Deer Consultancy Services

A Deer Management Plan for

Sub Area 1

of the

East Grampians DMG

2016-2021

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Executive Summary

This plan aims to improve many aspects of deer management within Sub Area 1 of the East Grampians DMG (SA1). In particular, it seeks to involve more people and more interests in discussions about deer. Change will be driven by a new Constitution and by the consultation surrounding this plan. However, the two most important issues in a deer management plan are how many deer there are and how many deer there should be. The recent complete count of the East Grampians by SNH provides an excellent starting point for this deer management plan as there is broad agreement on how many deer there are in the East Grampians. In 2016 some 2026 stags, 2437 hinds and 767 calves were counted. These 5226 total deer occur at a density of 16 deer per km2. Between 2010 and 2016 an average of 543 stags have been culled annually. This represents 27% of the stag population counted in 2016. Between 2010-2016 an average of 674 hinds have been culled annually. This represents 28% of the counted hind population in 2016. Culling at these rates should reduce the population but this has not occurred probably because SA1 does not contain a discrete deer population.

To answer the question of how many deer there should be we need to find an acceptable balance between the benefits deer bring with the impacts they cause. The Caenlochan Section 7 Agreement 2014-19 and the accompanying Caenlochan Deer Management Group Deer Management Plan (Putman, 2014) sets targets for how many deer there should be over much, but not all of Sub Area 1. These figures are used as the basis for developing a target population for SA1 along with cull targets for 2016-17. This target population attempts to balance the need to protect internationally important designated habitats within Caenlochan, with the importance of the local deer economy in creating income and supporting jobs. Any target population needs to be reviewed in the light of habitat data as well as the importance of the deer economy and the interests of local communities. Habitat monitoring systems for estates are developed and these should be put in place by 2017 which will allow habitat data to influence future cull targets.

Conflict with deer and agriculture and the resulting high level of out of season culling of stags is an important issue within SA1. Options for reducing this conflict are discussed. SA1 does not contain a discrete population of deer. Deer regularly cross the northern and north eastern boundaries of SA1 and range across the East Grampians count area. This makes population modelling difficult and unreliable and makes good communications with neighbouring DMGs essential. The relationship between SA1, the Caenlochan Section 7 Agreement, neighbouring DMGs and the East Grampians DMG is set out.

Summary of Actions Arising from the East Grampians Sub Area 1 Deer Management Plan

A list of the actions arising from the plan is presented below:

Action		Who by	Timescale
1.	Review and update deer management plan targets and actions annually and carry out a full review of the plan after 5 years.	SA1	At each AGM
2.	Carry out an annual review of Group performance against the Benchmark and Public Interest Actions after each AGM.	Chair & Secretary	After each AGM
3.	Consider and confirm the role of SA1 in relation to the EGDMG.	SA1	End Sep 2016
4.	Consider a new name for SA1 or agree to continue with the current name.	SA1	End Sep 2016
5.	Review and agree the boundary of SA1, particularly the southern boundary and ensure all relevant properties are invited to meetings.	SA1	End Sep 2016
6.	Identify the owners of the Harran plantation and invite them to become members of SA1.	SNH, neighbours	End Sep 2016
7.	Update Constitution in line with ADMG's Template for DMG Constitutions.	SA1	End Sep 2016
8.	All members to adhere to the Code of Practice in Deer Management.	All members	Continuous requirement
9.	Keep up to date with Wild Deer Best Practice guidance as it evolves.	All members	Continuous requirement
10.	Carry out actions arising from the Communications Policy including making relevant data and documents publically available through the SA1 website.	Chair & Secretary	End Oct 2016
11.	All stalkers to attain DSC1 and work towards DSC2. Identify training needs within the DMG and organise training courses where necessary. Consider inviting other rural workers to participate in training courses where possible.	All members	End Dec 2017
12.	Organise annual co-ordinated foot count of SA1 and consider forming a combined estate count team to improve count coverage. Discuss results at Spring meeting and make results publically available through the SA1 website.	Stalkers, all Members, Chair, Secretary	In winter/ spring annually
13.	Ensure a full analysis of count and cull data is carried out at the EGDMG Spring meeting.	Chair & Secretary	Annually at EGDMG Spring meeting.
14.	Consider whether methods to estimate deer populations within woodlands are necessary.	All members with significant areas of woodland	End Dec 2016
15&16	Carry out annual mortality searches and recruitment counts and use data to update the population model within the deer management plan.	Stalkers, Secretary	Before Spring meeting annually.
17.	Work towards attaining SQWV standards and ensure a supply of venison is available for local sale.	All members who process deer.	Local venison sales available annually.

18.	Keep up to date on research on methodologies for counting mountain hares and for measuring their grazing impacts.	All members	Updates should be available at Caen Sec 7 Steering Group meetings and should be passed to all members.
19.	Ensure EGDMG analyses count and cull data before each May meeting.	Secretary	End April annually.
20.	Members who own ground within the Caenlochan Sec 7 Area will initiate their own Habitat Impact Assessments in 2018. These will be completed on both Blanket Bog and Heath habitats in 2018. Following that, habitat surveys will be completed in the same years as member estates out-with the Caenlochan area.	Relevant members	End Sep 2018
21.	Members who are not currently in the Caenlochan Habitat Survey area will initiate a habitat monitoring scheme which will be compatible with SNH Best Practice guidance.	Relevant members	End Sep 2017
22.	The DMG will organise a group training event for Habitat Impact Assessment if required.	SA1	End Oct 2016
23.	Each member will carry out Habitat Impact Assessments every 3 years.	All members	Every 3 years with first round in summer 2017.
24.	The DMG will review results from the first round of Habitat Impact Assessments and will set targets to reduce grazing pressure where impacts are found to be high.	SA1	End Dec 2017
25.	Estates in SA1 to consider means of reducing the need for out of season shooting either by preventing damage or by agreeing compensation for damage.	SA1	End Dec 2016
26.	Maintain current successful deer management regime in Crossbog Pinewood SSSI.	Relevant deer managers	Fences maintained annually and deer culls achieved annually.
27.	SNH to publish Caenlochan HIA data for 2015. The progress of the Agreement should be reviewed in the	SNH	Asap

	light of these data.		
28.	Members to provide count, mortality and recruitment data to the Secretary to enable the population model to be updated before each June meeting.	All members	Annually
29.	Ensure EGDMG carries out an analysis and reconciliation of population models for SA1 and SDNA DMG (former sub area 2).	Chair & Secretary	Annually
30.	Fully implement all aspects of the Caenlochan Deer Management Group Deer Management Plan.	SA1 signatories to Caenlochan Section 7 Agreement	June 2017
31.	Consider culls and target populations in relation to habitat data as trends in habitat condition become clear.	SA1 signatories to Caenlochan Section 7 Agreement.	Aug 2017
32.	Where deer are likely to be the cause of impacts on native woodlands, each relevant estate to use NWSS results to prepare condition assessments of each woodland within the High or Very High impact categories and produce management proposals to improve condition or justify current management. These management proposals should be supported by a regular cycle of woodland condition monitoring in accordance with WDBPG.	All members with native woodlands assessed as having High or Very High herbivore impacts.	End Dec 2017.
33.	SA1 will monitor woodland condition following Best Practice guidelines and will adaptively manage woodlands dependent on the outcome of these surveys.	All members who own >0.5ha of native woodland.	After Action 32 above has been completed.
34-41	Carbon storage action points including identifying the extent of degraded peat on blanket bog.	All members	End Dec 2017.
42-44	Continue to resist colonisation by fallow and sika through culling all observed individuals where possible. Any feral pigs observed will also be culled if possible. Numbers and locations of culled animals will be reported to the DMG.	All members	Report at each DMG meeting.
45	Ensure DMG is open to communication with regard to concerns of damage to historic and cultural features. The DMG to contact the appropriate Council archaeologist to see if they have any concerns.	SA1	Council archaeologists contacted by Mar 2017.
46.	Members to consider use of the Heading for the Scottish Hills website as a means of providing information for walkers.	All members	Consider by end Dec 2016.
47.	Consider ways of raising driver awareness of the risk of deer vehicle collisions on the A93. Monitor numbers of deer killed on the roadside on a monthly basis. Report collisions to the Deer Collisions UK	SA1, relevant estates.	End Dec 2016.

	database.		
48.	Deer vehicle collisions to be an agenda item at each AGM	Secretary	End Dec 2016
49.	Ensure estate guests are aware of the risks and symptoms of Lyme disease. Ensure First Aid kits include appropriate tick removal equipment.	All members	Annually as part of information to new guests.
50.	Consider establishing commercial deer related activities other than deer stalking. These might include deer viewing, photography etc.	All members	Consider by end March 2017.
51.	Develop good lines of communication with farmers to the south of the SA1 boundary and north of Alyth. SA1 will try to find solutions to any concerns raised.	Chair and Secretary	End Dec 2016.
52.	Consider deer welfare issues at each SA1 meeting and consider the implications for deer welfare when taking management decisions.	All members	At each DMG meeting.
53.	Consider the use of a signed Declaration form in relation to Chronic Wasting Disease for stalking guests from North America and Scandinavia.	SA1	End Dec 2016.

1.0 Introduction

This deer management plan was commissioned following the Scottish Parliament's Rural Affairs, Climate Change and Environment Committee's review of deer management in 2013. The Committee called for increased professionalism in deer management planning across Scotland and challenged all Deer Management Groups (DMGs) to produce forward looking deer management plans by 2016. To support DMGs in plan preparation, the Association of Deer Management Groups (ADMG) produced a Benchmark against which DMG performance could be assessed. SNH also produced a list of Public Interest Actions. Both of these elements are essential components of a competent deer management plan.

This deer management plan has been commissioned by Sub Area 1 of the East Grampians Deer Management Group (SA1). The East Grampians DMG (EGDMG) is one of Scotland's oldest DMGs but has gradually evolved into an umbrella group for five sub areas. These sub areas have now developed into independent DMGs. SA1 is one of these new DMGs and covers the SW quadrant of the East Grampians including Glenshee, Glen Isla, Glen Prosen and Glen Clova. SA1 sits within the Cairngorms National Park. In 2014, SNH carried out a review of SA1's performance against the Benchmark and the Public Interest Actions. This plan is broadly structured around the Benchmark and the Public Interest Actions. The plan covers the five year period from 2016 to 2021. However, targets and actions outlined in the plan should be updated annually with a full review carried out in 2021. It is recommended that SA1 carry out an annual review of performance against the Benchmark and the Public Interest actions after each AGM.

Action 1:	*Review and update targets and actions annually and carry out a full review of this plan after 5 years.*
Action 2:	*Carry out an annual review of SA1s performance against the Benchmark and Public Interest Actions after each AGM.*

Much of SA1 is covered by the Caenlochan Section 7 Agreement which is designed to restore the Caenlochan SAC and other designated sites to Favourable Condition. Signatories to this Agreement have agreed to implement the Deer Management Plan for the Caenlochan Deer Management Group Area (Putman, 2014) (hereafter referred to as the Caenlochan Plan). The Caenlochan Plan sets out population targets for some estates in the Section 7 Agreement. However, the Caenlochan Plan does not cover all estates within SA1 and was not designed to address all the issues identified within the Benchmark or the Public Interest Actions. This plan seeks to build on the Caenlochan Plan and focuses on the weaknesses identified within the review.

1.1 Purpose of the Plan

The purpose of the plan is to improve the performance and function of the SA1 in the following key areas:

- Communication: including both internal communication between SA1 members and communication with wider interest groups.
- Collaborative deer management: encompassing deer counting, population modelling and cull planning.
- Habitat management: implemented through habitat monitoring and the use of habitat data to influence cull targets. In addition to this, the use of habitat management in the protection of important habitats within designated sites.
- Delivery of the Code of Practice on Deer Management. SA1 endorses the Code and will use this deer management plan to help deliver it.
- In balancing private and public interests. These interests include the local economy, public safety, the condition of designated sites and a range of other issues.
- Promoting sustainable deer management including setting population and cull targets.

1.2 Management Structures and Agreements which influence deer management within SA1

A variety of management structures influence deer management within SA1. Discussions and activities which influence deer management within SA1 also take place within a range of geographical boundaries. These structures and boundaries can be confusing. The **East Grampians DMG (EGDMG)** is one of Scotland's oldest DMGs and, for

some time, was one of Scotland's most effective. A long series of annual collaborative deer counts was achieved and many estates worked together on joint culls. EGDMG includes the area recognised by SNH as the **East Grampians count area.** The count area encompasses a largely discrete population of deer contained within the roads from Braemar to Finzean, from Finzean to Edzell, from Edzell to the Spittal of Glenshee and from the Spittal to Braemar (see Map 1.1). The EGDMG also contains an area to the north, west and south west of Braemar which includes Glen Avon, Invercauld Home Beat, Mar Lodge, Mar and the Baddoch. This area does not contain a discrete deer population and is considered part of the West Grampians count area by SNH. This area was included within the East Grampians DMG in the 1970s by the Red Deer Commission largely for reasons of convenience rather than deer management logic.

Like many other large DMGs, the East Grampians struggled to maintain member interest, as deer management issues at one end of the large group were thought to be of little relevance to members at the other end of the DMG. This led to attendance dropping at the EGDMG and stimulated the formation of five sub areas. These sub areas now largely function as separate DMGs and attendance by deer managers is usually good. The advantages of breaking the EGDMG into sub areas have been better estate engagement and more locally focussed deer management discussions and decisions. The main disadvantage is that the sub areas do not manage discrete populations of deer and there are regular deer movements between most sub areas. Population modelling is difficult and potentially unreliable at sub area level and collaboration between sub areas is essential.

During the period of this plan SA1 will run as an independent Deer Management Group, albeit with a need for close liaison with neighbours and other East Grampian sub areas. The East Grampians DMG will remain in existence as an umbrella Group with the role of:

- continuing to organise a co-ordinated deer count for the whole East Grampian count area
- providing a forum for collaboration between sub areas
- analysing and attempting to reconcile population models across SA1 and neighbouring sub areas
- providing a forum for discussion on East Grampians deer issues for a wider range of stakeholders.

SA1 will formalise its position in a Constitution (see appendix A).

The **Caenlochan Section 7 Agreement** covers some, but not all, of the estates within SA1 but also includes estates from neighbouring sub areas. This Agreement is a legal document which sets deer management targets designed to restore the Caenlochan SAC to Favourable Condition. The initial Section 7 Agreement covered the period from 2003 -13. A new Agreement now covers the period from 2014-19. Usually Section 7 members meet twice per year and the Section 7 Agreement has tended to dominate the deer management agenda within SA1. Signatories to the current Section 7 Agreement have agreed to implement the Caenlochan Plan prepared by Prof. R J Putman in 2014. The Caenlochan Plan sets population targets for some estates but does not address all the issues in the Benchmark or SNH's Public Interest Actions.

The **Cairngorms Deer Advisory Group (CDAG)** influences deer management within SA1 at a strategic level. CDAG consists of representatives from DMGs, NGOs and government agencies. Its role is to advise the Cairngorms National Park Board on deer management, to advise deer managers of Board policies and to provide a forum for discussion on Cairngorms deer management between diverse interests.

The roles of the various structures and agreements which influence deer management within SA1 are summarised in Table 1.

Table 1. *Deer management structures and agreements which influence SA1.*

Deer Management Structure or Agreement	Boundary	Deer Management Role
Sub area 1	See Map 1.1	To promote the sustainable management of deer throughout SA1 including setting cull and population targets across estates out-with the Caenlochan Section 7 Area.
Caenlochan Section 7 Agreement	See Map 1.2	To set deer cull and population targets and habitat targets with the objective of restoring the Caenlochan SAC to Favourable Condition.
East Grampians count area	See Group Overview Map	This area encompasses a discrete population of deer which range across SA1 and three other sub areas. This is the area likely to be counted by SNH if there are future helicopter counts.
East Grampians DMG	See Group Overview Map	To co-ordinate an annual ground count over five sub areas including SA1. To provide a forum for discussion between neighbouring sub areas and for a wider range of diverse interests.
Cairngorm Deer Advisory Group	Cairngorms National Park boundary.	To promote sustainable deer management across the Cairngorms National Park. To provide a forum for discussion on Cairngorms deer management amongst diverse interests. To advise the CNP Board on deer matters and to advise deer managers within the CNP on Board discussions and deer policies.

