Forestry and Land Scotland
Coilltearachd agus Fearann Alba

Patna

Land Management Plan 2022-2032 South Region-V1.0

Plan Reference No:
Plan Approval Date: 21/10/2022
Plan Expiry Date: 21/10/2032

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

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

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Contents

1.0 Objectives and Summary

1.1 Plan overview and objectives

Plan name	Patna (FDP 181)
Forest blocks included	Patna
Size of plan area (ha)	705.2
Location	See Location map (**Map 1**)

Long Term Vision
The Patna block will, over time, increase species diversity and age class to provide a range of ecosystem services including timber supply, greater habitat biodiversity and landscape quality. A network of broadleaved riparian zones within sustainably managed conifer forests will connect to the Ancient Semi-Natural Woodlands, both within the block and out into the surrounding area. The forest block will continue to offer access to local communities and visitors through a network of formal and informal paths and forest roads. Silvicultural management will, enhance the experience of time spent in the forest and associated wellbeing benefits.
Management Objectives
1. Produce a sustainable supply of timber while increasing resilience to future climate change impacts. 2. Ensure landscape design is sympathetic to surrounding landform and land use, enhancing general character and external views of the woodland from public roads and Patna Village. 3. Maintain and enhance the structural diversity and species richness of the woodland to benefit biodiversity with the continued gradual restoration of priority Ancient Woodland sites. 4. Maintain access and enable communities to enjoy the woodland to improve overall health of the nation. Contributing to sustainable rural development through engagement with local communities.
Critical Success Factors
• Planting carried out sustainably, to meet the stocking density requirements. • Broadleaves and soft conifers must be protected from damage, and beaten up where required, to ensure successful establishment. • Restructuring of the forest by redesigning management coupes and increase species diversity, whilst being sensitive to the local topography.

Long Term Vision
• Enhance broadleaf area, targeting riparian zones and boundaries to adjacent land to tie-in with local landscape and increase connectivity.

1.2 Summary of planned operations

Table 1

Summary of Operations over the Plan Period	
Clear felling (gross)	108.2 ha
Thinning (potential area)	0 ha
Restocking (gross)	84.7 ha
Afforestation	0 ha
Deforestation	0 ha
Forest roads	940 m
Forestry quarries	0 ha

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

2.0 Analysis and Concept

The planning process was informed by collecting information about the woodland, which is presented in **Appendix I** and on the Key Features map **(Map 2)**. During the development of this plan we have consulted with the local community and other key stakeholders, and a Consultation Record is presented in **Appendix III**.

Below lists the objectives for the site and how the key features present opportunity or constraint. The Analysis of these form the concept for this Land Management Plan.

Objective: **1. Produce a sustainable supply of timber while increasing resilience to future climate change impacts.**

- **Opportunities**:
  - Core timber production with predominantly upland Sitka Spruce with mixed broadleaves.
  - Native mixed broadleaves along riparian zones enhancing natural flood management and habitat networks within the block.

    - Good forest road network, which will need to be maintained.
- **Constraints**:
    - Recent larch sanitation felling and windblow clearance have reduced age diversity. It will take time for this to re-establish.
    - Wind hazard class is high, covering large parts of the block, Low Impact Silvicultural System (LISS) and thinning will be unsuitable in most areas.
    - Consultation route is the only permitted haulage route from the block.

- **Concept**:
    - Re-design the existing plantation through age restructuring to reduce average coupe size, extending or advance fell dates, optimising tree species (diversifying where appropriate), and promote an increased area of LISS where suitable.
    - Enhance forest resilience, through the use of good silvicultural principles to reduce the impact of current and future climate-related challenges.

Objective: **2. Ensure landscape design is sympathetic to surrounding landform and land use, enhancing general character and external views of the woodland from public roads and Patna Village.**

- **Opportunities**:
    - Remove hard edge across Patna Hill.
    - Improve views of Patna Forest from the Doon Valley, enhancing tourist route views along the A713 Ayr to Castle Douglas public road and the general setting for the village.
- **Constraints**:
    - Recent large-scale clearfell areas will take a while to re-establish and provide a forested aspect behind the village.
    - Most clearfell areas are restocked, so a change in species may be limited in the short to medium term.
- **Concept**:
    - Design setting behind the village to fit sympathetically in the surrounding landscape, potentially using LISS designed open space, in addition to age and species diversity.
    - Use broadleaved belts on lower slopes to frame the village and use distinctive medium scale summits to influence coupe design and open space.

Objective: **3. Maintain and enhance the structural diversity and species richness of the woodland to benefit biodiversity with the continued gradual restoration of priority Ancient Woodland sites.**

- **Opportunities**:

    - Linkage to Ancient and Semi-natural Ancient Woodlands (ASNW) on neighboring land.
    - Improve water quality in catchments for Loch Doon, the River Girvan and Loch Spallander Reservoir.
    - Habitat connectivity into the plantation, thus increasing biodiversity value for priority species and other wildlife.
- **Constraints**:
    - Re-establishment Ancient Woodlands will be a long term vision.
    - Deer browsing pressure on palatable species.
- **Concept**:
    - Expansion of ASNW linking into neighbouring land through increased native broadleaves species planting through restocking and ancient woodland restoration.
    - Connect habitats within riparian zones along extensive watercourses using suitable species and increased open space, while also considering natural flood management opportunities and water quality.

Objective: **4. Maintain access and enable communities to enjoy the woodland to improve overall health of the nation. Contribute to sustainable rural development through engagement with local communities.**

- **Opportunities**:
    - Forest accessible by foot from Patna Village.
    - Maintained access for walking, cycling and riding through the forest roads networks and core paths.
- **Constraints**:
    - Antisocial behavior including fly-tipping, illegal vehicle access and fire raising.
    - Due to the volume of clearfelling over recent years, varied woodland experience have been hampered in the short term.
- **Concept**:
    - Support the local community by continuing to engage communities in decisions relating to management of the national forests and land.
    - Provide a varied and enjoyable woodland experience for forest users ensuring continued use of the forest under Scotland's Outdoor Access Code and through the use of Core Paths and the forest road network .

Different management options for achieving the plan's objectives were considered against the constraints and opportunities identified during scoping and consultation. The preferred approach is summarised on the Concept map (**Map 3**).

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.

Table 2

Designations and significant features		
Feature type	Present	Note
Site of Special Scientific Interest (SSSI)	No	
National Nature Reserve (NNR)	No	
Special Protection Area (SPA)	No	
Special Area of Conservation (SAC)	No	
World Heritage Site (WHS)	No	
Scheduled Monument (SM)	No	
National Scenic Area (NSA)	No	
National Park (NP)	No	
Deep peat soil (>50 cm thickness)	Yes	3ha of 10b soils present(Upland Sphagnum Bog), very wet and part of a wider connected flush (9b)
Ayrshire and Arran Forest and Woodland Strategy	Yes	Within the Carrick Hills and Valleys Zone
Tree Preservation Order (TPO)	No	
Biosphere reserve	Yes	Galloway and Southern Ayrshire
Local Landscape Area	Yes	East Ayrshire Authority
Ancient woodland	Yes	Muirsmill Glen and Trouqhain Wood
Acid sensitive catchment	No	
Drinking Water Protected Area (Surface)	No	Scottish Water's Loch Spallander is currently not used as a drinking water source

The Key Features map (**Map 2**) shows the location of all designated areas and significant features. Any deep peats are indicated on the Soils map (**Map 9**).

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	Fell Year	Gross Area (ha)
1	92055	2022/23	6.5
1	92020	2023/24	27.2
1	92010	2025/26	12.2
2	92051	2027/28	14.0
2	92003	2027/28	33.6
2	92037	2028/29	3.8
2	92050	2030/31	10.9
		Total	108.2

Table 4

Clearfell by Species													
		Nett Area (ha) by Main Species >20% (or MC, MB)											
Coupe Number	Fell Year	CP	DF	EL	HL	JL	LP	NS	SP	SS	MC	MB	Coupe Total
92055	22/23									5.7			5.7
92020	23/24									14.8			14.8*
92010	25/26									11.2			11.2
92051	27/28							0.1		13.3			13.4
92003	27/28								0.8	15.0			15.8*
92037	28/29									3.1	0.4		3.5
92050	30/31									10.6			10.6
Plan Area Total								0.1	0.8	73.7	0.4		75.0

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

* Areas of these coupes felled early due to windblow.

