Forestry Commission Scotland
Coimisean na Coillteareachd Alba

Planning

Cowal and Trossachs Forest District

Land Management Plan

Beinn Bhan

Cowal and Trossachs Forest District

BEINN BHAN

Land Management Plan

Approval date:

Plan Reference No:

Plan Approval Date:

Plan Expiry Date:

CSM 6 Appendix 1b

FOREST ENTERPRISE - Application for Land Management Plan Approvals in Scotland

Forest Enterprise - Property

Forest District:	Cowal & Trossachs
Woodland or property name:	Beinn Bhan
Nearest town, village or locality:	Kinlochard
OS Grid reference:	NN407019
Local Authority district/unitary Authority:	LLTNP

Areas for approval

	Conifer	Broadleaf
Clear felling	102.1ha	
Selective felling		
Restocking	68.3ha	33.7ha
New planting (complete appendix 4)		

1. I apply for Land Management Plan approval for the property described above and in the enclosed Land Management Plan.

2. I apply for an opinion under the terms of the Environmental Impact Assessment (Forestry) (Scotland) Regulations 1999 for roads, tracks and quarries as detailed in my application.

3. I confirm that the initial scoping of the plan was carried out with FC staff on 13th April 2017.

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

5. I confirm that the scoping, carried out and documented in the Consultation Record attached, incorporated those stakeholders which the FC agreed must be included.

6. I confirm that consultation and scoping has been carried out with all relevant stakeholders over the content of the of the land management plan. Consideration of all of the issues raised by stakeholders has been included in the process of plan preparation and the outcome recorded on the attached consultation record. I confirm that we have informed all stakeholders about the extent to which we have been able to address their concerns and, where it has not been possible to fully address their concerns, we have reminded them of the opportunity to make further comment during the public consultation process.

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

Signed ..... Signed .....

Forest District Manager — Conservator

District ...Cowal & Trossachs FD — Conservancy ..... Perth & Argyll

Date 8th February 2018 — **Date of Approval** ..... 27 JUL 2018 .....

Date approval ends ..... 27 Jul 28 .....

Forestry Commission Scotland
Coimisean na Coilltearachd Alba

Environmental Impact Assessment
Screening Opinion Request Form

Please complete this form to find out if you need consent from Forestry Commission Scotland, under the **Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017**, to carry out your proposed forestry project. Please refer to Schedule 2 Selection Criteria for Screening Forestry Projects under Applying for an opinion. If you are not sure about what information to include on this form please contact your local Conservancy office.

Proposed Work							
Please put a cross in the box to indicate the type of work you are proposing to carry out. Give the area in hectares and where appropriate the percentage of conifers and broadleaves							
Proposed Work	select	Area in hectares	% Conifer	% Broad-leaves	Proposed work	select	Area in hectares
Afforestation	☐				Forest roads	☒	1.1
Deforestation	☐				Forest quarry	☐	
Location of work							

Description of Forestry Project and Location
Provide details of the forestry project (size, design, use of natural resources such as soil, and the cumulative effect if relevant). Please attach map(s) showing the boundary of the proposed work and other known details.
See section 5.9 of LMP and relevant map

Provide details on the existing land use and the environmental sensitivity of the area that is likely to be affected by the forestry project.
These are described in section 3 the LMP.

Description of Likely Significant Effects
Provide details on any likely significant effects that the project will have on the environment (resulting from the project itself or the use of natural resources) and the extent of the information available to assist you with this assessment.
Some tracks will be visible from summit of Ben Lomond. This has been assessed from site visits and analysis in GIS.

Include details of any consultees or stakeholders that you have contacted in order to make this assessment. Please include any relevant correspondence you have received from them.

Mitigation of Likely Significant Effects
If you believe there are likely significant effects that the project will have on the environment, provide information on the opportunities you have taken to mitigate these effects.
See section 5.9 and appendix V and VI of the LMP

Sensitive Areas	
Please indicate if any of the proposed forestry project is within a sensitive area. Choose the sensitive area from the drop down below and give the area of the proposal within it.	
Sensitive Area	Area
National Park (NP)	1.1
Select...	

Property Details			
Property Name:	Beinn Bhan		
Business Reference Number:		Main Location Code:	
Grid Reference: (e.g. NH 234 567)	NN407019	Nearest town or locality:	Kinlochard
Local Authority:		LLTNP	

Owner's Details					
Title:	Mr	Forename:	John		
Surname:	Hair				
Organisation:	FES		Position:	Planning Manager	
Primary Contact Number:	0300 067 6600		Alternative Contact Number:		
Email:					
Address:	FES				
Aberfoyle					
Postcode:	FK8 3UX		Country:		
Is this the correspondence address?			Yes		

Agent's Details					
Title:		Forename:			
Surname:					
Organisation:			Position:		
Primary Contact Number:			Alternative Contact Number:		
Email:					
Address:					
Postcode:			Country:		
Is this the correspondence address?			Select...		

Office Use Only	
GLS Ref number:	

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Summary of Proposals

The Beinn Bhan Land Management Plan (LMP) draws on the key themes of the Scottish Forestry Strategy (SFS) (2006), Forest Enterprise Scotland's Strategic Directions and Cowal & Trossachs Forest District's Strategic Plan. The area covers approximately 1050ha in a single unit.

The objectives of the new plan, which were developed following internal and external consultation, are summarised below and emphasise the key principals of establishing and maintaining a diverse, resilient forest capable of delivering a wide range of ecosystem services into the future.

- Review productive potential and seek to maximise this potential using Sitka spruce as the predominant species, whilst ensuring compliance with UKFS standards.
- Design a coupe structure and restocking strategy that take account of flood risk and which reduce potential negative impact on water quality in the Duchray catchment.
- Allow for retention of some older stands in the medium term.
- Protect notified features in Ben Lomond SSSI, creating buffer zones between it and commercial planting.
- Manage riparian areas to promote a variety of habitats for wildlife and improve links between the SSSI and the Duchray Water.
- Seek opportunities to improve habitats for black grouse.
- Protect public right of way linking forest road to Ben Lomond hill path.
- Seek to improve visual appearance of forest from prominent viewpoints such as Ben Lomond.
- Establish an effective deer control programme.

1.0 Introduction:

1.1 Setting and context

The Beinn Bhan Land Management Plan area lies about 3km west of the village of Kinlochard in Stirling. Covering an area of 1050ha it sits under the shadow of Ben Lomond in the heart of the Loch Lomond and the Trossachs National Park. The summit of Beinn Bhan, at 569m is part of the south east ridge of Ben Lomond and is the highest point in the plan area. The lowest point is where the Bruach Caorainn Burn meets the Duchray Water at about 125m. The former marks the southern boundary, the Duchray from the confluence to Stronmacnair, the eastern. The rest of the eastern and north eastern boundary follows a more arbitrary line below the ridge separating the Duchray from Loch Chon. Small burns and gullies mark the western boundary. To the south and east is Loch Ard Forest and Beinn Bhan is at the northern edge of the Queen Elizabeth Forest Park. To the north and west lies rugged, open ground associated with Ben Lomond. The woodlands fall within the scope of the Strathard Initiative, a partnership between local communities and several agencies whose aim is to deliver a number of ecosystem services through collaborative planning and practical land management (see Appendix VII for further details).

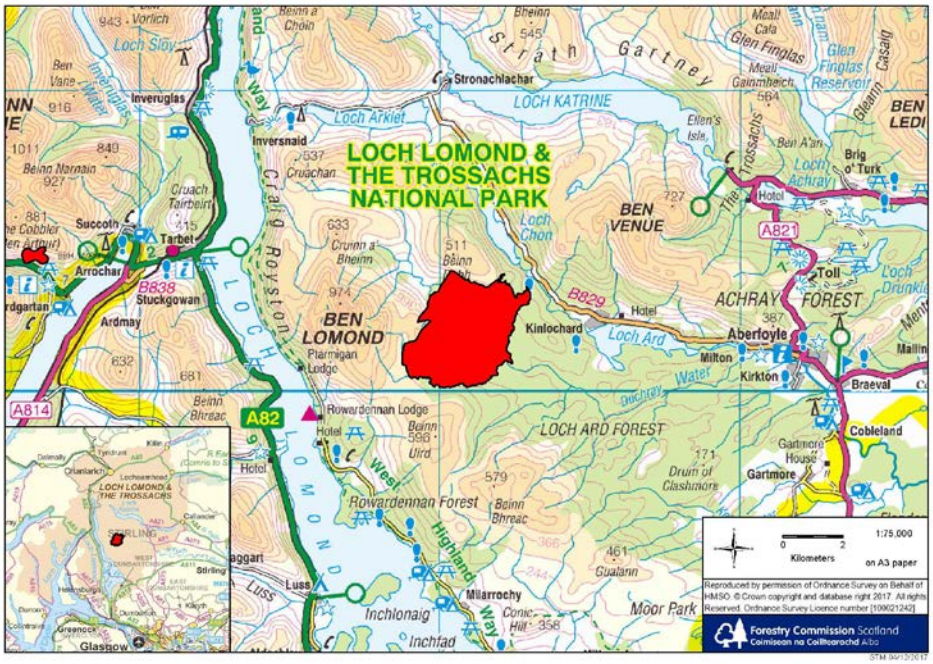


Figure 1.1 Beinn Bhan: location

1.2 History of the plan

This is the third forest plan for Beinn Bhan, the previous plan having been submitted and approved in 2006. The plan covers an area of 1050ha and continues a general aspiration to maintain production whilst improving the environmental and landscape features of the area. The earliest commercial planting took place in the 1950s and 1960s and some of these first rotation stands remain. Sitka spruce was the predominant species with only small proportions of Norway spruce and lodgepole pine. Very small amounts of Douglas fir, Scots pine and larch were also planted. Historically there had been a small area of semi-natural woodland next to the Bruach Caorainn Burn but prior to the first commercial planting the land would have been mainly rough grazing. The first two plans introduced a programme of restructuring aiming to achieve a more diverse and resilient forest and the first results of this are now being seen.

2.0 Analysis of previous plan

2.1 Aims of previous plan and achievements

The previous plan aimed to continue the restructuring work already begun in the first plan. The expected result was an increase in species and age diversity which would help deliver a number of benefits. These include improvements to the landscape and recreation experience, maintenance of water quality, improved habitats and habitat linkages. Although the area of commercial spruce forest was to be reduced timber production was to remain an important element in the plan. Other objectives were to protect known heritage sites, establish a programme of native woodland restoration and to keep deer numbers at acceptable levels. In addition Loch Dubh was to be an important link in an ambitious water vole re-introduction project.

At mid-term review it was noted that two of the six coupes for which approval was being sought had not been felled and this remains the case. One of these coupes is due to be felled in 2017/18 and the other will now be retained longer to keep some older trees in the short to medium term. Restocking of felled coupes has been largely achieved and is in line with the proposals outlined in the plan. The only areas where woodland has not been effectively re-established is in the ancient woodland restoration site along the Bruach Caorainn Burn. Elsewhere native woodland in the forest habitat network (FHN) is doing well. Also in the riparian FHN work is being carried out to remove excessive non-native regeneration. The heritage features at Big Bruach Caorainn were preserved during harvesting operations and the

water vole project has been a great success. The appearance of the steep slopes on the north side of Gleann Dubh has been softened as more extensive ground vegetation has developed following felling and a certain amount of natural regeneration has taken place.

2.2 How previous plan relates to today's objectives

The broad objectives of the previous plan are relevant to the new land management plan, though there is a slight change in emphasis with regards to some of these. Sustainable timber production remains a key objective and the plan seeks to maximise the productive potential of the area without compromising other objectives. In addition, due to climatic and site conditions there are only limited opportunities to use species other than Sitka spruce for productive purposes. Diversification will be achieved by continuing to increase the amount of native species in FHNs. There is increasing emphasis on managing forests to mitigate against flooding and to avoid deterioration in water quality. The felling programme follows guidelines to achieve the latter and the establishment of woodland in the riparian FHN is part of a range of measures being implemented throughout Strathard to help reduce flood risk. The importance of heritage features is emphasised in the plan and managing sensitively for both conservation and landscape remains a key element.

The zones map illustrates the relative importance of the main objectives throughout the area, though there is a degree of overlap.

3.0 Background information

3.1 Physical site factors

3.1.1 Geology soils and landform

The Land Management Plan area lies to the north of the Highland Boundary Fault and is underlain by fine and coarse grained metamorphic rocks. These rocks are exposed at the surface on the steeper slopes of the area. There are superficial deposits of glacial or fluvio-glacial origin, largely derived from the solid geology, at their deepest on less steep slopes. Landform is oriented broadly north west to south east, broad irregular ridges being separated by the Duchray and Bruach Caorrain Burn. There is a secondary south west to north east alignment of tributary burns. On the northern side of Gleann Dubh slopes are very steep, occasionally in excess of 40%, but relatively uniform. To the south they are less continuously steep but much more broken with frequent rock outcrops and broad flattish areas. Hummocky morainic deposits are found in the latter and along the sides of riparian areas. Many of the smaller burns are deeply incised into the superficial deposits. Elevation ranges from 125m to 569m at the summit of Beinn Bhan.

Detailed soil survey indicates that the plan area is dominated by peaty gleys and poorly flushed or unflushed deep peat. Some steeper slopes have either upland brown earths or podzolic soils. Soils are often shallow and rock outcrops are frequent in places. Soil pattern can be quite complex with rapid changes, for example, in areas where hummocky moraines are separated by more or less broad flatter areas. Typically the soils in Beinn Bhan will be very moist or wet and have a relatively poor nutrient status.

