

Appendix II - Supporting Information

II/1.1 Aims of Previous Plan and Objectives

Objective	Description from Previous Plan	Achievements	Relevance in Present Climate
Minimise impact of forestry on the landscape	<p>Retain stable thinned crops beyond normal felling age to improve and vary the forest structure and reduce the impact of clearfelling.</p> <p>Improve the edge and internal views by planting more broadleaves.</p> <p>Fragment the upper margin to improve transition to open moorland.</p>	<p>Fail. None undertaken.</p> <p>Fail. No fragmentation achieved. Areas have been left unplanted. Those areas planted adjacent to open moorland are dense, contiguous conifer.</p>	
Maintain Production of quality timber	<p>Carry out continuing program of thinning and clearfell.</p> <p>Restock according to good silvicultural practice for species selection and plant density.</p>	<p>Achieved. 104 ha of second or subsequent thinnings were undertaken.</p> <p>Approximately 800 hectares would have been within the thinning window. (This total includes areas which may not be thinned for other reasons – soils, access, proximity to felling age. A reasonable assumption may be that 30-50% of the available thinning area was thinned.</p> <p>A total of 320 hectares was restocked in the plan period. With a further 109 hectares fallow in 2021.</p> <p>Species choice was appropriate however areas of larch have been superseded by P.ramorum infections.</p> <p>Density of margin woodland although suitable for commercial conifer does not meet environmental objectives</p>	

Objective	Description from Previous Plan	Achievements	Relevance in Present Climate
Maintain and enhance existing natural habitats	<p>Improve the moorland and forest edge to provide better habitat for species such as black grouse.</p> <p>Improve riparian zones by planting more broadleaf woodland especially in lower glen</p>	<p>Not achieved. Density of conifer is too high on the margin although a degree of scalloping has been undertaken.</p> <p>Minimal establishment of broadleaves was undertaken. Areas identified within the plan for riparian broadleaves have been established with Sitka.</p>	<p>Extremely important in the present environment as this will help join fragmented habitats.</p> <p>An objective of high importance in the present climate. Protection of water quality and aquatic ecosystems is vital. The site drains into drinking water supplies and the River Tay SAC.</p>
Increase amounts of early thinning	To increase longer term stability	Minimal. Of the 124 ha of crops which reached 20 years of age within the plan period 45 hectares was thinned.	Improving stand stability increases options for management, increases individual tree stability, air flow within the crop and log quality. Undertaking the first thinning on time is more important now than ever before in order to maximise resilience.
Slow the rate of clearfell to improve age diversity.			
Preserve Historic Features	Protect all known features including Scheduled and Unscheduled Ancient Monuments.		

II/1.2 Summary Table of Objectives from previous LMP:

Brief	Objectives
Minimise impact of forestry on the landscape	<p>Retain stable thinned crops beyond normal felling age to improve and vary the forest structure and reduce the visual impact of clearfelling.</p> <p>Improve the edge and internal views by planting more broadleaves.</p> <p>Fragment the upper margin to improve the transition to open moorland.</p>
Maintain production of quality timber	<p>carry out continuing programme of thinning and clearfell</p> <p>restock according to good silvicultural practice for species selection and planting density</p>
Maintain and enhance existing natural habitats	<p>Improve the moorland and forest edge to provide a better habitat for species such as Black grouse.</p> <p>Improve the riparian zones by planting more broadleaved woodland especially in the lower</p>
Preserve historic features	protect all known features including Scheduled and unscheduled Ancient Monuments

II/1.3 Background Information

1.3.1 Physical Site Factors

The site lies at between 250 metres above sea level, rising to 689 metres above sea level at Craigie Thrives, situated at the northern limit of the site.

1.3.2 Geology and Soils

Glenisla is predominately underlain by Quartz-mica-schist, grit, slate and phyllite (Upper Dalradian), part of the large group of schists comprising the Dalradian series. Overlying the solid geology there are deposits of fluvioglacial till and shallow drift deposits left by the receding glaciers of the last ice age.

The soils in Glenisla Forest are predominately Upland brown earth and surface water gleys, in the southern half of the forest ironpan soils and podzols are more frequent on the higher ground. In the northern half end of the forest there are more gleys and some areas of flushed bog and ironpan soils on the upper margins.

These soils suit a reasonable range of upland tree species, particularly Spruce, Larch, and Scots pine. The most suitable broadleaves are birch, rowan, alder, and willow.

1.3.3 Gradient

Within three glens, lower ground tends to have shallower gradients as do the tops of the ridges and plateaus. Valley sides include the steeper ground, most of which is workable with standard forestry equipment. Although areas of steeper gradient can be found across the block, the eastern side of The Crock and both east and west aspects of Hare Cairn contain more constant and constraining areas of steep ground.

1.3.4 Aspect

The three glens run broadly north to south, therefore the primary aspects of the surrounding landscape are east and west facing. However, the ends of ridges typically have south facing aspects.

