5.0 Land Management Plan Proposals

5.1 Forest stand management

The Easter Ross Land Management Plan has been produced in accordance with the UK Woodland Assurance Scheme (UKWAS) guidelines and the UK Forestry Standard.

Appendix 8 - Coupe Summary details the forecast of timber volumes and areas to be clear felled and thinned in the first 2 plan phases, this information can be viewed spatially on **Map 5 - Management Proposals and Map 7 – CSM6 Planned Operations (Proposed Roads and Future Coupes).**

5.1.1 Clear felling

The Easter Ross LMP area has been the site of some significant clearfelling to date beyond the restructuring objectives in previous plans, primarily due to windblow and forest health issues. The forests within the LMP area are capable of producing high quality softwood timber due to slow growth rates and reasonable harvesting conditions for thinning. There are also some small areas where some good quality hardwood can be produced. The majority of clearfell over the next ten years will be driven by forest health issues and an attempt to maximise the effect of restructuring, however the rate of felling will reduce significantly beyond year five as restocking, thinning and LISS fellings predominate.

Felling will also aim to fulfil several other objectives, including windblow clearance and habitat restoration (primarily restoration of the PAWS but also to achieve a general move toward site native species for conservation reasons). 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. 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 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 and more recently forest health fellings have increased the programme.

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 every productive coupe.

Intermediate (selective) thinning will be undertaken throughout the FDP area at a rate that generally does not exceed marginal thinning intensity. Heavier thinnings will be taken where species dictates (e.g. larch crops) or where conservation objectives dictate (e.g. riparian zones and areas where increased field vegetation layers are important).

5.1.3 LISS

Low impact silvicultural systems (LISS) – also refered to as continuous cover forestry (CCF) – will play a major role in the future management of the forests within this plan area, for reasons detailed in the background information section.

We propose to continue managing Morangie as a CCF trial site and extend the LISS management into other areas of the forest.

The primary species will be Scots pine, European larch, birch spp, Norway spruce and ash oak mixtures. Many of the current crops are young in terms of seeding potential and so management for the period of this plan will largely focus on sustaining a thinning programme of appropriate yield and intensity. This should provide the conditions suitable for ground flora to develop without compromising the future ground conditions suitable for seeding.

In the Lamington CCF trial we will double the size of current group fellings in the regular matrix from 0.25 Ha to 0.5 Ha moving in a southerly direction. This should encourage further regeneration within the felled areas, but this will be monitored and some supplementary planting will be undertaken where it's appropriate.

Where LISS is proposed adjacent to watercourses that will be managed towards a system of riparian buffers, we will thin at up to 140% of marginal thinning intensity, removing more crop to allow light and rain to assist growth of a high quality field layer. We will use supplementary planting in these areas to increase species diversity, including using aspen and birch species.

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. The combination of low yield classes and sheltered sites means that slow grown softwood, thinned correctly and grown to a reasonable size is a very realistic possibility in these forests and the focus on native tree species will allow us to do this whilst maintaining our conservation goals.

Where it is possible, without compromising delivery of higher priorities, productive conifer will form the main component of the forest. **Appendix 10 – Productive Forestry Prescriptions** details the species that are suitable for each site type identified across the plan area and this will form the basis for discussion at each coupe 75% meeting. The need to use site native tree species will be a major focus.

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. In general, broadleaf woodland will be concentrated in both current and newly created riparian zones and PAWS areas however broadleaved species will be encouraged throughout the entire forest by retaining regeneration and establishing new seed sources by planting.

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. **Appendix 11 – Native Habitat Presriptions** details the appropriate woodland types for each site type encountered across the LMP area.

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. 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 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 and reviewed at each coupe 75% meeting. 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.

Restoring site-native woodland along the banks of the Strathrory River is noted as a particularly high conservation objective and we propose to work with stakeholders including SNH and the local Fishery Board to achieve this.

