



Forestry and
Land Scotland
Coilltearachd agus
Fearann Alba

Castlemaddy

Land Management Plan

2023 – 2033

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

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



The mark of
responsible forestry




Property details	
Property Name:	Castlemaddy
Grid Reference (main forest entrance):	NX 5984 8801, NX 5984 8828, NX 5853 9052, NX 6039 9136
Nearest town or locality:	Carsphairn
Local Authority:	Dumfries and Galloway Council

Applicant's details	
Title / Forename:	Carol
Surname:	Finch
Position:	Forest Planner
Contact number:	07584336505
Email:	carol.finch@forestryandland.gov.scot
Address:	Forestry and Land Scotland, Creebridge, Newton Stewart
Postcode:	DG8 6AJ

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

1. I apply for Land Management Plan 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, Pp Regional Manager		Signed, Conservator	
FLS Region	South	SF Conservancy	South
Date	28 August 2023	Date of Approval	
		Date Approval Ends	

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1.0 Objectives and Summary

1.1 Plan overview and objectives

Plan name	Castlemaddy
Forest blocks included	Carminnows, Dundeugh, Marscalloch, and Polmaddy
Size of plan area (ha)	2,826.6 ha
Location	NX 5980 8799. See Location map (Map 1)

Long Term Vision
<p>Castlemaddy will continue to provide sustainable timber volumes, however, over time it will transform into a more diversely structured woodland. The woodlands will continue to support and provide habitat for nationally important species such as Red Squirrel, while open and wooded habitats contribute to improvements in water quality, particularly within the Polmaddy Burn catchment. Ancient woodlands at Dundeugh will be restored with native tree species. Designated features such as the Merrick Kells and Polmaddy township are protected and enhanced by the neighbouring woodland. Peatland restoration at Carminnows, while modest, will contribute towards national carbon sequestration efforts. The diverse woodland, views of the surrounding landscape, and highlighted areas of interest along paths and forest roads provide an enjoyable experience for visitors to Castlemaddy.</p>
Management Objectives
<ul style="list-style-type: none"> ● Sustainable timber production ● Peatland restoration of priority soils within Carminnows block ● Continue phased restoration of (semi-)ancient woodlands/PAWS within Dundeugh block ● Manage the Merrick Kells SSSI/SAC as per the designated site management plan ● Manage Scheduled Monuments (SM) as per regional asset management plan.
Critical Success Factors
<ul style="list-style-type: none"> ● Maintain productive timber capacity through timely silvicultural intervention to realise crop potential ● Protection of soft conifers and broadleaves to ensure successful establishment ● Removal of Larch species as per the FLS Larch Strategy ● Complete necessary road construction and maintenance to facilitate harvesting operations ● Application of current best practice to restore peatlands ● Removal of non-native species in PAWS areas ● Timely and effective management of the historic environment (SM) as per South Region Asset Management Plan.

1.2 Summary of planned operations

Table 1

Summary of operations over the plan period	
Clear felling (gross)	467.9 ha
Thinning (potential area)	682.9 ha
Restocking (gross)	305.4 ha
Afforestation	0.0 ha
Deforestation	34.1 ha
Forest roads (including forest road upgrades)	1590 m
Forestry quarries (including extensions to existing quarries)	2.0 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 (FLS) 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 (presented in **Appendix I** and **Map 2**). During the development of this Land Management Plan (LMP) we have consulted with the local community and other key stakeholders; a consultation record is presented in **Appendix III**.

Below lists the objectives for the site and how key features present opportunities and/or constraints. The analysis of these form the concept for this LMP. Different management options for achieving objectives were considered against the constraints and opportunities identified during LMP scoping and consultation. The preferred concept is presented in **Map 3**.

2.1 Sustainable timber production

Opportunities:

- Contribute to regional timber production
- Contribute to national efforts to limit the spread of *P. ramorum* by felling Larch
- Design management coupes to improve future wind firmness
- Increase future forest habitat resilience through species diversification
- The well-established forest road network provides suitable access to most coupes for forest management purposes

Constraints:

- Occurrence of windblow
- Block sits within the Polmaddy Burn acidified water catchment (restricts scale of felling)
- Access to a small number of coupes could be improved via upgrading the existing forest road network and/or by constructing new roads
- Retention of mature crop required for priority species such as Red Squirrel and Raptor
- Bog habitat with restoration potential will reduce restocking within Carminnows block.

Concept:

- Focus areas of clearfell within plan period on larch and windblow
- Build future productive potential through silvicultural management and restock with optimum species
- Design coupes to encourage wind firmness
- Extend/Maintain forest road access where necessary
- Appropriately site palatable species to facilitate focused wildlife management.

2.2 Peatland restoration of priority soils within Carminnows block

Opportunities:

- Contribute to the Scottish Government's Climate Change Policy and national targets for peatland restoration
- Site re-wetting has the potential to benefit water quality (by reducing the loss of aquatic carbon) and flood risk management
- Removal of poor windblown crop will enhance visible impact along primary transport routes.

Constraints:

- Deforestation, albeit not significant, reduces timber productivity potential
- Operational delivery will be subject to contractor availability and require specialist equipment.

Concept:

- Identify areas of forest to bog restoration.

2.3 Continue phased restoration of (semi-)ancient woodlands/PAWS within Dundegh block

Opportunities:

- Removal of non-native species in ASNW and PAWS areas via clear felling or thinning
- Restock and/or under plant with native species
- Potential for existing mature broadleaves to seed and naturally regenerate
- Increase habitat linkage for priority species (e.g. Red Squirrel).

Constraints:

- Natural regeneration of non-native conifer
- mature non-native conifer on steep riparian embankments (dangerous access)
- Browsing pressure on more palatable species
- Ground flora vulnerable to sudden changes in microclimate

Concept:

- Conversion to LISS management across PAWS sites
- Strengthen habitat connectivity and enhancement of woodlands by expanding native species cover beyond PAWS boundary through natural regeneration and restocking
- Retain minor mature coniferous component for priority species habitat (e.g. Norway Spruce and Douglas Fir)
- Phased removal of neighbouring commercial crop
- Control non-native natural regeneration incursion

2.4 Manage the Merrick Kells SSSI/SAC as per the Designated Site Management Plan

Opportunities:

- Clear fell commercial crop to expand the site's buffer zone
- Establish permanent open ground and/or native woodland cover adjacent to the designated site
- Contribute to the improvement of water quality in the Blaree, Goat and Polmaddy Burns.

Constraints:

- Regeneration and control of non-native conifer
- Reduction of timber productivity potential
- Browsing pressure threatens establishment of alternative tree species.

Concept:

- Enhance the buffer zone between the designated site and core timber production areas by establishing open habitat and low density native woodland cover
- (Working in partnership with other agencies) Continue to manage as per the designated site management plan.

2.5 Manage Scheduled Monuments as per the regional asset management plan

Opportunities:

- Enhance status of Scheduled Monuments and other undesignated features.

Constraints:

- Vegetation encroachment on buffer areas
- Unknown undesignated features.

Concept:

- Continue to manage Scheduled Monuments as per the South Region Asset Management Plan
- Continue to maintain heritage features as per the UKFS and Historic Environment Scotland (HES) guidance.
- Continue to work with the FLS Archaeologist to identify appropriate asset management. (Potential to work in partnership with other agencies.)

3.0 Management Proposals – regulatory requirements

This land management plan 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 Land Management Plans can be found using the link [HERE](#).

3.1 Designations

The plan area forms part of, includes, or is covered by the following designations and significant features. The Key features map (**Map 2**) shows the location of all designated areas and significant features. Deep peats are indicated on the Soils map (**Map 9**).

Table 2

Designations and significant features		
Feature type	Present	Note
Site of Special Scientific Interest (SSSI)	Yes	<ul style="list-style-type: none"> Cleugh (proximity only) Merrick Kells
National Nature Reserve (NNR)	No	
Special Protection Area (SPA)	No	
Special Area of Conservation (SAC)	Yes	<ul style="list-style-type: none"> Merrick Kells
World Heritage Site (WHS)	No	
Scheduled Monument (SM)	Yes	<ul style="list-style-type: none"> Dundeugh Castle SM02476 Polmaddy township SM05391
National Scenic Area (NSA)	No	
National Park (NP)	No	
Deep peat soil (>50 cm thick)	Yes	<ul style="list-style-type: none"> Carminnows block Polmaddy block
Tree Preservation Order (TPO)	No	
Biosphere reserve	Yes	<ul style="list-style-type: none"> Galloway and Southern Ayrshire
Local Landscape Area	Yes	<ul style="list-style-type: none"> Galloway Hills
Ancient woodland	Yes	<ul style="list-style-type: none"> Ancient (of semi-natural origin) Long-established of plantation origin (LEPO) Other on Roy map Plantation on ancient woodland sites (PAWS)
Acid sensitive catchment	Yes	<ul style="list-style-type: none"> Polmaddy Burn (failing)
Drinking Water Protected Area (Surface)	Yes	<ul style="list-style-type: none"> Existing river WB ID: DWPA13_494 Galloway (Groundwater) ID: 150694
Environmentally Sensitive Area	Yes	<ul style="list-style-type: none"> Western Southern Uplands Stewartry

3.2 Clear felling

Sites proposed for clear felling in the plan period are identified as Phase 1 and Phase 2 coupes on the Management map (**Map 4**).

Table 3

Clearfell summary by phase and coupe number		
Phase	Coupe Number	Gross Area (ha)
1	59097	24.4

Clearfell summary by phase and coupe number		
1	59232	28.9
1	59109	6.6
1	59119	2.4
1	59093	35.3
1	59078	20.6
1	59048	5.8
1	59022	26.7
1	59626	17.3
1	59503	16.9
2	59155	28.4
2	59164	10.5
2	59170	3.5
2	59089	34.8
2	59019	37.6
2	59017	7.5
2	59736	31.5
2	59085	19.1
2	59001	85.1
2	59629	25.0

Total	467.9
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Table 4

Clearfell by species										
Coupe Number	Net Area (ha) by main species >20% (or MC, MB)									Coupe Total
	DF	HL	JL	LP	NS	SP	SS	MC	MB	
59097	-	-	4.3	5.9	-	-	10.3	-	0.7	21.2
59232	-	-	-	-	-	-	24.1	-	2.0	26.1
59109	-	-	1.6	-	1.4	3.5	-	-	0.1	6.6
59119	-	-	-	-	-	0.1	1.7	-	-	1.8
59093	-	-	-	3.1	1.9	-	16.7	-	-	21.7
59078	-	-	-	-	-	-	18.8	-	0.1	18.9
59048	-	-	-	-	5.0	0.1	0.1	-	0.1	5.3
59022	-	-	0.3	-	8.7	-	16.8	-	0.1	25.9
59626	-	-	-	-	-	-	17.3	-	-	17.3
59503	-	-	-	-	2.8	-	3.6	-	1.6	8.0
59155	8.5	-	-	-	0.1	-	17.7	-	1.1	27.4
59164	-	-	-	-	-	-	9.6	-	-	9.6
59170	-	-	-	-	-	-	3.3	0.1	-	3.4
59089	-	-	-	-	-	-	30.7	-	-	30.7

Clearfell by species										
59019	-	1.7	-	3.7	9.8	-	18.9	-	0.1	34.2
59017	-	3.0	-	-	-	0.1	3.5	0.1	0.8	7.5
59736	-	1.2	8.9	-	2.4	-	11.7	-	0.1	24.3
59085	-	-	-	-	-	-	17.2	-	-	17.2
59001	-	-	-	-	-	-	76.7	-	-	76.7
59629	-	-	-	-	3.0	-	21.4	-	-	24.4
Plan Area Total (ha)	8.5	5.9	15.1	12.7	35.1	3.8	320.1	0.2	6.8	408.2

NB Coupe totals: Table 3 shows gross coupe area / Table 4 shows net area of species

Table 5

Scale of proposed felling areas										
Total Woodland Area		2,826.6 ha								
Felling	Phase 1	%	Phase 2	%	Phase 3	%	Phase 4	%	Long Term Retention	%
Gross Area (ha)	184.9	6.5	283.0	10.0	76.7	2.7	38.5	1.4	299.4	10.6

3.3 Thinning

Potential sites for thinning cover a gross area of 682.5 ha and are identified on **Map 5**.

Opportunities for timely thinning will be assessed as crops reach pole stage. 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.

3.4 Other tree felling in exceptional circumstances

FLS will normally seek to map and identify all planned tree felling in advance through the LMP process. However, there are some circumstances requiring small scale tree felling where this may not be possible and where it may be impractical to apply for a separate felling permission due to the risks or impacts of delaying the felling. Felling permission is therefore sought for the LMP approval period to cover the following circumstances:

Individual trees, rows of trees or small groups of trees that are impacting on important infrastructure (as defined below*), either because they are now encroaching on or have been destabilised or made unsafe by wind, physical damage, or impeded drainage.

*Infrastructure includes forest roads, footpaths, access (vehicle, cycle, horse walking) routes, buildings, utilities and services, and drains.

The maximum volume of felling in exceptional circumstances 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 Land Management Plan 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].

3.5 Restocking

Proposed restocking is shown on the Future Habitats and Species map (**Map 6**) and in Table 6.

Should the restock or natural regeneration should fail to reach 1,600 sph (stems per hectare) (native broadleaves) or 2,500 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.

Table 6

Restocking						
Phase †	Coupe Number	Gross Area (ha)	Species	Method *	Minimum stocking density (s/ha)	Note
1	59097	4.8	Native MB	R	1600	NMB - peatland edge.
			OG	None	-	OG - restore peatland.
1	59232	24.9	MC, SS	R	2500	MC, SS - 10:90, MC on mid to lower slopes.
			MB	NR/R	1600	MB - PAWS .
1	59109	5.4	SP	R	2500	SP, MB - 60:40, plant to suit ancient woodland site conditions, utilise NR.
			MB	NR/R	1600	
1	59119	1.72	SP, SS	R	2500	SP, SS - 80:20, separate pure stands.
1	59093	2.33	Native MB	R	1600	NMB - peatland edge.
			OG	None	-	OG - restore peatland.
1	59078	16.8	DF, LP, SS	R	2500	LP, SS - 20:80, intimate mix (nursery). DF - pure crop.
			MB	R	1600	MB - wet woodland.
1	59048	4.4	DF, NS	R	2500	DF, NS - 20:80, blocky mix to suit site conditions.
			MB	R	1600	MB - riparian.
1	59022	23.8	LP, SP, SS	R	2500	LP, MB, SS - 5:5:80, intimate mix (LP nursery) to suit ground conditions, with pure SS outside riparian zone.
			MB	R	1600	MB, SP - 30:60, riparian.
1	59626	16.3	LP, MC, SP, SS	R	2500	LP, SS - 20:80 intimate mix (nursery). MC, SP - pure separate stands.
1	59503	9.8	DF, LP, NS, SP, SS	R	2500	LP, SP - 20:80 & MB, NS - 20:80, blocky mixes targeting visitor experience. DF & MB - pure separate stands.
			MB	R	1600	
2	59155	26.6	DF, LP, SS	R	2500	LP, SS - <10:>90, intimate mix (nursery) to suit site conditions. DF & MB - pure stands. Utilise existing crop and NR where present.
			MB	NR/R	1600	

Restocking						
2	59164	10.1	SS	R	2500	MB, SS - 70:30 blocky mix to suit ground conditions.
			MB	R	1600	
2	59170	2.9	SP, SS	R	2500	SP, SS - 80:20 blocky mix.
2	59089	31.2	LP, MC, NS, SP, SS	NR/R	2500	LP, NS, MB, OC, SP, SS - <10:10:<10:10:20:50, (LP nursery) to suit site conditions. Blocky mix targeting visitor. experience.
			MB	NR/R	1600	
2	59019	31.2	LP, NS, SS	R	2500	LP, NS, SS - 10:10:80, (LP nursery) blocky mix to suit site conditions. MB - riparian.
			MB	R	1600	
2	59017	7.5	SP, SS	R	2500	MB, SP, SS - 30:40:40, pure stands except minor intimate MB, SS mix due to NR in east.
			MB	R	1600	
2	59736	25.0	LP, SP, SS	R	2500	LP, MB, SP, SS - <10:20:<10:80, blocky mix (LP nursery) to suit site conditions.
			MB	R	1600	
2	59085	17.8	LP, SS	NR/R	2500	LP, MB, SS - 20:20:60, intimate conifer mix (nursery), MB pure. Utilise existing crop and NR where present.
			MB	NR/R	1600	
2	59001	21.3	Native MB	R	1600	MB - riparian.
2	59629	21.6	MC, NS, SS	R	2500	MC, NS, SS - 10:60:30 pure stands with MC/NS blocky mix targeting visitor experience

Total	305.4
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† recently felled awaiting restock (F) / Phase 1 (1) / Phase 2 (2)

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

3.6 Species diversity and age structure

The following tables and charts 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. The current woodland composition is shown on **Map 8**.

Stands adjoining felled areas will be retained until the restocking of the first coupe has reached a minimum height of 2 m. Where this is not possible (e.g. due to windblow risk), the planned approach to achieving height separation between adjacent coupes is outlined in section **4.1**.

Table 8

Plan area by species						
Species	Current		Year 10		Year 20	
	Area (ha)	%	Area (ha)	%	Area (ha)	%
Sitka spruce	1,400.4	49.5	1,209.6	42.8	1,139.8	40.3
Other conifers	417.9	14.8	402.8	14.3	439.5 (426.9)*	15.5 (15.1)*
Broadleaves	195.2	6.9	258.7	9.2	275.6	9.8
Fallow	117.8	4.2	191.8	6.8	62.8	2.2
Open ground	695.3	24.6	763.7	27.0	908.9	32.2
Total	2,826.6	100.0	2,826.6	100.0	2,826.6	100.0

* Figures in brackets '()' indicate area/percentage minus nursery crop. Note that some nursery crop species (i.e. LP) may remain following the establishment period.

