ACHA-BHEINN

WOODLAND CREATION: ENVIRONMENTAL IMAPCT ASSESSMENT

1 Non-technical summary

This report uses the formal scoping process of the application to focus on the effects that a new woodland creation proposal is likely to have on black grouse. The proposal is called Acha-bheinn and is in the Kilmichael glen, about a 15-minute drive north from the town of Lochgilphead in Argyll.

Black grouse populations outside of central Scottish strongholds are more difficult to assess and there are limitations with the accuracy of the recent estimated total population in Argyll. The standard method to assess a population is based on lek counts of the displaying cocks at dawn.

There is one lek within the proposed woodland creation (Chambered Cairn) and another larger lek to the north (Stroneskar). A 1.5km buffer has been set around these two leks as an indication of the likely extent of the local population and this radius is based on accepted range sizes of this species. This population area (defined in the EIA as 'the study area') is 1,512 hectares (ha) within which the proposed woodland creation covers 138.95 ha (including open space). The woodland creation proposal accounts for c. 10% of the wider area assumed to be utilised by the local black grouse population. Over the last decade other woodlands with a mix of commercial and native species have altered the land use in the study area from predominantly sheep walk. The cumulative impacts of this proposal, alongside those at Barmolloch and Eurach are assessed as non-significant.

The proposal has been designed with 42% conifers intended for commercial harvesting once mature, 15% broadleaves and 43% open space. Planting is proposed around one of the leks that follows best practice guidelines on the balance of land cover that research predicts will retain viable black grouse populations. The majority of previous observations at the Chambered Cairn lek show a point location used by the cocks with some recent expansion over an oblong area in the centre of the proposal. The lek site itself will be managed to maintain an optimum short sward by mowing and/or grazing with livestock. The woodland design provides open space on (i) an area of heather-dominated wet heath and mire used by the black grouse along with (ii) wet, nutrient rich rush pasture that is key for the invertebrates required for chick/juvenile development. The design includes habitat corridors to the adjoining key habitats in the study area that includes links to both satellite and the Stroneskar leks. The proposal creates broadleaf woodland/scrub mosaic with a variety of species at three different densities that is a key habitat requirement for this species. The applicant proposes to undertake nest/chick predator control focused on foxes, crows and mink.

The applicant will continue to monitor the population in the study area to check that these measures are successful.

2 Introduction and Background

2.1 TERMINOLOGY

LEC – Lawrence Environmental Consultants
SWL – Scottish Woodlands Ltd
SF – Scottish Forestry (formally Forestry Commission Scotland (FCS))
Application Area – Acha-bheinn – 138.95ha
Study Area – Appendix 11.8 – 1,500m around two key lek sites
Adjacent area – areas adjacent to the study area.
Local Area – Study area plus adjacent area and connected populations.
Regional Area - Natural Heritage Zone 14 - Argyll & the Islands
Sensitivity – See appendix 11.9
Magnitude – See appendix 11.9
Significance – See appendix 11.9
UKFS – UK Forest Standard

2.2 PROJECT TEAM

The Woodland Creation proposal and forestry elements of the EIA Report (and its evolution) were designed and drawn up by Lochlan Dulson. Surveys and analysis, including design and assessment of impact, mitigation and residual impact on black grouse were provided by Simon Lawrence. Ian Robinson is the project supervisor.

Ian Robinson – Director, Scottish Woodland Ltd. BTec nd Forestry, MICFOR with 30 years' experience working in the forestry sector.

Lochlan Dulson – Senior Forest Manager, Scottish Woodlands Ltd. First Class BSc (hons) Forestry Woodland Management with six years' experience working in the forestry sector.

Simon Lawrence – Director, Lawrence Environmental Consultants. PhD; CEnv CIEEM.

2.3 SITE SELECTION

Appendix 11.1 shows the area under ownership initially considered for woodland creation. A brief desk-based analysis and walkover of the whole area was carried by Scottish Woodlands. The area selected for afforestation named 'Acha-bheinn' is 138.95 ha in size and can be accessed for timber extraction (subject to agreement) through the neighbouring forestry to the east. Surveys for birds, archaeology, habitats and soil were carried out along with extensive site visits by SWL staff to design the initial proposal.

2.4 PREVIOUS PLANTING

Pertinent to this report are the previous woodland creations planted by Scottish Woodlands on behalf of the owner's neighbours in and around what will later be described as the 'the study area'. These consist of the forest management units Barmolloch 1, 2 and 3, Creag Bhreac and Eurach. They are shown in appendix 11.2 and summarised in Table 1.