Following decisions made by EGDMG in May 2016, it is now proposed that SA1 and other sub areas should maintain independent finance. Subscription levels would be a matter for members but it is proposed they would pay a small annual fee to EGDMG to pay for the meeting costs of the umbrella group. The above reflects the current situation with regard to the relationship between SA1 and EGDMG. Members should consider if they are happy to adopt this relationship or develop a different model. Collaboration between SA1 and neighbouring sub areas is essential as SA1 does not contain a discrete deer population.

Action 3: *Consider and confirm the role of SA1 in relation to EGDMG.*

1.3 A new name for Sub Area 1?

Other sub areas within the East Grampians DMG have changed their name to reflect their wish to become independent DMGs. Sub area 2 has been re-named as the South Deeside and North Angus DMG (SDNA DMG). SA1 may want to consider changing its name. SA1 contains four major glens: Shee, Isla, Prosen and Clova. It falls into NE Perth-shire and West Angus. A short, snappy name for this area is not easy to identify. Members may wish to continue operating as Sub Area 1 or consider a new name.

Action 4: *Consider a new name for SA1 or agree to continue with the current name.*

1.4 Boundary of SA1

The boundary of SA1 is shown on Map 1.1 and is formed by the following:

- From the Glenshee Ski Centre east along the northern boundary of the Glenshee beat of Invercauld to Glas Maol.
- From Glas Maol along the northern boundary of Tulchan Estate until it reaches Corrie Fee.
- Along the west boundary of Corrie Fee and east along the southern edge of Glen Doll forest until it descends into Glen Clova and follows the River South Esk to Cortachy.
- From Cortachy north and then north-west to Glackburn and across the Prosen Water to the southern edge of Pearsie Estate and then due west skirting the southern edge of Auldallan Farm and Balintore to the south end of the Backwater Reservoir.
- From the Backwater Reservoir along the B951 through Kirkton of Glenisla and then SW to Cairn Gibbs.
- From Cairn Gibbs NW to Drumore and west to Blacklunans.
- From Blacklunans north along the Shee Water skirting Dalnaglar Castle and its land and onto the A93.
- North along the A93 to the Glenshee Ski Centre.

The main landholdings are Alrick, Auchavan, Auldallan Farm, Airlie West, Balintore, Clova South, Corrie Fee, FCS Glenisla/ Glen Markie, FCS Glen Prosen. Also Glencally, Glen Isla House, Glen Prosen and Balnaboth, Glenshee, Lednathie, Pearsie, Scottish Water (Glenhead/ Glendamph) and Tulchan.

There are regular movements of deer across the boundary of SA1 particularly to the north where SA1 marches with Glen Callater and Bachnagairn. To the north and north east, SA1 neighbours the South Deeside and North Angus DMG. To the east it neighbours the grouse moors of Glen Moy and Glen Ogil. Deer are largely excluded from these grouse moors by fencing and culling so there is little exchange of deer with SA1. To the west, SA1 neighbours the West Grampian DMG on the west side of the A93. Invercauld Estate owns both Glenshee and the adjoining Rhiedorrach beat in the West Grampians DMG thus forming a communications link between SA1 and neighbours to the west. The southern boundary is largely adjacent to farmland where there are much fewer red deer and where no formal deer management structures exist. Some landholdings south of the current boundary will shoot deer that may originate from SA1. Dalnaglar Castle and farms south of Mt Blair may fall into this category. SA1 should review and agree its southern boundary to ensure all relevant properties are invited to become members.

Action 5: *Review and agree the boundary of SA1, particularly the southern boundary. Ensure all relevant properties are invited to meetings.*

1.5 Membership

DMGs are generally structured so that land holdings pay an annual subscription. Other interests can usually attend without paying a subscription. A new constitution is developed for SA1 in section 2 of the DMP and in Appendix A. This constitution details how subscriptions will be set and who else should be invited to be meetings.

1.6 The Member Estates

Brief descriptions of member estates, their objectives and management practices are set out below. Ownership boundaries are shown on Map 1.1.

1.6.1 Airlie West (Tarabuckle)

Airlie West covers some 2496ha. Sporting rights are let to a tenant on a 15 year lease. This lease has just started and will require time to bed in. Deer stalking is the main sporting priority with the estate culling 20 stags and holding a population commensurate with that objective. There is some walked up grouse shooting and there is a pheasant shoot on low ground. The estate is farmed under a secure farming tenancy and is well stocked with sheep.

1.6.2 Alrick

Farming is the main objective on Alrick which has an area of 1545ha. Sheep are grazed on improved grass parks around Forter Castle and along the B951. There are extensive hill parks where grass has also been improved. The estate covers ground on both sides of the B951 including the slopes of Mount Blair. Large numbers of stags winter on Mt Blair and other parts of Alrick and these can cause conflict. Some stags are culled in season particularly in July and early August and some stags are culled out of season to reduce conflict with farming. One full time employee is involved in deer stalking on Alrick and also carries out some stalking on Auchavan.

1.6.3 Auchavan

This small estate of 810ha is run collaboratively with neighbouring Alrick which is owned by the same family. However, objectives differ with farming the main objective on Alrick while Auchavan is primarily a stalking estate which aims to cull 10 stags per year on a fee paying basis. Stalking guests stay in the estate's holiday cottages. Labour on Auchavan is largely contracted from Alrick. The estate is keen to increase revenue and is developing innovative ventures including a residential gun dog training school and opportunities for wildlife photography.

Deer move through Auchavan during seasonal movement between high and low ground but the occurrence of deer on Auchavan at any one time can be unpredictable. Most stalking on Auchavan occurs during the rut when the big herds of deer break up and deer are scattered more evenly through SA1.

1.6.4 Auldallan

Auldallan covers 603ha and is on the southern edge of the SA1 area. It is owned by Andrew Ogilvie Weatherburn and has one tenant farmer and the deer stalking is leased. There is also a small pheasant syndicate and a limited number of days grouse shooting each year (separate agreement to deer stalking). The stalking tenant's primary focus is recreational stalking of roe deer. Around 4 bucks and 4 does are culled each year however it is felt that the numbers of roe may be decreasing. Although unconfirmed, it is thought there may be some poaching. A small number of red deer access Auldallan but these are shared with both Balintore and Pearsie and a maximum of 2 stags are culled annually. There are no full time stalkers on Auldallan and no venison is sold. The stalking tenant would like to see more public engagement within the deer industry.

1.6.5 Balintore

Balintore covers 1689 ha and is on the southern edge of the SA1 area. It is owned by the Kinnordy Farm Partnership and leased to Mr Barclay Dougal. The tenant's primary focus is on running an efficient business which includes sporting objectives as one of its primary aims.

1.6.6 Clova South

South Clova is part of the wider Clova estate which straddles SA1 and the South Deeside and North Angus DMG. Clova South covers 1163ha and is managed from a farming and tourism perspective. The deer are used to attract more visitors to the Glen Clova Hotel with the stalking let to a local shooting agent. There are 1700 ewes grazed on the hill which are managed commercially as part of a wider farming enterprise.

1.6.7 Corrie Fee

Corrie Fee is a small nature reserve at the head of Glen Clova which is owned by SNH. The reserve covers 166ha and consists of Corrie Fee, Corrie Sharroch and the lower slopes of Craig Rennet. Corrie Sharroch which covers about one third of the whole reserve is deer fenced while Corrie Fee is open to deer. The reserve is important for its glacial features and for its alpine plants including dwarf willows. The main objective is to allow dwarf willows to grow and expand their extent both within the fenced area and without. Deer density is generally low and there is little conflict with neighbouring objectives. Deer do occasionally gather in large numbers in Corrie Fee when seeking shelter, but SNH local staff feel this is always likely to occur even if density was reduced across the whole of SA1.

Culling is carried out by a contractor. No guests are involved and cull targets are partly driven by the need to reduce impacts on the habitat. However, culling in Corrie Fee is challenging and cull targets are also influenced by logistics. Extraction is difficult and stalking in Corrie Fee can be physically demanding. Around 80 man days were spent culling deer in 2015-16.

1.6.8 FCS Glenisla/ Glenmarkie and FCS Glen Prosen

Forestry Commission Scotland own two woodland blocks within SA1. Both blocks have mixed age classes of commercial timber species with recently planted re-stock sites amongst thicket stage and mature compartments. Deer management is focussed on crop protection and culls are set to reduce deer density. Both blocks are securely deer fenced with few large scale incursions of deer. Part of the Glenisla/ Glenmarkie block is has electric wires fitted to add additional height and off set wires to add width. These electric wires give extra security during periods of deep snow. The electrified section of the deer fence is inspected monthly with other sections of deer fence inspected four times a year. FCS see deer fences as essential in SA1 to protect crops and to prevent conflict with neighbouring estates.

Both blocks have significant populations of red and roe deer. The target cull for Glenisla/ Glenmarkie is some 400 red deer and 100 roe deer. The target cull for Glen Prosen is 100 deer in total. Culls of this order have been taken for several years and the populations are beginning to decrease. Damage levels are reducing and re-stocks, which could not be planted for some years, are now able to grow. Currently broad leaved trees cannot be planted without internal deer fencing.

1.6.9 Glen Cally

Glen Cally is located centrally within SA1 and covers an area of 2075ha. Deer stalking and red grouse production are the main sporting interests on Glen Cally. Around 1000 red deer over winter on Glen Cally and the estate aims to cull 50 stags and 100 hinds and calves annually. Some stags are culled out of season on farmland. Stags are fed in the lower ground during winter. In terms of deer management, there is currently one full time employee and a seasonal ghillie. There are no tenant farmers and no sheep on the ground.

1.6.10 Glenhead/ Glendamph (Scottish Water)

Glenhead/ Glen Damph (GHGD) covers 2827ha and is owned by Scottish Water with the main objective being the production of clean water within the Backwater Reservoir. There are two tenant farmers who both graze sheep and sporting rights are also let to a tenant. There is some tension between farming and sporting objectives as deer compete with sheep for grazing. The current sporting lease includes both deer stalking and grouse shooting. This lease comes to an end in early 2017 and future arrangements are unclear. The current sporting tenant would be happy if there was no deer stalking and very few deer on the ground. A low deer population would benefit sheep farming and possibly increase grouse numbers too. GHGD marches with FCS Glenisla/ Glenmarkie on its western side. This woodland is securely deer fenced and there is very little deer movement between these properties. However, on its eastern side GHGD marches with stock fenced plantations which are in separate ownership. Large numbers of red deer are resident within these plantations and these graze on GHGD. Culling these deer is difficult as they run into thick woodland whenever a shot is fired. There is a particular problem when herds of hinds maraud on improved grass in spring time when they cannot legally be shot. This situation causes tension between farmers and

sporting tenant but the sporting tenant feels the problem cannot be solved without better co-operation with neighbouring woodland owners,

1.6.11 Glen Isla

Glen Isla is a mixed farming and sporting estate of 1544ha managed by the Gibb family who are resident owners. Deer stalking is the main sporting interest. The estate aspires to shoot 25 stags with guests each year. In some years this is possible but stalking on Glen Isla is weather and wind dependent and in prolonged north winds there may be no deer on the estate. The estate has tried to hold deer for longer periods on Glen Isla by supplementary feeding but with only limited success. A small number of grouse are also shot.

Around 450 breeding ewes are grazed on the hill with 50 cows and calves also on the hill in August and September. The rest of the farming operation takes place in grass parks on the lowest ground which are protected from deer coming from the north by fencing. However, wintering stags on Mount Blair do maraud onto the Glen Isla parks and some are culled out of season to prevent damage. The estate has 160ha of woodland from which deer are excluded. The estate is considering whether to open some of these woodlands to deer and is also considering future forestry options.

1.6.12 Glen Prosen and Balnaboth

Glen Prosen covers an area of 3342ha and is owned by Robin Batchelor. The estate is run as a commercial mixed sporting estate and hill sheep farm. The estate's priority is red grouse production, both driven and days over dogs are let for income. Letting of stalking, farming and forestry also feature in the estates business model. It is estimated that around 25% of the estate time is allocated to deer management and although the income from deer stalking is not viable on its own, it contributes to overall estate income.

Balnaboth estate covers an area of 2324ha and is owned by Hector and Alastair Maclean. Robin Batchelor has leased the sporting rights. Balnaboth's main interest is in tourism (through self -catering cottages and a hostel) and let domestic & commercial property. It also has a hill sheep farm, and forestry interests.

The two estates were separated in 1957 and the new purchasers, the Forestry Commission erected a deer fence along the north east part of the new march and shot out all Balnaboth deer in Glen Logie to the south. Over the years red deer have built up again in Glen Logie despite strenuous efforts to control them.

Glen Prosen estate employ eight full time staff, a Head Keeper/ estate manager, three beat keepers, two trainee keepers, a shepherd and an administrator. In addition to this they employ seasonal staff during lambing and the sporting seasons.

Both estates currently hold populations of both red and roe deer. Only a small number of roe bucks are let commercially due to the clash with grouse nesting season. Red deer density is relatively low and they move on and off the estates on a seasonal basis. In simple terms, a large proportion of the population can move away to neighbouring ground once pressure of culling commences. Stags are generally absent until August and leave in November, with this in mind the aim is to cull 25 mature stags with paying clients each season. A small number of younger stags may be shot on Balnaboth to protect agricultural interests. The overall aim on upper Glen Prosen is to hold several small groups of deer with an overall density of less than 10 deer per hectare. Sheep in the upper reaches of the Glen are wintered off the heather, with the exception of 200 ewes. Lambing on both estates is carried out on in-bye parks, with ewes and lambs returning to the heather in early May. Hoggs return from wintering during the first week in April, turning to the hill once the weather allows. Glenprosen estate have recently removed a block of non native woodland from the top of the glen and are due to replant a mixed deciduous woodland in-bye.

Balnaboth planted a 107 ha block of native woodland on previously heather moorland in 2014. The hill terrain on Balnaboth is not so conducive to stalking, and deer (red and roe) have in general been considered as inimical to

farming and forestry interests. The overall aspirations of both land owners is to have estates which can provide a balance of sporting resources and sustainable income.

1.6.13 Glenshee

Glenshee is owned by Invercauld Estate and managed in partnership with sporting partner Rhiedorrach Sporting LLP. Glenshee covers 4326 ha. The partnership began in 2012 and will run for 15 years. Invercauld Estate administer Glenshee but the estate and partner work together on policy e.g. setting deer culls and target populations. The objective is to run Glenshee as a mixed sporting estate in harmony with its farming tenancies. Deer stalking is the main sporting priority followed by driven grouse shooting. The estate wishes to cull around 40 sporting stags annually and to hold a population commensurate with that objective. Grouse bags have ranged from 140-300 brace over the last few years.

There are two farm tenancies. The Lindsay's run sheep in a fenced hill park of 1000ha from which deer are excluded. Mr Hunter Smith runs sheep across a wider area of the estate. Sheep numbers are currently relatively low and Mr Smith has indicated an intention to increase his stock numbers.

The estate employs four full time job equivalents with staff working on Glenshee and the Rhiedorrach beat to the west. These two beats are bisected by the A93 which is a key route for public access to the Cairngorms National Park. There is significant public access on Glenshee via the Glenshee ski tows which are one of Scotland's five winter sports centres. The ski tows also provide summer access to popular mountains while the Cateran's Trail provides low level walking access to the south end of Glenshee.

