Shalloch Land Management Plan 2017-27

Galloway Forest District

SHALLOCH FOREST BLOCK

Land Management Plan

Approval date:

Plan Reference No: FDP

Plan Approval Date: 2017

Plan Expiry Date: 2027

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

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

The mark of responsible forestry

CSM 6 Appendix 1
FOREST ENTERPRISE – Application for Forest Design Plan Approvals
Forest Enterprise – Property

Forest District:	**GALLOWAY FD**
Woodland or property name:	**SHALLOCH**
Nearest town, village or locality:	**NEWTON STEWART**
OS Grid reference:	**NX3755 8855**
Local Authority district/unitary Authority	**SOUTH AYRSHIRE AND DUMFRIES & GALLOWAY**

1. I apply for Forest Design Plan approval*/~~amendment approval~~* for the property described above and in the enclosed Forest Design Plan.

2. I confirm that the scoping, carried out and documented in the Consultation Record attached, incorporated those stakeholders which the FC agreed must be included. Where it has not been possible to resolve specific issues associated with the plan to the satisfaction of consultees, this is highlighted in the Consultation Record.

3. I confirm that the proposals contained in this plan comply with the UK Forestry Standard.

4. I undertake to obtain any permissions necessary for the implementation of the approved Plan.

Signed ……..... Signed .....
Forest District Manager Conservator

District **GALLOWAY FD**..... Conservancy .....

Date **…..**..... **Date of Approval:** .....

Date approval ends: .....

*delete as appropriate

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Summary of Proposals:

The primary objective for this Land Management Plan is to achieve a balanced forest block, utilising a zonal approach to obtain high quality production areas, enhanced visual amenity and, establishment of a landscape scale wildlife corridor which facilitate links to adjacent blocks.

1.0 Introduction:

1.1 Setting and context

Shalloch, which is part of Galloway Forest District, is a large scale linear plantation that lies some 20 km due north of Newton Stewart. It also lies adjacent to a much larger area designated as an SSSI and SAC and also is part of Galloway and Ayrshire Biosphere Reserve. The block, totalling some 6436ha, is particularly visible in near and mid distance view from the C46w minor county road from Glentrool village to Straiton.

The block adjoins areas of open hill and agricultural land to the North, East and South. The whole block captures the source and head waters of the Water of Minnoch, a major tributary of the River Cree.

This plan is a comprehensive update of an earlier plan approved in December 2005.

1.2 History of plan

Shalloch LMP comprises three former design plan units amalgamated to encapsulate the upper catchment of the Water of Minnoch.
The main afforestation, on the lower elevations, was carried out in the late 1950s to 1966. The higher ground at Mount Shellie was planted in 1970's and at Waterhead in 1993

Afforestation began in the late 1940s / early 1950s and continued to the 1970s as areas south of the R Cree were acquired. Little of the first rotation crops remain. The area was heavily harvested in the 1980s and 1990s leaving relatively large areas of uniform age class second rotation conifer crop.

2.0 Analysis of previous plan

2.1 Analysis from previous plan

Objectives from the previous plan were as follows:

Objectives	Assessment of Objectives during plan period
Commercial softwood timber production in forest core. Diversify age structure and species composition of the block through restructuring to benefit habitat and visual diversity (particularly along public roads)	The plan area has been extensively harvested recently due to *P. ramorum* infection and subsequent management operations. This has provided opportunities for alternative species restock and enhanced views into the block from the Straiton road. The age diversification process has continued throughout the plan period, however, given the constraints of *P. ramorum* management, the next rotation will be required to achieve a greater age diversity. Visual diversity has been enhanced with revised coupe shapes, felling/restocking, and adherence to adjacency guidance.
Increase area of broadleaf and open space to enhance conservation	Over the previous plan period significant areas of open space and broadleaf have been created along Water of Minnoch and the main riparian areas.
Improve riparian zones particularly along the Water of Minnoch and other significant tributary watercourses as identified by Galloway Fisheries Trust Monitor and improve water quality as per Guidelines	Significant areas of open space and broadleaf have been created along the Water of Minnoch and along the principal riparian areas. 50% of the extended buffer areas have been established through felling and restocking.
Maintain suitable habitat for Red Squirrel conservation	Although not a stronghold site for the species, small seeded broadleaf planting and continued conifer restock have ensured that the block remains advantageous towards the species. Some action is now required due to the restructuring of the forest which has led to an isolated conifer coupe being most heavily used by red squirrels.
Improve landscape impact in the upper margins, create moorland	Several coupes along the northern boundary have been restocked taking a greater account of

fringe on plantation margins to improve Black Grouse habitat	land form and incorporating elements of woodland fringe creation.
Improve internal amenity and develop area for public recreation	Views in and around both of the SAMs have been enhanced, however, the block has remained a low priority for recreation throughout the plan period and has therefore achieved a modest improvement.

3.0 Background Description

3.1 Physical site factors

3.1.1 Geology Soils and landform

Most of the afforested area comprises sedimentary greywackes and shales of the Ordivician period that have been obscured by large quantities of coarse and generally indurated glacial deposits of boulder till material. Peaty gleys (11% of the area) and deep peat (87% of the area) dominate. The underlying till tends to be very coarse and often peat masks what is in effect a very bouldery terrain. Combination of poor draining soil and high rainfall has resulted in very shallow rooting crops leading to very high risk of premature windblow.Small pockets of stony brown earths and podzols are usually exploited to grow Larch and hardwoods. See the soil map for details.

Two main features dominate the landscape of the Shalloch block. Firstly, the large sweeping valley of the Water of Minnoch, with the river having a high priority, and secondly the dramatic and rugged Merrick range with slopes cascading down into valley and giving a large dimension to the landscape. Altitude ranges from 180m in the south rising up to 768m on the Shalloch on Minnoch in the Merrick hill range to the south east.

The 1998 Ayrshire Landscape Assessment (northern part of the plan) classifies the area as ”southern uplands with forestry” characterised by steep smooth slopes covered in dark green conifers rising to rounded summits. The 1995 Dumfries & Galloway Council Landscape Assessment (which refers to the southern end of the plan) classifies the landscape as “Plateau moorland with forest”. Summary guidelines suggest that the “gentle landforms and large scale relief requires similarly large scale design responses”. The 1995 The Galloway Local Forestry Framework (which covers a small part of the southern end of the plan) classifies the landscape into Minnoch 5 category where “‘extensive areas of productive forestry predominate”. Guidance suggests restructuring should improve diversity, open space and bird habitat. The James Hutton Institute "Land Capability for Forestry" classification (previously Macaulay Institute) for the area is a mix of F5 and F6 (land with limited or very limited flexibility for growth and management of tree crops).

3.1.2 Water

The River Cree catchment, which has a proportion of dense conifer plantation, has suffered from issues such as surface water acidification, riparian over-shading, siltation risk, and poor site drainage. The northern extent of the plan, which contains the source of Water of Minnoch, has peaks of Craigenreoch (565m) and Rowantree Hill (552m). The area around and between these two peaks contain the majority of the watershed between the Minnoch and the River

Stinchar catchments. The Water of Minnoch runs along the entire length of the valley and is the main watercourse. It is supplemented by the Shalloch, Pillow, Kirkennan and Kirriemore burns all with headwaters in the Merrick range, and with only the Cairnfore Burn rising from the west. There are two open water bodies also located within the block, Kirriereoch Loch and Kirriemore Loch.

With regard to River Basin Management Plan, part of the River Cree catchment area in this Land Management plan is currently classified by SEPA as "moderate" for water quality. There is some evidence to suggest that the catchment historically supported a healthy Atlantic salmon and trout population that has, to an extent, declined due to reduced water quality and degraded riparian and instream habitats. Some burns now only support limited Brown trout and European eel (GFT 2016 survey results) yet still retain good instream habitats FES has liaised with various external stakeholders to identify priority watercourses to address the issues of forest encroachment onto watercourses in the plan. The remedial work to increase riparian buffer zones and reduce dense conifer plantation around watercourses should benefit a range of species and will be further developed with the subsequent creation of aquatic and riparian zone improvements, generally in excess of basic guidelines identified in Forest and Water guidelines 5th edition.

FES has analysed the flood risk of peak flows at the exit of the site and also further downstream. There are no known flooding issues.

Details of all known private water supplies within the block are held in a District GIS layer (see constraints map).

3.1.3 Climate

The south west of Scotland has a predominantly mild windy oceanic climate influenced by the Gulf Stream. Annual rainfall in the block is around 1600mm, compared to the district range of 1000 – 2000mm, and falls mainly during the winter months October to February.

Guidance on climate change suggests that the District can expect an increased frequency of extreme weather events with the climate remaining wet and mild. Whilst there may be little impact on this forest block with regard to primary species choice (mainly conifer) there may be future threats to wildlife habitats.

3.2 Biodiversity and environmental designations

There are no PAWS sites or areas of Ancient Semi Natural Woodland within the LMP. However further downstream, outwith the plan area, there are relict Ancient Semi Natural Wooded areas along the River Cree valley making these upper reach sections of the River Cree potentially high priority sites for restoration to further develop riparian network links.

The open hills on the east of the LMP area are designated as a Site of Special Scientific Interest listed as Merrick Kells (SNH reference 1148), covering an area of 6587ha with extends east along the Merrick range outside the LMP area (see constraints map). All features in the SSSI are listed as "favourable" condition.

3.2.1 FCS Biodiversity Programme key species

Shalloch LMP is considered to be a core area for black grouse (*Tetrao tetrix*). The species is thriving to the east and to the northern end of the Shalloch LMP and would once have used the area now occupied by this forest plantation.

Red squirrel are present at low densities in this LMP, however, the area is not considered to be a red squirrel "Stronghold site" – areas designated by the Scottish Government as sites where red squirrel can be assisted to survive through positive management practices. Due to extensive *P. ramorum* operations in the area, most of the red squirrel population have entered into an isolated coupe.

Pine marten are also resident in the area and are monitored through an ongoing pine marten box scheme which will be maintained. Current research nationally into the natural control of invading grey squirrel by pine marten will be facilitated if the opportunity arises.

3.2.2 Scottish Biodiversity List Species

Water bodies and existing riparian habitats within the plan area are regularly used by otters for breeding and for movement into other river systems. Otters have a large territorial range; consequently wide ranges of adjacent connecting land will also be used. Evidence also suggests that good otter numbers have a natural control effect on invading mink.

Whilst relatively scarce, water voles also use these riparian tracts.
Positive riparian zone improvements, often exceeding guidelines proposals, such as an increase in BL cover coupled with our aim to keep sections of stream banks permanently vegetated and persisting throughout subsequent rotations has increased both the availability and connectivity of suitable breeding and feeding habitat for both of these species.

Numerous raptor species use the LMP area and these will continue to be protected during all operations.