Unit	Planting Year	Conifer (ha)	NMB (ha)	OG (ha)	Total (ha)
Barmolloch 1	2010 & 2011	144	43	30	217
Barmolloch 2	2011	10	33	5	48
Barmolloch 3	2015 & 2016	117	8	68	193
Creag Bhreac	2017	8	1	6	15
Eurach	2004	0	35	18	53
Total		279	120	127	526

Table 1. Previous woodland creations in or near to the study area. Areas are identified on map in appendix 12.0

2.5 THE PROPOSAL

The current proposal revised following EIA screening and further surveys is shown on the amended woodland design map in appendix 11.4. A map of the proposal submitted for EIA screening is shown in appendix 11.3 and the determination in 11.5. UKFS design issues mentioned in the screening determination have been rectified in the latest design, the majority of these can be seen in appendix 11.4.

The proposal covers a gross area of 138.95 ha. Assessments of soils (11.11), archaeology (11.12), vegetation (11.13) and ornithology (11.14) were carried out in 2017, further surveys specific to black grouse where carried out in 2018 (11.15) and 2019 (11.16) and black grouse data from a neighbouring windfarm proposal (11.17) and forestry and land Scotland (11.18) was kindly provided. The design objectives are to optimise productive timber production along with native woodland retention and expansion in the context of existing ecological, environmental and archaeological sensitivities. The composition of the woodland in broad categories and in detail is shown in

Table 2 & 3 respectively (cross referenced to the legend in appendix 11.4).

Species	Ha	%
Conifer	58.28	41.94%
Broadleaf	20.71	14.90%
Open Ground	59.96	43.15%
Total	138.95	

Table 2. Abbreviated composition of Acha-bheinn once planted

Species	Ha	%
Sika Spruce	51	37%
Norway Spruce	5	3%
Scots Pine	3	2%
Hawthorn	2	1%
Native Mixed Broadleaves	5	3%
Low-density Native Broadleaves	12	9%
Open Ground	34	25%
Existing Trees	2	1%
Other Land (Deep Peat)	25	19%
Total	139	

Table 3. A detailed composition of Acha-bheinn once planted, refer to appendix 11.4.

3 EIA Determination

After receiving an amendment to the original proposal, Scottish Forestry (then Forestry Commission Scotland) issued an EIA screening determination and statement of reasons on the 22nd December 2017.

This stated that the proposal for new woodland creation at Acha-bheinn is an EIA forestry project and would require consent. The full determination is shown in appendix 11.5.

The statement of reasons focused on the cumulative impact on black grouse.

Following receipt of this Scottish Woodlands wrote to Scottish Forestry asking to take the project onto the scoping stage.

4 Scoping

The scoping report can be found in appendix 11.6. This is the official record of the scoping meeting minutes and issues raised.

4.1 SCOPING MEETING

At scoping meeting was held on the 28th March 2018 at the SWL offices in Lochgilphead, Argyll. Attendees included the RSPB, Dunadd Community Council, Argyll Raptor Study Group, Kilmartin Museum, the Landowner, SF, SWL and LEC. Other stakeholders that were not there (e.g. SEPA, SNH and neighbours of the property) were either represented or sent their issues in written form. All stakeholders where sent a copy of the scoping report.

4.2 ISSUES RAISED

Issues were taken from the minutes and added to the issues log, which is part of the scoping report (appendix 11.6). Mitigation was suggested for each issue and a residual significance predicted. Eleven issues were raised which were not given significance as more information was required. These are either questions to be answered by this report or mitigation to be included within the final design. An updated issues log, with new predicted significance following new information and mitigation from this report, is shown in appendix 11.10.

4.3 SCOPING REPORT

The scoping report recommended that this EIA report should focus on assessing the impacts, direct and cumulative, of this scheme and previous schemes on black grouse.

It suggested that the appropriate focus of this assessment was the area within 1.5km of the two main leks previously identified. This is called 'The Study Area' and is shown in appendix 11.8. It also outlined the need for further surveys and suggested a methodology for these.

4.4 SCOPING OPINION

On the 3rd July 2019 Scottish Forestry issued a scoping opinion, this is shown in appendix 11.7. The opinion required that the following effects on the environment are assessed:

- The cumulative impact (and at a landscape scale) on black grouse populations and the loss of their open ground habitat brought about by the current proposal and the preceding three Barmolloch schemes (Barmolloch 1, 2 and 3), using the area identified in Appendix 5 of the applicant's scoping report, as the study area.