Chart 1

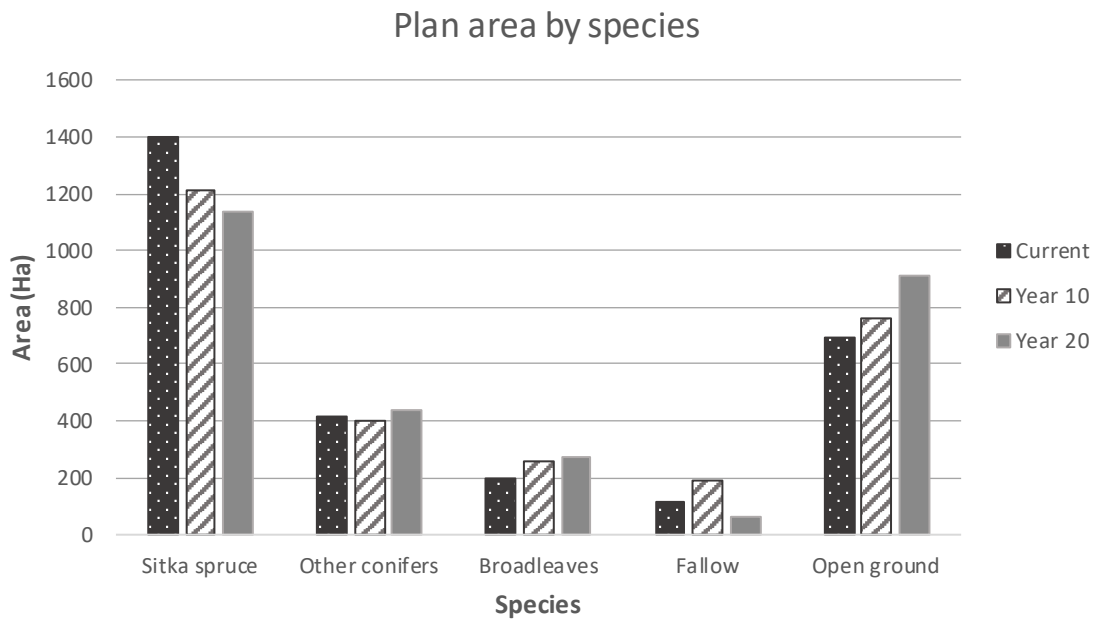
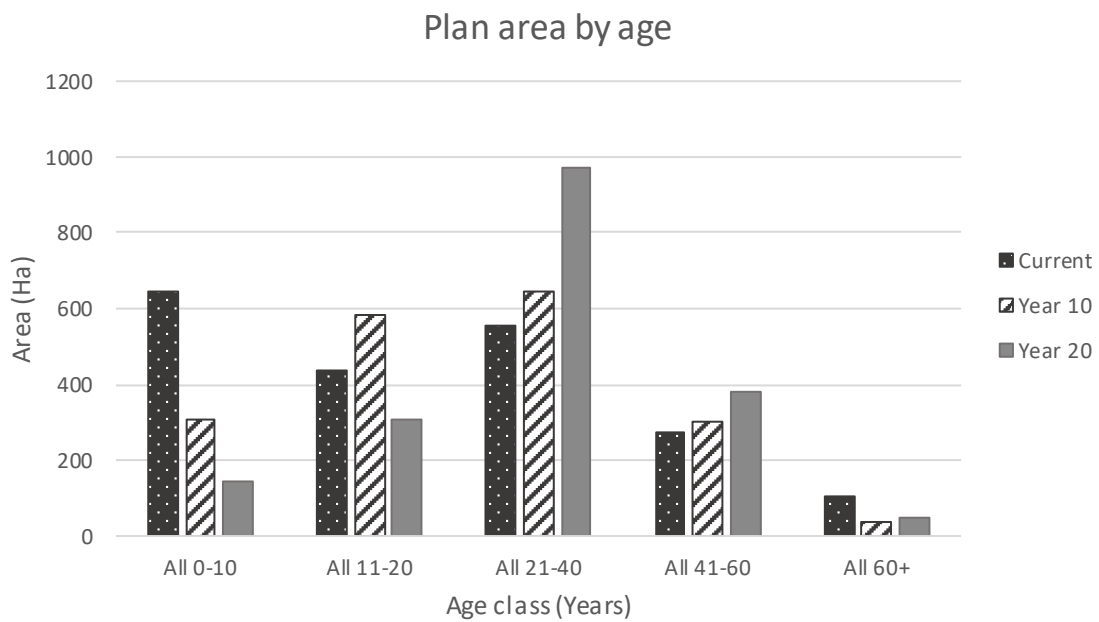


Table 9

Plan area by age (excluding open ground)						
Age Class (years)	Current		Year 10		Year 20	
	Area (ha)	%	Area (ha)	%	Area (ha)	%
0 – 10	643.2	32.0	307.8	16.4	144.4	7.8
11 – 20	436.6	21.7	583.6	31.2	305.9	16.5
21 – 40	555.6	27.6	645.4	34.5	974.4	52.6
41 – 60	274.0	13.6	299.7	16.0	379.7	20.5
60+	103.5	5.1	34.9	1.9	49.8	2.7
Total	2012.9	100.0	1871.4	100.0	1854.2	100.0

Chart 2



3.7 Road Operations and Quarries

Planned new roads, road realignments, road upgrades, new quarrying, and timber haulage routes are shown on the Road Operations and Timber Haulage map (**Map 7**).

Table 10

Forest road upgrades, realignments, new roads and new quarrying		
Phase(s)	Length (m) / Area (ha)	Operation description
1	110 m	Coupe 59097: new road access and turning point
1	200 m	Coupe 59736: new road access
1	870 m	Coupe 59001: new road access
1	300 m	Coupe 59629: new road access and turning point
2	110 m	Coupe 59016: new road access
1+2	20,000 m	Block: road maintenance
1	1.0 ha	Quarry 1420: extension
1	1.0 ha	Quarry 1464: extension

3.8 Environmental Impact Assessment (EIA)

Any operations requiring an EIA determination are shown in the table below. If required, the screening opinion request form is presented in **Appendix IX**.

Table 11

EIA projects in the plan area		
Type of project	Yes / No	Note
Afforestation	No	-
Deforestation	Yes	34.1 ha forest to bog restoration
Forest roads	Yes	1,590 m new roads (1,480 m potential construction in phase 1)
Forestry quarries	Yes	2.0 ha existing quarry extensions

3.9 Tolerance table

Working tolerances agreed with Scottish Forestry are shown in **Appendix II**.

4.0 Management Proposals – guidance and context

4.1 Silviculture

4.1.1 Clear felling

Clear felling supports the key management objectives of this plan (see **1.0**) and will be typically focused on restructuring the woodland through first rotation, windblow and Larch clearance. Felling also aims to increase windfirm forest edges, safeguard the environment, strengthen terrestrial and aquatic ecosystems, and enhance visitor experience. Refer to **Map 4** for clearfell coupes.

Felling will comply with the UK Forestry Standard (UKFS) and other regulatory guidance. To achieve the UKFS of separation between adjacent crops, adjoining coupes should not be felled before the restocking of the first area has reached and average height of at least two metres. We expect this to be achieved in 5 years following planting. Any unforeseen reduction in separation during the period of the plan will be formally agreed with Scottish Forestry as an amendment.

4.1.2 Thinning

Potential thinning coupes are detailed on **Map 5**.

4.1.3 Low Impact Silviculture Systems / Continuous Cover Forestry

There are currently no coupes managed under Low Impact Silviculture Systems (LISS) or Continuous Cover Forestry (CCF) in Castlemaddy, however, clear felling and potential thinning during this plan period will promote future conversion to LISS and CCF management. This will be explored in subsequent LMP renewals.

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

Coupes managed as Long term retention (LTR; 299.4 ha), Minimum intervention (MI; 11.7), and Natural reserve (NR; 5.0) are typically focused on benefiting woodland structure, species composition, visitor experience and biodiversity. Refer to **Map 4** for coupes.

4.1.5 Tree species choice / Restocking

Forest Research's Ecological Site Classification (ESC) tool and local site knowledge have been used to identify site suitability and appropriate species choice for restocking. Restocking species are detailed on **Map 6**.

Sitka Spruce remains the primary species for timber with predicted average yield class ranging up to 24 where site conditions are suitable. Where soils have lower nutrient regimes, SS may be planted in mix with alternative species such as Lodgepole pine to act as a nurse crop. Where ground conditions are suitable, alternative species planting is proposed to meet timber production objectives, to strengthen resilience, and to benefit biodiversity and visitor experience. Alternative species are primarily Norway Spruce, Scots Pine, and native broadleaf species. With timely interventions, higher yielding areas should produce quality saw logs, also with offerings of small round wood, pulp and biomass.

Broadleaf restocking will typically be native and should complement or enrich existing naturally occurring scrub and woodland to give the most ecological value. A key objective is to improve terrestrial and aquatic habitats, which is particularly relevant where priority species are present and where coupes lie within (semi-)ancient woodland (including PAWS) and the Polmaddy Burn acidified water catchment (refer to 4.2). Proposed for planting are species such as Downy/Silver Birch, Hawthorn, Rowan, Willow, Crab/Wild Apple and Common Alder (a minor component within the acidified water catchment).

A key objective is to return afforested deep peat within Carminnows block to a near-natural functioning bog site. Maintenance of hydrological function and defence against non-native seed rain, will be crucial for bog habitat robustness, therefore peatland edge woodland will be flat planted on neighbouring mineral soils. Plantable areas that are isolated by the recovering bog will be left as open ground with the natural regeneration of native species being accepted.

The Restocking Strategy for Scotland's National Estate explains that FLS will minimise chemical usage in restocking (insecticides and herbicides) by considering options at the site scale and using tactics such as delayed planting to achieve this.

4.1.6 Natural regeneration

There are some productive sites where natural regeneration of conifer is occurring. These sites will be monitored and recorded in the FLS sub-compartment database. Where natural regeneration is the desired species, it will be recruited as the next rotation at the required stocking density. It will be important that any thinning interventions avoid damaging young trees.

There should be a preference for natural regeneration of broadleaf areas (to maintain provenance and improve the chances of establishment), including in the Dundeugh block PAWS. Where this is unlikely or has not been successful, these areas should be beaten-up to the required stocking density and site requirements.

It is expected that some riparian corridors and open ground will fill in with naturally regenerating species. This will be managed in such a way as to ensure that, where practicable, it does not significantly impose a negative impact upon LMP objectives, or upon designated sites/structures, or on watercourses in terms of shading and acidification.

Where stocking densities are too low, sites will be beaten up by year five. If the natural regeneration is too dense, it may be necessary to clearfell/restock or respace through a thinning regime. Where natural regeneration is not the desired species, it will be considered against the LMP objectives and tolerance table, and either accepted (with a plan amendment if necessary) or removed.

4.1.7 New planting

There is no new planting proposed within the plan area.

4.1.8 Protection

Browsing

There is a significant challenge in establishing species palatable to deer such as soft conifers and broadleaves. The Regional Deer Management Strategy aims to manage the populations through shooting to achieve set annual cull targets (determined using integrated data i.e. population counts, fecundity/mortality rates, and damage levels) to meet land management objectives.

Within Castlemaddy, restock areas have been selected based on accessibility for protection and to benefit biodiversity. Tree guards may be used where browsing pressure is particularly high and population control difficult, Guards will be removed and recycled once trees have established

Refer to **Appendix VI** for the Castlemaddy Deer Management Plan (DMP).

Pests and disease

Castlemaddy lies within the current Management Zone for *Phytophthora ramorum* and infected Larch has been historically felled to comply with Statutory Plant Health Notice (SPHN) requirements. Remaining larch will be felled in this plan period in line with Scottish Forestry's *P. ramorum* Action Plan (2021) and the FLS Larch Strategy (2022).

Dothistroma Needle Blight (DNB) (*Dothistroma septosporum*) is present across southern Scotland and has been identified on a young Scots Pine crop within Polmaddy block (approx. 5.6 ha). FLS monitor the crop condition of such sites as per the FLS *Dothistroma* Needle Blight Strategy (2017) to determine the appropriate next action.

Ash dieback (*Chalara fraxinea*) is present within the National Estate in South Region, however, there is no known evidence within Castlemaddy. Regional monitoring is ongoing and any identified specimens will be treated as per the *Chalara* Action Plan for Scotland (2013).

Large pine weevil (*Hylobius abietis*) populations will be managed through the *Hylobius* Management Support System (HMSS) to measure weevil numbers on clearfell sites and to establish the optimum time for restocking.

FLS guidance for biosecurity will be employed throughout operations.

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.

4.1.9 Road operations, Timber haulage and other infrastructure

Map 7 shows the existing forest road network, planned new roads, main egress points, FLS quarries, and agreed Timber Transport Routes.

1,590 m of new roading and up to 20,000 m road maintenance may be required to facilitate ongoing forest management across Castlemaddy and the neighbouring Forrest Estate (which utilises the road network for forest access).

To reduce the impact of stone transportation on the county road network, stone material for roading operations will be sourced locally from the active Castlemaddy quarries.

Preferred haulage will be via the existing forest road network that joins the A713 'agreed' timber transport route. For haulage from Marscalloch block, the B729S is a 'consultation' route.

4.2 Biodiversity

4.2.1 Designated sites

Designated sites are shown on **Map 2**.

Merrick Kells

The Merrick Kells Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) border the far west of Polmaddy block. The Merrick Kells are designated for priority habitats (e.g. dry heath, blanket bog, acid peat-stained lakes/ponds, and clear lochs) and species (e.g. otter, birds, dragonfly and beetles). NatureScot's Sitelink classify site condition as generally 'favourable' with the exception of blanket bog, which is 'unfavourable recovering' with key pressures listed as agricultural operations and burning.

Proposals aim to enhance the Merrick Kells interface by drawing back the productive timber core and replacing this with native broadleaf woodland cover and open ground within the vicinity of the Blaree, Goat and Polmaddy Burns. Areas within the FLS block that overlap with the SSSI/SAC will remain unplanted.

All forestry operations interacting with the designated site will meet the requirements of the UKFS, relevant best practice guidance (e.g. Guidelines on Forests and Water, Managing Open Habitats in Upland Forests, etc.), and the Designated Site Management Plan. Operations will also comply with FLS South Region's Pollution Control Plan and additional mitigations detailed within site specific risk assessments undertaken as part of the work planning process ahead of operational commencement.

Cleugh

Cleugh SSSI lies outside of the FLS boundary and approximately 700 m downstream at the head of Carsfad Loch. No perceived negative impacts are envisaged from LMP proposals.

4.2.2 Native woodland

This plan seeks to protect and enhance existing areas of native woodlands and, where practicable, expand the areas to maximise habitat connectivity. Efforts to extend/establish native woodland will be focused within (semi-)ancient woodlands (including PAWS), riparian zones, in areas surrounding peatland restoration sites and, in the long term, on mineral soils adjacent to Merrick Kells SSSI/SAC.

The plan aims to establish open ground and native woodland cover riparian buffers to help improve overall water quality, assist with bank stabilisation, and to assist with aquatic habitat protection from the effects of climate change (e.g. provision of dappled shading and woody debris/leaf litter). Establishment of an open-broadleaf woodland mosaic neighbouring the Blaree, Goat and Polmaddy Burns should consider the recommendations of FLS partners Scottish Environment Protection Agency (SEPA) and Galloway Fisheries Trust (GFT).

Regeneration of non-native conifer species is anticipated due to proximity to the core timber plantation (public and private). Monitoring will be carried out to ensure conifer regeneration does not compromise site objectives and establishment of broadleaves.

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

Ancient woodlands (including Long established of plantation origin (LEPO) and PAWS) are present within and adjacent to Dundough block. The continued phased restoration of these woodlands present within the block is a key objective of this LMP, with conifer removal and native broadleaf establishment typically being targeted.

Dundough Wood PAWS

Expansion of native woodland cover out from the Water of Ken embankment and across the southern reaches of the block are envisioned for Dundough Wood PAWS. Following intervention (clear felling and/or thinning), native natural regeneration will be assessed at year five and, if necessary, supplementary planted to meet desired stocking densities (ranging from scrub development in western areas to denser high forest). Naturally regenerating desirable species such as Oak and Rowan are already present and planting species choice should complement the existing woodland structure: Oak is preferable in riparian corridors and scrub species such as Hawthorn and Crab/Wild Apple on the woodland edge. While non-native conifer will not be planted, mature Norway Spruce and Douglas Fir will be retained as a minor component ($\leq 10\%$ as per PAWS guidance) to cater to Red squirrel.

4.2.4 Protected and priority habitats and species

Habitats

FLS has a duty to protect priority habitats and ensure their condition does not deteriorate. Blanket bog, upland and montane heathland dominate the area bordering the Merrick Kells SSSI/SAC. Upland flush, fen and swap is present in the vicinity of Polmaddy township Scheduled Monument (SM), while wet woodlands, upland oak and birchwoods are present in riparian areas (particularly in Dundough block). The forest design aims to maintain and enhance these habitats via native woodland expansion, peatland restoration, and keeping open priority habitats unplanted with efforts made to remove naturally regenerating conifers and invasive species (see **Map 6**).

Invertebrates

Open ground (including bog, heritage features, priority habitat, rides and forest road corridors) has been incorporated into the design to ensure suitable habitat is available to support a range of invertebrates. Road and ride management will be carefully planned to minimise disturbance to these species.

Vertebrates

- **Black Grouse**

Black grouse were last recorded on site in 2020 and future surveying will seek to confirm their continuing presence. As black grouse require a mosaic of open and wooded habitats, this plan presents an excellent opportunity to provide for the species via native broadleaf establishment and increased areas of open ground. Over time, traditional conifer forest food sources will decline, however, establishing native woodlands, upland heathland, and recovering bog should provide alternative nourishment (e.g. buds, berries, and invertebrates).

- **Raptor**

Raptor such as Barn Owl (*Tyto alba*), Red Kite (*Milvus milvus*), Northern Goshawk (*Accipiter gentilis*) and European Honey Buzzard (*Pernis apivorus*) have been recorded across Castlemaddy. Where appropriate, additional areas of mature conifer may be retained to provide nesting habitat. The projected increase in open habitat and native broadleaf cover should also benefit these species and potentially facilitate increased use of the block.

- **Red Squirrel**

Red squirrel are present across the Castlemaddy block. The forest design aims to maintain and expand squirrel habitat, particularly within Dundough. FLS has a single licence to cover forest management activities that may affect squirrel on the National Estate. All works within the plan area will follow the assessment and mitigation actions set out as conditions of this licence. This is in accordance with the Scottish Biodiversity Strategy's aim to resolve species management issues.

- **Others**

The Water of Deugh supports European Otter (*Lutra lutra*), while GFT surveying in 2021 confirmed the Polmaddy Burn as supporting Atlantic Salmon (*Salmo salar*) fry. The plan design aims to positively contribute to aquatic habitat quality via the creation of riparian buffer areas and native planting. Fish species require clean and well oxygenated waters, making it vitally important that diffuse pollution is avoided through careful planning and delivery of all operations. Pine Marten (*Martes martes*) are monitored annually and efforts to retain mature crop have been implemented. European Badger (*Meles meles*) have also been recorded across the block: sett locations will be identified and protected during forestry operations, with necessary licences sought as part of the work planning process.

4.2.5 Open ground

Open ground contributes to approximately 32.2 % of the LMP area. This includes the Merrick Kells SSSI/SAC buffer, in riparian corridors, peatland restoration at Carminnows, heritage features, roads, quarries and wayleaves. Approximately 1.0 % of the LMP area is classified as successional open (located in Carminnows and isolated by proposed bog restoration), where natural regeneration will be tolerated if compatible with LMP objectives. These areas will be monitored to identify any significant changes and Scottish Forestry will be notified if amendments to this plan are required. Fallow sites will contribute to transitional open space across the LMP period.

Throughout LMP delivery FLS will manage non-native natural regeneration in such a way as to ensure that, where practicable, it does not significantly impose a negative impact upon site objectives. Natural regeneration will be managed to minimise negative impact upon designated, protected or promoted habitats, species, landscapes, historic environment features, and relevant catchments.

