Easter Ross

Land Management Plan
2024 - 2034
030-516-444

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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Property details	
Property Name:	Easter Ross
Grid Reference (main forest entrance):	NH 7586 7914
Nearest town or locality:	Tain
Local Authority:	Highland Council

Applicant's details	
Title / Forename:	Eelco
Surname:	De Jong

Applicant's details	
Position:	Planning Forester
Contact number:	07776172088
Email:	Eelco.dejong@forestryandland.gov.scot
Address:	FLS Golspie Office, Golspie Business Park
Postcode:	KW10 6UB

Owner's Details (if different from Applicant)	
Name:	N/A
Address:	N/A

1. I apply for Land Management Plan (LMP) approval for the property described above and in the enclosed Land Management Plan.

2. I apply for an opinion under the terms of the Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017 for ~~afforestation~~ / deforestation / roads / ~~quarries~~ as detailed in my application.

3. I confirm that the scoping, carried out and documented in the Consultation Record attached, incorporated those stakeholders which the FC agreed must be included. Where it has not been possible to resolve specific issues associated with the plan to the satisfaction of the consultees, this is highlighted in the Consultation Record.

4. I confirm that the proposals contained in this plan comply with the UK Forestry Standard.

5. I undertake to obtain any permissions necessary for the implementation of the approved Plan.

Signed, Regional Manager		Signed, Conservator	
FLS Region	North	SF Conservancy	Highlands and Islands
Date	8th February 2024	**Date of Approval**	
		Date Approval Ends	

Contents

1.0 Objectives and Summary

1.1 Plan overview and objectives

Plan name	Easter Ross
Forest blocks included	Morangie, Strathrory, Inchindown, Wallace Hill, Leinster Park, Morrich More, Dounie, Struie and Cnoc Navie
Size of plan area (ha)	6900ha
Location	See **Map 1 – Location & Viewpoints**

Long Term Vision
50 Year vision *The biodiversity and quality of the native woodlands, open habitats and designated sites will have improved due to continuous effort of managing open space, rewetting, removal of invasive non-native species and increased age and species diversity. Riparian woodland will have established along watercourses increasing water quality and buffering forest operations. Populations of capercaillie, red squirrel as well as species associated with deadwood are thriving as a result of proactive management to benefit these species.* *Considering the soil composition and designations the preferred tree species in the majority of the block will remain Scots pine habitat. The main tree species will therefore still be Scots pine with other species being used where soils and growing conditions require. The biggest change to the forest will be from single-storey, single-aged, monoculture forests to multi-aged and sometimes multi-storied and multispecies forests.*

These forests are more resilient whilst ensuring the production of high quality sawlog for timber markets and providing the necessary habitat for Scots pine associated species.

The Easter Ross forests will be actively used by the local communities for recreation. Walking, mountain biking, horse riding and other forms of recreation will be commonplace. The local highlights such as Aldie Burn and Tain Hill will attract locals as well as people from further away.

Peatland restoration will have taken place on deep and nutrient-poor ground and there where it is adjacent to priority habitat. This will have reversed the negative carbon emissions and the now active peatlands are sequestering carbon again. Pockets of native woodland on shallow soils will further promote biodiversity and a natural landscape.

Management Objectives

1. Diversify tree species and age to mitigate against climate change and disease
2. Produce high quality sawlog for local timber markets
3. Manage to benefit habitat for Capercaillie by maintaining lek habitat and protecting and expanding brood habitat especially within the SPA area.
4. Restore peatland where this is in line with current guidance
5. Retain recreational facilities and look for opportunities to work with local user groups to improve facilities
6. Manage deer population to enable natural regeneration and allow restocked sites to develop
7. Establish riparian woodland along watercourses

Critical Success Factors
• First CCF transformation operations will need to have been carried out in mature pine crops • A steady flow of timber will need to be harvested from Easter Ross to supply local markets and achieve the other management objectives • Deer densities need to remain at a level to allow for natural regeneration • Where felling takes place alongside watercourses riparian woodland will need to be established

1.2 Summary of planned operations

Table 1: Summary of operations over the plan period

Summary of Operations over the Plan Period	
Clear felling (gross)	1207.2 ha
Strip felling	139.6 ha
Thinning (potential area)	3872.7 ha
Restocking (gross)	1016.9 ha
Afforestation	0 ha
Deforestation	329.7 ha
Forest roads	2710 m
Forestry quarries	0 ha

The forest is managed to the UK Woodland Assurance Standard – the standard endorsed in the UK by the *Forest Stewardship Council and the Programme for the Endorsement of Forest Certification*. Forestry and Land Scotland is independently audited to ensure that we are delivering sustainable forest management.

2.0 Analysis and Concept

The planning process was informed by collecting information about the woodland, which is presented in **Appendix 1 – Description of Woodlands, Map 2 – Key Features** and **Map 3 – Key Water Features**. During the development of this plan we have consulted with the local community and other key stakeholders, and a Consultation Record is presented in **Appendix 3 – Consultation Record**.

Below lists the objectives for the site and how the key features present opportunity or constraint. The Analysis of these form the concept for this LMP. Different management options for achieving the plan's objectives were considered against the constraints and opportunities identified during scoping and consultation. The preferred approach is summarised on **Map 4 – Analysis & Concept**.

Table 2 : Analysis and concept

Objective	Opportunities	Constraints	Concept
Diversify tree species and age to mitigate against climate change and disease	High percentage of mature Scots pine makes it economically viable to restructure. Some of these are on slightly better soils which allows for species diversification Good access across most of the block will improve chance of success Removal of larch as a preventative measure against *Phytophthora ramorum* frees up good ground for other species	Constraints such as LEPO and PAWS as well as SSSI's/SPA's and SAC's limit use of non-native species. In large parts of Easter Ross species choice is very limited due to low fertility and very wet soils Continuous Cover Forestry is difficult or impossible in the majority of the Easter Ross LMP area due to the limited rooting depth and high exposure	A mix of strip felling, group shelterwood felling, continuous thinning and clearfelling will be used for the necessary restructuring across the block. Where possible, the least intensive method will be chosen but due to instability and lack of fertility sites will sometimes need to be either clearfelled or stripfelled. Where clearfelling takes place restock will be designed to allow for smaller coupes in the future. All opportunities will be sought to diversify species composition. Where there are no soil fertility or environmental constraints other species will be used. Native broadleaves will be planted and stimulated in forest edges, around waterbodies and on operationally difficult ground.
Produce high quality sawlog for local timber markets	Soils in Easter Ross allow for the growing of high quality sawlog Timber markets are closeby increasing timber value The blocks are generally well roaded which allows for easier and more environmentally friendly harvesting as well as increased prices	General yield classes are low due to infertile soils Yield has reduced due to overthinning and infection of *Peridermium pini* Rooting depths are generally poor	All productive areas in Easter Ross will be thinned where possible to ensure highest quality of timber. Scots pine will mostly be used in areas of low fertility using strip felling where stability is adequate. Higher yielding species such as firs and spruces will be used in more nutrient rich areas using group or single tree selection. Overthinned areas will be transformed to ensure maximisation of yield.

Manage to benefit habitat for Capercaillie	Diversification of age for forest resilience will likely also benefit Capercaillie Small scale regeneration where possible will increase structure and benefit Capercaillie	Potential conflict between increased recreation, forest operations and Capercaillie Species diversification could have a negative impact on Capercaillie habitat	Operations will be carried out outwith Capercaillie breeding seasons and leks will be protected Within the SPA Scots pine will be the default species for restock unless site characteristics dictate otherwise. All operations in the block will be done under guidance of the internal conservation team and the national SME with Capercaillie as the main objective
Restore peatland where this is in line with current guidance	Planted areas on deep peat are getting ready for harvesting Without fertiliser, heather spraying and/or ploughing lower yielding areas on deep peat are unlikely to be economically viable for forestry going forward	Areas of deep peat are poorly roaded Some areas consist of a mosaic of peat and mineral soils which in the future might make forest management difficult	A thorough assessment of peat depth and forest performance will be carried out to ensure guidance is adhered to. Peatland restoration design will be done to ensure roadside frontage for future forests.
Retain recreational facilities and look for opportunities to work with user groups to improve facilities	Objectives such as diversifying age and species structure will likely improve recreational value as well	Recreational use and operations exclude one another for safety reasons which can lead to negative impact on either Limited budgets for creation and maintenance of recreational facilities	Good communication and cooperation with user groups will result in minimal disturbance to recreation as a result of forest operations and input from user groups can be used to improve recreational value
Manage deer population to enable natural regeneration and allow restocked sites to develop	Easter Ross is well roaded allowing for easy access and extraction	Undergrowth limiting opportunities for shooting High recreation limiting opportunities for shooting Impact of deer on small areas of CCF transformation might be significant as a small number of deer could cause a relatively large amount of damage	Access for wildlife managers will be retained and enhanced. Particularly in areas of CCF transformation access will be essential to ensure the areas of regeneration aren't damaged. Where necessary palatable species will be tubed to ensure successful establishment.

Establish riparian woodland along watercourses	Establish riparian woodland will reduce risk of polluting watercourses during future operations as well as improving the aquatic habitat and providing corridors of native low intervention woodland	Deer numbers might make it difficult to establish more palatable species Most riparian areas have currently got a non-native crop on them which is not ready to be felled yet	Riparian zones will be planted after the current crop reaches an economically viable age for felling. This will allow for the operations to be integrated in adjacent restock works and should result in better ability to manage deer and lower cost of establishment Where necessary tubes will be used to ensure successful establishment.

3.0 Management Proposals - regulatory requirements

This LMP was produced in accordance with a range of government and industry standards and guidance as well as recent research outputs, recognised at the time of its production. A full list of the current standards and guidance which guide the preparation and delivery of FLS LMP's can be found in **Appendix 14 – Key policies and publications.**

All forestry operations are planned in accordance with the UK Forestry Standard 2023, and access during operations maintained according to the *Forestry Commission practice note - managing public safety on harvesting sites (2013).*

3.1 Designations

Map 2 – Key Features and **Map 3 – Key Water Features** show the location of all designated areas and significant features. Any deep peats are indicated on **Map 9 – Soils** with peat depths for relevant sites found on **Map 11 - Deforestation**. Scheduled monuments are shown on **Map 2 – Key Features** and **Map 12 – Historic Environment** and listed in **Appendix 5 – Environmental Features**.

The plan area forms part of, includes, or is covered by the following designations and significant features.