The EIA was advised to contain measurements of the black grouse population within the application area and within the wider study area in a chronology that includes:

- The present summer of 2019

- Prior to the planting of the three Barmolloch woodland creation areas (2010) and in the intervening years between then and now (in so far as that data is available)
- After the collection and analysis of the survey information, assess the impact on black grouse of the current proposal and make recommendations to mitigate significant impacts; and
- Seek any information available on black grouse populations on the nearby National Forest Estate managed by Forestry and Land Scotland (outside the study area) to include in the assessment.

5 Black Grouse

5.1 NATIONAL CONTEXT

Black grouse is Red-listed due to an historical decline in the UK between 1800 and 1995. Although there was a partial reprieve during the period 1950-1970, when large areas of the uplands were planted with conifers, this appeared to provide temporary enhanced habitat. Once the trees grew and achieved canopy closure the range restricted once more. This species also qualifies for Red list status due to a severe decline in the UK breeding population size of >50% over the recent 25 years. The Scottish population of c. 3700 accounts for 71% of the British total. In Scotland the breeding range of black grouse is contracting, and numbers are declining, though the rate of decline varies regionally, being highest in south-western Scotland (-49%). This suggests that the national and regional populations are in unfavourable conservation status. From tracking research on this species in Central Scotland the long-term viability of a particular lek population is dependent on immigration of females from other areas (and mainly juvenile grey hens). Lek populations must therefore be considered as part of larger functioning meta populations.

5.2 REGIONAL POPULATION

The NHZ14 population of Argyll & the Islands was estimated by Wilson et al. (2015)[1] to be 67 (range 38-99) displaying males. Local experience of the accumulated renewable energy bird surveys in Argyll over the last two decades indicates this estimate to be on or above the upper range value of 99 cocks and probably double the 2015 estimate.

5.3 LOCAL POPULATION

For the evaluation process there are estimated to be 15 cocks within the 1.5km radius study area. On this basis the local population accounts for c. 15 to 20% of the Argyll NHZ. The seven cocks recorded at the Acha-bheinn Chambered Cairn lek in 2019 is taken to be the maximum number potentially directly affected by this SRDP application. The Acha-bheinn lek has been consistently occupied over the last decade or more of surveys (with four cocks) and this suggests that this locality is possibly a 'source' meta population rather than a sink site. A source population is defined as one that consistently exports females rather than a more transitory, satellite lek location of one or two adult females that may be below the self-sustaining level). This factor combined with that in Section 5.7 indicates that the nature conservation importance is ranked as medium (i.e. c. 50% of the study area population of 15).

[1] Wilson, M. W., Austin, G. E., Gillings S. and Wernham, C. V. (2015). Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number SWBSG_1504. pp72. Available from:www.swbsg.org. Local experience of the accumulated renewable energy bird surveys in Argyll over the last decade indicates this estimate to be on or above the upper range value of 99 cocks.

5.4 STUDY AREA POPULATION

The most appropriate study area incorporates a 1.5km buffer of the Chambered Cain lek within this SRDP application plus the main lek at Stroneskar to the north. A total of seven lekking areas were recorded during the most recent baseline surveys from 2017 to 2019 and these include one within the Acha-bheinn application area, five within the Barmolloch plantations and one at Stroneskar (11.14, 11.15, 11.16). The Stroneskar lek has only been surveyed since 2015. Up to nine males were located at any one lek (Stroneskar), with up to fifteen males recorded within the survey area in total on any single dawn survey. Contacts with or observations of females during the surveys at Acha-bheinn varied from zero to seven individuals over the survey years. The importance of the Study Area is ranked as medium as it contains c. 15 to 20% of the estimated NHZ14 population.

5.5 POPULATION ADJACENT TO STUDY AREA

Outside and NW of the 1.5km study there is a lek at Eurach (with two cocks in each of 2017 & 2018) and eight or more leks to the NE around Glasvaar and east of Fernoch and Leckuary. These leks have not received coordinated surveys in the recent five years, but some have been covered as part of renewable energy surveys (11.17) as well as by FLS rangers (11.18). The Stroneskar/Barmolloch wind farm associated surveys cover five of the six years from 2013 to 2018, exclude the Barmolloch south area, but have not been supplied with details of the methodology. The wind farm associated surveys to the east are confidential and not in the public domain. The FLS data set is based mainly on anecdotal, non-coordinated records of leks and flushed individuals at other times of year and have not been updated for recent sightings over the last five or so years. In total it is provisionally estimated that they account for a minimum of seven cocks (or possibly eight or nine). These leks are within the range of the export/import of grey hens to or from the Acha-bheinn site and are likely to underpin the resilience of the target sub-population.