Table 5

Scale of Proposed Felling Areas										
Total Woodland Area			508.6 ha							
Felling	Phase 1	%	Phase 2	%	Phase 3	%	Phase 4	%	Long Term Retention	%
Nett Area (ha)	31.7	6	43.3	9	17.0	3	0	0	0	0

3.3 Thinning

Whilst there is no thinning planned for the duration of this plan period, potential future thinning sites are identified on the Thinning map (**Map 5**).

This covers an area of 75.7 ha, with only one thinning coupe 92503, possibly being ready for first thinning in 2032/33 after the end of the plan period. Further site specific surveying nearer this time and the LMP revision will determine the future management requirements.

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. Where trees need to be removed to accommodate facilities to support approved thinning, including stacking areas, ramps and access racks within adjacent management coupes, this should ideally be identified in thinning maps and thinning plans as part of the LMP submission. Where this is not the case, additional felling necessary for reasonable infrastructure can be agreed by exchange of email. 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**).

Table 6

Restocking							
Phase †	Coupe Number	Gross Area (ha)	Proposed Restock Year	Species	Method *	Minimum stocking Density (s/ha)	Note
F	Various Infected Larch sites	8.1 in total	2023	Mixed Conifer (MC), Sitka Spruce (SS), Norway Spruce (NS) & Mixed Broadleaves (MB).	R	2500 MC, SS & NS. 1600 MB.	Restocking may be delayed in line with Phytophthora ramorum Policy.
1	92055	4.8	2023	MC, MB	R	2500 MC. 1600 MB.	NF could be suitable. Species diversity for landscape and amenity reasons
1	92020	21.1	2024	SS, Scots Pine (SP) & Native Mixed Broadleaves (NMB)	R	2500 SS & SP. 1600 NMB	NMB riparian zone 50% open
1	92010	10.2	2026	SS, SP & MB	R(SS/SP) NR (MB)	2500 SS & SP. 1600 MB	Enhance LTR area with SP
2	92003	24.8	2028	NS/NF,SP/MB & NMB	R	2500 NS, NFN & SP. 1600 NMB	Coupe with potential for future CCF, NS, NF 80:20 mix, with NMB in riparian zones and increase area of NMB adjacent to the ASNW. SP, MB 80:20 area surrounding open space at Carlout Hill.

Restocking							
2	92051	10.2	2028	SS & NMB	R	2500 SS. 1600 NMB	A 50:50 mix of NMB and open to act as buffer to Loch Spallander water catchment.
2	92037	3.4	2029	SS, NF & MB	R	2500 SS & NF. 1600 MB	Open area to be left for sight lines on merging roads.
3	92050	9.5	2032	SS, MC, NS/NF/GF & MB	R	2500 SS, MC & NS mix 1600 MB	Mixed species to improve long-tern landscape view. NS/NF/GF blocky mix of 70:20:10

Total	84.7

† recently felled awaiting restock (F) / Phase 1 (1) / Phase 2 (2)
* replant (R) / natural regeneration (NR) / plant alternative area (ALT) / no restocking (None)

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

3.6 Species diversity and age structure

The following tables show how the proposed management of the forest will help to maintain or establish a diverse species composition and age-class structure, as recommended in the UK Forestry Standard. 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 2m. 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 – Clear felling.

Table 7

Plan area by species						
Species	Current Area (ha)	%	Year 10 Area (ha)	%	Year 20 Area (ha)	%
Sitka spruce	272.2	48%	236.6	41%	227.5	39%
Other conifers	51.4	9%	80.6	14%	91.6	16%
Native/other broadleaves	71.6	13%	78.7	14%	84.6	15%
Fallow	86.5	15%	83.9	14%	71	12%
Open ground	87.3	15%	100.8	17%	107.9	19%
Total	**569**	**100%**	**580.6**	**100%**	**582.6**	**100%**

Chart 1

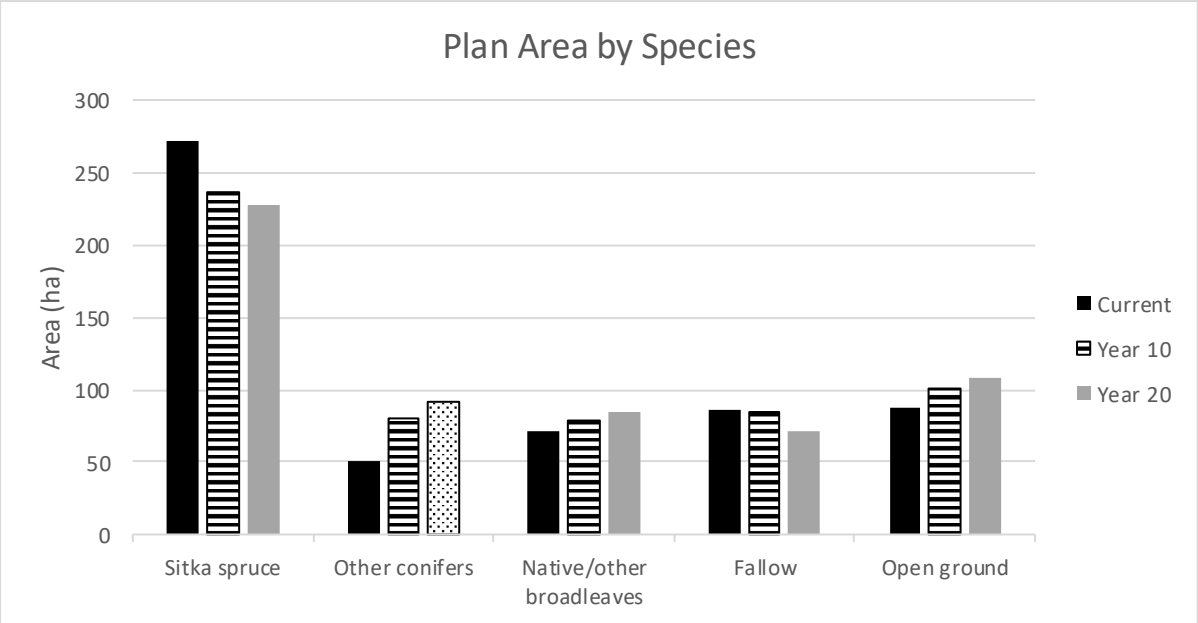
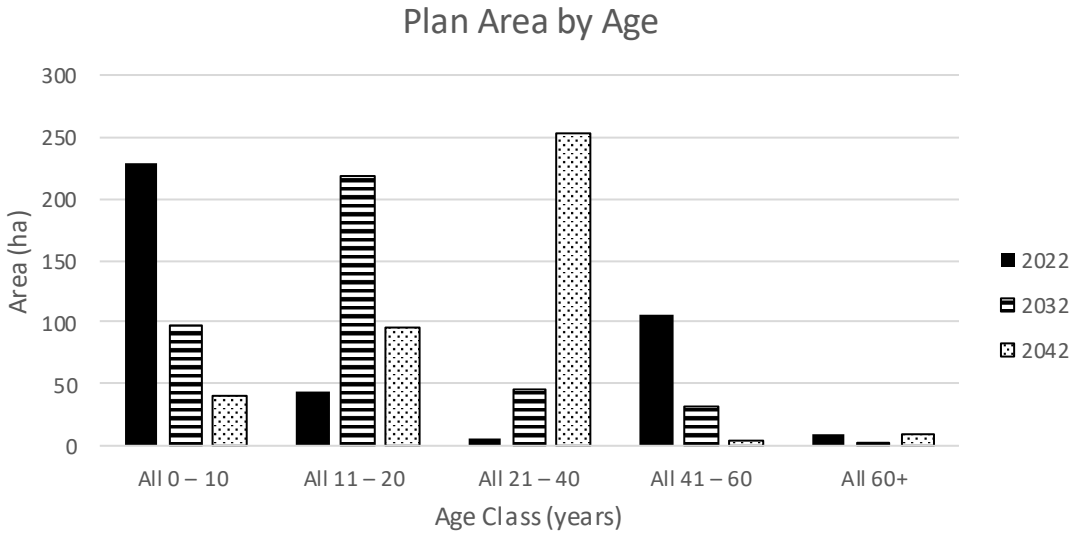


