

Loch Trool Land Management Plan 2018-28

Galloway Forest District

LOCH TROOL FOREST BLOCK

Land Management Plan

Approval date:

Plan Reference No: FDP 11

Plan Approval Date: 2018

Plan Expiry Date: 2028

Loch Trool Land Management Plan 2018-28

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



Loch Trool Land Management Plan 2018-28

CSM 6 Appendix 1

FOREST ENTERPRISE – Application for Forest Design Plan Approvals Forest Enterprise – Property

Forest District:	GALLOWAY FD
Woodland or property name:	LOCH TROOL
Nearest town, village or locality:	NEWTON STEWART
OS Grid reference:	NX410 796
Local Authority district/unitary Authority	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
Forest District Manager

Signed
Conservator

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

Conservancy

Date

Date of Approval:

Date approval ends:

*delete as appropriate

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- Analysis and concept map
- Features map
- Soils Map
- Management map
- Future Habitats and Species map
- Visitor Zone map

Appendices:

- i) Land Management Plan Consultation record
- ii) Tolerance table
- iii) Ground Truthed Heritage sites
- iv) Coupe details for clearfell and establishment
- v) Loch Trool Land Management Plan Brief
- vi) The UK Forestry Standard, Forestry Commission Guidelines and the UK
Woodland Assurance Scheme (UKWAS)
- vii) Assessment of felling and restock proposals within catchments at risk and
failing

Summary of Proposals:

The primary objective for this Land Management Plan is to achieve a balanced forest block, utilising a zonal approach to establish a link between two nationally recognised SAC/SSSI/ASNW areas utilising local provenance native species, enhancing LISS areas, enhancing internal viewpoints along with general visual amenity. The plan also aims to retain production in areas where this is appropriate while ensuring that there is minimal impact to the other zones of the LMP.

1.0 Introduction:

1.1 Setting and context

Loch Trool, which is part of Galloway Forest District, is a former estate with both agricultural and forested area. The standing forest is, unlike some of the other areas in Galloway Forest District, not linear in shape, but still of a large scale. The east and south of the block lie contiguous with adjacent forested areas, with the North and East providing the gateway to the Galloway hills which are important open habitats. There are many water bodies within the plan area, including the central Loch Trool which is the main focus for visitors and tourism in the plan area. The plan incorporates two key designated areas; the Glentrool oakwoods and the Merrick Kells. The forest management area also has the historic battlefield of Glentrool, a monument at the viewpoint opposite the battlefield known as Bruce's stone. The LMP area is a central feature of the Galloway dark sky park and contains sections of the southern upland way and 7Stanes cycle routes. Both the Merrick Hill race and the Galloway Gallop take place annually within the block. The only renewables interest within the block is a micro hydro scheme which supplies a local residence within the plan area. The block, totalling some 3107ha, is a one of the most important areas for tourists in the Galloway area and this plan seeks to accommodate the desires of visitors to the LMP area while maximising ecological and habitat network benefits.

This plan is a comprehensive update of an earlier plan approved in June 2004.

1.2 History of plan

Loch Trool LMP was initially approved as a forest design plan in 1998, with resubmission in September 2003. Due to the expiry of the approved plan, there have been two major operations completed via amendment – to fell the southern Loch Trool face and plant the area at the top of the Bennan. The felling operation on the southern side of Loch Trool required skyline felling and the creation of additional forest road, which was completed in 2016. The planting of the Bennan in a fenced enclosure was completed in 2017.

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There is some evidence to suggest that the Glentrool oakwoods may be an ancient remnant of oak forest, with coppicing in areas dating back to the 1800's at a minimum (Edlin, 1965). More recent afforestation began in 1947, with the conversion of some sheep grazing areas to productive conifer. This has been changed more recently to a reduction in productive conifers and an increase in broadleaves with recognition of the increasing value of habitat and tourism. Little of the first rotation of conifer remain in the vicinity of the loch, with the north of the forested area being the largest contiguous block of non-native conifer. The area has been heavily harvested over the last decade or so, as part of Larch *Phytophthora ramorum* management which has resulted in an increase the pace of transition in areas to broadleaf, native conifer, woodland fringe and open space.

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
Design coupe size and structure in most visible areas, to minimize visual "intrusion" to landscape created by clearfelling and ground preparation for replanting.	<p>The plan area has been extensively harvested recently due to <i>P. ramorum</i> infection and subsequent management operations. So the visual intrusion on the south face of the loch has been greater than set out in the approved plan.</p> <p>Visual diversity has been enhanced with revised coupe shapes, felling/restocking, and adherence to adjacency guidance where possible.</p>
Create access for harvesting machinery onto currently inaccessible face above L. Trool to allow implementation of harvesting and subsequent restocking with the species which will enhance the area.	Under an approved amendment, access to the southern face of Loch Trool was created to allow skyline harvesting to occur and clear the area of Larch and a significant area of spruce.
Enhance the landscape and recreation value within the area	Since the previous plan has been approved, Loch Trool has been incorporated into the dark skies park, with Loch Trool being recognised as the darkest place in the UK. The Southern Upland Way has been maintained with disruption due to harvesting operations being minimised. The walking paths to the Merrick, Bruce's stone, cycle routes and associated parking facilities have all been maintained. The visitor's centre in the neighbouring plan has been renovated and modernised.
Maintain and improve linkage between the existing ancient Oak woodland	The opportunities for improving this were limited by not wanting to create a large visual disturbance and the lack of access to the southern face. Some broadleaves were introduced along the face, but needed protection for establishment.
Enhance visual, recreation and environmental value of area	The objective to redistribute the Sitka away from areas that are extensively used by the public and

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through restocking proposals	internal viewpoints has continued, with the use of broadleaves, Scot's pine and alternative conifers. This is especially marked around the Merrick hill path and the Southern Upland Way
Secondary objectives	
Commercial softwood timber production	With the harvesting of the South face, this plan has reached the peak of commercial softwood production. There will be some commercial capacity retained, but will be mostly on the edge of the forest area.
Restructuring of even aged plantation to create a diverse age structure between coupes to benefit habitat & visual diversity	Areas have been targeted for long term retention giving diversity of age structure. The management operations for both <i>P. ramorum</i> and harvesting have provided opportunities for alternative species restock and coupe redesign. The age diversification process has continued throughout the plan period with the next rotation will be required to achieve a large age diversity.

3.0 Background Description

3.1 Physical site factors

3.1.1 Geology, Soils, and landform

The upland area lying to the north-east of the plan is dominated by the massive Loch Doon granite intrusion of the Old Red Sandstone era with its surrounding harder layered rocks forming a metamorphic aureole. This is mostly unforested and forms a rugged hinterland. This area houses the Merrick Kells SSSI. The western area comprises of Ordovician and Silurian greywackes and shales with a number of igneous dykes. These are the underlying geology for most of the forested area.

The geology has played a major role in forming the landscape and this has been further sculpted during periods of intense glaciation. The LMP includes the headwaters of the Water of Trool and open hill tops of the Merrick Kells with steep slopes above the west-east orientated Loch Trool valley. Loch Trool itself lies within a basin deepened by glacial scouring. Altitudes range from 75m from Loch Trool foreshore, to the peak of the Buchan Hill at 562m.

The soils are varied across the site with 20% indurated, 22% podzolic ironpan soils, 13% peaty rankers and the rest of the soils mainly gleys and peats. A more detailed breakdown is shown in figure 1 below. The forested areas tend to be on the better soils around the loch edge. The soil survey data for the LMP has improved greatly in detail since the last plan submission.

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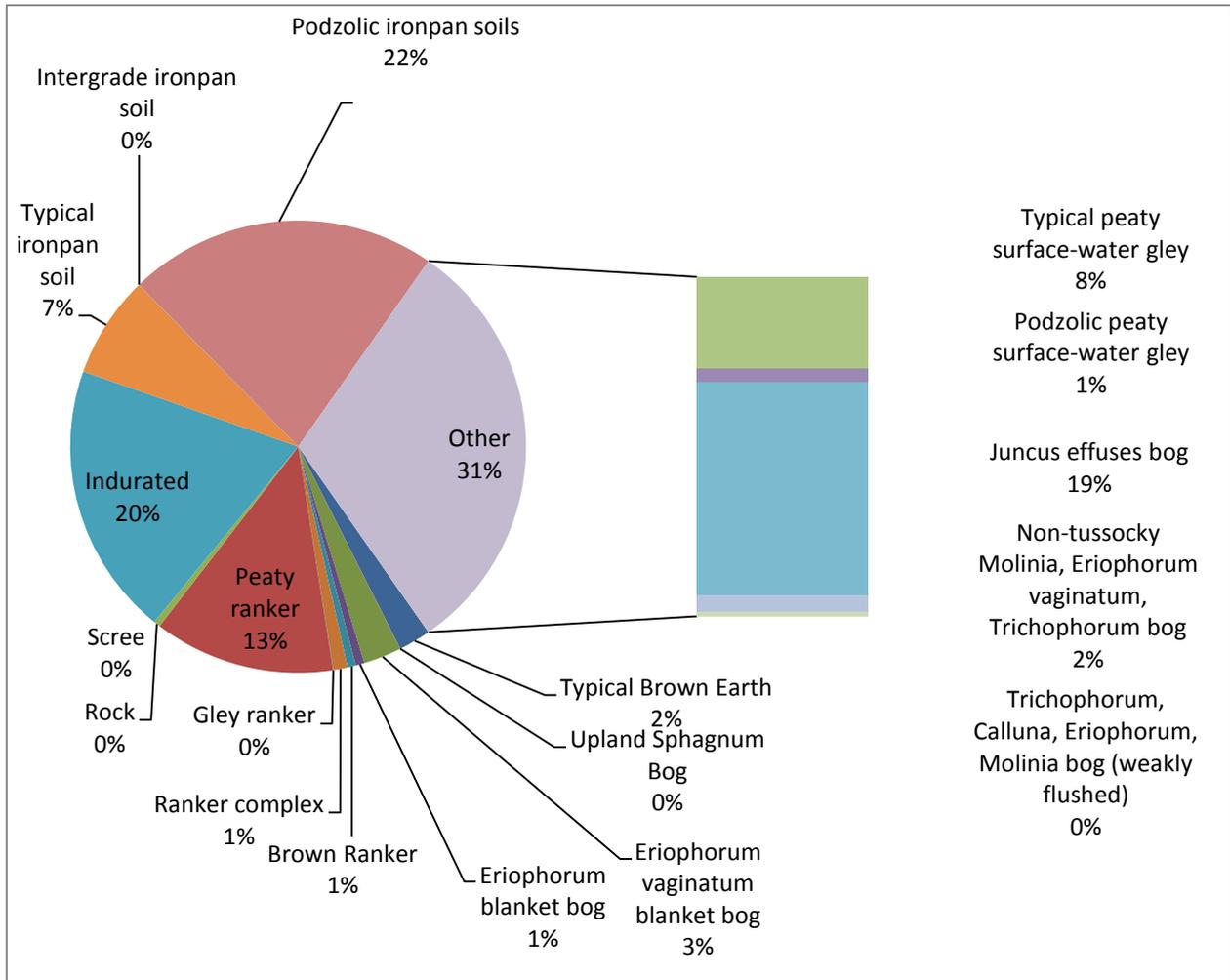


Figure 1 - Soils composition

There are two prominent landscape features of the contained within the Loch Trool block. Firstly, the large sweeping valley of the Water of Minnoch, with the river shaping the valley, and secondly the dramatic and rugged Merrick range with slopes cascading down into valley and giving a large dimension to the landscape.