1.6.14 Harran (plantation)

This large woodland neighbours GHGD to the west and Balintore to the east. It consists of commercial timber species planted in the 1960s. It was recently sold but the new owners are unknown. Large numbers of red deer live within this plantation and graze on neighbouring hill ground. This has enabled some neighbouring estates to increase their in-season sporting cull but has increased marauding problems on GHGD. Better collaboration is required between the Harran plantation and its neighbours.

1.6.15 Lednathie

Lednathie covers an area of 1315ha and is located at the south end of SA1. It is owned by Mr Barclay Dougall. The focus of the estate is on running an efficient business which includes sporting objectives as one of its primary aims. Both red deer and roe deer are present on the estate and can be found in both the woodland and on the hill ground. In general, the mortality rate is low and calving is at an average level. It is thought that there has been a decline in the quality of mature stags which come onto the estate during the rut and that the natural movement of the deer is also changing. It is also thought that the estate could hold a slightly higher population of red deer but that the roe deer population may be marginally too high. Human disturbance has an impact on deer management on Lednathie and deer are known to move on and off of the estate on a regular basis due to human pressure. The estate currently employs 3 full time gamekeepers who spend around 10% of their time managing deer.

The estate currently has mixed amenity woodland with plans for small scale expansion. The woodland is mainly managed for sporting purposes however there is some commercial activity. In addition to plans for small scale expansion, all felled woodland is replanted so as to maintain the overall area of woodland. There are areas of native woodland present. The woodland is mainly managed for sporting purposes and although it is thought that deer occasionally have an impact on the woodland, this is not a regular occurrence.

In addition to sporting and woodland objectives, the estate runs a flock of 900 sheep which are moved seasonally between the hill ground and the inbye. These are managed inhand.

1.6.16 Pearsie

This small estate of 1260ha in the SE corner of SA1 is under a long term sporting tenancy. Pheasant shooting is the main objective and the sporting tenant does not wish to have red deer on the ground. Deer are culled whenever legally possible when they occur on Pearsie.

1.6.17 Tulchan

Tulchan occupies much of the high ground at the head of Glen Isla. It covers 4926ha and includes Glen Brighty, Caenlochan Glen and Canness Glen. Much of the estate lies within the Caenlochan SAC and this designation has a significant influence on deer management. The calcareous geology underlying the high ground of Tulchan produces attractive grazing for herbivores. The estate has been heavily grazed by sheep and deer in the past and vegetation is grass dominated as a result. Heather occurs in some areas and increasing the extent of heather cover is an important objective for the estate.

Tulchan is a mixed sporting estate with deer stalking the main sporting objective. The estate wish to cull 70 stags per annum and to hold a deer population commensurate with that objective. However, it is difficult for Tulchan to hold deer all year round as much of the estate is high ground. Tulchan can hold large numbers of deer in summer but may hold very few red deer in a snowy winter as deer move to lower ground. Deer are given supplementary feed to try and reduce this movement and to keep deer on Tulchan for as much of the year as possible. This feeding takes place off the SAC. Stags are stalked by fee paying guests as well as the friends and family of the owner. The estate has developed a pheasant and partridge shoot and sells packages which may include stalking, walked up grouse shooting and driven pheasants. This combination of sport enables the estate to sell more stalking than just selling deer stalking alone. Some roe buck stalking occurs but this is rarely carried out on a commercial basis. Three people are employed full time and two seasonal staff are also employed for six months making four full time job equivalents.

The estate has invested in a hydro scheme to produce electricity so the estate is self-sufficient in energy. The estate has no livestock of its own and sheep from elsewhere have been mostly excluded by fencing. There are no agricultural tenancies. Some sheep move onto Tulchan in summer to take advantage of the high quality summer grazing. The estate is remote so there is limited opportunity for public engagement. However, Tulchan has a website which enables public communication.

Action 6: *Identify the owners of Harran plantation and invite them to be members of SA1.*

1.7 Summary of the Objectives of Member Estates.

The main private objectives within SA1 are sport and farming with forestry also important. Farming is largely based on livestock with significant numbers of sheep grazed on hill land alongside deer. Sport is based on deer stalking and grouse with the relative importance of each varying between estates. Unlike other parts of the East Grampians there are no estates which want to entirely exclude deer in favour of grouse although some estates want very few deer to reduce conflict with farming. Pheasant and partridge shooting are also important to some estates particularly in the south east corner of SA1. Forestry is largely based on commercial timber species with some amenity woodland.

The main public objective is centred on designated habitats within the Caenlochan SSSI, SAC and SPA.

2.0 Deer Management Sub Area: Organisation, Functions & Policies

2.1 Updating the Constitution

SA1 should update its current constitution to reflect developments in deer management using the ADMG Template for DMG Constitutions (see Appendix A).

Action 7: *Update the Constitution as above.*

2.2 Code of Practice on Deer Management

The Code of Practice on Deer Management has been endorsed by all members of the SA1. The Code is endorsed within this deer management plan and within the Constitution.

Action 8: *All members to adhere to the Code of Practice on Deer Management.*

2.3 ADMG Principles of Collaboration

The ADMG Principles of Collaboration are endorsed within this deer management plan and the Constitution. In particular members will:

- Respect each other's range of management objectives.
- Communicate openly with each other and all relevant parties.
- Negotiate and, where necessary compromise, in order to accommodate reasonable land management objectives of neighbours.
- Work together to resolve conflict.

2.4 Wild Deer Best Practice Guidance

Members agree that all deer management activities will be carried out in accordance with Wild Deer Best Practice guidance. Best Practice guidance will evolve over time and members will make reasonable efforts to keep up to date with developing Best Practice.

Action 9: *Keep up to date with Wild Deer Best Practice guidance as it evolves.*

2.5 Long Term Vision

Members of SA1 support the long term vision for deer in Scotland as detailed in "Scotland's Wild deer- A National Approach." Members agree to work together and manage deer in accordance with the Code of Practice on Deer Management and will work to ensure all management activities are carried out in accordance with Wild Deer Best Practice guidance.

2.6 Strategic Objectives

The strategic deer management objectives agreed by SA1 are listed below. These are not in priority order and are all of equal importance.

- To safeguard deer welfare.
- To ensure thriving populations of native deer species are maintained.
- To manage deer populations so they are in balance with their habitats.
- To minimise damage to other land uses.
- Where possible to minimise risks to public safety arising from deer and their management.
- To achieve an agreed sporting stag cull.
- To ensure continuation of rural employment based on deer stalking.

- To bring all designated sites affected by deer impacts into Favourable Condition and to maintain them in Favourable Condition.
- To openly communicate information relating to deer management between members and between SA1 and local communities and other communities of interest.

2.7 Communications Policy

Good communication is a cornerstone of collaborative deer management. SA1 is required to communicate internally between members and with local interest groups such as Community Councils and farmers. In addition, there may be wider communities of interest such as outdoor access groups and Environment LINK. In the future, members will agree to communicate openly and be pro-active in communicating about their plans and activities. There shall be a culture of "no surprises" amongst members in that future deer management changes will be fully discussed in advance of the change taking place. SA1 will function in a transparent manner and to this end will make the following information available:

- The SA1 Deer Management Plan including annual updates.
- The Constitution.
- Minutes of SA1 meetings.
- Count data.
- Future meeting dates.

ADMG have developed a web portal which will provide a central location for accessing information about local deer management throughout Scotland. This should be useful to a range of people who have an interest in deer. Once complete, anyone will be able to access a map showing the boundaries of all DMGs in Scotland and then click on the DMG of interest to them. Over time, the information listed above should then be available for each DMG. SA1 will develop its own website accessed through the ADMG web portal. The consultation on the first draft of the deer management plan will be hosted on this website. Other information about the Group will be added in 2016-17.

All enquiries to SA1 should be made to the chairman or secretary by email. Contact details are given below:

Chairman: Florian Kuehnle

Contact email: florian@tulchan-glenisla.co.uk

Secretary: Deirdre Stewart

Contact email: Deirdre.stewart@ckdgalbraith.co.uk

Short term enquiries will be dealt with as soon as practical while more strategic issues may be discussed at SA1 meetings. These will be scheduled to take place in spring/summer and autumn/winter. The AGM in autumn/winter will be open to all and representatives of Community Councils and farmers will be invited to attend and take a full part in the meeting.

The relevant Scottish Natural Heritage contact for SA1 is Iain Hope, SNH, Great Glen House, Leachkin Road, Inverness IV3 8NW. Email: iain.hope@snh.gov.uk

General deer enquiries to SNH should be addressed to wildlifeops@snh.gov.uk

It is recognised that individual estates will have established contacts with local communities and farmers etc. These existing networks should be retained and encouraged and in many circumstances it may be more appropriate for local issues to be discussed with individual estates rather than with the whole DMG. This plan does not seek to replace these existing local communications with a more formal communications route through the DMG. However, the DMG is open to communication from outside interests where required.

2.8 Authorisations

From time to time members may require to apply for authorisations to take or kill deer under the various provisions of the Deer (Scotland) Act 1996. These may include authorisation to shoot deer at night to prevent damage or to shoot deer out of season. In the past, lack of communication about authorisations has been a common source of conflict within many DMGs. Members agree to communicate about their likely application for authorisations to the SA1 Chair or Secretary and to report the numbers of deer killed under authorisations at each SA1 meeting. Where appropriate, the Group may discuss alternatives to the use of authorisations e.g. in season culls which target deer causing damage out of season.

Action 10: *Carry out actions arising from Communications Policy including making relevant data and documents publically available through the SA1 website.*

2.9 Training Policy

Within SA1, all stalkers should be adequately trained and deemed competent to cull deer. This includes both lone stalkers (e.g. unsupervised) and those who supervise guests. The accepted definition of Competence within the Scottish deer sector is the attainment of Deer Stalking Certificate 1. To date 23 lone stalkers held DSC 1 within SA1. In addition, 15 held DSC 2. The DMG will encourage all remaining stalkers to attain DSC 1 and 2 by Dec 2017.

Stalkers who are required to shoot deer under legal authorisations must be on the SNH "Fit and Competent" register. To be registered, stalkers must hold DSC2 or DSC1 qualification in combination with references from two relevant sources.

SA1 stalkers often work in remote locations where self-reliance is imperative. A range of skills are required to work safely and efficiently in this environment. These skills include first aid, chainsaw work, mechanical work and use of ATVs. As employers, individual estates have the legal responsibility of identifying and assessing potential risks to their employees and, where necessary, providing training to minimise or eliminate those risks. These responsibilities will continue to lie with employers. However, the DMG has a role in co-ordinating the efficient provision of training. Training courses are often more cost effective with increased participation and the DMG may be able to identify and organise courses in areas where multiple estates require training. The DMG could highlight the value of its role as a training co-ordinator and increase community benefit by inviting other rural workers from relevant professions to training courses. There could be important public relations benefits to this approach.

Action 11: *All stalkers to attain DSC 1 and work towards DSC 2 by Dec 2017. Identify training needs within the DMG and organise training courses where necessary. Consider inviting other rural workers to participate in training courses where possible.*

2.10 Deer Counting Policy

Deer counts are also a cornerstone of collaborative deer management. Currently the East Grampians DMG organises a co-ordinated ground count of the entire DMG area, including SA1, once every year. This is normally timetabled for the first day with good snow cover after 15th February. If there is insufficient snow throughout February and March, then a black ground count is normally attempted in the last week of March. Many estates in the East Grampians can muster a number of deer counters so estates tend to count the deer present on their own ground without mixing estate teams or crossing estate boundaries. Deer movement across estate marches is discussed on a common radio frequency. The East Grampians DMG has achieved a long series of annual counts with most estates participating. However, over the last 15 years participation from SA1 has declined. The frequent helicopter counts of the Caenlochan Section 7 Area have acted as a dis-incentive for some estates within SA1 to count deer on foot. Many felt the large herds of deer which were encountered in SA1 during the 2000s were difficult to count accurately from the ground and much more accurately counted using digital photography from the air.

It is recognised that member estates have differing levels of resources available for deer counting and differing time constraints. Counts may clash with important farming activities which makes it difficult for some stalkers to

participate as farming may be the main objective of some landholdings. However, deer counting is a core activity within deer management and all member estates should attempt to resource the DMG count effectively. There is scope for improvement in pre-count planning to ensure all estates are willing and able to count at the agreed time. There may also be scope for estates with stalking teams who are less involved in farming to form a mobile count team which could help on areas where resources for counting may be limited. Under this system the count would have to take more than one day. This is unlikely to produce an accurate result on black ground but could work well when good snow cover limits deer movement. In addition, SNH may carry out periodic helicopter counts.

Count data will be made public through SA1 meeting Minutes, which in turn will be made available on the SA1 website which can be accessed through the ADMG portal. The DMG will discuss the count and its implications in the spring meeting following the count. Count and cull data from SA1 and SDNA DMG should be analysed at the EGDMG spring meeting in order to help set the cull targets which are required to achieve estate objectives. It is difficult to do this at individual sub area level due to deer movement between sub areas.

Action 12: *Organise annual ground counts and consider forming a combined estate count team to improve count coverage. Discuss results at Spring meetings and make results public through SA1 website.*

Action 13: *Ensure a full analysis of count and cull data is carried out at the EGDMG spring meeting.*

2.11 Counting in Woodland

Direct counts of deer numbers are impossible in large areas of dense woodland. FCS have developed robust counting methods which provide useful estimates of deer population size in woodland and which are sufficiently accurate to enable cull targets to be set. These methods are most commonly based on estimating the amount of dung deposited by deer within the forest. Although dung counts have often been viewed with scepticism by the estate sector, they are currently the most effective means of estimating populations in dense woodland and dung counting has enabled FCS to achieve management objectives. FCS will continue to use dung counts to estimate deer populations in their woodlands but these methods may also be useful in estimating deer populations in woodlands such as the Harran plantation. Alternatively, the grazing impacts of deer can be measured e.g. the proportion of planted seedlings which are browsed annually. Cull targets can be set so as to maintain deer impacts within acceptable limits.

Action 14: *Estates to consider whether methods to estimate deer populations within woodlands are necessary.*

2.12 Mortality Searches

Count data is vital for making deer management decisions but we also need to know how many animals die each year if we are to accurately predict future populations. The number of animals which are culled annually is relatively easy to determine but data on the number of animals dying naturally is harder to collect. Deer in the East Grampians typically suffer little natural mortality but episodes do occasionally occur. High natural mortality can occur if there is prolonged snow fall which ices over or if there frequent high intensity rainfall. To determine numbers of deer dying from weather effects each winter, we need to carry out mortality searches. Some estates already carry these out. For the most part, mortality searches are carried out in conjunction with other routine tasks e.g. fence checks around plantations or spring rounds of fox dens. This is an efficient use of manpower as mortality searches are time consuming and expensive. Deer can die at a range of altitudes and it is impossible to find evidence of all the deer that die naturally. Data from mortality searches are an index of winter mortality rather than an accurate estimate. The key requirements of a mortality search is that there is a standard amount of search effort used each year, and that areas where deer gather and spend a lot of time during the winter are thoroughly searched. In order to standardise this approach, the same areas should be searched annually unless there is significant change in deer behaviour.

Data which are gathered can then be used in a population model to predict future population size and the culls required to achieve DMG objectives.

Action 15: *Estates to carry out annual mortality searches and to use these data to update the population model within the deer management plan.*

2.13 Recruitment Counts

As well as collecting data on how many animals die each year, we need to know how many calves enter the adult population as yearlings annually. If we know how many adults are recruited annually, then culls can be set to let the population grow or reduce as required. Recruitment counts can also be incorporated into other tasks e.g. they can be carried out during spring rounds of fox dens. Once annual culls have been completed and the peak of natural mortality has passed e.g. by early May, then most calves observed will survive the winter and will become yearlings in the following June. A minimum of 50 hinds should be counted and classified on each estate so as to determine how many hinds have a calf at foot. If 50 hinds are observed as having 17 calves at foot then the calving percentage is 34%. The average calving percentage can then be used in population models to estimate the number of animals entering the adult population each year (pages 43 & 44).

