Title:	Deer Management in Aigas Community Forest
Summary purpose:	To provide background information on deer management issues in a forestry context and to seek a decision on the Aigas Community Forest deer management strategy.
Date:	8 October 2015
Presented by:	Donnie Chisholm
Attachments	None

1. Purpose

This paper will set out the requirements for deer control to enable continuous cover forestry to be achieved and show how this relates to Aigas Forest in its present condition. It will also evaluate the different methods of controlling deer to allow regeneration.

This is a referenced document with a bibliography given at the end. Further reading of the sources is encouraged if you are still unclear after reading this paper.

There is some use of technical forestry terminology throughout the document but where possible this will be explained.

2. Background

For the last six years Aigas Community Forest has set out a series of objectives which are most easily described as the 5 E's:

Environment: Woodland management which will combine a mixture of replacement conifers, appropriate broadleaves to enhance biodiversity and improve amenity and small areas of open space for biodiversity enhancement.

Economy: Use of the forest's resources to create or support local businesses and jobs and to produce a sustainable income source for the effective management of the Forest.

Enjoyment: Development of a path network, wildlife viewing opportunities and associated visitor infrastructure taking advantage of existing key viewpoints. This is to include all abilities access and will build on existing roadside/ River Beauly access. Based on this we will build a range of cultural and heritage events and activities based around the community's close connection to the land.

Energy: To exploit existing renewable energy opportunities through the production of fire wood and to explore the viability of other renewable energy technologies.

Education: To participate in the Forest Education Initiative and provide a resource for local primary schools, Aigas Field Centre, who run an extensive education programme for all ages, and others including HC Rangers and to build skills within the community through a volunteering programme.

In this light an approach to future forest management has been adopted which is based around a 'continuous cover' model (CCF) which will deliver the organisation's vision with fewer landscape impacts, greater environmental and recreational benefits and a more sustainable financial model. The conversion to CCF requires thinning with natural regeneration and some supplementary planting to improve genetic stock in most Scots Pine areas along with felling of smaller coupes and restocking in other species areas. This management approach has been set out in the recently agreed Scoping Document and used to produce a Cash Flow Projection discussed at the Board meeting of 21st

September2 2015. The Scoping Document is the first stage in the development of the Long Term Forest Plan (LTFP).

In developing these ideas considerable consultation has been undertaken and management proposals have been shaped through expert advice from Woodland Trust Scotland and their consultants (Steve Morris, whom the Board have met on two occasions), Scottish Natural Heritage (Sinclair Coghill), Forestry Commission Scotland, Native Woodlands Discussion Group and other forestry and deer management professionals.

Success of the CCF forestry model is reliant on a lower number of deer than currently. The justification behind this is set out below in detail. It should be noted that if an alternative approach to deer management is taken by the ACF board then this will necessitate a rethink of the forest management model – likely to a more traditional commercial model of larger scale clearfell areas with fencing to protect planting. As such this will require a rethink of the Scoping Document and Long Term Forest Plan and will mean starting all consultation processes again.

3. Successful CCF Management and the Role of Deer

The need to reduce deer numbers to be able to carry out successful CCF management of a forest is well documented. Deer are considered to be one of the main limiting factors in CCF management in Scotland, so much so that in order to be eligible for Forestry Grant Scheme (FGS) payments under SRDP for Low Impact Silvicultural Systems[1] (LISS) the applicant has to have a Deer Management Plan in place that the Forestry Commission for Scotland Conservancy deem to be acceptable in terms of achieving management outcomes (https://www.ruralpayments.org/publicsite/futures/topics/all-schemes/forestry-grant-scheme/woodland-improvement-grant/wig-low-impact-silvicultural-systems/). Therefore any organisation not managing deer effectively in a forest that is to be managed under CCF not only raises serious questions over the viability and future success of management but also cuts itself off from a source of funding.

Some of the advice in on these matters are reproduced and referenced below.

The Forestry Commission Information Note 29: *What is Continuous Cover Forestry?* states;

> '*Young seedlings are very vulnerable to browsing damage and, in areas with high deer densities, it is unrealistic to expect regeneration without reducing the population below 5 – 10 animals per 100 ha and/or fencing the zones to be regenerated.'* (Mason *et* a 1999:5)

Information Note 45: *Monitoring the Transformation of Even-aged Stands to Continuous Cover Management* states;

> '*The presence of seedlings, whether or not they are browsed, and the amount of competing vegetation is important and must be noted while the plot is being assessed on the monitoring form. The information on seedlings, browsing and other vegetation will help understand why a stand is not regenerating or why the seedlings are not surviving to become saplings.'* (Kerr *et al* 2002:5)

[1] Low Impact Silvicultural Systems (LISS) is an approach to management that helps increase small scale species and structural diversity in forests. It also generally causes less rapid change to the landscape and to the physical environment than clear felling systems and so can contribute to multi-purpose objectives. The use of Low Impact Silvicultural Systems is based upon a presumption against clear felling and the use of natural regeneration and the creation of a varied forest structure containing a range of species.