3.3 The existing forest

3.3.1 Age structure, species and yield class

Species / Yield class

Pure Sitka spruce and Sitka spruce and lodgepole pine crop mixtures dominate the block accounting for around 85% of the plan area. Minor conifer species such as Scots pine, Norway spruce and larch account for 6% with broadleaf providing the remainder of the plantation area, around 9%. This figure for minor conifer species would have been slightly higher, however, sanitation felling for *P. ramorum* infection has resulted in premature removal of much of the larch component of the crop. Accordingly species diversity throughout the block has reduced (see fig. 1 below) with limited opportunities to retain appropriate mature conifer. Broadleaf is generally confined to the riparian and aquatic zones located throughout the block.

Including open water bodies, the open ground to the north and east of the plan and all felled areas, currently around 1734 ha of the plan area is classified as open space. The area of open space should increase slightly as planned conifer removal for water quality improvement and habitat network enhancement impacts further on the plan.

Yield class across the block is variable, ranging from low YC values in the spruce crops on deep peat sites (see Forestry Commission Scotland, 2015 for definition) and the poorer soils at elevation up to YC16 in the valley bottoms and better site types. Opportunities exist for substituting some of the poorer crops with alternative conifer species better suited to the site such as Scots Pine or further conversion of the area to broadleaf woodland fringe, peatland edge woodland or permanent open space.

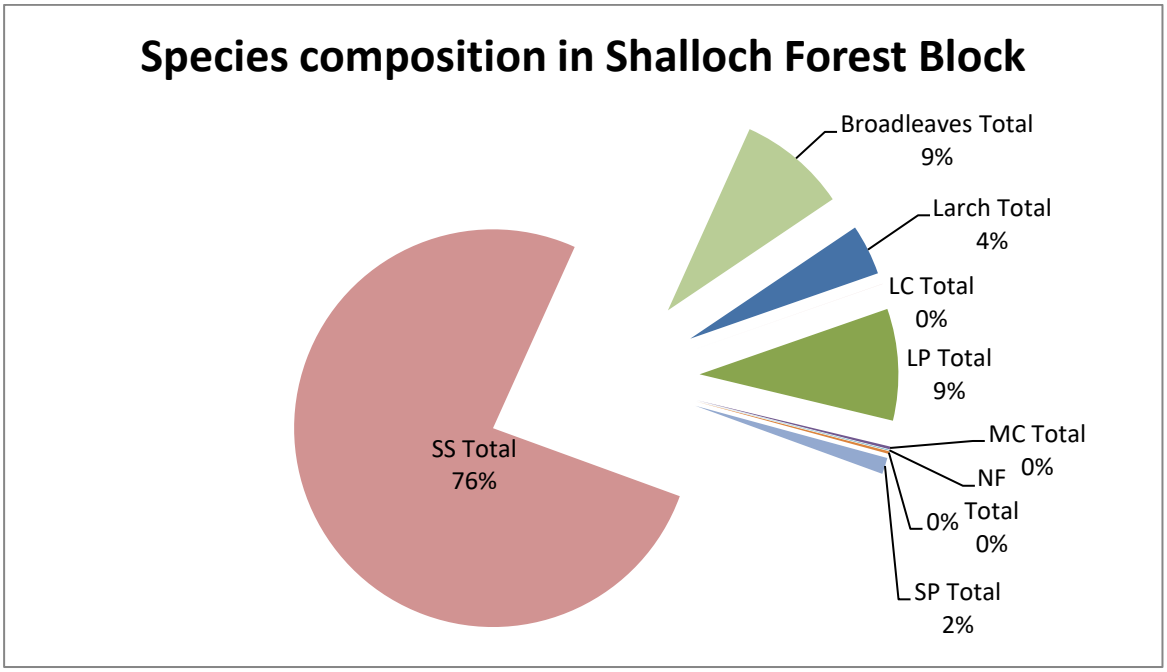

Figure 1 - 2016 Species composition in Shalloch forest block as taken from the FCS subcompartment database.

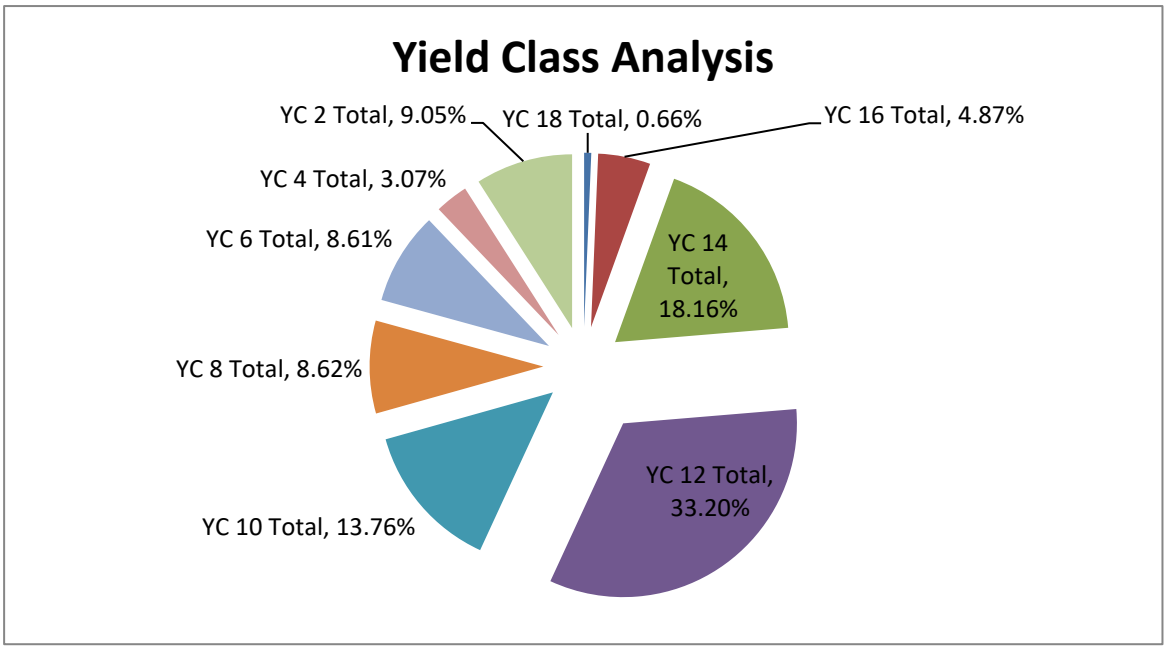

Figure 2 - 2016 Yield class analysis showing dominate yield classes 12-14. Data extracted from the FCS subcompartment database.

Age Structure

Given the original plantation establishment dates, a hiatus of planting during the 1970s and 1980s and the fairly concentrated clearfell associated with first rotation crops (a minimum of 7yr age gaps or a 2m height differential maintained between fell coupes), clearfelling during the previous plan periods appears to have had a minimal effect on restructuring. Establishment and thicket phase crops (around 55%) currently dominate the plan area with mature high forest (61+) covering less than 1% of the area resulting in a relatively poor age class spread (see table below). The additional recent felling of, and as yet not restocked, *P ramorum* infected larch areas has also negatively impacted on current structural diversity. Projected future percentages do however suggest a more even distribution of age class throughout the block.

Table 1 – Showing present age structure and 30 year projection. Restructuring remains an important consideration throughout the plan area.

Age of trees	Growth stage	Percentage of class at given year	
		2016	**2046**
0 – 10	Establishment	25.73%	14.1%
11 – 20	Thicket	29.57%	2.6%
21 – 40	Pole stage	16.47%	29.0%
41 – 60	Maturing high forest	27.47%	28.2%
61 +	Old high forest	0.76%	1.3%
Total		**100.0%**	**100.0%**

3.3.2 Access

Currently the plan area is relatively well roaded and generally accessible for timber haulage. As identified by the Dumfries and Galloway Timber Transport Group Agreed Routes Map for Timber Haulage, the principal timber haulage routes exit onto the C46w Bargrennan to Straiton road which is classified as a "consultation route".

3.3.3 LISS potential

Virtually the entire plan area north of Loch Moan along with a broad spine of ground running south from the loch through the centre of the plan has DAMS scores (Detailed Aspect Method of Scoring) of more than 17 leaving little opportunity for the future expansion of LISS management areas. LISS is defined as "Use of silvicultural system whereby the forest canopy is maintained at one or more levels without clearfell of areas over 2.0ha".

Opportunities for the expansion of LISS management areas are generally constrained by the low quality of the site types throughout the plan area however second rotation crops on better site types to the east, especially along the Straiton road may potentially provide opportunities for thinning and structure diversification through LISS.

3.4 Landscape and land use

3.4.1 Landscape character and value

The majority of people view the landscape as they travel along the C1/C46 public road to Straiton. There is a mixture of short distance views interspersed with longer views on the Merrick Hill range on clear days. Short distance views have been enhanced by using smaller coupes & species diversity. Small plantings of broadleaved, Norway Spruce and Scots pine are concentrated near areas more frequently used by public. The use of fragments of coniferous retentions and open space also improved diversity and provide vistas towards the Water of Minnoch & Merrick range.

Long distance views have been addressed through more organic coupe shapes both enhancing and being in scale with the land form and by altering the upper planting line to remove currently visible geometrical shapes. Plantations on the slopes of Craigenreoch are highly visible when traveling south from Straiton.

The gentle landform and large scale relief allows for large scale felling coupe design in the plan hinterlands however enhancing the limited topographical diversity through the greater use of interconnected patterns of open space and the restocking of alternative species with a greater future reliance on broadleaf and minor conifer species such as Scots pine is appropriate.

Restructuring of the forest for spatial, age, species and wildlife diversity through the use of Low Impact Silviculture where suitable and smaller coupe size in the lower basin areas where ground conditions allow for planting alternative species has been started.

Land Use	Area(ha)
Agricultural land Total	2521.86
Archaeological sites Total	3.27
Car Parks/Picnic Areas Total	1.17
Deer glades Total	4.35
Failed Total	0.07
Felled Total	194.35
High Forest Total	1843.15
Open Total	1734.03
Open Water Total	21.54
Partially Intruded Broadleaf Total	1.46
Quarries Total	1.4
Unplantable or bare Total	8.79
Unplanted streamsides Total	17.59
Windblow Total	4.46
Grand Total	**6357.49**

3.4.2Visibility

With views partially released by felling of dense crop along the C46 road, much of rolling topography and dramatic crags of the Merrick range are now visible. Important consideration of this LMP is to maintain vistas and create more complex structure of the forest via LISS, especially with the moorland edge where this is possible.

3.4.3 Neighbouring landuse

Upland hill farming exists to the north where the block adjoins open hill and to the south where there are more intimate smaller scale agricultural holdings. Private residences at Shalloch on Minnoch, Tarfessock, Laglanny, Kirriemore and Craigenrae lie within the plan area.

