

Appendix 4 – Tolerance Table

	Adjustment to felling coupe boundaries	Timing of restocking	Change to species	Wind throw or environmental response	Adjustment to road lines
Scottish Forestry approval not normally required: <i>(record & notify SF)</i>	Upto 10% of coupe size On A82 coupes: upto 1 ha or 10%	Upto 5 planting seasons after felling (allowing fallow periods for <i>Hylobius</i>)	Change within native species group (<i>e.g. Scots pinewood to upland birchwood</i>); Non-native conifers (<i>e.g. Sitka spruce to Douglas fir</i>) and Non-native to native species (<i>allowing for changes to facilitate Ancient Woodland policy</i>).		Departures of upto 60 m from the centre of the roadline.
Approval by exchange of letters and map	10 to 15% of coupe size On A82 coupes: 1 to 5 ha.	Over 5 years	Change of coupe objective likely to be consistent with current policy (<i>e.g. from productive woodland to open ground, open ground to native tree species</i>).	Upto 5 ha.	Departures of greater than 60 m from the centre of the planned roadline.
Approval by formal plan amendment	Greater than 15% of coupe size. On A82 coupes: over 5 ha.		Major change of objective likely to be contrary to policy (<i>e.g. native to non- native tree species, open ground to non-native species woodland</i>).	More than 5 ha.	As above, depending on sensitivity.

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 tree, rows of trees or small groups of trees that are impacting on important infrastructure (as defined below*), either because they are encroaching on or have been de-stabilised 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 covered by this approval is 75 cubic metres per Land Management Plan 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.

A maximum 5-year fallow period between felling and any prescribed restocking is adopted across the LMP area to allow a natural reduction in *Hylobius* populations. Population monitoring will be carried out prior to restocking in order to ascertain population levels as a means of reducing the use of insecticide applications during subsequent restocking and establishment phase. Given the drive to minimise the use of pesticides on FLS landholdings, delaying restocking operations might be the most appropriate option to successfully establishing the next generation of trees. Where and when this is a preferred option - outside tolerance limits agreed with Scottish Forestry – prior approval will be sought to address any adjacency issues resulting from proposed delayed restocking.

Appendix 5 – Restock prescriptions & glossary

Glossary - tree species codes used in this LMP.

Broadleaves

CAR	Common alder
POK	Pedunculate oak
SOK	Sessile oak
ASP	Aspen
PBI	Downy birch
SBI	Silver birch
BI	Downy or silver birch
WCH	Gean or Bird cherry
HOL	Holly
ROW	Rowan
SYC	Sycamore
WLW	Goat or grey or eared willows
HAZ	Hazel
NMB	Native Mixed Broadleaves
MB	Mixed broadleaves <i>(some or all non-native)</i>

Conifers

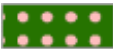

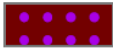






SP	Scots pine
JUN	Juniper
LP	Lodgepole pine
DF	Douglas fir
GF	Grand fir
NF	Noble fir
SF	Silver fir
SS	Sitka spruce
NS	Norway spruce
OMS	Serbian spruce
WRC	Western red cedar
EL	European larch
HL	Hybrid larch
JL	Japanese larch
WH	Western hemlock
MC	Mixed Conifers
XC	Other conifers <i>(pure stands or alternative single species in SP, BI, MB mixture)</i>













Restocking/Regeneration species composition prescriptions and management objectives


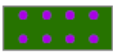


LMP **Maps 6a** and **6b** illustrate areas scheduled for restocking/regeneration in the next 10 years and into Phase 3 (for coupes felled in the late stages of the Plan).

Maps 7a and **7b** show prescribed woodland types planned for LMP areas for restocking and – for PAWS areas in particular – restructuring. These prescriptions also apply in defined regeneration coupes where the current seed tree resource dictates follow-on recruitment. Regeneration may be enriched (supplementary planting) with missing component species to achieve the prescribed woodland type when monitoring and stocking density assessments dictate. The symbology used for the prescribed woodland types on the maps is used in the table below. The table also gives each woodland type a Mixture Number which is then used in Table 6 in the LMP main document (**section 2.5**).

The following table details restocking prescriptions applied (or anticipated - in the case of regenerating coupes) in re-establishment for all woodland types in the LMP: native/non-native woodland and for productive and conservation objectives (or both).

