planning Forester - comparisons to be made overtime which will inform the planning forester as to whether the plan is working and whether adjustments are required allowing the region to adjust expectations and business plan for alternative management methods. FM Forester - gauge what returns might be expected from future interventions and which customers would most likely be interested and to gauge the quality of conditions and whether future crops might fetch improved revenues if managed correctly.
Protect establishing planted/naturally regenerating crops from herbivore browsing through active mammal management.	Regeneration establishment Deer Population	Leader Browsing	Site survey SCDB Query Deer Pop Survey Thermal Imaging Survey	Onsite SCDB Impact monitoring form	After operations and at appropriate intervals e.g. mid-term and 10 year reviews	FM Forester Wildlife Manager	Regional Overview Map Thermal Imaging Po Spread-sheet NNR Survey by SCL Impact monitoring form	Monitoring leader browsing by deer allows the FM Forester and Wildlife Manager to establish whether future establishment of natural regeneration is likely to be successful or whether further methods of protection are required and therefore factored in to business planning.



Objective	Assessable Criteria	Appraisal Method	Monitoring Method	Monitor Where	Monitor When	Monitor Who	Record Monitoring Where	Evaluation. <i>How does the Appraisal and Monitoring method inform current & future proposals? If you cannot answer this question then the methods may not be appropriate.</i>
Maintain biodiversity value through appropriate design e.g. conifer retention for Red squirrel and Pine marten habitat to discourage grey squirrel.	Tree species & Landuse	Changes in species types, ages, proportions & distributions	Site survey SCDB Query	Onsite SCDB	After operations and at appropriate intervals e.g. mid-term and 10 year reviews	Planning Forester Environment Advisor	Against the LMP	Monitoring the diversity of species and structure of the canopy will allow for comparisons to be made overtime which will inform the planning forester as to whether the plan is working and whether adjustments are required allowing the region to adjust expectations and business plan for alternative management methods.
Maintain and encourage good development of native broadleaves on areas of former Plantations on Ancient Woodland Sites (PAWS)	Timber production	Production Forecast	Record post thin figures	Onsite Sales Recording Package	After operations and at appropriate intervals e.g. mid-term and 10 year reviews	FM Forester	Against the LMP	Monitoring the volumes and quality of timber produced and levels of income received will allow the FM Forester to gauge what returns might be expected from future interventions and which customers would most likely be interested. This monitoring also allows the FM Forester and Planning Forester to gauge the quality of conditions and whether future crops might fetch improved revenues if managed correctly.
Protect historical features,	Historic features	Changes in condition	Site survey	Onsite Aerial photos	At mid-term and 10 year review	Environment Forester	Forester Heritage Module	Monitoring the condition of heritage features allows the Environment Manager and Visitor Services Manager to evaluate whether implementation of the plan has adversely affected any features e.g. has increased visitor numbers increased pressure on features or have operations damaged features? Any issues can be captured and mitigated against in future.
Protect and enhance views from within and of the site empathetic of the landscape contributing to Stirling's historic setting	Landscape	Survey users	Visitor survey	Onsite Online In community	At mid-term and 10 year review	Recreation Manager	Evaluation Feedback Forms folders in VS folder within Management unit folders	By seeking visitor feedback on the woods the recreation manager can evaluate what affect visitor zone management and operation thinnings have had on visitor appreciation of the sites and also learn where further improvements can be made and if necessary factored in to future business plans.



Objective	Assessable Criteria	Appraisal Method	Monitoring Method	Monitor Where	Monitor When	Monitor Who	Record Monitoring Where	Evaluation. <i>How does the Appraisal and Monitoring method inform current & future proposals? If you cannot answer this question then the methods may not be appropriate.</i>
Protect water quality and plan to mitigate/manage flood prevention	Run off effects	Visual reference	Site evaluation	Onsite	After operations and at appropriate intervals e.g. mid-term and 10 year reviews	Harvesting Forester / Stewardship Manager	Against the LMP	By effects of run off particularly after operations Stewardship Manager can evaluate what affect these have both within and out with our ownership and also learn where further improvements can be made and if necessary factored in to future business plans. By monitoring this and liaising with the local flood management officer FLS can evaluate if action is required and if necessary plan budgets for subsequent operations.
Maintain attractive woodlands and trails and other recreational opportunities to promote fun in the outdoors for all	Landscape Local community opinion	Visual reference Contact lists numbers. Event & Project activity	Site evaluation Contact list check, number of events / projects progressing	Onsite Within the local community	At mid-term and 10 year review On-going engagement with local stakeholders	Landscape Architect Visitor Services Manager	Against the LMP & Site contact list	By evaluating changes in roadside corridors the landscape architect can evaluate what affect over time the development of the crop has on the motorist experience and also learn where further improvements can be made and if necessary factored in to future business plans. By monitoring when and who we have contacted as well as what events and projects are being progressed the VS Manager can evaluate how active we have been in engaging with local community as well as being better able to plan budgets for upcoming events/projects.
Promote responsible access and use of the forests	Visitors & Public Opinion	Visitor numbers Survey users	Gate counters Visitor survey(s)	Onsite Online In community	On-going engagement with communities and at appropriate intervals for gate counts and mid-term and 10 year review	Visitor Services Area Manager	People counter data & Evaluation Feedback Forms folders in VS folder within Management unit folders	By monitoring visitor numbers and seeking their feedback on the woods the recreation manager can evaluate whether numbers are increasing and if so if those increased numbers can be confidently attributed to improvements made to the visitor experience of the woods. Visitor feedback will also allow for opportunity to learn where further improvements can be made and if necessary factored in to future business plans.