3.5 Social factors

3.5.1 Visitor Zone Recreation

Despite the relative close proximity of a core recreation facility, the Glentrool visitor centre, there is little in the way of formal recreation within the plan area. The ground is rather bland and there are currently no particular areas of interest within the forest for people to walk through. The central Merrick range is accessible through the forest from Rowantree bridge carpark but established routes already exist, notably from Loch Trool and Loch Dee. The only current facility is a short section of the Glentrool green mountain bike route that runs through the southern corner of the block at the Straiton road near Palgowan farm

(see table below).There are currently two picnic sites one at Kirriereoch and the other at Bell's memorial, at Laigh Rowantree bridge. Kirriereoch picnic point acts as parking for fishing on the Water of Minnoch.

Whilst there are no current plans for further recreational development in the block within the period of this plan, the minor county road running from Straiton to Glentrool remains strategically important as it's part of the 7 stanes route. As stated before the recent clearfell operations have opened up impressive near and distant views into the forest and beyond to the Galloway hills, showcasing the area for visiting tourist traffic, generally heading for Glentrool or further south into Galloway.

Some of the views from the road are currently being compromised by conifer regeneration. Where funds allow, these areas will be cleared to maintain the long distance views.

3.5.2 Community

Glentrool village, though it lies outwith the block to the south, is the largest noticeable local community although there are numerous other residential properties within the forest block and other agricultural neighbour interests that are either contained within or directly neighbour the block.

Cree Valley Community Council covers the LMP area, and are in receipt of the latest version of our local Strategic Plan.

Appendix 1 details the comments received from consultation with the Galloway Forest Forum and local residents.

3.5.3 Heritage

There is a long history of human occupation in the area covered by the plan. There are heritage features such as Neolithic burial cairns at Kirriemore, a Scheduled Ancient Monument (SAM) at Tarfessock, and a modern memorial in the upper valley. Several unscheduled ancient monuments, mostly post-medieval rural settlements, along the lower valley sides, including 2 Toll houses are found at Sui & Rowantree.

Local knowledge has been supplemented with information from RCAHMS web site. Any recent archaeological surveys that have been undertaken on behalf of FCS have been incorporated into the Forester GIS Heritage Module geodatabase - and any new archaeological surveys required (in unimproved upland areas for example, or areas within which the archaeological record is unusually rich) are undertaken to the standards laid out in *FES Historic Environment Planning Guidelines.* Following these guideline will ensure that undiscovered historic

environment features are mapped and recorded prior to forestry establishment and management operations - and further enhance the continued comprehensive protection of the known archaeological resource.

All known heritage features are highlighted on constraints maps during the work plan stage of operational planning. All compiled features and associated buffer zones are also discussed during the electronic Pre-Commencement Meeting Gateway process (PCM Gateways) prior to start of the forestry operations clear directions as to the code of practice when in the vicinity of any heritage features. Operational staff and machine operators are also asked to report any unmarked heritage features they may come across for inclusion in the GIS database.

3.5.4 Forest Renewables and Utilities

Forestry Commission Scotland (FCS) is working to develop the wind and hydropower potential of the land and forests that we manage for the Scottish Ministers. Our aim is to ensure that the potential of the National Forest Estate is developed and managed in ways that

- contribute to the Scottish Government's renewable energy target
- maximise financial returns from the National Forest Estate
- secure benefits for local communities and
- achieve a reasonable and sustainable balance with other FCS objectives

Currently there are no renewable developments planned for the Upper Cree LMP unit however the possibility remains that the area could be subject to future windfarm applications.

3.6 Statutory requirements and key external policies

The legal status of the land is purchased.
This forest plan is in accordance with the guidance supplied in

UK Forestry Standard and associated Forestry Guidelines
FCS the role of Scotland's National Forest Estate and strategic directions
Forest & Woodland Strategies (FWS)
Design techniques for forest management planning
Native Woodland Survey of Scotland
Historic land-use assessment
Rationale for Woodland Expansion
Policy on Control of Woodland Removal
Peatland Management
FCS Guidance and other documents including 'Deer and fencing' and Wildfire

4.0 Analysis and Concept

4.1 Analysis of constraints and opportunities

The following table sets out the site factors that are deemed significant in influencing the long-term management of the forest block.

Objective	Opportunity	Constraint	Concept Development
Environmental Quality	Enhance water quality along the Water of Minnoch and its main tributaries.	Conifer monoculture planted close to watercourses Poor levels of existing species diversity Extended period of landscape change	Continue riparian enhancement through increased open space / BL restock Increase species diversity (BL and minor conifer) Increase moorland edge
Timber	Provide planned sustainable & normalised timber supply	Creation / enhance conservation habitats Uniformity of age class across forest block.	LISS management and smaller coupe size where appropriate and practicable. Maintain conifer restock programme whilst increasing area of BL in subsequent rotations Smooth the timber production level to avoid peak flows in the future.
Biodiversity	Enhance connectivity of aquatic and riparian habitat networks	Isolated nature of lochs Extended restructure period	Increase connectivity of internal open space to riparian zones and external open space / woodland fringe
Biodiversity	Maintain Red Squirrel habitat	Low density, isolated resident population. Lack of appropriate mature conifer crop and subsequent low levels of food source	Increase % of NS and light seeded BL restock for species diversity where appropriate. Identify retention areas of mature conifer. Ensure retained areas can allow for migration through surrounding crops.

Biodiversity	Enhance Priority Habitats and their connectivity to other habitat networks	Isolated and highly fragmented nature of existing Open space and broadleaf habitats Extended restructure period	Increase areas of BL restock centred on identified Native woodland sites Extend BL woodland / open space connectivity to riparian zones and internal / external open space
Environmental Quality	Maintain water quality and flood prevention	Current poor levels of species diversity and insufficient buffer zones along main watercourses	Restore the riparian habitat where possible, Increase minor species and BL restock for species diversity Develop LISS areas on better site types and reduce coupe size, especially in the lower lying areas.
Wildlife Quality	Create woodland fringe on upper planting margins to improve wildlife habitat	High deer population and GFD open hill no shooting policy	No shooting policy revised. Proposals to create woodland fringe up on the higher elevations by planting native species

4.3 Concept Development

The concept forms the broad framework for the detailed design and is presented graphically in map 1: Analysis and Concept. A variety of themes, often overlapping, are outlined as follows:

The Water of Minnoch and its extensive tributary system (Upper Cree riparian zone 2, 3 & 5).

The plan aims to create a major habitat corridor to link the upper areas in the north east of the plan with the west and south west areas. This is hoped to encourage the migration of black grouse between the areas to the north east of the plan area and the west/south west. The two main themes for the corridor are the development of a large riparian zone, covering the water of Minnoch and tributary system, combined with the woodland fringe expansion. These are critical success factors in the plan. Opportunities, where practicable and

achievable, will be taken to go beyond the basic proposals contained in the UK Forestry Standard (UKFS) to fully open up this important riparian corridor.

Extensive moorland fringe areas are proposed in the north of concept areas 1 and 2, with further development along the eastern edge of compartment 2 and 4. to help achieve the multiple objectives such as improved water quality and habitat. Woodland fringe creation will be above 450m asl in these areas, with high density conifer blocks below this. The woodland fringe creation in concept area 2 is one of the main features of the wildlife corridor.

Dense conifer plantation or regeneration will be removed from watercourses to enhance the aquatic habitats by reducing the likelihood of acidification. This is seen in the coupe redesign of concept area 2. A mixture of broadleaf, mainly aspen and alder, will be combined with open space in the aquatic habitats to maintain open flight paths and improve the feeding and nesting conditions for a variety of water fowl species, especially in area 5.

Visual diversity will be improved through alternative conifer species and broadleaf planting while improving structural diversity through the use of LISS, especially in woodland along the county road corridor. Thinning interventions have been planned in areas where ground conditions and access allow it. Areas of poor ground of deep peat areas in recently felled coupes have had their potential for establishment of Peatland Edge Woodland or Wet Woodland areas considered and applied where suitable.

Areas of larch, which have been subject to disease control management due to *P. ramorum* infection, have created opportunities for species diversification which will allow for the use of alternative conifer species or broadleaf planting as per the district agreement for diseased larch management (see appendix II).

Retain core productive areas (Concept areas 1 & 4)

Area 1 and 4 are core production areas of the forest, mainly planted with Sitka and other conifers in high density monocultures (SS) or intimate/nursing mixtures (SS/LP). Retaining the productivity of these core areas allows the plan to meet the district and national objectives for productive forests, while enabling other areas of the forest to cater for different objectives. Coupes will be redesigned after felling to allow for less geometric coupe boundaries incorporating enhanced open space, broadleaf margins and riparian corridors.

There are few species which are well suited to the concept areas, however, intended replanting of forests will also utilise alternative conifer species (non-Sitka) where appropriate to maintain squirrel habitat, increase the resilience of the forest from disease and enhance the visual amenity.

The coupe felling has been arranged in such a way that felling in successive adjacent areas proceed against the prevailing storm direction which is W and SW, with little diversions encompassing shape of the road network. This method should increase the resilience of the forest against wind damage. Further resilience to wind will be incorporated into coupe design by utilising self-contained coupes, which will remain unaffected by felling of neighbouring coupes. These resistant self-contained coupes will generally be managed under a no-thin regime, and will require minimal management operations once established.

Felling phases will try to enhance the visual amenity of the plan area by minimising the visual impact of tree removal, especially when viewed from the Straiton road. Further consideration will be given the areas which can viewed from the 7 Stanes route, especially the south of the plan which neighbours the Loch Trool LMP. The recreational demands associated with the Loch Trool LMP will impact on the management choices with our standard regimes modified to improve the internal and external views associated with them. Treatments will be developed for each site involving where practicable, bespoke thinning regimes, additional permanent open space, mature tree retentions and the creation of a seasonal assortment of foliage colours through enhanced species diversity.

The plan area suffers from a high deer population combined with occasional sheep trespass. This can create difficulty in establishment of forest, both by planting and natural regeneration, and will require improved access to the higher elevation area; hence the proposition to construct an additional ATV track in concept area 1.The greater forest road network in areas 1 and 4 provides acceptable levels of access without large scale extension.

Increase in Riparian buffering (2,3 & 5)

All concept areas, with special focus on 2, 3 and 5, will target the creation of open space / BL areas to enhance the woodland corridors linking open ground at elevation to lower lying valley ground to reduce watercourse acidification and improve the visual diversity of block. Concpet area 3 represent the transistion between the emphasis on the wildlife corridor for moorland birds in area 2 and the visitor amenity and open water habitat in concept area 5. Area 3 has the highest proportion of open space, due to the large riparian buffers and areas of open space to improve water quality, especially at lower lying levels.

Natural regeneration will be monitored by FM staff and appropriate actions taken to establish tree cover where required. As tree density can be affected by many factors, and a holistic approach will be taken, with planting undertaken where confounding factors such as deer browsing pressure, pest and disease, competing vegetation and seed source have been eliminated. When these factors have been

addressed and tree density is well below the planned density and there is little chance of further natural regeneration, areas will be planted with appropriate species. Where the density is greatly above what is desirable, regeneration will be respaced. Natural regeneration which is causing overshading or acidification in riparian zones will be removed.

Woodland fringe creation on top of Rowantree hill (Concept area 1).