The forest sits in this landscape with a variety of coupe shape, form and size, reflecting the surrounding landform. The south loch side has a recently been cleared of conifers which had a large component of larch in the area. This face was assessed repeatedly and areas were retained which were deemed of visual prominence, overlooked by Bruce’s stone. Unfortunately the areas retained which had larch become infected and died. Behind the ridge running east-west, lies the White Knowe quarry and some continuing productive conifer which is contiguous to the Brighton LMP area behind. The productive conifer is hidden from public view at lower elevations and is only visible from a distance at higher elevation. This is one of two areas outside the enclosure that will remain as productive conifer.

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The North side of the loch contains one of the two sections of the oak SSSI & SAC, and is visible from many internal viewpoints. This is the area to which most tourists are directed, with a round-loch walk and parking facilities. Behind the lower lying areas of the north loch side, the elevation rises rapidly with the Merrick hill path which follows the forest areas north rising past the Bennan. The forest here changes from broadleaf on the valley floor to the montane enclosure on top of the Bennan, with productive conifer in an enclosed area with surrounding peaks beyond where the path crosses.

3.1.2 Water

The Water of Trool, Glenhead Burn, Gairland Burn, Buchan Burn, and Caldons Burn are all significant watercourses flowing west towards Glentool and the River Cree. There are also a number of significant lochs in the open upland moor of the central Merrick range including Loch Enoch (headwaters of the Eglin Lane draining into Loch Doon) Loch Neldricken, Loch Valley, Long Loch of Glenhead, Loch Narroch and Round Loch of Glenhead.

SEPA have assessed the south side of the loch to be of "moderate" acidification risk and the removal of the majority of conifer, combined with the change of silvicultural approach from clearfell to long term retention should also reduce the risk of acidification.

The LMP area contains one area that has been identified for bog restoration on the Bennan. The continued removal of naturally regenerated conifer continues in this area and any felling areas with a YC of less than 8 and the correct soil type and hydrology structure will be considered as per FES policy towards bog restoration. See section 5.2 for details of FES policy.

Galloways Fisheries Trust have ongoing studies in the area and have found that there are issues surrounding the diversion of water from the headwaters of the Glenhead burn to increase the water flow into Loch Dee. This diversion is required to support the Galloway Hydro Scheme during "low flow" conditions. This diversion will result in a lowering of the suitability to support salmon and trout and is an ongoing issue that GFT is in discussion with SEPA with. From the land management perspective, Glen head burn will require to have consideration given to this issue when protecting the water quality and suitability for aquatic habitat.

The water quality over the course of the previous plan and amendments have seen a recovery in fish populations over the last 15 years, according to GFT's electrofishing results (see table 1 for results). With the continued reduction in conifer species from around water courses and catchments within the plan area,

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a reduction in acidification, overshadowing and resultant increase in fish populations should continue.

Table 1 - GFT electrofishing results for areas in the Loch Trool LMP. Published with permission from Galloway Fisheries Trust

Site	Grid ref	Trout fry*	Trout parr*	Salmon fry*	Salmon parr*	Notes
1 - Glenhead Burn, upstream of forest track to Loch Dee	243250 579800	0	6.83 (M)	0	20.5 (E)	Excellent parr habitat present
2 – Glenhead Burn, near Gairland Burn inflow	242600 580300	52.08 (G)	0	24.04 (M)	2.73 (L)	Good spawning and fry habitat present
3 – Gairland Burn, between wooden bridge and Glenhead Burn.	242600 580300	2.3 (VL)	4.3 (L)	0	14.4 (G)	Site is low on burn and provides parr habitat
4 – Pulnabrick Burn, d/s road to Glentool Lodge	240200 579900	18.18 (M)	1.8 (VL)	0	9.09 (G)	Small burn, recently had conifers removed around it
5 – Pulharrow Burn, near Caldons	240147 579072	16.19 (M)	10.12 (G)	0	8.09 (M)	
6 – Water of Trool, u/s of bridge to old campsite	239800 579100	2 (VL)	1 (VL)	25 (G)	0	
7 – Caldons Burn, at side of old campsite	240000 578900	3 (VL)	0	6.4 (L)	17.5 (E)	
8 – Jenny's Burn, d/s forestry road bridge	239673 578427	15.22 (M)	5.07 (M)	0	0	Inaccessible to migratory fish
9 – Water of Trool, u/s old wooden foot bridge	237950 578230	0	0	14.85 (M)	10.28 (G)	Instream habitat conditions not very suitable for salmon
* - the fish densities provided are standardised to fish per 100 m ² of water. Letters in brackets indicate quintile range (standardised for Solway area) for fish densities; E = excellent, G = good, M = moderate, L = low, VL = very low.						

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.

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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. The wind direction is predominately from the south west, with occasional winter storms coming from an alternative direction. This leeward direction is considered for seed distribution and stand stability.

3.2 Biodiversity and environmental designations

The open hills on the north east of the LMP area are designated as a Site of Special Scientific Interest and SAC 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 plan area which have the designation SSSI are listed as "favourable" condition, however there is ongoing liaison with SNH regarding the condition of the SSSI's of Glenhead and Buchan Oakwood and Caldons Oakwood with regards to control of the understory. These two SSSI's are contained within the larger Glentool Oakwoods SAC.

Caldons Oakwood and Glenhead and Buchan Oakwood are both listed as ASNW sites, with non-ASNW with veteran trees sites in the immediate vicinity of Glenhead and Buchan.

3.2.1 FCS Biodiversity Programme key species

The LMP is not a Galloway Red Squirrel Stronghold Site (RSSS) which is located to the east of the plan area. All coupes are checked for signs of squirrel activity and dreys before harvesting operations and there is a strong emphasis on avoiding the creation of isolated coupes of mature conifer which provide habitat for red squirrels. Although the plan does have a relatively large area of large-seeded broadleaves, there is not a resident grey squirrel population.

Black grouse are resident on the edges of the plan area, with a district monitoring plan in place. Open moorland will be maintained as habitat where suitable and no active black grouse sites will be afforested within the plan area. The fence at the top of the Bennan enclosure has bird strike markers in place and is regularly monitored for collisions. Any new fencing would also have markers added to minimise any impact on Black grouse. The establishment of additional stands of native broadleaf species such as Birch, Hawthorn, Willow and Rowan and Aspen on adjacent sites for winter browsing will further develop the habitat network, and these will tend to be at higher altitudes which are unsuitable for

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oak. There will also be the addition of a woodland fringe area in the north of the FMU, providing additional habitat.

There have been reports of attempted nesting by black throated diver on islands contained within lochs in the surrounding LMP areas. As there is also islands which are isolated within the plan area and these may prove to be suitable habitat for this migratory species. The area will be monitored to see if black throated divers successfully nest on any of the island and accommodations made as required.

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.

Positive riparian zone improvements, often exceeding basic 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 will increase both the availability and connectivity of suitable breeding and feeding habitat for both of these species. Galloway FD Environment staff now also prepares brash piles along water courses where it is considered to be of overall environmental benefit, specifically providing excellent cover for rearing, resting and breeding otters. 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.

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.

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There is a feral goat heft in the Loch Trool area, concentrated on the south side of the loch. This heft is monitored and where necessary controlled. Since the removal of the dense conifer on the south side of the loch, the heft have mainly stayed on the edge of the plan area and have not ventured onto the face of the loch.

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

With the designated sites covering large areas of the LMP, significantly more than 15% of the forest management unit will be managed with conservation and the enhancement of biodiversity as major objectives given the scale of these designated sites.

3.3 The existing forest

3.3.1 Age structure, species and yield class

Species / Yield class

The remaining Sitka plantation still makes up 36% of the forest area which can be generally classified as mature, rotation age conifers. Minor conifer species such as Scots pine (8%), Lodgepole pine (1%), Mixed conifers (1%), and NS (>1%) can be classed into two groups as either groups of veteran trees/long term retentions, or newer planting which has yet to reach canopy closure. There is still 3% of the forested area which is Japanese Larch. This will have to be removed as a sanitation felling for *P. ramorum* infection which has previously resulted in premature removal of much of the larch component of the crop. Broadleaf species make up approximately half of the forested area. There is a large range of species for the area, which excluding the large oak components, are mostly small seeded species. The main components area Rowan (10%), Birch (11%), Oak (~5%), Aspen (6%) with the 17% being an intimate mixture of BL. The areas of BL will increase and the area of productive conifer will fall over the course of plan.

The open space of the areas within the forest area, which excludes the large open area to the north east and open water, come to 277ha out of an FMU area 1126ha.

Yield class in the two main spruce areas is 14-18 in the southern area, with 10-14 in the northern sections at higher elevation in the north. As there will be little commercial timber production in the area with the next rotation, there will be few commercial conifer or broadleaf crops in the LMP area, therefore yield classes are not of great importance.