The Strathrory River Photo N McInnes, NHFD

5.3 Restructuring

Forest restructuring will now be led by the restoration of PAWS, the conversion of single age crops to LISS and forest health issues. This will continue to achieve structural diversity in the current rotation. Outwith LISS areas we will create 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.

The preferred means of dealing with any adjacency issues will be through delayed felling, i.e. a coupe will not be felled until all surrounding crops are at least 2m tall. Where this is not possible any adjacency issues will be dealt with through delayed restocking, i.e. a coupe will not be restocked until all surrounding crops are at least 2m tall.

The overall area of productive woodland 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:

- To obtain maximum benefits from restructuring, restocking areas will not be less than 3ha per individual shape or exceed 50ha outwith LISS areas unless forest health issues or windblow 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 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.
- 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, 11c, 11d, 14, 14h and 14w due to the intensive drainage regimes and high fertiliser inputs required.

5.4 Future Management

The overall aim of the plan is to maintain productive capacity, with species matched to appropriate sites, whilst protecting designated species and sites and restoring native woodland and riparian habitat within the forest. Water quality management is acknowledged as a fundamental issue. Woodland grouse and red squirrel are acknowledged as primary drivers for all management decisions.

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 Age structure

Diversification of age structure will not be fully realised in the current rotation, which can be mainly attributed to the effect of previous windblow clearance and forest health felling. 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.

Within LISS structural diversity will be achieved by thinning and monitoring the crop for an appropriate final felling age.

5.6 Management of Open Land

The management of open land is detailed in **Appendix 5 – Management Prescription Types** and is visualised in **Map 6 – Future Habitats.**

We recognise the valuable ecosystem services that are provided by open land and in particular active ombrotrophic mire systems such as ‘blanket bog’. The benefits include carbon and methane storage, water quality improvement, reduced flooding risks and increased biodiversity.

Blanket bog restoration or enhancement will be undertaken in areas where hydrological connectivity can be assessed as having an effect on intact active blanket bog, on designated sites where blanket bog or it’s associated species are the notified features or where we believe that topography will allow full restoration to active bog at a scale that will achieve the benefits noted above.We will restore all areas of active raised bog where they are encountered across the LMP area.

Where suitable open habitat frames watercourses we will plant native broadleaves adjacent to watercourses to improve aquatic habitat quality, as per our management prescriptions in appendix 5, avoiding sensitive species and habitats.

5.7 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.

5.8 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. All proposals and operations are tested against the criteria contained in the Joint Agency Statement on Deer 2004.

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 and 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 and maintain an effective network of external deer fences where they are required.

- 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 and identify opportunities to reduce overall fencing by contributing towards 'strategic landscape scale fencing'.

- 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.

- Produce venison 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 non-native deer species into areas where they are not currently present.

The Easter Ross LMP area falls outwith an area covered by the Association of Deer Management Groups but is affected by four FCS Deer Management Units covered by individual Deer Management Plans divided into the following areas:

- 51624 – Mid Fearn DMU
- 51625 – Dounie DMU
- 51626 – Morrich Mor DMU
- 51627 – Morangie DMU

The deer population across the 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 external deer fences will be maintained and marked against bird strike. 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.

5.9 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 6 – LMP 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 (2019) and a full revision will be undertaken after nine years (2023) to allow a new plan to be submitted by the expiry date of 2024.

5.10 New Planting Proposals

We propose to establish two new areas of native woodland; one at Strathrory adjacent to the Strathrory River around NH 670 773 and another at Cnoc an t-Sabhail on the highest area of Morangie Forest, around NH 731 819. The FCS Open Habitat Ecologist, Jeff Waddell, has visited both sites (Strathrory on 16th August 2010 and Cnoc an t-Sabhail on 1st July 2013) and his summary comments on planting potential are as follows:

Strathrory:
"There are significant areas of non priority habitat (i.e. acid grassland) in the floodplain area (including parts of the SSSI) which are suitable for woodland planting in terms of avoiding impacts on open habitat conservation interest. Perhaps 10-20ha or so could be planted within this area in that respect. Any woodland type would be appropriate on the acid grassland, either commercial conifers or native woodland in terms of the low open habitat interest. A FES HAP survey was conducted by Kate Proctor of this area in 2007, which confirms the view that there are significant areas here that could be planted without impacting on important habitats. One concern I have with this data is that all the Soft-rush (Juncus effusus) areas appear to have been recorded as FMS-NON i.e. M23b, but JW thought that some of these where M6c i.e. fen priority habitat. So any FMS-non areas being considered for planting should be checked in more detail. There is also much potential for planting in the SSSI as much of the FES managed area is non HAP acid grassland. But the site is obviously sensitive and has scattered pockets of interesting fen and Purple Moor-grass and Rush Pasture that should be protected in any planting proposal.
I suggest that, if the district wish to pursue planting in the area that a more detailed visit is conducted by JW next year with a view to mapping/assessing the area in detail, i.e. mapping areas suitable for woodland planting and areas with significant existing habitat interest, which should be left open. There is scope here to increase the area of productive woodland or native woodland and leaving a mosaic of open areas within this woodland to preserve important areas of fen and bog habitat within woodland clearings.
The existing grazing could perhaps be switched to hardier breeds such as highland cattle (if this is not the case already), so that they might graze the Purple Moor-grass and Rush Pasture areas more".

Cnoc an t-Sabhail:
"The bulk of the area visited was found to be Blanket Bog and thus unsuitable for woodland expansion on biodiversity and green house gas grounds. However some areas were found to be predominantly Upland Heathland habitat on mineral soil or shallow peat, and it is thought that there could potentially be a net environmental gain if native woodland could be established in these areas.

However, as these heathland areas have an unusually high cover of Cladonia lichens, it is recommended that a lichenologist should be commissioned to survey the lichen species present before plans are drawn up for woodland expansion. These areas are also quite exposed and on poor soils at a rather northern latitude so it is suggested that advice is sought on soils and climate from Forest Research, if specific expertise in these areas is not available in the Forest District.

The areas in question, which may be suitable for woodland expansion amount to approximately 43ha. A further 2.5ha (not mapped) may be available for woodland expansion on the slope between area 14 and the flat area of Blanket Bog below. Identified on a previous visit five or so years ago, this area is Upland Heathland on shallow peat. If woodland expansion is undertaken in these areas care should be taken to leave areas of deep peat noted, as open ground with small buffers of open ground around them to avoid damage to the blanket bog. Otherwise there is little risk in planting on deep peat in the potential expansion areas highlighted in this report. The appropriate native woodland types would probably involve, Scot's-pine Pinus sylvestris, Birch Betula species and Juniper Juniperus communis."

<u>Proposal – Strathrory (19Ha Net planted area)</u>
It is proposed to establish native woodland to benefit the aquatic habitat of the Strathrory River. The Strathrory River is noted by the Cromarty Fishery Board as a regionally important site for sea trout and during LMP consultation they requested that riparian woodland be planted where possible along the banks to help regulate water temperature, increase invertebrate abundance and provide woody debris for habitat improvement. The FCS Open Habitat Ecologist's (OHE) survey and report of 16th August 2010 support this request.