Table 8

Plan area by Age						
Age Class (years)	Current Area (ha)	%	Year 10 Area (ha)	%	Year 20 Area (ha)	%
0 – 10	228.6	58	97.9	25	40.8	10
11 – 20	44.4	11	218.1	55	95.6	24
21 – 40	6.3	2	45.7	12	253	63
41 – 60	106	27	31.6	8*	4.1	1
60+	9.9	3	2.6	1	10.1	3
Total		**100**		**100**		**100**

*NB 8% of mature standing timber (i.e. over 40 years) is within the plan area at year 10. Efforts have been made throughout plan development to mitigate this in the long-term and improvements to age structure will continue with future plan revisions. In addition, practicable opportunities (such as retentions for environmental benefit) may also be taken during plan delivery

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 9

Forest Road Upgrades, Realignments, New Roads and New Quarrying				
Phase	Name / Number	Length (m)	Year	Operation
1	Loch Spallander Rd Extension	730	26/27	New Road to phase 2 coupe
1	Carclout Spur Extension	210	26/27	New Road to phase 2 coupe

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 II**.

Table 10

EIA projects in the plan area		
Type of project	Yes / No	Note
Afforestation	No	
Deforestation	No	
Forest roads	Yes	For new roads: 940m
Forestry quarries	No	There are no current proposals to extend the existing quarry in Patna.

3.9 Tolerance table

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

4.0 Management Proposals – guidance and context

4.1 Silviculture

4.1.1 Clear felling

Coupes for clearfelling during the plan period (refer to **Map 4**):

To achieve the UK Forestry Standard 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 agreed with Scottish Forestry. Felling will be undertaken once trees in adjacent restocked coupes have reached 2 m height.

92055
Fell year 2022/23 (6.5 ha) SS P76
Windblown coupe to be felled in phase 1 to improve landscape views. Popular informal paths from village along coupe boundary. The possibility of disused mining hazards of medium risk should be highlighted at the work plan stages before any operations. Within the Local Landscape Area, any deadwood left on site should not negatively impact views looking on to the site. Restocking along the block boundary should look to improve linear affect using a mix of open space and broadleaves. Mixed conifer, possibly NF, to be planted to provide diversity to views and to improve the visitor experience. Previous windblow felling creates possible adjacency issue which will be dealt with through delayed restocking where required.

92020
Fell year 2023/24 (27.2ha) SS P80
Small area felled in 2018 due to windblow. Felling earlier than MAI due to windblow and burnt areas in coupe. Overhead powerline (OHPL) alongside sites and water pipeline, liaison with Scottish Water (SW) and Scottish Power at workplan stage is imperative. Watercourses on site and Loch Spallander water catchment nearby, ensure areas are protected from diffuse pollution during operations and compliance with South Region Pollution Control Plan. Good forest road access. Restock with SS including areas which had failed in the previous rotation. Scots Pine with adjacent native broadleaves and open space should be used to create diverse riparian zones along watercourses. Open areas to be retained to allow for wildlife management access and along water pipeline to mitigate any negative impact from future forestry operations. Previous windblow felling creates possible adjacency issue which will be dealt with through delayed restocking where required.

92010

Fell year 2025/26 (12.2 ha) SS P76

Some substantial windblow in coupe, retained after Max Annual Increment (MAI) for landscape appeal and structural diversity. Within old mine working area of medium risk potential hazards may be on site and should be highlighted at workplan stage. Small area of 10b soils on site. Operations should be handled sensitively in these soft areas. Good forest roads, access to be kept passable for light vehicles along forest road to residential property. Paths, including the Core Path, run alongside the coupe. Restocking with SS, SP adjacent to the long term retention to extend red squirrel habitat. Mixed broadleaves through natural regeneration along roadside.

92051

Fell year 2027/28 (14.0 ha) SS P80 & SS/NS P85

Coupe shape redesigned to reduce size of clearfell coupe next to Loch Spallander. New forest road extension required to provide stacking space. SW pipeline alongside boundary. Ensure these are protected from diffuse pollution during operations (civil engineering and harvesting) and clearly marked on the ground before works begin. Liaise with SW at the work planning stage. Restock with SS and native broadleaves along the loch side to create a buffer from future felling operations and to expand native broadleaves in this area

92003

Fell year 2027/28 (33.6 ha) SS P76 & SS/SP P76

Partly windblown coupe, some of the area clearfelled due to this in 2015 will be restocked as one coupe. Harvesting track has been used under the overhead powerline for previous works however further works may require a road extension for access and stacking. This will also benefit any potential thinning/CCF in the future. Various watercourses on site ensure these are protected from diffuse pollution during operations (civil engineering and harvesting). Operations to avoid grassland on Carclout Hill which is also a mine working area of medium risk, potential hazards may be on site and should be highlighted at workplan stage. Private water supply (PWS) pipeline and abstraction point on coupe boundary and abstraction point buffer crosses into coupe, appropriate guidelines (UKFS Forestry and Water guidelines, Forestry & Water Scotland Know the Rules, and Private Water Supplies: guidance on forestry activities near PWS) to be followed and responsible forester to liaise with supply owner at work planning stages to identify accurate location of infrastructure so it can be clearly marked and buffered on the ground during operations. Restock: there will be SP/MB area surrounding open space encompassing Carlout Hill. This coupe has the potential for future CCF so a NS, NF mix is recommended in the productive areas. WIL, CAR, BI and open along riparian zones, to act as habitat networks to neighbouring Dallowie Wood along with further woodland expansion of native woodlands adjacent to this ASNW site. Small areas of priority habitat (Upland Fen Marsh & Swamp) should be left open.

92037
Fell year 2028/29 (3.8 ha) SS P76 & NF P76
Small coupe beginning to blow along residential access route. Liaise with residential neighbour to ensure access to light vehicles is maintained on forest road during operations. Watercourse on site ensure protection from diffuse pollution during operations. Delayed from MAI to avoid adjacency issues. Restocking of SS and MC with an open area to be left for sight lines on merging forest roads. Open natural regenerated broadleaved area to be left near entrance to residential property and as a buffer along field boundaries.

92050
Fell year 2031/32 (10.9 ha) SS P80
Coupe shape changed and to be felled in phase 2 to improve tree line effect on the landscape view on Patna Hill. Some steep working ground and old mine working mining hazards of medium risks to be addressed at workplan phase. Protected zones: research plot in crop (in 2022 was still active and in use) liaise with Forest Research at planning stages. Unofficial recreation on site, community liaison may be required before works begin. Restocking will comprise of SS, MC (possibly NF) and mixed broadleaves for a permanent landscape feature on Patna Hill. Open area surrounding conifers on the boundary to enhance Central Scotland's Green Network Area for grasslands.

4.1.2 Thinning

Refer to **Map 5**.

Restrictive site types of high wind classes, wetter soils and young establishing crops mean that currently there is minimal options for thinning. It is hoped thinning some of the second rotation crops to increase the overall thinnable area in the future. **Map 5 – Thinning** shows all areas where there is potential to thin, this will be in subsequent plan periods. Any operations need to be carefully planned to ensure they are realistic and, above all, well-timed to avoid missing intervention thresholds. Thinning will be carried out on a five year cycle in accordance with our FLS Regional policy. Patna crops are thinned primarily to realise amenity, biodiversity and landscape objectives.