3.1.2 Water

Rising on the eastern slopes of Ben Lomond the River Duchray and its tributaries form the upper catchment of the River Forth. The Duchray is relatively steep with numerous rapids and small waterfalls. In places these are separated by relatively wide flood plains and terraces where flow is quieter. The largest tributary is the Bruach Caorrain Burn which has recently been harnessed for hydro power. Like the Duchray the smaller tributaries tend to be steep and in places are deeply incised into the glacial moraines over which they flow. The River Forth is prone to flooding at Aberfoyle and it is believed that good riparian management in the upper catchment could help lower the risk of this. The Duchray itself is classed as a failing water body by SEPA due to excess acidification.

3.1.3 Climate

Using the measures of warmth and wetness defined in the Ecological Site Classification (ESC, see Forestry Commission Bulletin 124) the Beinn Bhan LMP area is categorized as warm and moist at lower elevations, becoming cool and wet above about 200m. Average annual rainfall is in the region of 1500mm, about 60% of which falls during the winter months. At lower elevations the plan area is considered to be sheltered to slightly exposed, becoming highly exposed, but never “too exposed for forestry” at higher elevations.

3.1.4 Future climate

Predicting the impact of future climate change presents one of the biggest challenges in forest planning. Analysis carried out by Forest Research indicates an overall increase in average temperatures with warmer summers and milder winters. There will be regional variation in the future rainfall pattern and distribution, with a predicted decrease in summer rainfall in the east but a predicted increase in the west of the country. This will lead to more frequent drought in the east but a reduction in moisture deficit in the west.

There is less confidence in predicting changes in other climatic parameters such as windiness and extreme winter cold or summer heat. However, there is a general belief that the number of frost days will decrease and that the incidence and severity of extreme events (e.g. gales and heavy rain) will increase.

Data for the Beinn Bhan area suggest an increase in accumulated temperature of over 50% by 2050, compared to baseline 1960 – 1990 data, and about 75% by 2080. Relative increase is even greater at higher elevations and all parts of the forest are predicted to be classed as warm as early as 2050. Annual rainfall is predicted to remain more or less the same, a decrease in summer rainfall being compensated by a similar increase in winter. Despite the decrease in summer rainfall moisture deficit is predicted to also decrease. The impact of these changes on soil properties is uncertain. Potentially there could be an increase in growth rate in all tree species and a wider range of species may become suitable. However where exposure is currently a limiting factor it seems likely to remain so, and this potential for increased growth rate will be restricted to more sheltered parts of the forest.

3.2 Biodiversity and environmental designations

Although the commercial planting is dominated by Sitka spruce, Beinn Bhan provides a number of other habitat types, from moorland heath to open water. The moorland at higher elevations has a mix of heath vegetation and the summit of Beinn Bhan is part of the Ben Lomond SSSI, designated for its upland plant assemblage and invertebrate fauna. Three particularly rare plant species have been reported from the plan area though the precise locations of these are uncertain. There are several small patches of native woodland and isolated trees reach high into inaccessible gullies. There is an area designated as ancient-semi natural woodland, concentrated along the Bruach Caorainn Burn. Most of this was planted with commercial conifer but is now undergoing restoration. The area of native woodland has also been increased by planting, particularly on the lower slopes of Gleann Dubh. Loch Dubh provides a range of wetland habitats from open water to wet woodland.

A number of important bird and mammal species use the woodlands including ravens and buzzards. Black grouse occur on the woodland fringes and there are several known leks in the general area. Golden eagles also nest in the area and it is likely that they range over Beinn Bhan. Loch Dubh was an important site in a very successful water vole re-introduction project delivered by FES. Surveys to assess numbers of moths and butterflies have confirmed the presence of small pearl bordered fritillary at Stronmacnair.

3.3 The existing forest

3.3.1 Species, age structure and yield class

A total of 22 species, including general categories of mixed conifer and mixed broadleaves, are currently listed as being present in the forest. Many of these are native broadleaves which, individually, make up only a tiny percentage of the overall total. Reference to table 3.1 clearly shows the dominance of Sitka spruce. Lodgepole pine and Norway spruce are the next most abundant species making up about 15% of the woodland area. Scots pine covers just under 6% of the woodland and the three common species of larch less than 3% combined. All other conifers account for less than 3% of the forest. Open ground has been excluded from table 3.1.

Species	Area ha	Area %
Sitka spruce	345.5	67.4
Lodgepole pine	39.4	7.7
Norway spruce	37.9	7.4
Scots pine	29.3	5.7
Larch	14.1	2.8
Other conifer	14.5	2.8
Native broadleaves	31.6	6.2
	512.3	**100.0**

Table 3.1 Species diversity, Beinn Bhan, 2018

Age Class	Area ha	Area %
0-10	76.4	14.9
11-20	157.4	30.7
21-40	0	0.0
41-60	141.7	27.7
60+	136.8	26.7
	512.3	**100**

Table 3.2 Age diversity, Beinn Bhan, 2018

Table 3.2 gives figures for age class distribution for the woodland area. There is an imbalance in the structure with nothing recorded in the 21 – 40 age category. There is a relatively low amount in the under 10 years category and perhaps too large an area over 60 years of age. This suggests it may take several decades to achieve a structure in which restocking keeps pace with felling and a smaller area is kept as longer term retention.

Yield class, (productivity) is measured as maximum mean annual volume increment ($m^3yr^{-1}ha^{-1}$) and is generally moderate to good in Beinn Bhan. Review of production surveys indicates that for Sitka spruce yield classes of 16 – 24 can be achieved on better sites. However growth at higher elevations is much reduced. At all elevations there are frequent areas of very slow growing trees due to waterlogging. Other conifers, for example Norway spruce, grow well at lower elevations on better sites. Performance of both Scots and lodgepole pine is variable dependent on site conditions. There is limited data for existing broadleaved species.

3.3.2 Access

The Beinn Bhan LMP area is well roaded and nearly all coupes are adjacent to an existing road. There is light vehicle access from the B829 about 1.5km north west of Kinlochard. Heavy vehicles, and therefore timber lorries, take an eastern route through Loch Ard Forest to meet the A81 at Hoish Farm. In the future a new road may be constructed to gain better access through the upper part of Bruach Caorainn. Because of the steep nature of the ground on the north side of Gleann Dubh some parts present serious access problems for wheeled harvesting machines.

ATV tracks have been constructed in several coupes to aid management operations however these are not regarded as permanent features.

3.3.3 Potential for continuous cover forestry

Continuous cover forestry (CCF) systems work best where there are deep, well drained soils on shallow slopes and in relatively sheltered situations. These conditions allow for easier access for harvesting machinery and represent the lowest risk of wind damage. Due to the proliferation of peaty soils, especially where combined with exposure and/or steep ground, there is limited potential for CCF in Beinn Bhan. The best opportunities will be on the lower slopes on the north side of Gleann Dubh and where better drained soils are found above the Bruach Caorainn Burn. In the latter location CCF will not be considered during the current rotation due to the age of the trees; the potential for using CCF principals in younger stands in Gleann Dubh may not be realised for several decades. It is intended to keep the recently established native woodland as permanent cover and some of this might produce a supply of wood in the future.

3.3.4 Current and potential markets

Although timber prices fluctuate, there is continued demand for softwood timber of all dimensions and it is expected that there will continue to be a ready market for spruce. Future markets for hardwood and other conifer species are uncertain but expectations are that these will develop over time; in particular the demand for biomass for the woodfuel market is expected to grow.

3.4 Landscape and land use

3.4.1 Visibility, landscape character and value

Beinn Bhan lies within the Loch Lomond and The Trossachs National Park and the western edge falls into a National Scenic Area. The landscape setting has much of value and the eastern and western sides of the area are

visible from the summit of Ben Lomond and the hill paths to it. Views from the south are generally distant and more limited.

3.4.2 Neighbouring land use

To the south and east the plan area is bordered by the extensive commercial plantations of Loch Ard Forest. To the north and west are the rugged open areas associated with the Ben Lomond massif. There is rough grazing on these moorlands and a limited amount of semi-improved pasture on the estate ground to the north. The wider area supports a large tourist industry.

3.5 Social factors

3.5.1 Recreation

There are no formal recreation facilities in the plan area, however there are rights of way through Gleann Dubh and Bruach Caorainn which link onto tracks leading to the summit of Ben Lomond. In addition visitors can gain access along the existing forest road network.

3.5.2 Community

The Strathard Initiative is a multi-agency collaboration in land management planning and has, as one of its key outputs, the involvement of communities in forest planning. Therefore this plan has been developed in close co-operation with the Strathard Community, taking into account aspirations identified both in the Strathard Initiative and the local Community Action Plan. More details can be found in Appendices VII to XI.

3.5.3 Heritage

There are several important heritage features which are shown on the conservation map. There include the remains of buildings, a small walled graveyard and shielings. There are also the remains of a footbridge across the Duchray which is shown on the first edition Ordnance Survey maps. Taken as a whole these features demonstrate the fact that there was once a substantial local population in the area. There has been a great deal of interest in the remains at Big Bruach Caorrain, especially with its relationship to another group of buildings on the south side of the burn at Little Bruach. Both sites have well preserved corn kilns which are relatively rare in the local area. More detail on the archaeological features can be found in Appendix XII.

3.6 Statutory requirements and key external policies

The key policy documents influencing the LMP are the UK Woodland Assurance Standard, the UK Forestry Standard (4th Edition) and the Scottish Forestry Strategy.

4.0 Analysis and concept

The analysis and concept map summarises the main issues and aspirations for the LMP area.

4.1 Analysis

- Climate and soil conditions limit choice of productive species. Sitka spruce is the most suitable species on many sites.
- The summit of Beinn Bhan is part of the Ben Lomond SSSI and is vulnerable to spread of Sitka spruce from established plantations.
- Duchray water is a failing catchment for water quality.
- Duchray Water is part of the Forth system, which is prone to flooding in Aberfoyle.
- Several important heritage features, some within first and second phase felling coupes.
- Small areas of plantation on ancient woodland which were felled several years ago are showing little sign of native regeneration.
- Non-native regeneration spreading into areas previously designated as open or native woodland.
- Black grouse known to occur within or close to the LMP area.
- Parts of the plan area clearly visible from the summit of Ben Lomond and approach paths.
- Strategically important high voltage power line passes through northern part of plan area.
- Loch Katrine aqueducts pass close to northern edge of plan area. Hydro scheme on Bruach Caorrain Burn.
- Two public rights of way with links to Ben Lomond.
- Sporadic occurrence of rhododendron
- High deer numbers.

4.2 Concepts of the plan

The main objectives of the plan will be to maximise timber production without compromising other objectives. In particular management practices which can potentially improve water quality and alleviate flooding will be followed. Protection of heritage features is a key aspiration of the local community. In addition creating buffers around the Ben Lomond SSSI and improving habitat linkages between it and lower ground will feature in the plan.

- Establish a coupe structure and restocking programme that will minimise impact on water quality and flooding in the Duchray/Forth system.
- Use Sitka spruce as the main species of choice for productive restocking and maximise area of planting without compromising the Ben Lomond SSSI and the forest habitat network.
- Establish effective buffers between productive conifers and SSSI.
- Seek opportunities for a limited amount of alternative species to Sitka spruce to increase species diversity, meet objectives related to climate change and add landscape interest.
- Maintain and enhance the forest habitat network, improving linkages between the SSSI and ground at lower elevation.
- Protect heritage features during felling operations and manage the areas around them to avoid any future deterioration.
- Assess extent of non-native regeneration and accept this where it does not compromise overall and special objectives of the plan.
- Reassess options for establishing native woodland on PAWS where natural regeneration has been slow.
- Seek opportunities to improve habitats for black grouse.
- Assess ways to lessen the landscape impact of the major wayleave.
- Follow Forest and Water Guidelines during all operations and liaise with Scottish Water when working in vicinity of Loch Katrine aqueducts.
- Take account of hydro scheme and ensure facilities are protected during operations.
- Control invasive rhododendron.
- Establish an appropriate deer control programme and use appropriate measures to protect vulnerable tree species.

5.0 Land management plan proposals

5.1 Management

Management will be guided by the key objectives of the plan. Broad objectives are illustrated in the management zones map though it should be stressed that there will be overlap between zones. The main management technique will be clearfelling and re-planting.

Coupes for which approval to fell is being sought are shown in the management map. All harvesting operations will be carried out in accordance with the UK Forestry Standard Guidelines, and Forests and Water Guidelines (5th edition). Prior to operations any known heritage features will be marked to ensure protection during the operation. Public access will be managed so as to reduce disruption without compromising safety. The Loch Katrine aqueducts pass close to, but are not in, this plan area. If operational activity has potential to impact on the tunnels Scottish Water will be informed in advance.

The proposed felling sequence is a balance between achieving optimum economic return and timber quality, minimising risk of wind damage and retention of some of the older trees in the medium term. Models recently developed by Forest Research and FES suggest optimum cost recovery and timber quality is achieved when trees are between 40 and 50 years old. The timing and spatial distribution of felling coupes fall within the parameters set out in the UK Forest Standard to minimise risk of flooding and deterioration of water quality. Retention of some stands for a longer period will aid restructuring, improving future resilience and achieving a better age class balance. Although wind risk has been assessed as being relatively low over large parts of the plan area, the first phase coupes have small areas of damaged trees within them. Other coupes of a similar age appear more stable at the present time and so felling will be delayed. Established native woodland in the FHN will be managed as long term retentions or minimum intervention. Some of these will form important components in a natural flood reduction strategy. In the former there may be some productive potential but in the latter operations will be restricted to those which benefit the environment.