Information Note 40: *Transforming Even-aged Conifer Stands to Continuous Cover Management* outlines some of the criteria that the FCS Conservancy uses to assess the suitability of an even aged forest for conversion to CCF, it also states;

> '*Deer, rabbits and hares will browse advance regeneration, while squirrels, mice and birds will eat seed either in the cone or on the ground, or both. Each of these factors must be carefully assessed by observation and inspection. Current information indicates that deer densities should be less than 5-10 animals per 100 ha to minimise damage to regeneration or they must be excluded from areas by fencing. Lower densities will be necessary where the desired tree species are preferentially browsed (eg. Douglas Fir, Silver Fir, most broadleaves).'*(Mason *et al* 2004:4)

Information Note 35: *Natural Regeneration in Broadleaved Woodlands: Deer Browsing and the Establishment of Advance Regeneration* states;

> *'The amount and type of damage inflicted on any seedling is very variable and its effects are difficult to quantify. The vulnerability of a seedling to damage depends on the deer species and vegetation structure. Muntjac deer browse very close to ground level, whereas red and roe deer focus most feeding on vegetation between 30-60cm in height. Although the woodland ground flora will provide some protection to seedlings, their leading shoots become vulnerable when they emerge above the height of the surrounding vegetation.'*(Harmer *et al* 2000:3)

The table below taken from the book *Woodland Management: A Practical Guide* (Starr 2007:104) shows the damage caused by each species, the time of year this would be expected to occur and some of the protection measures that can be employed.

Table 17: Summary of the more important woodland mammals that may cause damage to trees

Common name	Type of damage caused	Comments, tree species and habitats most affected	Protection measures
Red deer	Fraying of bark March–May. Stripping at any time	Optimum density around 4 per 100ha. Oak and beech	Fencing (2m), tree shelters (1.8m). Sitka spruce very tolerant
Roe deer	Fraying March–July	Optimum density 8 per 100ha	As for red deer, but fencing (1.8m) and shelters (1.2m)
Fallow deer	Fraying March–May.	Optimum density 6 per 100ha. Coppice	As for red deer
Sika deer	Fraying March–May. Stripping at any time	Optimum density as for red deer. Very secretive deer	Fencing as for red deer
Muntjac deer	Fraying March–May	A major problem in lowland broadleaved woodland	As for red deer, but fencing 1.5m
Grey squirrel	Stripping May–July. Ring barking. Eats seeds, cones and buds. Particularly affects oak, ash, beech and sycamore	If numbers are high may severely affect species choice. Major threat to the viability of many broadleaved woodlands	Choose less susceptible tree species. Remove trees with large seed if within red squirrel zones
Rabbit	Stripping in winter	Populations on increase with changing farming practices. Ash and sycamore very susceptible to 20 years	Fencing (90cm), tree shelters
Brown hare	Clipping of leading shoots in winter and spring	Trees survive but often with multiple leaders	Fencing
Blue hare	As brown hare	As brown hare	As brown hare
Field vole	Stripping and girdling young trees at any time	Populations may increase dramatically over short period	Tree or vole guards (inserted into ground). Weed control

4. Deer Management Requirements for Aigas Community Forest

It is noted that there is not an absolute measure of the number of deer present in Aigas Forest and adjoining land. However there are clear indicators that suggest deer numbers are too high to allow successful CCF management:

- There has not been any deer control carried out in Aigas Forest for a number of years, with no monitoring being carried out for at least 6 years.
- There is excessive tracking throughout the forest, mainly by red deer. This shows a high movement of deer, which would not be the case, were numbers lower.
- Although there is natural regeneration of tree species present only regeneration from the least palatable species manages to survive (in a heavily browsed condition) once it grows above the surrounding vegetation.
- There is evidence of a long history of bark stripping on Norway Spruce throughout the forest. Bark stripping is also currently present on fallen trees.
- Significant numbers of deer are regularly seen throughout the forest and on adjoining land at any time of the year.
- Dead deer are regularly seen on the road verges adjacent to ACF ground.