Action 16: *Estates to carry out annual recruitment counts and use these data to update the population model within the deer management plan.*

2.14 Venison Marketing

All the estates in SA1 are committed to the production of quality venison. Some are members of Scottish Quality Wild Venison which is a quality assurance scheme for the whole venison industry. All estates will be encouraged to meet SQWV standards. At present, most venison is sold to game dealers but estates will undertake to sell some venison direct to local buyers where it is legal to do so. Some estates may wish to explore the use of shared larders and collective marketing. This may be particularly beneficial to those estates who share access routes.

Action 17: *Work to attain SQWV standards and to make some venison available for local sale.*

2.15 Strategic fencing

Different deer management objectives often require different deer densities and the need for different deer densities on adjacent properties is often the main source of conflict within DMGs. Strategic deer fencing plays a key role in reducing and preventing conflict within SA1 by maintaining differential deer densities where these are required. Strategic deer fences are defined as long lengths of fencing which effectively separate one deer management objective from another. Low deer densities are required in FCS woodlands but higher deer densities are required to sustain sporting culls on neighbouring estates. Conflict would occur if there were no fences to separate deer densities. Strategic deer fencing also reduces deer incursions onto farmland at Glenisla where deer would maraud onto improved agricultural land and increase the need for out of season shooting. New strategic deer fences may be one measure which could reduce marauding on other estates.

The maintenance of deer fences is almost always the responsibility of individual estates. March fences may have shared maintenance responsibilities. Some estates within SA1 put considerable effort and resource into maintaining deer fences e.g. FCS where contractors are paid to regularly inspect and repair fences. Strategic deer fences will remain the responsibility of individual estates but the DMG recognises that all members gain some benefit from the maintenance of strategic deer fences. Estates should comply with Joint Agency fencing guidance when considering significant fencing issues. Any new fences should seek to comply with Joint Agency fencing guidance.

3.0 Native deer populations and their habitats

In recent decades the key herbivores in SA1 have been red deer and sheep. Within the Caenlochan SAC, mountain hares are also significant herbivores. This section of the plan examines deer count and density data, trends in sheep numbers and the implications of those trends for grazing levels. Data on mountain hares is lacking and their numbers and impacts are largely unknown. Research is currently on going to develop a reliable system for counting mountain hares and members should keep up to date with this work. Habitat monitoring systems for key habitats are then developed and we discuss how habitat data should influence future culls. Finally, we discuss an initial target population developed from the Caenlochan Plan and look at how the use of population modelling can aid management.

Action 18: *Keep up to date with research on methodologies for counting mountain hares and for measuring their grazing impacts.*

3.1 Red deer counts

Results from the SNH helicopter count of SA1 in February 2016 are shown in Table 2.

Table 2. *SNH helicopter count results from February 2016.*

Estate	Stags	Hinds	Calves	Total	Density (deer per km^2)
Airlie	41	2	0	43	2
Alrick	212	42	17	271	18
Auchavan	33	55	23	111	14
Auldallan	0	3	1	4	1
Balintore	117	158	48	323	19
Clova (South)	27	147	46	220	19
Corrie Fee	49	0	0	49	30
FCS Glen Isla and Glen Prosen	0	0	0	0	0
Glencally	82	257	84	423	20
Glenhead/ Damph	61	306	80	447	16
Glenisla House	269	482	115	866	56
Glen Prosen and Balnaboth	303	197	60	560	10
Glenshee	571	767	286	1624	40
Lednathie	178	2	2	182	14
Pearsie	0	0	0	0	0

Tulchan	1	15	5	21	0
West of Mt Blair	82	0	0	82	19
Total	**2026**	**2433**	**767**	**5226**	**16**

The total count shows 5226 deer occupying 32601ha at an average density of 16 deer per km^2. The sex ratio is 1 stag : 1.2 hinds and the calving percentage is 32%. The count shows the importance of some of the smaller southern estates for wintering deer in snowy conditions. Alrick, Auchavan, Balintore and Lednathie were holding 41% of SA1's stags during the 2016 count. With the exception of Balintore these estates often hold relatively few stags in the stalking season but are very important wintering areas.

Comparison of data from the last three complete helicopter winter counts of SA1 in 2005, 2010 and 2016 is shown in Table 3.

Table 3. *Helicopter deer count data 2005, 2010 & 2016*

Estate	**Stags**			**Others**			**Totals**		
	DCS 2005	**DCS 2010**	**SNH 2016**	**DCS 2005**	**DCS 2010**	**SNH 2016**	**DCS 2005**	**DCS 2010**	**SNH 2016**
Airlie	0	0	89	287	0	168	287	0	257
Alrick & Auchavan	274	93	327	903	929	137	1177	1022	464
Auldallan	0	0	0	0	0	4	0	0	4
Balintore	130	27	105	70	104	210	200	131	315
Clova (South)	0	2	27	0	33	193	0	35	220
Corrie Fee	0	16	49	0	48	0	0	64	49
FCS Glen Isla and Glen Prosen	0	0	0	0	0	0	0	0	0

Glencally	0	0	82	1543	70	341	1543	70	423
Glenhead/ Glendamph	72	57	46	761	218	271	833	275	317
Glenisla	347	200	269	684	872	597	1031	1072	866
Glen Prosen and Balnaboth	258	50	101	663	283	193	921	333	294
Glenshee	321	514	571	1600	292	1053	1921	806	1624
Lednathie	212	236	359	53	257	13	265	493	372
Pearsie	0	88	0	0	0	0	0	88	0
Tulchan	0	0	1	500	0	20	500	0	21
Total	**1614**	**1283**	**2026**	**7064**	**3106**	**3200**	**8678**	**4389**	**5226**

In 2016 all deer counted were classified as stags, hinds and calves, while in 2005 and 2010 deer were classified into stags and "other" deer. "Other " deer in 2005 and 2010 probably include more yearling stags than the fully classified count in 2016 so stag numbers are likely to be under-estimated in 2005 and 2010 relative to 2016. However, Table 3 does show the scale of the reduction in total deer numbers between 2005 and 2010 with numbers falling by almost 50%. This was due to determined efforts by estates, supported by the then Deer Commission for Scotland, to achieve the population targets within the Caenlochan Section 7 Agreement, 2003-2013. Between 2010 and 2016 numbers have increased by 837 deer. SA1 does not a discrete population of deer and there is regular movement over northern and north eastern boundaries. Total numbers counted in neighbouring SDNA DMG have remained stable between 2010 and 2016.

A number of estates have participated annually in ground counts organised by the EGDMG but there have always been gaps in coverage and no complete ground count has been carried out in the last 6 years. SA1 members will work to improve count coverage. One possible means of increasing count coverage would be for estates to work together to form a mobile count team.

3.2 Summer counts

Annual helicopter summer counts of deer were carried out by SNH as part of the monitoring for the Caenlochan Section 7 Agreement 2003-2013. Data from summer counts between 2005-2013 are summarised in Table 4. These are for estates within SA1 which were also signatories to the Caenlochan Section 7 Agreement 2003-2013.

Table 4. *Summer count data from SNH helicopter counts 2005-2013*

Estate	Number of summer counts	Average total deer numbers	Average density (deer per km^2)	Density range (deer per km^2)
Tulchan	9	2200	45	14-106
Glenshee	9	942	23	0-51
Alrick and Auchavan	9	252	11	1-25
Glencally	9	567	27	0-55
Glenisla	7	21	1	0-8
Glen Prosen and Balnaboth	8	882	15	6-32
Glenhead and Glendamph	7	258	13	1-37

Summer densities on the estates in Table 4 are very variable and can be very high. Both summer and winter densities show that deer movement in SA1 is characterised by relatively big groups of deer moving large distances between summer and winter range. Few estates have deer which remain largely resident on their land. These movements are driven by a number of factors and are described in detail in the Caenlochan Plan. The calcareous geology underlying the high plateau of Glas Maol and surrounding hills, produces highly attractive grazing and deer move out to high ground in summer to feed. However, the rolling hills of SA1 provide relatively little shelter particularly in snow. In harsh weather, deer move considerable distances to find shelter on lower ground. Attractive summer grazing and limited winter shelter tend to concentrate deer into big groups as individuals gather to share a scarce resource. This tendency to form big groups is probably exacerbated by regular hillwalker disturbance and past/ present culling pressure.

3.3 Trends in sheep numbers

Data on sheep numbers is publically available at the agricultural parish level. SA1 is covered by three agricultural parishes: Cortachy, Glenisla and Lintrathen. These parishes overlap into other parts of the East Grampians and include agricultural land to the south of SA1 where there are few red deer and no formal deer management structures. Sheep data at parish level does not apply to SA1 alone. Trends in sheep numbers across this area are shown in figures 1 - 3.

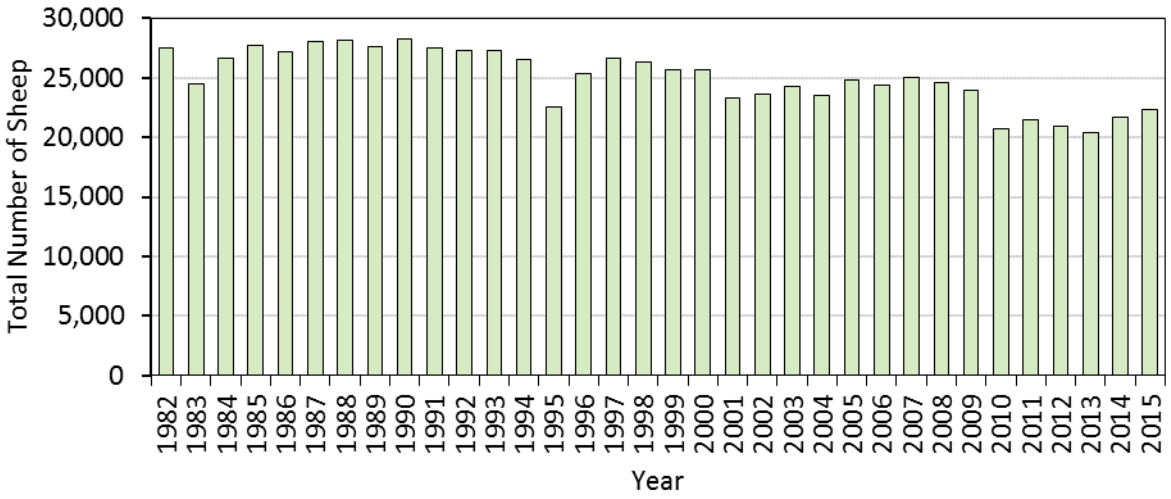

Figure 1. *Total sheep numbers in Cortachy parish.*

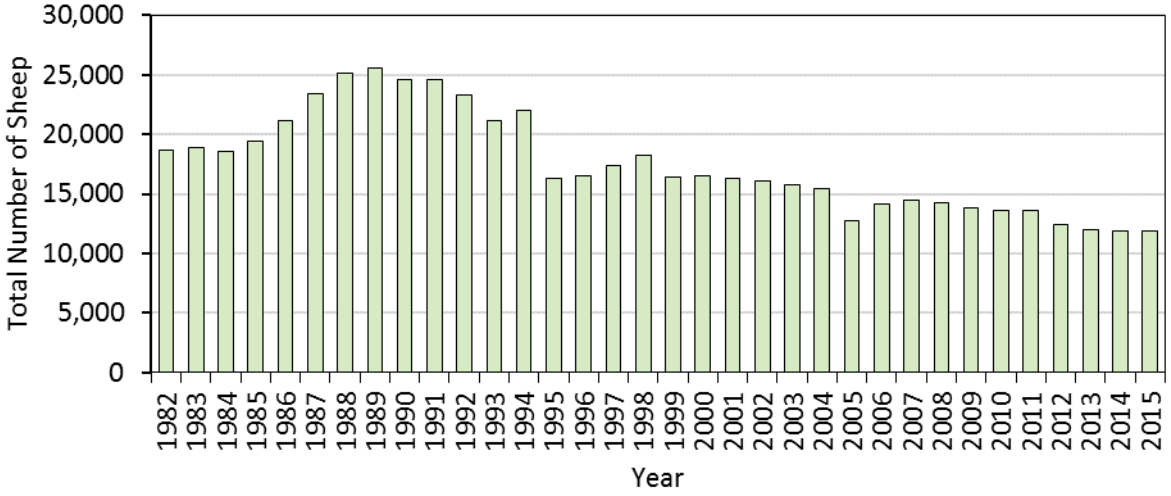

Figure 2. *Total sheep numbers in Glenisla parish.*

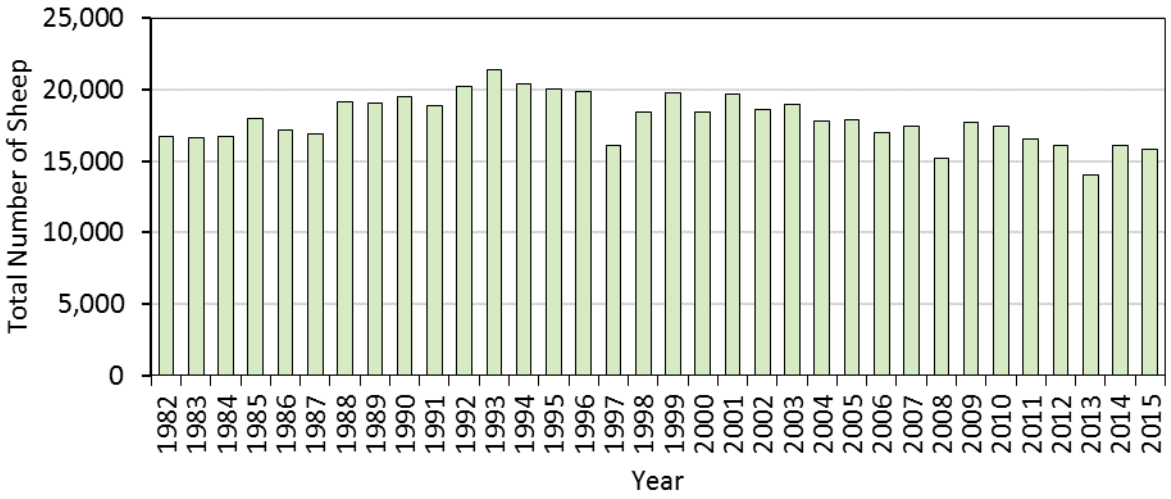

Figure 3. *Total sheep numbers in Lintrathen parish.*

Sheep numbers have declined across all three parishes between the 1980s and 2015. In all parishes the highest recorded numbers occurred between 1989- 1993 and the lowest numbers occurred between 2008-2012. The decline between maximum and minimum numbers varied from a 30% reduction in Cortachy and Lintrathen to a 59% decline in Glenisla parish. In all parishes sheep numbers have increased slightly between the lowest point and 2015. These reductions have largely been driven by changes in grant regimes. These data record total sheep numbers on hill and improved in bye land and reductions will have taken place across both types of land. Data is not available to show the scale of reductions on hill ground alone. Anecdotally, there is evidence that sheep numbers on the hill land of SA1 have declined significantly. Numbers of breeding ewes on Glenisla have been reduced from 650 to 450 over the last 5 years. Sheep numbers in Glenshee have reduced due to a change in tenant.

However, sheep reductions are not inevitable or irreversible. Glenshee are likely to increase sheep numbers as a new tenant builds up his stock. Sheep are obviously an agricultural crop but they are also used as tick mops on grouse moors and some flocks may be owned and managed by sporting tenants who wish to reduce tick densities to increase grouse productivity. This type of sheep management may be less influenced by grant regimes.

Between 2005 and 2010 deer numbers were reduced by about 50% across SA1. Hill sheep numbers are likely to have declined over a longer period although we are less clear about the extent of this decline due to the broad scale nature of sheep data. Given the scale of deer reductions and the trend in sheep numbers it is clear there has been a significant decrease in overall grazing pressure between 2005 and 2016.