5.1.1 Thinning

There is limited potential for thinning at the present time. This is partly due to the age structure of the forest but there are also concerns regarding ground damage on softer soils. Younger stands at Stronmacnair will be

assessed for their suitability and other areas might also be suitable during the second rotation. Stands of native species in the FHN might also be assessed for thinning potential.

5.1.2 Potential for Continuous Cover Forestry

As stated in section 3.3.3 there is limited potential for CCF given the current stand structure. In the future the lower slopes on the north side of Gleann Dubh and areas along the Bruach Caorainn, might be suitable for this type of silviculture. Native woodlands in the FHN will be managed to provide continuous cover.

5.2 Future habitats and species

The future habitats map shows the restocking proposals of the plan. Timber objectives will be met by continuing to use Sitka spruce as the dominant productive species without compromising other objectives. Where site conditions and access are favourable treelines will be kept at or close to existing elevations. There will be some variation for landscaping purposes and a wide buffer will also be established around the Ben Lomond SSSI. The trees in the upper part of the Rinzoorach Burn have grown only slowly and this area will not be restocked commercially due to a combination of its adjacency to the SSSI and poor ground conditions. Ideally, after felling, this area will remain open or develop a native woodland habitat through natural regeneration. Areas of deep peat might have potential for restoration. Regeneration of non-native species will be monitored and kept within acceptable tolerances close to the SSSI.

On poorer ground lodgepole pine may be used as a nurse to help establish Sitka spruce. In the short to medium term this will add to species diversity though the lodgepole pine is likely to self-thin before the Sitka reaches maturity. Other conifers will be used on a limited basis to add diversity and landscape interest but, more crucially, to continue progression towards more resilient forests in light of future climate change. The main species used is likely to be Norway spruce but there are already small areas of Douglas fir, which could be replicated on more sheltered, fertile and better drained sites. Other species that are suitable include Noble fir and Macedonian pine, but a wider range will be considered when developing detailed restocking proposals. Increased diversity and resilience will be achieved without significant reduction in productivity.

Much of the non-productive area is incorporated into the Forest Habitat Network (FHN, see zones map). The FHN is based on the rivers and burns and provides important linkages through the commercial forest between

higher and lower ground. It will ultimately contain a wide range of habitat types including native woodland and open ground.

Native woodland will be established on ancient woodland sites in Bruach Caorainn. To date desired natural regeneration has not occurred here and a decision whether to plant this site, in association with appropriate protection measures, will be taken early in the plan period. Elsewhere native woodland natural regeneration is a preferred objective throughout much of the FHN. This would be of variable density with areas of open space. Where non-native regeneration is found an assessment will be made as to whether it is acceptable and a decision made on whether to remove it. It is more likely to be accepted in areas previously designated as open but outside the FHN. Along the upper northern slopes of Gleann Dubh a mixed pattern of regeneration is taking place which includes larch and Sitka spruce as well as native species. This will potentially lead to an attractive mixed woodland which will provide varied habitat and sit well within the landscape. In particular the view from the summit of Ben Lomond will be much improved.

The riparian woodlands can help deliver a range of benefits in addition to the overall increase in diversity. Variable density woodland in riparian areas will help reduce runoff on steeper sites and will help slow the flow on floodplains, thereby contributing to flood mitigation. Additional measures on floodplains, such as construction of woody debris dams and creation of ponds will also help reduce flood risk. The creation of different habitats, and the adoption of novel management techniques such as cattle grazing, will also benefit bird and insect species, for example the small pearl bordered fritillary populations at Stronmacnair. The increase in native broadleaved species should also have beneficial effects on water quality. Outwith riparian areas variable density natural regeneration of a range of species, especially around woodland margins will provide habitat for black grouse. The latter species can also benefit from ground planted with non-native conifer at commercial densities for up 10 – 15 years after planting.

The Ben Lomond SSSI and a wide buffer around it will be maintained as open ground. Non-native species will be removed to keep their spread within acceptable tolerance limits, but some native species will be permitted. Permanent open space will also be retained around important heritage sites including Big Bruach Caorainn and those close to Tom a' Mhoid in Gleann Dubh. Regeneration around other sites will be monitored and kept to a level in keeping with preservation of the historic features.

5.3 Restructuring

The felling proposals continue the process of restructuring the forest developed in previous plans. The aim of restructuring is to gradually convert a largely even aged, single species woodland into one with a more balanced age structure and a more diverse species range. It is believed that a more diverse forest will be more resilient to both disease and damage from extreme climatic events. Creating a coupe structure where adjacent coupes are not felled and restocked within five to fifteen years of each other is a standard method of achieving diversity. Depending on species and site conditions this separation in time should ensure that restocking in the first coupe is at least 2m high before the second coupe is felled. So called “adjacency” issues have been avoided as far as possible and further diversification of structure will be achieved by splitting and staggering the time of planting in coupes on the north side of Bruach Caorainn. The retention of several stands beyond the age of 60years will afford improved age structure and resilience in the medium to long term. Permanent woodland and a mix of open ground and natural regeneration along riparian zones both within and outside the FHN will further improve resilience.

5.4 Future management

Table 5.1 indicates net felling area and volume figures for the plan area. These values are approximate and coupes will be surveyed to provide more precise figures prior to felling.

Phase	Area (ha)	Volume (m^3)
1	41.7	21900
2	61.4	36840
	103.1	**58740**

Table 5.1 Proposed felling

Table 5.2 summarises the establishment proposals for the plan area. The figures include approximately 9.2ha of previously felled PAWS that has not yet been restocked, accounting for the difference between area felled and restocked. Other differences are because felled area is net of open space.

	Broadleaves	Conifer	Open	Totals
Phase 1	13.1	30.2	1.3	62.4
Phase 2	20.6	38.1	3.7	44.6
Totals	**33.7**	**68.3**	**5.0**	**107.0**

Table 5.2 Proposed establishment

Where production is the key objective conifers will be planted at densities of approximately 2700 stems per hectare (sph) and broadleaves in the region of 3500. Target densities for native woodland regeneration will vary depending on site objectives but are expected to be in the range 200 to 1100 sph.

Where establishment is to be through natural regeneration its presence will be assessed five years after felling. If regeneration is not at desired levels a decision will be taken on whether to allow more time for natural establishment of trees or whether to take a more pro-active approach; for example, ground preparation to create a suitable substrate for seedling establishment, or planting. Further evaluation will take place when the plan is reviewed at mid-term and ten years and future commitments to natural regeneration outlined in the mid-term review and plan revision.

Open areas will be allowed up to 20% tree cover. Sitka spruce regeneration will be kept within agreed tolerance limits on both open ground and in areas designated for broadleaved woodland. Small amounts of rhododendron are known to be present and appropriate measures to control this species will be put in place.

5.5 Species tables

Table 5.3 and Figure 5.1 indicate the change in relative species composition between 2018 and 2048. There is a reduction in the amount of Sitka spruce relative to other species over the 30 year period, but it remains the dominant species. There is also a relatively large reduction in the amount of other conifers especially Norway spruce and lodgepole pine. The amount of larch is reduced as a response to the threat of Ramorum disease. Diversity is maintained due to the significant increase in native broadleaves.

Species	2018	2028	2038	2048
Sitka spruce	67.4	61.6	55.8	54.7
Lodgepole pine	7.7	4.3	0.0	0.0
Norway spruce	7.4	1.6	1.7	2.4
Larch	2.8	1.2	0.9	0.3
Other conifer	2.8	4.4	8.7	9.5
Scots pine	5.7	4.3	4.2	4.2
Native broadleaves	6.2	22.6	28.7	28.9
	100.0	100.0	100.0	100.0

Table 5.3 Change in species diversity over time in Beinn Bhan (percent planted area)

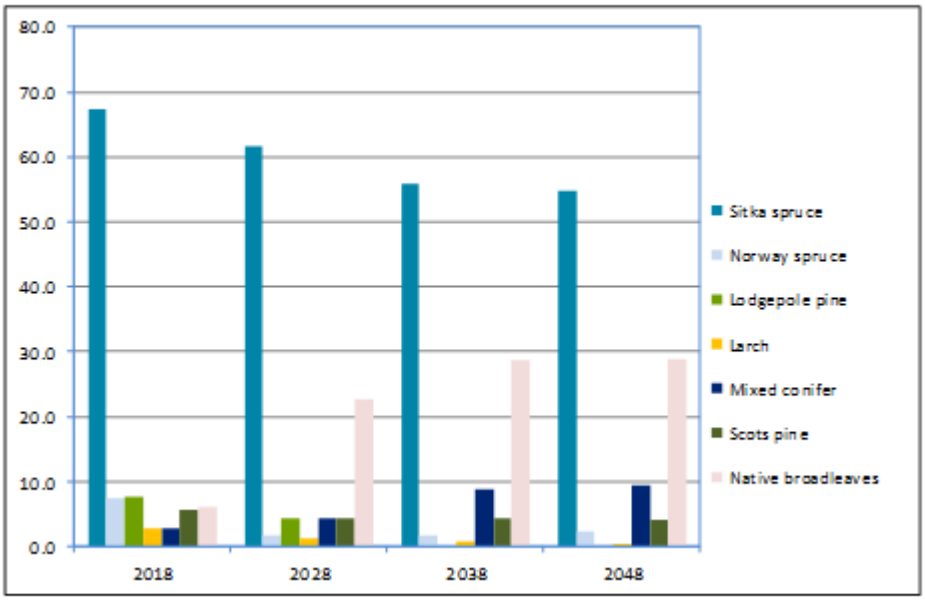


Figure 5.1 Change in species diversity over time in Beinn Bhan (percent planted area)

5.6 Age structure

Table 5.4 and Figure 5.2 show the change in relative age structure between 2018 and 2048. These figures indicate that it will take some time to achieve a balanced age structure. There is an early fall in older age classes which will not be fully compensated for till after 2048.

Age Class	2018	2028	2038	2048
0-10	14.9	28.7	48.1	23.5
11-20	30.7	11.6	10.4	36.1
21-40	0.0	28.4	41.1	21.3
41-60	27.7	20.3	0.0	18.7
60+	26.7	11.0	0.4	0.4
	100.0	100.0	100.0	100.0

Table 5.4 Age structure in Beinn Bhan (percent of forested area)

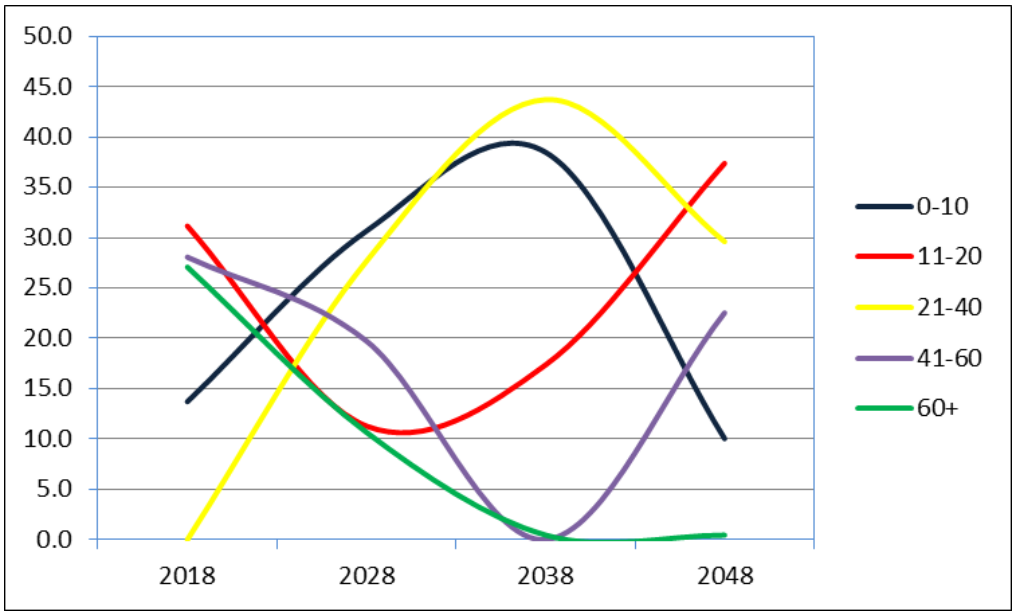


Figure 5.2 Age structure in Beinn Bhan (percent forested area)

5.7 Management of open land

	2018	2028	2038	2048
Forest	48.9	55.2	52.8	53.9
Open	51.1	44.8	47.2	46.1
	100.0	100.0	100.0	100.0

Table 5.5 Relative area of open ground and forest (%).

Table 5.5 summarises the relative distribution of open ground to forest in 10 year intervals between 2018 and 2048. These figures are approximate and include transient open space, where felled coupes have not yet been restocked. The reduction in the amount of open ground is due to the infill, with natural regeneration, of areas currently marked open: the actual figures will depend on the amount of regeneration. The Ben Lomond SSSI will be kept as permanent open space and a buffer around this kept open within acceptable tolerances. The area around the heritage features at Big Bruach Caorainn will also be treated as permanent open space though some native tree species may be allowed, as long as these do not compromise the features. In other areas variable density regeneration is already occurring on some previously felled land and this will be allowed to develop to create a patchwork of habitats. Wetland habitats around Loch Dubh will be managed to create a range of open and wet woodland habitats and this pattern will be repeated along other riparian areas. Open land is also incorporated into most of the restocking coupes though this is not identified specifically in the plan.