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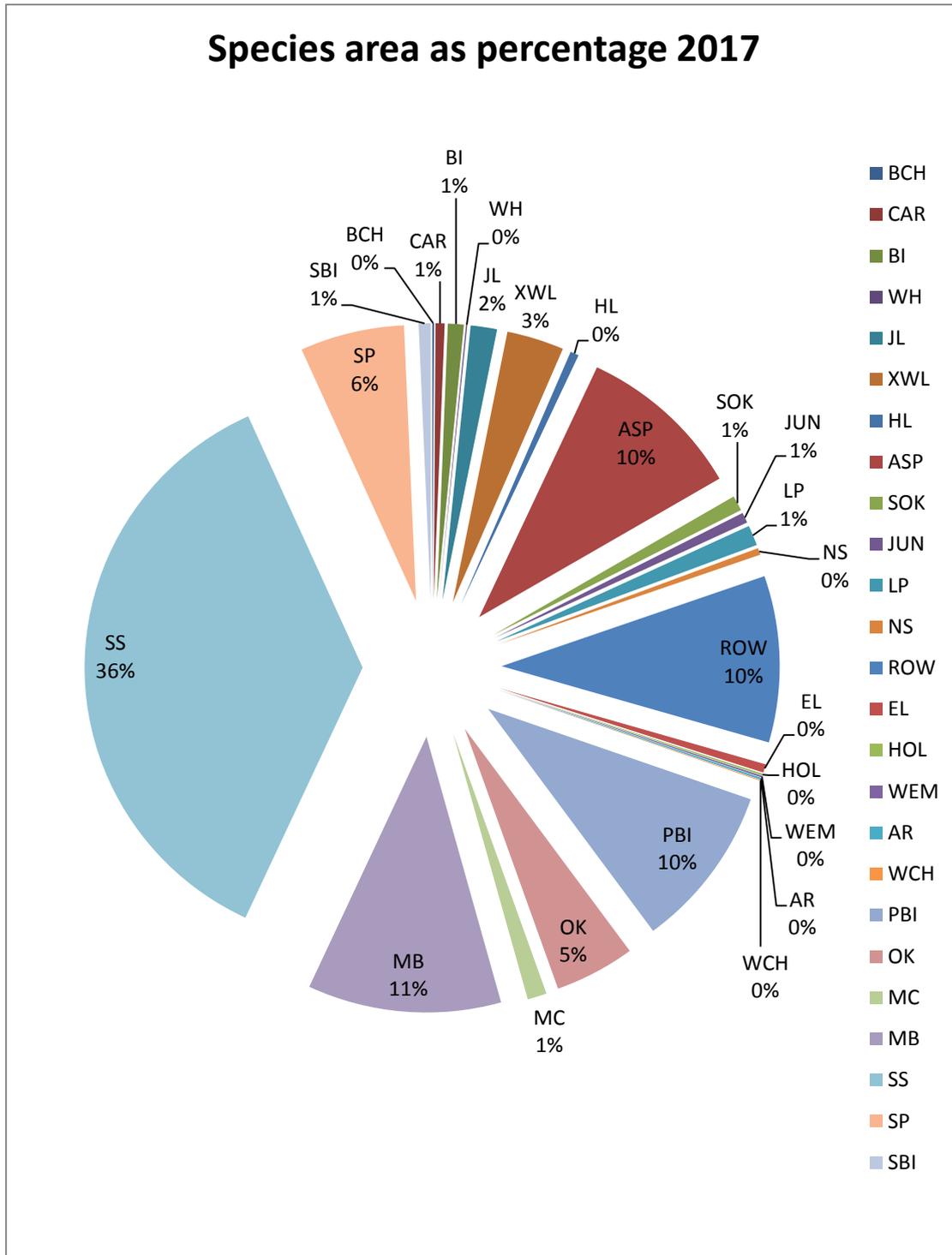


Figure 2 - 2017 Species composition in Loch Trool forest block as taken from the FCS subcompartment database.

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Species area as percentage 2027

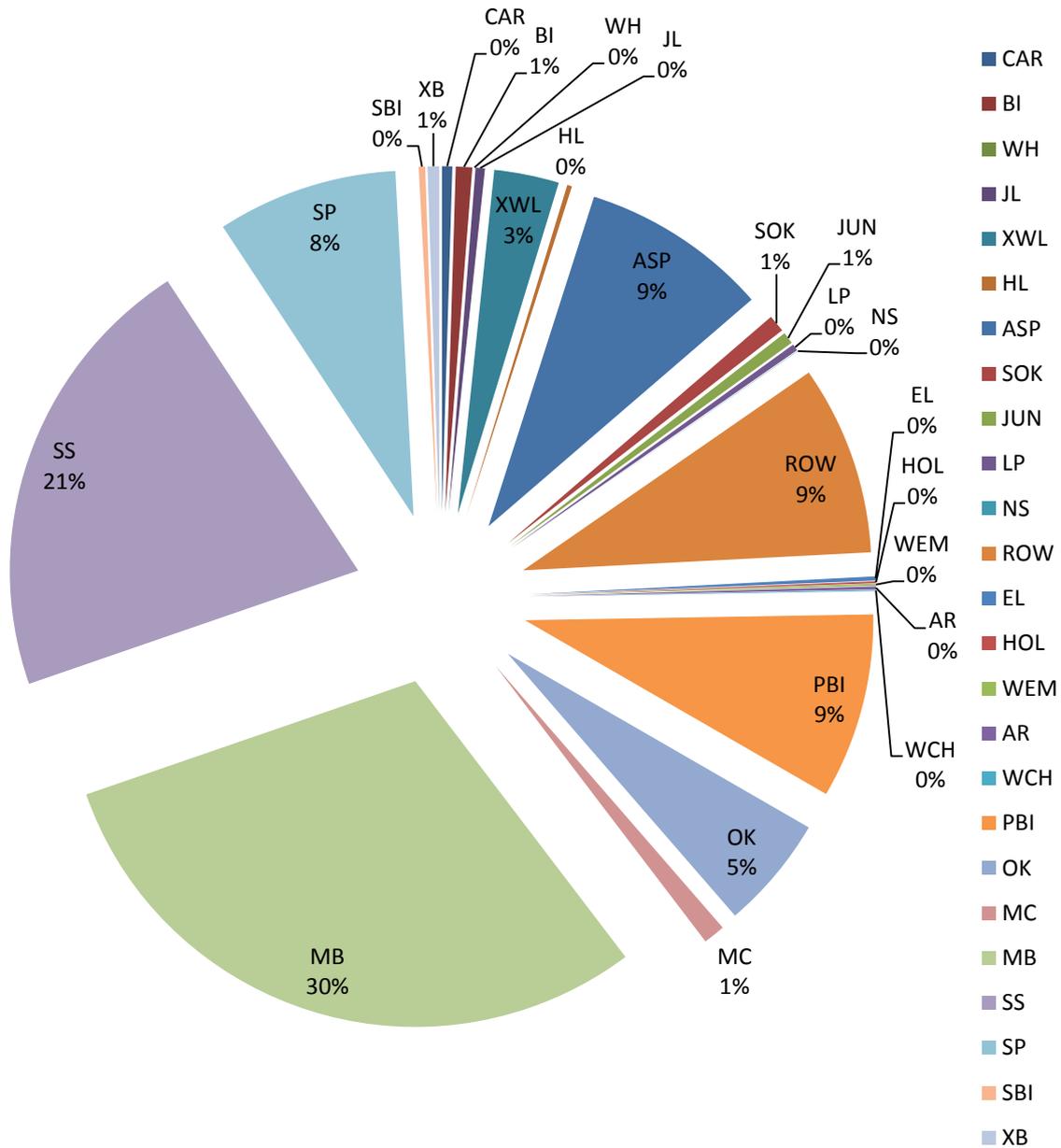


Figure 3 - 2027 Species composition in Loch Trool forest block as taken from the FCS subcompartment database.

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Age Structure

Over the previous plan periods the fairly concentrated clearfell programme associated with first rotation crops has initiated restructuring on a large scale. This has been driven by both the removal of larch from the forest as part of the tree health programme related to *P. ramorum* and the desire to decrease the productive area in the block.

Table 2 shows the large area in the establishment phase, which reflects the first rotation conifer reaching maturity. The age structure is being diversified by longer rotation periods and resizing of coupes where viable. In the longer term, the retention of a large area as non-productive oak forest will allow for greater age diversity within the LMP area. A large area will remain as LTR or minimum intervention and will add greatly to the old high forest in time. These areas should also have multi-cohort structure to them which will be managed to give a smoother age class. This structure is not current accurately captured in the in the database as the mensuration of non-productive stands (natural reserve, minimum intervention, and long term retention) is not completed regularly.

Table 2 – 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	
		2017	2047
0 – 10	Establishment	305.1	1.6
11 – 20	Thicket	16.2	59.9
21 – 40	Pole stage	6.1	411.2
41 – 60	Maturing high forest	199.1	51.3
61 +	Old high forest	80.6	67.6
Total		607.1	591.6

3.3.2 Access

The internal road network is in good condition, and the current road network will provide access to coupes that require harvesting within the plan period. Upgrades to the road will be required in terms of resurfacing, but no new road construction is proposed within the LMP timeframe. 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". The Bargrennan end of the road leads onto the A174 Newton Stewart-Girvan road, which is classified as an

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“agreed route” on the Dumfries and Galloway Timber Transport Group Agreed Routes Map.

A single small quarry, located to the south of the block (White Knowe), is identified in the suite of DP maps along with proposed / planned forest roads for the plan period and beyond. Most of the actual stone material required for these planned forest road upgrades is available largely via the internal roads network from the Garraries quarry (in the adjacent Clatteringshaws block) immediately 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 and guidance from SEPA.

To further reduce the impact of timber haulage on the internal forest road network, FES is currently reviewing the application of vehicles fitted with tyre pressure control systems / low ground pressure vehicles on the National Forest Estate. Across the district the requirement to utilise such vehicles will apply to specific catchments/roads and the Loch Trool plan area is one such candidate (further information is available from the Tread Softly: lower impact vehicles for timber haulage document). The proposed implementation date for this policy falls within the period of this plan, 1 April 2018

3.3.3 LISS potential

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” and the majority of the forested plan area would fall into this category. The move away from productive conifer plantation towards utilisation for oak natural reserves, mixed broadleaf and Scots Pine coupes, or montane planting will greatly increase the utilisation of LISS methodology. The natural reserve areas will only have interventions for invasive species and where there needs to be a change in the conditions to improve specific habitat. This will usually be in the form of small operations with long periods of assessment and monitoring. The remaining areas south of the loch, barring the coupes contiguous with the Brighton LMP will be either LTR or minimum intervention. The coupes on the north shore of the loch will remain as natural reserves. The remaining productive coupes will remain as clearfell sites due to high DAMS scores, limiting their potential for LISS.

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3.4 Landscape and land use

3.4.1 Landscape character and value

Loch Trool is one of the more heavily visited plan areas, with the forested area around the loch adjacent to the Merrick Kells SSSI and access to the Awful Hand range. These uplands are generally higher than the coastal granite uplands rising up to peaks over 700m such as the Merrick and their scale is generally large with extensive panoramas. Such is their inherent topographic diversity however that smaller scale enclosures are also created.