The website www.bestpracticeguides.org.uk supported by BASC, The British Deer Society, SNH, Lantra, FCS, and Association of Deer Management Groups provides best practice guidance on the management of wild deer in Scotland. This site states:

> *'Accurately estimating the number of deer utilizing areas of woodland is difficult. It is important that deer and woodland managers recognise and accept this especially when setting deer cull targets. It is possible to broadly evaluate deer densities into low, medium and high categories by collectively looking at indicators of the presence of deer such as the quantity and distribution of dung and tracking, whilst at the same time evaluating deer impacts.'*

Table 2: Woodland Deer Density Indicators taken from
www.bestpracticeguides.org.uk/planning/dung-counting

Evidence	Low Density (0-6 deer per km2)	Medium Density (6-12 deer per km2)	High Density (12+ deer per km2)
Tracks	Difficult to find deer slot marks or defined paths.	Defined paths; slot marks easy to find in areas of soft ground.	Many well defined tracks and paths often black with constant use.
Dung	Difficult to find with just the odd isolated pellet group.	Pellet groups relatively easy to find, particularly on woodland edges and good feeding areas.	Pellet groups very easy to find. Highly concentrated on favoured feed areas.
Browsing of Vegetation	Natural regeneration of broad-leaved trees taking place with no or little damage to current year's incremental growth.	Broad-leaved saplings present but showing significant damage.	No seedlings growing above dominant vegetation height. Often well defined browse lines on established shrubs and plants.

Based on the indicators above and Table 2, it is estimated that there is likely to be in excess of 12 beasts per 100 ha in the forest.

Given that earlier sections of this paper identified the deer numbers required for CCF to be successful as 5-10 per 100ha it is reasonable to state that any kind of regeneration, natural or planted, of any species is highly likely to fail at present and so CCF management would be unsuccessful. Additionally, from the personal experience of ACF's Development Officer/Forester of restocking on an adjacent estate, if ACF were to try and restock felled areas at the moment without fencing, beat up[2] rates of up to 70% could be expected in the first year after planting. This means ACF would be liable for replacing 70% of the originally planted trees within a 2-3 year period after planting, adding considerably to costs. Please note that the beat up trees would be just as susceptible to browsing and are therefore likely to require beating up themselves if deer numbers are not reduced. The obligation is to establish new trees following felling, not just plant them, in any felling licence.

There are a number of recognised options for protecting restocking sites such as fencing, tubing and culling. Deer repellents are another possible option, though they are largely untested in the UK, so convincing the FCS North Highland Conservancy of their effectiveness at Aigas could prove difficult. The effectiveness of each of these measures in the ACF situation has been evaluated below.

4.1 Fencing

Internally 8,554m of fencing would be required to fence all the restocks in phase 1 (first 5 years) alone. The second phase would require a further 9,823m of fencing, taking the total of fencing required in the first ten years of the forest plan as it stand to 18,377m.

Taking the standard cost from the current Forestry Grant Scheme (FGS) of £7.25 per metre (http://www.gov.scot/Topics/farmingrural/SRDP/RuralPriorities/Options/WoodlandCreation/ConiferBroadleaf/Fencing) this would add £62,000 of expenditure to the budget in the first 5 years, and £71,200 in the next 5 years of the budget. Fencing for restocks is not eligible for FGS funding, so ACF would have to meet the full cost of this. This changes the current 10 year cash flow prediction from always carrying a surplus to there being a deficit in two years of the first ten, these being years 9 and 11 (-£37,090 and -£4,382 respectively). It is also worth noting that the current predictions also show very small surpluses of £2,678 and £7,519 in years 3 and 8 respectively. This is significant in forestry management terms as ACF would not have the capital required to pay contractors during direct operations, meaning that ACF would be tied to standing sales, seriously limiting the management options and again making any CCF management impossible till sufficient capital could be built up again. Note; a standing sale involves selling the timber to a harvesting firm or contractor who would then come in and harvest it themselves. This would leave ACF with little or no say in who the contractor that would actually carry out the felling would be. This would, for example, leave far greater potential for damage to crops left during a thinning, which is one thing that is vitally important to control during silvicultural thinning.

While internal fencing would mean that the restock sites at ACF would be allowed to establish, this would offer no protection for CCF areas, meaning that any conversion would still be impossible from a deer pressure point of view. As there would be increased deer pressure outwith the fence any natural regeneration in the thinned areas would be unlikely to get away. The above evaluation of the cost of fencing also shows that protecting the restocking sites individually would be enough of a drain on the budget that ACF would not be able to afford to carry out CCF conversion operations (i.e. thinning) for years at a time. As CCF management and conversion has to be reactive to things beyond our control a gap of a few years could seriously affect the viability of CCF management at ACF in this situation.