5.8 Deer management

Successful establishment of broadleaves and softer conifers will require deer control in order to keep browsing to a minimum. Beinn Bhan is included in the Loch Ard Deer Management Plan, which covers a number of other LMP areas. Latest analysis suggests deer populations are slowly rising and given the number of deer in the plan and surrounding areas damage levels are potentially high where young trees have not been protected by fencing. Therefore, although the preferred approach is to manage background deer numbers through culling, (bringing numbers down to a sustainable population where browsing damage is at an acceptable level), because of the current density of deer numbers, fencing will be considered as an option. An added benefit of reducing deer numbers will be the improvement

of open ground habitats with added benefits for native flora and fauna including black grouse. In addition to ATV tracks described below opportunities will be taken to incorporate open deer glades at restocking.

5.9 Access

The plan area is well roaded and all timber will be taken to the A81 at Hoish Farm. The roads and tracks map indicates the direction of travel of timber through the forest along with approximate volumes of timber to be brought onto the A81 during the plan period. Some upgrading will be required but this will not require any change to the road footprint. Base material for road maintenance will be obtained from the nearest Forest Enterprise quarry.

Up to 12 ramps or tracks will be required to enable harvesting machinery to access felling coupes. The precise location of these will be determined during operational planning but the expectation is that there will be one ramp for approximately 100m – 200m of coupe/road interface. Ramps will be approximately 3m wide and generally up to about 15m long; they will not be treated as permanent features. Two longer forwarder tracks, of up to 50m length each, will also be needed. Like ramps these will be approximately 3m wide and not treated as permanent features. The nominal area of ramps and forwarder tracks will be about 0.08ha. In addition 5300m of ATV tracks are required to facilitate silvicultural operations and deer management on coupes to be restocked. ATV tracks will be approximately 2m wide and there will be a minimum amount of disturbance when they are being constructed. They will not be treated as permanent features and will be allowed to grass over once restocking is complete. Indicative positions of the tracks are shown in the roads and tracks map. Final position will be within ± 100m of the indicated positions and the nominal area amounts to approximately 1.02ha.

A screening opinion form for tracks is to be found at the front of this document. A written request can be found in appendix V and a summary in Appendix VI.

Appendix I: Land Management Plan Consultation Record

Consultee	Date contacted	Date response received	Issue raised	Forest District Response
Forestry Commission Scotland	22.09.17			FCS informed that scoping had begun
Loch Lomond and The Trossachs National Park		n/a	Involved in brief setting 13.04.17.	
SEPA	21.09.17	17.10.17	The Duchray is an acidified catchment. Be aware of Bruach Caorainn Hydro scheme and ensure forest operations do not negatively impact this. SEPA has been involved in Strathard Initiative and discussed proposals for natural flood management. Recommend site survey to identify any areas of degraded peat which could be restored. Avoid new planting on groundwater dependent terrestrial ecosystems. New watercourse crossings should be notified to SEPA. Notify SEPA if spraying herbicide close to water courses. Relevant guidelines and regulations should be adhered to.	Noted status of Duchray catchment. Felling and restocking to be managed within current guidelines. Hydro scheme is noted on constraints layers and facilities marked on the ground. Operations will be planned to avoid impacts. Coupe structure to follow guidelines to minimise flood risk. Restocking proposals to be consistent with natural flood management in riparian areas and possible sites for woody debris dams to be identified. No sites identified during plan development. No new planting proposed. FES will advise. FES will notify SEPA in advance of spraying activity. Guidelines will be followed during operations.
SSE	21.09.17	21.09.17	Request acknowledged but no issues raised.	

SNH	21.09.17	18.10.17	Support objectives of plan and in particular intention to protect features of Ben Lomond SSSI. Partners in Strathard Initiative	
Strathard Community Council	21.09.17	22.09.17	Involvement in Strathard Community Engagement	See appendices VII - XII
Mountaineering Scotland	21.09.17	16.10.17	Would welcome greater diversity in planting, including an increase in the proportion of native species, and an increase in biodiversity in general. Would like to see commitment to improving visual impact of forest from prominent viewpoints. Welcome initiatives to protect and enhance public rights of way. Several general and specific comments regarding access, a request that a statement regarding maintenance of access should be included in final proposals and that guidelines regarding access are followed during operations.	As far as possible an element of diversification will be included in the plan including retention of older stands, assessment and modification of treelines and increased use of native species. Proposals will seek to improve impact of woodlands from prominent viewpoints. Guidelines to be followed during operations and where feasible and safe public access routes will be maintained. Diversions may be put in place during operations.
Scottish Water	21.09.17	18.10.17	There are no drinking water catchments or water abstraction sources in the area. Confirmed presence of strategic Scottish Water assets close to LMP area. And encourage continued dialogue with Scottish Water if these might be impacted by operations. Relevant regulations and guidelines should be followed.	FES will maintain dialogue with Scottish Water and inform them of potential conflict with their assets. FES will comply with relevant guidelines.
RSPB	21.09.17	20.10.17	Supportive of proposals to improve habitat for black grouse, protect notified features and manage riparian areas for diversity. Would like to see proposals to increase area of native woodland and create buffers around SSSI carried forward into new plan. Recommend potential for peatland restoration is investigated. Connectivity of open ground habitat would be beneficial for black grouse. Improving and maintaining a diverse age structure is recommended.	FES will aspire to create a range of suitable habitats, including diversity of open ground, improved age diversity in conifer forest, native woodland and habitat linkages. Felling and restocking proposals will aim to improve both species and age diversity.

CLEAR Services Ltd	21.09.17	05.10.17	Areas around Stronmacnair and Loch Dubh were surveyed for Lepidoptera in 2015. Important open habitats occur here and retention of these will aid species such as Small Pearl Bordered Fritillary. FES should continue to gather evidence on benefits of cattle grazing as a management tool for wildlife habitats.	Proposals include a variety of habitats in riparian areas including maintaining a proportion of open ground. Cattle grazing will continue to be used as a management tool.
Forth District Salmon Fisheries Board	21.09.17	26.09.17	No issues raised.	
BSBI Plant Recorder	22.09.17	via Jane Jones	Three rare species known to occur in a particular 1km or 2km square. If found care needed when carrying out operations.	FES will note presence of rare plants and take care if found in operational areas.
Stirling Council	21.09.17	no response		
National Trust for Scotland	21.09.17	no response		
Friends of Loch Lomond and The Trossachs	21.09.17	no response		
Scottish Wild Land Group	21.09.17	no response		
Comer Estate	21.09.17	no response		
Scottish Power	22.09.17	no response		
CONFOR	21.09.17	no response		

Appendix II. Scoping Record

Beinn Bhan Land Management Plan

Record of scoping exercise carried out by email in February 2015

A number of stakeholders were contacted by email in January 2017 and the responses received are summarised in Appendix I. Additional information from the Strathard Initiative and Strathard Community Engagement is to be found in Appendices VII - XII.

NB: All forests managed by FCS are certified under the UK Woodland Assurance Scheme (UKWAS), which requires forests to be managed sustainably. The UKWAS is part of the Forest Stewardship Council (FSC) scheme, which allows timber sourced from certified forests to carry the FSC label. Callander FDP will incorporate the various requirements of UKWAS within its proposals.

Appendix III. Land Management Plan Brief

This forest plan will follow the general approach of the previous plan. During preparation reference was made to National and District strategy and other documents.

The key principal is to establish and maintain a diverse, resilient forest capable of delivering a range of ecosystem services into the future.

Objectives:

Review productive potential and seek to maximise this potential using Sitka spruce as the predominant species, whilst ensuring compliance with UKFS standards.

Design a coupe structure and restocking strategy that take account of flood risk and which reduce potential negative impact on water quality in the Duchray catchment.

Allow for retention of some older stands in the medium term.

Protect notified features in Ben Lomond SSSI, creating buffer zones between it and commercial planting.

Manage riparian areas to promote a variety of habitats for wildlife and improve links between the SSSI and the Duchray Water.

Seek opportunities to improve habitats for black grouse.

Protect the public right of way linking forest road to Ben Lomond hill path.

Seek to improve visual appearance of forest from prominent viewpoints such as Ben Lomond.

Establish an effective deer control programme.

Appendix IV: Tolerance Table.

	Adjustment to felling coupe boundaries	Timing of restocking	Change to species (including boundaries)	Windthrow response	Changes to road lines
FC Approval not normally required	Up to 1ha or 10% of coupe - whichever is less	For productive species, up to 3 planting seasons after felling Up to 10 planting seasons for natural regeneration	Change within species group i.e. diverse conifers; broadleaves; Sitka spruce. Non native conifers in native woodland areas and designated open space up to 400 stems/ha. <20% increase in area of Sitka spruce	Up to 2ha as a single unit with >50%windblow	
Approval by exchange of Beinn Bhans and map	1ha to 5ha or 20% of coupe - whichever is less	For productive species, 3 – 5 years after felling	>20% increase in area of Sitka spruce	2ha to 20ha as a single unit with >50% windblow	Additional felling of trees not agreed in plan Departures of >60m in either direction from centre line of road
Approval by formal plan amendment	> 5ha or 10% of coupe	For productive species, over 5 planting seasons after felling	Change from specified native species Change between species groups	>20ha as a single unit	As above, depending on sensitivity

Appendix V. Screening opinion request

Beinn Bhan LMP –roads, tracks and ramps

This is a request for an EIA determination for works covering construction of, tracks and ramps in Beinn Bhan LMP area. The request covers proposals for the full ten year period of the plan which will offer some flexibility with the work programme without the necessity of having to re-submit a determination. Any work to be carried out in the second half of the plan period will be preceded by a new EIA determination request.

Approximately 5400m of forwarder and ATV tracks will be required to access harvesting sites and to facilitate harvesting, silvicultural and deer management operations. In addition up to 12 ramps will be required to allow harvester/forwarder access into coupes that are to be felled during the design plan period.

ATV tracks will be constructed in line with the principles described in the SNH guidance on Constructed Tracks in the Scottish Uplands. Construction will also conform to the Forests and Water Guidelines (Fifth Edition). During construction ground disturbance will be kept to a minimum. ATV tracks will not be treated as permanent features; once operations are complete tracks will be allowed to grass over and the running surface and side batters will be left in a condition that will promote vegetation regeneration. Tracks will be constructed with a top-side drain and will have regular drainage cut-offs to prevent erosion of the trackside drain. No water from the trackside drains will discharge directly into any watercourse.

Indicative positions of the tracks are shown on the roads and tracks map and final positions will be within ± 100m of these. The actual line will be planned to minimise landscape impact and ground disturbance, reflecting existing topography, avoiding steep gradients where possible and avoiding sensitive habitats. ATV tracks will be approximately 2m wide and the nominal area amounts to 1.02ha. A maximum of 100m of forwarder track will need to be constructed to gain access to first phase coupes; the exact distance will not be known until construction begins. Width will be approximately 3m and the nominal area up to about 0.03ha. Forwarder tracks will not be treated as permanent features and will be removed once they are no longer required.

Ramps will be approximately 3m wide and up to about 15m long. The nominal area is approximately 0.05ha. They will not be treated as permanent features and will be removed following operations. The final number and location of the ramps will be determined at the time of operations but we believe one ramp per 100m of road/coupe interface will be sufficient.

A screening opinion request form is to be found at the front of this document and a summary of proposed works in Appendix VI. A revised EIA determination will be sought if any specific sensitive issues are encountered before construction.

1	Landscape	In general landscape impact will be minimal as most coupes are not visible from important viewpoints. Care will be taken in design of tracks in coupe 32003 as this is on a steep south facing slope and, although distant, can be seen from the summit of Ben Lomond.
2	Watercourses	All work will conform to the 5th edition of the UK Forestry Standard Guidelines "Forests and Water".
3	Archaeology	There are known features in coupe 32007 and these will be marked prior to operations in order to avoid damage. Care will be taken to avoid damage to any new features discovered during operations.
4	Biodiversity	Work carried out will be sensitive to permanent and temporary features of conservation value (e.g. spawning frogs and toads in roadside drains).
5	Access	There are no major access issues.
6	Recreation	Informal recreation on existing roads may be disrupted during operations.
7	Material	ATV tracks will use material from on site. Material suitable for forwarder tracks and ramps will be sourced from the nearest FES quarry.

Appendix VI. Screening opinion request summary - forest roads and tracks

Coupe	Length (m)	Area (ha.)	Purpose	Landscape	Water quality	Archaeology	Biodiversity	Access	Recreation	Material
32069	100	0.05	access for harvesting	no major impact	standard protection measures	no known issues	no significant issues	from forest road	n/a	nearest FES quarry
32069	1040	0.21	crop establishment and deer	no major impact	standard protection measures	no known issues	no significant issues	from forest road	n/a	to be found on site
32003	745	0.15	crop establishment and deer management	visible in distance from summit of Ben Lomond	standard protection measures	features requiring protection in SW corner of coupe	no significant issues	from forest road	n/a	to be found on site
32007	1560	0.31	crop establishment and deer	no major impact	standard protection measures	no known issues	no significant issues	from forest road	n/a	to be found on site
32011	1760	0.35	crop establishment and deer	partially visible from public roads to south	standard protection measures	no known issues	no significant issues	from forest road	n/a	to be found on site

Appendix VII. The Strathard Initiative and Community Engagement

The Strathard Initiative originated from a desire to address the problem of flooding around Aberfoyle and Kinlochard. From this early focus it developed into a collaborative project engaging with, and capturing the views of, those who benefit from the surrounding landscape, interacting with it and with each other. Residents, landowners, businesses and visitors have been given the opportunity to say how the landscape affects them and how they affect the landscape, thus informing decision makers as to what the important issues are for them.