4.2.6 Dead wood

Opportunities for retaining or creating deadwood will be identified during the planning of all felling works, favouring areas with the highest deadwood ecological potential (typically within riparian zones and in areas of older crop). Valuable deadwood and deadwood areas will be marked on contract maps. Where it is safe to do so, and does not compromise LMP objectives, standing mature dead trees will be retained as these offer excellent potential for a range of species.

4.2.7 Invasive species

Invasive Non-Native Species (INNS) such as Grey squirrel (*Sciurus carolinensis*) and Common rhododendron (*Rhododendron ponticum*) are present within and/or adjacent to Castlemaddy. The block also falls within SEPA's River Dee (Solway) zone for North American Signal Crayfish (NASC). FLS endeavour to control incursions as per INNS and biosecurity policies, as well as continuing to support the control of Grey squirrel being co-ordinated by Saving Scotland's Red Squirrels.

4.3 Historic Environment

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 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 (e.g. the views to and from a significant designated site).

The South Region Historic Asset Management Plan includes conservation management intentions for designated historic assets on the National Estate. Details of all known historic environment features are held within FLS's heritage data and are included within work plans for 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 (HER) and with the Council's HER prior to the commencement of forestry activities. Any upstanding

features will be clearly marked, both on the ground and on operational maps. Care will be taken to avoid any damage to surviving structural elements.

For historic environment features within Castlemaddy, see **Appendix IV** and **Map 12**.

4.3.1 Designated sites

Dundeugh Castle

Dundeugh Castle, a Scheduled Monument (SM2476), lies in an area of open ground within the Water of Deugh riparian corridor. Situated near the forest road that is popular with local walkers, the monument is within an FLS Visitor Zone. FLS monitor and maintain the area around the monument on a regular basis as per the South Region Historic Asset Management Plan. The forest design aims to enhance the woodland setting of the general area by adding a mixture of colours and textures through a variety of native broadleaves and conifers.

Polmaddy township

Polmaddy township, a Scheduled Monument (SM5391), lies in an area of open ground beside the Polmaddy Burn. The 16th century township remains are within the block's primary Visitor Zone and situated beside the popular Pack Road Core Path. FLS monitor and maintain the wider area of open ground around the monument on a regular basis as per the South Region Historic Asset Management Plan. The felling of coupe 59503 offers the opportunity to enhance the views south from the township and the future forest design proffers a mixture of colours and textures through a variety of tree species.

4.3.2 Other features

Numerous heritage features are present within the plan area and details of all known historic environment features are held within FLS's internal historic environment records (see **Appendix IV**). These are included within work plans, operational maps, and will be clearly identified on the ground during operations to ensure they are appropriately protected.

Of particular interest to the local community are the Craigwhar (NX 586 884) and Craigcrocket (NX 578 897) outcrops along the Pack Road Core Path. Craigwhar is potentially derived from the Gaelic *creag a' chuir*, meaning 'rock of the bend or turn' and this is thought to reference the corresponding turn in the Pack Road. The latter is potentially derived from the Gaelic *creag crochadair*, meaning 'hangman's rock' given proximity to Irongallows (NX 573 904) at Bardenoch Hill (a potential medieval/early modern execution site).¹ The future forest design aims to maintain expansive views west, in addition to highlighting the outcrops from the Pack Road via open ground and low density native woodland.

4.4 Landscape

4.4.1 Designated areas

The Galloway Hills Local Landscape Area overlaps the block. The proposed design has been carefully developed to reflect landform, landscape scale, and achieve best character fit with the Landscape Character Types (LCT) ascribed by NatureScot: Rugged Uplands (LCT 180), Southern Uplands (LCT 177), Foothills with Forest (LCT 176), and Upper Dale (LCT 165). See **Map 11**.

4.4.2 Other landscape considerations

Enhancing external views of the forest along the A713 corridor is a key consideration of this LMP. Proposed clear felling targets the removal of unsightly storm damaged stands visible from the public road, with subsequent restocking of both alternative conifers and broadleaves seeking to create diverse forest views.

¹ Information from *Place-Names of the Galloway Glens*: <https://kcb-placenames.glasgow.ac.uk/>

While there are currently no coupes managed under LISS or CCF, clear felling and potential thinning during this plan period will promote conversion to LISS/CCF management in the future. In the interim, LTR of large stands on Dundegh Hill and at the Polmaddy block entrance assist in maintaining a continuous forest feel.

Consideration has also been given to internal forest views and experience, particularly within Visitor Zones and frequented walking routes. At Castlemaddy, the aim is to present a variety of colours and textures by restocking with assorted species in key areas such as along the Pack Road, surrounding Polmaddy township SM, and within Dundegh block. Designed open space also aims to maintain long-distance views to the surrounding Galloway hills and Merrick Kells. See **4.5.2**.

4.5 People

4.5.1 Neighbours and local community

Neighbours and the local community have taken an active interest in the development of this LMP. Consultation drop-in events held in early 2023 were well attended at both Carsphairn and St. John's Town of Dalry. Additionally, in summer 2023 FLS hosted community walks along the Polmaddy Pack Road and through Dundegh Wood to discuss LMP development and learn more about what makes these areas important to the local community. Local information and aspirations have been incorporated where they do not conflict with LMP objectives and are consistent with FLS's approach to land management. See **Appendix III** for further details.

Where available, relevant neighbours were also consulted for the purposes of private water supply investigations (refer to **Appendix IX**).

4.5.2 Public access

Visitors are welcome to explore FLS land and will only be asked to avoid routes while certain work is going on that will create serious or less obvious hazards for a period (e.g. tree felling). Scotland's outdoors provides great opportunities for open-air recreation and education, with great benefits for people's enjoyment, and their health and well-being. The Land Reform (Scotland) Act 2003 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 must manage their land and water responsibly in relation to access rights and FLS will only restrict public access where it is absolutely necessary and will endeavour to keep disruption to a minimum.

There are active access agreements in place at Castlemaddy (e.g. for neighbouring properties and the Ministry of Defence).

FLS trails, forest roads, and Core Paths at Polmaddy and Dundegh Wood support moderate levels of public access to the forest. FLS will continue to work with Dumfries and Galloway Council to maintain, enhance and promote these routes. The local community have expressed an interest in expanding the range of facilities available throughout Castlemaddy to include the likes of benches and outdoor gym equipment. While there are no immediate plans to develop recreational facilities throughout the block, FLS will take the community's aspirations under consideration when future resources allow.

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. In these zones, single trees or small groups of trees will be removed when necessary to protect facilities, infrastructure and trails/paths, or to enhance the setting of features (e.g. Craiggrocket, Craigwhar, Scheduled Monuments, and other heritage features), or to maintain existing views (e.g. of the Galloway hills and Merrick Kells). Woodland may 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. Visitor Zones are mapped on **Map 2**.

4.5.3 Renewables, utilities and other developments

Refer to **Map 2**.

Renewables

There are currently no renewables developments within Castlemaddy.

Utilities

There are several power and communications lines intersecting the block that are located along the A713 and B729 public roads. Lines along the forest road network are typically associated with neighbouring residences (e.g. Dundough village and the entrance to Marscalloch). Wayleaves intersect Carminnows and Dundough blocks.

The A713 public road separates Polmaddy from the other blocks. Marscalloch is accessed from the B729 public road.

Private water supplies associated with neighbouring properties interact with the block (refer to **4.7.1**).

All utilities will be covered by servitude rights on the National Estate and all necessary precautions will be taken to locate services on the ground as part of work planning. This will include robust preparation, liaison with relevant stakeholders, in addition to dissemination of emergency and work planning particulars before operations begin.

Other

Several bridges which traverse the Polmaddy and Polquhanity burns, and the Water of Deugh.

Ministry of Defence 'Stone Tents' (active) at NX 554 895.

FLS quarries:

- Castlemaddy, ref.: 1420, at NX 544 904 (active), approx. 1.0 ha extension proposed
- Castlemaddy D34, ref.: 1464, at NX 581 897 (active), approx. 1.0 ha extension proposed
- Island Block Dundough, ref.: 1478, at NX 603 891 (not active)
- Marscalloch, ref.: 1479, at NX 612 922 (closed).

Forest Research experiment sites:

- Castlemaddy: *Hylobius* management, ref.: Mis 538, NX 541 914 (closed)
- Craigenwallie: biosoil, ref.: Biosoil Plot 195, NX 543 910 (open)
- Polmaddy: improved SS sample plot, ref.: MiscF 207 Plot 10, at NX 563 893 (open).

4.5.4 Support for the rural economy

FLS supports a sustainable rural economy by managing the national forests and land in a way that encourages sustainable business growth, development opportunities, jobs and investment. Castlemaddy is part of the local landscape that attracts investment and visitors to the local area. Careful forest design with these factors in mind, along with responsible delivery of forestry operations, will provide a positive visitor experience.

4.6 Soils

Site soils are presented in **Map 9**.

4.6.1 Protection and Fertility

There will be minimal soil disturbance and machine movement on sites with clayey soils to reduce the risk of compaction or damage to the soil structure. Brash mats (or alternative measures) will be used to protect sensitive soils. Except for sites targeted for peatland restoration and coupes located within acidified catchments, felling residue will usually be left on site to allow nutrient recycling, with consideration for the practicalities of restocking.

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: only discontinuous mounding within coupes pertinent to private water supply (PWS) catchments and no cultivation (flat planting) employed in PWS buffers, wet woodland, peatland edge and riparian areas.

4.6.3 Deep peats

Some peat types are edaphically unsuited to woodland, while 10a and 10b peat types are also associated with raised bog habitats. Lowland raised bog and blanket bog are UKBAP priority habitats and therefore FLS operate on a presumption to restore these. As such, there will be no restocking of commercial conifer on deep peats that are currently afforested with first rotation stands.

A combination of detailed soil data and site investigation have identified deep peat as minor component of the Castlemaddy block. There is restorative potential for approximately 34.1 ha of afforested peatland at Carminnows during the LMP period. Refer to **Appendix VI** for a full details.

Elsewhere, areas where restoration is unlikely to succeed but should not be commercially restocked due to soil type will be flat planted with low density native woodland or managed as open ground (where deep peats areas are <10 ha) to benefit biodiversity.

There is some scope for additional peatland restoration beyond the plan period (e.g. sites currently afforested with second rotation stands). These sites will be subject to further review as part of the subsequent LMP renewal.

4.7 Water

4.7.1 Drinking water

Relevant Drinking Water Protected Areas are:

- Existing river WB (Surface water), NX 60 88, ref.: DWPA13_494
- Galloway (Groundwater) ref.: 150694.

Forestry activities undertaken in the source water catchment will meet the precautions set out in the 'Guidance on Forestry Activities near Scottish Water Assets'. For DWPA13_494 (surface water), the predominant future habitat around the Water of Ken and Water of Deugh will be native broadleaf woodland, providing a buffer from the core timber production area.

Details of private water supplies (PWS) within the general area of Castlemaddy were supplied by the local authority. These were checked for relevance to the block and, where appropriate, ground truthed by FLS staff and/or via consultation with end users. A description of each water supply, potential impact from proposed LMP operations and mitigation statements are detailed in **Appendix IX.**²

All known drinking water supply points and pipes are internally recorded and this data is consulted during the work planning process. Sites are inspected ahead of operational commencement to ensure water supply details are correct and to assist with their protection. There will be close liaison with affected end users and relevant authorities prior to work commencement. Water supply features will be clearly marked on all contract maps/on the ground. Operational commencement will be subject to a site specific assessment of risk and will strictly comply with FLS South Region's Pollution Control Plan, UKFS Guidelines on Forests and Water, CONFOR's Forestry and Water Scotland Know the Rules (2nd Ed.), and FLS's legal obligations.

4.7.2 Watercourse condition

All forestry operations will meet the requirements of the UKFS Guidelines on Forests and Water, Forestry and Water Scotland Know the Rules (2nd Ed.) handbook, and Managing Forests in Acid Sensitive Water Catchments best practice. Operations will also comply with FLS South Region's Pollution Control Plan and additional mitigations detailed within site specific risk assessments undertaken as part of the work planning process.

Castlemaddy interacts with several key watercourses such as the Garryhorn Burn, Water of Deugh, Water of Ken, and the Goat, Blaree and Polmaddy burns. Water catchments in the area are classed as having 'bad' to 'poor' water quality. The majority of the block sits within the Polmaddy Burn acidified catchment. The proposed scale and phasing of felling, along with increases in open ground and broadleaf woodland establishment in riparian zones, seeks to reduce significant negative impact within these catchments as per the 'Managing Forests in Acid Sensitive Water Catchments' guidance. Catchment analysis is detailed in **Appendix V.**

Efforts to improve water quality will be realised through continued implementation of riparian zones along watercourses that increase open ground and broadleaf woodland (e.g. by headwaters of the Goat, Blaree and Polmaddy burns). Principles of the Riverwoods³ initiative have been incorporated into the LMP where possible to promote and provide valuable habitat corridors.

4.7.3 Flooding

The proposals herein have been screened against SEPA's Flood Risk Management (FRM) Cycle Two, which shows the block is upstream of Castle Douglas, Bridge of Dee, Kirkcudbright (Cycle One Objective Target Areas (OTA)), and now also Carsphairn OTA. There is also a high likelihood of localised flooding downstream of Castlemaddy.

The extent of proposed felling does not exceed the thresholds set in Forest Research's (2022) 'Designing and Managing Forests and Woodlands to Reduce Flood Risk' and as such there is no perceived measurable negative effect on peak flows at any of the areas prone to flooding. The block has been designed using the principles set out in the abovementioned guidance (e.g. UKFS riparian buffers, establishment of wet woodland and peatland restoration) and will be managed accordingly. SEPA have also expressed an interest in future floodplain creation within the FRM catchment and FLS welcome opportunities to work in partnership on this matter.

² Note: appendix is provided as a LMP attachment as it contains sensitive information.

³ Riverwoods initiative: <https://www.riverwoods.org.uk>

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Appendix I: Description of Woodlands

Description of woodlands
Topography and Landscape
<p>The site spans the main Castlemaddy block, Carminnows, Dundeugh (island block) and Marscalloch. The site is generally undulating, reaching a maximum elevation of 807 m (Carlin’s Cairn), and backs onto the Merrick Kells in the west. The Polmaddy Burn drains western areas, meeting the Water of Deugh and Water of Ken in the east by Dundeugh (near the neighbouring Kendoon power station).</p> <p>The Galloway Hills Local Landscape Area overlaps the block. Map 11 shows landscape character types (LCT) relevant to Castlemaddy. These are:</p> <ul style="list-style-type: none"> • Rugged Uplands – Dumfries and Galloway LCT 180 (NatureScot) across the west of Castlemaddy block. Key characteristics include wildness, massive rugged peaks, heather covered slopes, exposed ‘highland’ landscape, dark cliffs, water features, and forest on lower slopes. • Foothills with Forest – Dumfries and Galloway LCT 176 (NatureScot) across the majority of Castlemaddy block. Key characteristics include dark green blanket of forest covering undulating foothills, changing landscape with forestry and wind farm development, tall mature conifers at roadside, relic landscape with pre-improvement settlement remains, and some smaller-scale areas that are locally distinctive. • Upper Dale – Dumfries and Galloway LCT 165 (NatureScot) encompasses Castlemaddy, Carminnows, Dundeugh and the majority of Marscalloch blocks. Key characteristics include wide valleys enclosed by high peaks and moorlands, long open views, valley pasture transitioning to rougher ground up valley sides, riparian woodlands, medium to large scale forests on valley sides that extend over the horizon, wind farm development, and remnants of industrial activity (e.g. mine ruins and bings). • Southern Uplands – Dumfries and Galloway LCT 178 (NatureScot) across the north of Marscalloch. Key characteristics include gently rolling landform, large and smooth dome-shaped hills with large scale forests, changing landscapes with large scale forestry and wind farm development, and expansive scale.
Geology and Soils
<p>Bedrock is composed primarily of wacke and siltstone turbidite succession, wacke sandstone, and wacke quartzose (Caradoc series), interspersed with fingers of black or grey shale. Superficial geology is largely composed of complex glacial deposits (e.g. rock debris, clayey till, sand and gravel) giving a mounded topographical form, with smaller areas of peat, clayey hillwash and soil creep.</p> <p>Marscalloch and Dundeugh blocks are dominated by brown earth and (peaty) surface water gleyed soils, with infrequent but sizeable iron pan pockets in elevated areas. In the east, Polmaddy (the main block) is dominated by brown earth interspersed with surface-water gleyed and peat soils. Moving westwardly, a complex mosaic develops with brown earths becoming infrequent with gleyed, peat and ranker soils dominating. Carminnows block is a mosaic of deep peat, gleyed, and iron pan soils.</p>

Description of woodlands

Soil types within the forest block are shown on **Map 9**. Refer to **4.6**, and **Appendix VI** for peat restoration details.

Climate

The Glenlee climate station (approx. distance of 8 km from the block) has recorded average temperatures of 9.7 - 19.0 °C (summer) and 0.6 - 7.2 °C (winter). The average annual rainfall is 148.4 mm.

Accumulated temperature (day-degrees above 5°C)

Min: 730, Max: 1747, Average: 1531

Moisture Deficit (mm)

Min: 2, Max: 103, Average: 81

The climate of the block area is highlighted on the table below.

		Accumulated temperature (day-degrees above 5°C)								
		>1800	1800-1475	1475-1200	1200-975	975-775	775-575	575-375	375-175	<175
Moisture Deficit (mm)	>200									
	180-200	Warm	Dry							
	160-180									
	140-160									
	120-140	Warm	Moist		Cool	Moist				
	90-120									
	60-90		Warm	Wet						
	20-60				Cool	Wet		Sub-Alpine		
	<20							Sub-Alpine	Alpine	

Climatic Zones in Great Britain (shading indicates combinations not present)

Hydrology

Map 2 shows all watercourses, open water, and recorded water supplies within the FLS holding.

Water catchments

The block sits across the Polmaddy Burn, Garryhorn Burn, Water of Deugh, and Water of Ken catchments (as defined by SEPA).

The Polmaddy Burn is an acidified water catchment. Refer to **Appendix V** for full details.

Water quality

Key surface waterbodies in the plan area:

Name: Polmaddy Burn (ID: 10568) **Overall Condition:** Bad

Impacted condition / Responsible pressures or activity (as per SEPA's Environment Hub):

- Bad ecological condition (fish ecology).
- Key pressure is acid rain (fossil fuel burning – acidified soils).

Description of woodlands

- Over many decades, acid rain has caused changes in the chemistry of the soils in the catchment of the water body. As a consequence, water draining to the water body is more acidic than it would otherwise be. This has adversely affected the body's water quality (classed as 'moderate' in 2021)
- Substantial progress has been made in tackling acid rain. Emissions of acid-forming gases such as sulphur dioxide and nitrogen oxides have decreased significantly over the period 1970 to 2014. Despite this, the soils in the catchment have not yet recovered sufficiently to be able to buffer even the natural levels of acidity in rainfall. This is because soil recovery processes are slow, relying on the weathering of minerals in the underlying bedrock or on the accumulation of material from decaying, base-rich vegetation.
- These rate limiting natural conditions mean that it will take some time for the soils in the catchment of the water body to recover from the effects of acid rain. Until they do, the water body will continue to be more acidic than required for good water quality.