Table 3 : Designations and significant features in the Easter Ross LMP area

Designations and significant features		
Feature type	**Present**	**Note**
Site of Special Scientific Interest (SSSI)	Yes	See **Map 2 – Key Features**
National Nature Reserve (NNR)	No	
Special Protection Area (SPA)	Yes	See **Map 2 – Key Features**
Special Area of Conservation (SAC)	Yes	See **Map 2 – Key Features**
World Heritage Site (WHS)	No	
Scheduled Monument (SM)	Yes	See **Appendix 5 – Environmental Features** and **Map 12 – Historic Environment**
National Scenic Area (NSA)	Yes	Dounie and Struie blocks, see **Map 2 – Key Features**
National Park (NP)	No	
Deep peat soil (>50 cm thickness)	Yes	See **Map 9 - Soils**
Tree Preservation Order (TPO)	No	
Biosphere reserve	No	
Local Landscape Area	No	
Ancient woodland	Yes	See **Map 2 – Key Features**
Acid sensitive catchment	No	
Drinking Water Protected Area (Surface)	Yes	Cnoc Navie & Struie, see **Map 3 – Key Water Features**

3.2 Clear felling

Sites proposed for clear felling in the plan period are identified as Phase 1 and Phase 2 coupes on **Map 5 – Management Coupes.**

Table 4 – Phase 1 felling coupes

Phase 1	Coupe ref	Area (ha)	SS (ha)	LP (ha)	SP (ha)	Larch (ha)	Other (ha)	Monitoring comments
	59152	49.4		39.3	2.7	7.4		Windblown, part peatland restoration
	57126	10.0	0.5		9.4			Windblow clearance in NSA
	59178	65.5	1.8	42.5	17.5	3.7		Windblow clearance
	59189	13.8	3.3		3.8	4.6	2	Lawson Cypress removal included
	59316	25.2	1.5		12.8	10.9		Seed tree felling – will aim for a higher retention (>150 stems per ha)
	59816	13.5			0.3	13.2		
	68306	15.5	11.6		1.4	0.5	2	
	59314	16.0	8.1		6.5	1.1		Part peatland restoration
	68243	18.0	10		8			Gorse, hotplant if possible
	59169	26.0	1.7	24.3				Peridermium clearance
	59066	37.6	18.8	18.8				
	57690	27.4		13.9	13.5			Windblow clearance
	59348	44.7	22.4	22.3				Part peatland restoration
	59179	26.1	11.2	13.4			1.5	
	59880	59.6	28.8	28.8	2			Peatland restoration
	59247	95.6	44.7	44.7	3.8	2.4		Peatland restoration
	59100	106.6	47.9	47.9	10.4	0.4		Peatland restoration
	59173	33.3		1.6	16.4	15.3		

Table 5 – Phase 2 felling coupes

Phase 2	Coupe ref	Area (ha)	SS (ha)	LP (ha)	SP (ha)	Larch (ha)	Other (ha)	Monitoring comments
	59302	23.0	0.6		16.3	5	1.1	Seed tree felling – will aim for a higher retention (>150 stems per ha)
	57125	14.8	4.6		2.8	7.4		
	59427	23.4	5.4			0.8	17.2	
	59039	20.0		17.8	2.2			
	59171	39.2			26.7	10.9	1.6	
	59243	32.5	22.8	9.7				
	59191	27.2			24.1	2.1	1	Gorse, hotplant if possible
	68309	33.0	26.5		3.2	3.3		
	59333	19.1	14.5	4.6				
	59128	70.2		70.2				Part windblow, part peatland restoration
	59931	25.9	1.5	18.5	5.9			Part windblow
	59141	17.8		12.8	4.5		0.5	
	59347	53.5	19.6	19.6	14.3			Part peatland restoration
	57474	11.5	3.2		0.5	4	3.8	
	57074	13.1	1.5	8.4		0.5	2.7	
	59542	45.7		21.1	9.9	11.2	3.5	Likely peatland restoration site
	59306	35.0	0.1	13.6	13.8	0.9	6.6	
	59001	20.0	15			1	3.9	

3.3 Strip Felling

Sites proposed for strip felling in the plan period are identified with a separate colour on **Map 5 – Management Coupes.**

Table 6. Strip Felling (Phase 1)					
Coupe No.	**Coupe size (Ha)**	**Max. strip area within coupe(Ha)**	**Year**	**Spp**	**Monitoring Comments**
59308	43.2	14.4	26/27	SP/JL/NS	
59301	104.7	34.9	26/27	SP/LP/JL/NS	
59161	107.8	35.9	27/28	SP/SS	
59174	163.2	54.4	27/28	SP/SS	
Totals	418.9	139.6			

3.4 Scale of proposed felling

Table 7: Scale of Proposed Felling Areas (clearfell & stripfell)

Scale of Proposed Felling Areas										
Total Woodland Area			**6900 ha**							
Felling	Phase 1	%	Phase 2	%	Phase 3	%	Phase 4	%	LTR, MI & NR	%
Net Area (ha)	683.9ha	9.9	524.9ha	7.6	346.7ha	5	258.5ha	3.7	981.8ha	14.2

3.5 Thinning and LISS

Table 8. Thinning (Phase 1 & 2)

Coupe No.	Total Area (Ha)	Thin Year	Species	Prescription for Thinning	Final Thinned Area (Ha)	Final Vol/Ha Removed	Monitoring Comments
73902	142.9	23/24	CP/SP/EL/LP	Last thin before start of CCF transformation (light low thin) **deforest 1ha strip at shore**			
68908	200.4	23/24	SS/SP/HL/JL/EL/DF	Last thin before clearfell for SS (light low thin). Last thin before start of CCF transformation for SP (light low thin)			
59903	74.9	24/25	SP/NS/JL/SS	Last thin before start of CCF transformation (light low thin)			
59904	186.5	24/25	SS/SP/DF/JL	Largely 2nd thin (high intensity, high thin), small areas of 1st thin (rack and thin), small areas of mature SP (light low thin)			
59922	223.1	24/25	SS/SP/HL/WH	Largely 2nd thin (high intensity, high thin), small areas of 1st thin (rack and thin), small areas of mature SS (thin hard to reduce seedload in SP areas, remove any WH)			
59928	77.6	24/25	SS/LP/NS/EL	1st thin (rack and thin)			
57904	65.3	24/25	SP/SS/EL/JL/DF	Last thin before start of CCF transformation (light low thin)			
57905	19.8	24/25	SS/HL/SP/JL	1st thin (rack and thin)			
59926	107.9	25/26	SS/SP/JL/EL/NS	Group felling at the bottom of the coupes. Fell holes of approximately 60m diameter with a 60m interval. Groups becoming more sparse closer to forest road. Northern section 1st thin (rack and thin)			
59919	136.1	25/26	SP/LP/SS/HL	Review response in 59918, if response is good standard thin to improve form in this coupe (intermediate thin)			
59908	41.6	25/26	SP/SS/WH/JL	Remove any WH. Last thin before clearfell (light low thin)			
59907	52.1	25/26	SP/SS/WH/JL	Natural Reserve, to allow for set-up operation. Remove SS and WH			
59923	15.8	25/26	SP/SS	Last thin before clearfell (light low thin)			
59912	236.7	26/27	SP/JL/LP/SS/NS	Expansion of groups in western section. Thin of areas between strips. (some areas also covered under strip felling or seed-tree felling)			
59933	163.3	27/28	SP/SS	Thin areas between strips (area also covered under strip felling) remove any harvestable SS			
59927	170.8	27/28	SP/LP/SS	Thin areas between strips (area also covered under strip felling) remove any harvestable SS			
59916	37.8	27/28	SP/SS/JL	Last thin prior to clearfell. Remove low percentage of crop if necessary, disease and poor form			
59917	59	27/28	SP/LP/NS/EL/JL	Start making groups in lower sections away from road (60m diameter)			
59909	20	27/28	SS/HL	Likely last thin before clearfell (intermediate thin)			

59929	160.1	28/29	SP/DF/SS/LP	Thin for recreation purposes, create diversity, promote regeneration using small fellings (60m diameter) further from roads			
59913	137	28/29	SP/SS/JL/LP	1st thin (rack and thin)			
59906	249.9	28/29	SP/LP/SS/JL	1st thin (rack and thin) in young crops. Small fellings in mature SP below road (60m diameter) becoming more sparse closer to forest road. Light thin in mature SP above the road			
59915	15.8	28/29	SS/EL/SP	1st thin (rack and thin)			
59905	26.8	28/29	SP/JL	Last thin before clearfell (light low thin), remove any Peridermium pini infected trees			
59930	82.4	28/29	SS/SP/HL	1st thin (rack and thin)			
59918	184.2	30/31	SP/SS/HL/LP	Review response to previous thinning, if response is good thin again (intermediate thinning)			
57903	25.2	30/31	SP/JL/BI	Last thin before clearfell in mature SP (light low thin), 1st thin in Bi/JL (rack and thin), hard thin in SS (particularly in south) to promote regen			
59931	23.2	30/31	SP/BI/LP	1st thin (rack and thin) in young crops. Light thin in mature SP/LP (light low thin)			
59925	8.8	30/31	MC/MB	To allow for removal on non-natives from riparian zone			
59934	26.5	30/31	SP/SS/HL/EL	Excessive regen in coupe, 1st thin in regen following old racks, hard thin in mature crop to promote further regen			
59910	73	30/31	SP/EL/LP/NS/SS/JL	1st thin (rack and thin)			
68901	76.3	30/31	SS/SP/LP/JL	Group felling starting furthest from TP becoming more sparse close to TP (60m diameter)			
68902	35.8	30/31	MB/SP	1st thin in SP (rack and thin). Single tree selection in MB on form and crown depth			
59932	46.1	31/32	SP/SS/MB	1st thin (rack and thin)			
59924	13.6	32/33	SP/NS/SS	1st thin (rack and thin)			
59920	41.4	32/33	SP/Bi	1st thin (rack and thin)			
59911	615	32/33	MB/MC	To allow for removal on non-natives from riparian zone			
Total	3872.7				0	0	

Potential sites for thinning and LISS systems in the plan period are identified on **Map 5 – Management Coupes and Map 7 – Thinning coupes**

This covers an area of 3872.7 ha

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 MAI, or 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.

3.6 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 over the plan area covered by this approval is 75 cubic metres per calendar year.

A record of the volume felled in this way will be maintained and will be considered during the five year LMP review.

[N.B. Trees may be felled without permission if they: are of less than 10 cm diameter at breast height (1.3 m); pose immediate danger to persons or property; are completely dead; or are part of Authorised Planning Permission works or wayleave agreements].

3.7 Restocking / New Planting

Proposed restocking and new planting is shown on **Map 6 - Future Habitats and Species** and detailed in the tables below.