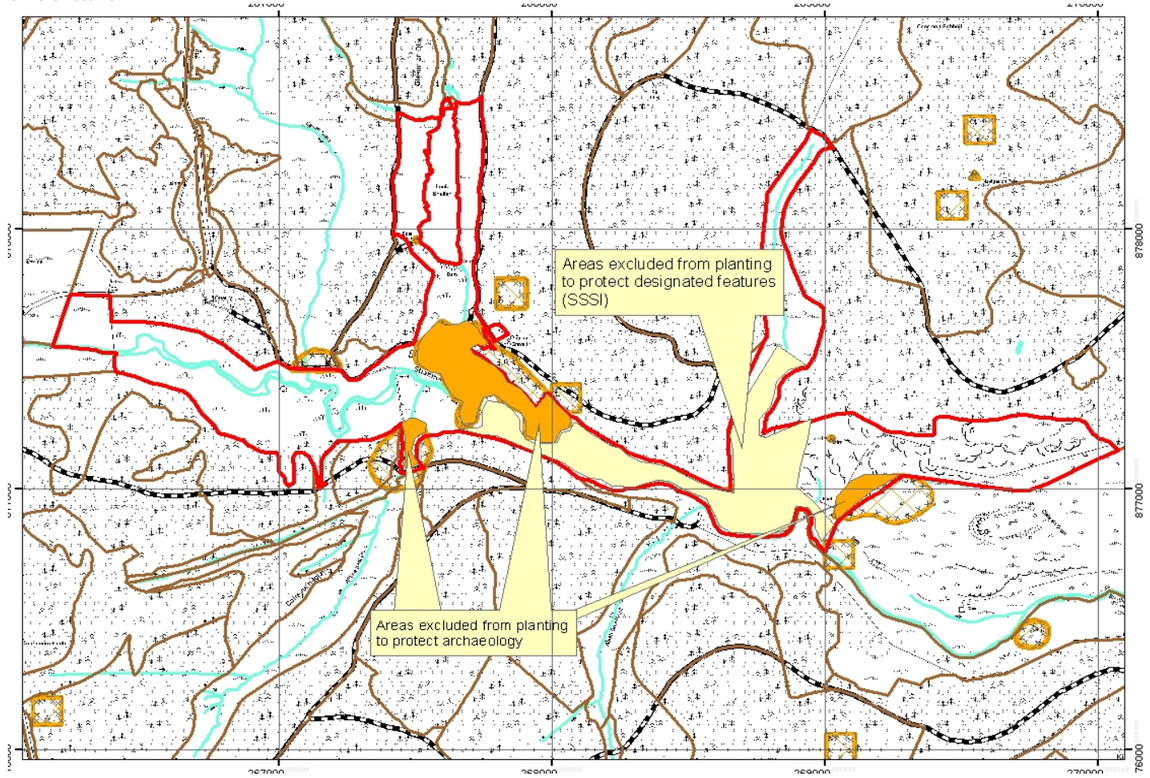
We are aware that the mosaic of habitats within the area contains some HAP priority habitats, and a detailed NVC survey of the area, to stratify the NVC communities identified by the OHE has been undertaken, informing the design proposals. We would anticipate this coupe of new planting being identified by both SEPA and SNH as a priority coupe and propose to involve both agencies in the consultation at workplan stage to agree operational detail and microsite planning. NVC report is appended to this plan as a supporting document.