3.4 Red Deer Culls

Average annual red deer culls for the whole of SA1 between the last two helicopter counts in 2010 and 2016 are shown in Table 5.

Table 5. *Average annual total culls for SA1 between 2010 and 2016.*

Stags				
In season	Out of season	Hinds	Calves	Total
468	75	674	312	1529

Between 2005-2010 culls were larger than in the period between 2010-2016. These large culls reduced deer density from over 30 deer per km^2 to around 19 deer per km^2. Between 2010 and 2016 an average of 543 stags have been culled annually. This represents 27% of the stag population counted in 2016. On average 109 stags per annum have been culled in woodland and it is possible many of these stags are not included in the open range count. If these stags are removed from the annual cull, then an average of 434 stags have been culled annually from open range representing 21% of the counted stag population in 2016. This means over one fifth of counted stags have been culled annually which is a proportion high enough to bring about a shortage of mature stags.

There is significant variation in annual estate stag culls. Between 2010-16 stag culls in Balintore range from 13-55, on Clova South they range from 17-62 while on Glenshee culls range from 23-78. Culls in woodland are also wide ranging from year to year. For instance, stag culls in FCS Glen Isla range from 27-88. The reason for this variation is unclear but may be a result of the distribution of deer with stags moving in big herds out-with the rut. Some years those big herds will spend more time on some estates than in other years and may be culled opportunistically when they are present. However, stags will spread throughout the hind range during the rut which should ensure a more even distribution of cull during this period.

Between 2010-2016 an average of 674 hinds have been culled annually. This represents 28% of the counted hind population in 2016. On average 98 hinds have been culled annually in woodland. If these are excluded, then 24% of counted hinds are culled annually. Given a calving percentage of 32% in 2016, then 16% of hinds will have a female calf and a hind culling rate of 24% should reduce hind numbers quickly. In 2016, assuming no significant post count mortality, 380 female calves from the count will enter the adult hind population as yearlings in June. If current culls are continued, then 670 adult hinds will be culled in 2016-17 leading to a theoretical reduction of 290 hinds across SA1.

However, between 2010-2016 the deer population in SA1 increased. This increase could be due to a number of reasons.

- The count could be an under-estimate of true population size.
- Calving rates may be much higher than 32% in some years.
- There is significant deer movement between SA1 and its neighbours.
- A combination of all or some of the above.

Both 2010 and 2016 counts were carried out in snow cover while much of the preceding hind culls were carried out on black ground. If the population available for culling is bigger than the counted population due to deer movement in reaction to snowfall, then the cull would appear to be a relatively large proportion of the count. However, for this to be true then the SDNA cull would have to appear as a relatively low proportion of the SDNA count.

An analysis of count and cull data should be carried out annually at the EGDMG meeting as part of the communication between SA1 and neighbours.

Action 19: *Ensure EGDMG analyses cull and count data at each May meeting.*

3.5 Habitat monitoring

The aim of a habitat impact assessment is to allow deer managers to monitor habitat condition both spatially and temporally, to inform management decision making. Initial habitat surveys should aim to collect data which will help categorise areas in terms of grazing pressure, particularly areas of moderate to severe overgrazing. More importantly, the surveys should establish a baseline from which changes in grazing and trampling pressure can be monitored. Subsequent monitoring can then be used to identify areas where the grazing pressure has changed, allowing overall habitat management and cull targets to be adjusted accordingly. Monitoring these impacts can allow managers to assess and understand the impacts of deer in their area under different deer densities. This can then be used to inform future management decisions for example adjusting cull targets up or down depending on impacts.

Following SNH guidelines, independent surveyors carried out Habitat Impact Assessment on Caenlochan in 2008, 2012 and 2015 and will do so again in 2018. These surveys cover alpine and sub-alpine heaths, blanket bog, dry heath, flushes, montane acid grassland, mountain willow scrub and species rich mat-grass. The results from 2015 suggest that although deer are a major herbivore, they are not the only herbivore having an impact on the habitat. At present, the impact on dry heath is moderate and it is in favourable condition. However, although currently stable, the prognosis for blanket bog is thought to be unfavourable. A final set of surveys will take place in 2018.

In order to provide a level of continuity and to make future results broadly comparable with those which have already taken place, the members currently holding ground within the Caenlochan survey area will begin a simplified version of the Habitat Impact Assessments in 2018. These should focus on Blanket bog and Heath habitats. It should be noted that the completion of surveys by both independent surveyors and member estates is deliberate. The crossover between the two should allow a degree of comparison to be made in future years. The member surveys will follow SNH recommended methodology (http://www.bestpractice.org.uk/impacts/principles). After 2018, the Caenlochan members will complete surveys on a rolling basis following the timetable out lined in Table 6.

Action 20: *Members who own ground currently within the Caenlochan HIA area will initiate their own Habitat Impact Assessments in 2018 to allow for a degree of comparison. These will be completed on both Blanket Bog and Heath habitats in 2018. Following that, habitat surveys will be completed in the same years as member estates out-with the Caenlochan area.*

It should be noted that Glenshee have begun completing their own Habitat Impact Assessments.

There are a number of members within SA1 who do not own land within the current Caenlochan Habitat Impact Assessment survey area and as such, do not currently have a plan for habitat monitoring. In these estates, the Habitat Impact Assessment surveys should be started before 2018 and again should follow Best Practice guidelines. These should follow the timetable shown in Table 6.

Table 6. *Habitat Impact Assessment for members within and out-with the current Caenlochan HIA survey area.*

Year	Surveys to be carried out by members with land within the current Caenlochan Sec 7 Agreement	Surveys to be carried out by members without land within the current Caenlochan Sec 7 Agreement
2017		30 blanket bog survey plots
2018	30 blanket bog and 30 heath survey plots	30 heath survey plots
2019		
2020	30 blanket bog survey plots	30 blanket bog survey plots
2021	30 heath survey plots	30 heath survey plots

Full details of the Best Practice guidelines a can be found at http://www.bestpracticeguides.org.uk/impacts/principles. These guidelines are summarised below.

The standardised approach to habitat assessment within the deer industry and at a landscape scale is to select "permanent" sample plots on two discrete habitat types on each estate. A minimum of 30 plots will be allocated to both dwarf shrub heath and blanket bog habitats as selected by SNH. Where there is a large enough expanse of suitable habitat of either type a minimum of 30 plots must be completed. To aid deer managers in completing habitat monitoring, SNH has selected 60 plots at random in each of the habitats. The locations of the plots suggested by SNH are available on request.

Plots should be laid out in 2 × 2m squares, and then further subdivided into 0.5 × 0.5m squares, giving a total of 16 sub-plots per square. Each plot should be orientated to align North-South and marked by a wooden post (approximately 5 x 5 x 20cm) located at the south-east corner of each plot. The plot location will be recorded using a GPS, a fixed point photograph will be taken facing north, as well as additional photographs showing any distinguishing landscape features, in order to relocate the plot in subsequent years.

Dwarf shrub heath assessment concentrates on identifying the extent of grazing and trampling across the habitat. Grazing is analysed by looking at 3 or 4 handfuls of Common Heather *Calluna vulgaris,* and assessing the amount of browsing on last year's shoots. If *Calluna vulgaris* is not present, then Blaeberry, *Vaccinium myrtillus,* may be used. If other less palatable species such as Cross Leaved Heath *Erica tetralix* also show signs of browsing, this is indicative of significant grazing pressure which over a period of years is likely to lead to habitat degradation. Trampling is assessed by looking at heather stem breakage which is categorised as light/moderate (inconspicuous) or heavy (conspicuous). Again, the presence of heavy trampling may result in habitat degradation in the future.

As with dwarf shrub heath, the assessment of blanket bog focuses on recording the grazing and trampling impact in the defined survey plots. Trampling is measured by recording the presence or absence of deer hoof prints on bare peat (if present) in each of the 16 sub-plots. Grazing is again analysed by looking at heather shoot browsing and the presence or absence of bog moss is recorded in each of the 16 sub-plots.

Surveying of dwarf shrub heath plots will be carried out during the period between March and August, while blanket bog plot will be carried out in the period between May and September. The survey time will be constant between years so that comparisons to the baseline data are easier to draw. The habitat analysis will be carried out every 3 years.

It is recognised that the DMG members may not currently have the skills to complete habitat surveys. Where this is the case, the DMG will aim to organise a group training event for members (in line with the training policy). Alternatively, members have the option of recruiting an appropriately qualified surveyor to complete the surveys on their behalf. Funding for habitat monitoring may be available through SRDP.

Action 21: *SA1 members who are not currently in the Caenlochan Sec 7 Agreement will initiate a habitat monitoring scheme which will be compatible with SNH Best Practice guidance.*

Action 22: *The DMG will organise a group training event for Habitat Impact Assessment if required*

Action 23: *Each member will carry out Habitat Impact Assessments every three years*

In ordered to fully utilise the results of the Habitat Impact Assessments, the group will review the impacts after the first round of assessments and will set targets to reduce grazing pressure where it is found to be high.

Action 24: *The DMG will review results from the first round of Habitat Impact Assessments and will set targets to reduce grazing pressure where impacts are found to be high.*

Woodland monitoring will also be carried out following Best Practice guidelines (http://www.bestpracticeguides.org.uk/impacts/woodland). The monitoring methodology is fully outlined in the management of native woodland section (p46).

3.6 Developing a population model for SA1

Developing a population model for SA1 is difficult as the area does not hold a discrete population of deer. Analysis of culls in section 3.4 shows these difficulties. A model based on current cull and count data would predict a population reduction while the opposite has occurred between 2010- 2016. However, SA1 also has some advantages in that count data is recent, natural mortality levels are probably low and most culling is carried out by estates who maintain good cull records. While there are problems developing a reliable population model it is possible to calculate an initial target population. There are a number of factors to consider when setting an initial target population for SA1. These include:

- Red deer are part of the natural fauna of the East Grampians and are ecologically and culturally important.
- Deer stalking is economically and culturally important to most members of SA1.
- It is likely there has been a significant decrease in grazing pressure throughout SA1 over the last 10 years.
- Habitat monitoring should shortly be in place to provide data which should influence cull targets.
- However, some designated features within the Caenlochan SAC and SSSI are in Unfavourable Condition and are vulnerable to over-grazing.
- A number of members have agricultural or forestry objectives which could be damaged by deer.

The Caenlochan Section 7 Agreement is a legal agreement between certain estates and SNH. The primary purpose of this agreement is to prevent damage to designated habitats within the Caenlochan SAC and SSSI. The Agreement sets out a target population for estates within the Section 7 Area. This target population is drawn from the Caenlochan Plan and the following assumptions have been used in calculating this target population

- stags are culled for sport at an average age of 6-8 years old

- if so, a stag population of around 6-8 times the annual cull is required to sustain the average age.
- the target sex ratio is assumed to be 1 stag : 1.1 hind.
- post winter calving rates average 33%.

Due to the importance of the Caenlochan Section 7 Agreement in the management of deer across SA1, the target population and population model for SA1 are set out in section 4.2 Delivery of designated features into Favourable Condition.

3.7 The importance of minimising deer mortality from sources other than culling.

The key economic benefit of deer arises from the value of stags culled by paying guests. Those guests spend money on accommodation, food and other services but the ability to provide stags for sport drives much of that spend. It is possible to calculate the approximate size of the deer population required to sustain a particular stag cull. In very simple terms, experience around Scotland has shown that the larger the deer population present in an area, the greater the potential for deer related conflict. If a DMG has to produce stags for paying guests to shoot but also has to sustain significant stag mortality from other sources, then the DMG will have to carry a larger deer population than would be necessary to produce a cull of sporting stags alone. The higher the level of mortality the stag population has to sustain, the bigger the total deer population that is required and the greater the potential for conflict. Within SA1 there is potential for conflict with designated sites and with agriculture. It therefore makes sense for estates within SA1 which benefit from stag stalking to try and minimise mortality from sources other than culling for sport.

Within SA1, winter mortality rates are usually low. Deer vehicle collisions on the A93 in Glenshee occur at a relatively low rate of 5-10 per year. Poaching is thought to occur very rarely. However, there is significant out of season culling on agricultural land within SA1 and further south. This section of the plan is not in any way critical of those who cull deer out of season. Deer are culled out of season to reduce damage to agricultural and forestry. Out of season culling is entirely legitimate and currently necessary for many objectives to be achieved. However, it makes sense for estates who benefit from sport stalking to try and reduce the need for this cull as much as practically possible while respecting the rights of others to protect crops etc.

Deer move onto agricultural land in winter for shelter on low ground and to access crops. This movement could perhaps be reduced in the short to medium term by the provision of more shelter on the hill, by opening up existing woodlands where that is possible and by giving deer supplementary feed. The Caenlochan Plan deals with this subject in detail. In the longer term, estates should give serious consideration to creating new woodland to increase shelter. However, deer also move onto agricultural land in spring time to access new grown grass. The attraction of fresh grass is such that this movement is very difficult to prevent without deer fencing.

Deer fencing to protect agricultural land may be an option for estates in SA1 to consider. Deer fencing would act to protect farm crops and protect deer stalking revenues, so there is a case for sharing the cost of any fence between those estates which benefit. A disadvantage of deer fencing is that deer might lose too much wintering ground and suffer in harsh weather. Any proposed fence line would have to take deer welfare into account. An alternative approach would be for those estates which benefit most from stalking to compensate those estates that suffer damage. Compensation could be based on the cost of venison foregone or for the cost of damage if that can be calculated. For such a system to work, estates that currently shoot out of season would cease to do so or reduce their culls in exchange for financial recompense. In SA1, numbers of marauding deer can be high and it would be difficult for a farmer to tolerate a hundred marauding stags on a grass park being kept for lambing sheep. Deer would have to be regularly driven away especially at night and some culling is probably inevitable. Scaring schemes can work for other species but driving hungry deer away from fresh grass requires resources and motivated people. A degree of trust would be required to make this work but there have been examples of such schemes working in crofting areas. A thorough negotiation would be required to agree the detail in advance of such a scheme commencing.

Action 25: *Estates in SA1 to consider means of reducing the need for out of season shooting either by preventing damage or by agreeing compensation for damage.*

3.8 Roe deer management

Roe deer occur at much lower density than red deer in SA1. Density may be low due to competition with red deer and because there is limited woodland cover. They are present in many woodland areas and on the open hill. Average annual roe culls between 2010-2014 are shown in Table 7.

Table 7. *Average annual roe culls in SA1 between 2010 and 2014.*

Roe bucks	Roe does	Roe kids	Total
175	240	90	505

Roe culls are spread thinly across all estates, with only four estates regularly culling more than 10 roe bucks annually. Roe stalking is a relatively low value economic resource for most estates. For some landholdings, roe stalking is more of a cost than a benefit. FCS control roe to protect young trees and some 28% of the average roe cull between 2010-14 in SA1 was carried out on FCS land. It is possible roe may cause significant local impacts to some areas of woodland but grazing by red deer and sheep is likely to cause more significant impacts than roe.

Members do not think there are any issues concerning roe deer management within SA1.

4.0 Public Interest Actions

4.1 Development of mechanisms to manage deer

These actions are developed throughout the plan. A complete list of Actions is presented on page 6.

4.2 Delivery of designated features into Favourable Condition.

There are a number of designated sites in SA1 and members are committed to ensuring all designated sites attain favourable condition status or are maintained in favourable condition through the life time of the plan. Designated sites are discussed individually below.

Crossbog Pinewood SSSI

Crossbog Pinewood SSSI is a small area of native pinewood at the southern end of Glen Clova (Map 1.5 and 1.6). The woodland area measures 62ha and is in Favourable Condition. No Feature Pressures are recorded. A feature condition summary is shown in Table 8 (data from SNH Sitelink).

