Forestry and Land Scotland
Coilltearachd agus Fearann Alba

Glen Isla Land Management Plan
2024 to 2033

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

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

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Contents

1. Introduction and summary

1.1 The Location

Lying to the east of the village of Glenisla, which is 15 km north-east of Blairgowrie, Glen Isla Forest totals 2,082.07 hectares. The forest includes Glen Finlet, Glen Taitney, Glen Markie, and Glen Damff. Small settlements of Glenmarkie and Freuchies border the forest. To the south-east is Backwater Reservoir operated by Scottish Water (see Map 1 – Location map).

The plan area is split between two blocks: Glen Isla (1640.30 ha) and Glen Markie (441.77 ha) of which 1,520 hectares is afforested, 200 hectares is integral open ground, 357 hectares is hill ground with approximately five hectares being other land uses, such as agricultural.

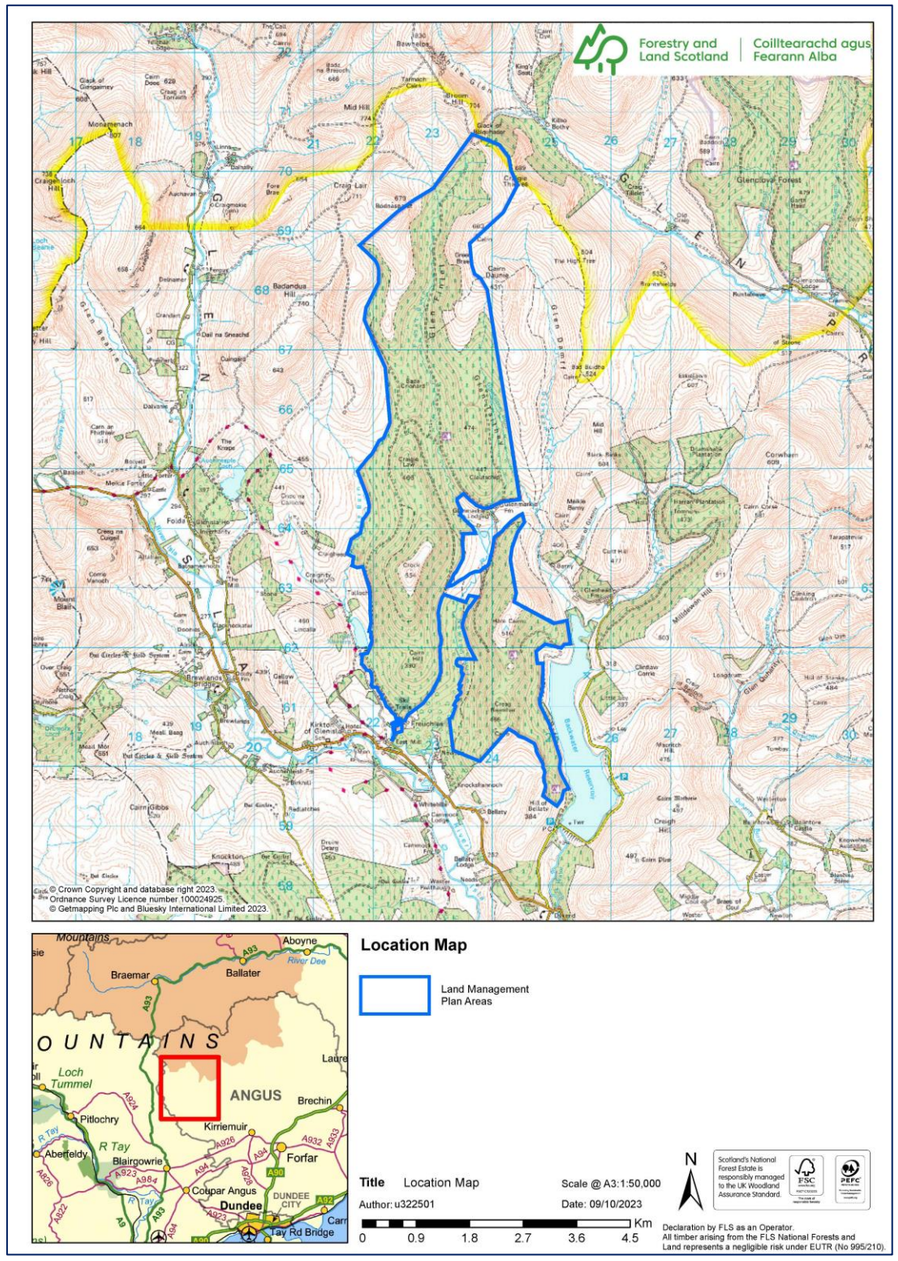
The principal access points to the Glen Isla block is one kilometre east of Kirkton of Glenisla from the B951 (NGR NO 2230 6040), and the primary access to the Glen Markie block is at NO 2500 6200, accessed via a private road from the B951 at Dykend.

Planting at the site began in 1949 with Scots Pine and Larch being the primary species. Afforestation continued from 1959 through to 1971, with Sitka spruce being the primary species of choice. A further 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.

Soils are predominantly brown earths with upland brown earths on valley slopes, ironpans and podzolic soils on the higher plateaus and surface water gleys in valley bottoms. Higher ground towards the north of the block includes areas of peaty gleys with Calluna and Blanket bog.

1.2 Key Issues and Objectives

- **Plant Health threat - Phytophthora ramorum (P.ramorum)**
- **Management of Storm Arwen windblown coupes**
- **Sustainable Timber Production and harvesting of mature crops**
- **Maintenance of habitat for European Protected Species**
- **Drinking water quality – Private and Public supplies**
- **Increase in native broadleaf planting**
- **Peatland restoration on open ground and some afforested areas**
- **Limited access - roads need to be extended to access timber in the Glen Markie block**



Map 1: Glen Isla Land Management Plan Location

1.3 Summary of Planned Operations

The primary focus of the first 5 years (2024 – 2028) of the Land Management Plan (LMP) is firstly to address the removal of the windblow coupes following Storm Arwen, and secondly the removal of mature stands of larch trees. The latter action is being undertaken to reduce the risk of Phytophthora ramorum, due to the recent incidences of P.ramorum detection within the forest.

Geographically, the harvesting work during this period will focus on felling on the eastern side of Glen Markie and at the southern end of Glen Isla. Road access improvements are incorporated into this plan to facilitate felling and extraction of timber from Glen Markie, principally via the road which runs adjacent to Backwater Reservoir and exits at the south of this part of the forest.

Phase 2 (2029 – 2033) of the plan will focus on the felling of mature larch to align with the FLS strategy on larch to mitigate and reduce the risk of P.ramorum. This strategy promotes a proactive approach to the management of P.ramorum, thus reducing the business risk of taking a reactive approach and having to respond at short notice to Statutory Plant Health Notices (SPHNs).

1.4 Timing of Approval

The existing LMP (033/T/G/11(11) expired on the 9th March 2022.

This plan presents in detail the management, felling, thinning and restocking proposals for the next 10 years (2024-2033). This first ten-year period is particularly important because it relates to the part of the land management plan that requires specific approval from Scottish Forestry. Longer term management of Glen Isla is included in the plan, mainly to provide an indication of the context and vision of future management of the forest.

1.5 Certification

Woodland and forestry managed by Forestry and Land Scotland is independently verified against the UK Woodland Assurance Standard (UKWAS) which reflects the requirements of both the Forestry Stewardship Council (FSC) and Programme for Endorsement of Forest Certification (PEFC).

1.6 Consultation and Further Information

For further information or to submit comments please contact:

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1.7 Environmental & Cultural Context:

1.7.1 Designations

There are no designated areas within the block however the Cairngorm National Park lies directly to the north of the block. Water from the block ultimately feeds into the River Tay Special Area of Conservation. Western parts of the block are within a Public Drinking Water Catchment.

1.7.2 Environmental Features

The forest is wholly within a Wild Cat (Felis silvestris) Priority Area and Glen Isla is within the range of several Schedule 1 European Protected Species. Other important species including Red squirrel (Sciurus vulgaris) also inhabit the block. A detailed bird survey is attached in Appendix (VIII)

1.7.3 Heritage Features

There are no Scheduled Monuments within or adjacent to the blocks. 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. Details of each of these features can be seen in the Table 1 opposite:

1.7.4 Fire

There is limited fire risk at Glen Isla in the present climate. This risk is likely to increase with higher summer temperatures and changes in the forest structure. Creating and maintaining light vehicle access with a greater coverage of the block will enable any fires which may ignite to be tackled in a timely manner.