5.6 APPLICATION AREA SUB-POPULATION

The Acha-bheinn lek site (Chambered Cairn) supported a maximum of seven cocks in 2019 (11.19), but the average number of birds present over the last five years was four.

5.7 BLACK GROUSE MOVEMENTS

Typically, one to three black grouse flights were recorded during or more commonly just after the dawn lek survey period. Commonly these involved single cocks with one flight of four individuals between Stroneskar and Glasvaar in 2018. These interchanges underlined the connected nature of the different sub populations in and around Kilmichael Glen with an effective combined population that is c. 22. Observations of flights here and throughout their Scottish range also underlines that mature trees of either native or coniferous woodland do not present barriers to movement (Dr. Lawrence pers. obs).

6 Impact of Barmolloch 1, 2 and 3 on Black Grouse Within the Study Area

6.1 EFFECTS OF BARMOLLOCH/OTHER WOODLANDS AND LANDUSE CHANGES

The long-term monitoring of black grouse in this area by Mr. J. Halliday (from 1990 to 2004) indicated fluctuations in numbers of cocks at one lek (Lochan Add East) from 13 to zero. These variations/re-distributions took place prior to the first WGS applications at Barmolloch which was planted in 2010. There have been significant changes to the landscape within the 1.5km radius study area over the last two decades and these include the Barmolloch woodlands along with reductions in grazing livestock elsewhere to the west. The three phases of the Barmolloch woodlands covered five to six historical lek sites and the recent lek surveys indicate continued use by cocks (one to two birds) of four of these or nearby sites (Table 4). On average the Barmolloch sub set of leks has held c. 8 to 9 cocks since 2007. In the context of the local changes in landuse (not just afforestation), the presence of the Barmolloch woodlands so far have resulted in the retention of black grouse in satellite lek locations in addition to the two main sites. One of the latter main leks at Stroneskar has either increased in numbers or developed as a new site since c. 2008. With the latter site included the average local population since 2016 has been c. 16 to 17 cocks (Table 4).

Over the next 5 to 10 years the conifer components of the Barmolloch woodlands will close canopy and there is predicted to be some displacement of the black grouse from the satellite leks. This will be mitigated by the dissected nature of the conifer plantings between black grouse suitable habitat of wet heath, mire and wet flushes in all three stages of the Barmolloch woodlands. It is likely that the cessation of a long history of sheep grazing on the moorlands to the north west of the survey area and introduction of the native woodlands at Eurach have attracted an additional group of black grouse (two cocks in 2018).

In summary the historical evidence shows a relatively stable black grouse population in this locality that is self-sustaining in the context of a number of changes to the local habitats. The cumulative effects of the Acha Bheinn proposal are evaluated in Section 7.5 below.

Year	Barmolloch woodlands	Stroneskar	Eurach	Total
2007	7			7
2008	10			10
2009	8			8
2010	12			12
2011	8			8
2012	14			14
2013	4			4
2014	3			3
2015	5	5		10
2016	9			9
2017	12	7	2	21
2018	9	9	2	20
2019	13	7		20
Total	114		**Total all 3 sites**	146
Mean	8.8			11.2
denotes -reduced survey effort				
		mean since 2016		**17.5**

Table 4. Cumulative numbers of black grouse in proximity to the Acha Bheinn site, Kilmartin. Counts = cocks only (11.19).

7 Impact of the Proposal

7.1 DISTURBANCE

.7.1.1 Effect

Lekking, foraging and nesting black grouse may be displaced from the site during forestry establishment (short term) or medium term by ongoing disturbance from other management and harvesting.

.7.1.2 Magnitude of Effect

The planting design maintains a buffer around the Acha-bheinn lek site itself of 75m by 160m. Beyond this zone the proposal includes significant sectors of open ground interspersed with a combination of native and commercial woodland. Thus physical, direct disturbance to the lek area will not take place. Since the tree establishment sectors fall within 300-500m of the lek site on a worst-case, unmitigated scenario there is likely to be a moderate magnitude effect.

.7.1.3 Significance of Effect

The unmitigated effect from forestry disturbance on the regional (NHZ 14) black grouse population is considered to be Moderate adverse and is therefore potentially significant in the context of the EIA Regulations.