Name: Garryhorn Burn (ID: 10567) **Overall Condition:** Poor

Impacted condition / Responsible pressures or activity (as per SEPA's Environment Hub):

- Poor ecological condition (fish ecology).
- It has not been technically feasible to remove all barriers to fish migration as yet due to the scale of the programme of works required across Scotland. SEPA are undertaking a phased programme of work due for completion by the end of 2027.

Name: Water of Deugh (ID: 10562) **Overall Condition:** Poor

Impacted condition / Responsible pressures or activity (as per SEPA's Environment Hub):

- Poor ecological condition (fish ecology and barriers).
- Key pressure is hydroelectricity generation on fish migration and water storage.
- It has not been technically feasible to remove all barriers to fish migration as yet due to the scale of the programme of works required across Scotland. SEPA are undertaking a phased programme of work due for completion by the end of 2027.
- Water flows and levels are below the standards expected for good status, however, there is currently no evidence that this is adversely affecting the condition of the water body's plant or animal communities. This is because flows and levels are not so altered as to cause the types of major or severe impacts that have been identified and link back to pressures on flows or levels.
- SEPA are currently working on the development of new and improved methods for assessing the impacts of pressures on water flows/levels.

Name: Water of Ken (ID: 10558) **Overall Condition:** Bad

Impacted condition / Responsible pressures or activity (as per SEPA's Environment Hub):

- Bad condition (hydromorphology and ecological indicators), though water quality 'high'
- Key pressures are impacting the physical condition (e.g. modifications to bed, banks and shores) and water flows/levels (e.g. water abstraction and storage).
- It has not been technically feasible to improve the physical condition of all waterbodies as yet due to the scale of the programme required across Scotland. SEPA are undertaking a phased programme of work due for completion by the end of 2027.

Name: Water of Ken u/s High Bridge of Ken (ID: 10559) **Overall Condition:** Poor

Impacted condition / Responsible pressures or activity (as per SEPA's Environment Hub):

- Poor ecological condition (fish barriers).
- Crossing of the watercourse impacting fish migration.

Description of woodlands

- It has not been technically feasible to remove all barriers to fish migration as yet due to the scale of the programme of works required across Scotland. SEPA are undertaking a phased programme of work due for completion by the end of 2027.

Flooding

Upstream of Castle Douglas, Bridge of Dee, Kirkcudbright and Carsphairn Objective Target Areas (OTA). There is a high likelihood of localised flooding downstream of Castlemaddy. Impacted areas are generally associated with the Water of Ken (Carsfad, Carlingwark and Earstoun lochs, and Loch Ken) and River Dee, which flows into Kirkcudbright Bay where the likelihood of coastal flooding is high.

Water supplies

Drinking Water Protected Areas are:

- Existing river WB (Surface water), NX 60 88, ref.: DWPA13_494
- Galloway (Groundwater) ref.: 150694.

There are numerous private water supplies either within or neighbouring the Castlemaddy blocks. Refer to **Appendix IX**.

Windthrow

In general, the site is sheltered to moderately exposed, with an area of severe exposure spanning across Carlin's Cairn in the far west. DAMS ranges from 12-27; **Map 10** illustrates DAMS measurements for the land management unit.

Adjacent land use

Predominantly rough grazing, woodland, and forestry plantation (public and private). The main block neighbours Merrick Kells SSSI to the west. There are private dwellings neighbouring the block, typically concentrated at Dundough and Marscalloch wood, some offering holiday accommodation. Kendoon power station sits on the Water of Ken, neighbouring Dundough in the south.

Public access

FLS recreation facilities include car parks at Polmaddy and Dundough blocks and a walking trail at the Polmaddy township Scheduled Monument.

Core Paths at Polmaddy and Dundough Wood support moderate levels of public access to the forest. The Pack Road at Polmaddy is popular with the local community.

There are active access agreements in place at Castlemaddy (e.g. for neighbouring properties and the Ministry of Defence). Wayleaves intersect Carminnows and Dundough blocks.

Forest Research experiment sites:

- Castlemaddy: *Hylobius* management, ref.: Mis 538, NX 541 914 (closed)
- Craigenwallie: biosoil, ref.: Biosoil Plot 195, NX 543 910 (open)
- Polmaddy: improved SS sample plot, ref.: MiscF 207 Plot 10, at NX 563 893 (open).

There is local interest in the block, with particular interest in species diversity, the scheduled monuments, and recreational trails. Refer to **Appendix III**.

Description of woodlands

Map 2 shows the location of forest roads and pathways.

Historic environment

There are two Scheduled Monuments:

Name: Polmaddy (SM 5391) **Location:** NX 59026 87842

Description (Historic Environment Scotland): The remains of the deserted village of Polmaddy, documented from the early 16th century AD. The remains take the form of an extensive complex of fields bounded by drystone walls and containing many small cairns and, on the lower land beside the Polmaddy Burn, an area of open fields marked by traces of rig and furrow cultivation. Along the lower edge of the dry ground are the lower wall courses of several small farm building groups, characterised by rectangular houses, five kilns (three with attached barns), byres and barns. In addition there are the lower walls of a watermill, mill-pond and lade system, and foundations of a more substantial building which was once an inn. A pack-horse road runs from N to S through the E edge of the area, past the inn. The area is irregular, bounded on the SE, S and SW by the N bank of the Polmaddy Burn, on the NW, N and NE by existing fences (which are themselves excluded from scheduling).

Name: Dundeugh Castle (SM 2476) **Location:** NX 60105 88037

Description (Historic Environment Scotland): Castle or tower. Only the SE angle walls and the E wall of the N wing are partially extant, measuring 0.8 m – 2 m high and 1 m wide. RCAHMS and early OS maps suggest further structures were attached to the S and W of the present remains.

There are numerous undesignated historic environment features recorded across the block. Historic environment records for the plan area are shown in **Appendix IV** and on **Map 12**.

Of particular interest to the local community are the Craigwhar (NX 586 884) and Craiggrocket (NX 578 897) outcrops along the Pack Road Core Path.

Biodiversity

The block lies within the Galloway and Southern Ayrshire Biosphere.

Designated Sites

The Merrick Kells Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) border the far west of Polmaddy block. Designated for priority habitats (e.g. dry heath, blanket bog, acid peat-stained lakes/ponds, and clear lochs) and species (e.g. otter, birds, dragonfly and beetles). NatureScot's Sitelink classify site condition as generally 'favourable' with the exception of blanket bog, which is 'unfavourable recovering' with key pressures listed as agricultural operations and burning.

Priority Habitats

Blanket bog, upland and montane heathland dominate the area bordering the Merrick Kells SSSI/SAC. Upland flush, fen and swap is present in the vicinity of Polmaddy township Scheduled Monument (SM), while wet woodlands, upland oak and birchwoods are present in riparian areas (particularly in Dundeugh block). Peatland restoration potential within Carminnows block where currently afforested with first rotation conifer. Refer to **4.2**, **4.6**, and **Appendix VI**.

Description of woodlands

Priority Species

The block supports a wide range of species: various invertebrates, Black Grouse, Pine Marten, Red Squirrel, Atlantic Salmon, European Otter, European Badger, and various raptor.

Ancient Woodland / PAWS

Ancient woodlands are located within and surrounding Dundegh (island block). These include Dundegh Wood PAWS.

Natural Reserves

Natural Reserves associated with PAWS in Dundegh Wood.

Deadwood potential

The greatest potential for deadwood is along riparian buffers and in ancient woodlands.

Open ground

Rides, glades, components of riparian zones, wayleaves, heritage buffers, Scheduled Monuments, car parks, roads, and quarries:

- Castlemaddy, ref.: 1420, at NX 544 904 (active), approx. 1.0 ha extension proposed
- Castlemaddy D34, ref.: 1464, at NX 581 897 (active), approx. 1.0 ha extension proposed
- Island Block Dundegh, ref.: 1478, at NX 603 891 (not active)
- Marscalloch, ref.: 1479, at NX 612 922 (closed).

Invasive species

Grey squirrel, Common rhododendron and the block falls within SEPA's River Dee (Solway) zone for North American Signal Crayfish (NASC).

Woodland composition

The current woodland composition of the forest is shown on **Map 8**.

18.6 % (366.5 ha) of high forest is first rotation and 81.4 % (1603.3 ha) is second or subsequent rotation.

There are some areas of windblow that are typically limited to coupe edges, with more extensive occurrences across coupes in Dundegh and Polmaddy blocks. Conifer stock on deep peat soils at Carminnows is generally not growing well, plus stems have snapped and/or are windblown. Broadleaves across the site are generally vulnerable to browsing.

The current woodland management (and % of the plan area) is approximately:

2,173.5 ha (76.9 %) under Clearfell
306.9 ha (10.8 %) under Long term retention
8.1 ha (0.3 %) under Minimum intervention
338.0 ha (12.0 %) is Other/Open land.

Plant health

Phytophthora ramorum present on Larch species within the block confirmed. The block lies within the Larch Strategy's 'Management Zone'. Larch will not feature in the future restock mix.

Description of woodlands

Dothistroma septosporum present within Polmaddy block on P2007 Scots Pine crop (approx. 5.6 ha). Future condition surveying required.

Infrastructure

Refer to **Map 2**.

There are several power and communications lines intersecting the block that are located along the A713 and B729 public roads. Lines along the forest road network are typically associated with neighbouring residences (e.g. Dundegh village and the entrance to Marscalloch). Wayleaves intersect Carminnows and Dundegh blocks.

There are several bridges within the block which traverse the Polmaddy and Polquhanity burns, and the Water of Deugh.

Polmaddy (main block)

Main vehicular access into the block is via a shared general access route at NX 5980 8799, with alternative access via Braidenoch Road at NX 58705 90146. There is a well-established forest road network throughout the block.

Ministry of Defence 'Stone Tents' (active) at NX 3645 7902.

Quarries within the block are:

- Castlemaddy, ref.: 1420, at NX 544 904 (active), approx. 1.0 ha extension proposed
- Castlemaddy D34, ref.: 1464, at NX 581 897 (active), approx. 1.0 ha extension proposed

The A713 public road separates Polmaddy from the other blocks.

Private water supplies interact with the block. Refer to **Appendix IX** for details.

Forest Research experiment sites:

- Castlemaddy: *Hylobius* management, ref.: Mis 538, NX 541 914 (closed)
- Craigenwallie: biosoil, ref.: Biosoil Plot 195, NX 543 910 (open)
- Polmaddy: improved SS sample plot, ref.: MiscF 207 Plot 10, at NX 563 893 (open).

Carminnows

Main vehicular access into the block is at NX 58534 90527. There is a well-established road network throughout the block.

The A714 public road borders the block to the west, separating it from Polmaddy block.

Wayleaves: overhead Scottish Power lines are present.

Private water supplies interact with the block. Refer to **Appendix IX** for details.

Dundegh

Main vehicular access into the block is at NX 59858 88281. There is a well-established road network throughout the block.

Quarry: Island Block Dundegh, ref.: 1478, at NX 603 891 (not active)

Description of woodlands

The A714 public road separates the block from the main Polmaddy block.

Wayleaves: overhead utility lines associated with Kendoon are present.

Private water supplies interact with the block. Refer to **Appendix IX** for details.

Marscalloch

Marscalloch is accessed from the B729 public road, which separates it from the other blocks to the west. Main vehicular access into the block is possible at NX 61959 90931 and NX 60387 91328. There is a well-established road network throughout the block.

Quarry: Marscalloch, ref.: 1479, at NX 612 922 (closed).

Private water supplies interact with the block. Refer to **Appendix IX** for details.

Appendix II: Tolerances

	Maps Required (Y/N)	Adjustment to felling period *	Adjustment to felling coupe boundaries **	Timing of Restocking	Changes to Restocking species	Changes to road lines	Designed open ground ** ***	Windblow Clearance ****
FC Approval normally not required	N	Fell date can be moved within 5 year period where separation or other constraints are met.	Up to 10% of coupe area.	Up to 3 planting seasons after felling.	Change within species group e.g. evergreen conifers or broadleaves.		Increase by up to 5% of coupe area	
Approval by exchange of letters and map	Y	Advance felling of Phase 2 coupe into Phase 1	Up to 15% of coupe area	Between 3 and 5 planting seasons after felling, subject to the wider forest and habitat structure not being significantly compromised.		Additional felling of trees not agreed in plan. Departures of >60 m in either direction from centre line of road	Increase by up to 10% of coupe area Any reduction in open space of coupe area by planting.	Up to 5 ha
Approval by formal plan amendment may be required	Y	Felling delayed into second or later 5 year period. Advance felling (phase 3 or beyond) into current or 2nd 5 year period.	More than 15% of coupe area.	More than 5 planting seasons after felling, subject to the wider forest and habitat structure not being significantly compromised.	Change from specified native species. Change between species group.	• As above, depending on sensitivity.	In excess of 10% of coupe area. Colonisation of open space agreed as critical.	More than 5 ha.

Notes

* Felling sequence must not compromise UKFS, in particular felling coupe adjacency

** No more than 1 ha, without consultation with FCS, where the location is defined as 'sensitive' within the Environmental Impact Assessment (Forestry) 1999 Regulations (EIA)

*** Tolerance subject to an overriding maximum 20% open space

**** Where windblow occurs FCS should be informed of extent prior to clearance and consulted on where clearance of any standing trees is required.

Table of working tolerances specific to Larch and available for all approved forest plans in the Risk Reduction Zone (RRZ) – including the Management Zone (MZ) to help reduce sporulation of *Phytophthora ramorum* on larch species.

Approval process	Adjustment to felling period	Timing of restocking and species component	Felling of Larch within a mixed coupe	Changes to road lines
SF approval normally not required	Fell date for phase 2 can be moved forward where larch comprises 50% or more of the coupe species component	Changes to restocking proposal that exclude larch and closely related species in the same genus e.g. Sitka and Norway spruce. Up to 3 planting seasons after felling		
SF approval normally by exchange of letters and map	Felling moved between phases 1 and 2 where larch comprises less than 50% of the coupe species component	Changes to restocking proposal that exclude larch and closely related species in the same genus e.g. Sitka and Norway spruce Between 3 and 5 planting seasons after felling	Areas of pure larch up to 20% of coupe area within phase 1 and 2 can be felled to remove the sporulating host with restocking deferred until the rest of the crop is felled. Where larch constitutes more than 20% of the coupe component then the whole coupe must be felled and restocked together	New road lines (subject to EIA screening opinion) or tracks within existing approved plans necessary to allow the extraction of larch material. Where necessary Prior Approval should be dealt with directly with the relevant Planning Authority
Approval by formal plan amendment is required	Advance felling into current or second phase for pre-emptive larch removal.			Where a new public highway entrance or exit is required. Where necessary Prior Approval should be dealt with directly with the relevant Planning Authority

Notes

Larch felled in the autumn and winter, when the presence of P. ramorum cannot be assessed visually must be treated as infected and will therefore require a movement licence. When carrying out operations where the clearance has not been on the Public Register or through the consultation procedure it is important that due diligence is undertaken to identify sites that will require to be protected. SPHNs will still be issued and should be complied with accordingly. This tolerance table is offered to assist in the pre-emptive early removal of the host species.

Appendix III: Consultation record

Consultee	Date contacted	Date of response	Issues raised	FLS response
British Horse Society	December 2022	None	-	N/A
Butterfly Conservation Scotland	December 2022	None	-	N/A
Carsphairn Community Council	December 2022	None	-	<ul style="list-style-type: none"> See 'Neighbours/Local communities' below.
Carsphairn Community Woodland	February 2023	February 2023	<ul style="list-style-type: none"> Community asset transfer (CAT) of Marscalloch. 	<ul style="list-style-type: none"> Woodland information for CAT supplied upon request.
Carsphairn Heritage Initiative	December 2022	None	-	N/A
New Galloway Community Council	December 2022	None	-	<ul style="list-style-type: none"> See 'Neighbours/Local communities' below.
St John's Town of Dalry Community Council	December 2022	None	-	<ul style="list-style-type: none"> See 'Neighbours/Local communities' below.
CONFOR	December 2022	None	-	N/A
Crichton Carbon Centre (CCC)	December 2022	None	-	N/A
Dumfries & Galloway Council (DGC) – Environmental Health	December 2022	January 2023	<ul style="list-style-type: none"> Provided a list of private water supplies and properties served by private water supplies within a 10 km radius of Castlemaddy block. Land and tree management activities can affect the quality and safety of nearby water supplies. 	<ul style="list-style-type: none"> FLS appreciate sharing of information. Safeguarding the water environment is a key objective of this LMP. PWS were investigated in February 2023 – refer to 4.7 and Appendix IX FLS comply with UKFS Forests and Water Guidelines, Forestry and Water Scotland Know the Rules, FLS South Region Pollution Control Plan, and its legal obligations.
DGC – Access	December 2022	December 2022	<ul style="list-style-type: none"> Provided records showing the relevant Core Paths and Rights of Way Consider core paths/rights of way in planning Any improvements to existing routes or access would be welcomed No issues with anything that is proposed. 	<ul style="list-style-type: none"> Maintaining access routes is a key objective of this LMP and FLS welcome support for LMP proposals Efforts to improve visitor experience through future woodland management along paths and forest roads have been incorporated into LMP proposals. FLS also encourage responsible access across the forest block as per SOAC – refer to 4.5.
DGC – Archaeology	December 2022	July 2023	<ul style="list-style-type: none"> Identified small number of unmapped heritage features Concur with proposals with regard to historic environment. 	<ul style="list-style-type: none"> FLS appreciate sharing of information. Details of features noted and added to record – refer to Appendix IV Heritage features will be managed as per the agreed South Region Asset Management Plan and in line with UKFS commitments – refer to 4.3.
DGC – Resilience	December 2022	N/A	-	N/A
Galloway Fisheries Trust	August 2022	August 2022	<ul style="list-style-type: none"> Smolts (trout/salmon) recorded in Polquhanity Burn 	<ul style="list-style-type: none"> Safeguarding the water environment is a key objective of this LMP – refer to 4.2, 4.7, and (for forestry acidification effect) Appendix V.