1.7.5 Water and Hydrology

There is hydrological connectivity between the forest and Backwater Reservoir via Glen Taitney Burn, Glen Damff Burn and the eastern slopes of Glen Markie. Glen Isla forest is located within a Drinking Water Protected Area (DWPA), designated under Article 7 of the Water Framework Directive. Prior to operations commencing, FLS will consult with Scottish Water so we can minimise risk and plan mitigation measures.

Item	Description	Location	Designation	Importance
HLA relict Area.	Rectilinear Fields	NO 2288 6059	Undesignated	Uncategorised
West Freuchies	Houses	NO 224 607	Undesignated	Regional
East Freuchies Lime Kiln	Lime Kiln	NO 226 608	Undesignated	Regional
HLA Relict Area	18th Century Rectilinear Fields	NO 247 615	Undesignated	Uncategorised
Crock	Sheepfold	NO 220 625	Undesignated	Regional
Tulloch	Former Farmstead	NO 219 629	Undesignated	Regional
Crock	Buildings and enclosure	NO 233 632	Undesignated	Regional
HLA Relict Area	18th Century Rectilinear Fields	NO 234 632	Undesignated	Uncategorised
Glen Finlet	Township of six buildings	NO 235 637	Undesignated	Regional
HLA Relict Area	18th Century Rectilinear Fields	NO 235 640	Undesignated	Uncategorised
HLA Relict Area	Medieval / Post Medieval Settlement	NO 214637	Undesignated	Uncategorised
Glen Markie Old Lodge	Hunting lodge	NO 239 643	Undesignated	Regional
Cairn 107	Cairn	NO 237 656	Undesignated	Regional
Glenisla Butt	Grouse Butt	NO 235 659	Undesignated	Uncategorised
Glenisla 105	Grave	NO 225 666	Undesignated	Uncategorised
Green Brae	Enclosure	NO 231 679	Undesignated	Local
Green Brae	Enclosure	NO 232 683	Undesignated	Local
Sheiling	Sheiling	NO 226 690	Undesignated	Uncategorised

Table 1: Table of Heritage Features

1.7.6 Utilities

There are a number of private water supplies originating within the block supplying nearby properties. These are mapped on the FLS geospatial database, although for privacy these are not included on maps within this LMP. The eastern areas of the Glen Markie forest block drain to Backwater Reservoir.

The location of each water supply and the associated infrastructure is included on all operational site maps. Forest and Water guidelines will be adhered to in forest and operational planning, with appropriate mitigation measures put in place to protect these supplies. These will be site specific measures, which shall be agreed as part of operational planning prior to the commencement of work.

There are no electricity power lines which pass within the actual forest block, however there are several powerlines which do run adjacent to the block, serving both Glenmarkie and Freuchies. Telecommunications to the local settlements of Freuchies and Glenmarkie are provided via telephone and fiber optic cables which run alongside the Freuchies to Glenmarkie road.

The location of these can be found on the Roads & Planned Roads maps & Issues map.

1.7.7 Peat

There are areas of peat within the forest, and these are located towards the northern and north eastern boundary of the Glen Isla block (Appendix VI - Peat Restoration Areas map). Peatland restoration of the upper reaches of Glen Finlet will enhance carbon sequestration in areas identified as deep peat. There is opportunity for collaborative peat restoration work with a neighbouring landowner, where the hydrological peat unit extends over adjacent ownership boundaries. This has the potential to restore areas of peat at the landscape level and FLS are in discussions with the neighbour to develop this approach. Afforested areas of deep peat will be subject to surveying and assessment to establish both the viability and most effective restoration techniques. The timing of restoration works will be determined by several factors including environmental and timber harvesting constraints.

1.7.8 Tree Health and Pathogens

Phytophthora Ramorum, which principally affects Larch has been identified within Glen Isla. A number of trees across various locations within the block have shown symptoms and FLS have been served with Statutory Plant Health Notices (SPHN) at two locations. The most recent SPHN was served in September 2022 (NO 237 624) in Glen Markie with a further one served in Glen Finlet at (NO 231 690) in 2020. Glen Isla is within the Priority Action Zone (PAZ), as identified within the Scottish Forestry Phytophthora ramorum Larch Action Plan, June 2021. Requirements in this zone are to eradicate local infections through tree felling rapidly after detection.

Further to this, FLS has developed a Larch Strategy published in April 2022 which designates Glen Isla forest as being located in the Priority Action Zone (PAZ) more vulnerable zone. This internal designation requires a more proactive approach to the removal of Larch at the forest block level, thus requiring the removal of greater volumes of Larch within a set timescale within this LMP. As such, this designation has significant implications and is a leading driver in the development of this LMP. The key aim is to manage the removal of all mature Larch over a 10-year period, to mitigate the risk of Phytophthora ramorum spreading further afield into the Priority Action Zone PAZ less vulnerable zone. This proactive management of removal of mature Larch, will have to be balanced with the requirements of protecting European Protected Species and factoring in the rate of change on the age structure of the forest. The Issues and Concept maps in this document highlight this further. These competing objectives have been factored in and fully considered in the development of the felling schedule proposed across the plan period.

The thinning coupes in the plan have been designed to prioritise the removal of larch in order to reduce the risk of further infections of Phytophthora ramorum in Glen Isla forest. FLS may opt not to work all of the proposed thinning coupes within the timescale of this plan. However, by designing the thinning coupes around the FLS Larch Strategy, we retain the ability to be proactive should we be served with further SPHN' s for Phytophthora ramorum.

Dothistroma Needle Blight (DNB) can affect Scots, Corsican and Lodgepole pine. The pathogen responsible is Dothistroma septosporum. DNB has been identified within the Glen Isla block. Pine stands, where accessible, will be thinned to reduce inoculum levels. Where areas of poor condition Lodgepole pine cause no detrimental impact such as landscape or obstruct access to other crops, these will be retained through to senescence to create deadwood. These reserves will serve as nuclei for ecosystem protection and connectivity. The existing species within Glen Isla can be found on the Present Species maps.

2. Scottish Forestry Regulatory Requirements

2.1 Summary of Proposed Operations

Proposed Operations		Phase One (2024 – 28)	Phase Two (2029 – 2033)
Felling	(ha)	270.94	101.52
Thinning	(ha)	324.85	168.51
Restocking	(ha)	313.40	190.34
New Planting	(ha)	270.51	13.90
New Roads	(m)	4565	-
Road Upgrade	(m)	-	-
New Forwarder Tracks	(m)	1600	-

Table 2.1: Summary of Proposed Operation

2.2 Proposed Felling in years 2024 – 2033

Proposed Phase	Area to be Felled (ha)	Proportion of Woodland Area (%)
2024 - 2028	270.94	13.01
2029 - 2033	101.52	4.87

Table 2.2: Proposed Felling by Phase 1 & 2

2.3 Details of Clearfell by Coupe for phase 1

Coupe Reference	Programme Year	Species 1	Area (ha)	Species 2	Area (ha)	Species 3	Area (ha)	Open Area (ha)	Total Area (ha)
35036	23/24	SP	1.3	SS	0.4	-		0.02	1.72
36007	24/25	SP	17	JL/EL/HL	13.4	SS/LP	9.6	1.09	41.09
36023	24/25	SS	28.8	JL	9.5	LP/SP/NS	8.4	0.33	47.03
35045	24/25	JL/EL/HL	16.6	SP	15.9	LP	5.1	0.25	37.85
36001	25/26	SP	12.71	EL/HL	2.8	LP/SS	0.70	-	16.21
36008	25/26	JL	14.85	NS	1.9	SP/LP/SS	3		19.75
35032	26/27	SP	41.8	LP	11.3	JL/EL/HL/DF	18.3	2.94	74.34
35078	26/27	SS	3.3	JL	1.8	-	-	-	5.06
35083	26/27	JL	8.18	-	-	-	-	-	8.18
35281	27/28	JL/HL/EL	9.5	SS	4.8	SP/LP/NS	4.3	1.11	19.71