The rapid removal of the larch component of the forest has lost the opportunity to have a deciduous conifer within the landscape, which was previously utilised to contrast with the dark Sitka plantations. Under the existing management agreement for the control of *P. ramorum*, sanitation fellings can only be replaced with an agreed list of species, which does not include Sitka. Where site restrictions allow, the species will attempt to provide the same contrast and landscape value as larch.

Under the 1994 Dumfries and Galloway Council Landscape Assessment the plan area is classified as a mix of type 17a "Plateau with Forest", type 21 "Rugged Granite Uplands", type 21 "Rugged Granite Uplands", and 21a "Rugged Granite Uplands with Forests"

Type 21 Rugged Granite Uplands and 21a Rugged Granite Uplands with Forests are summarised in the DGCLA as land cover is typified by massive steeply rising rugged peaks and heather covered slopes that contrast with the white granite outcrops and create an exposed almost "highland" landscape. There are also numerous small scale loch water features with dark green monotonous Sitka dominated plantations blanketing the lower slopes. These types would characterise the large unforested area in the North and North east of the plan area, covering the majority of the land cover, but a smaller area of the FMU.

This upland landscape type is noted and valued for its wild, open and highland nature distinct within the region. It is an area that is sensitive to any human activity and development that would intrude on its distinctive character and part of our overall strategy for the plan area is to conserve this landscape character.

The main landscape issues to be addressed by these types are

- potential loss of "wildland" areas through forestry expansion and the resultant impact on land use balance
- the potential for wind power development given the sensitivity of this landscape
- the growth of active tourism in mountainous area

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Type 17a Plateau with Forest can be summarised from the DGCLA as a forest dominated landscape, mainly with Sitka spruce plantations at late first or early second rotation. These plantations are on flat or gently undulating landscape of a large scale. The lack of elevation allows the forest to create dark horizons.

The main landscape issues to be addressed by this type is

- How land management plans can add diversity to the landscape with the next rotation of forest
- Threat through forest expansion of loss of plateau moorland character area
- Potential windfarm development

These key specifics have been addressed in the plan design by:

Preserving the open and wild character of the landscape through the maintenance of any existing unforested "untamed" components of the landscape and having a general presumption against large scale extension of existing plantation areas, especially afforestation with monocultures of conifer.

The large scale relief allows for large scale felling coupe design in the plan hinterlands, enhancing the 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. Creating an interface between the two landscape types (21 & 21a) through the creation of woodland fringe as a replacement for conifer plantation at elevation.

The plateaus are subject to smaller scale planting than the higher elevations or generally management as natural reserves for the oak dominated broadleaf forest found at lower elevations. Where suitable for the site, productive species are diversified to create contrast within the landscape while retaining productive capacity.

The DGCLA repeatedly mentions wind power developments as a threat to the landscape character. However, there has been a change of perspective at a national level and of the importance of renewable energy and a reduction in the use of fossil fuel. The rapid expansion of windfarms in the Galloway forest district in recent years, as driven by national policy, has led to the views from higher elevations, such as those found on the Merrick or the Bennan now all include a visible windfarm development. While not near the LMP area, due to the topography of Galloway, windfarm developments will affect the long range views at altitude.

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Land Use	Area(ha)
Agricultural land Total	1301.7
Archaeological sites Total	0
Car Parks/Picnic Areas Total	0.3
Deer glades Total	0.9
Failed Total	0
Felled Total	151.1
High Forest Total	456.1
Open Total	912.5
Open Water Total	52.6
Partially Intruded Broadleaf Total	0
Quarries Total	0.3
Unplantable or bare Total	3.0
Unplanted streamsides Total	0
Windblow Total	0
Grand Total	2835.46

3.4.2 Visibility

There are no public roads in the LMP area, with only forest tracks into the LMP area, and therefore the area is hidden to passing traffic.

The majority of visitors to the LMP area concentrate towards the internal viewpoints from around the loch, utilising either the Southern Upland Way, the tarred road to Bruce's stone (with associated car parks) or Caldons former campground. The main internal viewpoint is to the southern face of the loch where there has been large scale felling due to *P. ramorum* felling. The southern face includes the historic battlefield of Glen Trool. Larger scale views are achieved from the Merrick Hill path and Buchan Hill.

Figure 3 shows the south face of the loch in 2017, with the forwarder track and the existing conifer removal. The conifer on the left of the figure, coming over the shoulder of the hill is due to be removed in 2018 as it has reached maturity and would leave a disjointed and blocky appearance. In the foreground of the figure, the oak dominated broadleaf forest structure which is to be replicated on the opposite side of the loch. This will allow for the retention of open areas at higher altitude, a greater level of interlock at lower altitude with internal open space for gullies, hollows and knolls. The removal of the coupe structure will allow for greater flexibility with planting to create a more sympathetic landscape.

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Figure 4 - Viewpoint from Bruce's stone showing south side of the loch

The previous plans were not integrated into the landscape fully, and the current plan removes the production coupe structure from large areas of the LMP area, allowing a greater reflection of the surrounding forests in both species and long term structure.

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 smaller scale agricultural holdings.

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3.5 Social factors

3.5.1 Visitor Zone Recreation

We will aim to improve the recreation facilities to a level where we are able to meet the expectations of larger visitor numbers.

The formal recreation of the areas for Loch Trool extended from the visitors centre in Kirriedarroch. There are small sections of the 7 stanes which cross into the north east of the plan, but not to any great extent. The no 7 Sustrans off road route does go through extensive areas of the plan along with the "big country" loop which starts and ends just outside the LMP area. There are 3 maintained carparks, none of which are for overnight stays. The Southern Upland Way runs on the South side of the loch, along with waymarked paths round the loch, and the Merrick Hill path.

Loch Trool has been classified as the darkest place in the UK, and forms a key element of the dark sky park. It hosts part of the Dark Skies Run @ Galloway along with the Merrick Hill race. There are also events arranged throughout the year, by both FES and external partners which take advantage of the Loch's lack of light pollution.

Informally, the former Caldon's campsite still attracts some wild campers, along with other areas in the hills. There has not been reports of large scale unauthorised vehicle use, probably due to how far the area is from the public road or settlements.

Table 3 - Opportunities and Constraints for Loch Trool LMP

Facility / visitor zone	Concept / Opportunity	Constraint	Plan Development
Section of Southern Upland Way	Enhance immediate trail surroundings	Entire section on forest road Maintenance of permanent views Removal of mature larch and other conifer Fenced enclosure crosses 2 points	Maintain and enhance sight lines along route Increase species and age class diversity adjacent to forest road Install and maintain gates for visitor access.
Off road section of National Cycle Route (Big Country cycle route)	Enhance the surroundings of important route across open ground	Entire section on forest road Maintenance of permanent views	Maintain and enhance sight lines along route Increase species and age class diversity adjacent to forest road

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Sections of the 7 Stanes Glen Trool routes	Maintain the existing trails and enhance viewpoints	Interactions with forest traffic and pedestrians.	Assess and utilise larch fellings where possible to retain open viewpoints. Maintain enhance sight lines along the route.
Bruce's Stone	Enhance key internal viewpoint Enhance surrounding visual context for battlefield	Removal of mature conifer from south side of loch Large dead stems overhanging SUW	Replant conifer areas with BL in more sympathetic planting scheme. Hide fence behind terrain where possible.

The recreational demands associated with these areas will impact greatly on our management choice, with the productive nature of large areas of the LMP area changed to a focus on habitat and ecological goals. This should also improve the internal and external views associated with them. Treatments will be developed for each site involving, where possible, thinning regimes which enhance visual amenity, additional permanent open space, mature tree retentions and the creation of a seasonal assortment of foliage colours through enhanced species diversity.

There are currently no plans to increase the formal recreation of the plan area, by way of increasing infrastructure, only to maintain and enhance the current facilities where appropriate.

3.5.2 Community

Glentrool village, which is outside the LMP area to the west, is the largest noticeable local community. Although there are a few other residential properties within the forest block, none of these are continuously occupied. As stated previously the LMP area is entirely surrounded by other LMP areas which form part of the NFE.

3.5.3 Heritage

Following FES Historic Environment Planning Guidance, this Land Management Plan describes and considers the conservation and management of the historic environment. The LMP includes details of all relevant scheduled monuments, listed buildings, designed landscapes and the most significant undesignated features. Designated historic environment features are recorded in the Designated Historic Assets Register (maintained by the FCS Archaeologist). Scheduled monuments and listed buildings are managed within a programme of individual Monument Management Plans and Condition Surveys respectively. FCS also maintains a programme of detailed measured survey of our most significant sites in order to

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enhance the national historic environment record and inform conservation management.

There is, what is believed to be, the historic battlefield of Glentrool within the plan area. Historic Scotland was consulted on the draft plan, but made no comment on the management of the site. This is a nationally important feature with interpretation boards maintained at Bruce's stone. There is, as would be expected with a battlefield, no structures or markers remaining. The surrounding replanting will leave a more open aspect to the battlefield site.

Whilst there are a raft of archaeological heritage features, settlement remains and sheep pens present within the block (details are listed in Appendix III) there are no historic environment structures of national importance within the plan area. All significant features will be protected and managed following the Forestry and Archaeology Guidelines (2011), the FCS policy document Scotland's Woodlands and the Historic Environment (2008) and the supporting FES Historic Environment Planning Guidelines (available from the FCS Archaeologist).

Historic Scotland and the Dumfries and Galloway Council archaeology service have been consulted as part of the stakeholder consultation process. Felling coupes, access roads and fence lines will be surveyed prior to any work being undertaken to ensure that upstanding historic environment features can be marked and avoided. Historic environment features, including drystone dykes, coming to light during forest operations will be surveyed, recorded, mapped and monitored for inclusion in future versions of the Land Management Plan and to demonstrate Forestry Commission Scotland compliance with the UK Forestry Standard.

Known heritage features are marked on workplans before the start of forestry operations. Machine operators are fully briefed on their responsibilities prior to all sites being worked. The known record is based on features recorded on the 1st edition OS Map (1850). At planting and restocking, historic features will be removed from ground disturbing operations with opportunities to enhance the setting of important sites considered on a case-by-case basis (such as the views to and from a significant designated 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. This will ensure that undiscovered historic environment features are mapped and recorded prior to forestry establishment and management operations - and will ensure the continued comprehensive protection of the known archaeological resource.

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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 is one micro-hydro scheme in the plan area which supplies a local residence. There are currently no plans to expand or introduce any further renewable schemes in the plan area.