Mixture Number	Map Symbol	Main Species Components	Stocking Density & Management Objectives	
Mix 1		SP/SBI*	Minimum 1,600 stems per hectare.	Objective: native woodland for biodiversity to achieve sympathetic, naturalised upland character.
Mix 2		NMB	Variable density & intimate species mixtures to match topography, localised soils, waterbody proximity.	Managed with minimum intervention upon establishment (non-native removal of seedbed non-native regeneration).
Mix 3		NMB/SOK	Densities possibly as low as 500 stems/ha upon prior application and approval to Scottish Forestry (i.e. wet, infertile peat-edge NVC W4 woodland).	Relevant upland NVC woodland types envisaged are: W18 – SP with SBI/PBI & JUN on heath. Some/few localised ROW, ASP, WLW, SOK. <i>This is the archetypal Caledonian pine woodland.*</i>
Mix 4		BI/NMB		W17, 16 & 11 – SOK and PBI/SBI. Some localised ROW, HOL, WCH, HAZ, CAR, WLW & ASP <i>Dependent on dominant species W11 & W17 can be either upland oak- or birchwood.</i>
Mix 5		PBI/NMB		W4 – Grey/eared WLW with PBI. Possible CAR, ROW, SOK if fertility/drainage allows. <i>A shrub willow dominant scrub woodland on impoverished/marginal sites or downy birch-dominant wood on exposed, gleyed and peaty soils and treelines.</i>
Mix 6		NMB/SP		
Mix 7		CAR/SOK/BI		* Due to FLS' current DNB risk reduction strategy (see section 4.4.3 & App 11), restocking within CPI areas will not include nursery-raised (i.e. imported) SP transplants so only the other W18 component species will be restocked. Subsequent enrichment planting of SP (if naturally regenerating SP is not evident or sufficient) will be undertaken when this strategy has been revised or certified DNB-free transplant stock can be supplied of local CPI provenance.
Mix 8		SOK/NMB		
Mix 9		XB	n/a	Objective: Research – established trial species plots & nursery stands (Auchterawe).

Mixture Number	Map Symbol	Main Species Components	Stocking Density & Management Objectives	
Mix 10		SP/XC	Minimum 2,500 stems per hectare. Uniform density.	Objective: High quality timber production (high sawlog component but early short roundwood or birch fuelwood thinnings). Species mixtures give tree health and growth performance insurance as well as (where SP and SBI present) increased ecological fit. Stocking density will ensure potential for timber quality. Subsequent operations such as singling and respacing might take place to further improve the crops. Some NMB component for non-productive areas or margins (rides/riparian). Intended for continuous cover uniform shelterwood management. Note: XC/OG includes Lon Mor (1920's afforestation trial plots) for long term retention and p2015 WRC, SF, OMS, NF performance trial plots.
Mix 11		SP/NS	Typical compositions: NS/SP/NMB/OG: 40/40/10/10	
Mix 12		NS/SP	SP/XC/SBI: 35/35/20/10	
Mix 13		NS/DF	SP/NS/NMB/OG: 40/40/10/10	
Mix 14		XC	NS/DF/SBI/OG: 35/35/35/10 XC/OG: 80/20	
Mix 15		SS/SP	Minimum 2500 stems per hectare. Uniform density.	Objective: Mainly short roundwood and biomass but with as large a percentage of sawlog as possible. In SS/SP: pure SS matrix with pure SP stands in driest zones. In SS/LP: LP as nurse species: Triplet (3 x 3) intimate 'nutritional mix' to ensure no fertiliser requirement for growth and to overcome heather where prevalent in localised areas. No subsequent thinning envisaged.
Mix 16		SS/LP	Typical compositions: SS/SP/BI/OG: 50/20/10/20 SS/LP/OG: 50/50/<10	
Mix 17		SP/BI	Minimum 2,500 stems per hectare. Uniform densities.	Objective: Softwood timber (sawlog and short roundwood or fuelwood thinnings). Broadleaves provide early biodiversity and resilience in case of conifer resilience issues. Stocking density will ensure potential for timber quality. Subsequent operations such as singling and respacing might take place to further improve the crops. Thinning regime imposed that favours most valuable, best performing species in matrix.
Mix 18		SP/NMB	Typical compositions: SP/BI or NMB/OG: 60/30/10	
Mix 19		MC/NMB	MC/NMB/OG: 80/10/10	
Mix 20		LP/PBI	LP/PBI/OG: 45/45/10	
Mix 21		BI/XC	BI/MC/OG: 45/45/10	