.7.1.4 Proposed Mitigation

All woodland establishment works will be scheduled outside of the black grouse breeding season (April-July) to avoid all disturbance.

.7.1.5 *Residual Disturbance Effects*

The proposed mitigation is likely to result in the continuation of settlement by grey hens and thus the continuation of lekking by cocks and foraging activity. This is predicted to reduce the effect from Moderate adverse to at worst, Minor adverse and therefore Not Significant in the EIA Regulations.

7.2 COLLISION & OTHER DIRECT MORTALITY

.7.2.1 *Effects*

Birds flying within the site may be subject to a collision risk with fences (both stock and deer fences) or other infrastructure (meteorological masts). Black grouse are known to be at risk of colliding with structures close to ground level, such as fences and wires; deer fencing has proved to be a particular hazard. Previous research has shown that the fence collision rates can result in local population declines for a number of species of grouse. Changes in the land use of moorlands from pastoralism/game management that results in reduced predator control is known to alter survival rates and population viability of black grouse.

.7.2.2 *Magnitude of Effect*

The anecdotal records of flight activity were frequently associated with birds flushed by the surveyors and these showed low level, short flights. Other records showed longer distance, higher altitude flights often associated with dispersal from the dawn lek sites. The majority of the observed flight activity involved male birds and not females which are the key population driver- Section 5.1. The proposal will erect 3478m of new deer fence with the unmitigated potential to result in mortality in the region of c. 0.5 to 1.0 grouse/km of fence/y. The magnitude of effect of collision with fences on black grouse is therefore considered to be low and long-term temporal on the regional population. The baseline predator control on and around the application area has been reduced/ceased for the last two decades and thus the effects of the Acha-bheinn proposal will result in an additional impact of negligible magnitude.

.7.2.3 *Significance of Effect*

The unmitigated effect from collision mortality on the regional (NHZ 14) black grouse population is considered to be Minor adverse and is therefore not significant in the context of the EIA Regulations. Similarly, the unmitigated effect from predation will be negligible and not significant.

.7.2.4 *Proposed Mitigation*

To mitigate the potential adverse effect the applicant will seek to reduce this mortality effect from Minor adverse to Negligible the Applicant will undertake the mitigation outlined below.

Deer fence marking is advised on the new exclusion areas bounded by the 3478m deer fence. There will be a commitment to ensure the fence markers effectiveness is maintained long term and that the neighbouring fences of the Barmolloch woodland are also marked. On a precautionary basis the applicant will undertake predator control of foxes, crows and mink. This will be focused on the late winter, spring and early summer period and a log of the results will be maintained for an assessment of efficacy and adjusted if necessary (11.21). This will not be maintained throughout the year at the same intensity of managed grouse moors in central/eastern Scotland but will be coordinated with the sheep farming unit of Stroneskar to the north.

.7.2.5 *Residual Mortality Effects*

The proposed fence marking mitigation is likely to result in a reduced but not zero level of additional grouse mortality. This is predicted to reduce the effect from Minor adverse at worst, to negligible adverse

and maintain the category of Not Significant in the EIA Regulations. The proposed mitigation of predator control is predicted to result in a positive, medium magnitude impact on the local black grouse population which is of moderate significance in the EIA Regulations.

7.3 HABITAT LOSS/MODIFICATION

.7.3.1 *Effect*

Black grouse are known to decline c. 6-12 years after significant thresholds of commercial spruce plantations are established within different distances of 0.2km, 0.5km and 1.5km of lek sites (Geary et. la. 2013; Pearce-Higgins et. al. 2007). Following canopy closure the local black grouse populations are no longer retained and prior to that the associated loss of heather and grass moorland is a key factor in the required habitat mosaic. Research shows that at both the landscape scale and the individual lek scale the unmitigated establishment of commercial conifer plantations results in local and regional population declines for black grouse. Lek abandonment also occurs with a delay of 6-12 years where the lek site itself and/or a buffer of 200m is altered to closed canopy woodland of any species type or mix (but in particular conifers). Exclusion of grazing associated with a land use change also causes the lek arena to become unsuitable for the cocks and this can also reduce the suitability of a lek site.

.7.3.2 *Magnitude of Effect*

If the majority of 138.95ha proposal involved a land cover change to a spruce plantation the unmitigated potential would result in the displacement of the four to seven cocks and associated grey hens. If in addition the Chambered cairn lek arena were planted with trees of any type or allowed to regenerate into dense native scrub, there would be lek abandonment. If the unmitigated proposal changed the botanical character of the majority of the wet, rush flushes within the application area this would reduce the brood-rearing capacity of the site. Any one or a combination of the above effects could spatially compromise the local Kilmichael population and this would also affect neighbouring lek sites by the reduced export of juvenile females. The magnitude of effect of such an unmitigated land use change on black grouse is therefore considered to be medium and long-term temporal on the regional population.