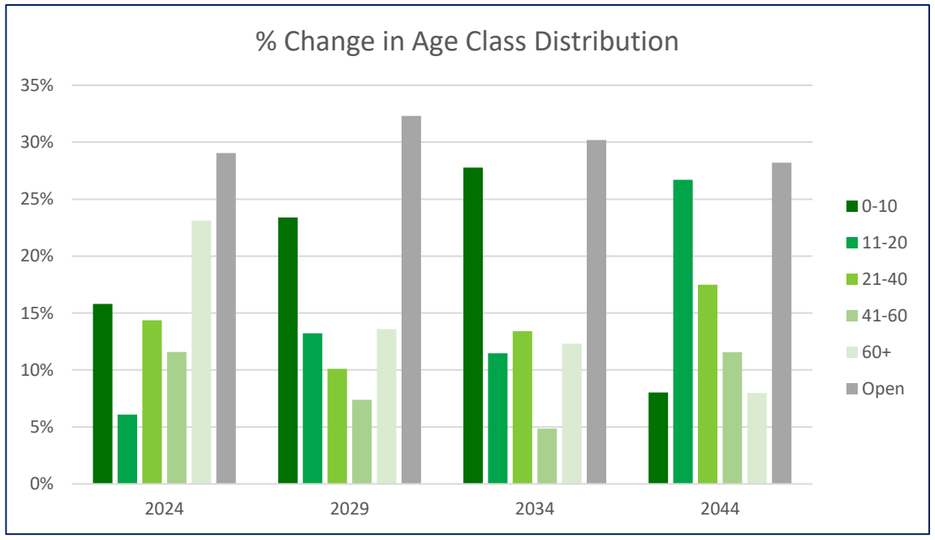
Table 2.3: Clearfell by Coupe in Phase 1

2.4 Change in Age Class over plan period

Age of Trees	Growth Stage	Percentage of Age Class at Given Year			
		2024	2029	2034	2044
0 – 10	Establishment	15.8	23.4	27.8	8.0
11 – 20	Thicket	6.1	13.2	11.5	26.7
21 – 40	Pole	14.4	10.1	13.4	17.5
41 – 60	Maturing High Forest	11.6	7.4	4.9	11.6
60+	Old High Forest	23.1	13.5	12.3	7.99
Open Ground		29	32.3	30.1	28.13

Table 2.4: Change in Age Class over Plan Period

2.4.1 Percentage Change in Age Class over plan period



Graph 1: Percentage Change in Age Class over plan period

2.5 Thinning in Years 2024 – 2033

Phase	Area to be Thinned (ha)	Proportion of Block Area %
Phase One (2024 – 2028)	324.85	15.60
Phase Two (2029 – 2033)	168.51	8.09

Table 2.5: *Thinning Area in Phases 1 & 2*

2.6 Proposed Restocking in Years 2024 – 2033

Phase	Area to be Restocked (ha)	Proportion of Block Area %
Phase One (2024 – 2028)	313.40	15.05
Phase Two (2029 – 2033)	190.34	9.14

Table 2.6: Proposed Restocking in Years 2024 – 33

Photo 1: Glen Isla Restock Coupe

2.7 Proposed Restocking by Coupe 2024 – 2033

Coupe Reference	Felled awaiting restock	Species 1	Area (ha)	Species 2	Area (ha)	Species 3	Area (ha)	Species 4	Area (ha)	Open Area (ha)	Total Area (ha)
35011	Felled	SS	1.46	NF	0.63	-	-	-	-	-	2.09
35013	Felled	NMB	9.95	SS	9.30	NS	2.32	-	-	1.94	23.51
35017	Unfelled	SS/NS	11.14	NF	9.44	SP	6.13	NMB	3.99	1.45	32.15
35019	Felled	BI	4.84	MB	3.87	SP	0.07	-	-	3.95	12.73
35027	Unfelled	BI	0.40	NMB	0.40	-	-	-	-	0.54	1.34
35032	Unfelled	SP	21.86	NS/SS	22.98	MC	14.53	NMB	3.49	11.48	74.34
35037	Unfelled	SS	5.29	SP	1.32	-	-	-	-	-	6.61
35045	Unfelled	NS/SS	8.72	NF	8.48	SP	7.93	NMB	4.78	7.94	37.85
35056	Felled	SP	6.45	BI	3.11	NMB	1.20	NS	0.32	3.79	14.87
35060	Felled	SS	18.84	NF	3.80	SP	1.46	NMB	0.48	1.11	25.69
35065	Felled	NF	11.27	SS	10.59	SP	0.36	-	-	-	22.22
35071	Felled	SS	4.47	NF	2.98	-	-	-	-	-	7.45
35078	Unfelled	MC	2.02	BL	1.78	NS	0.31	-	-	0.95	5.06
35082	Unfelled	NS	3.36	SP	0.84	-	-	-	-	-	4.2
35083	Unfelled	SP	4.78	NS	1.64	SS	1.32	NF	0.44	-	8.18
35086	Unfelled	BI	0.65	ALD	0.22	ASP	0.22	SP	0.07	1.00	2.16
35128	Felled	BI	0.63	ALD	0.21	ASP	0.21	-	-	1.06	2.11
35281	Unfelled	SS	4.65	SP	4.55	NMB	3.45	NF	1.99	5.07	19.71
35652	Unfelled	SP	15.31	SS	8.60	Mace P	2.34	NF	0.22	0.58	27.05
36001	Unfelled	BI	4.36	SP	3.52	NMB	1.64	-	-	6.69	16.21
36005	Felled	SP	20.49	BI	6.69	NMB	0.83	-	-	1.26	29.27
36007	Unfelled	NF	12.35	NMB	8.73	SP	7.23	MC	5.6	7.18	41.09
36008	Unfelled	NF	6.8	SP	6.78	NMB	3.08	SS	0.19	2.90	19.75
36021	Unfelled	SP	1.04	Mace P	1.04	SS	0.52	NMB	0.06	0.42	3.08
36023	Unfelled	SP	14.32	NMB	10.88	NF	8.0	Mace P	2.5	11.33	47.03
36035	Unfelled	BI	8.56	NMB	1.41	SP	0.66	Mace P	0.53	4.20	15.36
36087	Felled	BI	1.45	ASP	0.24	OK	0.24	-	-	0.70	2.63

Table 2.7: Proposed Restocking by Coupe 2024 -33

2.8 Proposed Woodland Creation by Coupe 2024 – 2033

Coupe Number	Restock (see footnote)	Species 1	Area (ha)	Species 2	Area (ha)	Species 3	Area (ha)	Species 4	Area (ha)	Open Area (ha)	Total Area (ha)
35000	* **	BI	7.39	NMB	4.04	MC	2.56	-	-	3.31	17.30
35007	**	BI	0.64	ALD	0.10	-	-	-	-	0.73	1.47
35010	**	BI	5.14	NMB	5.14	-	-	-	-	6.86	17.14
35012	**	NMB	14.23	SP	1.05	BI	0.63	-	-	9.89	25.8
35014	**	NMB	9.81	-	-	-	-	-	-	14.72	24.53
35034	* **	BI	2.87	ALD	1.38	ASP	1.38	SP	1.25	6.87	13.75
35038	* **	BI	14.94	NMB	5.80	MC	4.20	SS	2.28	21.32	48.54
35040	* **	BI	0.55	SP	0.31	NMB	0.17	ASP	0.14	0.55	1.72
35053	**	BI	8.47	NMB	8.47	-	-	-	-	11.30	28.24
35080	* **	BI	7.60	SP	1.02	ALD	0.97	-	-	7.07	16.66
35102	**	NMB	0.98	-	-	-	-	-	-	0.25	1.23
35103	**	BI	1.62	NMB	1.08	-	-	-	-	2.69	5.39
35108	**	BI	0.50	ALD	0.50	-	-	-	-	4.01	5.01
35113	* **	BI	1.88	SP	0.63	ALD	0.63	ASP	0.63	2.48	6.25
35114	**	BI	0.20	ALD	0.07	SP	0.07	ASP	0.07	0.25	0.66
35115	* **	SS	0.78	BI	0.57	NF	0.34	ALD	0.11	0.45	2.25
35117	* **	BI	4.97	SS	2.24	MC	0.96	ALD	0.80	8.71	17.68
35122	* **	BI	1.85	SP	0.93	NMB	0.93	BL	0.93	4.61	9.25
35123	**	NS	0.39	BI	0.22	ALD	0.22	SP	0.1	1.79	2.72
35125	**	BI	0.89	-	-	-	-	-	-	2.07	2.96
35126	* **	NS	2.63	BI	1.60	NMB	0.96	SS	0.74	-	5.93
35127	* **	SP	2.02	BI	1.34	-	-	-	-	3.36	6.72
36002	**	BI	2.92	OK	0.74	NMB	0.72	ASP	0.61	1.07	6.06
36006	* **	BI	2.57	NMB	1.28	SP	0.64	-	-	1.93	6.42
36011	* **	BI	0.80	NMB	0.40	SP	0.20	-	-	0.61	2.01
36018	* **	BL	0.44	SP	0.08	Mace P	0.08	SS	0.04	3.94	4.58
36033	**	BI	1.09	NMB	0.18	-	-	-	-	0.54	1.81
36101	* **	BI	0.62	NMB	0.31	SP	0.16	-	-	0.46	1.55
36104	**	OK	0.39	NMB	0.16	-	-	-	-	0.23	0.78
	Woodland Creation total area										284.41