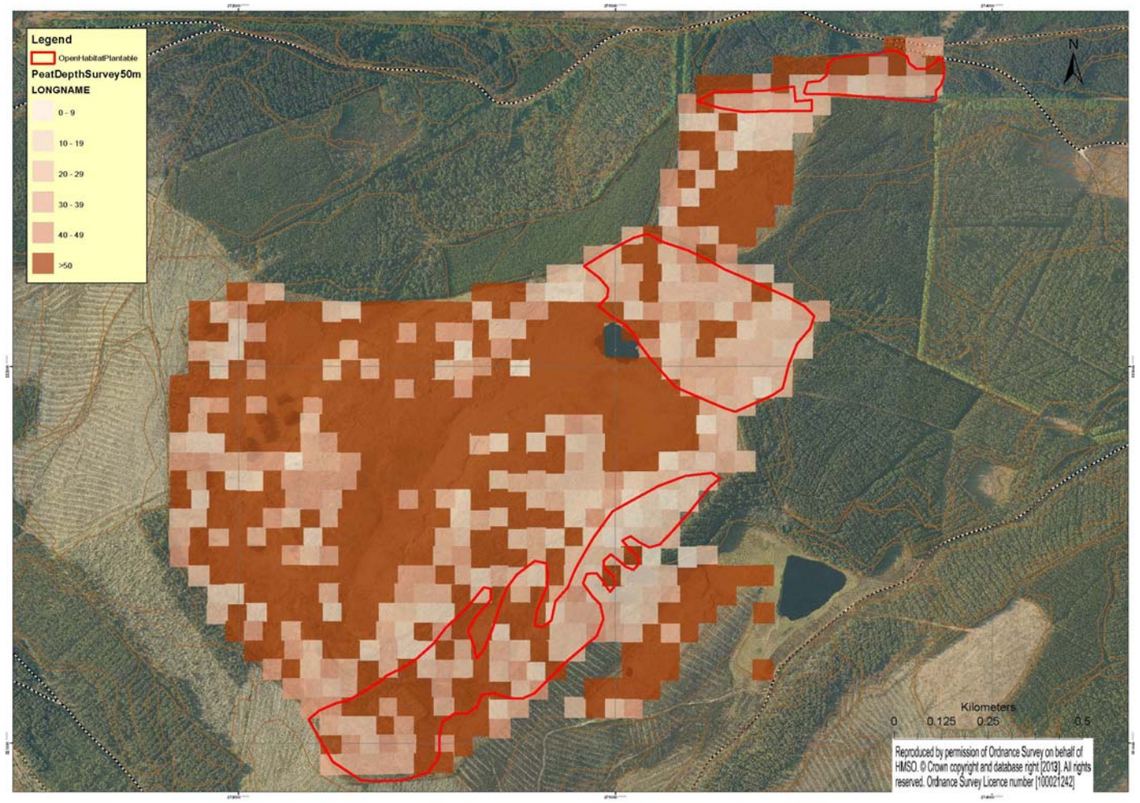
We propose to plant approximately 30% of the 65 Ha available – a total net planting area within this coupe of 19 Ha. We propose to plant an intimate mixture of downy birch 70% (*Betula pubescens*), rowan 10% (*Sorbus aucuparia*) and aspen 25% (*Populus tremula*). Trees will be planted at a stocking density of 1600 stems per hectare at variable spacing within the group. Any conifer regeneration within the planted areas will be removed.

The full gross planting area for Strathory is outlined in red on the first map below. The actual plantable area will be restricted by heritage features, the SSSI boundary and priority open habitats. The map below shows the coupe outline and details the areas requiring protection from planting.

The area will not be planted until a minimum of three years into the plan period to allow for business planning. The plantable area as depicted on the map below will be given a full NVC survey in Spring 2014 and a detailed (workplan stage) planting proposal will be forwarded to both SNH and SEPA for approval of species and design (final) prior to any works being

undertaken





Proposal – Cnoc an t-Sabhail (40Ha)

It is proposed to establish a low density native treeline woodland at Cnoc an t-Sabhaill as illustrated in the Future Habitats Proposal Map. The total area extends to 40 Ha and it is proposed to carry out a hinge mound and plant operation with subsequent low intensity silviculture sufficient to establish tree survival.

It is proposed to plant 50% of the area, selecting suitable microsites and avoiding deep peat, pools and areas identified by the supporting survey works. Stocking will be at 1600 stems per hectare at variable spacing, but generally close groups. Species will be Salix spp, Betula pubescens, Sorbus aucuparia and Pinus sylvestris with the conifer element taking up no more than 15% by species.

The FCS Open Habitat Ecologist has surveyed this site and indicated where planting would be inappropriate due to peatland conservation and these areas have been excluded. On the recommendation of the OHE a survey was undertaken by a Lichenologist during November 2013 and the resulting report is appended in support of this plan. Recommendations regarding open space have been adopted and low density woodland is assessed as posing no threat to the lichen interest on the site. A full peat survey of the site was undertaken during October 2013 and the following map demonstrates that the areas deemed suitable for establishing woodland fit well with the recommendations of the OHE and the expert Lichenologist opinion.