This plan proposes to remove dense conifer plantation back from elevations above 450m to create ecotone between high forest and open ridge biomes. The plan proposes to enhance the montane habitats by utilising a mixture of low density broadleaf and conifer combined with open space to improve the feeding and nesting conditions for a variety of species, especially black grouse. As stated previously the intended extension to the existing network of ATV tracks will allow for greater capacity for deer control. Existing open space will be maintained and future open space creation will enhance habitat for black grouse and other moorland bird species' habitats. This will also have the added benefit of improving water quality in the Rowantree burn, along with the enhanced riparian buffers.

Improved visual diversity (Concept area 5)

The aim of the increase in visual diversity is to improve visitor access and interest in this southern area of the forest block, from the straiton road, the neighbouring Loch Trool area and the internal viewpoints. The area is targeted for open water enhancement, focussed around the 3 loch areas, and will have the greatest increase in the use of alternative conifers and broadleaves. Interior viewpoints within the forest will be maintained and enhanced with all felling coupes redesigned on replanting or maintain under LISS where possible.

Agricultural areas

There may be opportunities for the planting of broadleaf shelter or hedgerows in vicinity of agricultural areas which may enhancing environmental value of the agronomic areas and provide shelter for various species. These opportunities will be considered as they arise with the renewal of tenant leases. In agricultural areas, the plan aims to enhance the overall habitat network by connecting to adjacent open space, or broadleaf planting to create shelter.

5.0 Land Management Proposals

5.1 Forest stand management

This plan has been designed in accordance with sound silvicultural and environmental principles within the framework outlined by the UK Forestry Standard (UKFS) and the Galloway FD Strategic Plan. Furthermore the criteria given in the UK Woodland Assurance Scheme (UKWAS) will be met.

The accompanying Management map provides details of our coupe management proposals and the following tables summarise the average annual felling and thinning volumes (m^3ob) expected for the next 10years (plan period) and a breakdown of management types :

Table 2 - Areas of mangement type

Management Type	Area (ha)
Clearfell	2358
Group Shelterwood	5
Minimum Intervention	19
Natural Reserve	15
Long Term Retention	30
Other/Open land	3929

Table 3 - Volume (m^3ob) by method and phase

Fell period	Thinning / LISS	Clearfell	Total
2017-2021	507	65353	65860
2022-2026	1681	55454	57135
2027-2031	1964	42905	44869
2032-2036	1874	17268	19142
2037-2041	1035	51844	52879

Allowing for reduced availability of timber in the second and third felling periods (mainly due to the current significant area of young crop), the timber volume programme for this block has been smoothed to provide a regular and sustainable supply of timber to the market. While stands have been assessed for stability before deciding to extended their rotation length, a combination of factors such as shallow rooting depth, a lack of previous thinning and, some stands which have higher than desired exposure values, there may still be stands which will suffer from windblow and will have to have their felling dates moved.

Where required as per tolerance table found in appendix II, FCS will be contacted for amendment approval.

5.1.1 Clear felling

Most of the plan area (around 93%) will be managed under a clearfell management type using conventional harvester and forwarder working with only a modest area managed under alternative management types. The clearfell management types will include the self-contained coupes which will be in areas throughout the block.

A number of coupes (27 coupes, around 5.5 % by area) are scheduled for clearfell during the 10yr period of the plan and they contribute quite substantially to the district programme (see Appendix IV).

The following table confirms that, as per paragraph 3.4.2 in the UK Woodland Assurance Standard (second edition), no more than 25% of the plan area is due to be felled in any five year period within this plan approval period.

5yr Fell period	Area felled (ha)	Area felled as % of total forested area (2427 ha)
2017-2021	**168**	**7**
2018-2022	**93**	**4**
2019-2023	**159**	**6**
2020-2024	**160**	**6**
2021-2025	**156**	**6**
2022-2026	**124**	**5**
2023-2027	**158**	**7**
2024-2028	**93**	**4**
2025-2029	**90**	**4**
2026-2030	**60**	**2**

It is of course important to manage forestry activities in acid sensitive water catchments and within this Land Management Plan area there are several that have been identified as being either “at risk” or “failing”. These are expected to improve with enhanced riparian buffers, increased open space and increased broadleaf planting.

Calculations involving proposed felling and restocking for these catchments have been prepared and are included at Appendix IV.

All of the identified catchments satisfy the felled area threshold but fail to meet that of closed canopy forest >15yrs needing to be less than 30% of the catchment in 15

years' time. There is little up to date water chemistry data available for the area and until we have access to more recent data we intend to:

- In discussion with SEPA commit to the collection of water samples on identified watercourses in 2017 and
- Revise restocking proposals through plan amendment according to resulting critical load calculation

In extensively (>50%) forested catchments like those present in the Shalloch plan area, additional measures to reduce the impact of forestry such as the conversion of conifer stands to broadleaf will be more closely considered where this will not adversely impact the overall goals for the concept area.

For conservation and biodiversity considerations efforts have been made

- to extend the felling period between coupes
- to reduce the overall size of the remaining clearfell coupes
- to remove dense conifer plantations above 450m

All proposed operations sites will be surveyed prior to work taking place to identify the presence of species such as red squirrel, otter or badger that may require specific management treatments i.e. locating dreys or avoiding breeding seasons. The resident red squirrel population are in an isolated forest coupe and we have been working with external stakeholders and our internal environment team to ensure that the squirrel population in this coupe can migrate to an alternative area before felling.

The restocking plan is based on a fallow period of 3 years which has been established as the most advantageous timescale through both experimental results within the district and feedback from previous establishment operations. One of the objectives for felling and restocking is to have at least a 7 year separation between felling and restocking of neighbouring coupes for both visual amenity and overall forest structure. Wherever possible, this plan will resolve adjacency issues by delaying of felling, rather than restocking outside the normal 3 year window.

When a felling operation has been moved and will deviate from the normal 7 year period, we would look for surrounding crops to be at least 2m tall where they are commercial conifer crops, and over 1m where they are broadleaves or natural regeneration. The density of natural regeneration will also be considered where it is suppressing ground vegetation to a reasonable extent and it is firmly established without requiring further restocking by planting. Where the surrounding forest is below the minimum height, a site visit will be undertaken and assessment of the wider forest structure carried out to determine an appropriate management of the area.

Further factors in the assessment will include any windthrow in adjacent areas that will likely result in felling and proposed areas for development such as quarries, powerlines, roads etc. Where the available data does not present a clear picture of the forest, a site visit will take place to survey the area surrounding the proposed felling and assess the forest structure. This assessment will be recorded along with any supporting evidence, such as photographs, collected and presented at 5 year review.

5.1.2 Thinning

Thinning is generally constrained by the restrictive site types and it is certain that in most instances it is too late to thin first rotation crop in this LMP area without the onset of early windthrow. It is, however, likely that LISS management will take place in the plan area during subsequent rotations. During the period of this plan modest opportunities to thin crops to the west and south of the plan area have already been identified. Carried out on a 5-7yr cycle in accordance with our local policy, crops will generally be thinned to realise amenity, biodiversity and landscape objectives and to improve timber quality. These second rotation crops offer potential to expand the overall thinnable area of the plan area ultimately resulting in increased areas moving from clearfell to other less intensive management systems.

5.1.3 LISS, Long-term Retention and Natural Reserve

None of the LMP area is currently managed under a Low Impact Silvicultural System (LISS) however as LISS can contribute to the protection and improvement of soil quality, water quality and biodiversity through reducing soil erosion and the creation of suspended solids in water, then additional areas adjacent to the main watercourses and where site types are better will be targeted for LISS development. There is, however, very little scope to utilise this methodology within the forest block and only 4 small coupes are targeted in the plan. The method utilised will be done after the coupes have been assessed for suitability before operations begin as they may be affected by surrounding operations.

Should the potential thinning area increase, additional road spurs and a permanent network of coupe access racks may be required. If required they will be identified and recorded during future plan period operations.

Natural Reserves are predominantly wooded, permanently identified locations of high wildlife interest or potential that is solely managed for high conservation or biodiversity value. As there are sufficient selected broadleaf Natural Reserves of higher biodiversity value throughout the district only small areas of conifer Natural Reserve have been identified.

Minimum intervention has management with no systematic felling or restocking although operations such as fencing, control of exotics and pests, safety work and trail maintenance are permitted. In this plan around 2.4% of the plantation area, mainly broadleaf areas, provides the focus for Minimum Intervention management.

Under Long-term Retention trees are retained for environmental benefit significantly beyond the age or size generally adopted. There are currently 6 coupes identified as suitable for long term retention.

5.2 Future habitats and species

The accompanying Future Habitats and Species map provides detail of our proposed restock species and habitats for Shalloch Land Management Plan.

5.2.1 Bog habitat restoration & open space

The UK Forestry Standard (UKFS) and the Scottish Government's policy on Control of Woodland Removal presume that sites will be restocked following clearfell. The UK Forestry Standard also requires managers to minimise soil disturbance, particularly on organic (peaty) soils with a general requirement to consider the potential impacts of soil disturbance when planning operations involving cultivation, harvesting, drainage and road construction. Since the FC Forests and Peatland Habitats Guidelines Note was published in 2000, the importance of trees in mitigating climate change has become more important with supplementary guidance produced in 2015 ("Deciding future management options for afforested deep peatland") to support the original note. This additional guidance offers a decision making framework based on the likely carbon storage or release from different management options on deep peats. Three restocking options are now available

1. where the site is a priority for habitat restoration on ecological grounds, conventional restocking will not be required
2. where the site is not a priority for restoration and is likely to support tree growth of Yield Class 8 or above for Sitka spruce, conventional restocking should be undertaken
3. where the site is not a priority for restoration to open peatland and is unlikely to support tree growth of Yield Class 8 or above for Sitka spruce, the appropriate action will usually be to create peatland woodland edge.

Under the FES strategy for "Lowland Raised bog and Intermediate bog on the National Forest Estate in Scotland 2012-2022", there are environmental and

conservation considerations for areas within the plan where there will be a presumption against commercial restocking in the second rotation. Existing areas of woodland planted on areas of deep peat offer the potential of bog restoration and carbon sequestration if successfully restored and accordingly represent significant conservation opportunities.

As a result of recommendation 5 from this strategy "Initiate further lowland raised bog and intermediate bog restoration work on other plantation sites which are ecologically suitable for restoration" and the decision framework from the FCS guidance the following table identifies an area prioritised for bog restoration according to its perceived habitat value. We will also continue to work with the FES Open Habitat Ecologist to identify the best sites for potential bog restoration within the Forest District.