Table 9. Phase 1 Restock (2024-2028)										
Coupe No.	**Total Area (Ha)**	**SS (Ha)**	**LP (Ha)**	**SP (Ha)**	**Other Non Native Con. (Ha)**	**Native B/Leaf**	**Open (Ha)**	**Year**	**Method**	**Monitoring Comments**
59895/67342	32				18.2	10	3.8	23/24	R	Planting winter/spring 23/24
59691	47.6			8.6	4.8	13.9	20.3	23/24	R	**17.1ha** Peatland Restoration
59974	25.8	9.8	9.8	1		2.6	2.6	24/25	R	
68301	22.7			7.6	3	8.6	3.5	24/25	R	
61338	63.2	25.3	25.3			6.3	6.3	24/25	R	
59147	59.8			27.5	19.5	5.9	6.9	26/27	R	
59339	72.2	16.5	16.5			12	27.2	26/27	R	Planting winter/spring 23/24, **15.7ha** Peatland Restoration **2.4ha** Deforestation
59316	25.2			6.9	11.6	3.6	3.1	26/27	NR	Nat Regen, Seed-Tree
59308	10.8			10.8				26/27	NR	Nat Regen
59301	26.2			26.2				26/27	NR	Nat Regen
59161	27.0			27.0				27/28	NR	Nat Regen
59174	40.8			40.8				27/28	NR	Nat Regen
57887	21.1	11.6		0.5		5.4	3.6	27/28	R	
68243	18				14.4	1.8	1.8	35/36	R	Potential Gorse issues
57957	25.9	10.1		4.9		6.2	4.7	28/29	R	Potentially delay and plant with 57126
57020	5.2	2.6		0.4		1.5	0.7	28/29	R	Potentially delay and plant with 57126
Total	**523.5**	**75.9**	**51.6**	**162.2**	**71.5**	**77.8**	**84.5**			

Table 10. Phase 2 Restock (2029-2033)										
Coupe No.	**Total Area (Ha)**	**SS (Ha)**	**LP (Ha)**	**SP (Ha)**	**Other Non Native Con. (Ha)**	**Native B/Leaf**	**Open (Ha)**	**Year**	**Method**	**Monitoring Comments**
59312	35.4	10.2	10.2			4.5	10.5	28/29	R	**6.3ha** Peatland Restoration
59075	29.2			13.3	7.8	4.4	3.7	28/29	R	
59319	20.0	5.4	5.4					28/29	R	
57373	24.8			9.5	5.2	3.3	6.8	28/29	R	
59178	65.5			52.4		6.6	6.5	28/29	R	
57030	14.6	1		0.8		3.2	9.6	28/29	R	**6.6ha** Deforestation
59152	49.4			12.6	3.2	8.3	25.3	28/29	R	**22.2ha** Peatland Restoration
57126	9.9	7.9				1	1	29/30	R	
59302	23			6.6	11	2.8	2.6	29/30	NR	Nat Regen, Seed-Tree
59169	26.0			20.8		2.6	2.6	31/32	R	
59189	13.7			9.9	0.3	2	1.5	31/32	R	
59816	13.5			4.6	1.8	5	2.1	31/32	R	
59314	16.0	2.3	2.3	1.6		5.3	4.3	31/32	R	**2.5ha** Peatland Restoration
68306	15.5	12.4				1.6	1.5	31/32	R	
59191	27.2			20	0.2	3.7	3.3	31/32	R	
57690	27.4	11	11			2.7	2.7	32/33	R	
59066	37.6	15	15			3.8	3.8	32/33	R	
59348	44.7	16.5	16.5			5.8	5.9	32/33	R	**1.4ha** Peatland Restoration
Total	**493.4**	**81.7**	**60.4**	**152.1**	**29.5**	**66.6**	**93.7**			

Table 11. Phase 3 Restock (2034-2038)										
Coupe No.	**Total Area (Ha)**	**SS (Ha)**	**LP (Ha)**	**SP (Ha)**	**Other Non Native Con. (Ha)**	**Native B/Leaf**	**Open (Ha)**	**Year**	**Method**	**Monitoring Comments**
59880	59.6					6	53.6	33/34	R	**53.6ha** Peatland Restoration
59247	95.6					15.8	79.8	33/34	R	**74.9ha** Peatland Restoration
59100	106.6					10.7	95.9	33/34	R	**95.9ha** Peatland Restoration
59173	33.3			16.2	9.7	3.8	3.6	33/34	R	
59179	26.1			4.5	9.8	5.9	5.9	33/34	R	
57125	14.8	9		0.3	0.3	3.3	1.9	34/35	R	
59427	23.4	14.5			1	4.9	3	34/35	R	
59039	20			16		2	2	34/35	R	
59171	39.2			31.4		3.9	3.9	35/36	R	
59243	32.5	13	13			3.3	3.2	35/36	R	
68309	33			26.4		3.3	3.3	35/36	R	
59128	70.2			41.7		7.1	21.4	36/37	R	**16.2ha** Peatland Restoration
59931	39.4			17.4		4.6	3.9	36/37	R	
59333	19.1	6.9				7.2	5	36/37	R	
59347	53.5	15	15			6.4	17.1	37/38	R	**13.9ha** Peatland Restoration
59141	17.8	13.8				2.2	1.8	37/38	R	
Total	**684.1**	**72.2**	**28**	**153.9**	**20.8**	**90.4**	**305.3**			

* replant (R) / plant (P) / natural regeneration (NR) / plant alternative area (ALT) / no restocking (None)

If the Restock or natural regeneration should fail to reach 1600 per hectare (Native Broadleaves) or 2500 sph (Productive Conifers) the site will be beaten-up to the required planting density. This will be assessed at year 3 and year 5 after planting with beat up by at least year 5.

3.8 Species diversity and age structure

The following tables show how the proposed management of the forest will help to maintain or establish a diverse species composition and age-class structure, as recommended in the UK Forestry Standard.

Stands adjoining felled areas will be retained where possible until the restocking of the first coupe has reached a minimum height of 2m. Where this is not possible (e.g. due to windblow(risk) or disease), the planned approach to achieving height separation between adjacent coupes will be achieved through delaying restocking.

Table 12: Species diversity

Plan area by Species						
Species	Current Area (ha)	%	Year 10 Area (ha)	%	Year 20 Area (ha)	%
Sitka spruce	814.7	12%	9%	9.3	599.2	9%
Scots pine	2331.6	34%	30%	29.5	2079.1	30%
Larches	357.9	5%	3%	3.1	119	2%
Lodgepole pine	908.9	13%	8%	8.0	404.1	6%
Other conifers	174.3	3%	4%	4.4	377.6	5%
Broadleaves	267.3	4%	9%	9.1	822.9	12%
Fallow	444.9	6%	12%	10.9	621.5	9%
Open ground	1371.2	20%	24%	24.1	1786.2	26%
Other	229.2	3%	2%	1.6	90.4	1%
Total	6900	100	6900	100	6900	100

Figure 1: Bar chart demonstrating species diversity and land use

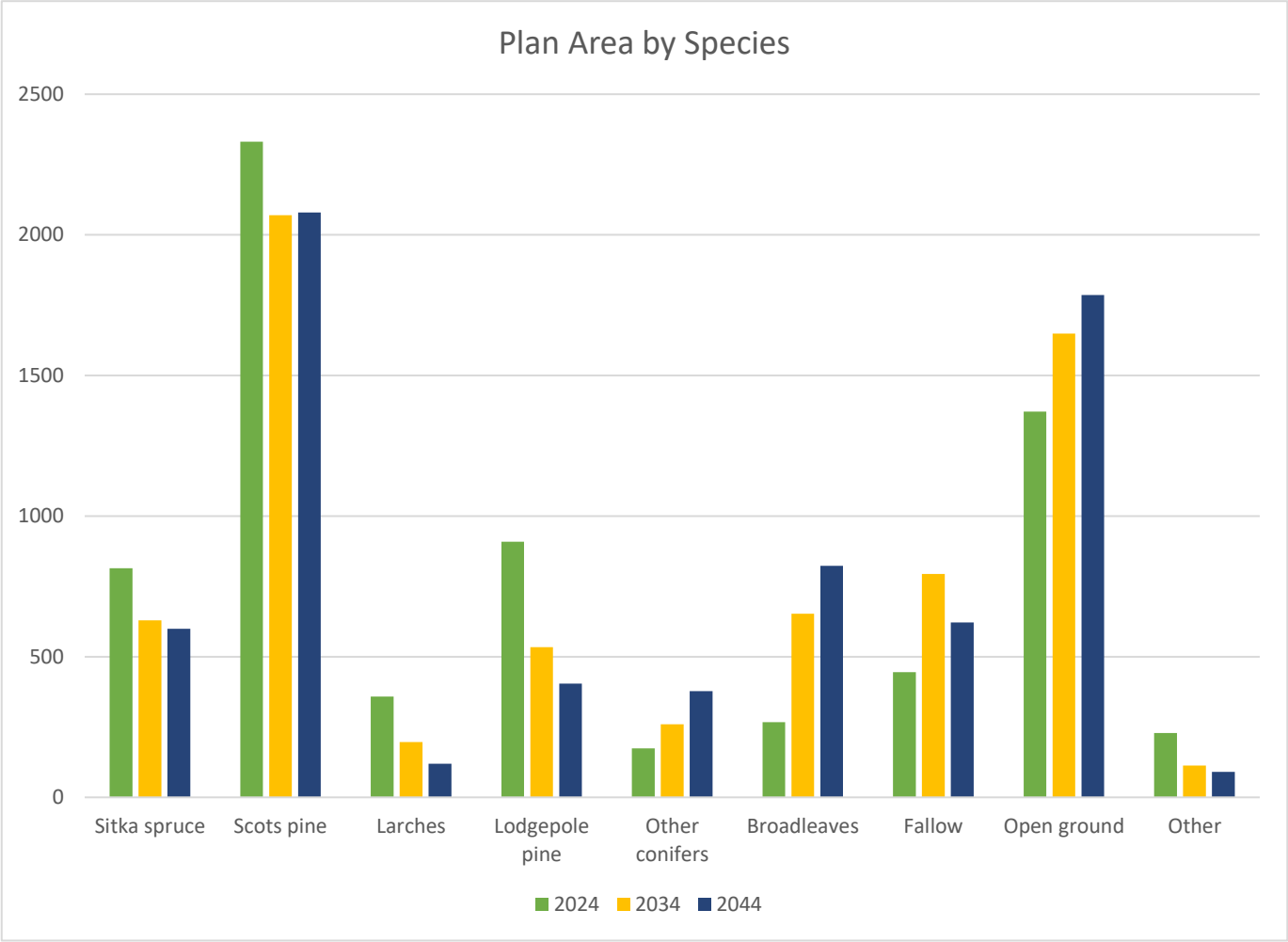
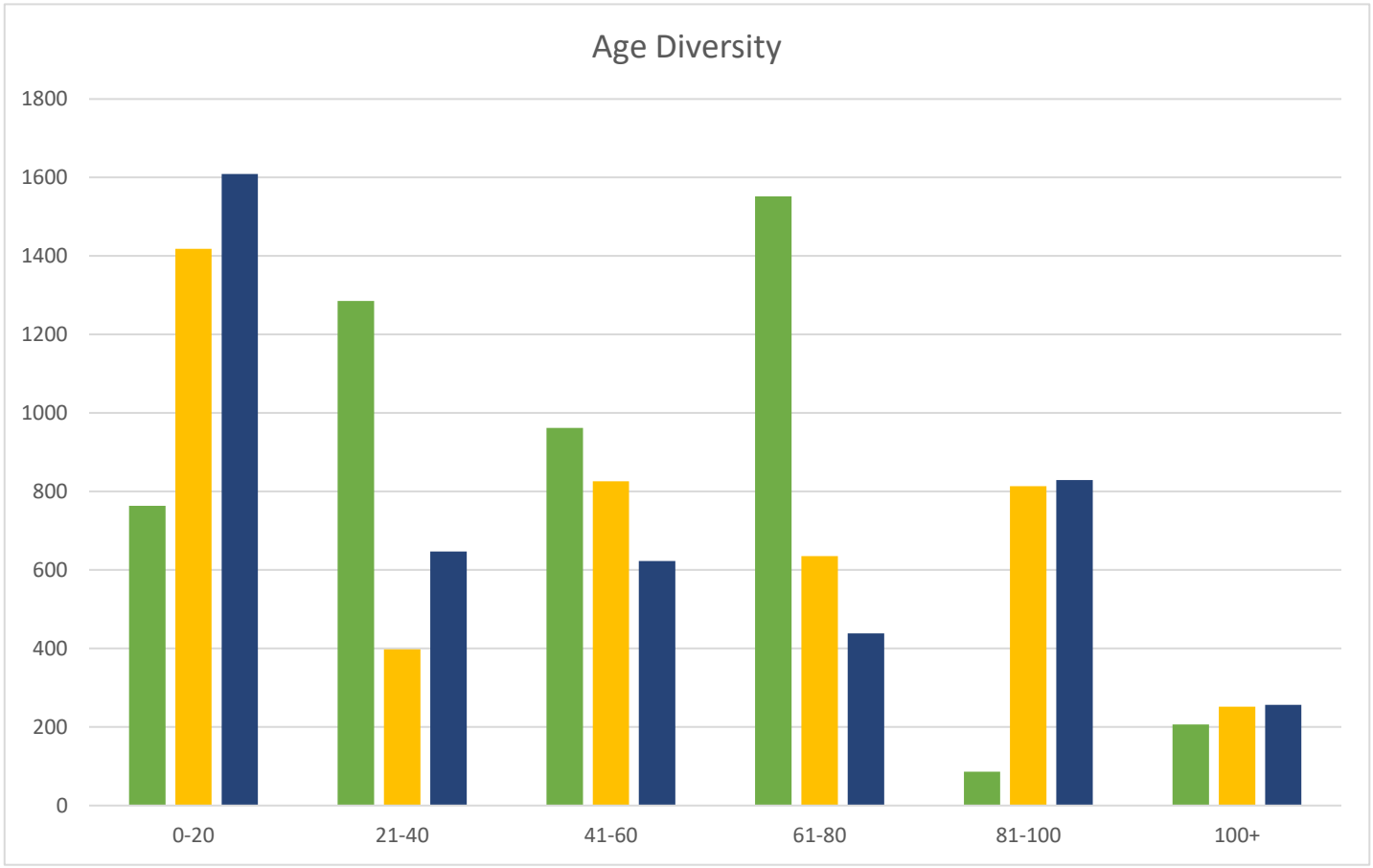