Consultee	Date contacted	Date of response	Issues raised	FLS response
Galloway and Southern Ayrshire Biosphere	December 2022	None	-	N/A
Historic Environment Scotland	December 2022	January 2023	<ul style="list-style-type: none"> • Maintenance of open ground and general management of Scheduled Monuments Polmaddy (SM5391) and Dundegh Castle (SM2476). • Management of heritage features as per UKFS. 	<ul style="list-style-type: none"> • Scheduled Monument management advice noted • Heritage features will be managed as per the agreed South Region Asset Management Plan and in line with UKFS commitments – refer to 4.3.
IUCN Otter Specialist Group	December 2022	None	-	N/A
NatureScot	December 2022	December 2022	<ul style="list-style-type: none"> • Management of Merrick Kells SSSI/SAC: <ul style="list-style-type: none"> ○ overlapping areas are to remain unplanted ○ removal of Sitka Spruce ○ welcome a continuation of buffer area ○ importance of deer management • No concerns over impacts from the proposed plans on Cleugh SSSI. • Welcome the commitment to protecting watercourses (recommend going beyond UKFS buffers). • Support committing to facilitation of public access in line with SOAC. 	<ul style="list-style-type: none"> • FLS welcome support to improve SSSI/SAC buffer. Advice on amending the buffer has been noted. Open ground is to be left unplanted – refer to 4.2 (also for priority species/other habitats) • Designated sites will be managed as per the agreed Site Management Plans • Deer management plan – refer to Appendix VII • Safeguarding the water environment is a key objective of this LMP with a catchment scale approach to improving water quality – refer to 4.2, 4.7, and (for forestry acidification effect) Appendix V • FLS encourage responsible access across the forest block as per SOAC – refer to 4.5.
Neighbours/Local communities	December 2022	December 2022	<ul style="list-style-type: none"> • Forest management for biodiversity • Queried rainforest potential at Dundegh wood • Maintained access throughout blocks • Requested more recreation facilities (and enhancement of existing) • Cultural heritage interests • Private water supply (PWS) investigations. • Requested community engagement walks during LMP development 	<ul style="list-style-type: none"> • Importance of local biodiversity noted – refer to 4.1 and 4.2 • Rainforest details noted and referred to FLS Native Woodlands Ecologist. At this time, the Scotland's Rainforest Zone does not encompass areas of southwest Scotland. • Access and recreational aspirations noted – refer to 4.5 • Cultural heritage interests noted – refer to 4.3 and 4.5 • PWS were investigated in February 2023 – refer to 4.7 and Appendix IX • FLS drop-in consultation event details: <ul style="list-style-type: none"> ○ 8 February 2023 at Carsphairn village hall: 7 people attended ○ 10 February 2023 at St. John's Town of Dalry village hall: 10 people attended • FLS guided walk consultation event details: <ul style="list-style-type: none"> ○ 6 June 2023 along the Pack Road, Polmaddy block: 16 people attended ○ 8 June 2023 through woodlands, Dundegh block: 15 people attended.
Raptor Study Group	December 2022	None	-	N/A
RSPB	December 2022	January 2023	<ul style="list-style-type: none"> • Important area for Black Grouse: welcome proposals to improve SSSI buffer zone and advised it should include native broadleaf planting to 	<ul style="list-style-type: none"> • Black Grouse habitat advice noted – refer to 4.2 • Natural regeneration management – refer to 4.1

Consultee	Date contacted	Date of response	Issues raised	FLS response
			improve habitat/foraging opportunities and suggest fringe habitat on edge of core planting areas.	<ul style="list-style-type: none"> Deer management plan – refer to Appendix VII.
Saving Scotland's Red Squirrels	December 2022	None	-	N/A
Scottish Forestry	December 2022	None	-	N/A
Scottish Water	December 2022	None	-	N/A
Scottish Wildlife Trust	December 2022	None	-	N/A
Scottish Environment Protection Agency (SEPA)	December 2022	January 2023	<ul style="list-style-type: none"> Polmaddy Burn morphological study completed Water quality improvement across catchments beyond UKFS Work in line with Riverwoods initiative Potential for future floodplain creation Support for proposed peatland restoration Consideration and investigation of private water supplies Planning and operational pollution control and compliance with Forestry and Water Scotland Know the Rules booklet 2nd ed. 	<ul style="list-style-type: none"> Safeguarding the water environment is a key objective of this LMP. Catchment scale approach to improving water quality advice noted – refer to 4.2, 4.7, and (for forestry acidification effect) Appendix V FLS are a partner organisation and follow Riverwoods initiative principles – refer to 4.7 FLS welcome the opportunity to work in partnership on SEPA's future plans for floodplains FLS welcome support for peatland restoration proposals – refer to 4.2, 4.6, and Appendix VI PWS were investigated in February 2023 – refer to 4.7 and Appendix IX FLS comply with UKFS Forests and Water Guidelines, Forestry and Water Scotland Know the Rules, FLS South Region Pollution Control Plan, and its legal obligations.
Tilhill Forestry	December 2022	January 2023	<ul style="list-style-type: none"> Management plan for the forest block neighbouring Marscalloch. 	<ul style="list-style-type: none"> FLS appreciate sharing of information. Currently approved management of Marscalloch returned in kind.
Vincent Wildlife Trust	December 2022	None	-	N/A
Visit Scotland	December 2022	None	-	N/A
West of Scotland Archaeology Service (WOSAS)	December 2022	December 2022	<ul style="list-style-type: none"> No comment. 	<ul style="list-style-type: none"> Refer to 4.3.

Appendix IV: Historic environment records

Refer to Map 12.

Historic Environment Records					
Designation	Name	Feature description	Grid reference	Importance	Area (ha)
Scheduled monument	Polmaddy	A scheduled township comprising 11 buildings, one of which is a mill and one an inn. 5 kilns, enclosures and fields with rig. Some buildings were excavated in 1975.	NX589878	National importance	8.3
Scheduled monument	Dundeugh Castle	Scheduled castle or tower. Only the se angle walls and the e wall of the n wing are partially extant measuring 0.8m -2m high and 1m wide. RCAHMS and early os maps suggest that further structures were attached to the s and w of the present remains.	NX601880	National importance	0.1
Undesignated	Galloway Forest Park	Two unroofed buildings are depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX562899	Regional importance	0.0
Undesignated	Largerie	A field system associated with Largeire farmstead comprising six enclosures including a 'hay ree' to the west of the farmstead and a further dyke to the east. Depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX 5758 8860	Local importance	1.5
Undesignated	Barlae Hill - Stroangassel Hill	Old pack road, visible in places as a hollow way 2.5m to 3.0m wide.	NX575899	National importance	10.0
Undesignated	Deil's Dyke	NX 5704 8500 - NX 5735 8558; NX 5725 8653 - NX 5820 8792; NX 5836 8798 - NX 5848 8806. Deil's Dyke - an old land boundary. A Graham 1951. From NX 5725 8653 to NX 5752 8700: Old fragmented stone wall. Elsewhere along the suggested line nothing is visible. Canmore ID 63819.	NX 5694 8493 to NX 5879 8824	Uncategorised	0.0
Undesignated	Drumness	A single unroofed structure is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9)	NX575890	Local importance	0.0
Undesignated	Cairn	Cairn	NX572882	Regional importance	0.0
Undesignated	Shiel Of Castlemaddy	One building and one enclosure are depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX537900	Local importance	0.1
Undesignated	Gala Lane / Corserine	Located to a 100m square is the wreckage of an aircraft, an anson dg 787 of j/anbs. Crashed 23/10/42. Only tiny pieces are visible at the site.	NX497873	Uncategorised	1.0
Undesignated	Aeroplane Parts	Located within a 100m square are aeroplane wreckage from a crashed plane.	NX501887	Uncategorised	1.0
Undesignated	Sloan'S Cairn	A marker cairn known as sloan's cairn.	NX590883	Local importance	0.0
Undesignated	Craigenwallie	One small structure annotated 'old sheep rees' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX546915	Local importance	0.0
Undesignated	HLA Relict Area	Site identified by hla - no further information available.	NX538900	Uncategorised	1.4
Undesignated	Largerie	A farmstead, comprising one roofed building, two unroofed buildings, one unroofed structure. The associated field system of six enclosures, and a field-system are all depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX 5764 8852	Regional importance	0.3

Undesignated	Radio Mast	A radio mast and with associated buildings to the s.	NX603894	Local importance	0.0
Undesignated	Dundeugh Houses	A farmstead is depicted on the 1st and 2nd editions of the os 6-inch map. Four buildings are recorded with two enclosures attached. To the n of the buildings is a two compartment rectangular structure aligned n/s with an attached enclosure.	NX609887	Regional importance	0.2
Undesignated	Sheep Pen	Sheep pen	NX605903	Local importance	0.0
Undesignated	Marscalloch	One enclosure or field annotated 'old fence' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX609913	Local importance	0.6
Undesignated	Muirdrochwood	A farmstead, comprising one partially roofed l-shaped building, one unroofed building annotated 'ruin' and one enclosure, and a field are depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX611910	Regional importance	1.3
Undesignated	Midgate Strand	What may be a single building is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX544899	Regional importance	0.0
Undesignated	Polquhanity	Located to a 100m square is an alleged cairn with kerb measuring 10.97m and 0.6m high. Later visited by os who could not locate the cairn.	NX583898	Uncategorised	1.0
Undesignated	Halfmark Burn	An enclosure annotated 'old fence' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9),	NX552926	Local importance	0.2
Undesignated	Marscalloch Sheep Ree	3 compartment square sheep ree depicted along head dyke on 1st edition os 6-inch map (Kirkcudbrightshire 1853, sheet 9)	NX609914	Local importance	0.0
Undesignated	Meaul	One enclosure annotated 'old fence' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 8).	NX504905	Local importance	0.1
Undesignated	Barlae Hill	Located to a 100m square is a cairnfield laying on both sides of a track comprised 18 cairns. This cairnfield could not located during later fieldwork.	NX584889	Uncategorised	1.0
Undesignated	Bardennoch	One unroofed building and one enclosure is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9)	NX578918	Regional importance	0.0
Undesignated	Building platform, moat, leat	Building platform, moat, leat.	NX570890	Uncategorised	0.0
Undesignated	Sheep Pen	Circular sheep pen	NX604917	Local importance	0.0
Undesignated	Craig Lingal	A single unroofed structure annotated 'old sheep ree' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9)	NX585894	Local importance	0.0
Undesignated	Craig Lingal	A single unroofed structure annotated 'old sheep ree' and the pecked outline of an attached enclosure are depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX586893	Local importance	0.0
Undesignated	Polmaddy Burn	Located to a 100m square is a knoll which bears traces of an enclosure and some small cairns. These could not be located when visited in 1978.	NX577879	Uncategorised	1.0
Undesignated	Glenhoul Bridge	A bridge.	NX609883	Local importance	0.0
Undesignated	Craig Lingal	Located to a 100m square is a cairnfield comprising 18 small cairns and 2 ring cairns. But these could not be located during a later visit.	NX582893	Uncategorised	1.0
Undesignated	Polquhanity	Area of clearance heaps previously reported. Recent survey unable to locate.	NX582895	Uncategorised	1.0
Undesignated	Barlay Hill Chambered Cairn	Located to a 100m square is a chambered cairn.	NX584888	Uncategorised	1.0
Undesignated	Kendoon Loch	Located to a 100m square are a number of small cairns said to be about half a mile se of an earthwork. No cairns at this rough location were noted by the os in 1978.	NX610900	Uncategorised	1.0

Undesignated	Dundeugh	A field-system annotated 'old fences' and a possible building at the nw end are depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX603887	Local importance	2.8
Undesignated	Kendoon Loch	A field marked by pecked lines and annotated 'old fence' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX607900	Local importance	1.3
Undesignated	Dunbeg, Kendoon Loch	A field-system annotated 'old fence' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX611898	Local importance	0.7
Undesignated	Jubilee Cairn	Jubilee cairn	NX582917	Regional importance	0.0
Undesignated	Craig Lingal	A single unroofed structure annotated 'old sheep ree' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9)	NX581895	Local importance	0.0
Undesignated	Drumness	A single unroofed structure is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9)	NX575890	Regional importance	0.0
Undesignated	Cairn	Cairn	NX571882	Regional importance	0.0
Undesignated	Craig Lingal	A field annotated 'old fence' and one enclosure of four compartments annotated 'sheep ree' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX578890	Local importance	1.3
Undesignated	Shiel Of Castlemaddy	A field-system annotated 'old fences' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX540901	Local importance	1.4
Undesignated	Largerie	A small field-system is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX575883	Local importance	0.8
Undesignated	Galloway Forest Park	A large field-system annotated 'old fences' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX561896	Local importance	18.7
Undesignated	Galloway Forest Park	A field-system annotated 'old fences' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX565894	Local importance	3.9
Undesignated	Polmaddy	A farmstead annotated 'in ruins', comprising three unroofed buildings and one enclosure is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX588877	Regional importance	0.7
Undesignated	Marscalloch	A farmstead, comprising two buildings, a sheepfold and surrounding fields.	NX603913	Regional importance	1.8
Undesignated	Marscalloch	A large field-system annotated 'old fences' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX605914	Local importance	5.6
Undesignated	Midgate Strand	One possible enclosure and a sheepfold annotated 'sheep ree' are depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX543899	Local importance	0.4
Undesignated	Castlemaddy	A farmstead annotated 'in ruins', comprising one unroofed building and one enclosure is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX565892	Regional importance	0.1
Undesignated	Midgate Strand	A field-system annotated 'old fence' and one unroofed structure annotated 'hay ree' are depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX545899	Regional importance	2.4
Undesignated	Cairn Abel	One unroofed structure and one enclosure denoted by a pecked line and annotated 'Hay Ree' are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 9), but they are not shown on the current edition of the OS 1:10000 map (1980). Information from RCAHMS (AKK) 13 September 1999. Canmore IF 159675.	NX553924	Uncategorised	0.0
Undesignated	Castlemaddy	One enclosure or field annotated 'old fence' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX553898	Local importance	0.6

Undesignated	Castlemaddy	Two enclosures or fields, both of which are annotated 'old fence' are depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX550896	Local importance	1.1
Undesignated	Kendoon, Suspension Bridge	A suspension bridge.	NX604876	Local importance	0.0
Undesignated	Castlemaddy	Located to a 100m square was the site of a medieval hunting lodge lying within the royal hunting forest of buchan. The name castlemaddy was used by a later farmstead.	NX554895	Uncategorised	1.0
Undesignated	Craigcrocket	Located to a 100m square is a possible chambered cairn measuring 6.4m in diameter. A cist 3.66m e-w by 0.30m, with bedrock forming the n side lies within the cairn. The cairn could not be located during a later field visit.	NX579896	Uncategorised	1.0
Undesignated	Drumness	A farmstead, comprising two roofed buildings, one unroofed structure and two enclosures is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX573888	Regional importance	0.2
Undesignated	Braidenoch Lane	A single unroofed structure annotated 'old hay ree' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX576895	Regional importance	0.0
Undesignated	Braidenoch Lane	A single unroofed structure annotated 'old hay ree' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX574893	Regional importance	0.0
Undesignated	Kendoon, Suspension Bridge	Suspension bridge, built c. 1934. A footbridge with pylons of braced-steel-girder construction and a wooden deck supported from wire-rope main cables.	NX603876	Local importance	0.0
Undesignated	Dundeugh	A farmstead, comprising one roofed building and one enclosure, one unroofed structure, three conjoined enclosures annotated 'hay ree' and a large field-system is depicted on the 1st edition of the os 6-inch map.	NX594876	Regional importance	28.8
Undesignated	Castlemaddy	A field-system annotated 'old fences', one enclosure and a sheepfold annotated 'sheep ree' are depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX549899	Local importance	2.0
Undesignated	Galloway Forest Park	A farmstead annotated 'in ruins', comprising three unroofed buildings and one enclosure, and a field-system annotated 'old fence' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX564898	Regional importance	3.9
Undesignated	Craig Lingal	A farmstead annotated 'in ruins', comprising two unroofed buildings and one unroofed structure annotated 'hay ree', and a field-system annotated 'old fences' are depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX584892	Regional importance	8.3
Undesignated	Craigwhar	One unroofed building, one unroofed structure annotated 'sheep ree', and a field-system annotated 'old fence' are depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX586884	Regional importance	5.1
Undesignated	Sheep Pen	A sheepfold, comprising a circular compartment and two rectangular compartments. Two walls extend from the sheepfold to the e and s.	NX526899	Local importance	0.0
Undesignated	Sheep Pen	A sheepfold with up to eight compartments.	NX536899	Local importance	0.1
Undesignated	Shiel Of Castlemaddy	A farmstead, comprising a building and enclosure and a field is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9). Plans for a bothy probably that built to the s of the original building c.1947.	NX539900	Regional importance	1.4
Undesignated	Carlin's Cairn	Scattered wreckage from a crashed aircraft, a dakota k-14 of rba that crashed 10/04/47. Large pieces, much scattered.	NX500881	Uncategorised	100.0
Undesignated	Castlemaddy	An enclosure or field annotated 'old fence' is depicted on the 1st edition of the os 6-inch map (Kirkcudbrightshire 1853, sheet 9)	NX561891	Local importance	1.6

Undesignated	Carlin's Cairn	A cairn, measures 15.8m in diameter and stands 1.5m high. It is composed of large angular stones and the centre has been hollowed out to form a shelter. No evidence of any burial.	NX496883	Regional importance	0.0
Undesignated	Barlae Hill	A farmstead, comprising two roofed, two partially roofed buildings and three enclosures, two unroofed structures and a field-system are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX590883	National importance	15.4
Undesignated	Sheep Pen	A sheepfold of four compartments.	NX594879	Local importance	0.1
Undesignated	Duneugh	A single unroofed structure annotated 'hay ree' aligned n/w/s/e attached to the w side of a dyke is depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX607886	Regional importance	0.0
Undesignated	Shiel Of Castlemaddy	A field-system annotated 'old fences' is depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX537900	Local importance	1.1
Undesignated	Sheep Pen	A small sheepfold, with two walls extending from the nw side.	NX511902	Local importance	0.0
Undesignated	Halfmark Burn	Six possible sheiling huts and a possible seventh structure, annotated old sheep rees, are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX534913	Regional importance	0.1
Undesignated	Craigenwallie		NX547918	Regional importance	1.5
Undesignated	Craigenwallie	An enclosure is depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX545914	Local importance	0.1
Undesignated	Craig Lingal	A field annotated 'old fence' and one enclosure of four compartments annotated 'sheep ree' is depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 9).	NX578890	Local importance	0.2
Undesignated	Marscalloch	Head dykes as depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 9)	NX614906	Local importance	0.9
Undesignated	Marscalloch	Head dykes as depicted on the OS 6-inch map (Kirkcudbrightshire 1853, sheet 9)	NX615914	Local importance	1.3
Undesignated	Marscalloch	Head dyke as depicted on the OS 6-inch map (Kirkcudbrightshire 1853, sheet 9)	NX608916	Uncategorised	1.2
Undesignated	Marscalloch	Sheep ree recorded on HER.	NX60799256	Uncategorised	0.1
Undesignated	Marscalloch	Sheep ree recorded on HER.	NX60699205	Uncategorised	0.1
Undesignated	Marscalloch	Sheep ree recorded on HER.	NX60289165	Uncategorised	0.1
Undesignated	Castlemaddy	Moat recorded on 1st edition OS map.	NX57778845	Uncategorised	0.5

Appendix V: Acid sensitive catchments

The purpose of this document is to demonstrate that felling and restock proposals for Castlemaddy are compliant with the 'Managing forests in acid sensitive water catchments' FC practice guide (2014). The acid sensitive catchment relevant to Castlemaddy are assessed as follows:

- 1.0 Critical loading is considered: restocking proposals are evaluated to determine if the area of closed canopy forest (age > 15 years) will exceed 30% of the (sub-)catchment in 15 years' time.
- 2.0 Potential felling impacts on the site are assessed: the scale of planned felling in any three year period is checked against a 20% (sub-)catchment threshold.