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

Refer to **Map 4.**
Much of the area has poor site types with relatively high DAMS scores; accordingly only a small area of the block is currently managed under Low Impact Silviculture Systems (LISS). Most of the plan area, around 530ha, is managed under a clearfell regime.

Currently there are no obvious opportunities for CCF, though the restock has been designed with future opportunities in mind through appropriate species choice that could have potential for CCF areas in the long-term. This should be reviewed in the subsequent plan iterations.

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

Refer to **Map 4.**

Long term retention (LTR)

92104 (2.9 ha) Retained SP as habitat network for red squirrels connecting to neighbouring ASNW.
92023 (13.93 ha) Screening of powerline for improvement of internal views.
92033 (2.66 ha) Enhance landscape views and red squirrel habitat.
92035 (4.76 ha) Retained as red squirrel habitat network and to improve age structure. Underplanting of SP to enhance low stocked areas to be implemented.
92056 (2.22 ha) Retained for habitat network, visitor experience and landscape views onto forested hillside.
92007 (1.69 ha) Retain SP in particular for red squirrel habitat networks.

28.2 ha of the plan area (4%) has been classified as 'Long Term Retention' to retain the existing stand beyond normal economic maturity for environmental, landscape and age-class benefits.

Minimum intervention (MI)

92038 (4.54 ha) Broadleaved belt at entrance to forest from village to enhance visitor experience and act as a fire resilient buffer.
92030 (8.17 ha) Broadleaved belt and riparian corridor environment and landscape views. To provide a fire resilience buffer next to settlement.
92029 (1.59) To protect existing ASNW
92032 (4.38) New planting of broadleaved riparian zones - Manage as MI once planted

18.7 ha of the plan area (3%) has been classified as 'minimum intervention' where activities will be limited to: wildlife management; removal of invasive /non-native tree regeneration that could reduce value for biodiversity or colonise surrounding stands; actions to benefit specific species of conservation priority; fire resilience; and ensuring tree safety along access routes. The objective in these areas is to enhance sensitive landscape views and species diversity.

Natural reserve (NR)
There are no Natural Reserves within the LMP boundary.

4.1.5 Tree species choice / Restocking

Refer to **Map 6.**

The site lies within the Ayrshire and Arran Forestry and Woodland Strategy (AAFWS) area and is mainly categorised as existing woodlands. There are opportunities for restocking this area to meet with AAFWS priorities for woodland management. This will be done through planting species that link and create, native and mixed woodlands, to further enhance prospects for retentions and re-structuring of existing woodland. Taking into account the chances to positively affect biodiversity and landscapes whilst adapting and planning for future climate changes through species choice and the use of appropriate silvicultural techniques.

All native broadleaf and mixed broadleaf planting to the area should complement and/or enrich existing naturally growing scrub and woodland to give the most ecological value.

The Restocking Strategy for Scotland's National Forest Estate explains that we 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

Natural regeneration (of the desired species) should be a preference for broadleaf areas (to maintain provenance and improve the chances of establishment) but where this is unlikely or has not been successful then these areas should be planted/beaten up to the required stocking density and site requirements.

It is expected that some of the riparian zones, designed open ground and broadleaf areas will fill in with natural regeneration of both conifers and broadleaves. This will be managed in such a way as to ensure that, where practicable, it does not significantly impose negative impact upon the objectives of the plan. Nor should it cause a negative impact upon the watercourse in terms of shading and acidification.

There are some productive sites where natural regeneration is occurring. These will be monitored and recorded in the FLS sub-compartment database. Where this is the desired species, we will endeavour to use it to achieve the required stocking density. If stocking density is too low it will be beaten up by year 5. If the natural regeneration is too dense it may be necessary to clear and restock. Where natural regeneration is not the desired species it will be considered against the plan objectives and agreed tolerance and either accepted (with a plan amendment if necessary) or removed.

4.1.7 New planting

There is no new woodland creation planting scheduled for the plan area, other than that approved under the Glenside Farm woodland creation which is due to be planted in the 2022/2023 season.

92039 - This area will be mounded at 1.9 m x 1.9 m to achieve 2500 stems per hectare. Species: 23.3 ha Sitka Spruce (SS) and 1.5 ha Norway Spruce (NS).

92031 - The native broadleaf areas will be planted with a 2.5 m x 2.5 m spacing to give a density of 1600 stems per hectare. These areas totaling 10.4 ha will be planted to with a blocky mix of native broadleaves (80%) in an intimate mix with open ground (20%).

92032 - The native broadleaf areas will be flat planted where possible with a 2.5 m x 2.5 m spacing to give a density of 1600 stems per hectare. These areas totaling 4.4 ha will be planted to with a blocky mix of native broadleaves (70%) in an intimate mix with open ground (30%).

4.1.8 Protection

Deer

There is a significant challenge in establishing species palatable to deer such as soft conifers and broadleaves. Generally, within the South Region there is a presumption not to erect physical protections against deer. The current Regional Deer Management Strategy is to manage the deer population by achieving set annual cull targets (determined using integrated data i.e. population counts, fecundity/mortality rates, and damage levels) to meet land management objectives. Deer management is currently undertaken in Patna by a Deer management permission lease, the lease has an annual cull target of approximately 50 Deer.

Patna forest is one of 4 forest blocks located within the Kyle Deer Management Unit 2 (DMU) as denoted in the South Region Deer Strategy 2021-2026. Currently just over half of the high forest area has been planted since 2011 due to windblow events and sanitisation felling of larch. This has made managing deer density and their impacts increasingly challenging.

Furthermore deer management efforts within the Patna block are impacted by moderate public recreational use, as well as illegal motorbike access on forest roads, extraction tracks and rides also have an influence on the wildlife management at times.

The main objectives within DMU 2 are:

- Ensure sustainability of all deer species.
- To enable re-stocking to take place without the need for deer fencing & Keep deer impact on all crops to acceptable levels and help the Region to achieve the appropriate

stocking density at year five in accordance with FLS Operational Guidance Booklet (OGB) 4 Plant Density.

- Ensure all biological resources on the National Forest Estate remain in favourable condition (as per SNH guidelines).
- Prevent the spread of Red Deer.

Agreed Targets to meet the above objectives are to maintain deer populations at sustainable levels and maintain impact levels in accordance with Regional policy of less than 10% Leader Loss on all P1 commercial tree species. To help the Region reach stocking densities in accordance with FLS' Operational Guidance Booklet 4 on all P5 sites.

The method of assessing progress against objectives will be to annually monitor all P1 sites, identifying and recording all deer impact. Monitoring will be carried out by independent specialist contractors. Produce population models to estimate culling impact on population of deer and through monitoring cull progress throughout the year. Current Stocking Density Assessments carried out in 2021 indicate minimal deer browsing damage found on Year 1 and Year 5 restock sites.

Proposed restock areas have been chosen primarily on the basis of site suitability in addition to accessibility for protection. At the work planning stage, we will re-assess all restock areas to determine site specific deer management requirements. If the potential occurrence of deer browsing is high, and where protection through deer population control alone is likely to prove difficult, alternative protection measures such as plastic tree guards may be used. Establishment will be assessed at year five after restocking has been completed. If used, plastic tree guards will be removed and recycled once trees are satisfactorily established and less susceptible to browsing pressure.

Patna has stock fences installed around the boundary of the main block and there are plans for further stock fences to be installed around the area of new planting at Glenside Farm to keep neighboring livestock from straying. There is one deer fence surrounding an area of broadleaves which totals 900m in length and has been implemented to assist with deer management in this area. Fences will be installed using the "Forest Research - Forest Fencing Technical Guide" and "Forestry Commission Bulletin 102 - Forest Fencing" which recommends best practice principles as a guide to planning, assessment and mitigation of adverse factors in choosing the fence design appropriate for the target species and by indicating the key practical steps in construction.

Sheep and other domestic livestock within the Patna block create a number of issues for both neighbouring farmers and FLS; including browsing damage to young plantation and native woodland regeneration, biosecurity risks from the potential spread of disease, animal welfare issues from unattended livestock and loss and inconvenience to farming neighbours. To help resolve this FLS handle cases of straying livestock with guidance which seeks to effectively, efficiently and in accordance with the law deal with this issue whilst maintaining good working relationships with neighboring livestock keepers.