Table 13: Age diversity

Plan area by Age						
Age Class (years)	Current		Year 10		Year 20	
	Area (ha)	%	Area (ha)	%	Area (ha)	%
0 – 20	763.5	16%	1418.6	33%	1608.9	37%
21 – 40	1285.4	26%	398.3	9%	647.2	15%
41 – 60	961.9	20%	826.3	19%	623.2	14%
61 – 80	1551.8	32%	635.4	15%	438.2	10%
81 - 100	86	2%	813.7	19%	829.2	19%
100+	206.2	4%	251.8	6%	256.2	6%
Total	4854.8		4344.1		4402.9	

Figure 2: Bar chart demonstrating age diversity



3.9 Road Operations and Quarries

Planned civil engineering operations are shown on **Map 15 – Roads and Civil Engineering**.

Table 4: Civil Operations

Forest Road Upgrades, Realignments, New Roads and New Quarrying				
Phase	Name / Number	Length (m)	Year	Operation
1	Struie Extension	590	25/26	Road extension
1	Strathrory Extension	2120	27/28	Road extension

3.10 Environmental Impact Assessment (EIA)

Any operations requiring an EIA screening opinion request are shown in the table below. The corresponding screening opinion request forms are presented in **Appendix 2 – EIA screening opinion request form**.

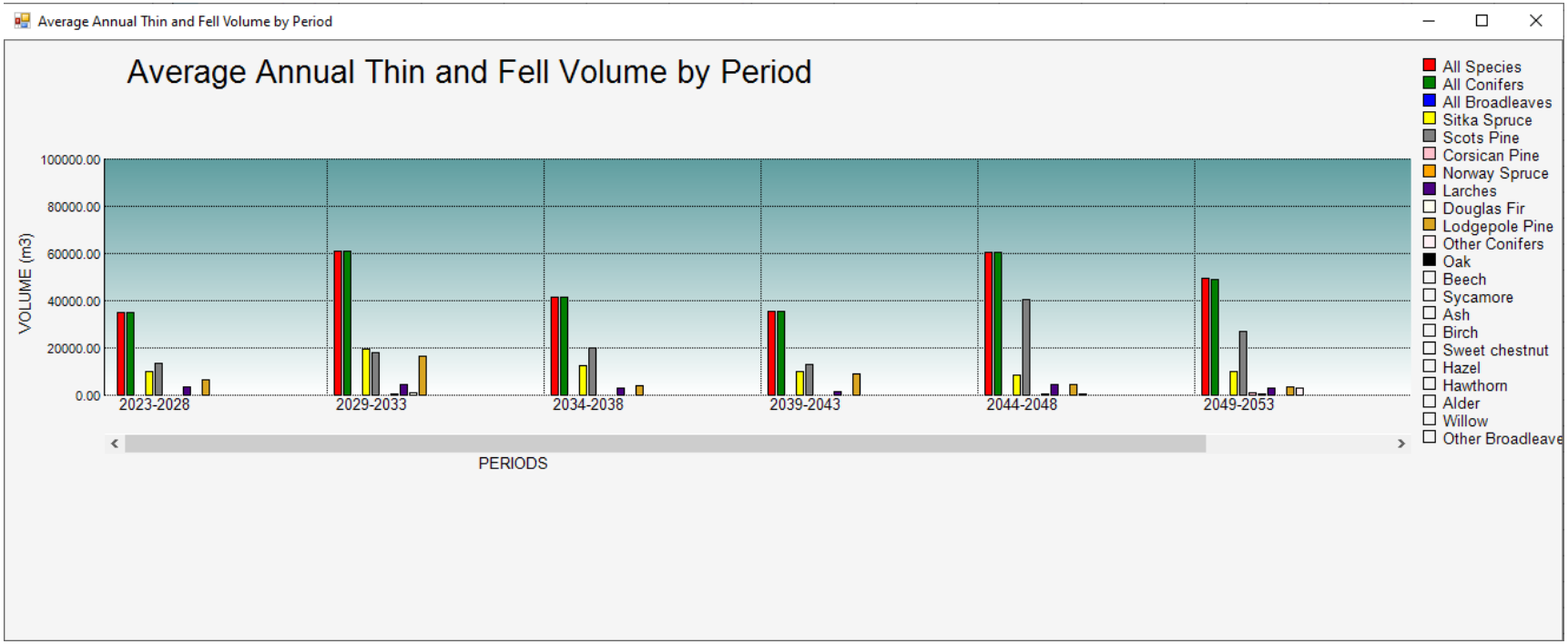
Table 55: Environmental Impact Assessment Summary

EIA projects in the plan area		
Type of project	Yes / No	Note
Afforestation	No	
Deforestation	Yes	
Forest roads	Yes	
Forestry quarries	No	

3.11 Tolerance table

Working tolerances agreed with Scottish Forestry are shown in **Appendix 4 – Tolerance Table**.

3.12 Volumes coming phases



4.0 Management Proposals – guidance and context

4.1 Silviculture

4.1.1 Clear felling

Coupe detail can be found in **section 3.2** and **Map 5 – Management Coupes.**

Clearfelling in this plan area is driven by windblow, peatland restoration, forest health and the desire to fell at the right time to influence the next generation and increase chances of success of natural regeneration. At sites in Strathrory, on the high ground at Lamington and at Wallace Hill the first three are most important. Here deep peat, windblow and DNB infection are common and felling will allow for peatland restoration and/or establishment of a healthier, more diverse, second rotation. Through the work planning process, we will identify opportunities to retain valuable dead wood and veteran trees, and consider whether areas of windblown or checked trees would be best left as cover for capercaillie.
We will remove all non-native species within the SPA during clearfelling operations where Scots pine is the desired crop.

Around Morangie, Tain Hill, Inchindown and the lower ground at Lamington successful CCF and re-establishment using natural regeneration is a more important driver. Designations such as extensive PAWS areas and the Capercaillie SPA further determine the timings and restock requirements for these areas.

To a lesser extend some of the felling is driven by the threat of *Phytophthora ramorum.* The felling coupes around Wallace Hill contain large amount of larch which, with regards to the larch strategy, we would look to reduce. However, as dictated in the '2022 FLS Larch Strategy' (FLS, 2022) there are no felling targets set in the 'PAZ less vulnerable zone' which almost the entire Easter Ross LMP area is part off.

Most of the Easter Ross coupes are serviceable by Harvester/Forwarder combinations. The large areas of peatland restoration in Strathrory-West might be done with specialist equipment depending on contractor availability. As timber is standing and relatively healthy it is likely

feasible to remove these crops with Harvester/Forwarder combinations. Coupes at Struie, Dounie and at a small section on either side of the Strathrory river contain steep sections. It is expected that an element of hand-felling, traction winch usage and/or skylining is needed for some of these coupes.

Clearfelling with seed tree retention

Where the standing crop isn't suitable for thinning or another alternative-to-clearfell system, but features trees showing favourable characteristics (height, form, seed-bearing age) we will aim to retain a select number of trees to reseed the surrounding area following a clearfelling operation. To ensure coverage across the site, we will retain between three and five seed trees per hectare, selected for the quality of their form. In addition to these, we will retain any veteran trees. Veteran trees may not exhibit the best form or may have passed their seeding age (into senescence), but their contribution to the biodiversity of the stand is high.

4.1.2 Thinning

The thinning coupes can be viewed in **Table 8 - Thinning** and on **Map 7 – Thinning Coupes.**

As stated above the Easter Ross LMP area is far from homogenous. Broadly a split can be made between exposed, peaty ground with majority Lodgepole pine and Sitka spruce and better drained, less exposed soils which tolerate other species such as Scots pine better. These latter ones will largely be managed along CCF systems as detailed above and with more detail to follow in 4.1.3. It is these latter ones where thinning will be carried out as stability and workability are better and exposure less. For more detail on the soils and exposure see **Map 9 – Soils** and **Map 10 – DAMS.** As can be seen from the map the soils in the area consist mostly of peats, gleys and/or ironpans. In all three rooting is severely restricted as a result of induration and/or the presence of an impregnable ironpan. On these soils rooting depth often does not exceed 40cm which severely impacts stability of stands. Thinning needs to be carried out carefully and timely to ensure stable crops. Crops which have not been thinned or have had a delayed thinning are sometimes not considered suitable for further thinning operations anymore and will therefore be clearfelled when most suitable. We will remove all non-native species within the SPA during thinning operations where Scots pine is the desired crop.