The Polmaddy Burn catchment (see **Map i**) is an acidified catchment with an area of 3,756.9 ha. It overlaps the Carminnows, Dundough and Polmaddy blocks in addition to privately owned woodlands.

The catchment and sub-catchments were generated using ArcMap and their accuracy checked against the approach described in practice guidance. For presentation purposes, (sub-)catchments have been labelled alphabetically (see **Map ii**). Felling and canopy information for the National Estate was accessed via FLS's internal geographic information system. For privately held forests, National Forest Inventory (2020) data was used with supplementary data provided by Scottish Forestry's South Scotland Conservancy.

1.0 Assessment of canopy cover

The estimated area of closed canopy forest in 15 years' time exceeds the 30% threshold across the catchment and several sub-catchments (encompassing both the National Estate and adjacent private land).

With the Polmaddy Burn catchment being heavily forested, compliance with the threshold is unlikely to be achieved as long as sustainable forestry is an objective for the area. As deforestation on this scale is not a reasonable option, efforts to mitigate the forestry acidification effect across the Castlemaddy land management unit include the introduction of UKFS compliant riparian buffers, management of non-native natural regeneration, in addition to increases in low density broadleaf woodland and permanent open ground in place of plantation forestry (e.g. wet woodland establishment within coupes 59001 and 59078, peatland restoration within coupes 59093 and 59097, and expansion of the Merrick Kells SSSI/SAC buffer).

While these measures should make a positive contribution to water quality, mitigating opportunities are limited within the scope of this plan owing to the immaturity of forest cover across Castlemaddy. Threshold exceedances and potential mitigating measures will therefore be considered further in the subsequent land management plan renewal.

Assessment of canopy cover		
Sub- /Catchment	Estimated area of closed canopy forest (age >15 years) in 15 years' time	
	Hectares (ha)	Percentage (%)
A	43.9	28.6
B	5.8	5.4
C	0.0	0.0
D	159.7	76.8
E	27.6	15.4
F	244.2	65.3

Assessment of canopy cover		
G	65.9	52.1
H	94.2	60.6
I	45.2	28.4
J	373.2	49.2
K	183.9	70.8
L	222.3	25.9
M ⁺	1,899.4	50.6
+ The entire catchment.		

2.0 Assessment of proposed felling

Felling within the Castlemaddy land management unit is unlikely to have a significant negative effect on the freshwater environment. The 20% threshold is exceeded in sub-catchments where there is felling proposed on private land adjacent to the block, however, there is no exceedance at the catchment scale. In an effort to reduce any negative impact, felling proposals within Castlemaddy have been scaled back during the affected intervals.

Felling site impact													
3 year period	Estimated proposed felling in (sub-)catchment (%)												
	A	B	C	D	E	F	G	H	I	J	K	L	M ⁺
2021/23	-	-	-	-	-	-	-	-	-	0.8	-	-	0.2
2022/24	-	-	-	20.9	0.3	-	-	-	-	0.6	27.1	-	2.7
2023/25	-	-	-	20.9	0.3	-	-	-	-	-	27.1	-	2.6
2024/26	-	-	-	20.9	0.3	-	-	-	11.8	3.4	27.1	-	3.8
2025/27	13.6	-	-	-	-	-	-	-	11.8	3.4	-	0.6	2.2
2026/28	13.6	-	-	-	-	-	-	-	12.9	3.4	-	0.6	3.0
2027/29	14.6	-	-	-	-	-	-	-	1.1	-	-	0.6	2.1
2028/30	1.0	1.7	15.6	-	-	1.6	11.1	-	1.5	2.4	-	8.9	3.7
2029/31	1.0	1.7	15.6	-	-	1.6	11.1	-	3.0	2.8	-	8.9	3.5
2030/32	-	1.7	15.6	-	-	1.6	11.1	-	3.0	2.8	-	8.9	3.3
2031/33	19.9	-	-	-	-	-	-	-	-	-	-	-	1.5
2032/34	19.9	-	-	-	-	-	-	-	-	-	-	-	0.8
2033/35	19.9	-	-	-	-	-	-	-	-	-	-	-	0.8
+ The entire catchment.													



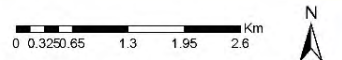
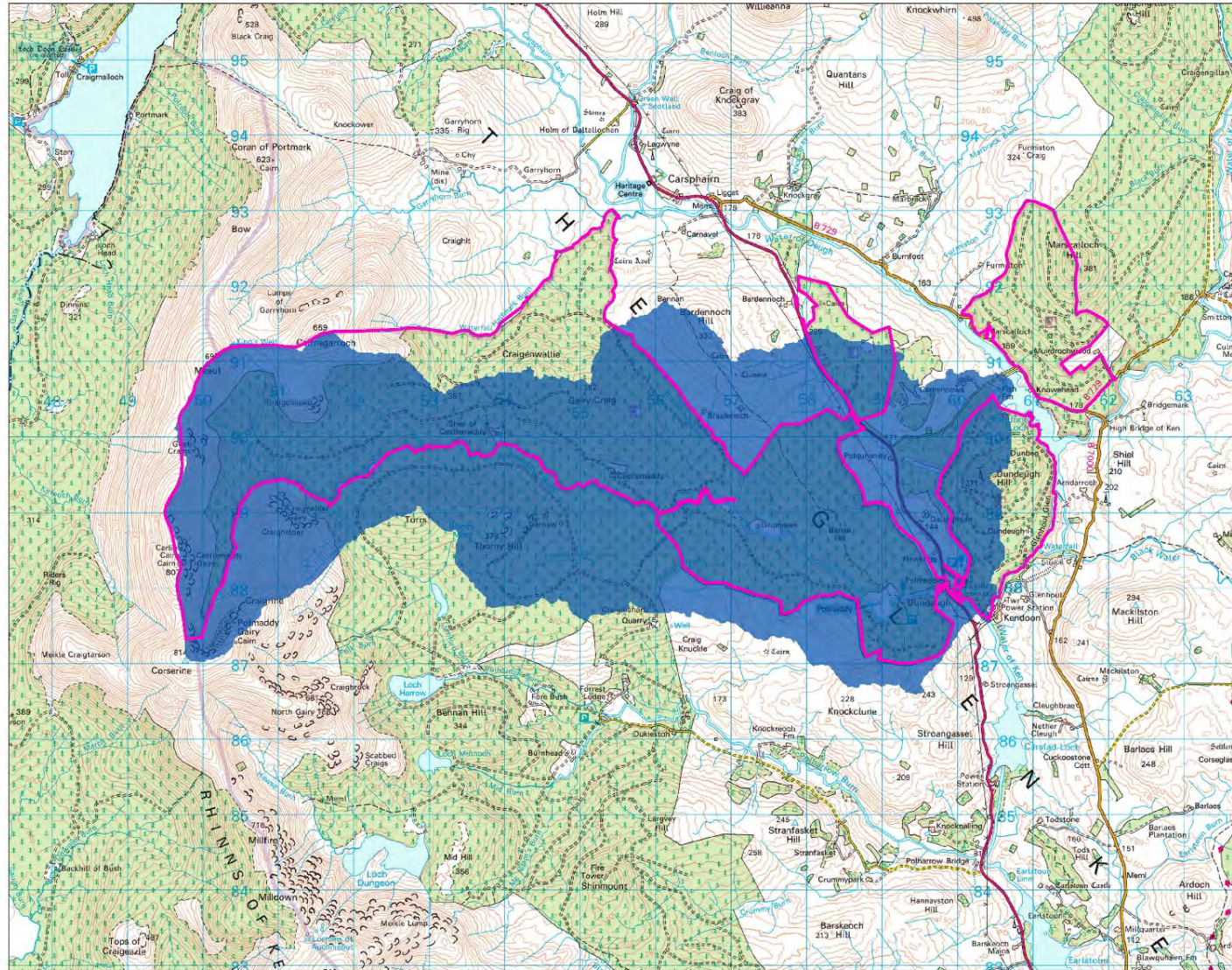
Map i
Acid Sensitive Catchment

Scale @ A1: 1:25,000

Date: December 2022

Legend

- Castlemaddy block
- Polmaddy Catchment



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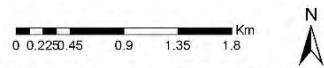
Map ii
Acid Sensitive Sub-catchments

Scale @ A1: 1:18,000

Date: June 2023

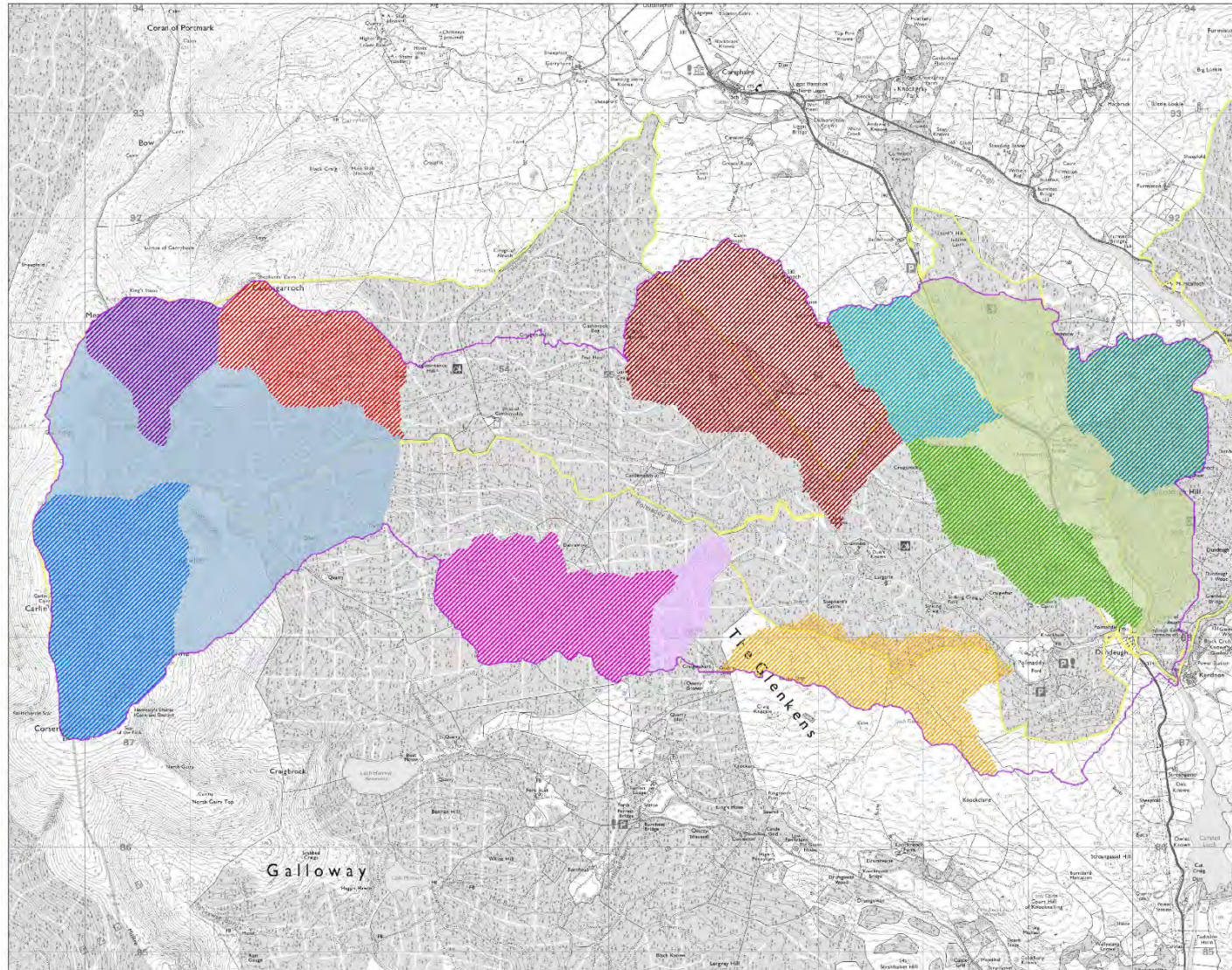
Legend

-  Polmaddy catchment
-  Castlemaddy block
-  Sub-catchment A
-  Sub-catchment B
-  Sub-catchment C
-  Sub-catchment D
-  Sub-catchment E
-  Sub-catchment F
-  Sub-catchment G
-  Sub-catchment H
-  Sub-catchment I
-  Sub-catchment J
-  Sub-catchment K
-  Sub-catchment L



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Appendix VI: EIA screening supporting information (deforestation)

The purpose of this document is to provide supplementary information to support the EIA screening application for deforestation in the Castlemaddy LMP submission for the purpose of large scale peatland restoration in the Castlemaddy plan area. It includes:

- 1.0 Context
- 2.0 Operational methodology
- 3.0 Castlemaddy site appraisal (by a suitably qualified Ecologist)
- 4.0 Assessment of potential impact
- Map i Forest to bog (2023-2033)
- Map ii Soils
- Map iii ESC suitability score for Sitka spruce
- Map iv ESC suitability score for Lodgepole pine.

This document demonstrates alignment with the following key Scottish Government and Scottish Forestry policies and practice:

- The Scottish Government Control of Woodland Removal Policy – in particular guidance on woodland removal without a requirement for compensatory planting
- FCS Practice Guide - Deciding future management options for afforested deep peatland
- Forestry on Peatland Habitats (FCS, 2000)
- UK Forestry Standard.

1.0 Context

The Scottish Government has set a target of net zero carbon emissions by 2045. In order to help meet this target, Forestry and Land Scotland (FLS) are currently in the process of preparing a Peatland Strategy. The strategy will set out the best way to manage its peatlands and to determine which afforested peatlands will be restored or restocked on Scotland's national estate.

Peatlands will play an important role in achieving this net zero target due to their natural ability to store and sequester carbon: it is estimated that UK peatlands store 2,300 Mt of carbon (Billett et al. 2010). Peatlands in the UK are naturally treeless due to the wet oceanic climate (Sloan et al. 2018). This differs from European continental peatlands which naturally support tree cover due to the drier, and generally warmer, summer climate. In their natural state, UK peatlands are too wet and nutrient poor to sustain tree cover, except in exceptional circumstances such as pine or oak bog woodland. In general, in the UK afforestation of unmodified peatlands is unnatural.

The purpose of the 'Deciding future management options for afforested deep peatland' practice guide is to ensure that principles of sustainable forest management are applied specifically in the context of managing the peatland asset. This is a shared objective of both FLS and SF, taking account of the valuable ecosystem services provided by peatlands. Specifically:

- The importance of peatlands in relation to climate change. Afforested peatlands have the potential to act as significant sources of carbon, depending on the levels of modification imposed at establishment and the impact these have had on peatland condition since. Evans et al. (2017) estimated an average carbon emission rate of 9.9 tCO₂e/ha/yr, therefore the growth rate of trees on a particular peatland must capture enough carbon to compensate for such carbon loss if a net carbon capture outcome is to be realised.

- The contribution towards enhancing biodiversity. Article 8(f) of the Convention of Biological Diversity, signed by the UK Government on 12 June 1992, encourages the repair of damaged ecosystems. Restoration of priority habitats is therefore a key component of the Scottish Biodiversity Strategy.
- The potential ability of peatlands to grow trees to capture carbon, although there are unknown risks to the security of the carbon store, and the ability of restoring peatlands after the end of subsequent rotations.

1.1 FLS approach to peatland management

Restoration of blanket bogs and lowland raised bogs is a key action from the Scottish Biodiversity Strategy (both habitats are included on the Scottish Biodiversity List). Beyond their value as a carbon store, peatlands host a huge diversity of organisms and planting trees on peat leads to a fundamental change in the ecosystem (Payne et al. 2018).

As a Scottish Government agency, FLS's objectives and legislative framework has an added 'Biodiversity Duty' as stated in the Nature Conservation Scotland Act (2004). Protection of conservation values is mentioned in UKWAS and the principles of sustainability are outlined in the UKFS. What this means is that for afforested peatlands, restoration is considered ahead of replanting.

This is set out in 'Deciding future management options for afforested deep peatland' practice guidance. It deals with afforested peatlands that are not going to be restored for biodiversity reasons and states that replanting must be justified by considering if the crop will achieve YC 8 or more for Sitka spruce. The default is not to restock, unless there is evidence trees will achieve a good growth rate for harvestable timber. If it does not, the option to restock is unsustainable as the three legs (economic, environmental, and social) of the sustainability stool are not present. A slow growing crop would not result in profit, it would act as a carbon source and contribute to climate change, and society would be disadvantaged/threatened (based on current scientific information).

Since 2014 FLS has undertaken peatland restoration on a number of peatland types, including the restoration of unproductive plantations on peatlands. FLS restored 2,786 ha of 'forest to bog' peatland sites across 60 project areas between 2014-2020. In the same period, FLS restored 3,786 ha of existing open peatland habitat across 29 project areas. FLS anticipates the need to restore 35,000-60,000 ha of afforested peatlands before 2035.

2.0 Operational methodology

In many areas of the UK large expanses of deep peat blanket bog have been historically drained and replaced with trees for commercial forestry. This afforestation has resulted in the degradation and loss of large areas of peat bog. However, with a greater interest in soil carbon and the realisation that many of the trees on deep peat are vulnerable to growth check and wind-blow, there is a shift to restore these low return forests back to open bog.

Afforested peatland restoration, known more commonly as 'forest-to-bog' restoration, is thought to take a least 10 years (following re-wetting) to change from acting as a carbon source to a carbon sink. Therefore, there is an inherent urgency to begin restoration as soon as possible after felling with respect to the Scottish Government target of net zero carbon emissions by 2045.

Restoration is achieved using a number of re-wetting techniques, the more common of which are detailed below. Methods are usually employed together in a sequence, beginning at the upper areas and working downslope towards main water courses or where water leaves the site, to achieve best results. Methods

are under constant development and improved techniques result in much better surface re-wetting in previously forested peatlands.

These methods will be applied across the Carminnows restoration site within Castlemaddy block. Note that detailed restoration plans cannot be confirmed until after tree felling and windblow clearance has taken place. Access across the site, giving a clear view of the lie of the land, localised undulations, and where the flushed areas are, is needed to determine the exact location of drains and to determine their status in terms of peak and base flows. This then allows decisions to be made on the positioning of any peat dams and spotting if the underlying peat is cracked or not. Some indication of the positions and intensity of drainage may be apparent from studying aerial photographs and mapped topography, however, this may not give a true picture of the site. In addition, a thorough survey of drains and their loading, peak flows, and depth of peat below the base of the drain can only be undertaken safely and efficiently after clear felling has taken place.