Table 4 - Bog restoration methodology

Area	Objective	Benefits / positive factors	Implementation
Priority sites for habitat restoration Although there are fragmented areas of deep peat stretching from Water of Minnoch along the flat areas towards the Kirriemore showing evidence of moss land vegetation and other scattered sites across the LMP, the areas are not considered to be priority sites for peatland restoration			
Sites currently not a priority for restoration; either poor tree growth resulting in peatland edge woodland, permanent open space or conventional restocking undertaken			
01048	Expand the area of open ground to the north	• Conserve existing moss land vegetation • meet UKWAS UKBAP priority habitats requirements	• Monitor occurrence of regeneration at 5yr intervals and assess impact on resulting habitat
Blanket Bog at Rowantree coupe 01021	• Maintain as area of open ground	• Extend existing moss land vegetation especially along the Rowantree burn • meet UKWAS UKBAP priority habitats requirements	• Monitor occurrence of regeneration at 5yr intervals and assess impact on priority habitat

5.2.2 Woodland fringe / open hilltop

A feature of this Land Management plan is the proposed creation of woodland fringe to the far north of the block below Pinbreck Hill and Polmaddie Hill.

Table 5 - Woodland Fringe methodology

Block	Objective	Benefits	Implementation
High elevation coupes	• Creation of woodland fringe (additional Black Grouse habitat)	• Enhance hill top habitat for variety of species including Black Grouse • Increase area of potential heather moorland / open space • Increase BL area within forest district	• Identify areas for open space / broadleaf woodland creation as an ecotone between higher elevation open ground and plantation

Woodland fringe is a transitional zone between the plantation and open hilltops where modification of the upper planting margins and highlighting crag areas through broadleaf planting and increased open space to better complement landform will take place.

Native woodland fringe is defined as 20-50% tree cover in a matrix of short vegetation where more than 50% (ideally 100%) of the tree species will always be native. Regeneration will be closely monitored, assessed as to its suitability and if the density of woodland cover is unacceptably low then restocking would take place or, if too dense, the conifer regeneration removed as resources allow. Woodland fringe has the potential to provide excellent additional habitat for Black Grouse. The creation of this habitat in these locations, will help to develop links between remnant Black Grouse populations in the western moors at Glen App, other populations on the Changue hills and to those using the upper reaches of the Cree valley. This helps to deliver the aims and objectives of the "Southern Scotland Black Grouse Conservation" strategy that is currently being prepared.

A recent report by the Game and Wildlife Conservation Trust (Warren, 2016) highlights the values of linking black grouse populations through forest environments and encourages the use of internal open areas to increase population spread. The open area around Eldrig Hill is an ideal size, particularly with the proposed woodland edge planting up on the neighbouring Rig of Shalloch. This is the main driver for the wildlife corridor which will run from the north east of the forest to the south western area to enable the connection of two areas which have established black grouse populations. See concept maps for proposed area (Concept area 2). The establishment of additional stands of

native broadleaf species such as aspen of local provenance, birch, hawthorn, willow and rowan on the non-peat sites for shelter and winter feeding in these areas will develop the habitat network further and increase areas of important brood habitat for this species.

5.2.3 Riparian zones / aquatic zones (open space)

As previously mentioned, the Water of Minnoch and couple of small lochs scattered throughout the block provide localised habitat oases for fish and wild fowl species. Significant buffer zones are required around these features to remove excessive shading by conifer crop, which will help the lochs reach favourable status under the "River Basin Management Plans" and by linking them together with the major riparian systems and other external and internal open space, to create larger scale habitat networks across the plan area.
To assist in improving water quality, protecting soils and benefiting species that use the riparian zone, all watercourses >0.5m wide associated within the block will be subject to riparian buffer zone enhancements up to 50m (see table below).

Planned proposals to increase the area of open space, reduce the area of high density conifer woodland restocked, replacing it with a combination of broadleaf areas, woodland fringe and open space. The broadleaf areas will be both productive and for biodiversity, with significant sized buffers which will minimise adverse conditions created by dense conifer plantation. It is appreciated that new planting with associated operations of draining and mounding can give rise to a very slight increase in peak flow (up to 20% at site scale). The significance of the potential increase in peak flow will reduce as more water joins from other tributaries and the peak flow is diluted. Clearly if whole water catchments were being proposed for planting this would require greater examination and consideration.

Potential pressures on the watercourse are morphological alterations from forest operations and diffuse source pollution. We therefore aim to comply with best practice and minimise sediment release from any forest operations with efforts made to create wider riparian zones (up to 50m either side of the burn) which will provide long term protection against disturbance from future forestry operations and loss of light from canopy closure. Water crossing during forestry operations will also be minimised by altering coupe and road design.

There is significant potential to improve the habitat and biodiversity along the Water of Minnoch catchment. The ongoing felling and subsequent increase of native riparian woodland and creation of open ground should help to improve water quality long term.

The presumption is that otters use all watercourses and Galloway FD Environment staff undertake walk over surveys prior to any felling to identify sensitive sites and actively encourage the operations team to create large deadwood and brash piles along water courses during felling to provide cover for rearing, resting and breeding otters. These piles will be every few hundred metres to avoid the brash degrading the water quality. The main benefits for FES is that providing these features greatly reduces the likelihood that otters will create resting places or breeding sites within commercial forest stands and the brash piles are also likely to be used by a wide range of animal species and provide valuable deadwood habitat.

Table 6 - Riparian buffer methodology

Objective	Benefits / positive factors	Implementation
• Enhance aquatic / riparian zone	• Improve water quality through removal of conifer shading • Protect soil through reduced impact of future operations • Enhance / improve habitat for species that use the riparian zone	• Identify aquatic / riparian zone and commit towards no planned restock • Monitor area for natural regeneration incursion • Accept range of habitat options from 100% open space up to 100% broadleaf woodland (conifer woodland area element restricted to 15%) • Where conifer woodland % exceeds 15% figure, canvas advice from appropriate stakeholders and, where resources permit, remove when required to avoid buffer zone loss

At a more detailed level where we continue to promote other natural features such as rock crags and wet hollows areas, increased open space and greater species diversity will persist.

5.2.4 Wetlands zones (open space / woodland)

As part of the River Cree valley system there are areas of marsh /mire habitats and other localised wetland areas prone to flooding. Areas along the important burns are identified in the plan as areas of permanent open space or low density broadleaf planting to complement their local habitats. Others will be identified by future operations during the plan period. These sites will as far as possible remain unstocked as a benefit to invertebrates and bird life although, if water

quality is not diminished, some natural regeneration of native species will be accepted.

5.2.5 Quarries (open space)

Two quarries are identified on the features map and will remain as permanent open space :

Rowantree Quarry (NX34798934)
Kirriemore Quarry (NX37478570)

Inevitably future quarrying will be required to provide source material for forest road construction and maintenance in the area although at present no significant quarry boundary expansion is planned. An enlarged area of open space is included around the quarry to reflect the future expansion of the quarry within the plan period.

Any significant quarry development proposals outwith our agreed tolerances will be submitted to FCS for approval prior to any work taking place (see Appendix II – Tolerance table).

5.2.6 Roads

Limited new forest road construction, along with planned maintenance and upgrade of the existing forest road network is required to meet productive objective for the plan period of this land management plan. The new infrastructure will serve both thinning and clearfell operations.

Around 30% of the planned roads programme for the block is scheduled for construction during the first phase of approval for this plan (see table below).

Table 7 - Road length proposals

Period of Proposed Construction	Proposed length of new forest road for construction
2016 to 2020	1605m
2021 to 2025	345m
Beyond 2025	3145m

A completed application for determination of Prior Approval or Alteration of a Private Way (Forestry) form will be provided to the FCS prior to work being carried out.

Several smaller scale quarries along with proposed / planned forest roads for the plan period and beyond are identified in the suite of LMP maps. Most of the stone material required for the planned forest road upgrade and new construction is available via the internal roads network from the Rowantree quarry (in the west part of the block) and Kirriereoch quarry to the east. Given the high diffuse pollution risk associated with quarry runoff from rainfall derived leaching and direct roadside drain connections to burns, all quarry and drainage arisings should be directed into natural treatment systems and soakaways in accordance with good forestry practice.

5.2.7 Deadwood / veteran trees

There is little in the way of established deadwood throughout the block and there are no veteran trees.

In this block dedicated areas for deadwood creation will rely on identifying around 1% of our conifer plantation as Natural Reserve from which no timber will be removed (see current District Deadwood Management policy and Features map). Coupe 0 is such an example. It should be noted that currently the 1% figure is not wholly met in this LMP.

5.2.8 Woodland

In the conifer dominant commercial areas Sitka spruce will continue to be the main timber species however, where landscape considerations prevail or where site conditions are favourable, NS and SP will also be utilised. Our current policy not to restock with Larch (driven by current and potential future *P. ramorum* infections) will in the long-term result in a loss of Larch forest previously deemed beneficial for black grouse and red squirrel. This potential loss will hopefully be offset through additional planned restocking of SP, NS, other minor conifer and BL and should the restocking embargos be lifted in the future, the reinstatement of some Larch crops.

The following table presents the details of our proposed species restock:

Table 8 - Future selected species by area

Species	Area (ha) in 2027	Total Area %	Total % of forested Area (2427 Ha)	Area (ha) in 2047	Total Area %	Total % of forested Area
Sitka spruce	1151.1	18.3	47.4	1067.9	18.3	44.0
Norway spruce	7.5	0.1	0.3	9.6	0.1	0.4
Larch spp.	75.3	1.2	3.1	66.6	1.2	2.7
LP (other pine)	160.3	2.6	6.6	133.4	2.6	5.5
Scots Pine	24.4	0.4	1.0	25.2	0.4	1.0
Douglas Fir	0.1	0.0	0.0	0.8	0.0	0.0
Other Conifers	6.0	0.1	0.2	0.9 2.5 0.3	0.1	0.2
Broadleaf	225.6	3.6	9.3	243.8	3.6	10.0
Open Space	4629.6	73.7	32.0	4723.2	73.7	35.9
Total	6279.9			6274.2		

Through the period of this plan and beyond, the table 8 shows the progressive reduction in area of Sitka spruce and the modest expansion of Norway spruce and mix of Norway spruce and aspen, other minor conifer species and broadleaf woodland. This increased species diversity should significantly enhance the landscape and provide an improved woodland habitat for the protection of soils with improvements to water quality. Target stocking densities for non-productive broadleaf will be a minimum of 1600stems per hectare (2.5m spacing) at planting with an objective of 1100 stems per hectare at year 5. Restocking will happen where the minimum density should not be reached and there is little chance of natural regeneration with the correct species. The block offers little potential for productive broadleaf plantation, however, there are areas along the Water of Minnoch where patches of alluvial rich soils tend to appear. These areas also have good access from the forest road network and will be considered for planting at productive spacing i.e 4000+ and group/nests method will be preferred. Aspen and alder would be preferred choice of species.

There is also a slight rise in the overall area of permanent open space. Open space remains focussed on riparian zones and their linkages into internal and adjacent hilltop areas some of which may eventually develop into native woodland fringe.

Post clearfelling there will be no conifer restocking within 20m (and on occasion up to 50m) of main watercourses with the riparian zones also benefitting from small areas of additional broadleaf planting. Significant natural regeneration of

conifers within these riparian zones will be managed as resources allow, avoiding the loss of proposed buffer zone.
Where species selection differs markedly from the design plan proposals, detailed restock plans will be submitted to FCS for approval prior to work taking place (see Appendix II Tolerance table).