Tree Pests and Diseases

Tree diseases reported in Patna include *Phytophthora ramorum* whose general infection has been confirmed on Larch across the region. All larch in the block has now been removed. Several infected areas in the plan area were initially felled to comply with the requirements of 3 Statutory Plant Health Notices (SPHN) in 2015, 2018 and 2020. Restocking of these sites will be compliant with SF Larch Tolerance Table, see Appendix IV.

Dothistroma Needle Blight (DNB) has been identified on Corsican and Scots Pine crops across the Region. Likely infection on pine in the block though effects of mortality is currently minimal.

Ash dieback (*Chalara fraxinea)* is present within the LMP boundary, though its scale and proximity to any infrastructure is minimal. Monitoring is ongoing and identified specimens will be treated as per the FCS published Chalara Action Plan for Scotland in 2013.

The great spruce bark beetle *(Dendroctonus. micans)* is increasingly spreading in the south of Scotland and has been found in Patna in spruce. Forest Research released the predator *Rhizophagus grandis* here as part of the national effort to control this pest. Monitoring is ongoing.

Hylobius, the Pine weevil, can cause extensive damage to young conifer crop (and at times young broadleaves) and is found in this plan area and throughout the region. As part of the districts chemical minimisation strategy, the *Hylobius* Management Support System (HMSS) is used to measure Hylobius numbers on clearfell sites. Using billet traps on conifer restock areas to assess, weevil numbers to establish optimum time for site restocking. This more flexible fallow period between felling and re-stocking may result in restocking not taking place within two years of felling (see Tolerance table section **Appendix IV**).

FLS encourage good biosecurity practices to prevent diseases from spreading. Monitoring established and emerging pest and diseases in Patna will be completed through defined plant surveys, and through training staff to recognise and report tree health issues. Enabling early detection of emerging tree health threats and any negative changes in existing ones.

When designing the restock of this plan, species have been appropriately matched to sites, and efforts have been made to diversify the range of species and silvicultural systems used where appropriate, including greater use of mixtures to reduce future impacts of climate affects.

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. Within Patna village and the surrounding area FLS staff are involved in local fire awareness education in partnership with Police Scotland, Fire Scotland and East Ayrshire Council. FLS in South Region are a member of the Ayrshire Partnership And Rural Crime (APARC) group. This group is made up of Police Scotland, FLS, local farmers, relevant councils, The Horse Society, local estates, and private forestry groups all working together in an attempt to tackle Anti-Social Behavior (ASB), including that of fire-raising. (For further details on ASB please see section **4.5 People**)

Where appropriate opportunities to create broadleaved buffers between the main forest block and the settlements have been implemented, to go towards creating a natural fire break.

4.1.9 Road operations, Timber haulage and other infrastructure

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

2 new roads are planned for the block in the next 10 years of the plan and both are to access phase 2 coupes. Loch Spallander Rd Extension 730m and Carclout Spur Extension 210m. Currently the roads are of a good construction within the Patna block. Tree felling will be undertaken where this is directly associated with the ground works. 2 other planned roads appear on the map which are indicative for future coupe access but this will be out with this plan period but left as reference for future revisions.

Patna Quarry, asset number 1463, is not proposed for extension during the period of the plan but the quarry is active and will be used to provide material to local forest road infrastructure.

The minor public road (C11) is where main and only egress points are located for the main block and Patna Hill. This is a 'consultation' timber transport route and connects through the village to the A713. Consultation with Ayrshire Roads Alliance must be made prior to any extraction from these blocks to determine any restrictions required, and the impact on haulage. All timber haulage will adhere to the Timber Transport Forum "Road Haulage of Round Timber – Code of Practice".

4.2 Biodiversity

4.2.1 Designated sites

There are no designated sites within the LMP boundary.

There are 2 Local Nature Conservation Sites (LNCS) Loch Spallander and Cloncaird Moor, in South Ayrshire and Dallowie Wood, in East Ayrshire. Loch Spallander and Cloncaird Moor crosses a small area of the block with the majority of the LNCS area being sited adjacent to the Patna LMP boundary. Wildlife networks through broadleaves and open space have been enhanced in this area as part of the future restock plan to provide increased opportunities for species movement through these habitat networks.

Dallowie wood along the Dallowie Burn valley is adjacent to the block. This small area of semi-natural woodland is comprised of mainly birch and alder species. Existing broadleaves within the nearby NFE will be supplemented by additional planting to enhance the area further. See comments in **4.2.3 Ancient woodland / Plantation on Ancient Woodland sites (PAWs)**

4.2.2 Native woodland

The plan area currently consists of 71.6 ha of native and other broadleaved (including Sycamore & Beech) woodland and this will increase to 84.6 ha once the plan is fully realised. The native woodland area will be protected and enhanced through establishment that creates corridors within the habitat connection zone, with small seeded species used where possible to improve red squirrel networks. Other areas bordering the lower slopes and knoll behind the Patna settlement have been implemented for landscape enhancement and fire resilience. This is also in line with the objectives of the AAFWS.

Where the plan shows mixed broadleaf woodland in riparian corridors, this is established at the appropriate density (1600sph) and in most cases within a 50:50% mosaic of open space and woodland. Implementation here is especially important for burns leading downstream into the River Doon and Girvan where the flow of these could have effects on flooding and water quality. Additionally, following clearfell, a mixed native woodland will be established around the northern edge of Loch Spallender within its catchment zone, due to its requirement as an emergency DWPA.

Monitoring of non- native regeneration (mostly Sitka spruce) will continue and be removed where resources allow. Some broadleaved areas have established mixed native woodlands to varying degrees and natural regeneration of native species will be supported with some supplementary planting where needed. Management interventions during this plan period include selective thinning and removal of conifer natural regeneration.

Where broadleaved areas are established, this native woodland has been designated as 'minimum intervention' with the intention of other areas such as these also being considered MI once they are planted and have become established. There are medium levels of herbivore impact and deer control will be monitored to ensure all native woodland areas establish successfully.

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

Ancient woodland areas from Nature Scots Woodland Inventory include Muirsmill Glen and Troquhain Wood within the LMP boundaries. Troquhain wood crosses the boundary into neighbouring ground. Also in this area, south west of the block, the Spallender Burn semi-natural woodland of Long-Established (of plantation origin) is also sited within the agricultural leased tenancy area. These areas follow natural watercourses and gullies in the area and the plan seeks to protect and enhance these existing areas of native woodland and extend these where appropriate. This can be seen through efforts to plant native species of local origin to increase the connectivity of these pockets of valuable habitat.

The Habitat Connection Zone will link riparian areas through appropriate broadleaved expansion leading to greater associations to ancient woodland sites on nearby private land, such as Hannah Glen.

Furthermore the Ancient Woodland Expansion Zone will look to enrich ancient woodland sites, mainly for Spallander Burn and the neighboring Dallowie Burn areas. Connected areas will be managed to establish wet woodland species of Aspen, Birch and Willow native broadleaves, in a mosaic of native trees and open ground expanding these fragmented units.

Carskeoch appears on the ancient woodland inventory as previously wooded. Whilst there is no legal requirement for restoration of the semi ancient woodland marked on the Roy map, FLS recognise that restoring areas where possible meets FLS values. Plans to re-establish an area of native woodland over part this ancient woodland site have been completed. With plans for some of the area to go back to conifer as this is one of the few suitable areas for possible thinning and eventual CCF within the block.

The above measures also work towards the AAFWS objectives in relation to ancient woodland site.

There are no PAWs sites within the LMP boundary.

4.2.4 Protected and priority habitats and species

All forest management operations involve a planning process before work commences which includes checks for wildlife and important habitats. Work plans will be adjusted if

necessary to avoid disturbance, and opportunities to further protect species or enhance habitats will be identified.