Drain blocking and peat dams

Where appropriate, peat dams are an effective way of blocking drains and furrows to encourage water dispersal across a peatland (whether on open peat or a forest-to-bog project). Drain re-profiling is carried out at the same time as installing peat dams only if they do not have high peak or base flows (indicated by the absence of vegetation in and on the sides of the drain).

Such 'traditional' methods of achieving hydrological restoration can help on damaged open bog habitat, however, on previously afforested sites intensive intervention is often required. The vast majority of these sites retain a legacy 'ridge' and 'furrow' pattern, with either single or double ploughed furrows varying from ~30 cm up to 1 m depth in extreme cases. These furrows act as drainage conduits, thereby lowering the natural water table and drying out the peatland. If left in situ, the water table and peatland vegetation are suppressed, while negative indicator species such as *Calluna* or tree regeneration are promoted.

Ground smoothing and stump flipping

FLS have been a key organisation in developing 'ground smoothing and stump flipping' methods, which aim to re-profile the uneven surface on previously afforested sites and restore the natural surface topography. This can be achieved by flattening any plough ridges and/or infilling furrows, allowing a greater proportion of the planar surface to be closer to the water table, thereby promoting the development of key peat-forming species (i.e. *Sphagnum* mosses) and reducing the opportunity for tree regeneration that typically occurs on uneven/drained sites.

The notable advantage of ground smoothing and stump flipping is that the vegetated surface of the peat is left upper-most rather than inverted, which helps to minimise the cover of bare, exposed peat. Where there are bigger and more solid wood stumps, the machine will invert the root plate into the furrow. Intact vegetation between the areas of the two plough ridges will assist with re-colonisation of bare peat where ridges have been removed. Once the 'mining' aspect of the work has been completed, the machine then cross-tracks across the furrows to further flatten out any topography or brash that is still standing proud.

Some afforested peatlands have suffered from surface cracking due to water deprivation which, alongside root structures, can lead to underground 'pipes' forming. These pipes act as a conduit to dissolved and particulate organic carbon loss, hampering the rewetting process by acting as 'hidden drains'. Forest Research have developed a method to tackle this problem which greatly improves restoration efforts and was trialed at the Lochar Mosses Longbridge Muir site near Dumfries. Barriers to prevent water flowing away through cracks are formed by digging trenches deeper than the cracks and repacking them with peat with or without a plastic membrane lining one side of the trench, leading to a rise in the water table (i.e. the level the water is at underground).

2.1 Machinery specification

Ground smoothing techniques require the use of suitably equipped, low ground pressure (LGP) tracked excavators to allow safe working practice on wet and unstable terrain. FLS specify 360° LGP excavators on 1100 mm to 1400+ mm track pads, using wide toothed digging buckets, to achieve an average ground pressure of ≤ 3 psi.

2.2 Environmental protection

Surface management techniques, such as stump-flipping and cross-tracking, can potentially create areas of bare peat prior to vegetation establishing, and thus pose a risk to the downstream water environment via runoff and erosion of bare peat surfaces.

Stringent Pollution Prevention Control (PPC) are integral to any ground-smoothing project, including intensive management of on-site drainage, and protection of watercourses within proximity to restoration sites. This includes robust sediment management measures, particularly in areas where stump-flipping is carried out, and the appropriate design and siting of silt traps at these sites.

Generally, a cascade of silt traps made from plastic piling will be required on clear-felled sites, in addition to fabric dams to trap any sediment run-off. These may already be in place on recently felled sites, along with lengths of drain that have been dammed as part of pre-felling mitigation. If drains are not blocked or silt traps installed in preparation for harvesting operations, then this will be addressed prior to ground-smoothing works commencing.

Buffer zones of at least 20 m will be employed to mitigate against elevated levels of dissolved organic carbon, suspended solids, phosphates or nitrates from entering any river, burn, ditch, or wetland, towards which the land drains.

2.3 Monitoring

Sites are monitored on a regular programme to assess the change in surface vegetation (also a proxy indicator of water table level) and for non-native conifer regen. Where natural tree regeneration is considered to be problematic to the restoration trajectory, regenerating stems will be removed in years 5-10. However, the restoration techniques FLS now use minimise tree establishment potential and it is unlikely that more than a single intervention would be required, if at all.

FLS continue to work with Forest Research on the effects of restoration on water quality, FR having monitored Flanders Moss for over 10 years, and currently have a monitoring programme in place for upcoming peatland restoration elsewhere in South Region. Best practice recommendations made in the recent publication by Shah and Nisbet (based on 10 years data from Flanders Moss) will be followed.

3.0 Carminnows site appraisal

The restoration potential of UKBAP priority habitats at Carminnows is considered to be high due to the very wet ground conditions, abundant remnant bog vegetation that persists, and general unfavourable condition of the existing crop. Based on Pyatt's 'FC Soil Classification' (1982), terrain, and FLS expert experience, site soils (i.e. 10b and 9) typically have a peat depth upwards of 0.5 m and are typically associated with National Vegetation Classification (NVC) type M17 *Scirpus cespitosus* – *Eriophorum vaginatum* blanket mire. FLS are committed to the long term restoration programme of these habitats.

Site objectives are to:

- Apply restoration treatments that encourage travel in the desired direction towards priority habitat, restoring these to function as near-natural peatland within 30 years
- Protect the storage of carbon in the soils
- Maximise the sequestration of carbon by peatlands in the future
- Improve water quality of the local area and help regulate flow.

This appraisal was authored by Amanda Ophof of the FLS Peatland Team and a professional member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

3.1 Site description

The Carminnows site is predominantly an intermediate lowland bog with flushed blanket bog surrounding it. The restoration proposed covers 34.1 ha across one hydrological unit which extends across coupes 59093, 59097-99 and into adjacent coupes. Rewetting these afforested peatlands will stop oxidisation and further peat degradation and erosion. The aim is to create functioning hydrological intermediate-blanket bog complex similar to NVC M17 *Scirpus cespitosus* – *Eriophorum vaginatum* blanket mire. The native woodland planting on elevated (organo)mineral knolls will complement the restoration proposal by creating an associated peatland habitat.

3.2 Previous crop

To establish a productive crop on an intermediate-blanket bog, the site was cultivated by means of deeply ploughed ridges and furrows and ploughed drains, and will likely have been heavily fertilised. Taking into account this historical input, as well as the ground conditions of a consistently high water table, it would be difficult to achieve sufficient crop performance over the second rotation in line with UKFS, without causing significant soil disturbance and the subsequent release of greenhouse gasses.

3.3 Restoration proposal

Felling and re-wetting of the proposed restoration areas will be undertaken using low ground pressure machines and standard forest-to-bog techniques. The area is currently retaining water with the water table at ground level with key bog indicator vegetation present across the site. Rewetting will allow the hydrology, and eventually the vegetation, to be restored to an intermediate-blanket bog habitat. There is sufficient existing seed source for Sphagnum and other bog species on site to make this successful.

A preliminary walkover across site was conducted by the national Peatland Programme Forester in July 2022 to establish the condition of the peatland, water table, vegetation, hydrology and extent of the bog. The walkover identified the main afforestation modifications and feasibility of restoration, confirming that full restoration is possible. The main findings of the walkover were as follows:

- The site is predominantly deep peat which indicates that the intermediate bog and unflushed blanket bog are hydrologically connected. The water table is at the surface across the bog, which is a positive indicator for restoration given the level of forestry modifications. There is abundant Sphagnum cover from which to reseed the site.
- Standard forest-to-bog rewetting techniques will be sufficient to undo the forestry modifications and restore the site.

After clear-felling the first rotation crop, the next stage of the restoration will be to re-wet the site. A combination of standard re-wetting techniques will be used to re-instate the natural water table across the site to ensure it is optimal for appropriate bog vegetation recovery. A combination of drain blocking, ground smoothing, and potentially backfill trenches, will be used following standard techniques as developed by NatureScot and FLS (as per the Peatland Action Technical Compendium⁴).

The following restoration methods will be used:

- Block all drains and, where necessary, plough furrows using peat dams or composite dams to disperse water across the peatland.
- Undertake stump flipping and ground smoothing across the previously afforested area to un-modify the pattern of ploughed ridges and furrows. If left in situ, the plough/furrow pattern will suppress the water table and development of peatland vegetation, and will promote regeneration of native or non-native tree species (negative indicators).
- Where there is suspected peat cracking, install backfill trenches to retain water on site. Backfill trenches counteract the excessive lateral flow of water within the peat, which can result from the ploughing and draining carried out during afforestation, and the subsequent drying and suppressing effect of the mature trees on the peat and water table.
- Re-profile hags to repair excessive erosion of peatlands and stop the development of artificial drains caused by surface water run-off.
- Monitoring and removal of tree regeneration (a negative indicator) and undesirable vegetation on the bog.

FLS is a Peatland Action delivery partner on behalf of Scottish Ministers to reduce greenhouse gasses across the National Estate. The delivery of re-wetting operations will be undertaken as soon as practically possible after clear felling in line with the UKFS and UKWAS. Monitoring of the site (via vegetation quadrats) will take place at year five following re-wetting. An evaluation of the restoration works will be completed and submitted to Scottish Forestry as part of the LMP mid-term review.

References

Billett et al. (2010) Carbon balance of UK peatlands: Current state of knowledge and future research challenges. *Climate Research*, 45, 13–29.

Payne et al. (2018) The future of peatland forestry in Scotland: balancing economics, carbon and biodiversity. *Scottish Forestry*. pp. 34-40.

Shah, N. & Nisbet, T. (2019) The effects of forest clearance for peatland restoration on water quality, *Science of The Total Environment*, Volume 693.

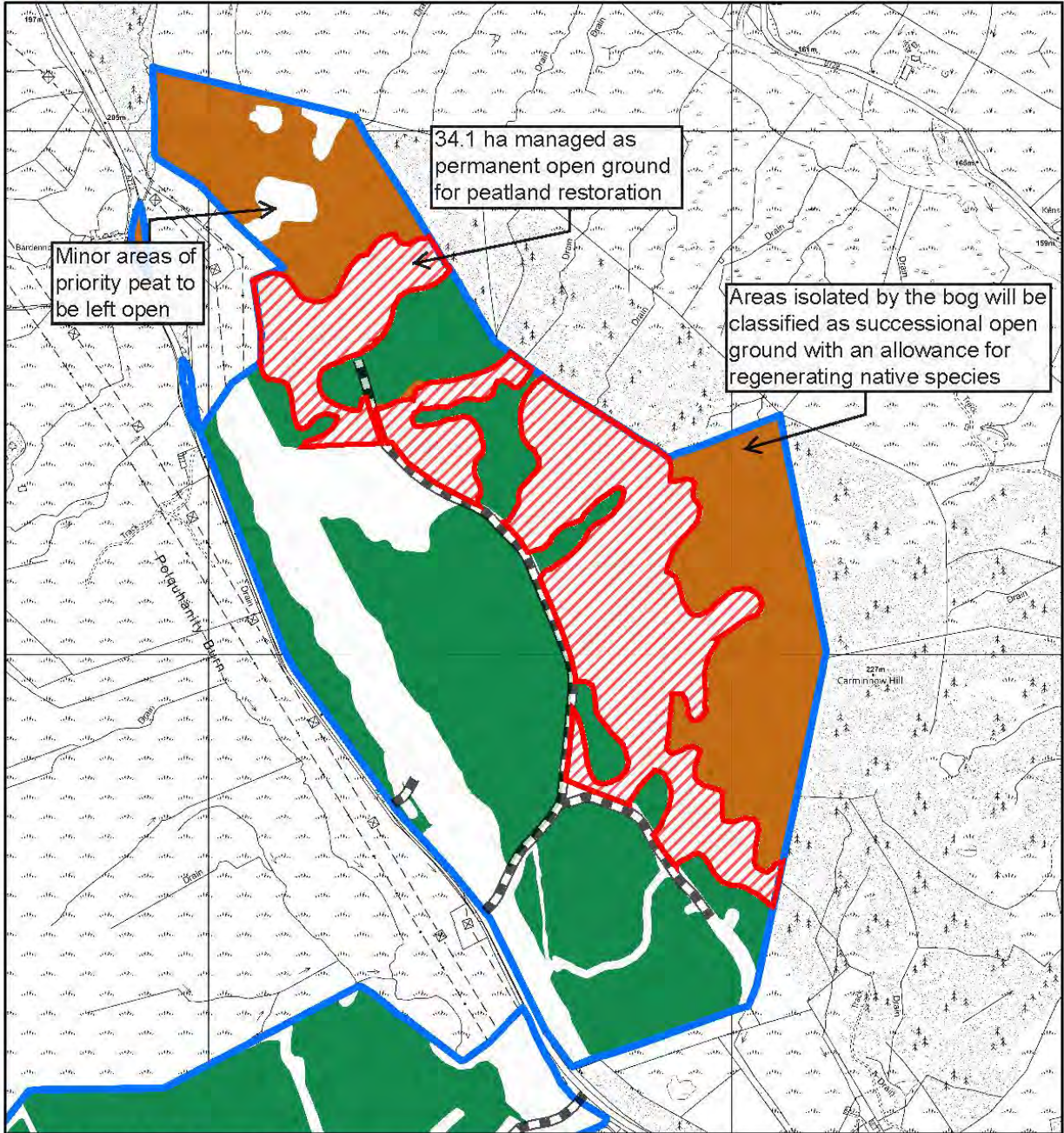
Sloan, et al. (2018) Peatland afforestation in the UK and consequences for carbon storage. *Mires and Peat*, 23(01), 1-17.

4.0 Assessment of potential impact

Peatland restoration projects meet the requirements of the Scottish Government's Control of Woodland Removal Policy as the deforestation and subsequent restoration will enhance a priority habitat and its hydrological connectivity.

⁴ Peatland Action Technical Compendium: <https://www.nature.scot/doc/peatland-action-technical-compendium>

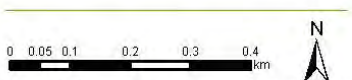
Assessment of potential impact	
Key risk	Impact assessment
Population and human health	Low impact. Ultimately, restored bogs will function as near-natural peatlands, helping to maintain a year-round near-constant water table.
Biodiversity	Positive. Restoration of a degraded peatland ecosystem will restore a priority open habitat, benefitting both habitat and associated species. Pre-operational surveys will identify any protected or breeding species to ensure suitable mitigation is in place to avoid disturbance.
Land	No known impact. Where the restoration project is adjacent to agricultural land, boundary drains will not be blocked to ensure neighbouring land is not compromised by re-wetting and increased potential to flooding.
Soil, geology and geomorphology	Positive. Re-wetting the site will benefit the peat soils as forestry modifications will be reversed to stop oxidation and further degradation/erosion of the peat.
Water	Positive. Re-wetting techniques have shown to cause no significant adverse effect on water quality. Ultimately, water quality of the local area should improve with a reduction in run-off from exposed peat and degraded peatland.
Air	No known impact.
Climate	Positive. Afforested peatlands have the potential to emit more greenhouse gas emissions than can be absorbed by a growing woodland. Restoration of afforested peatlands, especially 'presumption to restore' peatlands, will prevent the significant net release of greenhouse gases, ultimately benefitting the local climate.
Material assets	No known impact.
Historic environment	No known impact. Pre-operational surveys will identify any cultural heritage features to ensure suitable mitigation is in place to avoid disturbance.
Landscape	Positive. Peatland restoration will create more open space within the LMP forest blocks and the local area. This will add more diversity to the forest structure by creating open and associated native woodland habitats.



Map i Forest to bog project

Scale @ A4: 1:10,000

Date: June 2023



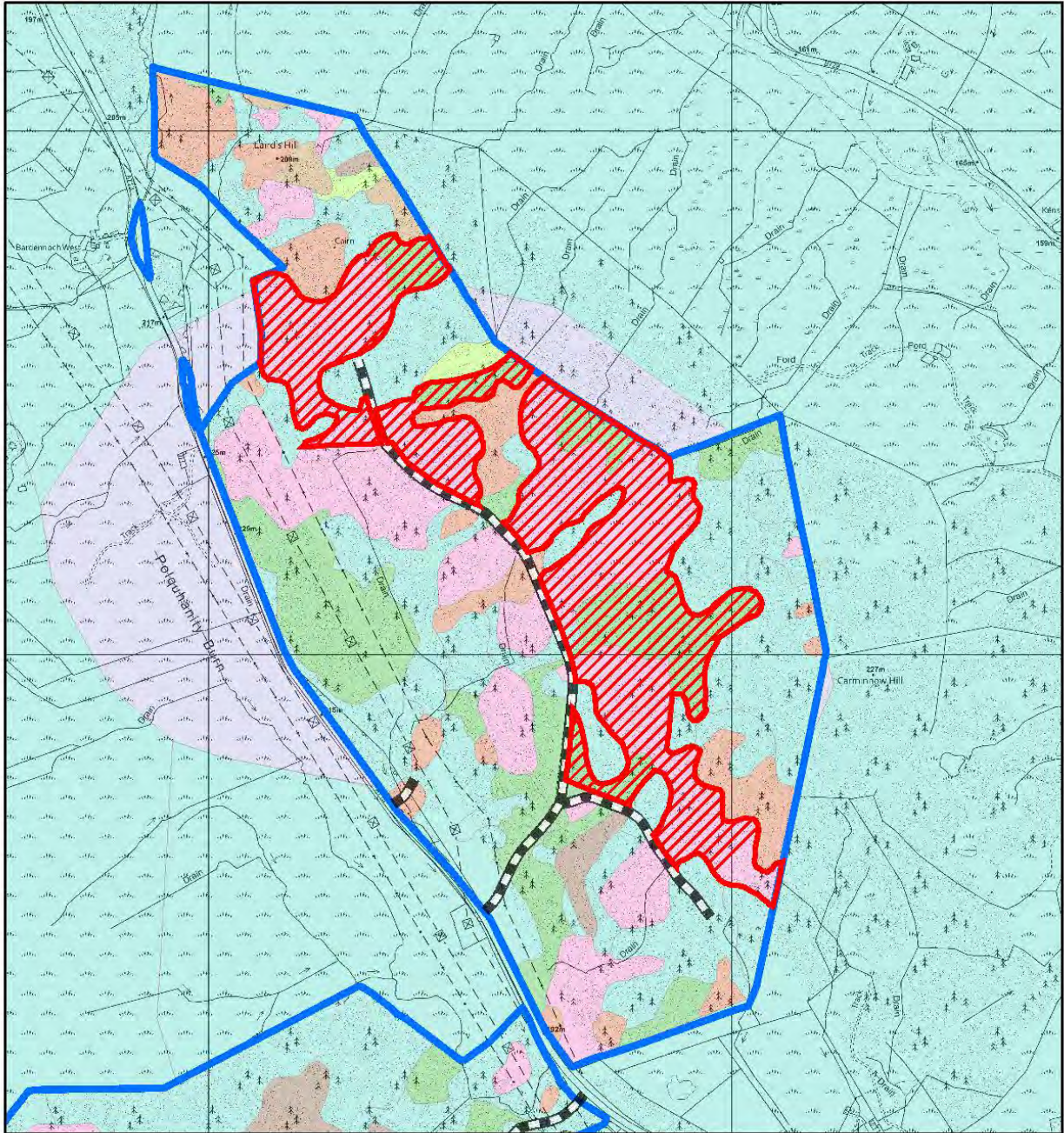
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Legend

- Forest Roads
- Block
- Forest to bog
- Forest (future habitat)
- Managed open ground (future habitat)
- Successional open ground (future habitat)

Scotland's national forests and land are responsibly managed to the UK Woodland Assurance Standard.