An important aspect of the initiative is the fostering of closer working relationships between agencies and others who are responsible for making and implementing land management decisions. The desired outcome is for there to be a more joined up approach to planning and delivery of solutions that meet community aspirations.

The following organisations worked together to develop the project:

- Community Partnership
- Forest Enterprise Scotland
- Forest Research
- Loch Lomond and The Trossachs National Park Authority
- Scottish Environment Protection Agency
- Scottish Natural Heritage
- Stirling Council

Community Partnership act as a link between the various organisations and all sectors of the community.

The Duchray catchment was recognised as a potential demonstration area to identify, and perhaps trial, land management and natural flood management solutions and a launch event was held in Kinlochard in February 2016. This was followed by several other meetings at which the local community were able to express what they liked or didn't like about the area and to articulate their aspirations for it. Opportunities were given for site visits, to look at the various

issues affecting land management, and there were also online tools to facilitate information gathering. Around the same time the community were revising the local Community Action Plan and the SI aimed to align itself with this.

Therefore "Strathard: a landscape to live, work and play" sought to "foster closer working relationships between agencies… …in a joint approach that will influence how the land, forest and water within the Strathard area is managed." The Scottish Government Land Use Strategy promotes an ecosystem services approach to land management planning and this was adopted in the SI. It is believed such an approach can improve decision making whilst delivering a wide range of benefits. The ecosystems approach is based on three key principles:

1. Consider natural systems by using knowledge of interaction in nature and how ecosystems function.
2. Take account of services that ecosystems provide including those that underpin social and economic wellbeing.
3. Involve people who benefit from ecosystem services and those that manage them in the decisions that affect them.

The expected outputs of the project were the gathering and presentation of information that can inform decision making in land and water management. Also a better understanding of community aspirations and the potential to trial different management options. Alignment with the revised CAP was seen as important and it was hoped to promote novel ways of working with communities – for example in funding and delivering projects. Almost 40 services and benefits were identified within the SI area ranging from timber production, landscape and nature viewing to wider concerns such as global climate change. More background to and the findings of the SI can be found online at: Strathard: a place to live work and play. This provides the information gathered during the process and checklists for assessing the potential impact of different projects on services and benefits.

One important aspiration described in the SI was "The need to work more closely with communities to improve understanding about forest management and reduce conflict".

As a result of this a group of Community Representatives was established to work with Forest Enterprise on the revision of the Beinn Bhan land management plan. Six people were selected to represent the community covering a range of interests including the Community Council, the Development Trust and local heritage groups. FES developed a framework within which they should work with the group and a series of meetings were held to discuss the issues that needed to be taken into consideration. The

guiding principles which governed the meetings are reproduced in Appendix VIII. Several site visits were held to examine and discuss plan objectives, potential services and benefits and the issues and concerns surrounding these. During discussions it was agreed the representatives had a responsibility to ensure information was disseminated more widely to avoid the sense that contribution to plan development was restricted to group members only. Notes from the meetings were made available online on the Development Trust web page. These are also found in Appendix IX.

Of particular interest to the community were the various heritage features to be found in the plan area with particular focus on the settlement at Big Bruach Caorainn. The latter has attracted wider interest in the archaeological community especially as it appears closely related to a similar site at nearby Little Bruach Caorainn. Other features were also highlighted, for example the house and graveyard at Stronmacnair. The potential of developing a heritage trail was recognised. Maintaining, and possibly improving, general access and signage were also considered important as were landscape and biodiversity. The potential to contribute to flood mitigation was also recognised.

The aspirations of the local community were incorporated into the objectives for the plan area and FES developed draft felling and restock maps which took these into account. The community were then provided with opportunity to comment on these plans which were also placed on the FES web site. A concluding meeting was held to discuss final drafts and the FES web page then updated with the final versions. The felling and restock maps attempt to balance all the various objectives, whilst allowing for the incorporation of future projects such as the construction of natural flood protection measures and heritage trails.

The overall impression of the process was that it had been a success with improved understanding between FES and the community of the various complex processes involved in land management planning and how delivery impacts on individuals and groups.

The community representatives considered the process to be open and candid with both parties able to discuss the various issues in a frank manner. The number of meetings and site visits was considered about right and well managed. FES were able to explain the planning process and some of the more technical and specialist issues, pointing out potential concerns and conflicts, without appearing prejudiced or biased. The group felt that FES listened to, and engaged with, the concerns raised by the group, a particular example being those associated with the management of the various heritage features found in the area. It was recognised that the members of this group were keen and committed to the process and this is something that needs to be carried through to future consultations. The timing of future meetings is something that ought to be considered to perhaps try and include a wider representation

of those who have daytime commitments. An important positive outcome is the establishment of direct contact between the community and FES through which future issues and concerns can be raised.

Looking ahead the group strongly suggested that FES carry out monitoring work that might help show how forest operations impact on water quality. This would provide re-assurance to the local community that over and above that operations meet relevant standards and guidelines. There is understanding that the process will develop over time and should improve as knowledge and experience develops.

Appendix VIII. Meetings with Community Group: Guiding principles

Background to the planning process and important considerations

There are a number of guiding principles which govern the content and production of Forest Enterprise Scotland land management plans.

1. Through the plan FES are seeking approval for felling and restocking for a period of ten years.
2. The plan is also used to support EIA determination requests for infrastructure projects and afforestation/deforestation where appropriate.
3. The plan describes, in broad terms, the management aspirations for the area under consideration, taking account of national and local strategy, forestry guidelines and stakeholder aspiration and advice.
4. FES woodlands are certified under the UK Woodland Assurance Scheme (UKWAS) and the plan demonstrates the sustainable nature of the management aspirations.

The Scottish Forestry Strategy was published in 2006 and emphasises:

1. The health and well-being of people and communities
2. Business and economic development
3. High quality, robust and adaptable environment

The means of achieving these are set out under seven key themes:

i. Climate change
ii. Timber
iii. Business development
iv. Community development
v. Access and health
vi. Environmental quality
vii. Biodiversity

FES and Forest District strategy add a more local nuance to these themes and are referred to when finding a balance between the various objectives of a plan. Other FES policy documents (e.g. guidance on peat restoration) and the UK Forestry Standard are also important reference points. Further information can be found on the Forestry Commission Scotland web site.

In the case of Beinn Bhan we will be using an ecosystems services approach as outlined in the Strathard Initiative. Relevant objectives of the Community Action Plan will be taken into account.

Background to the initiative can be found here and we will use the document prepared by Nicola Melville of SEPA, *"Information and Checklists for Assessing the Effects of Proposed Land and Water Management Actions"*, as a starting point for our discussions. This, and other information, can be found at the following link:

https://onedrive.live.com/?authkey=%21AInJC611pJ9kExY&cid=0D06DB146355BE3C&id=D06DB146355BE3C%211443&parId=D06DB146355BE3C%211199&o=OneUp

As stated above we will also refer to the CAP.

Appendix IX. Community Group meeting notes

Beinn Bhan Land Management Plan (LMP): Community Engagement

Initial Meeting, Wednesday 6th September 2017, Forest Hills Hotel Kinlochard

Present: John Hair, Steve Murphy - Forest Enterprise Scotland (FES); James Kennedy, Lynda McColl, Nigel Bonnett, Stuart Stephen, Jane Jones, Katy Lamb (Community Representatives)

The meeting convened at 10.00

This meeting is the first of several aimed at developing a long term management plan for FES' Beinn Bhan forest block in a collaborative partnership with local communities.

Following introductions JH described the background to the meeting, which is a direct outcome of the Strathard Initiative (SI), itself established to address concerns regarding flooding in the Upper Forth Catchment.

An ecosystems services approach was adopted and a range of other issues recognised.

Integral to the approach was the involvement of local people, taking into account their concerns and aspirations, leading to a partnership between agencies and local communities

Community working in partnership is a key aspect of Scottish Government Policy.

Important Community aspirations/concerns, relevant to the Beinn Bhan plan include:

- Tangible benefits to the flooding crises that affect the Upper Forth catchment.
- Improved communication between FES and communities, including points of contact.
- Successful delivery of the aspirations set out by the SI.
- Direct, pro-active and real involvement in plan development.
- Respect and protection of the area's rich heritage, avoiding mistakes of the past.
- Greater understanding of purpose, development and delivery of forest plans.
- Community Council support.
- Influencing introduction of flood protection measures.
- Mitigation of impact of clearfelling on landscape and existing path and trail infrastructure.
- Improved and safer access for all, including improved signage.
- Aesthetics of species choice and impact of species on environment.
- Clarification of the role of the National Park
- Timber transport.

It was recognised that, although stakeholder engagement has always been an important aspect of plan development, the concept of partnership is novel and the level of involvement is likely to be developed and refined during the process. It is important that everybody feels fully engaged and feels free to raise issues and ask questions.

There are constraints within which we have to work:

- Scottish Government Policy
- FES and Forest District Strategy
- UKFS (UK Forest Standard) – guidelines covering procedures and operations
- UKWAS (UK Woodland Assurance Scheme)– sustainability and certification
- Miscellaneous internal and external guidelines
- Planning law
- Resources and their limitations
- Communication
- Overall purpose and established process of plan development

Plans have a dual purpose:

1. Seeking approval, from Forestry Commission Scotland for felling and restocking.
2. Long term forest plan describing operations for the first ten years in some detail and longer term aspirations in the context of policy, site conditions and stakeholder input.

The process involves:

1. Internal and external stakeholder input
2. Information gathering (e.g. current forest structure, site conditions, environmental and cultural features.)
3. Analysis
4. Development of felling and restocking proposals.
5. Final consultation and approval via Forestry Commission Scotland (FCS)

In the case of Beinn Bhan there is now a common role for the community and FES to develop plan through Steve Murphy. Issues raised in the SI and Community Action Plan (CAP) need to be incorporated.

Outcomes raised in the SI and CAP, that are appropriate to the LMP, need to be incorporated into it.

The role of the community representatives is vital in communicating the plan to the wider community and feeding back response to FES.

During plan development any issues, regardless of perceived importance should be raised and discussed.

Where there is information missing or lack of understanding/clarity this should be raised.

Criticism of FES practice is acceptable and FES will respond, attempting to provide answers to issues raised.

Timeline:

Submission date: end November 2017

SM will now begin information gathering and the formal scoping process.

Information in the form of maps and relevant written documentation will be placed on FES web page. Community and reps to provide feedback and determine level of engagement.

Next meetings:

Monday 18th September – FES Aberfoyle Office.

Monday 16th October – FES Aberfoyle Office.

Indoor meeting concluded at 12.45 and was followed by a tour of the Beinn Bhan LMP area which concluded at about 15.00.

Beinn Bhan Land Management Plan (LMP): Community Engagement

Second Meeting, Monday 18th September 2017, Cowal and Trossachs Forest District Office, Aberfoyle

Present: John Hair, Steve Murphy - Forest Enterprise Scotland (FES); James Kennedy, , Nigel Bonnett, Stuart Stephen, Jane Jones, Katy Lamb (Community Representatives)

The meeting convened at 14.00

Feedback from previous meeting – everybody happy with the way that meeting went and no issues arising.

JH reviewed the Community Action Plan (CAP) and highlighted action points relevant to the Beinn Bhan plan area that ought to be considered during plan development.

Theme 1 – Community

P1 establish environmental projects that brings the community together

P2 establish heritage trails for locals and tourists (including community archaeology)

Theme 2 – Environment

P1 support the completion of the flood action plan, encouraging environmentally sustainable solutions
deal effectively with non-native invasive plants
encourage local conservation measures

Theme 3 – Outdoor recreation and economic development

P1 Investigate more mountain bike and multi-use trails
Better signs, interpretation maps and leaflets for all paths and trails

P2 Investigate the area for dark sky status
Encourage new and existing businesses and groups to utilise the natural assets of the outdoors, heritage and uniqueness of the area as selling points

Theme 4 – Roads, Traffic and Transport

P2 Restrict log lorries and coaches on Loch Ard Road

We then looked through comments captured during the Strathard Community Engagement (see highlighted points in appended list)
Other issues raised or discussed further included:

1. Establishment and maintenance of internal viewpoints: these could be tied in with heritage trails; practicalities of management discussed.
2. Impact on the environment and local businesses of the feral goat population. It was recognised that there was a diversity of opinion on how best goats should be managed.
3. Communication with local community and how best to achieve this.
4. Biking and path/trail maintenance

In addition comments captured at the SI launch events were also reviewed and those with relevance to Beinn Bhan are listed in the table below with a statement on FES response.

There was also a discussion on data requirements and how information is gathered. General conclusion was for SM to continue plan development as he normally would, perhaps including more and specific detail into analysis and concept maps, zone maps and species maps. These could then be used to inform further discussion.