.7.3.3 *Significance of Effect*

The unmitigated effect of the 138.95ha proposal with c. >40 % Sitka spruce cover without following the above design constraints on the regional (NHZ 14) black grouse population is considered to be Moderate adverse and is therefore significant in the context of the EIA Regulations.

.7.3.4 *Proposed Mitigation*

To reduce the significance of the land use change effect to Minor adverse or Negligible, the Applicant will undertake the mitigation outlined below.

The design of the Acha-bheinn woodlands and open space will follow/adhere to the majority of the target values and spatial constraints advised by current research (Table 5, Table 6 , Table 7, Table 8) (11.20).

Beyond this application there are the following features of the habitat mosaic that will increase the chances of the retention of this meta population of black grouse: the moorland to the north, west and southwest of this proposal accounts for two blocks of c. 200ha and one of c. 150ha (all contiguous). This complies with the current advice on the retention of such 200ha patches (for these two leks)[2] (White et. al. 2015).

Land use	Area (ha)	%	Threshold (Geary 2013 et al.)
Existing conifers	232.00	15.34%	
Other unsuitable habitat	15.80	1.04%	<20%
Acha-bheinn proposed conifers	55.20	3.65%	
Suitable habitat	1,209.00	79.96%	
Total	1,512.00		

Table 5. Cumulative land use changes in the 1.5km buffer around the Acha-bheinn and Stroneskar leks. Target levels of closed canopy and other unsuitable habitat to be 20% or less.

Land use	Target (ha)	%	Actual (ha)	%
Open canopy forest/woodland	15.70	20%	9.61	12%
Grass moor	23.55	30%	31.00	39%
Gross	78.50		78.50	

Table 6. Target habitat types and areas within 500m of a lek to result in 75% probability of retention of the lek (Pearce-Higgins et. al. 2007).

Land use	Target (ha)	%	Actual (ha)	%
Surface cover: dry heath	70.70	10%	71	10%
Gross	707.00		707.00	

Table 7. Target habitat types and areas within 1,500m of a lek to result in 75% probability of retention of the lek (Pearce-Higgins et. al. 2007).

Land use	Target (ha)	%	Actual (ha)	%
Closed canopy conifers	0.25	2%	2.90	23%
Gross	12.57		12.57	

Table 8. Target proportion of closed canopy conifers within 200m of a lek (Geary et. al. 2013).

Research indicates at the finer scale around the Acha-bheinn lek it is important to retain a higher proportion of moorland (Geary et. al. 2013) and link it to the three areas above. The design of the closed canopy plantation will exceed the recommended habitat mix of c. 2% within a circular 200m buffer of the Acha-bheinn lek (Geary et. al. 2013) Table 8. However, from observations of the behaviour of the cocks at this lek the design focuses on maintenance of grass moorland with native broadleaved woodland that extends over 24ha to the west and south west of the Chambered Cairn. The c. 8ha of cotton grass dominated blanket mire to the north west of the remnant native woodland ridge is used by the cocks (pers. obs) and this will be retained as open ground. This core area of c. 24ha is also well linked to the surrounding mosaic of key habitats such as wet flushes. Thus, when analysed for the 500m buffer there will be sufficient grass and heather moorland retained within the design (Table 6). In addition, it is advised to link this into the proposed northwest sector of native woodland and heather-dominated open ground beyond the site (Table 7)[2]. The design incorporates habitat corridors for ground-based movements of hens and broods through and to insect rich rush pasture and marsh around (i) the Allt an Airgid, (ii) the forest track access along the south east boundary with Barmolloch 2, (iii) the southernmost tip and south west margin with Cnoc na h-Eilde, and (iv) the western boundary & north western stream/marsh system. The planting design retains the majority of these flush systems as open ground and which importantly also have base rich influences. The design incorporates habitat corridors

[2] "Biodiversity lines" appear to be a landscape and visual construct of desktop forest design and have not been tested scientifically for their effects on black grouse habitat occupancy.

for black grouse through and to native woodland and scrub on Barr Mor in Barmolloch 2 and on to Lochan Add and the east slopes above Loch Leathan and the ridges above the tributary of the Clachandubh Burn along the north west edge of Barmolloch 1.