Table 2.8: Proposed Woodland Creation by Coupe 2024 – 33

*Commercial conifer = uniform planting (uniform 2,700 stems/ ha to achieve 2,500 ha by year 5)

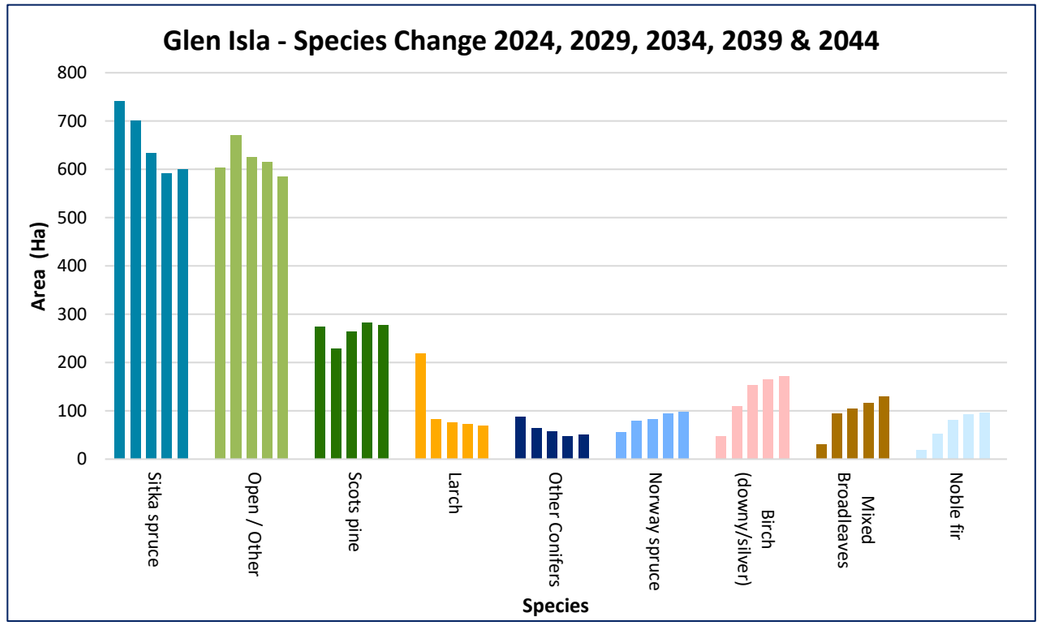
**Broadleaf – uniform planting (1,600 stems / ha)

Photo 2 – Unplanted riparian area with Sitka spruce regen

2.9 Change in Species Over Plan Period

Species	Area 2024	% 2024	Area 2029	% 2029	Area 2034	% 2034	Area 2039	% 2039	Area 2044	% 2034
Sitka spruce	741.8	35.6	700.7	33.7	634.5	30.5	592.4	28.5	600.9	28.9
Scots Pine	274.5	13.2	229.5	11.0	265	12.7	282.4	13.6	277.9	13.3
Larch	219.1	10.5	82.6	4.0	76.9	3.7	73.3	3.5	69	3.3
Other Conifers	88.2	4.2	63.8	3.1	58.1	2.8	47.7	2.3	50.7	2.4
Norway Spruce	56.7	2.7	78.9	3.8	83.1	4.0	95.3	4.6	98.6	4.7
Birch	47	2.3	109.8	5.3	153	7.3	165.6	8.0	172.5	8.3
Broadleaves	31	1.5	94	4.5	105.1	5.0	116.3	5.6	130.6	6.3
Noble Fir	19.4	0.9	52.5	2.5	80.5	3.9	93.5	4.5	96.5	4.6
Open / Other	604.37	29	670.27	32.2	625.87	30.1	615.57	29.6	585.37	28.1

Table 2.9: Changes in Species over Plan Period (includes proposed Woodland Creation)



Graph 2: Change in Species over plan period (includes proposed Woodland Creation)

2.10 Access and Roading 2024 – 2033

Phase	Road Construction (m)	Forwarder Track Construction (m)	ATV track Construction (m)	Road Upgrade (m)	Forwarder track upgrade (m)	ATV Track Upgrade (m)
Phase One	4565	1600	0	0	720	0
Phase Two	0	0	0	0	0	0

Table 2.10: Access and Roading 2024 -33

2.11 Departures from UKFS Guidelines

No departure from the UK Forestry Standard is requested as part of this plan.

2.12 Standards and Guidance on which this LMP is Based

The Land Management Plan seeks to follow the United Kingdom Forestry Standard (UKFS) in all requirements. No felling will take place until any neighbouring restock areas have achieved two metres in height. If this is not achieved the separation will be agreed with Scottish Forestry.

2.13 Tolerance Table

Appendix III provides details of the approved tolerance table at the time of approval.

3. EIA Screening Determination

3.1 Proposed Deforestation

No deforestation is proposed within this 10-year Land Management Plan.

3.2 Proposed Forest Road Works

New roads are proposed to access the extensive windblow in both the Glen Markie and Glen Isla areas of the forest, as currently the existing road network does not support timber extraction from the areas which saw the greatest damage by Storm Arwen.

The total length of new roads proposed is 4565 m. Due to existing access limitations, a new road will connect the Glen Isla & Glen Markie blocks, making timber extraction more efficient and resilient. Within the Glen Isla area of the block, 1350 m of new road will provide access to timber west of the Finlet Burn.

Three small timber loading areas will also be created. Two of these timber loading areas will be constructed in Glen Isla between Freuchies and Glenmarkie, along with a passing place, whilst the third timber handling area will be created in Coupe 38045. These will support efficient timber movements, and the creation of these facilities between Glenmarkie and Freuchies will allow resident access along this single-track road during harvesting operations. The design and precise location of these will be specified in the prior notification application.

3.3 Proposed Forest Quarries

The existing quarry will be expanded during Phase 1 of the LMP to support the creation of these new roads and to allow maintenance of existing roads. Expansion of the existing quarry will promote sustainability by reducing the volume of external traffic entering the block if an external quarry were to be used.

An EIA screening application will be submitted by FLS Planning and Civil Engineers in support of this request and this will be submitted to Scottish Forestry at the time of quarry expansion. This quarry expansion would ensure that stone sourced for the proposed new roads is sustainably sourced with fewer vehicles having to lead stone from further afield.

3.4 Proposed Afforestation

FLS propose the new planting of 284.41 ha on what is currently open ground within the timescale of this LMP. The majority of this new planting area is located in the most northerly areas of the Glen Isla part of the forest, and most planting will be on upper slopes above 450 m on areas currently managed as open ground. Primarily, these new planting areas will be stocked with a mixture of native broadleaved species, though there will be some small areas where mixed conifers will be introduced to diversify species.

Riparian areas along Glen Finlet & Glen Taitney will also see some tree planting with native broadleaves to create habitat connectivity and to improve shading along watercourses for fish and invertebrate populations. Additionally, the proposed planting in Glen Taitney will provide long term water quality benefits to both private and public water supplies, particularly with regard to the Scottish Water DWPA.

A separate EIA Screening Opinion Request will be submitted by FLS in support of the proposed Woodland Creation. This EIA SOR is in the process of finalisation and it will be submitted to Scottish Forestry for assessment upon completion. FLS will not commence any operations related to the proposed Woodland Creation in Glen Isla until approval has been granted by the regulator.

3.5 Additional Regulatory Requirements

3.5.1 Water Regulations

Where works fall within the remit of the Water Framework Directive and Water Environment (Controlled Activities)(Scotland) Regulations 2011 (CAR) relevant licenses will be sought at the work plan stage on completion of detailed engineering design.

Given that some proposed activities within the plan are located within a Drinking Water catchment, FLS are liaising directly with Scottish Water for advice and guidance on mitigations to reduce potential impacts from forestry operations.

3.5.2 Prior Notification

Prior notification will be sought for all sections of Private Way constructed for forestry management purposes. Application to the local authority will be submitted prior to works being undertaken.

3.5.3 Planning Consent

Expansion of Glen Isla quarry requires an EIA screening decision and all supporting evidence required under planning regulations to gain approval will be provided to Scottish Forestry at the time when quarry expansion is deemed necessary to meet with proposed roads infrastructure development. Planning approval and any work permits will be in place prior to the commencement of these works.