It was agreed that prior to the next meeting SM will carry out some preliminary analysis and produce draft management zones and felling maps; these can be used as a basis to further discuss species choice.

There was also further discussion on communication.

1. Use of social media should be considered and FES web pages kept up to date and accessible.
2. There should be a regular supply of information and explanation, avoiding any surprises at final draft stage.
3. Possibility of holding an open meeting sooner rather than later.
4. Management of expectations is important; this includes being better informed regarding operations, i.e. improving day to day communication.
5. It was suggested that a FES Communities and Visitor Services representative attend the next meeting.
6. Further suggestions regarding LMP development should be directed to SM.

Next meeting:

16th October 2017 at 1pm at Kinlochard Village Hall followed by a site visit at about 2pm.

Strathard community engagement - launch events, capturing comments from comments received at the Benefits From the Environment stand; decision support tree		
	Comments, issues, aspirations	**Proposals to address these issues in land management plan**
Products from the environment, business	Forestry lorries an issue at nursery and school time.	All timber will be extracted via internal forest roads meeting the public road at the A81 at Hoish Farm.
	Fewer conifer plantations.	Conifers will remain the backbone of commercial forestry in Scotland for the foreseeable future. However the plan's proposals show a fall in the area of Sitka spruce and a corresponding increase in the amount of native species.
	Goats - managing numbers? Welfare issues and who is responsible?	At present goats do not impact directly on the Beinn Bhan plan area. In the wider Strathard area FES are working closely with the community and other land owners to manage goat numbers in a safe and humane way.
	Windblown trees and felling blocking footpaths.	In areas of high recreation use windblown trees are cleared as quickly as possible. There may need to be temporary closure of footpaths during harvesting.
	Self-seeding Sitka growing in native woodland, affects mushroom growth and understory.	Self-seeded Sitka spruce will be kept to within acceptable tolerances in selected native woodlands.
Natural processes that help manage the environment	Improved flood management.	Felling and restocking programmes fall within accepted guidelines to minimise flood risk. Riparian management is also designed to help "slow the flow". Opportunities are being sought to implement other natural flood management measures in the plan area and throughout Strathard.
	Healthy habitats in good condition, functioning and free from rubbish, invasive species and human impact.	The plan describes measures to protect and enhance a wide range of habitat types and encourages responsible access.
	Top quality woodlands/rivers not spoilt by rhododendron and skunk cabbage.	See above comment. Invasive species such as rhododendron will be subject to a programme of control.

Cultural benefits	Archaeology, improving access to sites, and reducing damage.	The plan recognises the importance of the archaeological features in the area and proposes measures to protect these.
	Interpretation of archaeology sites (hydro scheme) Katy Lamb proposal.	The plan allows for the prospect of developing trails and interpretation of heritage sites.
	Need to support local history and heritage.	
	Helps me stay sane and healthy and at times gives me solace, peace, comfort which in turn helps me work/live	FES recognise the health benefits of woodlands and encourages access.
	Mountain bike trail centre – increase visitors, business opportunity, increased prosperity, people enjoying the park	The plan area could form part of a wider trail network.
	More all ability trails, wheelchairs and push chairs	Beinn Bhan is relatively remote and at present is probably not an ideal candidate for promotion of all ability trails.
	Mountain bike trails; café; eco campsites	
	maintained cycle paths in the forest	
	Bike free tracks – safer for children	In the short term bike access is likely to be along forest roads and all who use them are encouraged to do so safely and with regard to others.
	Access route up Ben Lomond rather than visitors and locals having to access from Rowardennan	Routes through the forest to access Ben Lomond will be retained.
	Naturalness of landscape, keeping it. Not too many signs, allowing people to find their own way, maps rather than trails.	Striking a balance between keeping a sense of naturalness and allowing safe access is something that should be considered in any future trail development.
	Landscape – wonderful for outdoor activities, mountain bikers and walkers, need to split up access (damage to paths).	
	FREEDOM – to use the landscape (albeit slowly eroding, the permission not the landscape).	
	Beautiful natural areas, leave it alone. No more infrastructure and plantations of spruce. Area for exploration not entertainment.	
	Promoting the place and maintaining the tranquillity.	

Beinn Bhan Land Management Plan (LMP): Community Engagement

Third Meeting, Monday 16th October 2017, Kinlochard Village Hall

Present: John Hair, Steve Murphy - Forest Enterprise Scotland (FES); James Kennedy, Nigel Bonnett, Jane Jones, Katy Lamb (Community Representatives); apologies from Stuart Stephen

The meeting convened at 14.00

No issues arriving from previous meeting.

SM described progress since last meeting. There have been several more site visits, including with Forest District harvesting, recreation and conservation and engineering teams. A further visit is planned with forest management (restocking) and deer management. There has been more investigation into tree species suitability and a draft felling map has been drawn up.

At the team site visit several issues were raised including creating adequate buffers around the Ben Lomond SSSI to help protect it from invading Sitka spruce and complex planting patterns which could potentially lead to problems for harvesting in the future.

We had some discussion regarding the nature and extent of the SSSI. It is notified for its plant assemblage and covers most of the upper slopes of Ben Lomond (details can be found on the SNH web site).

There was also a discussion on windblow and the problems this can cause.

JH described the various methods by which timber is cut and sold to merchants. The bulk of this is by "standing sale" where the merchant is responsible for and organises the felling and haulage of timber to its final market.

JH also explained the routes available for hauling timber out of the forest and the different costs involved. As far as possible FES avoids using the public road through Aberfoyle; most timber from the west and south of Strathard is taken along the internal haul road to Hoish. There is a classification of public roads for transporting timber agreed between the forest industry and local authorities.

SM described the draft felling plan noting that it followed a similar pattern to that of the previous plan. Shapes and sizes of felling coupes (management units) are dictated by the current pattern of tree cover (age, species, size), timber requirements and a desire to create a patchwork of different age classes.

Several coupes are designated as long term retention. This means they may be felled at some time in the future but the intention is to retain them well beyond a normal rotation age of 40 – 60 years. Coupe 32613 (a temporary number) is designated a natural reserve and it was suggested this might be in error. Natural reserves have a much more strict non-interventionist regime where the only work should be for conservation purposes. Natural reserves should also be retained in perpetuity. **SM to check with conservation team regarding this designation.**

Four coupes are suggested for felling in the ten year period of the plan and the question of access during felling periods was raised – this especially in relation to possible new trails that might be in place. There are clear health and safety issues around working harvesting sites but access to roads and trails will be maintained as far as possible. Diversions may be put in place where necessary.

The large areas of open ground require careful description. It is not always possible to keep these areas completely tree free without a great deal of resource. There are accepted tolerances of tree cover but these should not be exceeded. (FES is audited on a regular basis and has to manage land according to the broad descriptions in the management plan to meet the required standards). Open ground habitats can be prioritised by FES and resources allocated where appropriate (e.g. SSSIs). FES will also seek to achieve an acceptable balance between more productive conifer plantations and forest habitat networks (the latter can be productive but generally would yield less biomass than typical conifer stands).

SM described the methodology used to establish site suitability and species choice. This is based on Ecological Site Classification (ESC) which uses climatic and soil parameters to estimate likely productivity of a range of plantation species and suitability for native woodland types.

The climatic data suggest that commercial plantations could be pushed to higher elevations but a combination of exposure and soils restricts these to more or less the limits seen at present. In addition the potential for species other than Sitka spruce is limited. Other species are found in limited amounts and there are some stands of Douglas fir that should be checked to see how well they are growing. **SM to do some further site investigations, check status of Douglas fir stands and prepare more detailed species map.**

The community have an opportunity for input in species choice on both a stand level (e.g. commercial planting) and at individual sites (e.g. around heritage features and trails). For special projects they may be able to apply for funding unavailable to FES.

The difficulties of establishing tree cover through natural regeneration were discussed. Deer pressure is known to be a problem throughout Strathard with numbers being 6 to 7 times the recommended levels. A plan is being put in place to reduce numbers but fencing will also have to be considered for some sites. This highlights the need to prioritise sites and balance aspiration with resources. At Stronmacnair undesirable Sitka regeneration is being removed and cattle being used to help manage native natural regeneration.

JK Described a visit to Little Bruach with two academic archaeologists. They recognised the extent and importance of this site, especially when considered alongside Big Bruach. The possibility of linking both sites as part of a heritage trail was discussed.

JH suggested that the community prepare a brief description of the two settlements at Bruach Caorainn that can be incorporated into the plan. **KL to produce an initial description of the Bruach sites which summarises their importance. JK to ask the archaeologists to summarise their findings and thoughts on the sites.**

JH also mentioned the possibility of receiving funding from the VISTA project to carry out works to mitigate the landscape impact of the major powerline that runs through the block. **(Group to look at during next site visit)**

Communication with wider community was discussed, especially in relation to individual requests for information. Community Group responsibility to maintain information flow to avoid any sense that these joint meetings are "closed" was stressed. **JK to email individuals to explain the process whereby this group was established and works.**

JK reminded FES that other FES team members had been invited to attend meetings but this has not occurred. There have also been difficulties in establishing contact regarding other projects and this is frustrating. JH described some of the pressures facing FES at the moment and agreed to speak to Will again. Recreation team will be invited to next meeting. **JH to speak to Will Huckerby and get back to JK before end of this week.**

Next meetings:

Wednesday 1st November, 12.00 – 16.00; Kinlochard Village Hall followed by site visit.

SM to prepare more detailed felling and restocking plans.

Friday November 24th, 12.00 - 16.00; Kinlochard Village Hall

SM to prepare final draft maps.

Meeting closed at 15.00

Beinn Bhan Land Management Plan (LMP): Community Engagement

Fourth Meeting, Wednesday 1st November 2017, Kinlochard Village Hall and Beinn Bhan Forest

Present: John Hair, Steve Murphy - Forest Enterprise Scotland (FES); James Kennedy, Nigel Bonnett, Jane Jones, Katy Lamb, Lynda McColl (Community Representatives); apologies from Stuart Stephen

The group met at 12.00

There was a brief session in the hall to review the draft felling and restock maps. The restock map illustrated the dominance of Sitka spruce as the main timber producing tree. Sites where there was more potential for other conifers were also shown. Areas shown as either open or naturally regenerating native woodland would need careful review before a final draft is produced.

This was followed a site visit to the LMP area.

1. Overview of LMP area and various issues affecting felling design and restocking.
2. Species choice
3. Establishment of trees where natural regeneration appears to be failing (e.g. PAWS)
4. Management of heritage sites during and post felling.
5. Management of riparian areas and wider habitat network
6. Use of Sitka spruce as main conifer species
7. Possible locations of woody debris dams.

Beinn Bhan Land Management Plan (LMP): Community Engagement

Fifth Meeting, Friday 24th November 2017, Kinlochard Village Hall

Present: John Hair, Steve Murphy - Forest Enterprise Scotland (FES); James Kennedy, Nigel Bonnett, Jane Jones, Katy Lamb (Community Representatives); apologies from Stuart Stephen, Lynda McColl

The group met at 12.00

SM presented the final draft felling and restocking maps and described any differences from previous versions. The felling map had changed little – the coupe structure is more or less defined by age and distribution of trees and topography. SM had done some work with cost and climate models which suggested that optimum felling dates for some coupes might be earlier than indicated. Some dates might therefore be changed but this will not affect first and second phase coupes for which approval is being sought; neither will it affect the restocking proposals and therefore the future structure of the forest.

There were some minor changes to the restocking map. In particular SM had reviewed the distribution of Sitka spruce and looked for opportunities to increase the percentage of this species without compromising other objectives. For example, the existing treeline will be maintained whilst retaining a significant buffer between it and the Ben Lomond SSSI. A small percentage of Norway spruce and other conifers will also be used.

Large areas of native woodland are shown on the map and the preferred method of establishment will be natural regeneration. In places planting will be considered which will require deer control measures to be put in place. A certain amount of non-native regeneration will be allowed.

The Ben Lomond SSSI will be managed according to the plan agreed with SNH and other areas of open space are shown on the map. These include the area around the important heritage features at Bruach Caorainn and the wayleave for the main transmission line which runs through the plan area. There will be other areas of open space which are not shown on the map. Other areas are shown as open with mixed natural regeneration. Here there will be no commitment to maintain open space but the amount and type of regeneration will be monitored to ensure other objectives are not negatively affected.

SM showed figures of how species and open space percentages would change up to 2048.There will be a significant drop in the area of spruce and an even larger increase in the area of native broadleaves. The area of open space will decrease by about 10%. This will be largely due to the successful establishment of trees in areas currently described as open, but where woodland cover is the ultimate objective (e.g. ancient woodland sites).

JH said figures for 2008 will also be included in the plan to further illustrate the direction of travel of species structure.

KL asked if it was possible to get a figure for permanent open space.

SM said that it should be possible to get a figure for those areas specifically indicated on the map.

There was a discussion on management of heritage sites and how much open space should be kept around these.

KL suggested putting the information available on the various heritage features into the public domain. This could possibly done through the Community Trust.

There followed a discussion on flood management and SM described some of the ways felling and restocking can be planned to help mitigate against this and also help prevent deterioration of sensitive catchments. It was suggested that the science isn't exact but that FES have an obligation to take advice from SEPA and follow best practice.

KL wondered who was responsible for water monitoring and whether FES carried out any themselves. She suggested that this could only help FES to demonstrate how management can benefit the environment. She also suggested establishing an experimental area to monitor water quality in a managed environment.