Map 7 – Thinning Coupes shows the coupes where thinning will or might take place. Thinning will be done to increase timber quality or to promote a specific species composition and therefore selection is done predominantly on crown health, form and species. An outline thinning prescription for the upcoming coupes has been determined and is shown in the **Table - Thinning** in **section 3.5**.

On the thinning maps there are two additional thinning areas besides the regular silvicultural interventions. These are the road and riparian zone buffers. Alongside roads and inside riparian zones management is necessary at regular intervals. Alongside roads this involves felling or mulching regenerating trees to prevent retention of moisture in the road and to prevent roadside ditches from getting blocked. In riparian zones regeneration of non-native species can threaten the objectives of these areas by outcompeting the native broadleaved species desirable for a well-functioning riparian zone. Therefore removal of these non-natives will take place when non-native populations become problematic.

4.1.3 Low Impact Silviculture Systems (LISS) / Continuous Cover Forestry (CCF)

Continuous Cover Forestry has a multitude of advantages over a clearfell and restock management system. It positively contributes to soil health, carbon capture, ecology and forest aesthetics (Forestry Commission, 2008). For these reasons FLS has looked to maximize areas of CCF. To allow for use of these systems a site has to be thinnable and, as mentioned above, in Easter Ross this is the mostly the case for Morangie, Inchindown, Tain Hill, Rose Hill and Lamington. As a result the areas intended for CCF stretch over a large section of the plan area as can be seen on **Map 5 – Management Coupes**.

Depending on species, exposure and soil, different silvicultural systems will be used. As a rule the preferred silvicultural system for CCF in Easter-Ross is the least intrusive one. Choice of silvicultural system is mainly dictated by species, soil and crop stability. The least intrusive systems are reliant on shade-tolerant species such as spruces, firs and beech. Scots pine in combination with CCF relies on slightly larger interventions to allow for the necessary light and disturbance for successful reestablishment. The main two systems feasible for single aged Scots pine conversions to CCF are Group Shelterwood and Strip Shelterwood. Below a short description is given for each of these silvicultural systems to further explain how these will be used.

We will monitor regeneration from the time of the felling operation and if regeneration is insufficient we will intervene with planting to ensure coverage.

Seed Tree Felling

Seed trees are identified for good characteristics and marked at various stages in the life of the stand, with the aim of a final retention typically of between 40-50 stems per hectare. We will increase the final retention up to 150 stems per hectare in more sensitive areas where conditions allow. The surrounding trees will be gradually removed. These retained trees will seed into the surrounding ground and regenerate naturally. This system is suited to light demanding trees (such as Scots pine) as it ensures low canopy cover and high ground disturbance, allowing the seed to pass the hummus layer and reach the soil. Veteran trees will be retained even if passed seeding age, as they have a high biological value to the stand.

Group Shelterwood

This system regenerates a mature stand by cutting small holes within the original stand. Depending on the shade tolerance of the species holes are generally between 1 and 3 tree lengths but potentially bigger depending on land form, aspect and species. When working with shade tolerant species such as Norway spruce small gaps will be used whereas in crops with light demanding species such as larch and pine much larger holes will be cut. As a rule gaps within Group Shelterwood systems will not exceed 0.5 ha to ensure the maximum benefit of the CCF system is maintained. Full regeneration of the stand will generally take place over 4 phases

Strip Shelterwood

Strip shelterwoods are similar to group shelterwoods but generally better suited to areas where the forest is likely to be unstable, such as in the Easter Ross LMP area. In strip shelterwoods strips of forest, usually between 1 and 3 tree lengths wide, are harvested from a stand.

Subsequent strips are felled once the first strips have regenerated. Generally, the strips are perpendicular to the prevailing wind direction and felling is done into the wind to minimize risk of windthrow. The regeneration period is depending on the amount of strips necessary for full regeneration and the fertility of the soil. At Easter Ross most strip felling coupes will be regenerated using four subsequent strip felling operations. It is expected that full regeneration will take approximately 35 to 45 years.

Strip width in these shelterwood systems is dependent on light demand of species, seed dispersal abilities, aspect and soil. Strip shelterwoods will generally be applied to Scots pine stands which are highly light demanding. Strip width will not exceed 25% of the coupe over a 10 year period. The coupes to be worked under the strip felling system are mapped at the block level, but in practice will average 60m and not exceed 80m. This will allow for seed dispersal across the strip and maximize sunlight. Strip length will generally be as long as the coupe is long but might be broken up with small borders of trees as a seed source, windbreak and for aesthetic reasons.

Through the work-planning system we will ensure that the felling strips do not connect or expand other felling operations (clearfells, group shelterwoods etc) if unforeseen changes to the proposed programme of felling occurs. We will seek to maintain habitat connectivity where appropriate.

4.1.4 Long term retention (LTR) / Minimum intervention (MI) / Natural reserve (NR)

The Easter Ross LMP area contains 603.4ha of LTR, MI and NR sites, these are illustrated spatially in **Map 5 – Management Coupes**. These sites will be managed in accordance with FLS guidance for the respective management types which can be supplied on demand.

The majority of this area, 398.7ha is under the strictest designation of Natural Reserve. Natural Reserves will be perpetuated indefinitely and only very specific set-up operations or non-native removal operations are allowed. The areas have been selected on their size, ecological value and significance in the landscape. The large areas of Natural Reserve at Tain hill, Scotsburn and Kinrive Hill all contain old Scots pine and as such provide habitat for a variety of rare and protected species such as Capercaillie.

Minimum intervention areas are found in pockets at Inchindown, Leinster Park, Strathrory, Redburn, below Morangie and at several other places. These are generally smaller than the Natural Reserves and contain a large variety of habitats. Some are riparian areas with broadleaves, others mature pockets of Scots pine. Most contain trees at low densities interspersed with pockets of open ground resulting in open grown, stable trees and large variation of habitat at a small scale.

Several areas of Long-term retention have also been identified. These are generally plantation origin crops which will be retained because of specific environmental features they contain or to ensure a good age distribution within an area.

There are large areas of land in the plan which have been designated as CCF of which the aim is to change these to one of the above prescriptions in the future. Riparian areas for example have been classified as CCF to facilitate the removal of non-native species. It is expected that after the initial interventions these areas can be designated as minimum intervention.

4.1.5 Tree species choice / Restocking

Restocking will be done according to **Map 6 - Future Habitats and Species** and **Appendix 6 - Restock Prescriptions**. A variety of restock prescriptions are proposed dependent on the main objectives of the area in question. Stocking densities, species and main objectives are given in these restock prescriptions.
Restocking in productive areas will aim to maximise the productive capacity of the forest. The brief guidelines below will be followed to ensure adequate restocking:

- To obtain maximum benefits from restructuring, contiguous restocking areas will not be less than 1 ha per individual shape (except in CCF areas) or exceed 40 ha unless forest health issues, open habitat restoration feasibility or windblow dictate otherwise.
- Restock coupes adjacent to the forest roads should be restocked to within 5 metres of the forest road for at least 30% of the coupe frontage to facilitate future access and to limit potential for soil disturbance of compaction.
- Areas of non - productive broadleaved trees within productive coupes will be located where they will be of greatest ecological benefit; along drainage channels, adjacent to open ground, other broadleaf woodland or around archaeological features to enhance their setting.
- Commercial restocking will not be undertaken on soil types 9e, 11c, 11d due to the intensive drainage regimes and high fertiliser inputs that would be required to achieve successful establishment.

The LMP seeks approval for restocking of areas felled prior to the plan period, species enhancement operations and in those coupes felled within the first 5 years of the plan. The conventional 5 year fallowing period generally means that all coupes felled in the second phase of the plan will be restocked beyond the approval period. Where pine weevil numbers are expected to remain low following felling, restock will take place directly or shortly after felling. In order to secure approval for the restocking of coupes felled in the second phase of the plan the restock proposals for these coupes are also shown on **Map 6 – Future Habitats and Species**.

The Restocking Strategy for Scotland's National Forest Estate aims to minimise chemical usage in restocking (i.e. application of insecticides and/or herbicides) by considering adequate ground preparation at site level, and using tactics such as delayed planting (i.e. applying five year fallowing) to achieve this.

4.1.6 Natural regeneration

Natural regeneration will be used extensively within the next plan period. In strip felling areas in particular natural regeneration will be used to recruit the next rotation of trees. To ensure appropriate stocking in these and other CCF areas ground preparation such as screefing and/or scarifying might be used to optimize the seedbed. Stocking density and species will be monitored through the natural regeneration survey program. If stocking density is too low it will be beaten up by year 5. If the natural regeneration is too dense it may be necessary to clear and restock. Where the natural regeneration is not the desired species it will be considered against the plan objectives and tolerance table and either accepted (with a plan amendment if necessary) or removed. The strip felling is specifically aimed at protecting and improving Capercaillie habitat so will be monitored for success through annual lek counts. If the felling is not having the desired effect or if regeneration is not appearing within the expected periods the method will be reviewed and if necessary changed at the next plan review period

There should be a preference for natural regeneration of broadleaf areas (to maintain provenance and improve the chances of establishment) but where this is unlikely or has not been successful then these areas should be planted/beaten up to the required stocking density and site requirements. In those areas where recruitment is insufficient supplement planting will take place.

It is expected that some of the riparian zones, designed open ground and broadleaf areas will fill in with natural regeneration of both conifers and broadleaves. This will be managed in such a way as to ensure that, where practicable, it does not significantly impose a negative impact upon the objectives of the plan or create a negative impact upon the watercourse in terms of shading and acidification.

4.1.7 New planting

No new planting is proposed in this LMP.

4.1.8 Wildlife Management

The Deer Management Plan can be found in **Appendix 11**.

4.1.9 Fire

FLS continues to work closely with the Scottish Fire and Rescue Service (SFRS) to prevent and tackle wildfires that threaten Scotland's National Forests and Land. FLS support SFRS in their lead role for fire prevention and suppression through creating annual fire plans, maintaining a duty rota, and providing additional logistical support. FLS's primary objective is always to protect people's health, safety and wellbeing. A detailed fire assessment of the Easter-Ross plan can be found in **Appendix 13 – Fire.**

4.1.10 Tree health

One of the main objectives of this LMP is increasing the resilience of the forest to climate change, disease and windblow. There are currently several pests and diseases impacting the forests and more are coming. As a result of climate change it is expected that more pests and diseases will arrive and impact on forest management will increase.

One of the main diseases currently impacting forest management across Scotland is *Phytophthora ramorum*. In the south and west of the country infections of this disease are leading to mass die-off and large scale removal of the species. To reduce impact of the disease to forest management Forestry and Land Scotland published it's Larch Strategy (FLS, 2022) to which larch in Easter-Ross LMP will be managed. As mentioned in 4.1.1 most of the forests fall within the 'PAZ less vulnerable zone' for which no felling targets apply. The plan has considered the implications outbreak(s) of *P. ramorum* might have and is therefore proposing removal of larch in several locations. These locations are selected because the areas of larch are close to their economic optimal felling age and operations can be tied in with ongoing works and/or because they are hard to access in the event of *P. ramorum* arriving. This will reduce risk of infection and maximise financial return.