Despite the lack of squirrel stronghold designation, there is a continued commitment to restocking with an increased proportion of Norway spruce, small seeded broadleaf, Scots pine and the retention, where possible, of areas of mature conifer plantation will ensure that the block remains relatively advantageous towards red squirrel.

5.3 Restructuring

As previously stated, block restructuring remains an important consideration. Whilst our planned clearfell over the period of this plan will continue to gradually alter the spatial appearance and structure of the block, full restructuring will only become apparent during second and subsequent generation crops. Additional areas of minor conifer species and broadleaf restocking and, where possible, the retention of mature conifer species will benefit the internal landscape of the block and add to the overall spatial diversity.

5.4 PAWS restoration

Whilst there are no existing FES PAWS sites within the LMP unit, opportunities still remain for large scale habitat network creation creating links from this plantation to external blocks of adjacent Ancient Semi Natural woodland south down the River Cree valley.

5.5 Deer management

This plan will implement the district deer strategy which is developed between our in house wildlife conservation teams and external stakeholders. This will ensure the best practice of sustainable deer management is implemented district wide in conjunction with achieving national targets. The targets are centred around less than 10% damage impact from deer/herbivores on all tree species.

The Shalloch land management plan area has both red and roe deer present. On the open hill range above the treeline previously had a red deer buffer zone in place, where the intentions was not to shoot Red deer on the open hill ground. The main objective of this policy is to enable the general public visiting the area to be able to see red deer out on the open hill range. This policy has been revised and there will be a reduction in numbers of the deer present before the area is planted with broadleaves to ensure establishment.

There are significant ongoing issues with large numbers of sheep intruding into many areas of the forest and especially on vulnerable restocking sites. This has a

negative impact on ground flora and of course productive planted sites. These issues are trying to be addressed especially the significant lengths of porous fencing which has a considerable cost implication. There has also been a new strategy implemented at a national level with involvement from the NFU regarding sheep intrusion into the NFE and a system for reporting sheep intrusions.

Cull figures fluctuate but predicted culls are based on Deer Population Assessments (DPA) carried out by independent contractors.
The most recent surveys carried out in 2013 estimate figures of around 10-15 deer per kilometre square with average culls over the last 5 years of around 155 animals per year from the LMP area with almost a 50% split between Red and Roe Deer.

The aim of current policy is to reduce deer densities from 10-15 deer per km^2 to 5 deer per km^2 within the woodland area in order to ensure all tree species including natural regeneration and associated habitats are protected from negative impacts from deer.

In addition it is key that the current sheep presence is eliminated from this forest block in order to allow future objectives to be achieved.

New ATV tracks will be constructed along restocked coupes adjacent to open hill areas or along the larger riparian zones. Careful consideration will be given to their absolute need and location. Where required, they will be constructed to one of two agreed standards.

- Tracks along riparian zones will involve minimal ground disturbance work.
- Those not following riparian zones will involve removing topsoil and levelling the surface with a drain on the top side and will be a maximum of 2m wide.
- No trees will be planted within 5m of the track centre.

Temporary quad bike tracks will also be formed with minimum ground disturbance. They will generally follow old unplanted rides, with levelling to negotiate side slopes and be spaced at approximately 400m intervals. There will be no unplanted margin around these temporary tracks and they will subsequently be subsumed into the plantation as tree canopy closes. Forest and Water guidelines (Fifth edition) will be adhered to during their construction and crossing points will be piped as required.

Deer glades, typically up to 1.0ha in size, are not shown on the suite of Land Management Plan maps. Precise locations will be identified and inserted at time

of restocking when a member of Wildlife team member and Forest Management have had the opportunity to fully assess site conditions post clear fell.

5.6 Pathogens, Diseases and Invasive Non native species

Hylobius abietis also known as pine weevil, can cause extensive damage to young conifer crop and is found in the plan area and throughout the district. As part of the district's chemical minimisation strategy, the Hylobius Management Support System (HMSS) was used over a 6-year period to measure *Hylobius* populations on clearfell sites. Using billet traps an extremely high proportion of the districts conifer restock areas were assessed in this period. Weevil numbers were recorded and used along with other site data to determine the optimum time for site restocking. This more flexible fallow period between felling and re-stocking may result in restocking not taking place within three years of felling. (Appendix II Tolerance Table).

Phytopthora ramorum infection has been confirmed on Larch throughout the district with all infected groups initially felled to comply with the requirements of a Statutory Plant Health Notice (SPHN). The Shalloch LMP area has been particularly affected and coupes containing mature infected Larch 01004, 01064 and 01056 and several LTR were prioritised for felling. Although not a particularly significant component in previous planned restock, it is likely in this plan that the species will become a negligible component of the local woodland with alternative conifer (not Sitka spruce) and broadleaf woodland contributing more towards the species diversity of the block.

Invasive non-native species (INNS) impact the biodiversity of an area directly and are recognised as a significant risk to water environments. There are a few records of *Rhododendron ponticum* in the LMP area and these are being vigorously controlled. There are no records of, Japanese Knotweed, Giant Hogweed or Himalayan Balsam. Monitoring is ongoing and identified species will continue to be treated as per the District's Invasive Species Policy until eradicated.

5.7 Waste on site (including felling waste)

There are no plans to carry out chipping, mulching or spreading of forest waste over the plan area for ecological site improvement. Occasional felling to waste may however take place where the removal of natural regeneration is required to maintain the integrity of riparian zones.

SEPA will be consulted (reference their guidance on "Management of Forestry Waste 2013) and detailed action plans will be submitted to FCS for approval prior to any work taking place.

5.8 Tolerances

Tolerance thresholds for design plan amendments are as per our Tolerance Table (based on CSM6 Appendix 3 and subsequent to local agreement with FCS South Scotland staff) and the *P. ramorum* working tolerance table for larch found in Appendix II

5.9 Critical Success Factors

Development of the River Cree riparian corridor

Monitor water quality on an ongoing basis in collaboration with stakeholders

Apply prescription to riparian corridors after survey in year 3

Development of the wildlife corridor to link the population of black grouse

Bird surveys to ensure that population of black grouse either side of the forest block maintain populations before 5 year review of plan

Forest survey to ensure that forest conditions remain favourable to Black Grouse at year 4 of plan

Establishment of large woodland edge planting in the around the north and eastern edge of the plan area

Forest survey for appropriate density and species at year 3 post planting/establishment.

5.10 Amendments

To be logged on amendment form

Appendix I: Land Management Plan Consultation Record

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
Galloway Fisheries Trust: Jamie Ribbens	02 July 2015	07 September 2015	• Consider peatland restoration around Loch Moan and Upper Cree • Consider riparian zone widths in excess of FWG particularly named burns and Water of Minnoch feeder streams to the east • Ensure drainage ditches do not run directly into main watercourses (block them)	• Noted in LMP text (section 3.1.2 & 3.2)
Historic Scotland: John Malcolm	02 July 2015	27 July 2015	• 2 SAM sites identified with suggestions for view enhancements at restock	• Noted in LMP text (section 3.5 & appendix III)
RSPB Crossmichael: Julia Gallagher	02 July 2015	24 July 2015	• Support proposed habitat enhancements for Black Grouse • Question the objective of increasing BL around Loch Moan and deep peat areas • Need for pre-fell survey work to protect breeding raptors identified	• Comments noted in LMP text (sections 3.2, 5.1 & 5.2)

Cree Valley Community Woodland Trust: Peter Robinson	02 July 2015	23 July 2015	• Conifer regeneration in riparian and woodland fringe areas • Species specific information • Riparian buffer comments	• Comments noted in LMP text (sections 3.1, 3.2 & 5.2)
Rosemary Green;IUCN Otter Specialist Group	02 July 2015	20 July 2015	• Various notes on mammal records for area	• Noted in DP text (section 3.2)
SEPA: John Gorman; Newton Stewart office	02 July 2015	15 July 2015	• Identified importance of exceeding guideline recommendations for water quality and watercourse management considerations in R Cree catchment • management of natural regeneration • management of forestry waste • drainage management and pollution protection • protection of private water supplies	• Comments noted in DP text (sections 3.1, 3.2 & 5.7)
Land Ownership Scotland	26 June 2015	14 July 2015	• Ownership resolution	• Noted in DP text (section 1.2)
SNH Newton Stewart office: Stuart Graham	02 July 2015	No comment received	•	•
FCS South Scotland Conservancy: Dumfries office	02 July 2015	No comment received	•	•
Dumfries & Galloway Regional Council: Simon Fieldhouse	02 July 2015	No comment received	•	•

CONFOR: Jamie Farquhar	02 July 2015 by email	No comment received	•	•
Saving Scotland's Red Squirrels: Heinz Traut	02 July 2015	No comment received	•	•
Visit Scotland: Paula McDonald	02 July 2015	No comment received	•	•
Cree Valley Community Council : Morag MacIlwraith	02 July 2015	No comment received	•	•
Scottish Woodlands : Alastair Menarry	02 July 2015	No comment received	•	•
UPM Tilhill: GlennHeggs	02 July 2015		•	•

Appendix II: Tolerance Tables

1. Adjacency issues will normally be dealt with through delayed felling i.e. a coupe will not be felled until all surrounding crops are at least 2m tall

2. Where this cannot be achieved then adjacency issues may be dealt with through delayed restocking i.e. a coupe will not be restocked until all surrounding crops are at least 2m tall. Where this approach is adopted an assessment must be made and recorded, at the time of the decision being taken, to ensure wider forest and habitat structure is not being significantly compromised. Such evidence must be presented at 5 year review

3. Tolerance Table:

	Maps Required (Y/N)	**Adjustment to felling period ***	**Adjustment to felling coupe boundaries ****	**Timing of Restocking**	**Changes to Restocking species**	**Changes to road lines**	**Designed open ground *****	**Windblow Clearance ********
FC Approval normally not required	N	• Fell date can be moved within 5 year period where separation or other constraints are met.	• Up to 10% of coupe area.	• Up to 3 planting seasons after felling.	• Change within species group e.g. evergreen conifers or broadleaves.		• Increase by up to 5% of coupe area	
Approval by exchange of	Y		• Up to 15% of coupe area	• Between 3 and 5 planting seasons		• Additional felling of trees not	• Increase by up to 10% of coupe area	• Up to 5ha

letters and map				after felling, subject to the wider forest and habitat structure not being significantly compromised.		agreed in plan. • Departures of > 60m in either direction from centre line of road	• Any reduction in open space of coupe area by planting.	
Approval by formal plan amendment may be required	Y	• Felling delayed into second or later 5 year period. • Advance felling (phase 3 or beyond) into current or 2nd 5 year period.	• More than 15% of coupe area.	• More than 5 planting seasons after felling, subject to the wider forest and habitat structure not being significantly compromised.	• Change from specified native species. • Change Between species group.	• As above, depending on sensitivity.	• In excess of 10% of coupe area. • Colonisation of open space agreed as critical.	• More than 5ha.