JH said that SEPA were responsible for water monitoring and can provide data if requested and flag up issues if they arise. FES will seek further advice on roles and responsibilities for water monitoring. They will also ask Forest Research for advice on how best to monitor the impact of forest operations on water quality and feasibility of setting up such a monitoring programme.

JH suggested it might be possible to incorporate ATV tracks into more permanent trails, for example to improve access to open hill ground.

Next steps: SM will draft text and other supporting documents, maps and visualisations. These will be posted on line and any major changes flagged up to the Community Group. Once finalised the plan will be submitted to Forestry Commission Scotland Conservancy in Perth. The plan will be placed on the public register and there will be a final consultation period of 28 days giving stakeholders a chance to comment on whether the plan has incorporated any comments/issues from the initial scoping exercise. Once FCS are content that the plan meets the required standards they will issue an approval certificate.

Comments on this process:

JK believes it has been worthwhile and helpful, especially as an aid to understanding the many issues associated with forest management. Thought the site visits were particularly useful.

NB thinks it has been a very good process and very transparent. Wider involvement and how best to disseminate information might be something for the community itself to consider for the future.

JJ agreed and stressed the importance of being able to take answers from the group back to the community.

JH Said he was keen to promote the idea of site visits for the wider community and that perhaps this could be advertised more widely and arrangements made for the spring. JK thought a visit to Little Bruach might be a good idea.

The next plan in Strathard will be Achray. A request will once again be made for volunteers to join a community engagement group. This need not be made up of the same members as this group.

The meeting concluded at 14.00.

Appendix X. Ecosystem services identified in Strathard

The presence of the ecosystem services in the catchment was assessed and checked with the community at the initiative launch events in 2016. Not all are relevant to the Beinn Bhan plan area.

Products

1. **Farmed food** – sheep and cattle
2. **Wild food gathering**- mushrooms from woodlands
3. **Game hunting** – venison from woodlands and open land
4. **Surface drinking water** – predominately private water supplies in most of area. Loch Katrine and Loch Arklet- provide public drinking water supplies via Scottish Water
5. **Biomass for production**: timber, silage
6. **Genetic materials** – no specific materials identified
7. **Surface water for agricultural production**- no specific sites identified
8. **Biomass for energy production** - wood fuel and pellets
9. **Hydroelectricity** –run of river hydro

Role of natural systems in managing environmental risks

10. **Bioremediation –** local level composting
11. **Adsorption of air pollution** by trees this leads to acidification of water courses
12. **Adsorption and binding of pollutants** by wetlands and habitat networks in the forest
13. **Dilution and dispersal of pollutants** by river and lochs
14. **Visual, smell and noise screening** – by woodlands for pylons, forestry operations, hydro schemes and small quarries
15. **Erosion control** by woodlands and peatland vegetation
16. **Landslide control** by woodlands especially deep rooting species of trees
17. **Maintaining the water cycle and base flows** by water stored in lochs, wetlands and rivers
18. **Reducing flood risk** by storage and slowing the flow by all natural systems especially woodlands and lochs
19. **Storm protection** by woodlands dissipating high winds

20. **Pollination and seed dispersal** by natural habitat networks on farmland , in woodlands, in rivers and wetlands
21. **Maintaining habitats and features to support priority species / biodiversity** – especially for Scottish priority species such as Golden Eagles, Black Grouse, Water voles and priority habitats Western Atlantic Oak woodlands and Blanket Bog
22. **Natural pest and disease control** – through silviculture techniques and moorland management; Genetic diversity of species providing resilience
23. **Maintain soils fertility** through natural break down of organic materials and weathering of rocks across all settings
24. **Maintains chemical composition of freshwater** through natural processes in freshwater
25. **Carbon sequestration and storage** from above ground storage especially in woodland, and below ground storage in peatlands and active blanket bogs
26. **Local climate regulation** – affecting precipitation and temperature through large scale forestry plantation and topography of hills

Cultural benefits

27. **Nature and landscape viewing -** wild flower tours and other guided wildlife tours, providing a setting for weddings; osprey viewing
28. **Setting for outdoor recreation -** walking, running, climbing, orienteering, mountain biking, cycling, swimming, kayaking, sailing, fishing, game hunting, camping. Role of urban areas as centre for activities with cafes, Wool Centre, local foods and crafts
29. **Setting for research** – Queen Elizabeth Research Forest
30. **Setting for education -** primary school use of settings near school, Forest Visitor Centre, Outdoor Centre
31. **Historic environment** – Crannog in Loch Ard, historic bridges, Rob Roy Way, Old Inns, Graveyard, Poker tree
32. **Setting for entertainment** e.g. television – Ben Lomond and Loch Ard
33. **Aesthetic** e.g. Sense of place, artistic representations of nature – wildlife and landscape photography, materials and settings for artists
34. **Habitat for iconic species:** salmon, trout, water vole, osprey, eagle, primrose, perhaps beavers in the future as they recolonise Scotland
35. **Setting for Spiritual and religious experience** - Peace and tranquillity are key assets of the area providing a setting for informal spiritual activities. Group visits are supported by spiritual centres in the area Ben Lomond Memorial estate, Local spiritual places:, Coffin Route, Fairy Knowe

36. **Existence value - ** enjoyment provided by wild species , wilderness, ecosystems and landscapes without needing to see and experience it **–** expressed by local people and agencies across all settings
37. **Bequest value** – willingness to preserve nature for future generations – expressed by both local people andorganisations for all settings

Appendix XI. Checklists to assess effects of operations and projects on ecosystem service provision.

Checklist for woody debris dams

These are in- channel actions installed in rivers less than 5 m wide, with small defined flood plains. They are fixed into the river bank and allow water and fish to pass through them trapping smaller woody debris behind them. They help reconnect small watercourses with their floodplain, and increase storage in the floodplain behind, as well as slowing the flow.

Provisioning services – products from the environment

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Timber from woodlands (very high)	+/-	+/-	Few sites available for effective woody debris dams. These will not impact on timber production in a significant way. Investigate potential sites in coupe 32009 and along Rinzoorach Burn.
Hydropower (Medium)	+/-	+/-	Potential for dams along Rinzoorach Burn. Requires more detailed site investigation and expert advice to assess potential impact on Bruach Caorainn hydro scheme.

Regulating and maintaining services- natural processes that help manage the environment

Service (Level of Service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Water quality improvements (Very High)	+	+	Potential for trapping sediment and reducing siltation further downstream. Potential for bio-remediation uncertain.
Flood risk reduction in urban areas downstream (Very High)	+/-	+	This is one of the key approaches to slowing the flow and thereby reducing flood risk lower down-stream. Ideally constructed as part of a catchment wide scheme. Potential effects of catastrophic failure must be considered.
Mass stabilisation and control of erosion by woodlands (High)	+/-	+/-	Silt capture will help mitigate any issues with erosion in associated clearfell sites. Riparian woodlands that might develop will help slow the flow.
Global climate regulation (Very High)	+	+/-	Schemes will be of limited size and therefore impact is likely to be small.

Cultural services –

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Scientific (High)	+	+	There is an opportunity to demonstrate and monitor the effects of woody debris dams to better understand their benefits and adverse effects.
Existence value in the river	+	+	The improvement to river habitat from this action is of value in its own right.

Legislation

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Protected sites	+	+	Creation of wetland habitat along Rinzoorach Burn will add to diversity associated with Ben Lomond SSSI.

Checklist for wetland features

Includes:

- Restoration of valley mires -restore drained wetland features rather than create new ones
- Restoration of floodplain wetlands e.g. upstream and downstream from Aberfoyle or up at Comer farm. It would include restoration of wet grasslands and features such as ponds. It can include management of water table at a local level and rush management
- Creation of small wet features used to retain surface water temporarily and farm ponds on cultivated land
- Creation and restoration of ponds and small wetlands in woodland

Provisioning services – products from the environment

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Timber from woodlands (Very high)	-	-	Sites chosen for these actions will not be suitable for commercial timber production.
Food from livestock from grasslands (Medium)	+/-	+/-	Cattle grazing could be an integral part of riparian management.
Surface water for private drinking water using valley mires and small reed beds (Very high)	+	+/-	Potential benefits from filtering effect of vegetation might be offset where cattle grazing is used as management tool.

Regulating and maintaining services- natural processes that help manage the environment

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Water quality improvements through bioremediation, filtration and storage of sediments (Very high)	+	+	Potential to help address diffuse pollution from forestry and agriculture depending on location and design.
Flood risk reduction in urban areas downstream (Very high)	+	+	Floodplain wetlands can contribute to slowing the flow through storage and increased roughness of vegetation.
Mass stabilisation and control of erosion by wetlands (Very high)	+	+	Potential to buffer water courses from sediments washed out of landslides and from erosion depending on location.
Hydrological cycle and water flow using floodplain wetlands and valley mires (Very high)	+	+	Potential to retain water, then release at low flows depending on location and design.

Service (Level of service)	Potential effects	Project level effects	Opportunities, mitigation, recommendations
Pollination of plants by insects from ponds and other wet features (High)	+	+	General improvements in bio-diversity and habitat.
Global climate regulation through carbon sequestration and storage (Very high)	+/-	+/-	Potential positive and negative effects might cancel each other out.

Cultural services –

Service (Level of service)	Potential effects	Project level effects	Opportunities, mitigation, recommendations
Nature viewing (High)	+	+	Habitat improvements and increase in diversity will increase opportunity for nature viewing.
Educational (Medium)	+	+/-	Wetland features can provide good areas for schools to learn about nature e.g. pond dipping. Remoteness of Beinn Bhan might lessen opportunities.
Aesthetics and use of landscapes for activities (High)	+	+	Creates features in the landscape for art and photography especially in locations close to urban areas and in higher use areas in the forest.
Existence and bequest value across all settings (High)	+	+	There is a general decline in wetland habitats so creation of new ones will be a positive benefit.

Legislation

Service (Level of service)	Potential effects	Project level effects	Opportunities, mitigation, recommendations
Protected sites	+	+	Creation of wetland habitat along Rinzoorach Burn will add to diversity associated with Ben Lomond SSSI.

Checklist for silvicultural systems (continuous cover forestry)

Clear felling (CF) is defined as the cutting-down of all trees on an area of more than 0.25 ha. The distinctive element of 'continuous cover forestry' (CCF) is therefore the avoidance of clear felling of areas much more than two tree heights wide without the retention of some mature trees.

In this assessment continuous cover forestry is identified as part of the mitigation for the adverse effects arising from clear felling

Provisioning services – products from the environment

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Timber from woodlands (high)	+	+/-	Effects are likely to be mixed, tending towards negative if increased costs are not offset by improved revenue.
Wild plants and fungi for food (low)	+	+/-	CCF could improve habitat conditions for a range of forest species in the long term.
Wild animals and their outputs for food from woodland (low – medium)	+/-	+/-	Uncertain effects.
Surface water for drinking (low)	+	+	Well managed CCF sites should reduce erosion and run-off associated with clearfelling and avoid short term high fluctuations in water quality.

Regulating and maintaining services- natural processes that help manage the environment

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Water quality improvements in water bodies (high)	+	+	Well managed CCF sites should reduce erosion and run-off associated with clearfelling and avoid short term high fluctuations in water quality.
Flood risk protection in downstream areas (high)	+	+	Continuous cover significantly reduces this risk of downstream flooding.
Mass stabilisation and control of erosion by woodlands (high)	+	+	Continuous cover significantly reduces the risk of mass movements on steep slopes, especially where a mix of species is used.
Hydrological cycle and water flow (High)	+	+	Continuous cover will help slow the flow especially where other mitigation measures are also in place.
Storm protection (High)	+/-	+/-	Continuous cover forestry can reduce risk of wind damage in some circumstances.
Global climate regulation by sequestering and storing carbon (Very high)	+	+/-	Overall effect will depend on scale of CCF.

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Nature viewing (High)	+/-	+/-	Clear felling and continuous cover forestry creates diversity of structure within the forest at different scales, which can increase the diversity of species and open up new areas for viewing.
Physical activities in the landscape (Very High)	+/-	+/-	Overall effects likely to be neutral – potentially easier access through CCF stands are possibly offset by more frequent interventions.
Aesthetics and use of the landscape for activities such as art and photography. (High)	+	+/-	CCF potentially retains long term appearance of forest though clearfelling allows for more rapid change where this is desirable.

Legislation

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Protected sites	+/-	+/-	No issues identified.

Checklist for improved riparian zone

This action improves the size and structure of riparian zone to primarily address diffuse pollution and buffer water courses.

Provisioning services – products from the environment

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Timber from woodlands (very high)	+/-	-	Reduction in area available for high production forestry.

Regulating and maintaining services- natural processes that help manage the environment

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Water quality improvements (Very high)	+	+	Potential for bioremediation and storage of sediment from runoff from adjacent ground. Consider hydrological routing as part of detailed location and design.
Flood risk reduction from bank side trees and wooded buffer zones (High)	+	+	Woodland increases hydraulic roughness of channel slowing water flow. This affect is more localised and limited compared to floodplain woodlands.
Mass stabilisation and control of erosion by riparian woodlands (High)	+	+	Tree roots in riparian zone helps soil binding and reduce bank erosion.
Pollination and seed dispersal (Medium)	+	+	Riparian zone provides hibernation and feeding areas for beneficial insects such bees and hoverflies.
Maintaining nursery populations and habitats (Very high)	+	+	Provides sources of organic materials and nutrients helping to maintain aquatic habitats.
Global climate regulation by sequestering and storing carbon (Very high)	+	+	Trees in the riparian zone will sequester and store carbon and will provide this store as long as they are not harvested and burnt e.g. firewood.