On the other hand the long term objective is not removal of all larch in the Easter-Ross LMP area. As stated in the Phytopthora Ramorum Action Plan (Scottish Forestry, 2021) the purpose of the PAZ is 'to eradicate local infections by felling affected trees rapidly after detection' (Scottish Forestry, 2021). However the action plan also states that larch in this zone 'may still have a long term future' (Scottish Forestry, 2021). As larch is one of the few species well suited to low-nutrient soils, has substantial biodiversity associated with it and has great potential for natural regeneration it is intended to be used as a component in mixture with Scots Pine in places where access is easy. This would ensure that, in case of a Statutory Plant Health Notice (SPHN), removal will be quick and cheap. This approach will be kept under review depending on progress of *P. ramorum*.

Resin-top, *Peridermium pini,* is a species of fungus which is having a detrimental impact on some mature Scots pine stands in the Easter-Ross LMP area. This fungus impacts a percentage of Scots pine depending on the genetics of the stock and usually causes dieback from the top down. Incidence varies throughout the block as a result of the difference in genetic susceptibility to the disease and historical management. Critical incidence is occurring around Morangie hill where management is being adjusted to the loss of pine in some areas. A clearfell to the west of Morangie hill is proposed due to the overstorey becoming extremely sparse as a result of Resin-top.
As this fungus seems to effect Scots pine from the age of 30 onwards normal thinning regimes should adequately manage the impact on the forest. During each thinning operation any trees showing signs of *Peridermium pini* will be removed. Increase in incidence should be picked up during normal tree health monitoring operations and will be reported if deemed out of the ordinary.

Large pine weevil (*Hylobius abietus*) remains a constraint to forest management. Because of weevil populations density assessments will be done to determine when restock success will be likely. Ideally restock will follow felling within one or two years as this reduces nutrient run-off and reduces the need for herbicide. Whether this is possible will be determined using the *Hylobius* Management Support System. If weevil populations are too high restocking early would risk high mortality or excessive use of pesticide which is undesirable and therefore a fallow period of maximum five years will be applied. Where gorse is a substantial threat restocking might take place directly or shortly after felling to allow for establishment of the next crop. If weevil populations prove to be high pesticide spraying might take place to prevent crop failure.

4.1.11 Road operations, Timber haulage and other infrastructure

Map 15 – Roads and Civil Engineering shows the existing forest road network, quarries, planned new roads, powerlines and agreed Timber Transport Routes. **Appendix 2.2 – EIA – Roads** explains in detail the projects and environmental sensitivities.

Most of the Easter Ross LMP area has a well-developed road network and therefore limited new roading is proposed. The only new roading proposed is at Struie and Strathrory-West. The Struie road will open access to a thinning area and will be used for subsequent thinning and felling. The Strathrory-West block is currently unroaded. Clearfelling will start here in the next decade and subsequent peatland restoration and restocking will take place. The proposed roadline has been assessed and traverses the shallowest peat areas.

Several quarries are found throughout the Easter Ross LMP area but only the Strathrory quarry remains active. There is no intention of (re)opening other quarries.

Haulage will mostly take place over forest roads and Agreed Routes. Where Consultation Routes are needed to be used Forestry and Land Scotland will consult with the Highland Council regarding restrictions on haulage.

There are several vital powerlines running through the Easter Ross LMP area. In Strathrory-West a 275kV and 132kV dissect the forests. These lines are an essential part of the Scottish grid and future restock will ensure sufficient open ground and/or low growing broadleaves near the lines for resilience.
At Tain Hill and Morangie a critical 33 kV powerline feeds Embo, Tain and Dornoch. There have been incidents in the past where windblown trees have taken out the line temporarily. Opportunity will be sought to improve the resilience of this line by taking back the forest from the powerline where operations are planned and this doesn't compromise instability in the remaining crop. At restock, open ground and/or low growing broadleaves will be incorporated around the line to safeguard the line in the future.

4.2 Biodiversity

4.2.1 Designated sites

Designated sites in the area are listed in **Table 3** in **3.1** and shown in **Map 2 – Key Features**. The draft HRA and DSP can be found in **Appendix 9 – Habitats Regulations Appraisal** and **Appendix 10 – Designated Site Plan**. There are six designated sites in the area; Dornoch Firth SAC,

Dornoch Firth SPA, Morangie SPA, Morrich More SSSI, Struie Channels SSSI and Kinrive-Strathrory SSSI. At Leinster Park FLS ground borders on the Pitmaduthy Moss SSSI. Below a short summary of proposed management is provided for each site.

The main designated site influencing forest management is the Morangie SPA for Capercaillie. Capercaillie is one of the main objectives in the Easter Ross LMP as can be seen in Chapter 2 and forest management plays a big role in the maintenance and creation of habitat for this species. In the entire LMP area the management proposals have been assessed carefully by the FLS Environment Team to ensure the proposals have a positive effect on Capercaillie habitat.

Within the SPA several principles have been applied to the proposed forest management:
- The preferred species for restock is Scots pine where soil conditions allow.
- Clearfelling is the least preferred forest management option and will only be done where a CCF system is deemed unfeasible as a result of instability, disease or where a species change is proposed.
- As a rule the least intensive forest management type is chosen which has the highest chance of retaining Scots pine in the long term as well as providing sufficient quantities of regeneration to ensure continued productivity of the forest while maintaining Capercaillie habitat through forest structure diversification.

To further protect Capercaillie habitat several large Natural Reserves exist within the SPA. These all contain mainly mature Scots pine and thereby provide optimal long term habitat for feeding and lekking. This LMP also proposes several Vulnerable Zones for Capercaillie, see **Map 13 – Vulnerable Zones**, these zones include the Natural Reserves within the SPA. Event proposals or recreational developments within the Vulnerable Zones will be assessed carefully by the FLS Environment Team to determine impact on Capercaillie. Alternative locations and/or timing restrictions might be suggested to prevent negative impact on Capercaillie.

Morangie Forest currently holds the most northerly population of Capercaillie in the UK. This population along with that of the adjacent Novar forest is around 40km north of the nearest southern population and around 70km north of the peak population centres in Strathspey. This makes Morangie and its Capercaillie population particularly important and led to it being designated as an SPA in 2001.

FLS had been managing the forest with capercaillie at the forefront of objectives since before this designation and will continue to do so whilst also balancing other objectives such as timber production and recreation. This plan was prepared with reference to *Scottish Forestry's Action for Capercaillie (2006).*

Lek counts have shown a recent rise in lekking males with 11 birds counted in 2023 (only 3 birds were found in 2017). The exact location of leks within Morangie varies on an annual basis with birds moving to areas with suitable habitat as it becomes available. This means that while a core of the best quality lek sites will be retained, the concept of lek areas is more usefully applied in Morangie. In short, the aim of this plan is to retain lekking areas where possible but where these are compromised by windblow or stability issues the aim will be to provide alternative similar habitats within wider lek areas that can be used by the birds. This model is being successfully applied to FLS forests such at Inshriach and Glenmore, both of which have seen population increases and successful breeding under similar management regimes.

Using the most recent estimate of mean density (0.72 adult birds km-2)a the carrying capacity in the thinned and retained areas alone will be 22 adult birds. There will be 565 ha of other woodland habitat. If we assume the lower mean density estimate (0.24 adult birds km-2), then these areas can support (0.24 x (565/100)) 1.4 adult birds. So, as a minimum, and based on contemporary density estimates, the SPA area has a carrying capacity of 23.4 adult birds. Assuming a 1:1 sex ratio, this would be 11 cocks. Based on recent experience of capercaillie responses to forest management (thinning), a previous density estimate of between 0.4 and 0.9 adult birds km−2 b is a realistic target for this LMP. That would indicate a potential carrying capacity of ((0.4 x (565/100)) + (0.9 x ((2532+525)/100)) = 30 adult birds. Assuming a 1:1 sex ratio, this would be 15 cocks. This does not include the potential for densities of up to 5 adult birds km−2 in native pinewood areas such as Scotsburn Wood. These figures demonstrate that under the proposed plan the Morangie SPA does have a carrying capacity of 30 adults which is in line with that of the original SPA designation documents which show that at classification the SPA itself was able to support 30 birds. Of course in the face of a national Capercaillie design actual numbers may be lower but the habitat available will be able to support a population in line with the original classification. The SPA itself could therefore support between 23-30 birds. The overall SPA metapopulation based on the above carrying capacities for the entire forest would be between 38-50 birds.

Several important concepts are being built into the LMP revision process in 2024 which will further the management of Capercaillie.

1- Vulnerable Zones – These areas have been selected to protect areas currently used by capercaillie from any further recreational developments and to guide local decisions on organised event permissions etc. with the aim of minimizing disturbance to Capercaillie.

2- Thinning – Thinning will open up areas of early rotation Scots Pine at e.g. Strathrory to create a high quality, Blaeberry dominated field layer. Thinning will also be part of early interventions in those areas which are to become Alternatives to Clearfell (ATC). Thinning will aim to balance improving the field layer with opening up the canopy and will be conducted based on the stand density, age and stability. This will create more suitable habitat for capercaillie and retain that which is currently suitable by preventing canopy closure and enhancing ground vegetation.

3- Natural Reserves - Core areas of old growth forest such as Scotsburn Hill and Kinrive have been identified as Minimum Intervention and/or Natural Reserve areas. This will provide a core of old growth "native type" Pinewoods (603ha) throughout the area which will link with adjacent "plantation type" woodlands.

4- ATC – Where current forests are stable, they will be converted to ATC systems. These will largely be based on either strip fellings or seed tree fellings. In strip fellings a mini clearfell of approx. 60 -80m width will be carried out to create an area with enough light to allow natural regeneration with Scots Pine to take place. Non-natives will be removed (although they can be retained as shelter until coning age). As each strip matures (approx. every 10 years) an adjacent strip will be felled. This will allow for a successional forest with all ages from establishment to old growth phase while avoiding more extensive clearfell operations. Natural regeneration will be favoured but where there is no regen after 5 years some planting may take place. The strip size is the minimum that will allow natural regeneration to take place.

5- Seed tree felling will be carried out in areas where non-natives are beginning to dominate. This will allow for the gradual removal of non-native species by felling mature trees but retaining Scots Pine seed trees throughout (40 to 50 per hectare). Again, younger non-natives will be retained as shelter but removed before coning age. The interspersion of the group and strip felling coupes within the wider mature crop will be on a spatial scale that will make them accessible to capercaillie broods. The attractiveness of these areas to broods will also increase rapidly during the first five years as ericaceous vegetation recovers and provides food and cover close to mature forest. These areas will also have a high edge to open ground ratio – meaning capercaillie of all ages will be able to utilise most of the ground for feeding on the regenerating vegetation, as observed at Rothiemurchus and elsewhere – because at all times the birds using these areas will be close to mature forest.