[2] Beat up is the replacement of trees that have died shortly after planting

Internal fencing would also have significant impact on the landscape, both internally and externally, and to public access. These are two impacts that ACF, as an organisation, has said to the community would be kept to a minimum. For this reason alone fencing of this kind would be hard to justify.

External fencing, i.e. a fence round the perimeter of the forest, would not be effective as it would fence in deer that are hefted in the forest, the numbers of which the evidence listed above shows would still be too high to allow regeneration, so a perimeter fence would require the same culling as proposed below.

In addition to the costs and logistics of fencing there are also environmental arguments against fencing.

The UK Woodland Assurance Standard under the heading Protection and Maintenance 5.4.1 states:

> *'Where appropriate, wildlife management and control shall be used in preference to fencing. This requirement is especially important in areas where Capercaillie and Black Grouse are present.'*

(http://ukwas.org.uk/the-standard/certification-standard/protection-and-maintenance/fencing)

This adds further weight to the argument against fencing as ACF will have to comply with UKWAS to become certified adding a premium to our timber prices.

From an ecological perspective a certain level of browsing pressure is better as this can produce a more varied ground layer and a varied age structure within the woodland over time. Experiments involving fencing at SNH's Craigellachie National Nature Reserve, which is a birch woodland, show that those areas that have been subject to natural regeneration without fencing are much richer from a biodiversity perspective than those that were fenced with all deer and other browsing animals excluded (conversation with Amanda Byran, former SNH board member, currently FCC Chairperson)

In the case of ACF the fence that runs from road side to road side show in Map A is mostly intact, with some areas needing repairs or replacement. Through conversations with professional deer managers (Sinclair Coghill, SNH; Stewart Blair, formerly RSPB, currently gamekeeping lecturer at UHI) advice has been received that this is where ACF should 'concentrate its fencing effort'. This would isolate ACF from the large hill herds further north, and whilst the southern boundary would still be open allowing deer to migrate across the river, it is felt that you could control the deer population at a level to enable tree regeneration whilst still maintaining visible herds of deer. This joint approach has been discussed and agreed with the other major landowners inside the fence – Aigas Field Centre and Aigas Mains.

4.2 Tubing and tree guards

During the first 10 years of the plan ACF will be restocking with roughly 127,000 trees. A current price for 180cm tubes could not be found online; However a current price for 120cm tubes (which aren't tall enough for red deer) was available. To protect every tree planted with a 120cm tube would cost £1.45 per tree (£1.25 for the tube + 20p for the stake) this equates to an additional £184,500 of restocking costs (excluding labour). While this price is not accurate as 180cm tubes would be required to protect the trees from red deer, the actual cost would only be higher than this.

There is no additional funding within the FGS for tubing on restock sites and given the above analysis of the costs of the fencing option, which proved very limiting to ACF, this more expensive option would only be less financially viable.

It is also worth noting that this would limit ACF to only restocking broadleaved species as you can't grow a conifer in a tube; this also means that natural regeneration of conifers cannot be tubed, meaning that CCF in ACF would still be impossible.

4.3 Repellents

The Forestry Commissions Practice note 6: *Managing Deer in the Countryside* states:

> *'Some substances sold as deterrents to browsing deer provide temporary protection to small numbers of trees or garden plants. They need to be renewed regularly and are not suitable for large scale use. The use of ultrasound has not been shown to be effective in trials.'*

While repellents could be useful for smaller areas, and more likely in smaller areas such as CCF regeneration coupes when the deer numbers are still a little high in that area, they are unlikely to be effective as a large scale, long term measure. This means ACF would struggle to convince the FCS North Highland Conservancy staff of the merits of this type of control leaving us less likely to be successful in our bids for funding. Repellents could however be used as a supplementary tool in partnership with other deer control measures.

4.4 Culling

The final option for controlling browsing pressure to a level which will allow trees (both planted and natural regeneration) to establish is deer culling. The challenge is to know what level of culling is necessary to enable this to take place. Advice obtained would indicate that the most efficient way of achieving a successful outcome is to reduce deer numbers quickly to establish a more sustainable deer population in terms of forest management requirements. While it is recognised that there is flexibility within this the board should also be reminded that any deer management plan does have to be deemed effective within the timescale by FCS North Highland Conservancy.