After felling operations, planting schemes will be designed around any priority habitats that are revealed. This includes species-rich groundwater dependent terrestrial ecosystems (GWDTEs), which will also be protected during road building and any other forest operations using the current best practice.

Purple Moor Grass Pasture
Open habitats survey completed by FES open habitats ecologist June 2013 identified 7.4 ha of important priority habitat purple-moor grass and rush pasture (M23a/M25b) within design area. Efforts to manage this area through grazing will continue during the plan, where practicable. As per the ecologists report, the ground to the west of the purple-moor grass pasture will not be planted at this time in order to concentrate cattle feeders away from the habitat to avoid nutrient enrichment.

Upland Fen Marsh & Swamp
The open habitats survey also discovered a small area of Upland Fen Marsh & Swamp priority habitat which covers 40% of a 2ha area on the block boundary to the north and 40% of a 1.2ha area on the boundary to the south. In both areas will have confers removed when appropriate. Restocking of broadleaves in these areas will avoid these habitats which should be left open.

Red squirrel
This area is not a stronghold and limited sightings have been reported in recent years and efforts have been made to further encourage the species through habitat provision and tree species choice. Staff and contractors will be made aware of risk and responsibility of working near Red Squirrel populations. Scottish Forestry's Forest Operations and Red Squirrels in Scottish Forests guidance will be followed as appropriate. FLS has a single species licence to cover forest management activities that may affect red squirrels on the national forest estate (NFE). This is in accord with the Scottish Biodiversity Strategy's aim to resolve species management issues. All works within the Plan area will follow the assessment and mitigation actions set out as conditions of this licence.

Otters
Otters are ubiquitous throughout the LMP area. The species should benefit from our continued positive riparian management that will aim to keep sections of stream banks permanently vegetated and allow them to persist throughout second and subsequent rotations.

Badgers
FLS will carry out environmental surveys on a site by site basis, during the planning stages, and prior to any forestry operations beginning. These site surveys are carried out and species licenses from NatureScot obtained should they be required. Forestry Practice Guide 9 Forest Operations and Badger Setts is followed as appropriate.

Birds
Various raptors and black grouse have been seen on site, with a confirmed lek within the LMP area. The plan provides a mosaic of habitats providing a range of food types for black grouse which will increase as the plan is delivered. Open areas have been retained with areas of woodland fringe provided where suitable. In-house environmental surveys will provide up to date information on bird species using the area prior to the start of any operations.

For Peatland Restoration comments please see **4.6.3 Deep peats**

4.2.5 Open ground

Managed open ground contributes to nearly 13% of the plan area, and there is an expectation that resources will be allocated to maintaining it as open. These areas are primarily located around heritage zones and various utilities.

1% open ground is classified as successional open, where some natural regeneration will be tolerated as long as it is compatible with the plan objectives. These are areas primarily located along riparian zones and block boundaries.

Monitoring of these areas will allow us to identify any significant changes, and Scottish Forestry will be notified if these require amendments to the plan. By year 10 the plan area will consist of 17% open ground with additional internal open space as a component amongst planted areas.

Fallow clearfell sites will contribute to transitional open space throughout the forest

There is one active quarry identified in Patna on the features map. There are no quarry extensions planned for the period of this plan and this will remain as an area of permanent managed open space.

In addition the area of agricultural ground to the west of the plan has not been added to the open ground figures within this LMP but will also remain as permanent managed open whilst under a grazing lease.

4.2.6 Deadwood

Opportunities for retaining or creating deadwood will be identified during the planning of all felling and thinning works, favouring areas with the highest deadwood ecological potential. Valuable deadwood and deadwood areas will be marked on contract maps. Riparian zones will offer some of the best opportunities for the development of standing and fallen deadwood. Where it is safe to do so, standing mature dead trees will be retained as these offer excellent potential for a range of species.

In accordance with FLS Deadwood Management Guidance, the Deadwood Ecological Potential for Patna is mainly low with medium potential in LISS areas.

4.2.7 Invasive species

Invasive Non-Native Species (INNS) can impact directly on many environmental aspects of an area and are specifically recognised as a significant risk to water environments potentially causing problems for communities who rely on rivers and lochs for their livelihoods.

No known issues with invasive species are currently reported within the Patna block, other than the presence of Grey Squirrels in an area where Red Squirrels have been sighted in 2018. Incursions of Grey Squirrel on the NF&L is monitored on a frequent basis via sightings, once sighted organisations such as Saving Scotland's Red Squirrels (acting under Scotland Wildlife Trust) and the local squirrel groups will be immediately notified. If deemed as a significant threat SSRS or the local squirrel groups may then implement further action via ongoing monitoring and control if needed.

Monitoring of INNS is ongoing and any invasive species identified will be treated as per the Region's INNS Policy and this includes the use of biosecurity measures, which are also highlighted before operations begin, at the work plan stages.

4.3 Historic Environment

Refer to **Map 12**.

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

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

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

4.3.1 Designated sites

There are no known designated historic environment sites within the plan area

4.3.2 Other features

There are seven known undesignated historic environment features in the plan area of regional importance. These are recorded in **Appendix V** along with various locally important features within the block. Consultation with West of Scotland Archaeology Service (WoSAS) highlighted further sites found on 1st edition OS maps, some of which were not mentioned in the previous plan. These sites were surveyed to establish if there were any evidence of

features remaining at the site, if they were on FLS land and where evidence was found, these have been added to **Appendix V** and added to the regions mapped data which is referred to before operations begin. As mentioned above sites will also be ground-trothed for heritage features at the work planning stages.

A slope above Patna village contains a burning coal seam, resulting from its industrial past which spans across FLS and private land. This seam has been burning for a number of decades. This is a subject of action and active discussion with the coal authority and a neighbouring land owner. Due to this being a health and safety issue, improved fencing with warning notices have been erected to warn the public and to restrict public access from the area where the underground coal fire is. Talks in relation to the possibility of distinguishing it are ongoing. This is a challenging issue due to the nature of the fire burning underground and attempts to find agreement to a long-term solution to this issue are in progress.

Other features include old quarry and mine workings from Patna's industrial past. These areas will be identified on site before operations commence and will be avoided where appropriate. In conjunction with the **Map 12** please also see **Map 13** Mining Danger Areas.

4.4 Landscape

4.4.1 Designated areas

Special Landscape Areas
Patna sits within the East Ayrshire designated Sensitive Landscape Areas (SLA). See **Map 11.** These East Ayrshire Local Landscape Areas have been designated due to the location and setting within the Doon Valley, the scenic gateway to East Ayrshire. The block itself contributes characteristics of knolly hill patterns, waterbodies and land mark hills, such as Patna Hill, north of the village.

The upland landscape that Patna sits on has been included in the SLA as it forms an important role in proving the backdrop and setting for the Doon Valley and the Girvan Valley. The west facing slopes of Patna Forest face towards the eastern edge and back drop to the Girvan Valley in South Ayrshire. The east side of the forest block form the east facing slopes of the Doon Valley and the setting of the west side of the Doon Valley around Patna.
Landscape Character
Patna is covered by 3 of NatureScots Local Character Assessment areas as described in **Appendix 1**. The majority of the forest sits within the Foothills – Ayrshire Landscape Character Type (LCT). Elevation ranges from 265m on the more prominent summits and drops down to 100m in the west of the block within the field networks. The landform is typical of the Ayrshire hills and valleys with large-scale rolling hills dissected by riparian corridors, burns and rivers, incorporating pastoral landscapes on the lower slopes.

The landscape in this area of the forest block is gently undulating with soft conifers on the tops of the hills, grazing field networks, hedgerows and remnants of Ancient Semi-Natural Woodland (ASNW) following the natural gullies into neighbouring land.