Table 8. *Feature condition summary for the Crossbog Pinewood SSSI*

Feature	Feature Category	Latest assessed condition	Summary condition	Last visit date
Native pinewood	Woodland	Unfavourable recovering	Favourable	May 2009

The woodland was deer fenced in 1994 and grazing pressure is sufficiently low to enable natural regeneration to occur. Currently the extent of regeneration is patchy but spreading.

Action 26: *The current successful deer management regime will be maintained. Deer densities within the fenced exclosure will be kept sufficiently low to enable natural regeneration to grow.*

River South Esk SAC.

The River South Esk SAC includes the entire length of the River South Esk and the Prosen Water until the South Esk flows into the Montrose Basin Protection Area. It is designated for Atlantic salmon and freshwater pearl mussels. Feature condition summary is shown in Table 9 (data from SNH Sitelink).

Table 9. *Feature condition summary for the River South Esk SAC.*

Feature	Feature Category	Latest assessed condition	Summary condition	Last visit date
Atlantic salmon	Fish	Unfavourable recovering	Favourable	July 2011
Freshwater pearl mussel	Invertebrates	Unfavourable No change	Unfavourable	Sep 2009

Feature pressures are wide ranging including agricultural operations, invasive species and water quality. Over grazing in the catchment is also cited as a feature pressure. Information from Site Condition Monitoring states that over grazing was identified as a previous pressure for pearl mussels but this is no longer an active pressure. Over grazing is still a feature pressure for salmon but the pressure is likely to come more from livestock than from deer. The management note for salmon says “Grazing, canalisation, water quality issues related to heavy livestock stocking as well as management of the upper catchment for grouse ….. are also considered by the Esk District Salmon Fisheries Board to be issues for Atlantic salmon within the SAC.”

There is no specific information about the over grazing issue or deer management relating to the River South Esk SAC. However, it is accepted that a more wooded landscape would benefit the South Esk. Currently work being carried out by the Pearls in Peril project and the Fishery Trust are contributing to this goal.

River Tay SAC

The Allt a'Ghlinne Bhig and the Shee Water form part of the River Tay SAC. The River Tay system is designated for four fish species, its clear water lochs and for otters. All are classed as being in Favourable Maintained condition and there are no feature pressures associated with deer or their impacts.

Cairngorms Massif SPA

The Cairngorms Massif SPA covers a large area covering much of the high mountain ground from Aviemore in the north to Pitlochry in the south to the Cairn o' Mount in the east (Map 1.3). A feature condition summary is shown in Table 10 (data from SNH Sitelink).

Table 10. *Feature condition summary for the Cairngorms Massif SPA.*

Feature	Feature Category	Latest assessed condition	Summary condition	Last visit date
Breeding golden eagles	Birds	Favourable Maintained	Favourable	June 2010

Currently golden eagle populations are classed as being in Favourable Maintained condition. There are no feature pressures related to deer or their impacts.

Caenlochan SPA

This is a large upland site designated for its breeding dotterel and for golden eagles (Map 1.3). It is also important for its unusual assemblage of breeding birds which include ptarmigan, snow bunting, golden plover and dunlin. A feature condition summary is shown in Table 11 (data from SNH Sitelink).

Table 11. *Feature condition summary for the Caenlochan SPA.*

Feature	Feature Category	Latest assessed condition	Summary condition	Last visit date
Breeding dotterel	Birds	Favourable Maintained	Favourable	Jan 1999
Breeding golden eagles	Birds	Favourable Maintained	Favourable	Dec 2009

Currently dotterel and golden eagle populations are assessed as being in Favourable Maintained condition. Over grazing is cited as a feature pressure in relation to the Caenlochan SPA. Over grazing is also relevant to the Caenlochan SSSI and the Caenlochan SAC. As these designations overlap, the over grazing issue is discussed under the Caenlochan SAC.

Caenlochan SSSI

The Caenlochan SSSI covers a high mountain area which includes an extensive rounded plateau and several spectacular corries carved out by glaciers (Map 1.5 & 1.6). The SSSI is one of the most important upland sites in the UK for alpine plants including lichens and bryophytes. A feature condition summary is shown in Table 12 (data from SNH Sitelink).

Table 12. *Feature condition summary for the Caenlochan SSSI.*

Feature	Feature Category	Latest assessed condition	Summary condition	Last visit date
Breeding bird assemblage	Birds	Favourable Maintained	Favourable	July 2003
Bryophyte assemblage	Non-vascular plants	Favourable Maintained	Favourable	Dec 2005
Dystrophic loch	Freshwater habitats	Favourable Maintained	Favourable	July 2004
Invertebrate assemblage	Invertebrates	Favourable Maintained	Favourable	Aug 2011
Lichen assemblage	Non-vascular plants	Favourable Maintained	Favourable	Oct 2010
Montane assemblage	Upland habitat	Unfavourable- no change	Unfavourable	July 2006
Quaternary of Scotland	Earth sciences	Favourable Maintained	Favourable	July 2011
Vascular plant assemblage	Vascular plants	Unfavourable- no change.	Unfavourable	Aug 2009

Over grazing is cited as a feature pressure in relation to the breeding bird assemblage, dystrophic loch, montane assemblage and the vascular assemblage. Trampling is cited as a feature pressure in relation to the bryophyte assemblage. Over grazing and trampling are also cited as feature pressures relevant to the Caenlochan SAC. As the Caenlochan SPA, SSSI and SAC overlap considerably, the issues surrounding over grazing and trampling are discussed under the Caenlochan SAC.

Caenlochan SAC

The boundaries of the Caenlochan SAC overlap with both the Caenlochan SPA and SSSI (Map 1.2). The SAC is designated for a range of features. A feature condition summary is shown in Table 13 (data from SNH Sitelink).

Table 13. *Feature condition summary for the Caenlochan SAC.*

Feature	Feature Category	Latest assessed condition	Summary condition	Last visit date
Acidic scree	Upland habitat	Unfavourable Declining	Unfavourable	Aug 2012
Alpine and subalpine heaths	Upland habitat	Unfavourable No change	Unfavourable	July 2006
Base-rich fens	Upland habitat	Unfavourable No change	Unfavourable	July 2006
Base-rich scree	Upland habitat	Favourable Maintained	Favourable	July 2006
Blanket bog	Upland habitat	Unfavourable No change	Unfavourable	July 2006
Dry heaths	Upland habitat	Unfavourable No change	Unfavourable	July 2006
Grasslands on soils rich in heavy metals	Upland habitat	Favourable Maintained	Favourable	July 2006
High-altitude plant communities associated with areas of water	Upland habitat	Favourable Recovered	Favourable	Sep 2012
Montane acid grasslands	Upland habitat	Unfavourable No change	Unfavourable	Sep 2012
Mountain willow scrub	Upland habitat	Unfavourable No change	Unfavourable	Aug 2012

Plants in crevices on acid rocks	Upland habitat	Favourable Maintained	Favourable	July 2006
Plants in crevices on base-rich rocks	Upland habitat	Favourable Maintained	Favourable	Sep 2012
Species rich grassland with mat-grass in upland areas	Upland habitat	Unfavourable No change	Unfavourable	July 2006
Tall herb communities	Upland habitat	Favourable Maintained	Favourable	Sep 2012

Over grazing is cited as a feature pressure with regard to acidic scree, alpine and subalpine heaths, blanket bog, dry heaths, montane acid grasslands and mountain willow scrub. In addition, over grazing and trampling are cited as feature pressures with regard to the Caenlochan SSSI and SPA.

The issue of over grazing causing damage to designated features led to the signing of the first Caenlochan Section 7 Agreement 2003-13. Under this Agreement, estates and the then Deer Commission for Scotland worked together to reduce the red deer population by around 50% between 2005 and 2010. Grazing pressure reduced significantly during this period. However, impacts on some designated features remained high and further work was required to bring all features into Favourable Condition.

A second Caenlochan Section 7 Agreement (hereafter referred to as "the Agreement") was signed and this covers the period 2014-19. The primary purpose of the Agreement is to prevent deer from causing damage to designated habitats across the Caenlochan SAC and SSSI and other designated sites out-with SA1. The estates which are signatories to the Agreement within SA1 are shown in Table 14. SNH are also a signatory to the Agreement.

Table 14. *Estates within SA1 which are signatories to the Caenlochan Section 7 Agreement.*

Estates which are Signatories	**Estates which are Signatories**
Alrick Estate	Glenhead/ Glendamph Estate
Auchavan Estate	Clova Estate
Glenisla House Estate	Invercauld Estate
Glen Cally Estate	Tulchan of Glenisla Estate
Glen Prosen Estate	SNH Corrie Fee

The signatories agree that red deer are causing damage to Natura upland interests across the designated sites and that red deer impacts will be reduced by implementing the Caenlochan Plan (Putman, 2014). The main purpose of the Caenlochan Plan is to prevent damage to designated features and the Plan sets out the deer management measures required to reduce negative impacts caused by deer. In particular, the Caenlochan Plan defines a target red deer population for the area covered by the Agreement. This agreed target population is used as the basis for the population model below.

A habitat condition baseline was established in 2012 and the Agreement sets out clear habitat condition targets. The success of the Agreement will be judged by monitoring the delivery of these habitat targets. Habitat condition was assessed in 2015 (results not available at time of writing) and will be assessed again in 2018. Estates will introduce their own habitat monitoring in line with this deer management plan. SNH is likely to conclude that damage by deer is occurring if information from Habitat Impact Assessments shows that deer impact targets set out in the Agreement are not being met.

Action 27: *SNH to publish HIA data from 2015. The progress of the Agreement should be reviewed in the light of these data.*

A target population for SA1

The Agreement sets out a target population for the Caenlochan Section 7 Area. This target population includes deer on Balmoral Bachnagairn and Invercauld Glen Callater which are out-with SA1. The Agreement contains an additional target population for Clova South. The target population within the Agreement does not include targets for estates in the SE of SA1 such as Balintore, Lednathie and Airlie. A new target population for SA1 is calculated in Table 15.

Table 15. *Target Populations for SA1.*

		Stags	Hinds
1. Target population in Caenlochan Section 7 Agreement including targets for estates out-with SA1.		2390-2650	2680-3030
2. Target populations in Caenlochan Plan for Balmoral Bachnagairn and Invercauld Glencallater.	Bachnagairn	250	300
	Glencallater	300-350	360
3. Target population for estates within the Agreement and within SA1. (rows 1 minus 2)		1790-2100	2020- 2370
4. Target population for Clova South within the Agreement.		120	130
5. Target population for Balintore, Lednathie and Airlie. (Based on av. in season culls X 6 = stags X 1.1 = hinds)		330	360
6. Total target population for SA1. (rows 3 + 4 + 5)		2240- 2550	2510- 2860
7. Counted population for SA1 in Feb 2016		2026	2433

Currently the actual population counted within SA1 is slightly lower than the target population. Current culling rates should prevent this population from increasing. However, the population within SA1 has increased since 2010 presumably due to deer movement between sub areas and/ or due to counts under-estimating recruitment.

Population model

Data from counts, culls, mortality searches and recruitment counts can be used to make simple estimates of future population size. Once future population size has been estimated it can be compared with a target population. An example population model is shown in Table 16.

Table 16. *An example population model for SA1*

Data	Stags	Hinds	Calves
Count in March 2016 (from SNH heli count)	2026	2433	767
Mortality searches in May 2016 (fictitious data)	15	10	30
Population post natural mortality	2011	2423	737
Population adjusted for calving percentage recorded in recruitment counts in May 2016 showing 30% calving (fictitious data)	2011	2423	727 (2423 hinds X 30% calving rate)
Adult population in July 2016 once all 2015 calves have become yearlings	2374 (2011 + 727/2 calves which become adults on 1st July)	2786 (2433 + 727/2)	
Target population from Table 15	2240- 2550 stags	2510- 2860 hinds	
Cull for 2016-17	Adult pop minus target	Adult pop minus target	

Population models are rarely precise as there are many unknowns and inaccuracies in the data collected. However, they do provide a basis for discussion and decision making. A population model with formulas built in to an Excel spreadsheet is presented in Appendix C.

Action 28: *Members to provide count, mortality and recruitment data to the Secretary to enable the population model to be updated before each June meeting.*

The above example shows the difficulty of modelling a population which is not discrete. There is a need to carry out an annual reconciliation of population models with SDNA DMG. This reconciliation should be carried out by EGDMG

annually. Further analysis of population models for SA1 and for combined data from SA1 and SDNA DMG are shown in Appendix D.

Action 29: *Ensure EGDMG carries out an analysis and reconciliation of population models for SA1 and SDNA DMG (former sub area 2).*

Recommendations with Regard to Caenlochan Designations

Given the importance of designated features within Caenlochan and given the fact the deer population has increased between 2010 and 2016 despite a high rate of cull, we do not recommend that cull rates decrease as the model above might suggest. We recommend current culls should be maintained and an annual co-ordinated ground count should be organised to assess future trends in the population. As the target population has been reached, part of the Caenlochan Plan has been successfully implemented. However, the Caenlochan Plan also puts great emphasis on reducing the amount of time deer use the Caenlochan SAC by feeding them away from sensitive sites. Some estates like Tulchan and Glen Cally are now feeding large numbers of deer and this should reduce impacts on the SAC. The recommendations within the Caenlochan Plan on reducing deer movement and on reducing deer use of the Caenlochan SAC should be fully implemented. In the longer term estates should consider an expansion of woodland as the best means of reducing deer movement.

Action 30: *Fully implement all aspects of the Caenloachan Plan.*

Habitat Impact Assessments

Any target population for SA1 should be influenced by habitat monitoring data. Under the Agreement, SNH will organise Habitat Impact Assessments in 2015 and 2018. Any negative trends in HIA should trigger discussion about the target population or about further ways of reducing deer use of the Caenlochan SAC area.

Action 31: *Consider culls and target populations in relation to habitat data as trends in habitat condition become clear.*

4.3 Management of deer for retention of native woodland

The Native Woodland Survey of Scotland (NWSS) was carried out over the whole of Scotland to establish the baseline condition of Scotland's native woods. All native woodlands of over 0.5ha were surveyed. Within SA1 some 1238ha of native woodland were surveyed and the impacts caused by deer and sheep were assessed. Results are summarised in Table 17 and shown on Map 1.4.

Table 17. *The proportion of native woodland within each Herbivore Pressure Category from the NWSS.*

Herbivore Pressure Category	Area of native woodland within category (ha)	Proportion of SA1 native woodland within category
Low	438	35%
Medium	547	44%
High	35	3%
Very High	218	18%

The native woodland resource in SA1 is of high importance for biodiversity as well as shelter, carbon storage, recreation and tourism. Some 79% of native woodlands are recorded as having Low or Medium impacts. The national target is for 60% of native woodland to be in the Low/Medium impact class so native woodland condition

targets are being clearly met and exceeded within SA1 and these results are welcome. There is room for some improvement as 21% of native woodlands are in the High and Very High impact classes. These levels of herbivore impacts include trampling, canopy fragmentation, heavy browsing and bark stripping and woodlands are unlikely to regenerate under High or Very High impacts. Many of the High or Very High impacted woodlands are concentrated in a belt along the Prosen Water north of Cortachy. It is likely most of these impacts are caused by sheep rather than deer.

There are likely to be some issues to be addressed in some woodlands. As the NWSS states, the Herbivore Impact Category is valuable as a general indication of impacts but each woodland site needs to be assessed on its individual merits. It is beyond the scope of this deer management plan to assess each woodland at this stage. Where deer are likely to be the cause of high impacts, each relevant estate should use NWSS results as illustrated on Map 1.4 to prepare a brief condition assessment of each woodland within the High or Very High impact categories and produce management proposals to improve condition or to justify current management. These management proposals need to be supported by regular monitoring of woodland condition which should be carried out in accordance with Wild Deer Best Practice Guidance (see below). Estates should explore Scottish Rural Development Programme (SRDP) funding for management of native woodlands in SA1.