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	Combine two SSSI's in an SAC area with local provenance oak	Small areas of mature non-native conifer remain on face. Resident goat and deer population. Repeated intrusion by sheep from neighbouring properties	Seed had been collected from SSSI and grown in nursery, making stock available. Fence areas for planting
Environmental Quality	Enhance habitat network within Galloway district	Existing conifer seed source Resident goat and	Maintain establishment of native planting inside enclosure on the Bennan. Harvest mature conifer crops and all dense regeneration to grow to canopy closure stage for biomass.
Timber	Provide planned sustainable & normalised timber supply	Creation / enhance conservation habitats Uniformity of age class across forest block.	Coupes combined and timing rationalised into two areas of the plan to allow for smaller, less intrusive harvesting programme.
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	Utilising oak as major component in broadleaf mixtures	While not a stronghold area for squirrels, other than oak/hazel, use of large seeded BL will be limited. Where possible, mature conifer will be retained, preferably within a

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			habitat network.
Biodiversity	Enhance Priority Habitats and their connectivity to other habitat networks	Remaining area of conifers	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	Enhance habitat network within Galloway district	Existing conifer seed source Resident goat and Deer.	Maintain establishment of native planting inside enclosure on the Bennan. Harvest mature conifer crops and all dense regeneration to grow to canopy closure stage for biomass.
Wildlife Quality	Create woodland fringe on upper planting margins to improve wildlife habitat	Poor access to upper hill areas for shooting. Surrounding sheep access.	No shooting policy revised. Proposals to create woodland fringe up on the higher elevations by planting native species where viable. Intruding sheep capture policy and staffing improved at district level.

4.3 Concept Development

The primary concept objective was carried forward the previously approved plan originally submitted in 2004 to link the historic oakwoods of Glen Trool. The connection of Glenhead and Buchan Oakwood to Caldon's Oakwood has been an ongoing aim for the district and currently there is a good operational window to establish a continuous oakwood around the perimeter of Loch Trool. The linking of these areas will represent a significant addition to the forest habitat network in Galloway and a major contribution to biodiversity. The two oakwoods are both existing SSSI's, which are also ASNW sites and may be ancient remnants. Both these sites are part of the wider Galloway Oakwood SAC. We are aiming to do this by establishing 160ha of native woodland on land previously planted with conifers.

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The concept of creating this woodland has involved considerable discussion over a period of more than a year and involved all Forest District staff and advice from our Landscape Architect. Various options have been considered including no fencing, the use of stock rather than deer fencing, the use of small individual "island" fences and a lower, circular deer fence.

A rare mast year in 2016 allowed for the collection of a large quantity of acorns, resulting in approximately 700,000 trees available for planting. This combined with the limited natural regeneration on the site from other BL species should be beneficial and act as a nurse species as recommended by FC Upland Oakwood guide. The establishment of these oak represents a challenge to the concept of extending the oakwoods for 3 primary reasons:

- Oak is generally takes longer to establish than other tree species
- Due to this extended establishment phase, they will require protection from browsing for a long period
- There is no possibility to beat up the site if trees are browsed
- Historically, natural regeneration on the site has never reached beyond sapling stage due to browsing pressure.

With these considerations in mind, the best option was considered to be the use of a deer fence to protect the oak during the extended establishment phase as there is browsing pressure from an ancient resident deer herd, feral sheep and deer. A proposed line for the fence is shown on the management map.

In addition to the pressure from browsing, the success of the establishment of this oakwood is also challenged by some small patches of residual mature non-native conifer on the face. These small patches of conifer have been left due to extensive felling required by *P. ramorum* and a desire to retain some forest cover on the south face of the loch, which is viewed often from Bruce's stone on the north side of the loch. Adopting this objective removes the requirement to establish a long term framework of 'fell and restock' coupes along the prominent face, converts the area from conifer to native broadleaves and starts the landscape amelioration of post Larch felling as efficiently as possible.

The reasons for proposing to remove the remaining conifers on the Glen Trool south face are as follows:

The objective for this part of the forest is to establish a native woodland on an ASNW, including oak grown from local seed sources. Due to this change in management objectives, there is no need to establish a long term framework of 'fell and restock' coupes along this face; and our aim is to convert the woodland from conifer to native woodland as efficiently as possible.

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In consultation with our native woodland expert, he identified the two main ecological types of oak forest that could be established on the site; NVC W17 (Birch/oak with blaeberry) and NVC W11 (birch oak with bluebell). The oak planting could be enriched with hazel and wych elm in drier areas, and alder-goat willow in wetter areas. On the higher accessible section with the thinnest soil, there will be an attempt to establish juniper on the higher crags, but this will involve sourcing the correct provenance of juniper and finding a planting team with the correct technical knowledge required to ensure the best chance of establishment.

Phase 1 involves removing the majority all of the remaining non-native conifers on the Glentool face and establishing a deer fence. This allows FES to:

- Fell and extract the majority of the remaining conifers on the Glentool face, including dead, dying and diseased trees which are a threat to members of the public on the public footpaths that passes through the area. (Southern Upland Way and Loch Trool walk.) To facilitate the felling and extraction of the small but steep coupes, these will be marketed at the same time as the larger, more accessible coupes to the west which are outside the current LMP boundary (coupe 06512 9.40ha & 065001 7.37ha, which are part of the district's *P. ramorum* management strategy). The smaller coupes involved are 11029 (1.42ha), 11028 (2.02ha), 11014 (1.62ha), 11038 (1.8ha) and 11023 (5.05ha) giving a total of 11.91 ha as shown on map 1. To balance the felling on the face, coupe 11015 (52.78ha) will be put back into phase 2 felling in the LMP, after a small section (~2ha) is removed to provide resilience for the fenceline.
- The removal of conifers will remove the seed source and therefore reduce the level of future regeneration of conifers on this prominent site and therefore reduce on-going establishment costs to establish native woodland.
- Erect a new deer fence on a carefully selected line, the majority of which will lie behind the skyline when viewed from the north side of the Loch, (in particular Bruce's Stone) and link each end of the Deer fence into the Loch. This removes the requirement to erect a circular fence and minimises landscape impact. The fence will enclose 160 ha of ground as shown on map 1 and protect approximately 250,000 native trees planted at a spacing averaging around 1,100 /ha – 1400 /ha from browsing by the ancient feral goat herd which is resident, deer and wayward sheep. The enclosure allows us to plant the lower slope woodland (local provenance Oak, collected from the surrounding SSSI) with Galloway Aspen, west coast Rowan, Scots pine and Downy Birch in groups suitable to the microtopography. The upper margins will grade into montane woodland and will include Galloway Juniper and Downy Willow. Other native broadleaf regeneration and Scots Pine will be accepted. Spruce regeneration will be controlled if it becomes significant.

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- Temporary access to the Glentrool face has already been established to remove diseased larch and minimal further track construction is required. Once the remaining smaller coupes of timber have been felled, the temporary extraction track can be re-graded into a quad track for planting, deer culling and maintenance. This will facilitate amelioration of the track into the landscape and completely remove the requirement to maintain the track at the standard required for timber traffic into the future, thereby reducing both future roading costs and potential impacts on the Southern Upland Way and wider landscape.

Phase 2

- Phase 2 will involve further small scale removal of conifers to the east, including the diseased larch in coupe 11009 and extension of the native woodland to create the final link across the glen at the head of the loch. This will involve additional fencing as shown on the management map.

Interpretation.

Due to the scale of change caused by the removal of the Larch and extension of native Oak woodland, we plan to erect an interpretative panel at Bruce's stone to explain what is happening and provide "before and after" images to illustrate the change. These boards will also be replicated at the Southern Upland Way gates.

Productive conifer area

There will be two areas remaining in the plan for productive conifers, three coupes in the south ((11016, 11015, 11017) covering approximately 64ha and two coupes (11022 & 11002) in the north covering 87ha will be retained for conifer production. These areas will be replanted after harvesting with Sitka spruce. The northern coupes will be utilised to create a woodland fringe with the dispersed conifer crop at altitude being utilised as dispersed cover. Post harvesting the area will be enriched with broadleaf where the deer/sheep numbers allow.

Bennan native broadleaf montane planting

The Bennan native broadleaf montane planting will continue to be monitored against its objectives for successful establishment of a number of rare species at altitude. These include downy Willow, Galloway juniper, Galloway Aspen, Galloway Oak and other assorted native species. The enclosure fence has allowed these rare plants to establish, but there is ongoing work to prevent sheep intrusion and non-native conifer regeneration.

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In coupe 11004 there is extensive natural regeneration of conifer within the enclosure. Attempts at chemical control and manual removal have failed to date and so the crop will be allowed to grow to a height where it can be machine harvested along with neighbouring coupes of conifer. This should remove the seed source and prevent any future regeneration. There is the issue of the oak which share the coupe with this large amount of natural regeneration

SP/BL extended rotation length

The Scots pine and broadleaf area will have an extended rotation length which will allow for minimal disruption and access requirements once the forest has closed cover. This area will provide a gateway from the east, along with a backdrop when viewed from the north of native and alternative conifer.

Long term Natural reserve

The SNH report on the management of the SAC, recommends the continued removal of conifer from the surrounding area, the planting of local provenance oak seedlings and the continued exclusion and management of the resident deer and goat populations. There is also the need for some limited interventions to modify the structure within the forested areas which will allow for a greater range of habitat for the rare lichen and mosses.

Agricultural areas

There may be opportunities for the planting of broadleaf shelter or hedgerows in vicinity of agricultural areas which may enhance environmental value of the agricultural 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 (m³ob) expected for the next 10years (plan period) and a breakdown of management types :

Table 4 - Areas of management type

Management Type	Area (ha) FMU
Clearfell	219.7
Group Shelterwood	0
Minimum Intervention	231.6
Natural Reserve	109.2
Long Term Retention	167.5
Other/Open land	277.2

Table 5 - Volume (m³ob) by method and phase

Fell period	Thinning / LISS	Clearfell	Total
2017-2021	0	12692	12692
2022-2026	0	2869	2869
2027-2031	0	3604	3604
2032-2036	0	0	0
2037-2041	0	32	32

Due to the transformation that is ongoing due to larch sanitation fellings and the large scale introduction of broadleaves, non-productive conifer and the large extension of long term retentions; there will be a peak of commercial harvesting of the large remaining coupes which makes it difficult to smooth to any great extent. This will be compensated at a district level by other forest blocks where the priority is commercial timber production on a large scale. While stands have been assessed for stability before deciding to extend their rotation length, a combination of factors such as shallow rooting depth, a lack of previous thinning

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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

The remaining SS stands will be managed under a clearfell management type using conventional harvester and forwarder working with the exception of the south face clearances which will require some skyline felling, similar to work previously carried out in the area.

All of the other areas will be managed as LTR or Natural reserves. The clearfell management types will include the self-contained coupes which will be in areas throughout the block.

A number of coupes 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.