The guidance (Mason *et* a 1999:5) states that for woodland to regenerate typically a deer density of somewhere between 5 and 10 deer per 100 Ha is optimum. The range of 5 to 10 deer per 100ha is designed to cover all types of ground in the UK. It is recognised that the higher and of this scale will not be low enough where the ground is not as rich. For this reason the lower end of this scale should be used for ACF. Aigas Forest is 260 Ha meaning that the forest can maintain a herd of roughly 13 deer whilst still allowing regeneration to establish. The wider management area incorporating Aigas Field Centre and Aigas Mains is roughly 865ha and could therefore carry a herd of 44 at 5 deer per 100 ha. This however is not an exact science as if all 44deer congregate in the one area (say a restock site) then they could still cause considerable damage to the young trees. This demonstrates that taking a numbers based approach does not always work and why foresters and environmentalists base their judgements for cull requirement on habitat/tree damage not deer numbers per se.

The Forestry Commissions Practice Note 6: *Managing Deer in the Countryside* states:

> *'There is no single recommended population level to aim for; an acceptable deer population is that which an area can sustain without unacceptable damage to local interests.'*

Two population models for ACF have been prepared in order to give an idea of, but not set, the size of initial culls for two scenarios; the first to decrease the population enough to allow CCF management, the second to keep the population the same as at present. For these models a number of assumptions were made, these were;

- A starting number for the population of 120 beasts
- A 1:1 male female ratio
- A lifespan of 12 years for males and 18 years for females

- Winter/road fatalities of 2% of the adult population, and 80% of the old population
- Young females not starting to breed till their 3rd year
- Female fertility of 90% throughout their life (this is lower than the guidance suggests for woodland deer)

All of these assumptions have been taken from either discussion within board meetings, from Best Practice Guidance for Red Deer (http://www.bestpracticeguides.org.uk/ecology/red-deer), or from The Deer Initiatives *England & Wales Best practice Guide: Population Models*.

For simplicity's sake the models have been run as if the whole herd is Red deer. Although Roe deer would normally only live for 6-7 years (http://www.wildlifetrusts.org/species/roe-deer) they have the potential to produce as many calves in their lifetime. The young females are sexually mature earlier and would more commonly have twins than red deer (http://www.bestpracticeguides.org.uk/ecology/roe-deer). Sika deer have a comparable lifespan to red deer, but are sexually mature earlier and not as affected by inclement weather (http://www.bestpracticeguides.org.uk/ecology/sika-deer) meaning that in a modelling situation they would be comparable. As the main problem in ACF is red deer it is not unreasonable to simplify the model by running it just for red deer.

The population model in Appendix A shows how an enclosed population at Aigas would respond to culling. The model shows that 60 beasts (30 male and 30 female) could be culled for the first 3 years, 30 beasts (15 male and 15 female) in Year 4. By Year 5 the population is below 5 per 100ha required for CCF management and culling could stabilise at roughly 4 to 6 beasts per year.

The population model in Appendix B shows the alternative of shooting a lower number of beasts, 30 per year (15 male and 15 female). This model shows that by only taking 30 beasts annually the population doubles by year 6.

The model used is flawed from an Aigas perspective in that it is based on an enclosed population, which the population at ACF is not, therefore actual cull figures would need to be considerably higher for longer to achieve a 5 per 100 ha target. As we do not have any firm data at present for population size questions could also be raised over the effectiveness of the cull targets set in this model. However, although simplistic, this model does highlight the principle of requiring to shoot high numbers of deer initially, especially if we are to get any trees established within the first 5 year phase of the forest plan without internal fencing. The other thing that these models highlight is that high initial culls are required if ACF is to apply via the Forestry Grant Scheme for funding for the development of a Deer Management Plan (DMP); one requirement being that the population density be low enough for regeneration to occur within 3 years (https://www.ruralpayments.org/publicsite/futures/topics/all-schemes/forestry-grant-scheme/woodland-improvement-grant/deer-management-plan/). Board members are reminded that ACF will also need this DMP in place before we can apply for funding for LISS to help start the conversion to CCF.

Although questions can be raised over the accuracy of the input figures for this model the theory behind the model has been taken from The Deer Initiatives *England & Wales Best practice Guide: Population Models*. Therefore the mathematics behind it should be considered reasonable.

The costs of culling have not been set out as they vary considerably. Letting stalking can produce an income but this would have to be offset by any costs that would then arise either from having to replace damaged trees (all felled areas have to be restocked or a felling licence will not be granted) or by fencing. Contract stalking could produce a small profit or have an associated cost depending on the species targeted and prices achieved for carcasses. The direct costs of culling are dealt with in detail in another set of discussion papers.