6- Clearfell – Unfortunately because of previous planting regimes and soil conditions several areas of existing Scots Pine are either currently windblown or unstable and will need to be clearfelled. These will be replaced with a mixture of Scots Pine and broadleaves where soil

conditions allow but where these are outwith existing lekking areas and soils are unsuitable for Scots Pine there may be non-native trees planted.

7- Timing of operations – All work in the SPA area will be carried out outwith the critical breeding season of 1st March to 15th August. Where work is outwith the SPA but in similar connected habitat that may be used by Capercaillie but over 1km from lekking birds the work can progress until 1st April. Outwith connected habitat (e.g. Dounie, Strathrory West etc) and where there are no recent records of capercaillie (within the last 5 years) work can proceed normally. Annual lek counts, sightings and signs, recorded as part of pre-operational environment surveys will inform these decisions as part of the work planning process. Regardless of the geographic location, all FLS operations will comply with legal guidance and NatureScot best practice buffer zones (as per Goodship, N.M. and Furness, R.W. (MacArthur Green) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283)

8- Creation of Wet areas – Areas of deep peat over 60cm will not be restocked but will be restored to peatland habitats. Small wet and boggy areas will also be identified at the operational planning stage and where required, drains blocked to create a matrix of wet areas throughout the forest, this is crucial for brood habitat.

9- Ground vegetation – The mix of silvicultural systems above will provide an ideal mix of ground vegetation with high quality blaeberry maximized where conditions allow. Deer will be controlled to a target density of <5/km2 to allow regeneration. If the ground vegetation is too dense, FLS will investigate the potential for e.g. Mowing or Cattle Grazing.

10- Roadside vegetation – A balance of retention and removal of roadside vegetation will be applied. Where possible vegetation will be retained for screening (to help minimize disturbance to Capercaillie from road users) but where this would compromise health and safety, vegetation will be controlled. It should be possible to retain vegetation on the forest side of any roadside drains but again opportunities for deer stalking will be retained through complete vegetation removal in some areas. Screening will be targeted at areas where this is likely to be of most benefit to Capercaillie.

The above will create a mixed forest with a much more evenly distributed age class. Under this plan the area of old growth forest (100years +) will rise from 4% to 6% by yr 20 and mature trees (81-100yrs) will rise from 2% to 19%. This coupled with a cohort of younger dense

regeneration will provide an ideal habitat for both lekking and nesting birds. Creation of wet areas and provision of shelter will also be beneficial for broods.

Annual monitoring of birds will take place during the lekking period. This monitoring will target known lek areas from the previous 5 years with wider cold searching to identify any potential new sites. FLS will share the results of these surveys with the Capercaillie Officer and NS and this plan will be reviewed in the light of that monitoring. While a formal review will take place at yr 5 and a revision at yr 10, FLS will intervene sooner to revise the plan if the monitoring shows any major issues.

Each year a programme of work will be drawn up and processed through a workplan system. This system involves all FLS teams commenting on constraints and opportunities and advising on potential management and mitigation. This system is audited through the UKWAS accreditation audits and is an import part of the process of ensuring that any work proposed does not have negative impacts on Capercaillie (or other protected species and habitats). A similar consultation process will also be applied to any events or recreational activities in the area. Up to date population information will be applied to ensure that timing and location of any activities which may have a negative impact of the species is avoided. The workplan will also allow identification of site level improvements for capercaillie including creation of deadwood areas, retention of windblow areas and protection of high quality brood habitat. The preliminary ecological appraisal undertaken by the environment team will guide these decisions and along with the most recent sightings data will be applied to fine grain the planned operations to maximize improvements for Capercaillie and other species. The workplan will also allow us to identify sites where work should avoid impacting existing high quality brood habitat. Discussions following the field checks by environment team and the collation of most up to date population figures will be used to further discussions on timing of felling phases, retention of habitat or need for a different type of intervention. Essentially the workplan process is key to identifying and delivering site level improvements to capercaillie habitat which will refine the strategic level proposals within this LMP.

Proposed peatland restoration at Strathrory and Wallace hill will increase the quality of the habitat for grouse species due to an increase in forest edge and open ground.

Struie Channels SSSI sits within a large restock site as a result of DNB related felling. The channels have previously been cleared of trees and surrounding restock has included larger elements of open space and native species to protect the SSSI and improve the setting in the

landscape, this open space will be maintained by removal of non-native regeneration. A thin strip of coupe 59333 forms part of the SSSI and is proposed for clearfelling as the coupe consists of windblown Sitka spruce. The proposed restock within the SSSI is riparian woodland.

Kinrive-Strathrory SSSI is designated for its springs and native pinewood. Proposed management will see the main strath retained as open ground with an increase of riparian woodland along tributaries. Non-native species on two felling sites bordering the SSSI will be replaced with native species consisting of riparian species near watercourses and Scots pine in productive sections. Regenerating non-natives within the designated site will also be removed.

At Morrich More options are being explored for expansion of the open ground for the benefit of the dune system. However, previously deforested sites are proving a long term grazing solution is necessary to ensure high quality habitat. Until a grazing solution is found, no further large scale deforestation is proposed. To prevent loss of income and to increase mobility along the shoreline a small strip of trees already subject to erosion, approximately 10 meters wide, will be removed from the shoreline as per **Appendix 2.1 – Deforestation**.

Proposed felling adjacent to Pitmaduthy SSSI will result in the removal of non-native species on the edge of the designated site. Restock will be done with native species along the edge of the forest/SSSI.

4.2.2 Native woodland

The Native Woodland Survey of Scotland (Scottish Forestry, 2022) demonstrates the condition and extent of natural and semi natural woodland in Scotland.

As can be seen from the survey, herbivore impacts across the Easter Ross LMP area are low to medium as a result of continued deer cull. At a local level pockets of palatable species are suffering a high herbivore impact. The survey furthermore indicates the majority of the LMP area consists of Native Pinewood and the percentage of invasives is extremely low.

Due to the suitability of Scots pine and the importance of the species to the Morangie SPA the most important native species in Easter-Ross is Scots pine. As cited above, establishment within the SPA will be done with Scots pine unless the species is not deemed suitable to the soil conditions at the location. The slight reduction in Scots pine by total area at years 10 and 20 (table 12) is an acknowledgment that broadleaved species (mostly Silver birch) will rapidly colonise areas of Scots pine felling, and remain dominant until the Scots pine overtakes it

(as it would during natural succession). There is no planned reduction of Scots pine habitat, just Scots pine plantations at different stages of canopy dominance.

Further extensive native woodland establishment will take place along all watercourses. Riparian woodland planting will be done in line with **Appendix 6 – Restock prescriptions** and will consist of a majority native broadleaved species. The increase in broadleaved species can be seen in Chapter 3.8.

4.2.3 Ancient woodland / Plantation on Ancient Woodland sites (PAWS)

Ancient woodland sites can be viewed on **Map 2 – Key Features** and in **Appendix 5 – Environmental Features**. As can be seen in the appendix a large proportion of PAWS areas is threatened. Mostly this is due to the presence of non-native species such as Norway spruce, Sitka spruce and larch. Future management operations will favour native species and thereby eliminate non-native species from the crop through several operations. Norway spruce will be tolerated and might be planted as a small percentage of the PAWS areas in agreement with the FLS Environment Team for the benefit of red squirrel and other species.

At Lamington removal of non-native species and subsequent replacement with Scots pine will be in line with management for Capercaillie as well as allowing PAWS sites to be restored to native species.
The proposed strip felling at the Rose hill PAWS will increase the chances of successful regeneration of Scots pine and thereby safeguard the native woodland in the future. Non-native species will regenerate in small numbers but will be removed at the time of respacing or first thinning.

Large areas that are not PAWS within the Easter Ross LMP area are Long Established Plantation Origin (LEPO). Management and restocking in LEPO areas will be dependent on the quality of the current habitat, existence of adjacent ancient woodland remnants and the long-term potential for native woodland.

4.2.4 Protected and priority habitats and species

A detailed list of protected and priority habitats and species can be found in **Appendix 5 – Environmental Features.**

All forest management operations involve a planning process before work commences which includes checks for wildlife and important habitats (a Preliminary Ecological Assessment). Work plans will be adjusted if necessary based on NatureScot buffer zones and timing restriction to avoid disturbance (NatureScot, 2022), and opportunities to further protect species or enhance habitats will be identified. We refer to the series of guidance notes (notes 31 – 35) published by Scottish Forestry which make recommendations on forest operations with protected and designated species such as otters, squirrels and eagles.

All works within the Plan area which are likely to disturb protected species will be done under licence from NatureScot and will follow the assessment and mitigation actions set out as conditions of this licence.

The majority of the forests in the LMP area is a red squirrel stronghold. The proposals have been assessed to the *Forestry Commission Scotland Practise Note 'Managing forests as red squirrel strongholds' (Forestry Commission Scotland, 2012)* with the FLS environment team. The proposals are in line with recommendations set out in the guidance.

4.2.5 Open ground

Priority open habitats present within the plan area are described in **Appendix 5 – Environmental Features** and **Map 2 – Key Features** along with their management. Open habitats at Strathrory and Kinrive are designated and will be managed in line with the HRA and DSP in **Appendices 9 and 10.** Peatland restoration will be carried out as set out in **4.6.3 Deep peats.**

Within restocks opportunities will be sought to create high value open habitats in areas of extreme infertility, waterlogged soils and/or to buffer existing open habitat. There are several lochans and pools which provide habitat for a large variety of species. These will be surrounded by open ground and native planting after the current crop is removed. The restock prescriptions as detailed in **Appendix 6** have allowance for these elements within the coupe.

4.2.6 Dead wood

Opportunities for retaining or creating deadwood will be identified during the planning of all felling and thinning works, favouring areas with the highest deadwood ecological potential. Valuable deadwood and deadwood areas will be marked on contract maps. Areas of natural reserve will offer some of the best opportunities for the development of standing and fallen deadwood. Where it is safe to do so, standing mature dead trees will be retained as these offer excellent potential for a range of species. Deadwood will be managed in accordance with the Scottish Forestry Practise Guide '*Managing deadwood in forests and woodlands*' (*Humprey & Bailey, 2012*) and the FLS document '*Deadwood Management – Guidance for staff*' (*FLS,2021).*

4.2.7 Invasive species

Very few invasive non-native species (INNS) are present within the Easter Ross LMP area. A list is provided in **Appendix 5 – Environmental Features.** Presence of INNS is limited and therefore impact on the native habitats is small. Extensive INNS removal has been carried out in the past and currently populations are monitored and removed as necessary.

4.3 Historic Environment

Scheduled Ancient Monuments (SAM) and other heritage features can be found on **Map 2 – Key Features** and **Map 12 – Historic Environment.** Most notable is the Creag an Fhithich fort at Dounie, which contains the remains of a small hillfort. Interpretation was installed at the site on the informal trail. Detail of the SAMs can be found in **Appendix 5 – Environmental Features.** The protection and enhancement of significant archaeological sites is a key objective on all forests and land managed by FLS and the method is stated below.