4. Plan Objectives

4.1 Pertinent Issues

- Wind damage – Storm Arwen has led to large areas of windblow and destabilised crop, especially within older, mature crops – leading to increased felling activity and a high rate of change. This storm damage will lead to a reduction in timber values and increased operational risk during harvesting.
- Phytophthora ramorum – Loss of crop value and forced rate of change.
- Dothistroma Needle Blight – senescence and mortality of Lodgepole pine stands and reduction in Scots pine yield.
- Over 50% of the forest is at Maximum Mean Annual Increment (MMAI) and crop stability will reduce.
- European Protected Species – manage rate of change of forest cover within the block to protect these.
- Access – timing of operations to meet wider objectives and subsequent difficulty with road and climatic conditions.
- Water quality – This is important both for drinking water supplies and as a tributary to the River Tay SAC.
- Operational access to Glen Markie is limited – new road infrastructure is required.
- Peatland restoration opportunities – some areas are identified as presently afforested peatland.
- UKFS & UKWAS requirements - Broadleaf component does not currently comply.
- Landscape - especially as viewed from the east of the Backwater reservoir and west from the Cateran Trail.
- Dendroctonus micans (D.micans) - has been identified in the area and proactive management of spruce may be required.

4.2 Key Challenges

- Managing the rate of change especially in light of damage caused by Storm Arwen to balance the needs of wildlife within the forest but also to moderate financial loss and operational hazards from wind damaged or retained crops.
- Creating and maintaining access for scheduled harvesting operations as well as any felling requirements which may come through Statutory Plant Health Notices.
- Future resilience of the forest given changing climate, increasing pests and diseases and growing understanding of the role of forestry in combating both the climate and biodiversity crisis.

4.3 Management Aims

A Manage the forest to produce high quality timber for local markets with initial focus on felling those coupes damaged by Storm Arwen.

B Put in place measures to facilitate access to larch and remove areas of larch where harvesting is more complex. Focus on resilience planning for larch coupes and identify those larch coupes which remain but may need to be brought forward for proactive felling.

C Carbon – opportunity to increase carbon sequestration via peatland restoration. Opportunities to plant trees on existing open ground.

D Protect riparian and soil environments in order to maintain and improve the quality of water leaving the site.

E Maximising opportunities to improve contribution of the site to ecosystem services.

F Manage the woodland and restocking to maximise resilience to a changing environment and climate.

G Undertake management of the forest and surrounding areas in a manner which minimises impact on Schedule 1 protected species and enhances habitat connectivity.

H Manage the rate of change in the forest and proactively identify management opportunities to slow the rate of change.

I Increase the proportion of broadleaves to ensure UKFS compliance.

J Protect utilities infrastructure and telecommunications of rural community.

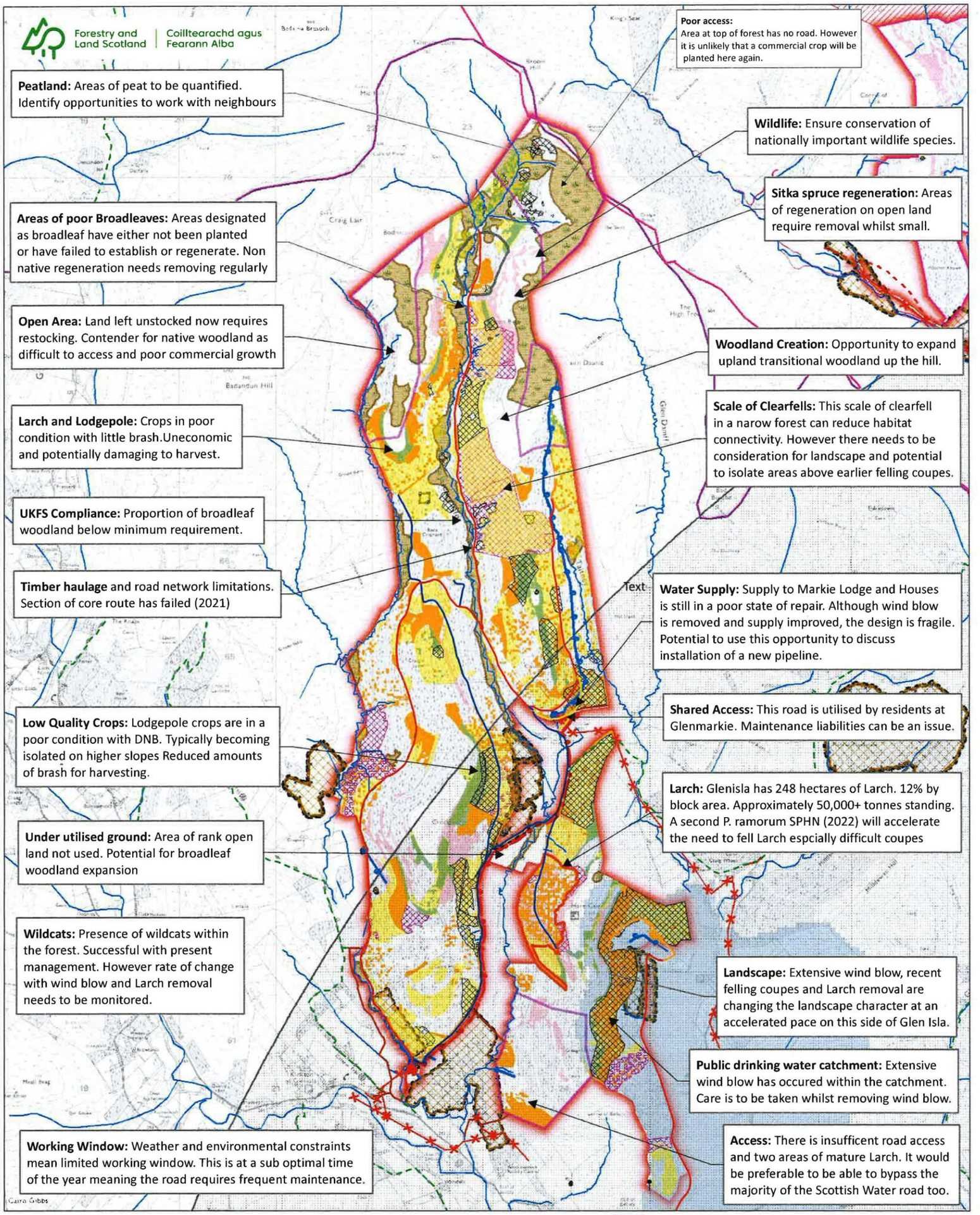
The management aims of this LMP have been influenced by the scoping exercise FLS undertook (Appendix 1 – Consultation record).

We have listened to local residents and FLS have reviewed existing haulage access in the forest. We have subsequently proposed additional road construction into the LMP to allow access to timber on the western side of Backwater Reservoir. These new roads also offer a wider working window for operational activities.

Given the historic and recent outbreaks of Phytophthora ramorum identified by internal staff and Scottish Forestry, the final Glen Isla LMP submission changed to proactively reduce the volume of larch in the block. This targeted harvesting of mature larch in addition to targeting Storm Arwen windblow, will also reduce the percentage of standing timber crop at MMAI. Some mature timber will be retained beyond MMAI to protect habitat for European Protected Species and to reduce the rate of change in the forest.

The new LMP has been sensitively designed to factor in the landscape, particularly from Backwater Reservoir, where the Glen Markie area of the forest experienced extensive catastrophic windblow during Storm Arwen. The soils in this area provide opportunity for increased species diversity, and restocking proposals include: Noble Fir, Douglas Fir, Mixed conifers and Scots Pine. Oak will be planted in some broadleaf areas on the Backwater Reservoir side, whilst birch and other broadleaves will be planted in riparian areas to buffer watercourses and create habitat linkage.

Within the Glen Isla forest area, there will also be a greater diversity of productive conifer species planted such as Noble Fir and Norway Spruce, providing climate resilience and reducing the impact of future tree pests and diseases.