Mixture Number	Map Symbol	Main Species Components	Stocking Density & Management Objectives	
Mix 22		BI/SP	<p>Minimum 1,800 stems per hectare. Randomised density.</p> <p>Typical composition: SBI/SP/NMB/OG: 60/10/10/20 to 40/20/10/30</p>	<p>Objective: Conservation & visual aesthetic (Loch Ness-side upper tree-line woodland) with potential future fuelwood potential and SP future seed source/ecological benefit.</p> <p>No thinning envisaged. Cleaning (non-native seedbed) required upto thicket stage.</p> <p>Possible felling if economically viable at the time of felling of down-slope mature productive conifer woodland - else long term retention for biodiversity/aesthetics.</p>
Mix 23		SP/SOK	<p>Minimum 2200 stems per hectare Uniform density primary species matrix. SOK clusters at final spacing.</p> <p>Typical composition: SP/SOK/NMB/OG: 60/20/10/10</p> <p>SBI/SOK/NMB/OG: 60/20/10/10</p>	<p>Objective: Quality soft- and hardwood timber (some biomass from early thinnings) and a long term high quality oak timber crop.</p> <p>Stocking density will ensure potential for timber quality. Subsequent operations such as singling and respacing might take place to further improve the crops.</p> <p>Primary species managed under uniform shelterwood continuous cover with increasing quality of thinned product from successive interventions. Thinning also to tend and promote SOK – singled for best quality stems over time.</p>
Mix 24		SBI/SOK		
Mix 25		SOK/SBI	<p>Minimum 3,000+ stems/hectare. Uniform density.</p> <p>Typical composition: SOK/SBI/NMB/OG: 40/40/10/10</p>	<p>Objective: High quality hardwood timber objective.</p> <p>High maintenance (cleaning) requirement upto thicket stage.</p> <p>Stocking density will ensure potential for timber quality. Subsequent operations such as singling and respacing might take place to further improve the crops.</p>

Appendix 6 – Peatland Restoration Analysis

One area is proposed for peatland restoration within the bounds of the Fort Augustus LMP in the first five years of the new Plan period (LMP 2024-2034). The restoration area is within management coupe 05011 (see **Maps 4a and 6a**) and is also illustrated on the GIS map extracts below.

The rationale behind the proposal is outlined here following the decision making process in *FCS Practice Guide 104 – Deciding future management for afforested deep peatland (2015)*.

The proposal is also considered in **Appendix 3 EIA Screening Opinion Request** as the majority of pertinent ground is currently afforested (first rotation non-native conifers) and peatland restoration would constitute deforestation. Accordingly the forestry regulator is required to determine whether formal Environmental Impact Assessment is required to inform approval.

Decision-making process and rationale

Initial GIS-based analysis of surveyed soils identified the distribution/proportion of current and typical bog ‘soil’ classifications e.g. areas containing abundant *Calluna*, *Sphagnum*, *Eriophorum*, *Juncus* and *Phragmites* bogs. These areas were then cross-checked against forest inventory data of tree yields/growth performance across the plateau, which together provided an initial theoretical indication of the potential gross extent of restoration. Site visits were subsequently made to undertake peat depth survey and examine local terrain - to ground truth extent and condition of remnant bog plant communities, and to consider slope and artificial drainage pattern for restoration potential and methodology.

