

5.0 Forest Design Plan Proposals

5.1 Forest stand management

The Lael Forest Design Plan has been produced in accordance with the UK Woodland Assurance Scheme (UKWAS) guidelines and the UK Forestry Standard.

Appendix 5 - Coupe Summary details the likely timber volumes and areas to be clear felled and thinned in the first 2 plan phases, this information can be viewed spatially on **Map 4 - Management Proposals** and **Map 6 – Proposed Roads and Future Coupes**.

5.1.1 Clear felling

The Lael FDP area has been the site of some significant clearfelling to date in line with the restructuring objectives in previous plans. The forests within the FDP area are capable of producing good quality softwood timber – in particular SP on the drier soils and fir on the limited areas of brown earths - and has areas where some good quality hardwood can be produced. The majority of clearfell over the next ten years will be driven by landscape issues in an attempt to maximise the effect of restructuring, however the rate of felling will reduce significantly as LISS is adopted and restocking and thinning predominate.

Felling will also aim to fulfil several other objectives, including windblow clearance and habitat restoration (primarily restoration of the PAWS around Braemore and the forest garden). Timber production from the plan area will consist of a wide variety of timber grades from Lodgepole pine crops, suitable for wood fuel and specific export markets to green sawlogs from SS/DF crops where edges are being rationalised to prevent further windblow. Maximising production will be balanced with the need to protect the soils and hydrology on sensitive sites.

Clearfell will be undertaken using harvester – forwarder systems on a standing sales basis. Where slope and soil stability are an issue skyline – harvester systems will be used.

5.1.2 Thinning

North Highland FD is currently designing the thinning programme for the full district following on from programme changes brought about by the FD boundary review. Absorbing significant extra volume following a windblow event in 2006 also had an impact on the thinning programme across the FD.

Opportunities to thin crops across the forest are limited only by slope and soil stability and it is a key objective of the plan that operations identify the

resources available to maximise the silvicultural potential of the site. Significant work is being undertaken by the Steep Ground Project nationally to identify suitable skyline resource and it is anticipated that thinning will be achieved where proposed.

Intermediate (selective) thinning will be undertaken throughout the FDP area at a rate not exceeding marginal thinning intensity. In areas where LISS is being proposed (see **Map 5 – Future Habitats**) these thinning operations will represent the preliminary steps to full conversion and regeneration of an understorey will be monitored. In the LISS thinnings small clearings up to 0.25 Ha may be undertaken where localised windblow occurs or growth has been very poor, to allow regeneration of an improved crop.

5.1.3 LISS

There is good potential for adopting low impact silvicultural systems (LISS) across the FDP area. The Lael Forest Garden is currently designated as LISS and it is proposed to extend this area. The primary management objectives that suggest LISS is appropriate are:

- Landscape enhancement – the potential negative impact of clearfell at Lael is high, where views from the main tourist routes are more open. Tourists are often seen using the laybys here as viewpoints for photography.
- Water and soils protection – adopting LISS will provide good soil stability and will help to ensure that water quality is protected. This will help to protect adjacent and downstream designated sites and fisheries.
- Enhancement of species habitat, allowing ‘natural’ understorey and field layers to develop of a type associated with pinewoods and upland birchwoods – of particular relevance on PAWS.

The crops that are currently growing on these sites are predominantly conifer. Wetter soils, where LISS would be inappropriate are stocked with SS and LP. The forest is at a very early stage in it’s conversion – a process that may take in excess of 120 years to complete and on this basis it is not appropriate to make commitments to a particular silvicultural system at the expense of others. However, during the coming plan period the following actions will be undertaken to continue conversion:

- Any felling will not exceed 2 Ha in size – shelterwood systems to be favoured.
- The preferred method of harvesting will be selective thinning.
- Regeneration will be monitored in these stands.

- Restock planting will be undertaken where regeneration is insufficient in any clearing.
- Deer management will continue following best practice, to reduce populations to levels where habitat quality is not compromised.

5.2 Future habitats and species

With the exception of the poorest, wettest soils, the forests across the plan area are capable of growing good quality millwood and where it is possible without compromising delivery of other obligatory priorities productive conifer will form the main component of the forest. SS, EL, DF and SP will be the major component of this zone.