NOTES:

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

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

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

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

TABLE OF WORKING TOLERANCES SPECIFIC TO LARCH WITH THE INFECTED ZONE

	Adjustment to felling period *	**Adjustment to felling coupe boundaries**	**Timing of restocking**	**Changes to Species**	**Changes to road lines**
FC Approval normally not required	Fell date for all larch can be moved and also directly associated other species	Larch areas can be treated as approved coupes. Other conifers directly associated with larch being felled, may also be removed up to an equivalent of 20% of the area occupied by the larch or 5 ha, whichever is greater	To be undertaken within the overall plan approval period	Replacement as per the agreed restock plan, but where this is not specified or is larch this may be replaced with either another diverse conifer (not SS) or Broadleaves.	
Approval normally by exchange of letters and map. **In some circumstances Approval by formal plan amendment may be required**		Removal of areas of other species in excess of the limits identified above.	Restocking proposals outwith the plan approval period	Restocking proposals for other species which do not meet the tolerances identified above.	New roadlines or tracks directly necessary to allow the extraction of Larch material

Appendix III: Ground Truthed Heritage sites

NAME	OS_GRID_RE	FEATURE_SI
ARROCH HILL	NX370847	A field-system annotated 'Old Fences' and one unroofed structure annotated 'Hay Ree' are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13).
HOUSE & SHEEP PEN	NX369896	HOUSE & SHEEP PEN
HLA Relict Area	NX379847	SITE IDENTIFIED BY HLA û NO FURTHER INFORMATION AVAILABLE.
HLA Relict Area	NX378849	SITE IDENTIFIED BY HLA û NO FURTHER INFORMATION AVAILABLE.
KIRRIEMORE	NX366859	One unroofed structure annotated 'Old Hay Ree' and one enclosure are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13).
TARFESSOCK	NX364886	A farmstead comprising three or four buildings measuring 26.3m x 3.5m, 16.9m x 4m and 8.5m x 3.6m. Best preserved stone walled enclosure is 23.7m by 18.2m and a rectangular stony platform 7.4m x 3.8m and up to 0.4m high). Abandoned before 1856.
SHEEP PEN	NX378899	A circular sheepfold with a short length of wall extending to the SW.
SHIELING	NX385912	A possible sheiling hut.
SHALLOCH	NX385921	An enclosure is depicted on the 1st edition of the OS 6-inch map (Ayrshire 1858, sheet lvii). The depiction matches a pond on the 25cm Orthorectified AP.

SHEEP PEN	NX361903	A circular sheep pen.
SHEEP PEN	NX362903	Sheep pen.
SHEEP PEN	NX385870	A sheepfold comprising five compartments.
KIRSHINNOCH BURN	NX386869	Four possible sheiling-huts and a small enclosure are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 7).
KIRRIEMORE BURN	NX376867	Two unroofed structures annotated 'Sheep Ree' and 'Old Sheep Ree' are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13).
KIRRIEREOCH LOCH	NX368864	What may be a farmstead annotated 'in ruins', comprising one unroofed building and one enclosure, and a head-dyke are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13).
KIRRIEMORE	NX379855	Two unroofed structures annotated 'Hay Rees' are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13).
KIRRIEMORE	NX376857	A single unroofed structure annotated 'Hay Ree' attached to a boundary dyke is depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13).
KIRRIEREOCH LOCH	NX368864	A farmstead, comprising one unroofed building annotated 'Ruins' and a field-system annotated 'Old Fence' and one unroofed structure annotated 'Sheep Ree' are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13).
PILLOW BURN	NX373888	A circular structure, possibly a sheepfold is depicted and annotated 'Hay Ree' on the 1st edition of the OS 6-inch map (Ayrshire 1858, sheet lxiii).

BUTTER BURN	NX364834	One unroofed structure aligned E/W annotated 'Hay Ree' attached to a E/W wall is depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13).
KINGS CHAIR	NX369834	A small field-system annotated 'Old Fences' is depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13).
KIRN BURN	NX400842	An enclosure annotated 'Old Sheep Ree' and a small structure are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13).
BENYELLARY	NX408834	A cairn, 1m high.
BENYELLARY	NX408833	A boulder with natural weathering which has been miss-identified as a cup and ring marked stone.
KIRRIEMORE	NX375856	What may be a farmstead, comprising one unroofed building annotated 'Ruin' and three enclosures, and one unroofed structure annotated 'Old Hay Ree' is depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13).
SHEEP PEN	NX373895	SHEEP PEN
TARFESSOCK	NX366889	The moss-covered remains of a cairn about 25 m in diameter, on which a sheep ree has been built.
HOUSE & SHEEP PEN	NX369896	HOUSE & SHEEP PEN
SHEEP PEN	NX369899	SHEEP PEN
WATER OF MINNOCH	NX359872	A farmstead comprising two unroofed buildings, one of which has two compartments, one partially roofed building, one roofed building and two enclosures is depicted on the 1st edition of the OS 6-inch map (Ayrshire 1858, sheet lxiii).

PILLOW BURN	NX366877	One unroofed structure annotated 'Old Sheep Ree' is depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 7).

Appendix IV: Coupe details for clearfell and establishment

Clearfell

Coupe	SS	NS	Larch	SP	LP	Other con.	BL	Open space	Total
01015	18.0	-	-	-	-	0.1	-	-	18.1
01029	32.4	-	0.8	-	-	-	-	-	33.2
01032	62.4	-	-	-	-	-	-	-	62.4
01047	34.2	-	-	-	-	-	-	7.5	41.7
01054	2.2	-	-	-	-	-	-	8.0	10.2
01059	11.1	-	-	-	2.5	-	-	-	13.6
01089	29.9	-	-	-	-	-	-	-	29.9
01104	20.9	-	-	-	5.9	-	-	0.3	27.1
01111	0.6	-	-	-	-	-	-	-	0.6
total	211.7	-	0.8	-	8.4	0.1	-	15.8	236.8

Restock

Coupe	SS	NS	Larch	SP	LP	Other con.	BL	Open space	Total
01015	3.9	2.2	-	-	2.6	-	1.5	7.9	18.1
01029	19.1	-	-	-	2.1	-	3.3	8.7	33.2
01032	39.8	-	-	-	2.9	-	0.3	19.4	62.4

01047	13.1	-	-	-	8.7	-	15.4	4.5	41.7
01054	6.1	-	-	-	-	-	4.1	-	10.2
01059	5.8	-	-	-	3.9	-	3.3	0.6	13.6
01089	18.9	-	-	-	7.2	-	2.5	1.3	29.9
01104	8.8	1.4	-	-	5.9	-	5.0	6.0	27.1
01111	-	-	-	-	-	-	0.6	-	0.6
total	115.5	3.6	-	-	33.3	-	36.0	48.4	236.8

Notes on coupe work schedule

01015	Sitka main crop matrix, along with areas of Norway Spruce and broadleaf for additional species diversity and adding visual interest from the Nick of the Balloch road. The tree line is drawn down from higher areas in the west for woodland fringe creation (see Map 1 – Analysis and Concept). There is an expectation that broadleaf species will colonise open areas in the east and west of the coupe via natural regeneration. This is in line with the woodland fringe / open hilltop methodology set out at 5.2.2.
01029	Sitka main crop matrix with additional open space and broadleaf species for riparian zone benefits for Knochlach Burn and Shiel Rig Burn to the north, south and west of the coupe. This is in line with the riparian zones / aquatic zones methodology set out at 5.2.3.
01032	Sitka main crop matrix with additional open space and broadleaf species for riparian zone benefits for Kochlach Burn and Shiel Rig Burn to the north and south, as well as black grouse habitat and woodland fringe enhancement to the east. There is an expectation that broadleaf species will colonise open areas in the east of the coupe via natural regeneration. This is in line with the woodland fringe / open hilltop methodology set out at 5.2.2 and riparian zones / aquatic zones methodology set out at 5.2.3.
01047	Sitka main crop matrix has been drawn down from higher slopes of Tarfessock and back from riparian zone of Cross Burn. These areas are replaced by open ground with the

	expectation of broadleaf regeneration for black grouse habitat and woodland fringe enhancement (see Map 1 – Analysis and Concept). This is in line with the woodland fringe / open hilltop methodology set out at 5.2.2 and riparian zones / aquatic zones methodology set out at 5.2.3.
01054	Areas of Sitka on land awaiting planting following earlier amendment. Mixed broadleaf planting to vary riparian habitat uphill from Rowantree Burn and to add visual interest from the Nick of the Balloch and Straiton roads. This is in line with the riparian zones / aquatic zones methodology set out at 5.2.3.
01059	Sitka main crop matrix with areas of open ground and broadleaf planting for riparian enhancement adjacent to Rowantree Burn and an unnamed tributary further south. This is in line with the riparian zones / aquatic zones methodology set out at 5.2.3.
01089	Areas of Sitka and Sitka main crop matrix with a small area of birch and broadleaf planting at the source of an unnamed tributary burn to the Water of Minnoch in the west of the coupe. This is in line with the riparian zones / aquatic zones methodology set out at 5.2.3.
01104	Sitka main crop matrix with considerable areas given to open ground and broadleaf planting for riparian enhancement adjacent to the Water of Minnoch at the east of the coupe and unnamed tributaries running through the coupe. This is in line with the riparian zones / aquatic zones methodology set out at 5.2.3.
01111	An area of mixed broadleaf planting to vary riparian habitat uphill from Rowantree Burn and to add visual interest from the Nick of the Balloch and Straiton roads. This is in line with the riparian zones / aquatic zones methodology set out at 5.2.3.

Appendix V: Coupe details for clearfell and establishment

A BRIEF FOR SHALLOCH LMP
Main management objectives in this large scale plan focus on Water quality (within the R Minoch catchment) and Timber production.
The block lies some 20.0km northwest of Newton Stewart, Dumfries & Galloway.