Our key priorities for archaeology and the historic environment are to undertake conservation management, condition monitoring and archaeological recording at significant historic assets; and to seek opportunities to work in partnership to help to deliver Our Place in Time: the historic environment strategy for Scotland (2014) and Scotland's Archaeology Strategy (2015). Significant archaeological sites will be protected and managed following the UK Forestry Standard (2017) and the FCS policy document Scotland's Woodlands and the Historic Environment (2008). Harvesting coupes, access roads and fence lines will be surveyed prior to any work being undertaken in order to ensure that upstanding historic environment features can be marked and avoided. At establishment and restocking, work prescriptions remove relevant historic environment features from ground disturbing operations and replanting. Where appropriate, significant historic assets are recorded by archaeological measured survey, see active conservation management and may be presented to the public with interpretation panels and

access paths. Opportunities to enhance the setting of important sites and landscapes will be considered on a case-by-case basis (such as the views to and from a significant designated site).

The Regional Historic Asset Management Plan includes conservation management intentions for designated historic assets on the National Forest Estate. Details of all known historic environment features are held within the Forester Web Heritage Data and included within work plans for specific operations to ensure damage is avoided. Significant historic environment features will be depicted on all relevant operational maps.

Areas of historic environment interest should be checked both on FLS's internal historic environment records and also with the Council's HER prior to the commencement of forestry activities. Any upstanding features should be clearly marked, both on the ground and on operational maps. Care should be taken to avoid any damage to surviving structural elements.

Regular monitoring of the SAM's in the LMP area will take place and subsequent tree/vegetation removal will be planned with the results from the survey and in liaison with HES and the FLS archaeologist. Sites will be prioritized based on the (potential) impact of vegetation on the SAM. When tree felling takes place near SAM areas opportunities will be sought to remove any remaining trees from the SAM and/or bufferzone. As per UKFS regulations a 20m buffer will be applied to SAM areas in which there is a presumption against restocking. Scheduled Monument Clearance will be applied for with Historic Environment Scotland if operations could impact SAM's. During the workplan preparation the site and potential impact to the SAM will be carefully assessed by our Environment team and a decision whether to apply for clearance will be made. Operations near the SAM are not to take place until clearance from Historic Environment Scotland has been received.

4.4 Landscape

See **Map 1 – Location and Viewpoints**, **Map 8 - Landscape**, **Appendix 7 – Landscape** and **Appendix 12 - Visualisations**

4.5 People

4.5.1 Neighbours and local community

FLS has actively engaged with the neighbours and local community for this land management planning exercise through an extensive consultation process. Signs were put out to notify visitors of the LMP revision and known neighbours and all community councils were contacted at scoping and consultation. A public consultation event was held in Tain and was advertised to several different media.

Several neighbours have taken an active interest in the development of the plan and their aspirations have been incorporated where they do not conflict with the objectives of the plan and are consistent with FLS' s approach to land management. Details can be found in **Appendix 3 – Consultation Record**.

4.5.2 Public access

FLS is the largest provider of outdoor recreation in Scotland, and we welcome over ten million visitors per year to the forests we manage. The forests and land we look after play a key part in Scotland's 'natural health service', providing spaces where people of all ages can spend time enhancing their physical and mental health through play, exploration and relaxation. We want to do what we can to make sure that as many people as possible, from all backgrounds can enjoy their visit. To help facilitate visits we provide a network of facilities including car parks and waymarked trails above and beyond the network of Core Paths (See **Map 2 – Key Features**). In some busier areas we offer public toilets and visitor centres. These facilities and opportunities are promoted via the FLS website and through a series of free leaflets. Where there are waymarked trails, on site information is also provided. The specific facilities within this Land Management Plan area are discussed below.

There are also many forests without formal facilities, and visitors are welcome to explore under a right of responsible access as described by the Scottish Outdoor Access Code (SOAC) and laid out in the Land Reform (Scotland) Act 2003. This ensures everyone has statutory access rights to most of Scotland's outdoors, if these rights are exercised responsibly, with respect for people's privacy, safety and livelihoods, and for

Scotland's environment. Equally, land managers have to manage their land and water responsibly in relation to access rights and FLS will only restrict public access where it is absolutely necessary, usually for safety reasons, and will keep disruption to a minimum.

Events

Previously hosted events within the Easter Ross LMP area include the Snowman Rally and the Tain Hill race. Many other smaller events take place under the right of responsible access, without the need for formal permission. FLS is supportive of events hosted in the Easter Ross area but will assess applications for events against the designated Vulnerable Zones (Map 13 – Vulnerable Zones) to help limit and reduce disturbance in the Morangie SPA. Recreational pressures will be managed carefully within these areas for the benefit of Capercaillie and FLS will look for alternative locations and/or timings in case a negative impact on Capercaillie is expected by the FLS Environment Team.

Recreation Facilities within Easter Ross

There are formal car parks at Aldie Burn, Tain Hill, Dounie and Strathrory. There are promoted way marked trails at Aldie Burn and Tain Hill. There is access along the Strathrory drove road, though this is a more challenging route. These opportunities are promoted via the free 'Forests of Ross and Cromarty' leaflet and via the FLS website. On top of these facilities informal usage is common throughout the forests in particular at Morrich More and Cnoc Navie.

We are working to maintain our current recreation infrastructure, though the ability to do so in future depends on available funding. We will remain open to working with communities to facilitate suitable projects on FLS land. The number of visitors in the area has grown over the recent years and we continuously assess whether the current infrastructure is sufficient and look for opportunities to expand the offering where necessary and when funding is available.

Aldie Burn

Aldie Burn is the most popular within the Easter Ross LMP area and consists of parking, two waymarked trails, picnic benches and informal paths. The site is promoted from the A9 but is mostly used by the local community for walking, dog walking, cycling and horse-riding. The trails here have been built to the highest standard of 'Easy+' to make them as accessible as possible. This makes them accessible to wheelchair users as well as very popular with families. The forest management in the area will be focused on retaining the existing diverse habitat.

Tain Hill

Tain Hill has a carpark and one waymarked trail. This site is again mainly used by the local community for recreation. The 'moderate' grade trail here offers a quite different experience to Aldie Burn. The Tain rifle range is adjacent to this site and the waymarked trail takes walkers safely around the old Tain quarries containing the rifle range. This area is partly designated as a Natural Reserve and contains a mix of species including old Scots pine and young broadleaves. No Visitor Zoning work will take place within the reserve area, but dangerous trees will be removed to prevent a risk to health and safety.

Dounie

The previously waymarked trail at Dounie is no longer waymarked and promoted, but the old trail is a core path and will be kept open. The car park is maintained, and recreation is welcomed. Interpretation was installed at the Creag an Fhithich fort to enhance visitor experience. The forest management in the area has carefully considered both the landscape and recreational value.

Stay the night at Strathrory

In recent years FLS has successfully hosted a Stay the Night carpark at Strathrory. Here tourists with self-contained motorhomes or campervans can stay the night for a small fee. The scheme is only intended for informal one night stop overs and users are strictly asked to not produce waste or noise to protect local wildlife and habitats. The need for this initiative, and what sites should be included, is reviewed on an annual basis.

Woodland Management in Visitor Zones

Visitor Zones have been identified in areas where FLS encourage and manage access or where the woodland managed by FLS interacts with popular visitor sites or access routes. Visitor Zones are mapped separately on the **Map 7 – Thinning Coupes**.

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.

4.6 Soils

4.6.1 Protection and Fertility

Brash mats (or alternative measures) will be used to protect sensitive soils on areas where harvesters and forwarders are being used. Felling residue will usually be left on site to allow nutrient recycling, with consideration for the practicalities of restocking.

The extended fallow periods (generally up to five years) that are required prior to restocking, to allow pine weevil populations to abate, have the negative effect of compounding nutrient deficit because nutrient released from decaying leaf litter will have largely been flushed from the site by the fifth year. Therefore it is possible that post planting applications of fertiliser, containing phosphates and potassium, might be required on the upper (more nutrient poor) margins of the forest with further remedial applications required in some crops in line with industry best practice (Taylor, 1991).

However, appropriate choice of silvicultural mixtures and well-timed heather control is preferable to fertilizer application. In this plan the choice of species has taken into account the fertility of the site to the extent that it anticipates no fertiliser will be used during restock and woodland creation. Broadleaf species will be incorporated within silvicultural mixtures to improve soil function and encourage a sympathetic and characteristic field layer to develop.

4.6.2 Cultivation

Where required, the choice of ground cultivation technique will consider the short-term benefits for establishment against any long-term side effects on tree stability, access for future forest operations and the environment. There will be a preference for the least intensive technique. A mix of scarifying, mounding and flat/screef planting will be used depending on soil type, weed growth, geomorphology and the desired species.
Scarifying will like be used in those areas where natural regeneration of Scots pine is desirable. This will likely be limited to areas of strip felling as these have been specifically selected on the seeding potential of the surrounding crop and the opportunity to expose the mineral layer.

4.6.3 Deep peats

As can be seen on **Map 9- Soils** the Easter Ross LMP area contains large expanses of deep peat. These have been assessed in detail in light of recent changes to policy regarding restock on deep peat in response to the climate and biodiversity crises.

As a rule we refer to the guidance 'Deciding Future Management Options for Afforested Deep Peatland' (Scottish Forestry, 2015) on any deep peats to determine our future management options to ensure biodiversity and climate benefit. Deforestation and subsequent peatland restoration is therefore proposed for areas in Strathrory and Wallace Hill as per **Map 11 – Deforestation** and **Appendix 2.2 – Deforestation**.

Deforestation and subsequent peatland restoration requires 11b soils, as found in most of the Easter Ross LMP deep peats, to be either hydrologically connected to priority habitat or of low fertility. For most of the sites proposed in this LMP the first of these applies and the priority habitats connected to areas of deep peat are found on **Map 11**. As detailed in **Appendix 2.2** some sites are not hydrologically connect to priority habitat and proposed deforestation and peatland restoration is done on the basis of low fertility. To support these proposals **Map 14 – Yield Classes** provides the yield of the relevant sites.

Forestry and Land Scotland has extensive experience with the restoration of peatland and has developed a tried and tested method. Restoration will involve careful removal of crops and subsequent drain blocking, reprofiling and stump moving to raise the water table.

Impact of peatland restoration on catchments has been calculated and the main catchment impacted is Balnagown. This catchment has a proposed change in land management of less than 5% and is not a Objective Target Area. When including the proposed felling areas in the catchment the changed land management stays well below the 40% threshold set out in the UKFS practise guide 'Designing and managing forests and woodlands to reduce flood risk' (UKFS, 2022).

4.7 Water

This plan has been prepared with reference to the Forestry and Water Guidelines issued by Scottish Forestry and the range of guidance issued by SEPA, with the special reference to the diffuse pollution General Binding Rules.

For more detail regarding management of water and catchment see **Appendix 8 – Water and Catchment Management** and **Map 3 – Key Water Features**.