During the plan period there will be a concerted effort to enhance and expand the native woodland component of the forest, with particular focus on protective riparian woodland, restoration of PAWS and the establishment of natural reserve (currently underrepresented given the biodiversity designations in the area). In general, broadleaf woodland will be concentrated in both current and newly created riparian zones and PAWS areas. Productive conifer coupes will comprise a minimum of 10% broadleaf woodland by area. Productive broadleaf will be concentrated in Braemore Forest.

All native woodland establishment, whether on felled sites or land currently open will be designed and delivered within the current FCS guidelines (Rodwell & Paterson, 1994). Planting operations will be aimed at encouraging a suitable National Vegetation Classification (NVC) woodland type appropriate to the soils and indicator vegetation encountered on site. This will be identified subsequent to harvesting operations and will generally adhere to FD fallow policy. Where Planted Ancient Woodland Sites (PAWS) have been identified within the plan area any restoration proposed will follow the current FCS guidelines (Thompson, 2009) as previously described in this plan.

Native woodland will be planted with the aim of creating a woodland stand structure that contains a range of different age classes, a proportion of mature and veteran trees with deadwood and some permanent open areas at the margins and internally. A light level of grazing by herbivores sufficient to allow regeneration of a characteristic range of trees and shrubs and a well developed field layer will be tolerated although deer control will be sufficient to allow establishment of transplants and eventually progression to regeneration. The presence – in appropriate proportions – of native tree and shrub species characteristic of the site and locality (NVC appropriate) will be sought.

Although non native trees will generally be absent, where they are considered particularly beneficial to priority species (EG *Larix spp* for woodland grouse) they will be tolerated at low levels.

Deadwood is acknowledged as a very important element of the forest ecosystem, positively effecting biodiversity, carbon storage, soil nutrient cycling, energy flows, hydrological processes and natural regeneration. Guidelines (FC E&C, 2002) on proportions and types of deadwood will be adhered to and the position and type of deadwood required will be agreed pre-commencement on harvesting operations.

The future management of open habitat types is mentioned in greater detail in section 5.7 Management of open land.

5.3 Restructuring

Forest restructuring will now be led by the restoration of PAWS and the conversion to LISS. This will continue to achieve structural diversity in the current rotation, creating appropriately scaled coupes and a coupe structure will be put in place that will allow structural diversity to be consolidated in subsequent rotations.

Forest restructuring in non-LISS areas will be subject to a 5 year fallow period between felling and restocking, 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 to reducing the use of insecticide applications during the establishment phase.

Productive Woodland

The overall area of productive conifers will be reduced during the life of the plan through the removal of plantation from riparian and PAWS sites. Restocking in productive areas will aim to maximise the productive capacity of the forest, the brief guidelines below will be followed to ensure adequate restocking:

- Productive restock sites will achieve no less than 20% open ground used to enhance visual diversity and protect watercourses and archaeology.
- To obtain maximum benefits of restructuring, restocking areas should not be less than 3ha per individual shape or exceed 50ha outwith LISS areas unless forest health issues dictate otherwise.
- Within LISS areas coupes will not exceed 2 Ha.
- Restock coupes adjacent to the forest road network should be restocked to within a short distance of the forest road for at least 30% of the coupe frontage for future access.

- Non - productive broadleaf elements within productive restock coupes should be located where they will be of greatest benefit; in riparian zones, adjacent to open ground, other broadleaf woodland or around archaeological features to enhance the setting – no less than 10% of area.
- Where SP is not appropriate to site type within PAWS coupes, commercial density broadleaves will be planted.
- Restocking will not be undertaken on soil types 9e, 10b, 11b, 11c, 11d, 14, 14h and 14w due to the intensive drainage regimes and high fertiliser requirements that would be needed for successful establishment.
- Restocked coupes will be monitored using the FCS OGB4 Stocking Density Assessment protocol to confirm success against quantitative targets (stems per Ha and minimum spacing between planted positions). Qualitative assessment will also be undertaken during these surveys and any management action required communicated to the member of staff responsible in the FD – eg FM Forester or Deer Manager.

5.4 Future Management

The overall aim of the plan is to maintain a productive capacity, with species matched to appropriate sites, whilst protecting designated sites and restoring native woodland and riparian habitat within the forest. Water quality management is acknowledged as a fundamental issue.

Development in best practice will be communicated to staff through the Operational Guidance Book system and training delivered by FCS Learning & Development and will be adopted to continually improve the management of the forest.