Map ii Soils

Scale @ A4:10,000

Date: June 2023

Legend

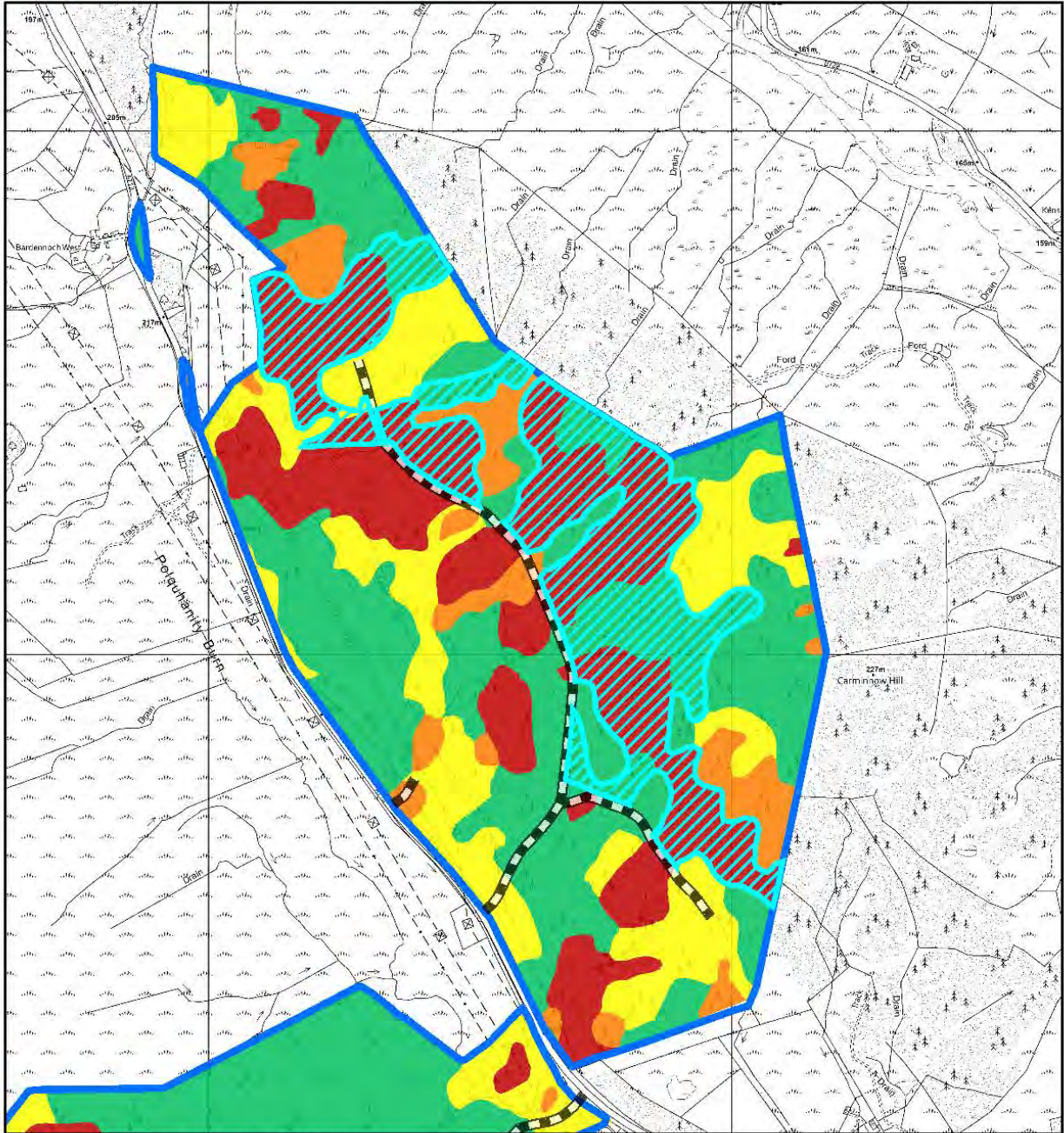
- | | | |
|--------------------------|--------------------------------------|-----------------------------|
| 1 [Typical Brown Earth] | 5 [Typical Ground-Water Gley] | 8 [Phragmites (or Fen) Bog] |
| 1 [Upland Brown Earth] | 6 [Typical Peaty Surface-Water Gley] | 9 [Molinia, Myrica, Bog] |
| 4 [Typical Ironpan Soil] | 7 [Typical Surface-Water Gley] | 10 [Upland Sphagnum Bog] |
| Forest Roads | Block | 11 [Calluna Blanket Bog] |
| Forest to bog | | |



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Map iii ESC Sitka spruce suitability

Scale @ A4:10,000

Date: June 2023

Legend

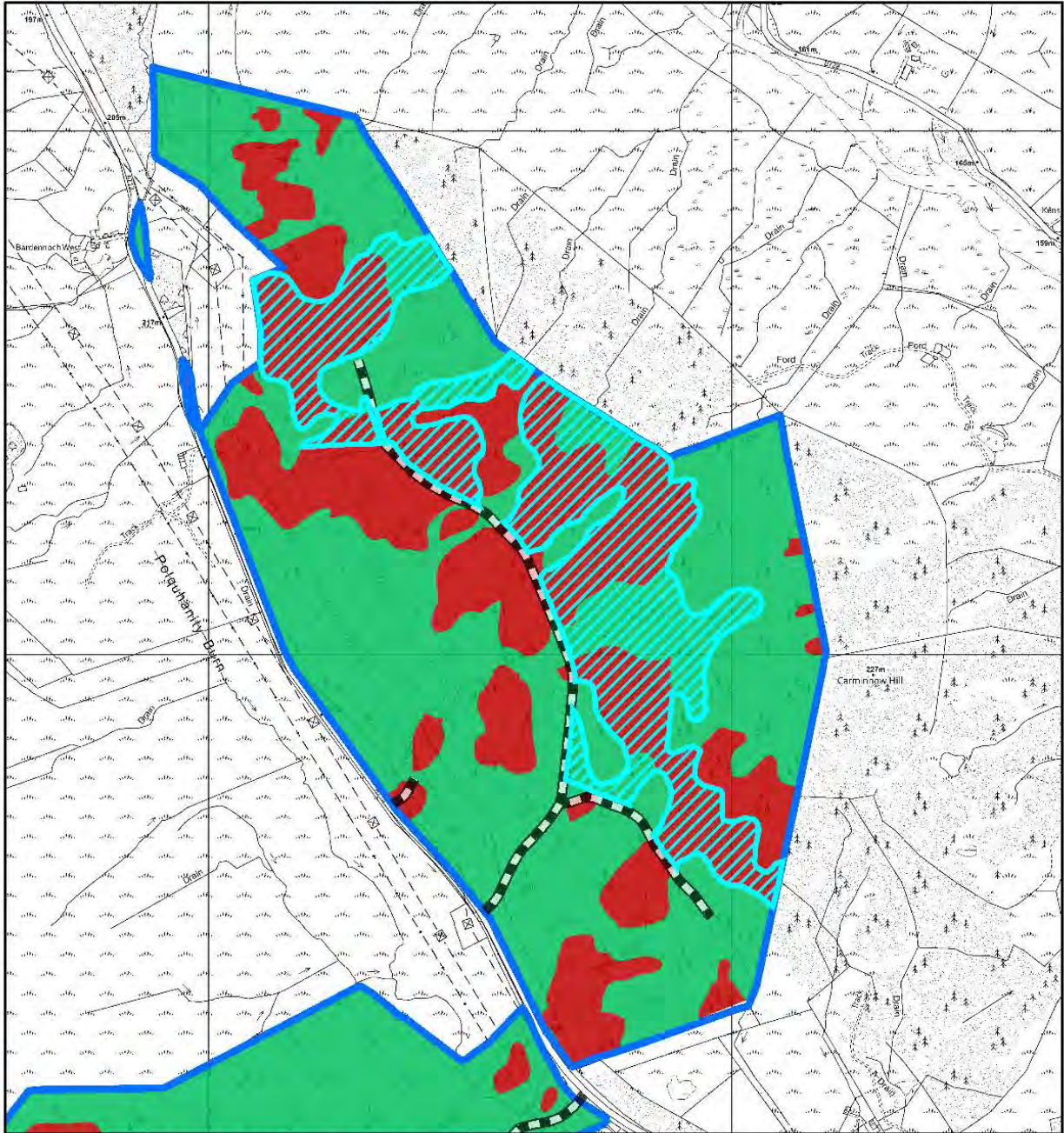
-  Forest Roads
-  YC <8
-  YC 8-13
-  Forest to bog
-  Block
-  YC 14-19
-  YC ≥20



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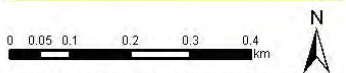
Map iv ESC Lodgepole Pine suitability

Scale @ A4: 1:10,000

Date: June 2023

Legend

- Forest Roads
- YC <8
- Forest to bog
- Block
- YC ≥8



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Appendix VII: Deer management plan

This Deer Management Plan (DMP) should be read in conjunction with the Castlemaddy land management plan (LMP) and with the FLS Deer Management Strategy. This document was authored by Grant Carson, Wildlife Ranger Manager for FLS South Region.

1.0 Introduction

The Castlemaddy forest block cluster has been and continues to be a commercial forest block with Sitka Spruce being the predominant tree species. Areas of Site of Special Scientific Interest (SSSI) & Special Area of Conservation (SAC) are found to the west, where the Merrick Kells merge with the block. Existing and future plans show increases in tree diversity with the addition of mixed broadleaves along riparian zones and soft conifer species on suitable soil types. In addition to this, there are some areas of deep peat which are being considered for peatland restoration (e.g. within the Carminnows area, while the western edge of the main block will likely be a peat-wet woodland mosaic). This will lead to increased biodiversity and will see a shift in deer management's focus from protecting a commercial crop to protecting the biodiversity within the area. The open hill above the tree line to the west will remain unchanged. The terrain within Castlemaddy is upland hill to steep semi-mountainous along the western boundary. An extensive network of forest roads and ATV tracks makes access to the area easy and extraction of deer possible for the most part. Eastern areas of the block attract public interest for walking, cycling, etc.

2.0 Deer management objectives

2.1 Local objectives

- Protect the National Estate from unacceptable impacts by deer (i.e. less than 10% leader browsing damage by deer on all planting year 1 to 5 coupes. Minimise bark stripping and fraying to all crop ages).
- Aim for total deer densities to be in the range of 3-7 deer/km².
- To maintain a sustainable deer population.
- Meet tree stocking density targets per hectare at year five.
- All biological resources on the forest estate are protected from negative impacts of browsing/grazing herbivores. This includes all tree crops, Sites of Specific Scientific Interest (SSSI's), Planted Ancient Woodland Sites (PAWS), Low Impact Silvicultural Systems (LISS), National Nature Reserves (NNR), and other locally designated areas.
- Contractor and authorised controllers ensure good relationships with members of the public, other forestry customers, and FLS staff.

2.2 National objectives

- Contribute to Scottish Forestry's Forestry Strategy.⁵
- Adhere to the FLS Deer Management Strategy.⁶

⁵ Forestry Strategy: <https://forestry.gov.scot/forestry-strategy>

⁶ Deer Management Strategy: <https://forestryandland.gov.scot/what-we-do/who-we-are/corporate-information/deer-management-strategy>

- Contribute to the Scottish Government's Scottish Biodiversity Strategy.⁷

3.0 Deer species, other herbivores and feral pigs

Red and Roe Deer are found throughout the Castlemaddy block with roe being the predominant species. Fallow Deer are also present in small numbers and are found locally in eastern parts of the forest block.

There is a goat heft resident on the Rhinns of Kells which have unrestricted access to the Castlemaddy block. This heft was last assessed in 2018, with an aerial count indicating the population was nearing the lower end of sustainability. FLS have therefore opted to withhold further culling until numbers are reassessed (due September 2023).

Feral pigs are present in very low numbers. Experimental control methods have seen extremely effective reductions in pig density – particularly in the eastern blocks where pigs were known to reside. Neighbouring land/forest blocks outwith FLS control are suspected of harboring feral pigs with their increase expected in the absence of continual culling efforts.

Sheep trespass is a regular occurrence in the Castlemaddy main block with stock fencing extremely porous along the eastern boundary. Regular incursion of up to 50+ sheep can be expected.

4.0 Management to date

Spring mean deer densities for 2021 were reported as circa 10-15 /km². Given the +/- 42.8% confidence figure quoted in their report, FLS are confident the true density is at the lower end of the confidence giving a spring population of 5 Roe/km² and 2 Red/km² (totaling 7/km²).

To achieve the above densities, in the last full five year culls from April 2017 to April 2022, FLS have culled 253 red, 837 roe, 62 fallow, 49 pigs and 14 goats. This has primarily been achieved by deer contract. Culling is ongoing with culls set based on population modeling and cull data/evidence. Deer cull charts and nearest neighbour impact assessment results at the end of this document.

Overall, deer impact is low, with higher instances of herbivore impact typical of areas where sheep trespass is known to be problematic.

5.0 Approach

FLS use an information based decision making process to set its deer management operations with the data received from various internal and external reports. All data is then combined as best possible and applied to a population model which is used to set culls. Data used to create this DMP can be found in the FLS Deer Dashboard. (Currently only available to FLS staff, however, it will be made publicly available soon.)

⁷ Scottish Biodiversity Strategy: <https://www.gov.scot/publications/scottish-biodiversity-strategy-2045-tackling-nature-emergency-scotland/>

Sources include:

- Thermal drone counts
- Herbivore dung counts
- Historical cull data
- Sighting data
- Ranger daily/monthly reports
- Deer Management Contractor daily/monthly reports
- Helicopter counts
- WRM surveys
- Strath Caulaidh survey data, independently obtained (i.e. deer density figure, impacts - NN/HIA, SDA, etc).

6.0 Population modelling and future culls

Castlemaddy falls within the Galloway southeast population model. The models are used to ascertain a recommended cull for a greater area, with cull and impact data used to support the distribution of culls across forest blocks within the model area.

The Castlemaddy cluster block deer cull is set to be circa 180 roe, 45 red, and 10 fallow for the next 3-5 years. Feral pigs will be culled on an opportunistic basis with no annual cull set. Feral goat culls will be reviewed in late 2023/24.

7.0 Resourcing

Castlemaddy main block and Carminnows will be/is currently managed by a wildlife contractor. Contractual agreement keeps contractors and rangers from sharing areas.

FLS Wildlife team currently manage the Marscalloch and Dundough (island block).

All controllers are qualified to Deer Stalking Certificate levels 1 and 2. In addition, all are required to carry out an annual firearms skills test, ensuring the highest levels of safety and competency when undertaking their duties. Rangers also complete additional self-checklists and training at set intervals that are part of the resumption system. FLS Wildlife Rangers are supported by a Wildlife Ranger Manager and Area Wildlife Manager.

Wildlife contractors are a vital resource in the FLS deer management tool box. Wildlife contractors are selected after satisfying FLS of their competence via a competitive tender. This work is arduous and critical to the success of the impact reduction strategy and only very experienced and appropriately qualified contractors are considered. All Wildlife contractors have the same qualifications as FLS Wildlife Rangers and compliance and health and safety are continually monitored by the Wildlife Ranger Manager.

Out of season shooting is an essential tool in the protection of vulnerable tree crops and natural habitats. This is conducted either under the General License issued by NatureScot for enclosed woodland or by 5(6) authorization on application to NatureScot for un-enclosed woodland. Male deer of all species will be shot

year round on the National Estate and, following permission, the shooting of females out of season will be limited to the periods 1st September to 20th October and 16th February to 31st March. When early out of season shooting of females is carried out any dependent young will be shot first.

Night shooting is permitted by the Deer (Scotland) Act 1996 as amended by the Wildlife and Natural Environment Act 2011 (WANE Act), under section 18(2) authorizations granted by NatureScot. Applications for night shooting will only be made where unacceptable levels of damage would occur, and where the use of all other legal means of control, including out of season shooting have been considered. Operational dates for night shooting will be kept under review and can be changed should circumstances dictate. All operations will conform to current best practice guidance and a copy of these will be held at the district office and issued to wildlife rangers as necessary. Night shooting is a valuable tool in areas of high deer management pressure where the population has become wise to deer management practices.

8.0 Infrastructure

Infrastructure and access within Castlemaddy is well developed and continually assessed against deer density data. New infrastructure is installed at the restock stage and Foresters consult with the Wildlife team to decide the best location for access tracks. At this time no new access is required to achieve culls within Castlemaddy but there are some areas to the west that will require future consideration due to the terrain and deer species present.

Natural regeneration in deer glades and ATV tracks restricts wildlife management access. Future plans for the block involve infrastructure maintenance which will restore access and shooting opportunities. Requirements will be addressed by the FLS Wildlife team as part of the work planning process for individual sites. Flailing of the road's edge (which can increase visibility of deer) and vegetation clearance that coincides with the forest road maintenance programme will be explored.

All FLS Wildlife Rangers have the following kit as standard:

- 4 x 4 vehicle with either a winch or loading crane attached to the back to aid in loading carcasses safely.
- Capstan rope to aid in extraction when far away from roads.
- 4 x 4 ATV with winch.
- Trailer to transport ATV.
- Sledge/hill trailer to aid in extraction using the ATV.
- .270 caliber rifle with high magnification scope. Some rangers have smart scopes where applicable.
- Binoculars.
- Handheld thermal imager to increase herbivore detection.
- Various knives, saws and PPE.
- Access to thermal drone and pilot.

The New Galloway Deer larder is the primary appointed Larder for these forest blocks. (Larder capacity equals 80 red deer.)

9.0 Collaborative working opportunities

Currently there are no active collaborative culling agreements in place. FLS seek to work with neighbours where there is a mutual benefit in managing herbivore populations at a landscape scale wherever possible.

FLS have and continue to work in collaboration with Nature Scot to develop feral pig control methods and support national guidance. There is intermittent communication with the Forrest Estate to the south of the block regarding issues such as goats.

Castlemaddy falls within the Galloway and Dumfriesshire Deer Group area. The group experiences some periods of inactivity due to member commitments.

10.0 Venison

FLS subscribes to the Scottish Quality Wild Venison (SQWV) scheme with all venison quality assured and currently sold to Highland Game Ltd. based in Dundee for the provision of a natural, sustainable, healthy product for the food industry. All animal by-products are sold to Highland Game along with the venison. All waste from larders is removed by a licensed waste disposal contractor.

Appendix VIII: EIA screening opinion request form

Scottish Forestry form. Provided as an attachment.

Appendix IX: Private water supplies

Subject to data protection. Provided as an attachment.