1.3.5 Water

There are three main burns within the forest:

- Glen Taitney Burn to the north-east of the block flows into the Glendamff Burn and into the Backwater Reservoir. The Taitney Burn provides water to the community at Glenmarkie
- The Finlet Burn located to the central north part of the block flows south into the Newton Burn and subsequently into the River Isla.
- The Muckle Burn and tributaries form the western march of the site, flowing into Loch Shandra and the River Isla.

The Backwater Reservoir supplies towns in Angus including Coupar Angus and Blairgowrie. The reservoir also provides backup supply for Dundee via the nearby Lintrathen Reservoir.

1.3.6 Climate

The site is described in Ecological Site Classification (ESC) terminology as between Cool - Highly exposed and Wet and Cool – Sheltered. These ESC predictions are typical of the Angus Glens area.

- Elevation: 250 m – 690 m
- Accumulated temperature: 590 - 1050 C
- Moisture deficit: 0 – 90 mm
- DAMS: 10 - 19

II/1.4 The Existing Forest

1.4.1 Age Structure

Afforestation began in 1959 and continued through till 1971 with the focus on conifer plantation establishment. A second phase of planting took in remaining areas to the west of Glen Finlet in the late 1970s with a final phase in the late 1980s, leading to the afforestation of some higher elevations on Craigie Law and the western aspect of Creag Reamhar. Restructuring of the plantation started in 1993.

The forest is predominately a mature coniferous forest given the extensive 1950's crop reaching maturity. Over 55% of the forest is at Maximum Mean Annual Increment.

1.4.2 Species

Sitka spruce is the dominant species followed by Scots pine and larch species. Additionally, there is Lodgepole pine and some Norway spruce in the block. There are some small areas of broadleaves and mixed conifer in the forest. There is scope to expand these, particularly the broadleaf element, which needs to increase to comply with UKFS and UKWAS requirements. See Table 1 below for further species breakdown.

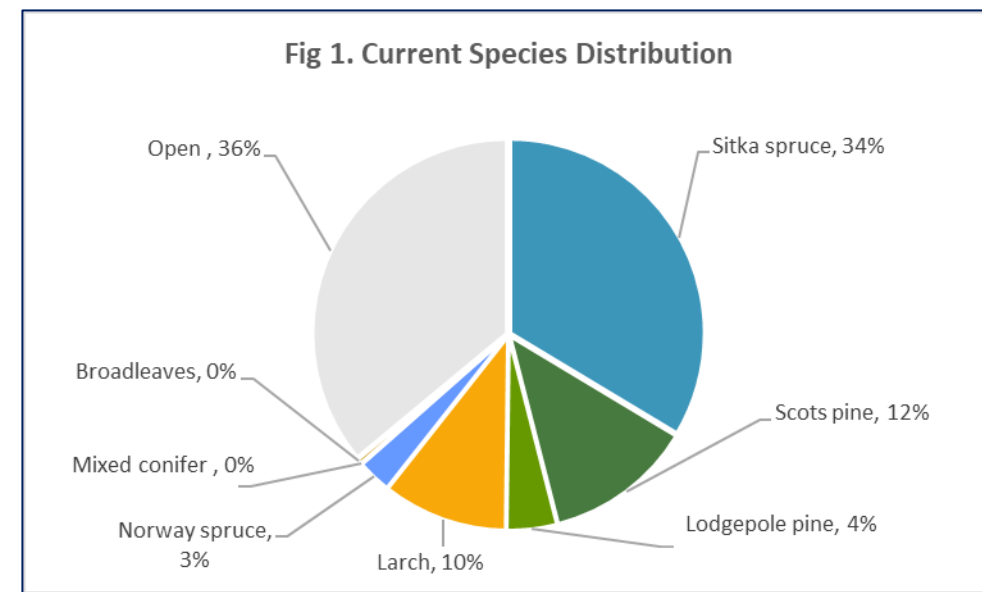


Table 1: Current species Distribution

1.4.3 Yield potential

The current Age Class Distribution highlighted in Table 2 below, shows the initial planting from the late 1940's – 2021. This highlights that the majority of the crops are still from the first plantings of the original rotation in the 1950 – 1970's. This is beginning to transition due to proportion of crop reaching MAI and will accelerate due to the forced structural change caused by the Storm Arwen windblow.