Table 6 - Areas for each 5 year period

5yr Fell period	Area felled (ha)	Area felled as % of total FMU (1126 ha)
2017-2021	93.8	11.9
2018-2022	102.3	11.0
2019-2023	76.4	6.4
2020-2024	61.4	5
2021-2025	61.4	5
2022-2026	85.2	7.6
2023-2027	77.2	6.9
2024-2028	24.4	2.1
2025-2029	24.4	2.1
2026-2030	41.2	3.7

It is 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.

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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 Loch Trool 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 the limited area in this particular plan, such a large area has been already converted to non-productive areas, the remaining productive areas have been carefully selected to be as minimally intrusive from a visual aspect, enable a buffer in excess of the water and forest guidelines, and will require minimal interventions and operations in future to reduce disturbance.

For conservation and biodiversity considerations efforts have been made

- to extend the felling period between coupes
- to remove dense conifer plantations above 450m
- Create habitat which is advantageous to riparian areas

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. Any resident squirrel populations will not be left in isolated blocks of mature conifer where at all possible, and transportation of any isolated populations will be considered as a mitigating measure.

The national restocking plan for FES is based on a presumption that restocking will take place as quickly as possible to avoid the loss of productive area for extended periods of time. This plan's restocking period is based on a fallow period of 3 years (see appendix II for tolerance table) which has been established as the most advantageous timescale through both experimental results within the district and feedback from previous establishment operations. This fallow period has been key to reducing the incidence of loss due to *Hylobius abietis* and a reduction in chemical usage on the NFE. This fallow period is under constant review, and where we believe we can shorten this period with acceptable losses through increased beat-up, greater ground preparation or

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using treated trees, we will take the opportunity. Any extension to this period will be noted in the mid-term review and any exceptions to the 3 year rule described and amendments will be applied for as per the requirements of the tolerance table. One of the objectives for felling and restocking is to have at least a 7 year or 2m 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 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 mid-term 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 conifer 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

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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. However with the areas intended to be utilised as LTR, LISS practices may be incorporated to allow for the long term health of the coupes.

Under Long-term Retention trees are retained for environmental benefit significantly beyond the age or size generally adopted. Most of the coupes identified as suitable are on the south face of Loch Trool, which when the transformation is complete, will dispense with the traditional coupe structure as the management will be guided by the biodiversity and conservation value of the site, rather than the productive capacity.

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. While the plan has one area identified as a natural reserve, other areas which are identified as LTR may be converted to natural reserve once they have a high enough biodiversity value.

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. This is management style is currently being applied to the planting inside the enclosure at the Bennan, which contains montane habitat planting. Once this is established, there will be a continued monitoring operation and a decision will be taken in future plans as to whether the fence will need to be retained or maintained in the longer term.

5.2 Future habitats and species

The accompanying Future Habitats and Species map provides detail of our proposed restock species and habitats for Loch Trool Land Management Plan. The mixture of species within the new oak enclosure has been specified in section 4.3 – Concept Development.

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

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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. Currently the district is reviewing its bog strategy for blanket bogs and the LMP area will be included in any future studies to find suitable areas within the district. This LMP area however does not contain any additional areas. Table 6 outlines the bog restoration strategy.

Table 7 - Bog restoration methodology

Area	Objective	Benefits / positive factors	Implementation
Priority sites for habitat restoration			
There are no sites in the LMP which are a priority for bog habitat restoration, there is however an area which has been identified as upland blanket bog which will be monitored as per the district bog management and restoration strategy [awaiting final version]			

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		•	• Monitor occurrence of regeneration at 5yr intervals and assess impact on resulting habitat
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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 Scab craigs and above the remaining conifer planting at Eldrick.

Table 8 - Woodland Fringe methodology

Block	Objective	Benefits	Implementation
High elevation coupes	<ul style="list-style-type: none"> • Creation of woodland fringe (additional Black Grouse habitat) 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Identify areas for open space / 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.

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 large conifer coupe (11001) at the north of the forested area has a chance to provide additional woodland fringe cover. This coupe is next to the Bennan montane planting and has some resident failed conifer planting on its north-east edges. These dispersed trees will form the basis of the woodland fringe with additional planting where required being undertaken after felling operations have taken place. Once deer, sheep and other browsing pressures have been established, there will be an assessment made as to viability of enhancing the fringe area with broadleaves planted in groups to make the area conform with the required percentage of broadleaf trees.

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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 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 surrounding moors, populations in the southern Shalloch area, which has a wildlife corridor being delivered by the current LMP, and southern Carrick Forest Drive LMP area. This helps to deliver the aims and objectives of the "Southern Scotland Black Grouse Conservation" strategy (SNH, 2017).

5.2.3 Riparian zones / aquatic zones (open space)

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 will minimise adverse conditions created by dense conifer plantation. It is appreciated that 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. The largest area proposed for planting is the oak establishment on the south face of Loch Trool, and this will be a mix of inverted hinge mounding and flat planting.

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.

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

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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 9 - Riparian buffer methodology

Objective	Benefits / positive factors	Implementation
<ul style="list-style-type: none"> • Enhance aquatic / riparian zone 	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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, we will 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)

There is currently one quarry identified on the features map and will remain as permanent open space:

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White Knowe Quarry NX 408792

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) in addition to prior notification as required by planning regulation.

5.2.6 Roads

There will be a new road required to access coupe 11002 clear felling along with upgrades to the existing roads and planned maintenance. This new road is shown on the management map (Map 4). This is required to meet the objectives for the plan period of this land management plan. The upgraded infrastructure will serve both thinning and clearfell operations.

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 as required.

Most of the stone material required for the planned forest road upgrade is available via the internal roads network from the White Knowe quarry (in the south of the block). 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 and SEPA guidance received at the draft stage.

5.2.7 Deadwood / veteran trees

Due to the large areas of natural reserve and areas which are long term retentions, the deadwood reserve is in standing trees and fallen limbs within these areas. These are believed to be the most beneficial as habitat for invertebrate and their subsequent predators. The veteran trees found around the loch areas will be managed and retained as long as they don't present a significant risk to the public safety.

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In this LMP area there is no specific need to create any more deadwood area given the large areas given over to LTR/Minimum intervention/Natural reserve.

5.2.8 Woodland

In the conifer-dominant commercial areas, Sitka spruce will continue to be the main timber species. 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.

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

Table 10 - Future selected species by area

Species	Area (ha) in 2027	Total % of FMU (1126 ha)	Area (ha) in 2047	Total % of FMU (1126 ha)
Sitka spruce	141.7	14	143.8	14
Norway spruce	0.1	0	0.1	0
Larch spp.	1.3	0	0.3	0
LP (other pine)	2.1	0	0.1	0
Scots Pine	56.3	6	57.5	5.1
Douglas Fir	0	0	0	0
Other Conifers	41.2	4	7.8	0
Broadleaf	453.6	46	464	41.2
Open Space	277	28	299	26.6
Total	973.3		972.6	

Through the period of this plan and beyond, the table 9 shows the progressive expansion of broadleaf woodland. There is also an expansion in Scots Pine. 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 1,600 stems per hectare (2.5m spacing) at planting with an objective of 1,100 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, due to the better soils around Loch Trool being utilised for linking of the oak stands. The current forest roads will be allowed to degrade through lack of use and ameliorate into the landscape.

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) within the main watercourse riparian zones. It is expected that some of the riparian zones, designed open ground and broadleaf areas will fill in with natural regeneration of both conifers and broadleaves. Through the delivery of this Land Management Plan (LMP) FES will manage natural regeneration in such a way as to ensure that, where practicable, it does not significantly impose a negative impact upon the objectives of the plan. Natural regeneration will be managed so that any negative impact upon designated, protected or promoted

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habitats, species, landscapes and catchments within or adjacent to the LMP area is minimised and where possible mitigated. The advice of the Galloway Fisheries Trust and comments from SEPA will be taken into account when planning management of natural regeneration.

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 in productive areas 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. This is a key area for tourism and has presented an opportunity to link important habitats and key landscape features. While the areas of clearfell in the first phase are large, the recovery to a planted forest which sits in the landscape should be rapid. Some of this is inevitable with the maturity of a crop which was planted over a large area all within a small time frame which combined with the accelerated larch felling required for disease management. This has left a somewhat disjointed overall look, which will be mediated within the timescale of this plan.

Whilst our planned clearfell over the period of this plan will create a moderate scale disturbance in 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/ASNW restoration

The two ASNW woodlands have been the basis for the proposed substantial expansion of their range. The sites will continue to be monitored and their management agreed with both internal and external stakeholders. Currently there are no plans for further restoration of any other PAWS/ASNW sites within the LMP area.

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

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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 Loch Trool land management plan area has both red and roe deer present, combined with an ancient resident feral goat population and regular intrusion by sheep. There are 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 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, along with increased staff resources to deal with this issue.

Cull figures fluctuate but predicted culls are based on Deer Population Assessments (DPA) carried out by independent contractors. The aim of current policy is to reduce deer densities from 10-15 deer per km² to 5 deer per km² within the woodland area in order to ensure all tree species including natural regeneration and associated habitats are protected from negative impacts from over grazing.

In addition it is important that the current sheep presence is eliminated from this forest block in order to allow future objectives to be achieved, along with ensuring control of the feral goat population.

The high quality ATV track has been constructed to allow access south of the block to control deer numbers on the open hills to the south along with the extant goat population. The areas to the north east are protected by their topography to a certain extent, and new coupes have been laid out to maintain access for deer management where 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 created at time of restocking when a member of Wildlife team and Forest Management have had the opportunity to fully assess site conditions post clear fell.

5.6 Pathogens, Diseases and Invasive Non-native species

Phytophthora 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). A wider management plan was agreed with FCS to prevent hybridisation of the disease which would have likely resulted in a more virulent strain of the disease emerging, further threatening larch

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populations. The Loch Trool LMP area has been particularly affected and coupes on the south face of the loch have been targeted 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.

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 restocking may result in restocking not taking place within three years of felling. (Appendix II Tolerance Table).

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 of conifers 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

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5.9 Critical Success Factors

Creation of the oakwood along the south face of Loch Trool

Monitor establishment of oakwood and control regeneration as required

Maintain the montane planting on the Bennan

Monitor the planting and control natural regeneration of conifer as required

Plan to remove non-native conifer seed source at appropriate time

Establishment of woodland edge in the north of the plan area

Forest survey for appropriate density and species at year 3 post harvest of coupe.