4.5 In Summary

The sections above set out the pros and cons of different options for reducing browsing pressure on both restock and CCF conversion areas. In short

- Fencing restock areas: Costly and will only protect restocks; conversion to CCF not possible as deer pressure shifted minimising natural regeneration; issues with landscaping and access. Will not produce a 'natural' woodland.

- Fencing whole site: Costly and will still require heavy deer culls within site.

- Tree tubes: Expensive and can only be used for broadleaves, unlikely to see CCF conversion for Scots Pine areas. Future disposal issue.

- Light deer cull: Will result in a significant increase of the population and so not enable natural regeneration/ conversion to CCF and will result in extensive damage and additional cost for beat up of restock sites.

- Heavy Deer Cull: Should achieve natural regeneration and minimal losses of planted stock. Enables conversion to CCF. May have challenging negative PR for ACF and deer management partners which would need to be managed.

4.6 Other Deer Management Related Issues

4.6.1 Contract Stalker vs Sporting Tenant

Regarding the management of culling, advice has been obtained from a number of professionals in the forest industry that culling is better left to a contract stalker rather than a sporting tenant, selling the stalking, or by a casual stalker. Experience from a number of locations has shown that a sporting tenant has different management objectives and will generally keep the numbers higher as they see a potential increased income (i.e. more deer on the ground = more stalking that can be sold) similar to historical practice on estates across Scotland, while casual stalkers rarely have the time to carry out the large culls required in the early years of reduction. This is also mirrored in the experience of other community owned estates not just in relation to woodland but in relation to achieving favourable status for designated areas. North Harris Trust for example let its stalking to a community stalking club but found that the club members favoured some areas while avoiding others due to personal preferences resulting in considerable ongoing damage to sensitive sites. They have had to resort to contract stalking(Conversations with Steve Morris, RDI Associates; Graham MacBryer, FCS Dingwall and Peter Lowe MICFor, The Woodland Trust and Amanda Bryan, former SNH board member, currently FCC chair)

4.6.2 Monitoring Protection Measures

Monitoring the impacts of the deer population at ACF is important as we are aiming to have a small enough population that tree regeneration can establish, whilst still ensuring that it is a healthy population. We will also need to monitor the impacts during any reduction to ensure that damage is indeed reducing, and to help set cull targets.

Effective monitoring of the impacts would require a number of surveys, namely tree damage surveys (beat up surveys), vegetation browsing surveys (fixed plots, both fenced and un fenced to compare), cull figures, female pregnancy percentages (also from cull (reference http://www.thedeerinitiative.co.uk/uploads/guides/114.pdf) and dung counts; the latter three being used for modelling, while the former surveys would give an indication of the control measures effectiveness. All of the above surveys would be expected as part of the Deer Management Plan

required to access LISS payments in the FGS (https://www.ruralpayments.org/publicsite/futures/topics/all-schemes/forestry-grant-scheme/woodland-improvement-grant/deer-management-plan/).

4.6.3 Timing of Control

In the sense of a single tree's lifetime deer control is mostly require for the first decade or so of its life, until enough of its canopy can get above the height at which deer can browse it, although soft bark species can obviously be susceptible to bark stripping after this. However when you consider that a forest being managed under CCF will generally have trees of all ages it is clear that deer control would need to be an ongoing process.

It has already been identified that high initial culls are required if ACF is to apply via the Forestry Grant Scheme for funding for the development of a Deer Management Plan (DMP); one requirement being that the population density be low enough for regeneration to occur within 3 years (https://www.ruralpayments.org/publicsite/futures/topics/all-schemes/forestry-grant-scheme/woodland-improvement-grant/deer-management-plan/).

Additionally in order to start felling and replanting in Aigas Forest in 2016, as currently planned, we will need to reduce deer number and use supplementary measures such as a combination of fencing, tubing and repellents or initial plantings will not get away. Any delay in starting deer management will result in a delay in the delivery of the proposed Long Term Forest Plan, the associated renvenues, and also our Business Plan. This will reduce the potential to generate income required to retain the services of our Development Officer; may lead to a failure to deliver on the targets required of our Scottish Land Fund grant and will delay the delivery of community and environmental benefits.

Therefore in order for the current CCF management model to be effective in the desired timescales it would be necessary for deer management to start immediately and to have the desired impact on numbers at an early stage ACF would require to permit night shooting and apply for out of season shooting for this winter initially, and possibly beyond depending on what monitoring shows.

4.6.4 Partnership Working

Whatever approach is adopted to deer management it will be important to work with neighbours on both shooting and fencing although the nature of this relationship will change depending on the decisions that are taken – fence only restock areas within Aigas Forest, fence the whole of Aigas forest or maintain existing boundary fence which includes Aigas Forest, Aigas Field Centre and Aigas Mains (refer Map A). To date all consultations that have taken place have been based around the latter and in-principle agreement has been received from both Aigas Field Centre and Aigas Mains to the latter proposal. Any new proposals will require re-consultation.