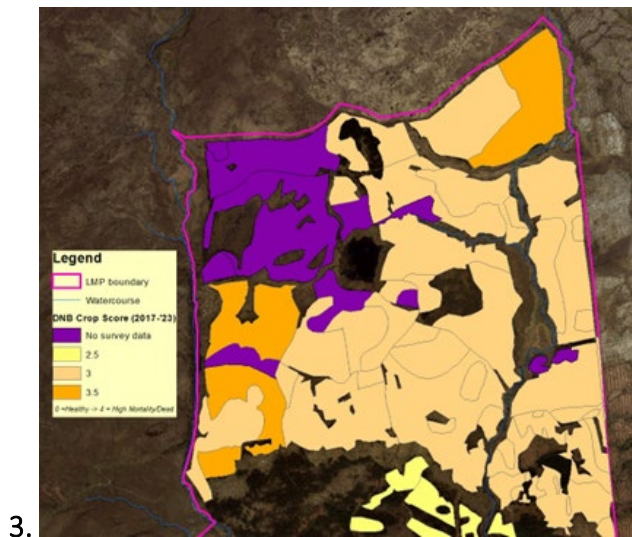
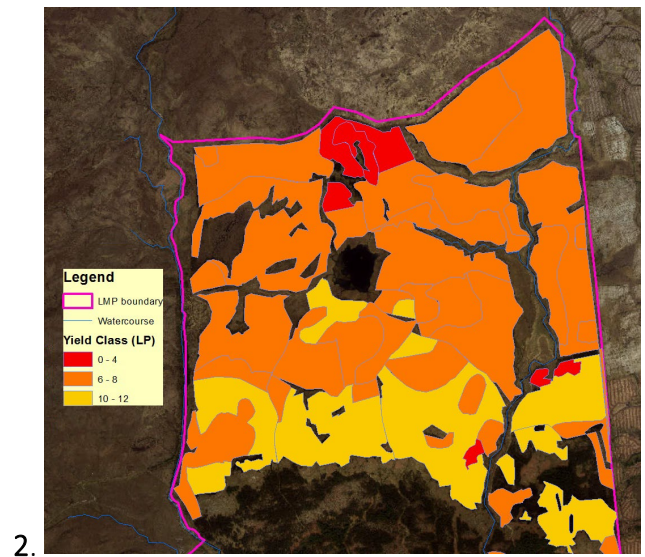
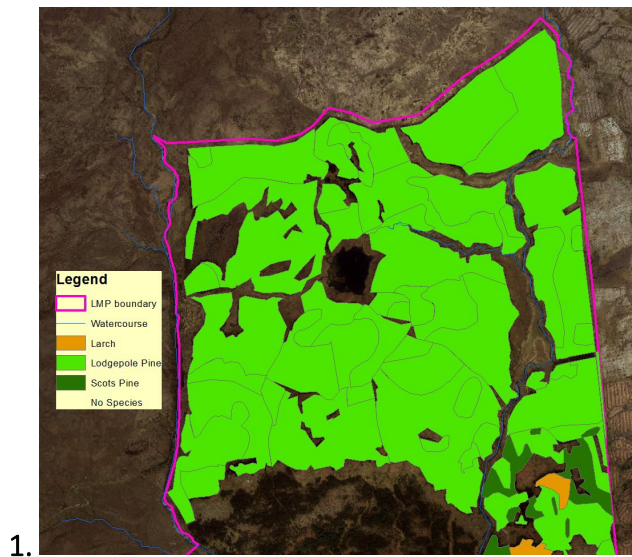
The combined data and site assessment were used to finally define a proposed restoration area and identify constituent areas expected – and now prescribed - to support restocked native woodland: Peatland Edge Woodland (PEW) – NVC W4: shrub willow and downy birch-dominant. The PEW will eventually account for approximately 30% of the gross coupe area as the plateau topography contains terrain undulations (some localised ridges and hillocks) where overlying peat is less than 50 cm deep and gleyed or podzolic soils persist on account of gradients/drainage. Trees/shrubs here can exploit local, marginally favourable, mineralised soils that will also be unaffected by the restoration/re-wetting operations undertaken on surrounding land.

Based on FCS Practice Guide 104, the site is categorised as “assessed peatland” i.e. its restoration potential has been arrived at by assessment of inherent features and hydrology, as opposed to a “presumption to restore” sites where component peat/habitat types – or proximity to designated peatland – automatically merits restoration. The table below summarises the extent and proportion of Category A, B and C peatland/bog types and soils within the coupe. The proposed restoration site is also bounded on its eastern side by an area of over 100 hectares where non-native coniferous woodland has been cleared and peatland restoration work undertaken in the last decade and that will be complemented (expanded) by this new restoration proposal.

	Gross Area (ha)	Afforested Area (ha)	Scenario A, B & C peats (% of gross area)	> 50 cm Peat (% of total)	Deforestation / Restocking Proposals
Balnacarn Plateau	249.3	214.9	A: 16.4 ha (7%) B: 0 ha (0%) C: 92.1 ha (37%) Soils: 81.3 ha (33%) Open/Loch/Failed LP: 57.3 ha (14%)	55% of gross area; or 80% of proposed restoration area	Deforestation: 139.5 ha Restocking: 75.4 ha (30%)

The following GIS map extracts illustrate:

1. the extent of **current afforestation** (100% Lodgepole pine, planted 1981-'84);
2. the **yield classes** for this pine (ranging between 2 and 8);
3. the **extent of Dothistroma needle blight infection**; and finally
4. **surveyed peat depths** and the peat-edge woodland restocking proposed during restoration.



DNB Scoring categories

- 1 = Healthy crop.
- 2 = Evidence of early stage infection.
- 3 = Significant needle loss & mortality evident
- 3.5 = Extensive needle loss, mortality wider spread
- 4 = Dead or will die within months.