Visibility

The Patna forest block is visible through the Doon River valley, from Waterside, 2km to the south east, through to Patna, and to the north around Polnessan 2km north. Patna is visible from surrounding hills and summits with glimpses of visibility from the west along minor public roads and various scattered private dwellings, however there is no visibility of the forest from the larger settlement of Kirkmichael nearby. Patna Forest is largely screened from the south being adjacent to a private forest and curtained by Lambdoughty Hill. There is no visibility from Straiton in the south. The forest has a prominent position behind Patna, one of the Doon valleys main settlements. This is shown in Viewpoint 1 with the plantation rising from behind the houses on to large rolling hills, broken by riparian passageways crossing the hills at various points, leading down into broadleaved buffers that surround the village and meet areas of agricultural grazing. Viewpoint 2 heading north west on the A713, a main tourist route between Ayr and Castle Douglas denotes the east facing hills rolling down into the Doon Valley showing the knolly hill patterns with swaths of conifers on the tops of the hills, gently meeting the village and the wider pastoral landscape of the valley bottom. Viewpoint 3 looking south west towards Patna Hill rugged rolling hills topped with conifers slope gradually to merge naturally with broadleaved belts that buffer the village to the commercial plantation moving softly into the network of grazing fields on neighbouring farms in the lower slopes of the Doon valley.

Key Landscape Issues to consider

- Setting of Patna Village – The close proximity of the forest to the town and it's elevated position on the sides of the valley result in the forest and village being visible in views together from the lower parts of the valley. Careful consideration within the plan will be necessary to ensure the village and forest integrate well.
- Setting of Doon Valley – Ensure design is sensitive to the characteristics of the Doon Valley as a main tourist gateway into Ayrshire. Views to the north west should continue to provide small to medium scale views whilst travelling through the valley floor. Views south west to Patna Hill should be enhanced and management areas blended into the landscape with a more natural affect within the characteristics of the Doon Valley area.

LMP response to landscape issues

Within the plan's concept 'Sensitive Landscape Zone' the key landscape issues will be to review the views from A713 and Patna Village to enhance the landscape experience. Coupe shapes have been simplified and reduced in size, restock species and open space have been designed to diversify the appearance and 'feel' of the area, while LISS coupes will be implemented through Long-Term Retention and Minimum Interventions to provide a stable element to the transient nature of a sustainable forest landscape. By taking into account

good design principles the plan has been designed to reflect the simple, gently rolling landform with large scale dark green forests remaining on slopes and over lower summits bordered by woodland belts and open space to soften boundary edges while framing the village.

4.4.2 Other landscape considerations

Over the term of the previous plan, Patna Forest has suffered from numerous windblow events and this has resulted in areas being clearfelled earlier than expected. In addition to this, areas of larch that have been infected by the disease phytopthora ramorum have also had to be felled prematurely. This has had an adverse effect on the landscape behind the village and internally within the forest. Efforts to rectify this will be reviewed as part of the plan through efforts to improve the age classes within the area and therefore the future visual effect on the landscape.

A current example of the windblow challenges within the block include a coupe that has been left 'floating' in the slopes above the village. This windblown coupe will be programmed into Phase 1 of the revision and any restocking delayed as necessary to improve its perspective.

One landscape aim for this plan is to investigate ways of improving the Patna Hill coupe design to reflect its landform and landscape scale. This small to medium-scale landform creates a distinctive shape in the landscape and can be seen clearly at various points on the A713 heading north of the settlement. Opportunities have been investigated through coupe restructuring and species choice to refine its sense of place in relation to Patna Village and those that live there.

4.5 People

4.5.1 Neighbours and local community

Neighbours have taken an active interest in the development of the plan and their aspirations have been incorporated where they do not conflict with the objectives of the plan and are consistent with FLS's approach to land management.

Anti-Social Behaviour (ASB) issues were raised by the Crosshill, Straiton and Kirkmichael Community Council during the consultation for this plan revision. Unfortunately the remote or secluded nature of our forest sites, including the Patna Forest block, can also make them attractive to a small number of people for antisocial or criminal activities including fly tipping, illegal use of motorbikes, quad bikes and fire raising which are ongoing problems that FLS staff face on a regular basis.

Regrettably these type of incidences are unlikely to be stopped by physical barriers, signs, information, interpretation or even face to face advice. Arguably people carrying out these activities are not taking recreational access but such incidents are linked to access in various ways. Most anti-social activities are criminal offences and are most effectively dealt with by the police or in partnership with other bodies. Whilst it is not wholly the responsibility of FLS to educate the public on the countryside code and responsible use of the forests, we as an organisation do recognise the part we can play in supporting communities in and around our forests with this. Nationally we work in partnership with other rural organisations, including the emergency services to try and tackle rural crime and ASB.

In relation to Patna Forest itself, FLS staff continually take steps to address ASB issues in order to protect our forest users and the forest environment. Locally this includes working as part of the Ayrshire Partnership And Rural Crime (APARC) group as mentioned in section **4.1.8 Protection - Fire**. We would encourage any ASB witnessed by forest users to be reported to the relevant authorities as close to the time of observation as possible.

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 have to manage their land and water responsibly in relation to access rights and FLS will only restrict public access where it is absolutely necessary, and will keep disruption to a minimum.

There are no formal FLS facilities in the block, Patna however remains an important recreational area for local residents who use it for walking, cycling and horse riding. The East Ayrshire Recreation Plan (Nov 2021) notes the Patna Bridleway (D3) which is now known as the Carnshalloch circular designated as a Local Path in this plan. Along with this the core path Patna to Straiton (CP7) crosses through the block on grassy tracks and forest roads. Any temporary or permanent closure of any Core Path for forestry operations will result in the submission of an advance notification to the relevant local authority, of three months, required under the Land Reform Act.

The land management plan will continue to enhance the most heavily used areas (to the east around the Patna Bridleway) on the edge of the town and the historical Patna to Straiton burial route which generally follows the only core path in the block. This will be done through targeted open space and species diversity.

4.5.3 Renewables, utilities and other developments

BT overhead Telephone line runs from the private dwelling inside the LMP area along the forest road to the block entrance.

There are a few Scottish Power owned overhead powerlines of various sizes within the LMP area. The most prominent of these is the 275kV line the runs approximately 0.36km across the centre of the block. Diminishing impact of interconnector is being attempted through species diversity and crop boundaries design. There are smaller 11kV overhead lines to the south west on the block, the majority of which are within the business farm tenancy area.

2 minor underground powerlines are within the forest block on Patna Hill and at the Loch Spallender access site.

Loch Spallander reservoir lies to the southwest boundary of the block, a mains water pipeline from here runs through the block, west to east, to serve Patna. Though this is currently disused as a drinking water source the pipeline and associated assets will be given the same protection in relation to restocking plans and any nearby forestry operations. Scottish Waters Guidance on Forestry Activities Near SW Assets and List of Precautions for Drinking Water and Assets – Forestry EdB have been used to inform the plan where appropriate.

All utilities will be covered by servitude rights on the NFE and all necessary precautions will be taken to locate services on the ground at the work planning stages. This will include robust preparation, liaison with relevant stakeholders and dissemination of emergency and work planning particulars before any operations begin.

No proposed developments for renewables are currently submitted.

4.5.4 Support for the rural economy

Patna is part of the local landscape that attracts visitors to the Doon valley area, who take advantage of local businesses and services. It also provides a more intimate backdrop for those following the Castle Douglas to Ayr tourist route. Careful forest design with these factors in mind, along with responsible delivery of forestry operations will provide a positive visitor experience and encourage return visits to the area.

Between 2012 and 2015 we established 9 part-time starter farms on Scotland's National Forests and Land, giving new entrants to farming a unique opportunity to get a start. The tenants gain valuable experience in growing and managing their own businesses, before moving on to larger scale operations at the end of their tenancy. Glenside Farm within the block is one such farm on a short term tenancy grazing livestock and enabling the ongoing management of the Purple Moor Grass priority habitat.

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.

4.6 Soils

Refer to **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. Felling residue will usually be left on site to allow nutrient recycling, with consideration for the practicalities of restocking.

As directed by SEPA in their consultation comments, great care will be taken when operations are working in or near old mine areas to avoid disturbance of spoil deposits and the release of harmful trace metals to the water environment. Mine workings will be highlighted during the workplan process and mitigation measures taken where necessary. Appropriate forestry good practice will be adhered to.