5.10 Amendments

To be logged on amendment form

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Appendix I: Land Management Plan Consultation Record

Statutory Consultee	Date contacted	Date response received	Issue raised	Forest District Response
Galloway Fisheries Trust: Jamie Ribbens	16 th June 2017	9 th August 2017	<ul style="list-style-type: none"> • Due to diversion to the Galloway hydro scheme, headwaters of Glenhead burn are susceptible to heating up during "low flow" conditions • Conifer plantation away from key water courses • Ensure drainage ditches do not run directly into main watercourses 	<ul style="list-style-type: none"> • Noted in LMP text (section 3.1.2 & 3.2)
Historic Scotland: Dr Kevin Grant	16 th June 2017	29th June 2017	<ul style="list-style-type: none"> • None (no designated features recognised) 	<ul style="list-style-type: none"> • Maintain appropriate buffers around non-scheduled sites, protect features during harvesting, and improve conditions of archaeological features at restock.
RSPB Crossmichael: Julia Gallagher	16 th June 2017	24th July 2015	<ul style="list-style-type: none"> • Support proposed habitat enhancements, both the Oakwood and woodland fringe proposals. • Add control of Sitka regeneration, especially near to the Bennan planting. • Need for pre-fell survey work to protect breeding raptors identified 	<ul style="list-style-type: none"> • Comments noted in LMP text (sections 3.2, 5.1 & 5.2)

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Galloway and Southern Ayrshire Biosphere: Dr Emily Taylor	16 th June 2017	23 July 2015	<ul style="list-style-type: none"> • Conifer regeneration in riparian and woodland fringe areas • Species specific information • Riparian buffer comments 	<ul style="list-style-type: none"> • Comments noted in LMP text (sections 3.1, 3.2 & 5.2)
Rosemary Green; IUCN Otter Specialist Group	16 th June 2017	19 th July 2017	<ul style="list-style-type: none"> • Enquired about fish & acidification data – has since been supplied by GFT 	<ul style="list-style-type: none"> • Noted in DP text (section 3.2)
SEPA: John Gorman; Newton Stewart office	16 th June 2017	15 July 2015	<ul style="list-style-type: none"> • Identified the wildlife corridor connecting Glen Trool- Minnoch - mid Cree • General comments regarding harvesting operations, roading and quarrying 	<ul style="list-style-type: none"> • Comments noted in DP text (sections 3.1, 3.2 & 5.7)
SNH Newton Stewart office: Callum Sinclair	16 th June 2017	17 th July 2017	<ul style="list-style-type: none"> • The proposals were generally supported • Further consultation on maintaining habitat assemblages were recommended 	<ul style="list-style-type: none"> • The oakwoods SAC/SSSI have contradictory management advice • The native woodland expert from FES was taken on a site visit for further advice on species selection
FCS South Scotland Conservancy: Dumfries office	16 th June 2017	No comment received		
Richard Cass: Owner at Glen Head	16 th June 2017	4 th July 2017	<ul style="list-style-type: none"> • Site visit arranged for 10th July 2017 • Consideration of retention of conifer species beside the Bennan planting • Continue with bracken 	<ul style="list-style-type: none"> • Species reviewed in concert with other stakeholder input and national restocking strategy • Bracken control continued • Transport discussed with civils

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			<p>control</p> <ul style="list-style-type: none"> • Remove bailey bridge for timber transport at glen head • Review of litter from wild camping 	<p>and ops teams for rationalisation</p> <ul style="list-style-type: none"> • Rec teams asked about wild camping in loch trool areas
Cree Valley Community Council: R Kay	16 th June 2017	No comment received		
Dumfries and Galloway Regional Council: Simon Fieldhouse	16 th June 2017	No comment received		

Appendix II: Tolerance Tables

PROCESS TO BE APPLIED IN RESPECT TO ANY ALTERATIONS TO APPROVED FOREST PLANS

- 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 letters and map	Y		• Up to 15% of coupe area	• Between 3 and 5 planting seasons after felling, subject to the wider forest and habitat structure not being significantly compromised.		• Additional felling of trees not agreed in plan. • Departures of > 60m in either direction from centre line of road	• Increase by up to 10% of coupe area • Any reduction in open space of coupe area by planting.	• Up to 5ha
Approval by formal plan amendment may be	Y	• Felling delayed into second or later 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	• Change from specified native species.	• As above, depending on sensitivity.	• In excess of 10% of coupe area.	• More than 5ha.

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required		• Advance felling (phase 3 or beyond) into current or 2nd 5 year period.		being significantly compromised.	• Change Between species group.		• Colonisation of open space agreed as critical.	
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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*

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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

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Appendix III: Ground Truthed Heritage sites

Name of site	OS REF	Feature description
AEROPLANE PARTS	NX456849	Located to a 1km square area wreckage from an aircraft crash
ARMSTRONG WITHWORTH WHITLEY V: LOCH ENOCH	NX446850	PLANE CRASH SITE. Located to a 100m square is an aircraft crash site. 29 May 1941 an Armstrong Witworth Whitley V crashed into Loch Enoch. The exact location of the plane is not recorded.
Buchan	NX422805	FIELD SYSTEM .A field –system annotated to 'Old Fences' comprising a number of disconnected lengths of field-wall is depicted on the 1 st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13). Modern aerial imagery show a larger area of walls and rig to N and NW
BUCHAN BRIDGE	NX416805	BUILDING, FIELD SYSTEM, SHEEPFOLD. One unroofed building, one unroofed structure annotated 'Old Sheep Ree; and a field-system annotated 'Old Fences' are depicted on the 1 st edition of the OS 6-inch map (Kirkcudbrightshire 1853, Sheet 13)
BUCHAN BRIDGE	NX417804	ROAD BRIDGE. A Road bridge dated 1851 over Buchan Burn single track on E-W axis. Single spans with semicircular arch. Rubble; granite dressings. Natural rock abutments.
Bennan hill crash site	NX397823	PLANE CRASH SITE. Crash site of Canadian Pilot Suv. Lt. Thomas A Oliphants Gruman Wildcat Mk V JV04 of NO898 Naval Air Sqn. RN. Crashed 11/09/1945. Pilot killed and body removed.
CAIRN	NX405783	CAIRN. A cairn constructed at the summit of Doon

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CALDON, GLEN TROOL	NX399788	FARMSTEAD (POSSIBLE). What may be a farmstead, comprising one unroofed building annotated 'Ruins', one enclosure, and a head-dyke are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 21).
CALDONS WOOD	NX403788	BUILDING. One unroofed building annotated 'Ruin' is depicted on the 1 st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 21).
CALDONS WOOD, GLEN TROOL	NX397788	ENCLOSURE. An open enclosure is depicted on the 1 st edition of the OS 6-inch map (Kirkcudbrightshire 1852, sheet Forestry Commission 21).
CALDONS WOOD, GLEN TROOL	NX398784	ENCLOSURE(S). Three enclosures are depicted on the 1 st edition of the OS 6-inch map (Kirkcudbrightshire 1852, sheet 21).
CALDONS, GLENTROOL, COVENANTER'S GRAVE	NX397788	COVENANTERS GRAVE. A tombstone, enclosed within a square stone enclosure measuring 1.4m high, said to be the first carved by 'Old Mortality' Robert Paterson, erected 1827 to mark the communal grave of six Covenanters.
CRAIGNINE	NX426828	SHEEPFOLD(S), SHIELING HUT(S) (POSSIBLE). What may be three unroofed sheiling huts annotated 'Old Sheep Rees' are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13).
CULSHARG	NX415821	SHEEPFOLD. A building and attached enclosure, and a sheepfold are depicted on the 1 st editions of the OS map (Kirkcudbrightshire 1853)
DOON	NX408783	ENCLOSURE, SHIELING HUT (POSSIBLE). What may be a single unroofed sheiling-hut one enclosure annotated 'Old Fence' is depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 21).
F1-11 CRASH MEMORIAL, CRAIGNAW	NX459833	MEMORIAL. A monument to an F1-11 aircraft of the USAF 20 th Tactical Wing crashed on Craignaw on 19 th December

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		1979.
GAIRY OF GLENHEAD	NX429803	FIELD SYSTEM (POSSIBLE). A field system annotated 'Old Fence' on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13). Modern aerial imagery shows areas of rig cultivation.
GAIRY OF GLENHEAD	NX436082	BUILDING, ENCLOSURE(S). A single unroofed building and two enclosures are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 14).
GLEN TROOL	NX422798	BATTLE SITE, COMMERATIVE MONUMENT. Located to a 100m square is the possible site of the Battle of Glentrool, between the English and Scots lead by Robert the Bruce 1306-7
GLEN TROOL LODGE	NX408803	ENCLOSURE, HEAD DYKE. One enclosure and a length of head-dyke annontated 'Old Fence' is depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1853, sheet 13).
GLEN TROOL, BRUCE'S STONE	NX415803	COMMENMORATIVE MONUMENT, STONE. 1929 (dated). Boulder monument. Large granite boulder set upon base of smaller granite stones cemented together. Robert the Bruce apparently directed operations from this site.
GLENHEAD	NX432799	SHEEPFOLD. A farmstead comprising a house, outbuildings and sheepfolds.
GLENHEAD, GLEN TROOL	NX426801	FARMSTEAD, FIELD BOUNDARY. A farmstead annotated 'in ruins', comprising 2 buildings and 1 enclosure are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1852, sheet 21). Aerial imagery show some rig.
GLENHEAD, GLEN TROOL	NX437796	ENCLOSURE(S), FIELD SYSTEM(S), STRUCTURE(S). Three field-systems and three enclosures annotated 'Old Fences' are depicted on the 1st edition of the OS 6-inch map

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		(Kirkcudbrightshire 1852, sheet 22)
GLENHEAD, GLEN TROOL	NX430796	BUILDING, ENCLOSURE(S), SHEEPFOLD. One unroofed building annotated 'Ruin', one unroofed structure annotated 'Old Sheep Ree' and two enclosures are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1852, sheet 21).
GLENHEAD, GLEN TROOL	NX434795	ENCLOSURE(S), GLEN TROOL. A long unroofed structure annotated 'Old Sheep Ree' and three enclosures annotated 'Old Fence' are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1852, sheet 22).
MEMORIAL TO AIRMEN	NX452824	CAIRN. Memorial cairn to airmen.
MULLWARCHER/DUNGE ON HILL	NX457862	PLANE CRASH SITE. Aircraft wreck of an Auster G-APMJ, crashed 18/10/1963. Framework survives at site. Main part of crash site lies in Cumnock and Doon valley, but some fragments fall within Dumfries and Galloway.
SHEEP PEN	NX422825	SHEEPFOLD. A circular sheepfold. Two walls extend outwards to the W and SE, for a distance of about 16m long.
SHEEP PEN	NX417822	SHEEPFOLD. A circular sheepfold. Two walls extend outwards to the W and S, for a distance of about 8 and 11m long.
SHEIL BURN, GLEN TROOL	NX435790	ENCLOSURE(S). Three conjoined enclosures annotated 'Old Fences' are depicted on the 1st edition of the OS 6-inch map (Kirkcudbrightshire 1852, sheet 22).
SHEIL HOLM	NX409788	FIELD SYSTEM (POSSIBLE), SHEEPFOLD. One unroofed structure annotated 'Old Sheep Ree' and what may be a field-system annotated 1st edition of the OS 6-inch map (Kirkcudbrightshire 1852, sheet 21).