Previously there has been an increase in c. 91ha of native woodland within this study area which is and will be of benefit to the required habitat mosaic for this species as it will predominantly be downy birch, rowan and the two species of willow. It is not anticipated to result in closed canopy, western oak woodland with less attraction for black grouse for another 100+ years. In addition, it is linked with open ground along the bases of the ridges. Within the application the native woodland will be designed to include species important to black grouse such as hawthorn, and Scots pine (latter as a substitute for European Larch), Juniper, rowan and birch. The sector of broadleaves around the south east entrance track will be designed to link the two-remnant native woodland on ridges south west of the lek site. The Scots pine compartments will be planted and or thinned to between 5 and 200 stems/ha to allow the Ericaceous ground story to develop. Research indicates that low density native pine over dry or wet heath is attractive to black grouse.

A woodland-free area around the lek at Acha Beinn (Lochan Add North NR 856 982) will be retained that extends laterally NW-SE 75m and longitudinally SW-NE for 160m (total oblong 320m x 150m) and based on Geary et. al. (2013) incorporates a scrub/open ground buffer beyond. It is advised to maintain a short sward over the central part of this lek area (total 200m x 50m in patches) by mowing biannually and/or grazing (or mowing/topping at c. 4-year intervals with focused periods of livestock grazing). This should prevent dominance by soft rush (*Juncus effusus*), (*Deschampsia cespitosa*), bracken or emerging scrub.

.7.3.5 Residual Land Use Change Effects

The proposed mitigation is likely to result in the retention of the Acha-bheinn lek site (max 7 birds). This is predicted to reduce the effect from Moderate adverse, to negligible adverse and maintain the category of Not Significant in the EIA Regulations.

7.4 RESIDUAL EFFECTS OF THE COMBINED IMPACTS

The proposed, combined mitigation from each of the above categories of disturbance, collision mortality, predator mortality and habitat change is likely to result in the retention of the four cocks at the Acha-bheinn lek site and maintain the integrity of the meta population within the 1.5km study area[3]. This will maintain the category of Not Significant in the EIA Regulations.

The above mitigation would similarly result in the retention of a proportion of the neighbouring Barmolloch lek sites and this would not result in a significant impact on the wider study area population of black grouse.

7.5 CUMULATIVE EFFECT OF THE ACHA BHEINN WOODLAND

The magnitude of the unmitigated, cumulative impact of the Acha bheinn proposal is classified as low on a medium sensitivity feature and therefore of minor significance. For example, the proposal will not impact significantly on the array of available habitats to sustain this population or their interconnectivity (Appendix 11.2). The provisions made within the design of the Acha bheinn application (Section 7.3.4 above) are predicted to result in the maintenance of the current baseline black grouse population in the wider study area. In future there will also be a staggered pattern of harvesting and re-stocking both

[3] Subject to no major, third party land management changes elsewhere in the wider study area.

spatially and temporally which will enable the species to adjust. Therefore, the residual cumulative effects of this proposal are predicted to be non-significant. On a precautionary basis there will be a commitment to ensure that predator control encompasses the Barmolloch areas and that these satellite lek arenas are maintained with a short sward. In particular the plantings near or over one of the historical lek sites on Barmolloch 3 will be assessed and enhanced.

8 Alternative Prescriptions

8.1 NO PLANTING ON THE SITE

With continued grazing by deer alone the site will transition to native scrub and woodland and could retain the four to seven cocks and associated grey hens. The presence of deer would maintain a source pollution of tick parasites and could depress chick fledging rates and match the current baseline. Over the next 10-20 years the lek area itself will become more overgrown with grass, rushes and scrub and the cocks may relocate elsewhere. Rather than representing a source site for the local population and being self-sustaining the Acha-bheinn site could become a side component of the habitat mosaic used by possibly the Stroneskar stronghold. Long term, the habitat quality could be further reduced for black grouse as the native woodland closed canopy over the brown earth soils down slope from the ridge to the northwest of the Chambered Cairn. Overall land management abandonment could result in a non-significant impact on the local population. Even with a single farm payment on this stock-free unit it is highly probable that remedial scrub clearance would not take place, even by a volunteer wildlife management group.