5.5 Future Habitat Prescriptions

The site capability of the Forests across the Lael FDP area indicates a moderate number of productive conifer species are suitable for the site conditions. Locally DF can be grown on richer soils, SS will generally grow when paired with LP or JL as a nursing mixture and SP is suitable across much of the forest. Productive broadleaves are likely to be restricted to birch species (*Betula*), Beech (*Fagus sylvatica*), Oak species (*Quercus*), Ash (*Fraxinus excelsior*) and Sycamore (*Acer pseudoplatanus*).

In 2010 a moratorium on planting LP was put in place to reduce the risks posed by RBNB. If the moratorium on all LP continues some consideration will be given to the commercial productivity of alternative species, for example Macedonian pine (*Pinus peuce*) nursery stock and this used where possible, either in mixture or as a pure crop.

At the time of writing this plan the FCS position on restocking with pine is as follows:

1. The moratorium on planting corsican pine (*Pinus nigra var maritime*) remains in force.
2. The moratorium on planting LP has been relaxed and now allows the planting of Alaskan LP (ALP) in mixture with SS on appropriate site/soil types (but must not be established within a 1 km radius of Caledonian pinewood inventory sites irrespective of ownership).
3. There is now a moratorium on planting asymptomatic SP (from infected nurseries) within 550m of known uninfected pine or within 550 m of Caledonian pinewood inventory sites.

It is anticipated that initial applications of potassium, phosphate and nitrogen may be required to establish productive conifer crops. Any requirement for detailed remedial fertiliser programmes will be decided following foliar analysis. Heather control and silvicultural mixtures will be used as a first alternative to fertiliser application.

Any initial or remedial fertiliser programmes will adhere to current industry best practice and follow FC Guidelines on water catchment protection. Restocking will be carried out with the principles of pesticide and fertiliser reduction foremost.

All operations will adhere to the Controlled Activities Regulations 2005 General Binding Rules with respect to appropriate buffer strips between restock areas and water bodies.

The forest district currently runs a system of pre-completion (harvesting site '75% visits') meetings between planning and operations and these will be used to agree priorities on a coupe by coupe basis. All procurement of planting material will adhere to the current guidance (FCS, 2007) on the sourcing of forest reproductive materials.

5.6 Age structure

Diversification of age structure will be fully realised in the current rotation, which can be mainly attributed to the conversion to LISS and the effect of previous restructuring work. Wind firm boundaries across non-LISS coupes will be designed for age class diversification in the next rotation, allowing more widespread restructuring to continue. The location of this framework will be dictated by soils and land form revealed after felling.

5.7 Management of Open Land

Open land accounts for just less than 45% of the plan area and it is anticipated that this will fall slightly as new native woodland is established.

Currently the open land is spread throughout the FDP area and includes felled coupes awaiting restock, internal open space, agricultural ground, areas of archaeology and hill tops.

The restoration of riparian woodland will increase internal open space, fragmenting productive blocks, increasing forest edge habitat and allowing a windfirm network of permanent habitat corridors to develop. This in turn will allow greater age class diversity in future rotations by providing a 'framework' within which reduced coupe sizes can be managed. As LISS conversion moves forward a degree of internal open space will be created where felling occurs.

Open space will form a key element of native and riparian woodland expansion.

Riparian areas and acid grassland

Where riparian habitat is not suitable for Northern water voles (*Arvicola amphibious*) native woodland can be encouraged through localised mixed density planting of broadleaf species as adjacent coupes are restocked. Where no restock coupes are adjacent, limited new planting of mixed density native woodland will be carried out. The development of riparian woodland will enhance water quality, contribute to habitat diversity and habitat networks and improve the visual amenity of the forest. In general, riparian woodland will be designated as natural reserve to ensure that over time natural processes improve the quality of the habitat and disturbance from management interventions are minimised.

Current climate change predictions under all climate change scenarios indicate that freshwater biota may become threatened by increases in summer temperatures and altered river flows resulting from increased precipitation. Salmonids in particular are susceptible to temperature changes (Broadmeadow, 2002).

In addition soil erosion may be exacerbated by increased flood and drought cycles. The increase in dappled shade and soil stability provided by broadleaf riparian woodland will help to protect river ecosystems from the predicted temperature fluctuations predicted to result from climate change.

Deadwood plays a vital role in the functioning of river ecosystems (FC E&C, 2002). Dedicating riparian woodland as natural reserve will encourage a high proportion of deadwood over time, performing the following functions:

- Helping to retain water and sediments.
- Trapping and facilitating the breakdown of organic matter into food for aquatic invertebrates.
- Diversifying channels by creating pools, falls and riffles.
- Improving physical habitat structure for fish and invertebrates.