Community soundings on the proposals would take place along with the consultation on wider forest management as part of the Scoping Process.

Although only very little of the boundary fence of the proposed joint management area is on ACF land it is proposed that ACF engage with partners on both sides of the fence to support the repair and maintenance of it as there are clear benefits to ACF and this will support a stronger partnership.

ACF is fortunate enough to have a good reputation amongst the community and this is strengthened by the transparency of our decision making (all meetings are open and all minutes are published); the integrity of our Board; and ongoing engagement and consultation with community members. It is important that this is not damaged by our deer management activities and so further community consultation, specifically on deer management, will be undertaken to explain our motivations, the need for access restrictions and to breakdown misconceptions.

5. Conclusions

The current forest management proposals (i.e. CCF) and what this means in relation to deer management have been set out above. In light of this the Board is asked to decide between the following two options:

1. Commit to CCF as the preferred forestry management model in order to achieve the ACF vision and, in line with advice from forestry professionals, commit to a 'heavy' deer reduction model including night shooting and out of season shooting in year 1. This does not commit the Board to any specific method of culling or any contractor / stalker at this stage. This is covered in separate papers.

2. Revise the current ACF Scoping Document and forest management model to take into account a more traditional approach to forest management based around fencing larger felled areas in order to achieve financial sustainability, alternative stocking proposals, no CCF, and less intensive deer management. This is equally valid in forestry management terms but does not meet ACF objectives as currently set out. This will require a rewrite of all documentation and new consultation.

The recommendation of the ACF Development Officer/ Forester is that the Board accept Option 1.

6. Bibliography

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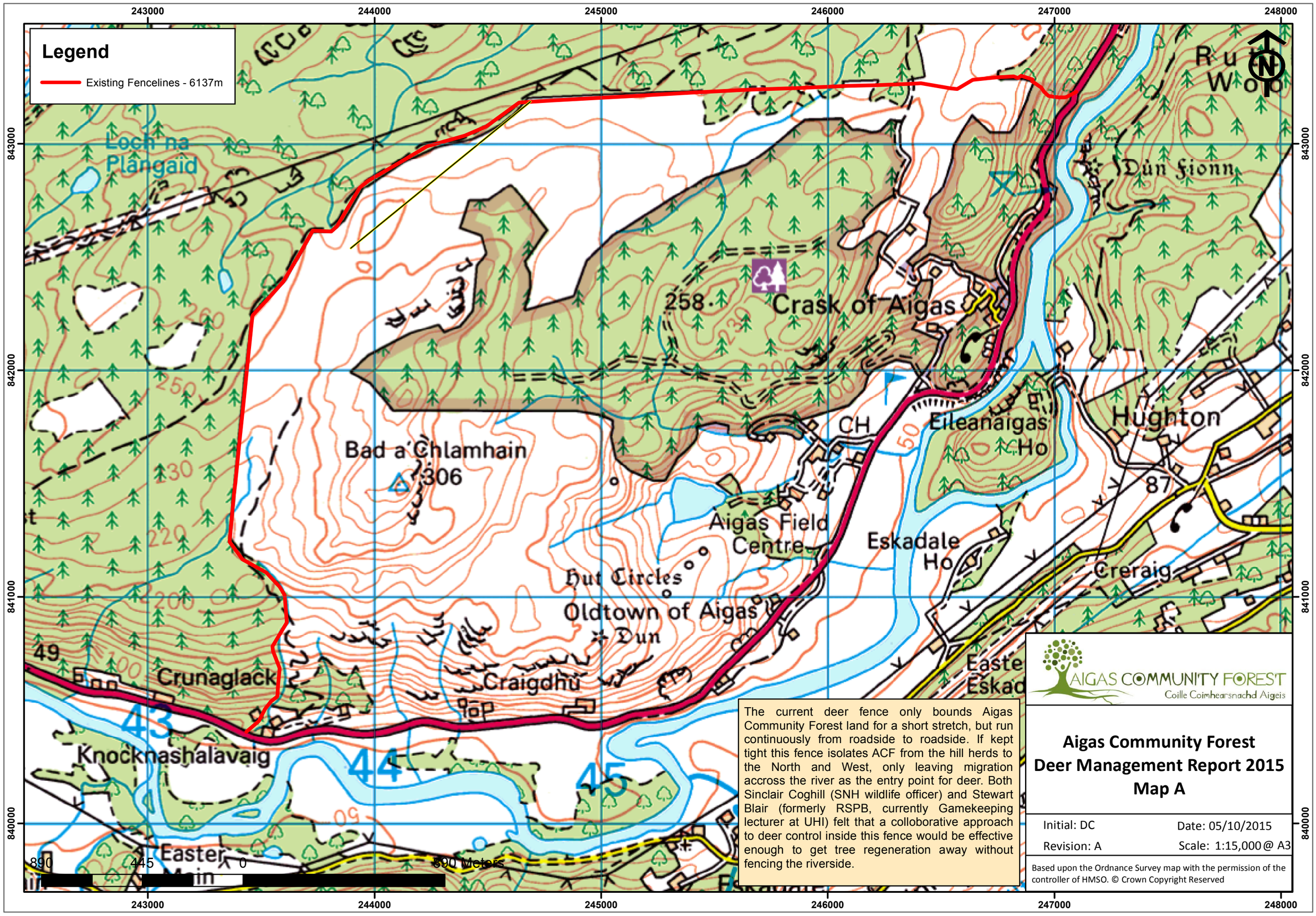
Woodland Management: A Practical Guide (Starr 2007:104) chapter 7