Forestry and Land Scotland | Coilltearachd agus Fearann Alba
Peatland: Areas of peat to be quantified. Identify opportunities to work with neighbours
Areas of poor Broadleaves: Areas designated as broadleaf have either not been planted or have failed to establish or regenerate. Non native regeneration needs removing regularly
Open Area: Land left unstocked now requires restocking. Contender for native woodland as difficult to access and poor commercial growth
Larch and Lodgepole: Crops in poor condition with little brash.Uneconomic and potentially damaging to harvest.
UKFS Compliance: Proportion of broadleaf woodland below minimum requirement.
Timber haulage and road network limitations. Section of core route has failed (2021)
Low Quality Crops: Lodgepole crops are in a poor condition with DNB. Typically becoming isolated on higher slopes Reduced amounts of brash for harvesting.
Under utilised ground: Area of rank open land not used. Potential for broadleaf woodland expansion
Wildcats: Presence of wildcats within the forest. Successful with present management. However rate of change with wind blow and Larch removal needs to be monitored.
Working Window: Weather and environmental constraints mean limited working window. This is at a sub optimal time of the year meaning the road requires frequent maintenance.
Poor access: Area at top of forest has no road. However it is unlikely that a commercial crop will be planted here again.
Wildlife: Ensure conservation of nationally important wildlife species.
Sitka spruce regeneration: Areas of regeneration on open land require removal whilst small.
Woodland Creation: Opportunity to expand upland transitional woodland up the hill.
Scale of Clearfells: This scale of clearfell in a narow forest can reduce habitat connectivity. However there needs to be consideration for landscape and potential to isolate areas above earlier felling coupes.
Water Supply: Supply to Markie Lodge and Houses is still in a poor state of repair. Although wind blow is removed and supply improved, the design is fragile. Potential to use this opportunity to discuss installation of a new pipeline.
Shared Access: This road is utilised by residents at Glenmarkie. Maintenance liabilities can be an issue.
Larch: Glenisla has 248 hectares of Larch. 12% by block area. Approximately 50,000+ tonnes standing. A second P. ramorum SPHN (2022) will accelerate the need to fell Larch espcially difficult coupes
Landscape: Extensive wind blow, recent felling coupes and Larch removal are changing the landscape character at an accelerated pace on this side of Glen Isla.
Public drinking water catchment: Extensive wind blow has occured within the catchment. Care is to be taken whilst removing wind blow.
Access: There is insufficent road access and two areas of mature Larch. It would be preferable to be able to bypass the majority of the Scottish Water road too.
Text
Ciara Gibbs
Glen Isla and Glenmarkie Issues
Scale @ A2: 1:25,000
Date: 21/12/2022
Author: U320903
0 0.2 0.4 0.8 1.2 1.6 Km
N
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Non-FC PHNs
Unclassified
Class A
Class B
Class C
Restricted
Core Paths
Underground telephone or fibreoptic
Overhead telephone or fibreoptic
Overhead powerline
Underground powerline
Water Pipelines
Water Supply Points
Watercourses
Active SPHN
SPHN Felled and compliant
Storm Arwen wind blow damage
Dendroctonus micans 20km buffer
Access restricted
Larch
Lodgepole
Dothistroma Needle Blight (DNB)
Glenprosen0
35 degree or more steep slope
Windblow
Failed_Felled
Peatland
Scotland's National Forest Estate is responsibly managed to the UK Woodland Assurance Standard
FSC
PEFC

5. Concept and Objectives

5.1 Analysis

Objective	Management Aim	Opportunities	Constraints	Concept
Undertake to maximise the proportion of crops which are thinned. This will improve the timber quality but also increase management options going forward.	A, B, D &F	• Old crop has previously been thinned and felling is more than 10 years ahead. • Target crop reaching age of first thinning within this plan period. • The existing road network allows access to much of the site.	• Crop Age and previous thinning history • Ground Conditions • Exposure on higher elevations • Areas, especially in Glen Markie and to the west of Glen Finlet have poor operational access.	• Undertake 171.4 ha of first thinnings within the thinning window to maximise opportunities for future management. • Specify areas for management under no thin system including reasoning.
Supply quality timber to local markets	A, B & C	• 55% of the forest will be at or over Maximum Mean Annual Increment within this plan period. • Larch component is over 10% of the block and FLS have been served with recent SPHNs for *Phytophthora ramorum*.	• Tree disease and suitability limit the species selection for commercial timber growth. – Larch may require removal before achieving timber dimension. Scots pine, although suited to poor conditions, shows reduced yield due in part to presence of DNB. • Ecological constraints and climatic conditions provide a limited working window. This in turn exacerbates the impact operations have on the road infrastructure both within and to the forest block.	• Undertake to fell 270.94 hectares within phase one and 101.52 hectares in phase two of this plan.
Interlinked habitat corridors Establishment of riparian buffer zones will protect water quality. Marginal woodland will provide refuge and linked corridors as well as connectivity to other land use.	B, E & F	• Watercourses provide opportunity to use Riparian corridors for linkages. • Existing low quality Lodgepole may be utilised to create deadwood reserves at higher elevations. • Corridors would provide boundaries which would create wind firm coupe breaks and fire barriers. • Maximise opportunities to establish new native woodland to improve marginal habitats and connectivity between woodland habitats as well as linking to open habitats.	• Given the gradient and narrow form of the block, operational access and landscape may require removal of valley to tree line sections of forest at felling. • Woodland edge if used will need to be designed appropriately to fit the landscape. • Regeneration of exotic conifers may need to be managed at cost. • There are limited numbers of minor watercourses running down the glen sides so altitudinal links will require careful design to maximise habitat contribution whilst providing best fit into the landscape.	• Creation of scalloped upland woodland edges to soften the landscape and the transition between the woodland edge and open areas. • Riparian planting alongside watercourses adjacent to private water supplies will reduce the risk to water quality from commercial restocking. • Increasing the riparian area will improve water quality within the DWPA. • Shading from newly planted riparian areas will provide benefits to aquatic species, including fish and invertebrates.
Take opportunities to expand woodland cover. Maximising woodland cover on appropriate sites will maximise the carbon sequestration potential of the site. this must be balanced against ecosystem services offered by open ground.	C, D, E, F, G & I	• Historic afforestation has concentrated on commercial conifer. Areas exist above the present tree line which are suitable for sub montane woodland edge woodland. • Land transactions to rationalise ownership have made available a section of lower ground for woodland creation. These areas are suited to low density sub montane and edge woodland. • Improved woodland edge management maximises the habitat value of the site and may be able to make the block sit more naturally into the landscape.	• Establishment of broadleaf woodland in this upland environment can be challenging. • Herbivore pressure must be maintained at a low level for a prolonged time frame to allow these woodlands to fully establish.	• Creation of upland birchwoods will expand woodland cover and soften the landscape. This will smooth the transition between woodland edge and open areas on existing open areas at higher elevations. • Woodland creation in riparian areas will improve water quality within the DWPA.
Where climate and soils are conducive alternative management systems to clearfelling should be utilised.	D, F & H	• Proportion of the site which has previously been thinned. • Effective herbivore management is currently in place. • Current infrastructure provides access to much of the site.	• Areas which are otherwise suitable but have missed age of first thinning. • Disease present in otherwise suited species such as Larch and Scots pine. • Neighbouring land management means high outside deer pressure. The boundary fences must be checked and maintained.	• Targeted thinning of larch will reduce ground disturbance from large clearfell coupes if FLS are served with further SPHN' s. • Improved control and removal of Sitka Spruce regen on open areas.

Objective	Management Aim	Opportunities	Constraints	Concept
Limiting soil disturbance through clear felling and ground preparation will help protect water quality and reduce carbon emissions from the woodland.			• Limited choice of commercial species that are well suited to the site conditions. • Growing exotic conifers to seed bearing age inadvertently threatens those adjacent areas being managed towards broadleaf woodland or open ground.	
Maintain and improve the ecosystem services provided by this site. Peatland restoration to enhance carbon sequestration and hydrological function. Increased planting on open ground to increase carbon sequestration and biodiversity.	C, D, E, F & G	• Areas of deep peat on existing open ground. • Large open areas with potential to create upland birchwoods and to establish riparian planting.	• Access to the deep peat areas will require the machinery to traverse steep ground to access the hill tops, where the peat restoration areas are located, on open ground around the plateau. • Some riparian areas supply private and public water supplies – caution required in ground preparation.	• Restoration and maintenance of deep peat areas. • Improved habitat and connectivity between riparian areas. • Greater proportion of broadleaves in the forest.
Protect utilities infrastructure and telecommunications of rural community Residents of a remote community depends on the utilities and telecommunications which run through the block.	J	• Maintenance of existing undisturbed utilities and telecommunications. • No disruptions to supplies caused by FLS or our contractors.	• Dependent on the quality and accuracy of the data supplied by utility companies. • Dependent on communications by contractors to employees and hauliers.	• Encourage utility companies to provide the latest updated utility maps. • FLS highlights utilities to contractors and undertake Pre Contract Meetings (PCM) walkovers with contractors to identify risks. • Ensure FLS maps identify location of utilities and telecommunications.

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Peatland: Extensive peatland needs to be assessed and areas prioritised for restoration

Broadleaves: Opportunity to expand BLs along riparian areas to link to peatland and open habitats, and increase the proportion of BLs for UKFS compliance.