Action 32: *Where deer are likely to be the cause of impacts, each relevant estate to use NWSS results to prepare condition assessments for each woodland within the High or Very High impact categories and produce management proposals to improve condition or justify current management. These management proposals should be supported by a regular cycle of woodland condition monitoring in accordance with WDBPG*

In addition to this, habitat monitoring in woodland would allow an assessment of deer impacts to be made. The following methodology can be used for assessing impacts in woodland:

Plot based survey method.

This methodology establishes circular plots with an area of 0.01 – 0.05 hectares marked by a central post whose coordinates are recorded using GPS. The circular plots are marked out by using string of length 5 – 12m from the central post. The number, size and location of plots is based on the area and the distribution of mature trees using the Nearest Neighbour Method for Quantifying Wildlife Damage to Trees in Woodland (Forestry Commission Practice Note).

In each plot record the following data are recorded:

- Number and species of seedlings/saplings that are less than 1.3m tall and/or less than 7cm in diameter at breast height)
- Number and species of all trees greater than 1.3m tall and/or greater than 7cm diameter at breast height
- Number of seedlings/saplings exhibiting deer damage
- Number of trees exhibiting deer damage
- Number of standing dead, fallen dead and tree stumps
- "Age Class" of all mature trees – i.e. young, mature, over mature, veteran. NB this is dependent on species, for example a 30-year-old silver birch would be mature, but a 30-year-old sessile oak would be classed as young.
- Number of seedlings/saplings frayed by deer
- Number of trees with bark stripped by deer

For each compartment:

- Calculate the frequency of leaders browsed for each species of seedling/sapling
- Calculate the frequency of other shoots browsed for each species of seedling/sapling
- Average the number of seedlings/saplings frayed per species per compartment

- Average the number of seedlings/saplings bark stripped by deer

Full guidance can be found at www.bestpracticeguides.org.uk/impacts/woodland.

Action 33: *SA1 will monitor woodland condition following Best Practice guidelines and will adaptively manage woodlands dependant on the outcome of these surveys.*

4.4 SA1's commitment to Woodland Expansion

The Scottish Government has set a target to expand Scotland's woodland coverage from its current 17% to 25%. Currently less than 10% of the SA1 is covered in woodland. The largest woodlands are plantations concentrated to the West, North West and North East of the Backwater Reservoir which are largely owned by FCS. FCS have another significant woodland block in Glen Prosen. Within private estates there are large woodlands in Clova South, Airlie West and Glen Isla with smaller woodlands scattered throughout. Most of these woodlands are securely deer fenced and there is rigorous deer control within these fenced areas with the objective of managing deer at densities that allow re-stocked areas to grow.

The extent of woodland created with public funding since 1991 within SA1 is shown in Table 18.

Table 18. *Woodland created with public funding since 1991.*

Time period	Woodland Creation Scheme	Area of woodland established (ha)
1991-92	WGS 1	193
1993-94	WGS 2	290
1995-2004	WGS 3	746
2005-2006	SFGS	49
2007-13	SRDP	213
Total 1991-2013	**All schemes**	**1491ha**

Between 1991-2013 some 1491ha of new woodland have been created in SA1 and SA1 members have shown significant historic commitment to woodland expansion. Current woodland management largely consists of re-stocking compartments within existing plantations. Some estates are developing their thinking about the opportunities to create new woodlands but these are mostly not at the formal planning stage. Tulchan plan to plant 10ha around their new hydro scheme. There is a general feeling that the current grant regime does not provide sufficient incentive to expand native woodlands. Grants are thought to be favourable for planting productive, commercial species. For most estates the creation of new woodlands has to be balanced against potential loss of sporting or farming opportunities. Woodland creation conflicts directly with grouse moor management which is important for some estates. However woodland creation is likely to enhance deer stalking opportunities. The Caenlochan Plan examines ways of holding deer for longer periods on individual estates so as to try and slow down

the big seasonal movements which occur across SA1. In the longer term the best means of holding deer is to create woodlands which allow deer to shelter from weather and disturbance. This is well illustrated locally on Balintore Estate, which now culls significant numbers of stags in season on relatively low ground. This is because deer are spending longer periods in the Harran (Milldewan) plantation rather than heading for higher ground in summer.

Currently some estates feel they have an acceptable balance between competing land use objectives while some feel new woodlands would enhance their estates. Proposals for new woodlands are likely to emerge during the lifetime of this plan.

4.5 Monitoring & management of deer impacts in the wider countryside.

It is important that SA1 monitor the impact of deer out-with designated sites to ensure deer are not having a detrimental effect on the wider countryside. The DMG's policy for monitoring deer populations is outlined in 2.10 and 2.11. In line with SA1's commitment to managing designated sites, each member will also ensure that Habitat Impact Assessments are conducted in the wider countryside following Best Practice guidelines (3.5). The combination of monitoring both the deer population and the habitat will ensure that SA1 can adaptively manage the area and will ensure that deer do not have an adverse effect on the wider countryside.

4.6 Actions to improve Scotland's ability to store carbon.

Climate change is one of the biggest global threats to biodiversity. The Scottish Government has set targets to reduce the amount of carbon released into the atmosphere, and also to find measures to increase carbon sequestration. On a national scale there are many measures which can be taken in relation to carbon storage, however the most pertinent to SA1, is the ability of peatlands to store carbon.

Peat deposition occurs in cool, wet climates where plant growth is faster than the rate of decomposition. The difference in the rate of growth and decomposition results in peat being deposited, and the carbon from organic matter being sequestered within the peat. Since the end of the last Ice Age, approximately 10,000-12,000 years ago, peat bogs in the UK have sequestered in the region of 5.5 billion tonnes of atmospheric carbon (Joint Nature Conservation Committee webpage). This figure is equivalent to the amount of industrial emissions released over a 20-year period (*National Trust*).

In terms of carbon richness, much of SA1's soil is classified as peat with organo minerals (*Bruneau & Johnson, 2014*). This is a high carbon storage peat soil, which is likely to reach an upper storage limit marginally below the 1200 tonnes of carbon per hectare of deep peat, but substantially above that of other soils (*ECOSSE report, Scottish Executive 2007*). It can be seen from the Peat depth map that much of the high ground within SA1 is covered by blanket bog and has a peat depth in excess of 1.5m.

The carbon storage capacity of peat is affected by peat erosion and degradation from inappropriate burning, grazing, peat extraction and drainage practices. These not only release the carbon already stored, but also reduce the soils ability to sequester atmospheric carbon. The inability of peat to perform its function has huge implications for climate change, due to its capacity to store large amounts of carbon worldwide.

Within a carbon storage context, SA1 will aim to maintain the overall integrity of the peatlands by limiting degradation and erosion, and by maintaining vegetation cover. Where peat degradation has already occurred, the DMG will aim to reinstate peatland function and biodiversity.

Action 34:	*SA1 will manage peatlands with the aim of maintaining the current extent of peat deposits.*
Action 35:	*The SA1 DMG will limit the loss of stored carbon and where necessary restore habitats to enhance carbon sequestration.*

In order to meet these aims, the current coverage of blanket bog must be known. Blanket bog is defined by peat depth, with true peat being classified as having a depth of 0.5m or more (Scottish Government guidance on developments on Peatlands*).* Habitat maps and soil maps can be used as a baseline for assessing peat coverage. Blanket bog coverage within SA1 is available from SNH, and soil maps are available from the James Hutton Institute.

Action 36: *Members will identify broad areas of Blanket bog*

It is then necessary to determine the extent of peatland degradation, and to map this at an appropriate scale, which will allow management decisions to be made at a landscape level. Where available, aerial photos may allow areas of severe degradation to be identified.

In order to standardise peat condition assessment, and taking into consideration the likely inexperience of employees who are currently in place, a simple and easily repeatable method of assessing peat should be used. In simple terms, peat degradation can be classified into the following 5 broad categories: active, degraded, bare, archaic and wasted/lost (as defined by Lindsay & Immirzi, 1996). Full category descriptions are available from SNH commissioned report 701 (http://www.snh.org.uk/pdfs/publications/commissioned_reports/701.pdf). Due to the large areas requiring assessment, the DMG will use a rapid assessment methodology, consisting of a walk over survey. This will grade the peat into the above categories and will record and map the outer boundaries of each area using a GPS.

Action 37: *Members to identify and map the location, extent and condition of degraded peat*

Where areas of active peat (solid peat with a full coverage of vegetation) is identified, the DMG will ensure that future damage is limited by; reducing grazing levels where poaching or overgrazing is identified and avoiding burning on areas on blanket bog. Where necessary, the DMG will also use low impact vehicles to access the site, and ensure peat extraction and drainage of peatlands does not increase.

Action 38: *Avoid burning on areas of peatland*

Action 39: *Ensure that grazing regimes and deer densities allow for maintenance of peat integrity*

Action 40: *Where possible, only access peatland with vehicles which have low ground pressure*

Action 41: *Ensure peat extraction and drainage of peatlands does not increase*

In areas of degraded or bare peat, and where restoration is a viable option, clear aims and realistic timescales for work must be outlined. If possible these should link areas of bog together. Where overgrazing has been identified but there is little damage to the underlying peat, a reduction in livestock would serve to protect the peat. However, where restoration is required, the removal of livestock alone is likely to take many years and may not be successful and other techniques will likely need to be used (Littlewood *et. al*., 2010). In broad terms these techniques are:

- Gully blocking
- Re-profiling
- Re-vegetation of bare peat

It is worth noting that although peatland restoration best practice is currently being updated, technical guidance on peat restoration can be sought from the Yorkshire Peatland Partnership (Pilot UK Peatland Code) and Moors for the Future. The James Hutton Institute is also currently developing a tool which will enable the identification of the most appropriate areas for restorative action, and those which would benefit most from peat restoration (Scotland's National Peat Plan).

4.7 Management of non-native invasive species.

This plan will not encompass all non-native species in SA1 but will cover non-native deer and feral pigs.

4.7.1 Sika

Sika were introduced to Scotland in the 1890s as a decorative species. One of the original introduction sites was in lowland Angus but this population appears to have died out some time ago. No sika are thought to be resident in SA1 and sika have not yet been recorded in culls. However, a number of estates have had suspicions that animals they have shot may have been red/ sika hybrids although none have yet been confirmed by genetic testing. The most likely route for sika colonising SA1 is from the south west with sika moving round the southern fringe of the West Grampians.

Action 42: *SA1 will continue to resist the spread of sika by culling all observed individuals where possible. Estates will report any sika culled to SA1. Where possible members will attempt to identify suspected red/sika hybrids by organising genetic testing through SNH.*

4.7.2 Fallow

Fallow deer occur at high density in Strath Ardle to the south of SA1. Fallow usually show less tendency to expand their range than sika but they have spread slowly through Strath Ardle and individual animals have occasionally been seen in SA1. From time to time they occur in the cull record but there is not thought to be any breeding population.

Action 43: *Members will resist the spread of fallow deer within SA1 by culling all animals seen whenever it is possible to do so.*

4.7.3 Feral pigs

A few feral pigs have been culled within the East Grampians in the last few years. The source of these animals is unknown but there are many farms around Scotland with “wild boar” from which escapes are possible. There are now free ranging feral pigs north of Alyth and south of SA1. Individuals have been seen as far north as the Drumore road. The term wild boar implies these pigs may have been re-introduced as a former native species. However, any such re-introduction would involve a widespread public consultation and a programme approved by Scottish Government. Although individuals may superficially look like wild boar, the genetics of farmed “wild boar” are often unclear. Until their genetics are determined, these animals are best described as feral pigs.

The effect of feral pig introductions throughout the world is almost universally negative. Feral pigs can damage farm crops and fences as well as native species e.g. ground nesting birds and gardens. They can be a road traffic hazard and can damage deer fences. However, they are rarely seen as detrimental to forestry and may benefit woodland regeneration by scarifying small areas and creating seed beds.

Action 44: *Estates will continue to resist colonisation by feral pigs by culling all observed individuals where possible. Estates will report toSA1 on numbers and locations of culled feral pigs.*

4.8 Protection of historic and cultural features

The glens of Angus and Perthshire have been settled by man for thousands of years. There are likely to be numerous features and sites which have historic and cultural significance. Light grazing can help conserve archaeological features as it may keep them visible and prevent them being lost amidst growing vegetation. Members are not currently aware of any historic or cultural features being damaged by deer or sheep grazing. If concerns about

damage to features are raised, the DMG will undertake to consider those concerns and address issues if possible. The DMG will contact Angus Council and Perth and Kinross Council archaeologists to see if they have any concerns.

Action 45: *Be open to communication with regards to concerns of damage to historic and cultural features. Contact the relevant Council archaeologists to see if they have any concerns.*

4.9 Delivering high standards of competence in deer management.

Of 24 individuals who shoot deer unsupervised within SA1, 23 have DSC 1 and 15 have DSC 2. There is already a high level of Competence as defined by the deer sector. All stalkers in the DMG will aim to achieve DSC1.

Deer managers in SA1 have many skills and qualifications and there is a strong commitment to Best Practice within the Group. A full training policy is provided in 2.9.

Action 11: *All stalkers to attain DSC 1 and work towards DSC 2. Identify training needs within SA1 and organise training courses where necessary. Consider inviting other rural workers to participate in training courses where possible.*

4.10 Contributing to public health and well-being

Deer contribute to public health and well-being in ways which are both positive and negative although often their contribution is relatively small. Deer are regularly voted as one of Scotland's favourite wild animals by the public. As such they contribute to public well-being by being a relatively accessible, visible and often exciting part of the natural world which many people can readily enjoy. Deer stalking is a healthy outdoor activity which can involve variable levels of exercise. In common with many outdoor recreational activities it contributes to public health to some degree. Access to the hills for outdoor activities is an important contributor to public health and well-being. The SA1 area is very popular with hill walkers and other outdoor enthusiasts. It contains one of Scotland's five ski centres and is a gateway to the Cairngorms National Park. SA1 contains a number of popular Munros and Corbetts and the Cateran Trail provides a lower level walking route passing between the Spittal of Glenshee to Kirkton of Glenisla.

Despite the popularity of the area there is little conflict between access and deer management. Walkers regularly disturb deer on the Caenlochan plateau but estates have adapted to this and generally stalk in corries where there is less disturbance. Estates in SA1 recognise the importance of outdoor recreation to the Cairngorms as a whole and have a welcoming attitude to walkers. Many estates have a pro-active approach to potential conflict and speak to walkers at access points to find out their intended routes, discuss alternatives if relevant, or seek to avoid the routes they know are going to be disturbed. Some estates use the Heading for the Scottish Hills website http://www.outdooraccess-scotland.com/Practical-guide/public/Heading-for-the-Scottish-Hills as another means of providing information to walkers. Use of this website could be expanded but currently informal systems work well and conflict between deer managers and recreationalists is minimal.

Action 46: *All members to consider the use of Heading for the Hills website as a means of providing information for walkers.*

Venison is a lean and healthy source of protein which can contribute towards a balanced diet. Venison is increasingly popular and accessible as a regular part of the UK diet. As such, the supply of venison to the local

community can be seen to contribute to improving public health. SA1 will ensure there is supply of venison available for local purchase. However, the local community is small and most venison will be sold to game dealers.

Action 17: *Ensure a supply of venison is available for local sales.*

4.10.1 Deer Vehicle Collisions

Deer collisions with vehicles are an obvious risk to public health. There are serious risks of collisions along much of the A93 with deer crossing between Glenshee and Rhiedorrach. This is a natural deer movement which would be difficult and perhaps undesirable to stop. Numbers of dead deer on the A93 are monitored by the Glenshee stalking team and between 5-10 deer are found dead annually. Not all deer involved in collisions will be killed and it is likely there will be an additional number of collisions which are non-fatal to deer.