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Appendix IV: Coupe details for clearfell and establishment

Clearfell

Coupe	SS	NS	Larch	SP	LP	Other con.	BL	Open space	Total
11002 Clearfell	22.7							1.7	24.4
11018 Clearfell	3.8	1	2.7			0.4	0.3	0.8	9
11022 Clearfell	47.1							16.7	63.8
11034 Clearfell	6.8		0.7		0.7			0.4	8.6
11021 Clearfell	12.5		2.3		2.4			3.5	20.7
11010 Clearfell	16.6							5.9	22.5
11053 Clearfell	0.8							0.2	1
11009 Clearfell	4.7	1.3	1.7		0.8			0.6	9.1
11037 Clearfell	2.8		1.4		1.1			0.7	6
11015 Clearfell	47.7							5.1	52.8
11068 Clearfell	0.1		0.5	0.2		0.7		0.6	2.1

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Restock

Coupe	SS	NS	Larch	SP	LP	Other con.	BL	Open space	Total
11002 Restock	19.1						3.6	1.7	24.4
11018 Restock				0.4			6.9	1.7	9
11022 Restock	36.7						6	21.1	63.8
11034 Restock							8	0.6	8.6
11021 Restock					11.5		2.4	6.8	20.7
11010 Restock	2.2						2.3	18	22.5
11053 Restock								1	1
11009 Restock				5.5			2	1.6	9.1
11037 Restock				4.5			0.5	1	6
11015 Restock	52.8								52.8
11068 Restock							1.7	0.4	2.1

Notes on coupe work schedule

11002	Large coupe require a road extension to allow access to coupe. This is a self-contained coupe which will be replanted and probably subject to a no thin regime due to access and exposure. Replant with SS to maintain limited productive capacity in the coupe. Extended
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	buffer of BL to help with acidification of water courses. There may be limited natural regeneration of SS, which should be left if non-disruptive to restocking operations and in large enough areas to warrant respacing operations at appropriate junctures.
11018	Area which was clearfelled in 2016. Replanted as part of the oak linking forest. Steep ground may make much of the coupe unreachable and unsuitable for oak, all other broadleaves are acceptable as regeneration. If suitable provenance of hazel, wych elm, or possible juniper can be sourced within the planting period this may be utilised as enrichment planting as the monitoring of the coupe continues for habitat. Conifer regeneration will require control and removal.
11022	The large amalgamated SS coupe at the top of the plan. Area subject to replanting will be SS with BL around riparian zones. Probable regeneration will occur and if correct species will be accepted, unless in riparian/open zones.
11034	Fell and replanting of SS by clearfell. Possible natural regeneration of coupe, but limited seed source. Not visually prominent and had forest road immediately adjacent to it. Merrick hill path to south and Bennan enclosure to the south.
11021	Block previously approved for felling under amendment. Felling is of the large conifer compartment which covers shoulder of the hill. Restocking will be with SP and oak-BL on lower areas after the second phase of the fence has been erected.
11010	Large areas have very limited sitka growth and will be challenging to harvest. These areas will be converted into a woodland fringe, to provide habitat and reduce acidification pressure on watercourses at altitude. This area of woodland fringe will require monitoring to ensure that there is not excessive natural regeneration which would disrupt the desired structure. Access will be through coupe 11001
11053	Small area which will be felled and restocked with oak-bl where possible, however most of the coupe will be outside the fence and will be allowed to regenerate, but will probably suffer from browsing pressure.
11009	Overdue coupe for felling as part of the ongoing south side conifer removal. Served by two forest roads, with the SUW on the north west corner, over a watercourse. Replanted with BL and SP, with BL on the north side leading to an area of wet woodlands.
11029	Removal of NS and larch beside loch with SUW running through coupe. Closure will be required. Inside new fenced enclosure. Immediately adjacent to forwarder track which is

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	ROW. BL natural regeneration is to be maintained, any conifer regeneration removed where accessible. To be restocked with BL as part of oak SAC linking forest stand.
11037	Coupe will be accessed from road to east, running into Brighton LMP roads. Will be restocked with SP to allow for SS removal. No natural regeneration of non SP conifers will be accepted.
11015	Area which will be felled and mostly left to open space. There may be capacity to plant some species on the steeper ground or natural regeneration of BL may occur in the open space. Conifer regeneration will be removed.
11068	Last remaining area of larch, western hemlock above SUW. Larch is dead and requires removal. WH will remove remaining conifer seed source in oak area. Coupe can be access from remaining forest road.

Appendix V: Coupe details for clearfell and establishment

A BRIEF FOR LOCH TROOL LMP

Main management objectives in this large scale plan joining two existing oak stands within the plan area along with maintain the montane planting inside an enclosure at altitude.

The block lies 14km north of Newton Stewart, Dumfries & Galloway.

Key Strategic directions from role of Scotland's National Estate	Local District Strategic Plan Objectives	Actions / Prescriptions
<p>Healthy: Good environmental and silvicultural condition in a changing climate</p>	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • <i>Increase</i> the area of broadleaf woodland to <i>establish / maintain</i> a permanent woodland infrastructure • <i>Increase</i> the area of broadleaf woodland and open space to <i>establish / maintain</i> a permanent woodland infrastructure around riparian zones • <i>Implement</i> National deep peat restocking / restoration policy and increase the overall area of peatland restoration within the district • <i>Improve</i> resilience through increased use of woodland managed under LISS • <i>Increase</i> use of natural regeneration in our restocking • <i>Increase</i> the areas designated as natural reserves to allow for habitat, carbon sequestration and • <i>Control</i> invasive species as per FES guidelines (specifically <i>R. ponticum</i> and American Mink)
<p>Productive: provide sustainable economic benefits from the land</p>	<ul style="list-style-type: none"> • Contribute to the local economy by maintaining core timber production and roads infrastructure 	<ul style="list-style-type: none"> • <i>Meet</i> production forecast commitment through felling programme reflected in the felling phases • <i>Implement</i> road construction / maintenance programme required to service proposed harvesting operations
<p>Treasured: a multi-purpose resource that sustains livelihoods, improves quality of life and offers involvement and</p>	<ul style="list-style-type: none"> • Involve and engage with local people / encourage partnership working • Recognise the Estate as a place for volunteering, research and development 	<ul style="list-style-type: none"> • Continue to <i>consult</i> with local communities and stakeholders through Forest panel and Land Management Plan process and work with third sector partners • <i>Incorporate</i> Research and Development into Land Management Plans • <i>Incorporate</i> the Biosphere buffer & Dark Skies park zones objectives into plan

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enjoyment		
Accessible: woodlands that welcome and are open for all	<ul style="list-style-type: none"> • Improve access and enhance existing facilities • Use for health benefits and outdoor learning 	<ul style="list-style-type: none"> • <i>Retain and improve</i> access to block specifically access for hill walkers through existing / future plantation to open hill tops and heritage features and access to fishing and the principal forest recreation facilities • <i>Continue to liaise</i> with Ministry of Defence over area usage within Galloway Training Area
Cared for: working with landscape and the natural and cultural heritage	<ul style="list-style-type: none"> • Maintain open habitats in good ecological condition • Landscape • Increase area of broadleaf cover in block • Conserve vulnerable species • Safeguard heritage features 	<ul style="list-style-type: none"> • Block is heavily used by tourists and some local groups for informal recreation and some formal recreation; <i>maintain and enhance</i> local landscape through additional species diversity, open space integrated management and revised coupe shapes to better suit landform • Connect the existing SAC/ASNW oak forest with another BL stand of local provenance seed, mirroring the make-up of the surrounding forests. • <i>Increase</i> area of native BL throughout plan area for added biodiversity, targeting a permanent BL woodland infrastructure along riparian zones • Although the block is not part of the priority area for Red squirrel, the species is present throughout; <i>maintain</i> area for Red Squirrel (priority species) through retentions and increased use of alternative conifer species to Sitka Spruce where appropriate • <i>Enhance</i> habitat for Black Grouse through creation of additional open space and broadleaf areas (woodland fringe and / or Peatland Edge Woodland) • <i>Manage</i> SAMs, battlefield site and all other minor heritage features as per FES guidelines
Good value	<ul style="list-style-type: none"> • Seek diverse range of income streams • Reduce carbon emissions from business activities 	<ul style="list-style-type: none"> • <i>Continue</i> to offer deer leases over plan area

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ACHIEVED BY PLAN

HEALTHY

Y Committed to high quality silviculture and increasingly using alternatives to clearfell (LISS): Large areas of the plan will be LISS under LTR/Natural reserve. Due to species change, opportunities are limited elsewhere.

Y Committed to dealing with invasive plants that threaten habitats and biodiversity: Sitka spruce within planting enclosure at the top of the Bennan will be removed where it threatens the objectives of the area. Rhodendron ponticum has been removed from LMP area, but is still present on private residence areas

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/Sheep/Goats 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

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 Work with partners to find new ways to harness our natural and cultural heritage and develop the estate's potential for tourism: continue to develop the block tourism facilities where they will meet the expectations of the visitors to the block area.

Y Support Scottish Governments woodland expansion programme: block has taken opportunity to plant ~150ha inside Bennan enclosure and will also include approximately 60ha which would have been left open with local provenance oak

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 ongoing monitoring and research of pramor

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

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Y Use estate for health benefits and outdoor learning: Block has numerous long, medium and short walking routes & some 7Stanes routes.

CARED FOR

Y Restore 85% of areas on ASNW to native species: Native species are being restored in all ASNW areas.

Y Increase BL tree cover from 8% woodland cover to 20%: projected BL cover will increase markedly in this LMP area

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 identified and managed accordingly

Y Committed to maintaining best open habitats in good ecological condition: the open habitats will be focused on the Bennan and riparian zones where conifer regeneration will be controlled

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 has some opportunities to diversify income with tourism, recreation and a moderate amount of timber.

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

All of the operations in Loch Trool 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.

Loch Trool Land Management Plan will be included in this audit process.

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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%

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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)	1365.2ha

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land)	
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).

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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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