Cultural services –

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Nature viewing (High)	+	+	Increases diversity of plant, insect and bird species for wildlife watchers and guides.
Aesthetics and use of the landscape for activities such as art and photography. (High)	+	+	Increases diversity of landscape alongside rivers and lochs.
Existence value of UK priority habitats	+	+	Greater diversity of species and habitat.
Bequest value of nature - native woodland	+	+/-	Riparian woodlands are high priority in rivers with salmon spawning areas as they will help keep rivers cooler in the face of climate change . At present rivers here are too acidic to support these species.

Legislation

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Protected sites	+	+	Creation of wetland habitat along Rinzoorach Burn will add to diversity associated with Ben Lomond SSSI.

Checklist for browsing mammal damage

This action refers to the control of populations of browsing mammals such as deer and goats at sustainable level, allowing restoration of degraded habitats and early establishment of commercial conifers other than Sitka spruce.

Provisioning services – products from the environment

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Timber from woodlands (Very high)	+	+	Where there is a suitable seed source natural regeneration of woodlands will occur under suitable conditions. This is especially valuable at the establishment phase of more vulnerable species such as broadleaves.
Wild animals for food (Low)	+	+	Increased deer culls will bring more venison to market. Sensitivities around goat culls and relatively limited market make benefits less certain.

Regulating and maintaining services- natural processes that help manage the environment

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Water quality improvements (Very high)	+	+	Sustainable browsing enables the establishment of bank side trees and riparian woodlands with benefits for water quality; eroded bogs caused by trampling could recover and reduce organic matter and water colour issues.
Flood risk reduction in urban areas downstream (High)	+	+	Sustainable browsing enables the establishment of bankside trees, floodplain woodlands and blanket bogs which contribute to slowing the flow.
Mass stabilisation and control of erosion in bogs, grasslands and heaths (Very high)	+	+	Sustainable browsing and reduced trampling restores vegetation and its ability to manage erosion and prevent peat flows.
Hydrological cycle and water flow (High)	+	+	Reduced trampling enables restoration of blanket bogs and reduced browsing pressure enables reestablishment of trees and other vegetation to more slowly release water.
Maintaining woodland, blanket bog, mire and heath habitats (Very high)	+	+	Sustainable browsing enables effective management and increases diversity of upland habitats.
Pollinations and seed dispersal (Very high)	+	+	Sustainable browsing enables greater diversity of plant species that are able set seed and produce flowers beneficial for insects.
Global climate regulation by sequestering and storing carbon (Very high)	+	+	Restored blanket bogs from reduced trampling enables more active growth of sphagnum with benefits for sequestering and storing carbon.

Cultural services –

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Nature viewing (High)	+/-	+/-	Greater biodiversity providing increased viewing opportunities for nature watchers and wildlife guides; Deer tend to be less visible in the landscape when they are managed by shooting.
Physical activities in woodlands, heathlands and wetlands (Very high)	+/-	+/-	There may be increased opportunities for activities such as game shooting as a way to manage deer. Management of deer results in temporary closure of some areas for safety, reducing access.
Aesthetics and use of the landscape for activities such as art and photography (High)	+	+	Managing deer browsing pressure can reduce the need for fencing woodlands at the establishment phase, if all land managers cooperate.
Existence and bequest value of UK priority habitats	+	+	Restores blanket bog and native woodlands which are UK priority habitats.

Legislation

Service (Level of service)	**Potential effects**	**Project level effects**	**Opportunities, mitigation, recommendations**
Protected sites	+	+	Reduced deer numbers will benefit the important upland plant assemblages in the Ben Lomond SSSI.

Annex 1: People involved and affected by land and water management decisions

This identifies who in the selected area are involved in and affected by the decisions. It should include those that make the decisions; have influence over the decision through their role for example statutory responsibilities; or their interests are affected by the decision. It can include groups that represent particular interests or individuals. This group are the stakeholders

Stakeholder	Responsibility/activity	Role in decision
Forest Enterprise Scotland (Forest District)	Forest management, visitor facilities	Agree and/or undertake actions; Fund actions
Forestry Commission Scotland (Conservancy)	Approval of forest plans/ regulation of forest guidelines and policy; Flood risk management responsible authority;	Consent and fund actions
Comer estate (Jensen Foundation	Land management	Agree and/or undertake actions
Other land owners/estates	Land management	Agree and/or undertake actions
Tenants	Land management	Agree and/or undertake actions
Other riparian owners	Land and water management, tourism businesses	Agree and/or undertake actions
Loch Lomond National park	Planning authority, recreational and conservation planning; flood risk management responsible authority	Consent and fund actions
Scottish Natural Heritage	Landscape and Nature conservation protected sites	Consent and fund actions
Stirling Council – officers and councillors	Flood risk management responsible authority (lead)	Consent and fund actions
Scottish Environment Protection Agency	Environment protection, flood risk management responsible authority	Consent and fund actions
Community Partnership	Community action plan	Represents community affected by decisions
Other community reps e.g. businesses, activity representatives		Affected by decisions
Forth Fisheries Trust	Nature conservation in river and riparian work	Affected by decisions and undertake actions
Loch Ard Angling Association		Affected by decision
Water sports reps		Affected by decision

Appendix XII. Heritage features at Bruach Caorainn

The Community asked that the area of Big Bruach Caorainn and any other heritage features found along the burn side are designated as open areas in the revised land management plan. In addition to preserve of the site and support the creation of a local heritage trail.

A brief outline of the site, it's value and provenance was provided by Jenny Robertson MA PhD FSA Scot. MIFA, Alan Hunter Blair (Guard Archaeology Ltd) with additional comments from Chris Dalglish.

In 1963, along with the adjacent Little Bruach Caorainn township to the south east, Big Bruach Caorainn pre-clearance township was described by the RCAHMS as one of the two "most interesting examples" in Stirlingshire. Jenny Robertson suggested that *"…*some consideration should be given by the Forestry Commission to the future preservation of this site, particularly with regard to the extensive vegetation growth. While it is to be welcomed that the settlement has not been re-planted, the growth of self-sown trees, heather and other vegetation threatens to swamp the site."

Cartographic evidence suggests that this settlement belongs to the pre-clearance period, with probably Medieval origins. Both sites were recorded on Roy's map of 1747-55 as Braechurnmor (Big Bruach Caoruinn) and Braechurnbeg (Little Bruach Caoruinn) and on Grassom's 1817 map of Stirlingshire as Bruacheurnmore and Bruacheurn. It is also possible that the Bra Cheurin on Pont's map, dating to between c. 1583 and 1601, also refers to one or both of the settlements.

Documentary evidence also indicates an early date: Macfarlanes of Brackearn (Bruach Caoruinn) were recorded in the early 17th century. In 1630, Duncan Moir Macfarlane Brackearne was one of the heritors of the parish of Buchanan and, in 1691, Isabella Graham disposed of East and West Brachern and Stron McNair to her nephew, Alexander Graham.

Chris Dalglish adds further information from the cartographic evidence for the medieval provenance.

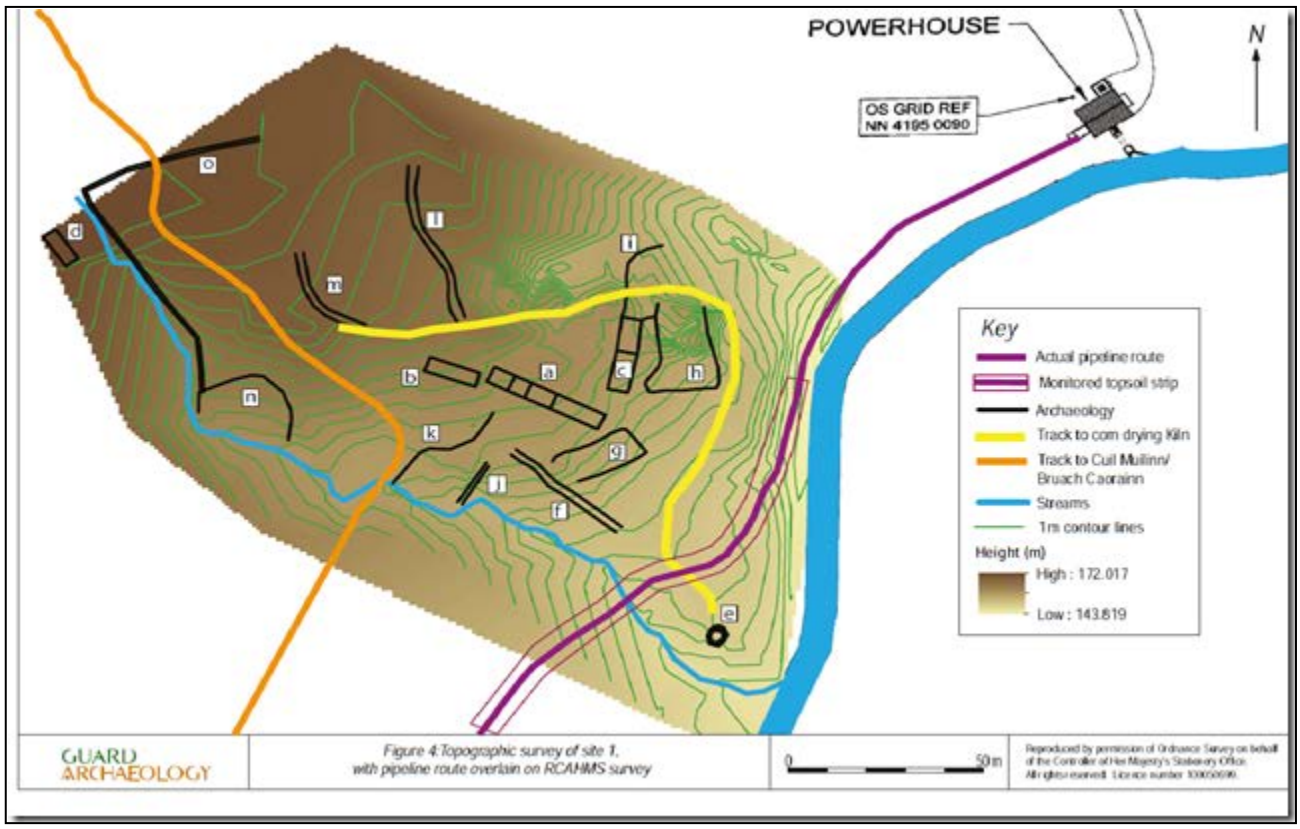
Chris Dalglish further suggests that the two sites were created sometime in the 17th century, when a single larger landholding was split into two. This process of splitting landholdings into smaller parts was occurring across Scotland in the late medieval/early modern period (roughly the 15th-17th centuries)

Although no evidence was found by Jenny Robertson, the place name Cuil Muilinn, c 200m upstream from Big Bruach Caorainn township, suggests that it may have been the site of a mill. When the hydro work was underway under the watch of Alan Hunter Blair (Guard Archaeology Ltd), additional evidence was found at the location of Cuil Muilinn, viz several clearance cairns and a track. The track was aligned from the SW to the NE leading to Big Bruach Caorainn from Cuil Muilinn. The track and cairns were

mapped and photographically recorded. Further investigation and development would add interest to the site.

The area of the Bruach Caorainn Burn is of general heritage interest and other structures may well be revealed. The old Ordnance Survey map shows shielings further up the Bruach Caorainn Burn which relate to an earlier period than the ruins at Bruach Caorainn. These may be contemporary with Roy's map of the 18th century and may even date earlier than that. If the shieling structures survive on the ground, they will provide archaeological evidence of this earlier period and are worth further examination.

A short summary of Big Bruach Caorainn is given below:



Heritage features at Big Bruach Caorainn

The remains of a township are situated at the confluence of Bruach Caorainn Burn and a small unnamed tributary, flowing from the NW. The remains of four structures, two enclosures, dykes and a corn-drying kiln as well as fragments of tracks have been recorded, scattered over a distance of over 200m along the tributary. This settlement was recorded by the RCAHMS in 1955 and a map with descriptions was published in the Inventory of the Ancient Monuments of Stirlingshire in 1963 (See Fig. 4). Shortly afterwards, in the 1960's or 1970's, the area was ploughed and planted with conifers. In

recent years these trees have been harvested and the area has been left as open ground. However, while the main stone structures have all survived and stand much as they were described in 1955, some structures have been damaged by the ploughing and planting and are now difficult to trace. Sites 1a and 1c, are particularly long buildings and seem to have been byre/dwellings, in which humans and animals occupied separate compartments under the same roof. These are well-preserved with gables, surviving to heights of 3m and 4m, while evidence of cruck slots indicates that the roofs were supported by a cruck frame construction These include the house, Site 1b and the northern part of the house, Site 1c, dykes, notably the boundary dyke, Site 1o, and the old tracks, Sites 1f, l and m. The absence of any grazing has also meant that the site is becoming overgrown with self- sown trees, heather and clumps of moss, which further obscures the picture. The settlement was accompanied by an extensive tract of cultivated ground, mostly downstream towards Duchray Water, but this, too, has been lost to forestry ploughing. The corn-drying kiln, Site 1e, is exceptionally well preserved with a well-defined flue at the foot of a drystone wall, over 2m in height.