The species that are planted in riparian zones will be selected to match the NVC community for the appropriate soils type and detail of the proposed habitat prescriptions is contained in Appendix 6.

New riparian woodland will contain a significant element of aspen (*Populus tremula*) of local provenance.



Natural Reserve Woodland in Lael Main Glen

Courtesy Neil McInnes

5.8 PAWS restoration

Ancient woodland currently recorded across the FDP area is noted in Background Information Section 3.2 (Biodiversity and Heritage Features). Many of these areas are graded as LEPO (2b), with full PAWS requiring restoration also being present.

This restoration will be geared toward a combination of productive forest using native species and natural reserve. It is anticipated that adopting LISS and long rotation clearfell systems across much of the area designated as LEPO will help

to encourage a native flora field layer, providing biodiversity gain while maintaining the productivity of the forest.

5.9 Deer Management

Wild deer on the National Forest Estate (NFE) are managed in accordance with the Scottish Government's strategy "Scotland's Wild Deer a National Approach" and under the auspices of the Code of Practice on Deer Management.

The strategy and Code of Practice takes recognition of the fact that Wild deer are an asset, an integral part of Scotland's biodiversity and provide healthy food and recreational opportunities. The challenge of managing wild deer originates in a need to balance the environmental, economic and deer welfare objectives of the Scottish nation with the objectives of private landowners for forestry, agriculture, sporting and other forms of land use.

The principal legislation governing the management of deer in Scotland and hence on the NFE is the Deer (Scotland) Act 1996.

Forestry Commission Scotland's (FCS's) policy recognises that deer are capable of causing significant damage to forests and woodlands, mainly through browsing and bark stripping and can also adversely affect biodiversity through over-grazing of ground flora and the suppression of natural woodland regeneration. They are, however a natural component of woodland ecosystems, they can provide recreational sporting opportunities; venison as a high quality food. The presence of deer can enhance the experience of visitors to the forest.

It is therefore FCS deer policy to

- Prevent adverse deer impacts on commercial tree crops and the wider habitat. In doing so carry out deer culling in an exemplary and humane way.
- Work closely with relevant organisations and neighbours to make sure that there are integrated deer management plans which seek to recognise the interests of all parties.
- Take opportunities to optimise income from venison from sporting where this does not conflict with our primary objective of maintaining deer impacts at an acceptable level, in line with Quality Meat Scotland accreditation in the form of The Scottish Quality Wild Venison (SQWV) Assurance Scheme
- Take all practicable steps to slow down the expansion of deer species into areas where they are not currently present.

The Lael FDP area is covered by one Deer Management Unit covered by an individual Deer Management Plan divided into the following areas:

- 51629 – Lael Block DMU

The deer population across the Lael FDP area comprises red (*Cervus elaphus*), sika (*Cervus Nippon*) and roe (*Capreolus capreolus*), Red being the predominant species. Deer numbers are being managed to ensure that restocked coupes are successfully established and the wider forest habitats protected.

Existing deer fences will be maintained, but no new fencing is proposed. As indicated previously, low grazing pressure will be tolerated, in particular around areas considered to 'buffer' the wider forest. These buffer areas may consist of either managed open space (deer 'lawn' areas) or planted woodland near existing forest edge where browsing damage will be accepted.

Development of a proportionate zone of browsed vegetation in these areas – either commercial density conifers or broadleaved species capable of coppice growth - also carries wider biodiversity benefits and is accepted as a consequence of efforts to manage deer populations without resorting to extensive fencing.

As the forest plan progresses the focus on deer management will change to ensure favourable conditions are present for the establishment of native broadleaves. It is believed that a density of 5 deer per 100ha or lower will be required for broadleaf establishment. Operational policies and procedures are held at the Forest District Office.

5.10 Critical success factors

In order to evaluate the relative success of the proposals stated in this plan a number of factors have been identified as key for it's implementation. These 'critical success factors' are detailed in **Appendix 4 – FDP Brief**, along with details of how NHFD will monitor delivery and who amongst FD staff will be responsible for that monitoring.

This plan will be reviewed (mid – term review) after 5 years (2017) and a full revision will be undertaken after nine years (2021) to allow a new plan to be submitted by the expiry date of 2022.