Open Area: Restock open area with native woodland.

Larch and Lodgepole: Construct minimal length of road to access Larch, as future commercial conifers are borderline financially

Adaptability: Put forward more felling coupes than needed to ensure permission is in place in case wildcats delay felling. Make sure there is flexibility in contracts for weather and environmental constraints which may mean limited working window. Ensure frequent maintenance of key roads to prevent delay.

Timber haulage: Ensure core road network is maintained to allow access for properties and for removal of priority Larch and windblow

Low Quality Crops: Lodgepole pine crops have Dothistrma Needle Blight (DNB). Thin Pine whilst extracting Larch from crops

Under utilised ground: Consider broadleaf woodland expansion in this area

Wildcats: Rate of change with wind blow and Larch removal needs to be monitored for wildcats

Dendroctonus micans: (Great Spruce Bark Beetle). Ensure all Spruce windblow and felling is removed within the 20km buffer zone

Wildlife: Ensure habitats for European protected wildlife species are protected

Non-native regeneration: Remove all non-native regeneration that has been spreading on open, riparian and PAWS areas while it is small and manageable. Continue frequent removal contracts.

Woodland Creation: Opportunity to expand upland transitional woodland up the hill.

Rate of change: Prioritise works that need to take place i.e. clearing wind blow and felling Larch difficult coupes. Delay non priority coupes if possible to try to slow the rate of change

Water supply: Restock all areas to East of water supply with BLs to ensure future access to trees are not required over water supply

Species: The soils allow a wider variety of commercial crops, and access will be good. Concentrate on mixed commercial conifers.

SPHN: Larch in SPHN is being removed as soon as possible

Wind firm: Establish a framework of BLs up the burns to create wind firm edges

Larch: Target difficult coupes due to issues of access, steepness of ground, powerlines , to ensure that there is good lead in time for these difficult coupes. Ensure all Larch coupes are planned in case of SPHNs

Access: 1km of road is already being built. The intention is to link this to the Glenmarkie road to the North, to access the Larch

Glen Isla and Glenmarkie Concept map

Scale @ A2: 1:25,000

Date: 24/01/2023

Author: U320903

0 0.2 0.4 0.8 1.2 1.6 Km

N

- Forest Roads
- Planned Roads
- Access connections
- Habitat connections
- Watercourses
- Drinking Water Protected Area
- Sensitive, smaller scale coupes
- Access restricted
- Active SPHN
- SPHN Felled and compliant
- Dendroctonus micans 20km buffer
- Larch
- Lodgepole
- Dothistroma Needle Blight (DNB)
- Mixed commercial
- Native with peatland
- Glen Prosen recent FLS acquisition
- 35 degree or more steep slope
- Windblow
- Peatland

Scotland's National Forest Estate is responsibly managed to the UK Woodland Assurance Standard

FSC PEFC

6. Land Management Proposals

6.1 Standards for Operations

The Glen Isla LMP has been designed in accordance with good silvicultural, legal, and environmental practice to meet UKFS & UKWAS Standards. The standards to which FLS manage Scotland's Forests and Lands can be seen on the FLS website.

6.2 Silviculture

6.2.1 Silvicultural Systems

Most of the afforested area has a DAMS score of less than 16, so is climatically suited to thinning. However due to the age and thinning history of most crops, thinning may not be achievable over all coupes in this rotation.

For commercial conifer crops, primarily the management system will continue as a clearfell system, maximising land productivity. As restock commences with a greater diversity of species and begins to change the age and species structure of the forest, there may be opportunity for some additional shelterwood systems in the future.

Broadleaf areas will be established with the intention that they will be managed towards lower impact silvicultural systems with natural regeneration as the regeneration methodology of preference. Details of the proposed silvicultural systems are included in the Management Coupes map.

6.2.2 Plant Health

Thinning is a key tool in managing the site in respect of plant health. The removal of individuals of lower vitality and those under stress will improve the chance of resistance at a stand level. Thinning will also improve airflow through the canopy which in many instances has been proven to be beneficial in at least reducing the impacts of infection. Thinning coupes identified within this Glen Isla LMP are designed to target larch to reduce and potential future infection from Phytophthora ramorum. (See Thinning Coupes maps).

6.3 Future Habitats and Restocking

6.3.1 Future Species

The Future Species maps lay out the aspirational plan at a point in the future whilst the Restock Coupes maps illustrate the restocking prescriptions for those coupes worked within this plan period (See Future Species Maps & Restock Coupes maps). A large focus of the restocking plan will be to plant those coupes which experienced extensive windblow from Storm Arwen. Species selection is designed to increase the species diversity of productive conifer to reduce the risk from tree diseases and climate change. Diverse conifers such as Macedonian Pine and Noble Fir will be among the species selected for restock.

6.3.2 Woodland Creation

The FLS land management strategy is to make the most of the land we hold. There are large areas of open ground, principally at higher altitudes where there is no tree cover. There is opportunity to enhance these areas to sequester carbon, increase biodiversity and to enhance the landscape character of the forest by planting selective areas of open ground. To achieve these environmental gains, we propose to establish areas of native woodland. This design will mature to form a more natural woodland edge rather than the existing hard conifer edges which are prevalent. Species planted will be oak, birch, aspen, alder, and other broadleaves. Several of these new planting coupes will have a small element of broadleaves and conifer, to smooth the transition from existing conifer stands and to soften the landscape.

Most of these new planting coupes will require nursery plants to be sourced, given the low percentage of broadleaves in the block for natural regeneration. Where there is scope for natural regeneration, we will take advantage of this. Whilst the proposed new broadleaf planting areas will aim to achieve 1,600 stems per ha, some riparian areas and upper slope margins will still maintain areas of open ground, so an open feel to these riparian and upland areas is retained. Access to these open areas will be managed to facilitate wildlife management activities (See Wildlife Management maps). Full details of the Woodland Creation proposal can be found in Appendix VII).

6.3.3 Regeneration Methodology

Regeneration of crops felled in this rotation will be through planting. This will facilitate species change where required but also to take advantage of improved stock where this has been developed.

6.3.4 Ground preparation

Standard upland forest establishment techniques will be adopted. The FLS Guidance on Ground Cultivation for Forestry and Land staff will be adhered to in decisions related to ground preparation. This FLS guidance recommends a range of ground preparation methods, and these are selected on an area-by-area basis depending on soils and vegetation on site at the time of restock and will also be determined by the future restock species and the soils post harvest.

In general, areas to be restocked with a commercial conifer crop on gleyed soils will likely use hinge mounding, whilst on podzols this will likely be via patch scarification. Ground preparation for broadleaves would likely be done via screef planting. Restock coupes will be maintained and monitored via Stocking Density Assessments to ensure establishment of specified tree density.

We aim to plant commercial conifers uniformly to a stocking density of 2,700 stems / ha to achieve 2,500 stems / ha by year 5. The broadleaf restock areas will be planted at 1,600 stems / ha.

Environmental surveys will be undertaken by the FLS Environment Team prior to the commencement of ground preparation operations.

6.3.5 Adjacency

There is some adjacency in several coupes in the forest. The Angus Glens were extensively impacted by Storm Arwen leading to catastrophic windblow in areas such as on the eastern side of Backwater Reservoir in the Glen Markie part of the forest. These coupes and the storm damage have been highlighted to Scottish Forestry and Felling Permission was granted for these previously, given the extensive windblow damage which swept through adjoining coupes.

6.4 Open Land

There are extensive areas of Glen Isla which are managed as open ground. FLS are required to ensure that we achieve maximum benefit from our land holdings and the declaration of a Climate Emergency has increased the focus on woodland creation. We have assessed the open ground areas in the forest and some of these areas have been identified for Woodland Creation (Appendix VII). A further objective of the Woodland Creation on these areas is to address the Scottish Biodiversity Strategy. This will manage the transition from the productive afforested lower slopes to the open hill ground in a more sensitive way. In order for this transition to be most effective, areas have been identified for tree planting on areas of existing open ground.

6.5 Riparian Management

Assessment of the existing riparian areas has highlighted these are under-utilised and there is potential to enhance the biodiversity value and carbon sequestration potential of these. New planting with native broadleaves in riparian areas will provide greater shade along watercourses for fish and invertebrate populations and will also help to reduce potential contaminants running off the land, by slowing the velocity of overland flow to watercourses. Planting of native trees along the Taitney Burn will improve the water quality and reduce potential impacts from future harvesting activities.
Existing FLS operations will continue to adhere the Forest and Water Management Guidelines.