Starr, C. (2007) *Woodland Management: A Practical Guide* Marlborough: The Corwood Press Ltd



The current deer fence only bounds Aigas Community Forest land for a short stretch, but run continuously from roadside to roadside. If kept tight this fence isolates ACF from the hill herds to the North and West, only leaving migration accross the river as the entry point for deer. Both Sinclair Coghill (SNH wildlife officer) and Stewart Blair (formerly RSPB, currently Gamekeeping lecturer at UHI) felt that a colloborative approach to deer control inside this fence would be effective enough to get tree regeneration away without fencing the riverside.

Document Path: C:\Users\Donnie Chisholm\Documents\Aigas\GIS\Projects\ACF_DeerManACFReport_A3L_20151005_REVA.mxd

Document Name: ACF_DeerManACFReport_A3L_20151005_REVA

Appendix A

Year	Starting population Male	Starting population Female	Female fertility %	Male cull No.s	Female cull no.s	Male Population after cull	Female population after cull	Annual winter deaths (Male)	Annual winter deaths (female)	Minimum population size (Male)	Minimum population size (Female)	Maximum population size (Male)	Maximum population size (Female)
0	60	60	**90%**	0	0	60	60	5	4	55	56	78	79
1	78	79	**90%**	30	30	48	49	4	3	44	46	63	65
2	63	65	**90%**	30	30	33	35	3	2	30	33	43	47
3	43	47	**90%**	30	30	13	17	1	1	12	16	18	22
4	18	22	**90%**	15	15	3	7	0	0	3	6	6	9
5	6	9	**90%**	2	2	4	7	0	0	3	7	6	9
6	6	9	**90%**	2	2	4	7	0	0	4	7	7	10
7	7	10	**90%**	3	3	4	7	0	0	3	6	6	9
8	6	9	**90%**	2	2	4	7	0	0	4	7	6	9
9	6	9	**90%**	2	2	4	7	0	0	4	7	7	10
10	7	10	**90%**	3	3	4	7	0	0	3	6	6	9

Male Lifespan (years)	12
Female lifespan (years)	20

Appendix B

Year	Starting population Male	Starting population Female	Female fertility %	Male cull No.s	Female cull no.s	Male Population after cull	Female population after cull	Annual winter deaths (Male)	Annual winter deaths (female)	Minimum population size (Male)	Minimum population size (Female)	Maximum population size (Male)	Maximum population size (Female)
0	60	60	**90%**	0	0	60	60	5	4	55	56	77	79
1	77	79	**90%**	15	15	62	64	5	4	57	60	81	84
2	81	84	**90%**	15	15	66	69	6	4	60	64	86	90
3	86	90	**90%**	15	15	71	75	6	5	65	70	93	98
4	93	98	**90%**	15	15	78	83	7	5	71	78	103	109
5	103	109	**90%**	15	15	88	94	7	6	80	88	115	123
6	115	123	**90%**	15	15	100	108	9	7	92	101	132	142
7	132	142	**90%**	15	15	117	127	10	8	107	119	155	167
8	155	167	**90%**	15	15	140	152	12	10	128	142	185	199
9	185	199	**90%**	15	15	170	184	14	12	155	172	224	241
10	224	241	**90%**	15	15	209	226	18	14	191	212	276	296

Male Lifespan (years) 12
Female lifespan (years) 18