8.2 PLANTING OF A LOW-DENSITY WOODLAND CREATION

This option may retain black grouse within the application site. With vigorous growth over the better quality soils in place of the current design of 52ha of spruce the native woodland (under the required SRDP planting density) would close canopy over c. 15 to 30 years but is likely to lead to the result of section 8.1. The exclusion of deer in order to establish the native broadleaved trees would speed up the process outlined in 8.1 and result in a minor negative magnitude effect. Such a land use change would result in a neutral overall impact on the local black grouse population and is assessed as not significant. The applicant wishes to maintain or enhance the current and future value of the application site and the option to create a timber or biomass output in future is preferred. Hence the applicant seeks to design a mixed woodland proposal with biodiversity, carbon sequestration and production benefits.

8.3 OTHER, DIFFERENT DESIGN OF WOODLAND CREATION

The applicant considers the proposal to be the most sustainable forest design possible while maintaining commercial objectives. Section 8.2 considers a sustainable design with a non-commercial objective. There is no third reasonable alternative suggested.

8.4 THE USE OF EXTENSIVE MOORLAND GRAZING REGIMES TO BENEFIT BLACK GROUSE (INC. PREDATOR CONTROL)

The applicant is aware of the enhanced per hectare payments under the AECS Habitat Mosaic payments for black grouse and other priority species and this would be likely to result in a minor positive significant impact on the local black grouse population. However, this option has not been pursued due to the onerous and time consuming nature of the required management for marginal financial benefit. This is a socio-economic analysis and outside of the scope of the ornithological impact assessment. The marginal

return on upland pastoral farming also precludes investment and return to higher sheep or cattle numbers and this does not fit the current and future farming system of the applicant. The ancillary wildlife benefits of predator and deer control undertaken by adjacent farm units has ceased in this Kilmichael/Kilmartin area which has undermined the viability of pastoral farming. However, the applicant is able to consider reintroducing predator control within the proposed woodland application.

9 Conclusions

Black grouse use the study area and adjacent areas extensively and it is important that adequate amounts of suitable habitat are retained in a mosaic with scrub and open ground to ensure their continued presence. The proposal is cognisant of the links to adjoining leks and associated supporting habitats and the application with its advised mitigation is designed to ensure that the local landscape of the study area retains a sustainable black grouse population. There are likely to be meta population links beyond the 1.5km study area (e.g. flights from Stroneskar to Glasvaar), and the proposal is unlikely to compromise these interchanges.

Black grouse use of the areas covered by Barmolloch 1, 2 and 3 appears to have declined marginally and may be subject to further displacement as the conifers mature and close canopy. In terms of the EIA process this area is outside the control of the applicant and therefore outside of consideration of the mitigation connected to the Acha bheinn application. However, subject to landowner consent the introduction of predator control and maintenance of a short sward will be extended to these lek sites and this will benefit these satellite groups of black grouse. The native woodland creation at Eurach (with deer grazing exclusion and moorland recovery) appears to have had a positive effect on the study area black grouse population. The applicant will continue to monitor the population in the study area with a coordinated dawn count on two days in April of the year of the woodland establishment followed by repeat counts at two year intervals for years two to five and one count in year ten.

Section 7 is an assessment of the significance of the proposal on the black grouse population within the study area. Subsections address separate impacts, each of which has been given a significance prior to and following mitigation. The proposal will implement all suggested mitigation. All potential residual impacts are assessed as having negligible or minor significance following mitigation.

The last alternative in section 8 could result in positive impacts on the local black grouse population but would not involve the range of mitigation measures over adjacent land units as proposed in the current application.

10 References

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11 Appendices

11.1 SITE SELECTION MAP

11.2 PREVIOUS PLANTINGS MAP

11.3 ORIGINAL WOODLAND DESGIN MAP

11.4 AMMENDED WOODLAND DESIGN MAP

11.5 EIA SCREENING DETERMINATION

11.6 SCOPING REPORT

11.7 SCOPING OPINION

11.8 MAP OF THE STUDY AREA

11.9 DEFINITION OF TERMS, MAGNITUDE AND SIGNIFICANCE

11.10 ISSUES LOG

11.11 SOIL MAP

11.12 ARCHAEOLOGICAL SURVEY

11.13 VEGETATION SURVEY

11.14 BIRD SURVEY 2017

11.15 BLACK GROUSE SURVEY 2018

11.16 BLACK GROUSE SURVEY 2019

11.17 MACARTHUR GREEN BLACK GROUSE DATA 2014 – 2018

11.18 FLS BLACK GROUSE DATA

11.19 ACHA-BHEINN & BARMOLLACH UPDATED BG DATA

11.20 ACHA-BHEINN & BARMOLLACH BLACK GROUSE

11.21 HABITAT MANAGEMENT PRESCRIPTION