Key Strategic directions from role of Scotland's National Estate	Local District Strategic Plan Objectives	Actions / Prescriptions
Healthy: Good environmental and silvicultural condition in a changing climate	• Commitment to high quality silviculture and increased use of alternatives to clearfell • Stewardship of carbon resources locked up in Estate's trees and soils • Adapt to climate change and make woodlands more resilient to pressure • Deal with invasive species that threaten habitats and biodiversity	• *Increase* the area of broadleaf woodland to *establish / maintain* a permanent woodland infrastructure along riparian zones (Creebank Burn, Cairnfore Burn, Fardin Burn and R Cree) • *Implement* National deep peat restocking / restoration policy and increase the overall area of peatland restoration within the district (potential sites around Loch Moan / R Cree) • *Improve* resilience through increased use of woodland managed under LISS (restricted to lower lying areas associated with R Cree) and smaller coupe size • *Increase* use of natural regeneration in our restocking • *Control* invasive species as per FES guidelines (specifically *R. ponticum* and American Mink)
Productive: provide sustainable economic benefits from the land	• Contribute to the local economy by maintaining core timber production and roads infrastructure	• *Meet* production forecast commitment through felling programme reflected in the felling phases • *Implement* road construction / maintenance programme required to service proposed harvesting operations
Treasured: a multi-purpose resource that sustains livelihoods, improves quality of life and offers involvement and enjoyment	• Involve and engage with local people / encourage partnership working • Recognise the Estate as a place for volunteering, research and development	• Continue to *consult* with local communities and stakeholders through Forest panel and Land Management Plan process and work with third sector partners • *Incorporate* Research and Development into Land Management Plans • *Incorporate* the Biosphere buffer & Dark Skies park zones objectives into plan
Accessible:	• Improve access and enhance existing facilities	• *Retain and improve* access to block specifically access for hill walkers through existing / future plantation to open hill tops and heritage features

woodlands that welcome and are open for all	• Use for health benefits and outdoor learning	and access to fishing and the principal forest recreation facilities • *Enhance and improve* this key welcome corridor to Galloway Forest Park through additional structural and species diversity • *Continue to liaise* with Ministry of Defence over area usage within Galloway Training Area
Cared for: working with landscape and the natural and cultural heritage	• Maintain open habitats in good ecological condition • Landscape • Increase area of broadleaf cover in block • Conserve vulnerable species • Safeguard heritage features	• Block is visually prominent from minor road; *maintain and enhance* local landscape through additional species diversity, open space integrated management and revised coupe shapes to better suit landform • *Increase* area of native BL throughout plan area for added biodiversity, targeting a permanent BL woodland infrastructure along riparian zones (Creebank Burn, Cairnfore Burn, Fardin Burn and R Cree) • Although the block is not part of the priority area for Red squirrel, the species is present throughout; *maintain* area for Red Squirrel (priority species) through retentions and increased use of alternative conifer species to Sitka Spruce where appropriate • Adjacent to but not part of the core area for black grouse (priority species), the species is using some of the larger clearfell sites; *enhance* habitat for Black Grouse through creation of additional open space and broadleaf areas (woodland fringe and / or Peatland Edge Woodland) • The R Cree catchment is important in water quality terms and also for the Atlantic Salmon; *manage* watercourses and private water supplies within LMP unit to meet the UKWAS standards, the Water Framework Directive and the Forest and Water guidelines to *maintain and improve* water quality within the R Cree catchment • Loch Moan is important for breeding birds; enhance the aquatic and riparian habitat through the creation of additional BL woodland (Peatland Edge Woodland) and open space • *Manage* SAMs (Cairnderry Chambered Cairn and Sheuchans Chambered Cairn) and all other minor heritage features as per FES guidelines
Good value	• Seek diverse range of income streams • Reduce carbon emissions from business activities	• *Continue* to offer deer leases over plan area

ACHIEVED BY PLAN

HEALTHY

Y/N Committed to high quality silviculture and increasingly using alternatives to clearfell (LISS): limited opportunities for LISS expansion (eastern section of block)

Y/N Committed to dealing with invasive plants that threaten habitats and biodiversity: none currently identified within block

Y/N Help the estate to adapt to climate change and become more resilient to pressure: Ongoing proactive control of P ramorum, alternative species restocking and an operational Deer management plan for block in place

PRODUCTIVE

Y Supply three million cubic metre of sustainable softwood: LMP felling programme is reducing throughout period of plan but will continue to modestly contribute to the overall district programme

Y/N Manage at least one quarter of our expanding broadleaf woodlands to produce quality hardwood and fuelwood: plan has limited potential to contribute towards this figure with increased BL restocking principally for biodiversity and landscape considerations

Y/N Work with partners to find new ways to harness our natural and cultural heritage and develop the estate's potential for tourism: limited benefits with LMP falling outwith core district recreation area

Y/N Support Scottish Governments woodland expansion programme: block presents limited opportunities for woodland expansion

Y/N Plan to increase the agricultural use of the estate where this is consistent with environmental objectives: block presents limited opportunities for agricultural land use expansion

TREASURED

Y Recognise the value of the Estate as a place for research and development of best practice: block has potential for further flood management development in the R Cree catchment

Y/N Committed to more unique special places across the estate and delivering benefits to a more diverse range of Scotland's people: peatland edge woodland and woodland fringe creation will deliver additional habitat diversity

Y Continue to use the Estate as a place for volunteering and gaining employment skills: block has previously been used by volunteers (Cree Valley Community Woodlands)

ACCESSIBLE

Y/N Invest available resources into high quality facilities that encourage and help visitors experience and enjoy the outdoor experience: block presents limited opportunities for development

Y/n Use estate for health benefits and outdoor learning: block has moderate capacity as part of the green mountain bike route

Shalloch Land Management Plan 2017-27

CARED FOR

Y Restore 85% of areas on ASNW to native species: block has limited potential to improve district restoration targets

Y/N Increase BL tree cover from 8% woodland cover to 20%: projected BL cover will have limited potential to contribute towards district's BL tree cover expansion targets through additional restock / natural regeneration

Y Identify particularly vulnerable species for which the NFE is important and take specific conservation action (Black Grouse / Red Squirrel): not a priority area for either of these species however proposed woodland fringe and open space creation should potentially benefit both populations

Y Safeguard archaeological sites through planning and management and recognise special places and features with local cultural meaning: SAM sites and local heritage features will be managed accordingly

Y Committed to maintaining best open habitats in good ecological condition: block presents opportunities for open habitat management around Loch Moan and open ground to north

GOOD VALUE

Y/N Seek a range of income sources to underpin the cost of managing the Estate and look for ways to achieve best value in delivery of public benefits: block presents limited opportunities for income from sources other than timber

Appendix VI: The UK Forestry Standard, Forestry Commission Guidelines and the UK Woodland Assurance Scheme (UKWAS)

All of the operations in Shalloch plantation will be carried out in accordance with the UK Forestry Standard and its supporting publications. In particular the following documents are relevant:

- Forests and Water Guidelines (5th edition)
- Forest and Nature Conservation Guidelines
- Forest and Archaeology Guidelines
- Forest and Soil Guidelines
- Forest Practice Guide - Forest Land Management Planning
- Galloway FD Deadwood Management Policy
- Galloway FD Deer Management Strategy Plan

In line with Forest Enterprise Scotland policy, Galloway FD has undergone an audit that is part of the process leading to certification under FSC and PEFC standards, using UKWAS. Membership of the scheme indicates that the District's forests and management practices have been found to be sustainable in terms of silvicultural, economic and environmental impact. Membership of the scheme is conditional on periodic audit and consistent attainment of audit standards.

Shalloch Land Management Plan will be included in this audit process.

Appendix VII: Assessment of felling and restock proposals within catchments at risk and failing.

Although the Upper Cree LMP impacts on 7 catchments at risk / failing most of the plan area lies within two catchments; Upper Cree 31 and Upper Cree 32 (see detail below). Catchments 92 and 93, previously identified in the White Clauchrie plan, present situations similar to these Upper Cree catchments. Areas of closed canopy forest are also not projected to be less than 30% of the catchments in 15yrs time.

Upper Cree31 catchment at risk / failing catchment

The total area of this water catchment centred on Loch Moan within the Upper Cree LMP area is 1434.5ha. The catchment is principally 1412.7ha* of FES land with an additional area of Loch Moan 21.8ha that is privately owned. See below for base catchment area detail as at 22 February 2016.

Open ground area (FES land)	387.5ha
Plantation area (FES land)	1025.2ha
Total catchment area (FES land)	1412.7ha*
20% of catchment (FES land)	282.6ha
30% of catchment (FES land)	423.9ha

The felled area within the catchment in any 3 year period needs to be less than 20% of the catchment. The table below based on the planned coupe felling programme confirms that this is the case.

5yr Fell period	Currently proposed felled areas (ha)	Proposed fell area as % of catchment area
2016-18	**90.1**	6.4%
2017-19	**44.6**	3.2%
2018-20	**64.3**	4.6%

2019-21	**88.5**	6.3%
2020-22	**88.5**	6.3%
2021-23	**30.7**	2.2%
2022-24	**39.3**	2.8%
2023-25	**39.3**	2.8%
2024-26	**39.3**	2.8%
2025-27	**0.0**	0.0%

The area of closed canopy conifer forest (age > 15years) needs to be less than 30% of catchment in 15 years' time i.e. 423.9ha. **The table below confirms that this is not the case.**
In the table the proposed fell area for the next 15yrs within the catchment is subtracted from the current plantation area in the catchment to give a notional area of 800.2ha of plantation within the catchment over 15yrs age (assumes that felled areas will be restocked within 2-3yrs of felling subject to planned restock and Hylobius Management Support System).

Current plantation area within catchment	1025.2ha
Proposed felled area between 2016 -2030 (15yrs)	225.0ha
Notional plantation area in 15yrs time > 15yrs age	**800.2ha**

Upper Cree32 catchment at risk / failing catchment

The total area of this sizeable water catchment straddling the A714 and covering the southern section of the Upper Cree LMP area is 2664.5ha. Only 1791.5ha* of the catchment comprises FES land with the remainder a mix of agricultural open ground and private conifer plantation. Calculations are based solely on available FES data, see below for base catchment area detail as at 22 February 2016.

Open ground area (FES land)	426.3ha

Plantation area (FES land)	1365.2ha
Total catchment area (FES land)	1791.5ha*
20% of catchment (FES land)	532.9ha
30% of catchment (FES land)	799.4ha

The felled area within the catchment in any 3 year period needs to be less than 20% of the catchment. The table below based on the planned coupe felling programme confirms that this is the case.

5yr Fell period	Currently proposed felled areas (ha)	Proposed fell area as % of catchment area
2017-19	**188.9**	7.1%
2018-20	**92.5**	3.5%
2019-21	**130.2**	4.9%
2020-22	**130.2**	4.9%
2021-23	**83.6**	3.1%
2022-24	**30.7**	1.2%
2023-25	**30.7**	1.2%
2024-26	**9.7**	0.4%
2025-27	**48.0**	1.8%
2026-28	**48.0**	1.8%

The area of closed canopy conifer forest (age > 15years) needs to be less than 30% of catchment in 15 years' time i.e. 799.4ha. **The table below confirms that this is not the case.**
In the table the proposed fell area for the next 15yrs within the catchment is subtracted from the current plantation area in the catchment to give a notional area of 967.5ha of plantation within the catchment over 15yrs age (assumes that felled areas will be restocked within 2-3yrs of felling subject to planned restock and Hylobius Management Support System).

Current FES plantation area within catchment	1365.2ha
Proposed felled area between 2017 -2031 (15yrs)	397.7ha
Notional plantation area in 15yrs time > 15yrs age	**967.5ha**

Appendix VII: References

Forestry Commission Scotland, (2015). *Deciding future management options for afforested deep peatland*. Forestry Commission Scotland Practice Guide. Forestry Commission, Edinburgh. Available from http://scotland.forestry.gov.uk/images/corporate/pdf/afforested-deep-peatland-management-options.pdf

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