6.6 Recreation

FLS promote recreation and access within the wider Angus Glens, with the focus being on our forest at Glen Doll. As such, Glen Isla is not a forest where promotion and expansion of recreation is being prioritised given the proximity to Glen Doll. Whilst there are no formal visitor zones identified within Glen Isla forest, there is a small car park at Freuchies which FLS maintains, which is used by the small number of visitors who use the forest. There is a core path from the car park which forms a loop along forest roads, passing Loch Shandra in the west before returning via the road between Glenmarkie and Freuchies, and signage for the core path is undertaken by the Local Authority. FLS do maintain the condition of this circular core path as it runs on FLS forest roads. The Cateran Way passes just outside of Glen Isla forest on the western boundary and is accessible via a path from Loch Shandra.

There is a Scotways footpath which links Glen Isla with Glen Prosen and enters the forest at NO 2453 6412, which mainly follows forest roads in the block. There are several other Scotways footpaths, including one which connects the forest to Cairngorms National Park (See recreation map).

There are several viewpoints on the summit of a number of the hills within Glen Isla such as Hare Cairn and The Crock, and the new planting proposals includes both of these hills. However, regards the viewpoints, there is no proposal to plant trees on the summit of Hare Cairn and this will remain open ground. Around the surrounding summit of The Crock NO 2260 6326, the proposal is to plant this area with 30% Downy Birch / 30% native mixed broadleaves and 40% open. Given the 40% open element within this planting proposal, this allows for views to be retained from the top of the Crock through the planting design. The species choice for The Crock and Hare Cairn and the open ground elements within these stocking proposals were chosen with the maintaining of public access to the summits of these hills a consideration.

6.7 PAWS Restoration

There are no PAWS sites located within Glen Isla forest.

6.8 Invasive Species

Given the location of Glen Isla at the head of the glen, to date there has been no invasive species identified.

6.9 Herbivore Management

It is likely the most significant deciding constraint for the proposals within this plan is the ability to maintain herbivore pressure at a level which permits the establishment of palatable species. Currently, the existing deer fence is in a good condition except in an area around Freuchies. Neighbouring land uses promotes high numbers of deer. As such, the only management option for the site is to maintain a deer proof boundary fence. This boundary fence allows effective deer control of the resident population to a level which enables establishment of palatable species.

With FLS having recently purchased the adjacent Glen Prosen estate, this provides greater opportunity to maintain the deer population at its current level. Management of deer on site will be in line with the FLS -

East Region Protection Strategy. The aim of this strategy is to maintain deer populations at a level which protects regeneration from negative impacts from over grazing.

6.10 Heritage Features

There are no Scheduled Monuments within or adjacent to the blocks. The small number of remnant shielings and historical agricultural remnant buildings within the site will continue to be protected by following best practice guidance.

6.11 Access

Existing access in Glen Isla will continue to facilitate felling and planting operations and allow resident access. There are Storm Arwen windblown coupes which are not currently accessible and this needs to be addressed to ensure the fallen timber can be removed for commercial and public safety reasons.

6.11.1 Operational Access

New roads are required to be built to access windblow to the west of the Finlet Burn in the Glen Isla part of the forest. Creation of a new road will allow FLS access to fell and remove large areas of windblown conifers, including large stands of mature larch, and removes the risk of crossing the Finlet Burn during harvesting operations.

Within the Glen Markie area of the forest, it is proposed that new roads are created to link up the Backwater Reservoir side of the Glen Markie block with the Glen Isla block. Glen Markie has limited access to the slopes on the eastern side and new roads will be required to remove the extensive windblow. This will allow felling operations of large areas of windblown larch from the Backwater side of the forest.

FLS Civil Engineers will seek the appropriate planning consent and prior notification for road infrastructure prior to the commencement of any construction activities. The proposal will include provision for access ramps for operational site access.

The proposed new road lines in Glen Finlet and in Glen Markie will not cross any watercourses. Run-off from any roadside drains will be managed to reduce the risk of run-off onto adjacent land holdings. During recent construction of a section of new road from Backwater Reservoir, FLS have been in discussion with Scottish Water about mitigations to reduce the risk of run-off in Glen Markie. In line with all planned FLS operations, Forest and Water Guidelines and the Water Environment (Controlled Activities) (Scotland)- Regulations 2011 will be adhered to at all stages in the design, construction, use and maintenance of this road.

To assist in meeting the above requirements and to prevent siltation in any watercourse; any issues identified at the workplan stage will be included in the construction method statement. A pollution prevention plan will be drawn up in accordance with SEPA guidelines and FLS will continue to liaise with Scottish Water.

6.11.2 Specifications

The specifications for the new access will be designed and created in line with the publication FLS Civil Engineering Handbook (3rd Edition Revised 2019).

6.11.3 Timber Haulage

Timber haulage will be via two exit points. The first of these is the existing route from Glen Isla which joins the Timber Transfer - Agreed Route at NO 2246 6022.

The second Haulage route will be via the proposed new Backwater road and along a section of the Scottish Water road on the western side of Backwater Reservoir. This route is a Timber Transfer consultation route, from NO 2510 5901 – NO 2491 5764. Consultation with Angus Council will be sought prior to haulage activities on this route.

6.11.4 Management Access

The forest has a good ATV network for wildlife management, but where there is the potential requirement for new ATV track creation to support the establishment of Woodland Creation, these will be subject to the appropriate Prior Notification process.

7. Critical Success Factors

7.1 Conifer Area

FLS will continue to prioritise removal of the windblown timber so forest operations can move away from reactive felling. This will include a targeted reduction in the total volume of larch in Glen Isla to make the forest more resilient to tree disease. This will require timely thinning and the proactive targeting of larch in thinning coupes. Development of a second rotation restock programme with an increase in the diversity of conifer species to reduce the risk of future pests and diseases.

7.2 Broadleaf Area

New planting areas will begin to link habitats across the block and will reduce the risk of Sitka spruce regen blanketing open ground and riparian areas.

7.3 New Roads

The creation of new roads is fundamental to the success of accessing Storm Arwen windblow coupes and to allow subsequent restocking of windblown coupes. This will lead to a reduction in the volume of larch in the forest and allow timely restocking. Creation of a new road in Glen Markie will provide additional haulage extraction routes and will reduce conflict with neighbours in the forest.

7.4 Woodland Creation

Upland birchwood creation will soften the landscape, create habitat, and sequester carbon. This will bring biodiversity benefits through an increase in species richness.

7.5 Peatland Restoration

Peatland Restoration on open ground area in the north of Glen Isla will lead to improved hydraulic function in areas of deep peat and promote an increase in bog species such as sphagnum and reduce loss of carbon rich soils.

7.6 Water Quality

Long term, newly planted riparian areas will enhance biodiversity in riparian habitats and in the aquatic environment and will lead to improvements in water quality. Day to day forest management will lead to no reduction in water quality from felling operations or ground preparation work from FLS activities.

7.6.1 Scottish Water & Drinking Water supplies

FLS have been in discussion with Scottish Water about the protection of drinking water supplies during the development of this LMP and we will continue this liaison ahead of forestry operations which link to the DWPA.

These discussions have focused on a number of areas to benefit both organisations and have covered:

- Landscape scale peatland restoration across march fences to reduce cross boundary peat-hagging. This work has the potential to reduce Dissolved Organic Carbon (DOC) and treatment costs at water treatment works.
- Identifying where there may be pinch points in ditches and watercourses used for water management during operational activities and suggested mitigation actions for these.
- Discussions on restock proposals within the LMP and the fallow period for these areas. Via these discussions it was agreed that there was no requirement to hot plant within the DWPA, as most damage to soils occurred when Storm Arwen hit, due to the windblown trees' root plates being exposed. Both parties recognised the greatest benefit to soil management would be the removal of the windblown trees to enable FLS to restock the windblown impacted area within the DWPA.
- Discussions on new forest road construction in the Backwater Reservoir catchment. This included recommendations from Scottish Water to continue to meet the UKFS and follow Forest and Water Guidelines, and to take into account the Guidance on Forestry Activities Near SW Assets.
- Restoration of march fences post Storm Arwen and management of march ditches.
- Discussions on deer fencing and the potential for the wider catchment area to have a joined-up deer management protocol.
- Scottish Water and FLS have discussed at length haulage of timber via the Scottish Water owned road on the western side of Backwater Reservoir.
- Discussions around access to allow both parties timber haulage across the existing road infrastructure and via the proposed new FLS forest road in Glen Markie.
- Scottish Water and FLS visitor services teams working collaboratively to promote access rights being exercised responsibly by members of the public.