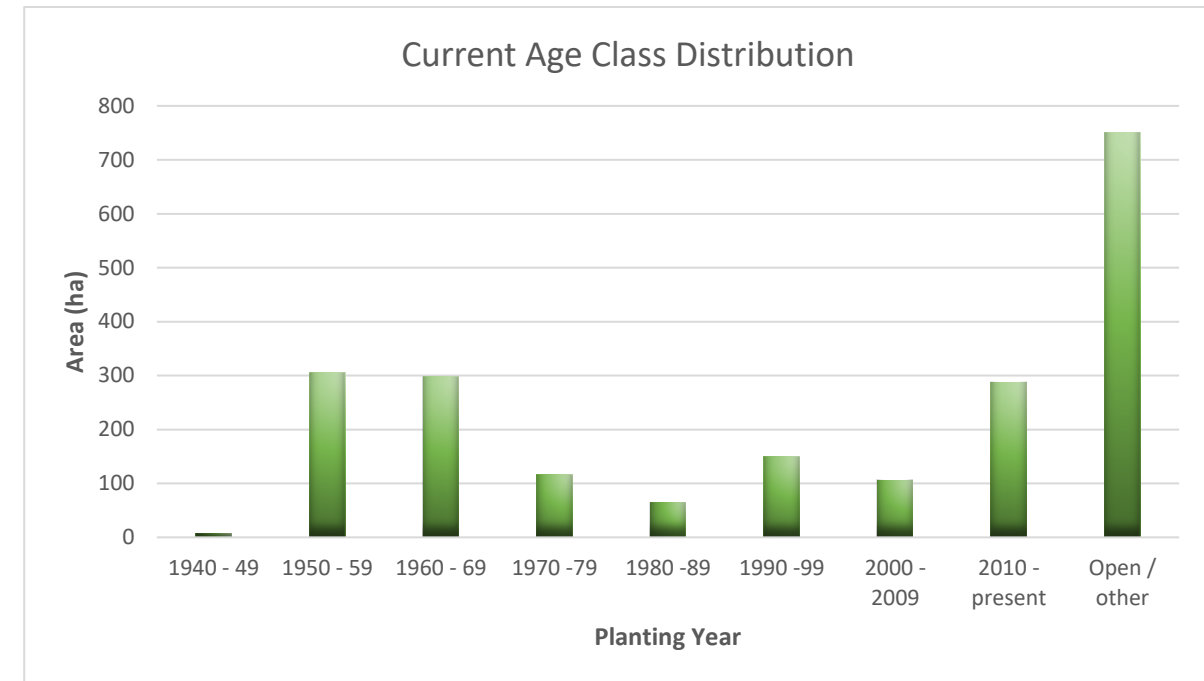


Table.2: Current Age Class Distribution

1.4.4 Access

Access is currently via the B951 which is an approved Timber Transfer route which links with Kirriemuir to the east, and this route also provides access to the A93 to the west. South of Backwater Reservoir, the B954 connects to Alyth from where it joins the A926. Timber currently all departs via the Freuchies exit, adjacent to the small visitor car park. The proposed construction of a new road for the Glen Markie block area of the forest will enable access to windblown timber and the ability to transport this to market. Additionally, this will reduce the volume of haulage wagons passing through the communities at Freuchies and Glenmarkie.

1.4.5 Thinning potential

There is scope for thinning in the plan as highlighted in the Summary of Proposed Operations in the Glen Isla Full Plan document. There are some limiting factors which include the high proportion of mature crop in the forest. The scope for thinning reduces in the north of the block at higher altitudes where the high DAMS score is the limiting factor.

II/1.5 Environmental Factors

1.5.1 Designated Areas

There are no designations within Glenisla forest. Cairngorm National Park does bound the north-east march fence. Several watercourses which pass through the forest join up with the River Tay SAC. The watercourses within the forest are not designated as part of the SAC, and the River Tay SAC starts south of the Loch of Lintrathen, close to Wester Campsie Farm Cottages and Kirkton of Kingoldrum. Given this riparian linkage to the designated River Tay SAC, operationally we treat all watercourses in Glenisla as SAC designated, so we mitigate any potential risk to the water environment.

1.5.2 Protected Species

Whilst there are no formal environmental designations, there are several European Protected Species within the forest and the surrounding area. As such, FLS are mindful of the rate of change and the specific habitat and niches which these require.

1.5.3 Heritage

There are no Scheduled Monuments within or adjacent to the forest. The blocks include and border with several historic rectilinear field systems. There is a small number of remnant shielings and historical agricultural remnant buildings within the site.

II/1.6 Climate Change Resilience and Adaption

1.6.1 Climate Change – Resilience Risk Assessment

This section outlines pertinent risks to future forest resilience and potential threats to land management posed by changes to the climate. It explores options for adaption and mitigation in response to these risks on FLS land, as well as consequences on adjacent land and elsewhere.

Objective	Opportunities	Constraints	Concept
Species Diversification - conifers	Windblow areas require restock	Access to some windblown coupes	Increase diversity of productive conifers in second rotation.
Species increase - broadleaves	Opportunity to increase % of broadleaves, so Glenisla is UKFS compliant. In riparian areas the shade will reduce water temperature in a warming climate.	Management of grazing by wild deer populations.	Increase broadleaves to connect open areas and to create habitat.
Peat restoration	Deep peat identified on existing open land which requires restoration.	Access to upper slopes and managing hydrological unit.	Restoration of deep peat habitat on open land will increase hydrological unit capacity to hold water. and support sphagnum and cotton grass species.



1.6.2 Opportunities for Carbon Storage and Capture

This section identifies opportunities to store carbon and where possible increase carbon capture.

Objective	Opportunities	Constraints	Concept
Woodland planting	Riparian planting and an increase in planting on existing open ground.	Management of grazing by wild deer populations.	Plant broadleaves to improve riparian habitats and water quality. Planting on open ground to increase broadleaf element and to soften the landscape.
Peat restoration	Deep peat identified on existing open land which requires restoration.	Access to upper slopes to manage hydrological units.	Restoration of deep peat habitat on open land will increase hydrological unit capacity to hold water and support sphagnum and other bog species etc