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.

4.6.3 Deep peats

FLS is preparing a Peatland Restoration Strategy which will be published in April 2022. (incorporating the 'FES Lowland Raised Bog and Intermediate Bog Strategy', 2013). In the interim, we will take a precautionary approach to restocking on deep peat soils, following the principles laid out in the FCS practice guide 'Deciding future management options for afforested deep peatland', in particular where there is a 'presumption to restore'.

Sites for which there is a 'Presumption to restore' are defined as:

- Habitats designated as qualifying features in the UK Biodiversity Action Plan, or on Natura sites, Ramsar sites, Sites of Special Scientific Interest (SSSI) or National Nature Reserves (NNRs);

- Sites or parts of sites where restocking is likely to adversely affect the functional connectivity (hydrology) of an adjacent Annex 1 peatland habitat (as defined in the EU habitats Directive) or a habitat associated with one;
- Sites where deforestation would prevent the significant net release of greenhouse gases

Some peat types (8a, 8d, 9a, 10a, 10b, 14, 14h, 14w) are classed as 'Scenario A' soils: edaphically unsuited to woodland. Additionally, 10a and 10b peat types are associated with raised bog habitats. Lowland raised bog and blanket bog are UK BAP priority habitats and therefore a presumption to restore. In the LMP process, by default we will not commercially restock areas where Scenario A peat types dominate, and will include such areas for further assessment for either peatland restoration, or manage as native broadleaf or peatland edge woodland (PEW).

After areas for which there is a presumption to restore are identified, the remaining afforested peatlands will be investigated, looking for evidence to support replanting, as per the FCS Practice Guide. If evidence is found that they will clearly support good growth of Yield Class 8 or more, then they will be restocked. If no evidence is found, they will either be restored, if this is considered to be achievable, or if not, e.g. on slopes of greater than 5%, have a low density native woodland established (PEW).

'Scenario A' soils within Patna have been surveyed by the FLS peatland team and they have established one small area of interest for future peatland management. The area consists of 4.4 ha of confirmed 10b/9b soils shown on **Map 9**. Ground covered by the 10b soils are very wet and part of a wider connected flush (9b). Due to the nominal size of this area, this site will be left unplanted in future rotations with a transition to peatland edge woodland through natural regeneration.

4.7 Water

4.7.1 Drinking water

All known private drinking water supply points and pipelines are recorded as a layer in our geographic information system (GIS) (included in **Map 2**). GIS is consulted during the work planning process for all forestry operations to aid their protection. Features will be clearly marked on all contract maps, as well as on the ground, and relevant neighbours will be consulted prior to any works commencing. Prior to operational commencement, a pollution prevention plan and site management rules will be established. Roles and responsibilities will be assigned with clear instructions on protocols and contactable people in the event of an incident. All operations will comply with UKFS Forestry and Water guidelines, Forestry & Water Scotland Know the Rules booklet V2, Private Water Supplies: guidance-on-forestry-activities-near-pws-sept-2018.pdf (confor.org.uk) and, where necessary, additional pollution prevention measures will be applied. In the event of water supply disturbance by

operations, FLS will follow due procedure as per the UKFS and relevant legislation, which will involve informing the local authority's Environmental Health department and affected residents. The design of the future forest has incorporated an open space or broadleaf buffers of at least 50m around these supply points and 5m either side of pipelines to minimise future disturbance. Further description of private water sources within the LMP can be found in **Appendix 1** – Watersources.

There are no active Scottish Water drinking water catchments or water abstraction sources, which are designated as Drinking Water Protected Areas (DWPA) – Surface Water, within the LMP area as confirmed by Scottish Water. Previously Loch Spallander, directly adjacent to the LMP boundary, was as a public drinking water supply and as a result Scottish Water still view this site as a potential DWPA source for use on a resilience or emergency basis. Therefore this waterbody and its catchment will still be given the same protection as a DWPA source in relation to restocking plans and any nearby forestry operations. Good practice guidance for Public Water Supplies such as guidance-on-forestry-activities-near-sw-assets-final.pdf (confor.org.uk) and Forestry and Water: https://www.confor.org.uk/resources/forestry-water-scotland/guidance-documents/ will be followed.

Groundwater protected drinking water catchments of Ayr and Cumnock have a poor overall condition. This is due to pollution as a result of legacy mining and quarrying and unable to be improved within the limitations of this plan.

4.7.2 Watercourse condition

The current status of Patna's water environment has been informed by SEPAs river basin management plan (RBMP) that outlines the condition, protection and improvement of the water environment across Scotland. This LMP will also work towards delivering the RBMP actions through adhering to relevant legislation and 'good working' practices.

The River Doon and Girvan surface water catchments cover the plan area and are in moderate condition. Important tributaries flow from the forest block into these catchments to the west and east of the boundaries. These minor watercourses feed into these rivers and are important for biodiversity, supporting the local fish species and in-turn the local communities with their interest in recreational angling. Most notable of these species are the Brown Trout and the protected, Atlantic Salmon. These rivers are important spawning and breeding areas especially for the nationally declining population of Atlantic Salmon.

The land management plan will continue to implement riparian zones along water courses such as broadleaf trees, copses and glades. The Riverwoods Initiative principles have also been incorporated into the plan where possible to promote and provide a valuable habitat corridor for the important ecosystems in these areas.

Water condition to some of the major burns in the area are moderate due to water flow issues caused by hydroelectricity schemes not related to the National Forest Estate. However water quality condition has been affected by diffuse causes due to rural sources. As standard, and to support the improvement to water quality of the area all forestry operations will meet the requirements of the UKFS Guidelines on Forests and Water and follow the good forestry practice advocated by the Forestry & Water Scotland initiative. All necessary precautions will be taken to avoid water quality deterioration, including robust preparation and dissemination of emergency and work planning particulars before any operations begin.

4.7.3 Flooding

Table 11

Mitigations for Objective Target Areas			
OTA Name	TA Number	Flood Risk Type	Relevant actions needed to help TA objectives
Kirkmichael	TA 14	River flooding, also a small risk of surface water flooding.	Any watercourses flowing towards the Dyrock Burn area or flows towards the Water of Girvan should receive focus from riparian management as per UKFS that can adapt with future climate change pressures working with natural processes in connection with the wider flood management of the area.
Girvan	TA 78	River flooding, also risk of coastal and surface water flooding.	
Dalrymple	TA 77	River flooding.	Support natural flood management in the area. Any watercourses flowing towards the River Doon area should receive focus from riparian management as per UKFS that can adapt with future climate change pressures working with natural processes in connection with the wider flood management of the area.
Patna	TA 164	River flooding, also a risk from surface water flooding.	
Ayr Doon	TA 74	River and surface water flooding.	

There are 5 Objective Target Areas (OTA) downstream of 2 main catchments within the plan area as highlighted in SEPAs Flood Risk Management Plan (FRMP) – Ayrshire Local Plan District (see Description of Woodlands for details). OTAs include Kirkmichael and Girvan flowing westwards and Patna, Dalrymple and Ayr flowing northwards.

FLS has considered its effect on flood risk and peak flows further downstream at the 5 relevant OTAs. The minor scale of felling in the forest, along with measures to improve the diverse age structure is likely to have a beneficial impact on downstream flood risk and may contribute to flood alleviation.

Relevant actions needed to help TA objectives in the FRMP include the use of Natural Flood Management (NFM) within the relevant catchments. New planting areas in the plan will be well-thought-out and watercourses given significant riparian buffers where appropriate to support these objectives. It is anticipated that our operations within the Patna LMP will have no negative impact on the existing flooding risk within the drainage areas.

There is a risk of Surface Water flooding highlighted in the Patna Datasheet https://www2.sepa.org.uk/frmplans/documents/lpd12-ayrshire-frmp-2021.pdf and with regards to the forest immediately adjacent to the West of Patna, the LMP includes low impact management systems where appropriate to ensure that FLS activity reduces flood flows wherever possible.

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