Along much of the A93 immediately south of the ski tows the road has good sight lines. Vegetation is generally short and deer are visible at distance even at night. Between Rhiedorrach house and the Spittal of Glenshee the road is much windier with shorter sight lines. The best way to reduce the risk of collisions is probably through increasing driver awareness and reducing driver speeds. Improved signage may play a role in this. Estates have taken action to reduce the risk of deer vehicle collisions e.g. feeding deer away from roads on Glenshee. There is no deer fencing alongside the A93. Glenshee should continue to carry out monitoring of dead deer at the roadside on a monthly basis. DVCs should be reported to the Deer Collision UK database. There are few DVCs reported on the B951 between Glenisla and Kirriemuir. Roe deer are occasionally hit by motorists on this road but there are no reports of collisions involving red deer.

Local communities will be encouraged to report deer vehicle collisions to SA1 and SA1 should address any concerns raised where it is reasonable to do so. SA1 should consider the risk of deer vehicle collisions when making management decisions e.g. when siting new deer fences.

Action 47: *Consider ways of raising driver awareness of the risk of deer vehicle collisions on the A93. Monitor numbers of deer killed on the roadside on a monthly basis. Report collisions to the Deer Collisions UK database.*

Action 48: *Deer vehicle collisions should be an agenda item at the SA1 AGM.*

4.10.2 Lyme disease

Lyme disease is a bacterial infection passed to humans from infected ticks. Deer play a peripheral role in Lyme disease transmission as they act as a host for ticks and can spread ticks across big areas. However, there is no evidence that deer control reduces Lyme disease. All countryside users should be made aware of ticks and the risks of Lyme disease. The public should be aware of early symptoms of Lyme disease so they can seek medical attention at an early stage of infection. DMGs have a very small role in raising public awareness about Lyme disease. However, deer stalkers and their guests are very prone to tick bites as they may work in tick infested areas and spend time crawling through vegetation while they attempt to approach deer. Stalking guests who may be new to the area or to the UK should be made aware of the risks and symptoms. Estate First Aid kits should include tick removers.

Action 49: *Ensure estate guests are aware of the risks and symptoms of Lyme disease. Ensure First Aid kits include tick removers.*

4.11 Maximising the economic benefits of deer management

Deer stalking in Scotland is currently very popular. Demand is high for stalking at all cost levels e.g. from a week's stag stalking for a large group of people with accommodation which may cost a five figure sum, or for a morning stalking roe does which might cost £50. Demand is both international and domestic. This popularity means deer stalking can play an important role in generating economic activity particularly in the remoter parts of Scotland.

The relative economic importance of deer management forms a spectrum across the different estates in SA1. Deer stalking is the main source of income on estates like Tulchan, Glen Cally and Auchavan. On some estates sporting income from deer may be matched or exceeded by income from grouse. On other estates income from deer may be a small part of a farming business. Most estates take a commercial approach to deer management and offer let stalking to paying guests. Assuming the average cost of a day's stag stalking in Scotland is £500 and the in season cull with guests within SA1 is around 460 stags, then the total value of stag stalking in SA1 is £230K. The enjoyment gained from stalking is largely the incentive to support 20 full time jobs. Assuming average weights of stags, hinds and calves and a venison price of £2 per kg the value of venison harvested annually is £150000. Employee's wages and associated spending contribute to the local economy. Within SA1 no one is employed solely to manage deer but some employees spend more than 50% of their time managing deer, with the remaining time spent on the management of other species, estate management and maintenance. Deer management is vital in sustaining jobs. Few non-farming estates in SA1 will produce a profit but paying guests will contribute to estate income and will reduce operational losses. Paying guests will also spend money locally on accommodation and services. Local hotels like the Glenisla Hotel gain a significant proportion of their business from deer stalking. There is a clear argument that deer stalking attracts visitors and contributes to overall tourist spend. Currently approximately 100 stalking guests visit SA1 annually to partake in deer stalking.

Deer are consistently voted as one of Scotland's most popular animals and are seen as an icon of Highland Scotland. As such the general ease of visibility of deer is one element that attracts tourists to remoter parts of Scotland like SA1. Although it is hard to quantify the sums involved, deer will contribute to the range of features which attract tourists to stay in guest houses and hotels and spend money in local shops.

There is capacity for increased wildlife tourism activities based around deer watching. SA1 is relatively accessible and, in some places, deer can be viewed close to roads. In many ways SA1 could be an ideal area for basing commercial deer viewing and there is probably scope for activity during the rut or during calving time which need not conflict with deer stalking. However, the general accessibility and visibility of deer can actually limit commercial opportunities as people can view deer without paying. People will pay for interpretation e.g. of deer management and deer based photography does have a commercial value. However, experience suggests the market is probably limited and much smaller than the deer stalking market.

Action 50: *Consider establishing commercial deer related activities other than deer stalking. These might include deer viewing, photography etc.*

4.12 Minimising the economic costs of deer.

It is often argued that the costs and benefits of deer management are distributed in a way that is inequitable. Those that incur costs sometimes do not share benefits. Those members of SA1 who do benefit from deer undertake to minimise the costs caused by deer to others, where it is reasonable to do so.

There are a number of properties in SA1 who may view deer management as a cost. Predominantly farming estates like Alrick, Auldallan and Pearsie often suffer incursions of large numbers of deer onto improved agricultural land. The value of culled deer may provide some compensation for the time and effort spent protecting crops. There are

potentially two options to reduce this cost for farming estates. Deer fencing could be constructed to prevent deer accessing farmland and the cost of fencing could be shared in some way between those who benefit from deer and those who would benefit from protected farmland. The relative share of cost would have to be subject to negotiation. Any deer fence would have to be sited so that deer had access to sufficient shelter and that deer welfare was not compromised.

Alternatively, those that benefit from deer stalking could pay compensation for damage caused by wintering deer or could replace the cost of venison foregone. However, this would have to be combined with some sort of scaring scheme to avoid large numbers of deer taking up residence on farmland. A combination of both deer fencing and compensation could be employed. Any scheme based on compensation would be complicated and would require careful trialling with lessons learned from those trials and experience built on over time.

FCS manage deer at a cost. Nationally, FCS has reduced their deer management costs over recent years through the use of stalking leases and contractors rather than full time staff. Deer management within SA1 helps support a team of contract deer managers supported by a full time Ranger Manager who cover a wider area than SA1. However, FCS deer management costs remain high and the cost of fencing is a very significant part of this total cost. Much of the deer fencing around FCS Glen Prosen and Glen Isla/ Glen Markie has been recently replaced at considerable cost. These fences are regularly inspected by contractors. There is an argument that fences which exclude deer from forestry plantations should be jointly managed by FCS and neighbours i.e. those that seek to benefit from deer pay a share of the cost for protecting the crops of others.

Another group of people who may incur costs associated with deer are tenant farmers who graze the hill land within SA1. Scottish Water has two farm tenancies on Glenhead/ Glendamph north of the Backwater Reservoir. Sheep are the main crop and these sheep have to compete with deer for grazing. A network of relatively small land ownerships to the east of Glenhead/ Glen Damph makes control difficult. Deer also have ready access to unfenced plantations, including the Harran plantation, which are in separate ownership. Large numbers of hinds maraud onto improved hill parks in spring from these plantations. They cannot legally be shot in spring unless severe deer damage can be proved. SA1 will work to identify plantation owners and will attempt to involve them in collaborative deer management.

Action 6: *Identify plantation owners east of Scottish Water ground, invite them to become members and involve them in collaborative deer management.*

Farmers south of SA1 and north of Alyth suffer occasional incursions of marauding deer. Farmers have the right to protect their crops and grazing through culling and some exercise this right, which may give some compensation for damage. SA1 will develop good lines of communication with farmers to the south of the current boundary and will try to find solutions to any concerns that are raised.

Action 51: *Develop good lines of communication with farmers to the south of the SA1 boundary and north of Alyth. SA1 will try to find solutions to any concerns raised.*

4.13 Effective communication on deer management issues

The Constitution of SA1 will ensure meetings involve a wide range of interests (see Appendix A). A communications policy for SA1 is shown in 2.7. SA1 will develop an open and inclusive communications culture both within the area and between SA1 and outside interests. SA1 will make various documents e.g. DMG Minutes available to the public through their own website hosted on the ADMG web portal.

The first draft of this deer management plan was circulated for public consultation. Direct consultees included Community Councils, Perth and Kinross Councillors and Angus Councillors and relevant Council staff. Also relevant MSPs, Members of the Rural Affairs and Climate Change Committee (Scottish Parliament), the local MP, SNH, Transport Scotland, Environment LINK, outdoor access organisations and a range of local contacts. The covering email encouraged all to send the link to the draft plan on to anyone who may have had an interest. The objective was to reach as wide an audience as possible and to carry out a genuine consultation. All comments were logged and will receive an appropriate response. All reasonable comments were considered for incorporating in the second draft of the plan.

Action 10: *Carry out actions within the Communications Policy.*

4.14 Safeguarding Deer Welfare

Safeguarding deer welfare is one of the strategic objectives of SA1. In simple terms this means that deer should not be made to suffer as a result of management activities. It does not mean that there should be no natural mortality as some is inevitable and indeed natural, in hard winters. Deer welfare can be safeguarded in a practical sense by maintaining deer numbers in balance with their habitats and by providing adequate shelter for the deer population in times of severe weather. The importance of deer having access to woodland cannot be overstated in this regard. Deer welfare can also be safeguarded by ensuring they are humanely culled by competent people and that deer vehicle collisions and levels of poaching are minimised.

Members of SA1 undertake to consider deer welfare when planning management activities. For example, if there are plans for any new deer fencing then the implications of fence lines for deer welfare will be considered. Levels of training and competence within SA1 are considered to be compatible with maintaining a high standard of deer welfare. Members currently have few concerns about deer welfare and think welfare is being safeguarded. Members agree to continue to keep deer welfare under review.

Action 52: *Consider deer welfare issues at each meeting and consider the implications for deer welfare when taking management decisions.*

4.14.1 Chronic Wasting Disease

Chronic Wasting Disease is a highly infectious disease of deer, present in North America, which has so far proved 100% fatal to deer. It is not thought to affect humans. Two cases have now occurred in Scandinavia although the origin and implications of these cases are not yet known. The potential consequences of its arrival in the UK could be devastating to deer. It is thought that the most likely transmission route is via hunters from infected areas bringing the disease into the UK on clothing or equipment. This situation is analogous to the potential risk of *Gyrodactylus* spreading to salmon rivers in Scotland from Scandinavia. Some Fishery Boards have introduced a Declaration form which all visitors must sign before they can fish in the river. This process raises awareness of the issue amongst visitors and seeks to modify behaviour so as to improve bio-security.

Action 53: *Estates within SA1 should consider asking visiting stalkers from North America and Scandinavia to sign the draft declaration in Appendix B.*

5.0 Appendix A

A Constitution for Sub Area 1 of the East Grampians DMG

Name

The Group name shall be the East Grampian Sub Area 1 Deer Management Group (East Grampian Sub Area 1 DMG).

Objectives

The Group's objective is to promote the sustainable management of deer in the East Grampian Sub Area 1 DMG area in accordance with the East Grampian Sub Area 1 DMG Deer Management Plan.

Group Area

The geographic area covered by the East Grampian Sub Area 1 DMG is as depicted on the attached map. The boundary may be open to amendment should the Group so decide.

Membership

The Members of East Grampian Sub Area 1 DMG will be the owners of land within the Group area or their authorised representatives. For the avoidance of doubt private, public sector, voluntary body or corporate land owners are entitled to be members of the Group.

Representatives from relevant public bodies, NGOs and local bodies may be invited to attend meetings of the Group.

Members' obligations

Members agree to support the effective running of the Group by:

- Attending or being represented at all DMG meetings.
- Supplying information required for the administration of the Group
- Supplying information required for the writing and review of the Group Deer Management Plan and for the other purposes of the Group.
- Paying an annual subscription to the East Grampian Sub Area 1 DMG at such rates as may be agreed.
- Collaborating with other Members and other relevant interests as set out in the ADMG Principles of Collaboration.
- Advising the Group of any relevant changes in terms of ownership or land management in respect of their individual landholdings.
- Carrying out deer management in accordance with all relevant legislation, the SNH Code of Practice for Deer Management and Wild Deer Best Practice.

Office Bearers

Office bearers will comprise Chair and, if required, Vice Chair, who shall be elected annually at the Group AGM. Re-election on a rolling basis is permitted with no restriction on the period of time that an office bearer may serve.

The administrative positions of Secretary and Treasurer (which may be combined) and external Auditor are appointed positions and such appointments and any terms of employment shall be for approval annually at the Group AGM.

Meetings

- The Group will meet twice annually or more frequently as may be necessary.
- The Secretary will take a Minute of all meetings and circulate copies to all Members.
- An Annual General (AGM) meeting shall be held at such a place, date and hour as the Group shall decide. Advance notice will be given to Members not less than 28 days in advance of the AGM.
- A voting majority shall be defined as two thirds of the full Membership of the Group.

Funding and Financial Arrangements

The Group will be self-financing and the subscription will be set annually at the AGM. The basis of subscription calculation shall be agreed by the Group and approved by members at an AGM. The proposal is to base subscription rates on relative estate areas. Subscriptions will be set a rate sufficient to cover all the operating expenses of the Group. Subscriptions will be payable at a date to be determined by the Group.

The Treasurer will operate a Bank Account for the Group and all financial transactions will be made on this account. Joint signatures of the Treasurer and Chair will be required on all cheques or debits drawn on the account in excess of £500.

A financial Statement will be prepared by an Auditor appointed by the Group and presented at the AGM for approval by Members. In the event of funds being left upon the winding up of the Group the disbursement of these funds will be determined by the Members.

Conflict resolution

It shall be the duty of all Members to seek agreement in respect of Group objectives and, where a dispute arises between Members, to resolve such dispute by negotiation and compromise. When agreement cannot be reached it shall be in the option of the Chairman to refer the matter to arbitration by the Chairman of the Association of Deer Management Groups or such other independent expert as the parties may agree.

Membership information, records and data

Storage of membership information will be the responsibility of the Secretary, such information to be used solely for the administration of the Group and stored in accordance with the law.

The Group shall determine such deer management and related data as will be required to fulfil the objectives of the East Grampian Sub Area 1 DMG. Such data will be collected by all Members and submitted to the Secretary for storage and analysis and shall be regarded as the property of the Group.

6.0 Appendix B

Declaration by Hunter

Chronic wasting disease (CWD) is a highly infectious disease which has had devastating effects on many populations of deer. Scottish red deer are susceptible. CWD affects only deer and until recently was thought to only be present in the United States of America and Canada. Two recent cases have been confirmed in Scandinavia.

CWD is caused by a prion and belongs to the same group of diseases as 'mad cow disease' (bovine spongiform encephalopathy or 'BSE'). This group of diseases are known collectively as 'transmissible spongiform encephalopathies' or 'TSE' for short and CWD is the most infectious of these. The prion is transmitted in deer body fluids and body parts including urine, faeces and in meat. The prion can remain infectious for up to ten years when bound to soil, several years on stainless steel and it defies normal farm disinfection processes.

CWD has resulted in the death of every known infected deer. There are currently no treatments or vaccines available to control the disease and efforts to control the spread of CWD in the USA/Canada have so far failed. There is now evidence that CWD has occurred in Europe but there is no evidence that it has become established in European wild deer. However, if it were to become established in wild deer it would be likely have the following major consequences:

• Loss of large numbers of the wild deer population

• Restrictions on sales of venison and live deer

• Restrictions on stalking activities

If the disease became established, stopping its spread might be practically impossible.

A possible (likely) route of transmission into the UK could be through hunters or stalkers bringing in contaminated clothing and equipment from North America or Scandinavia. We therefore ask you to make the following declaration:

I declare that, to the best of my knowledge, none of my equipment, clothing or footwear has been in contact with an animal infected or likely to have been infected with CWD.

Signed……..

Print name……

Date……..

I declare that my equipment, clothing and footwear has been meticulously cleaned of all adherent debris or dirt.

Or

I declare that my equipment, clothing and footwear is bought in Europe and has not been worn in North America.

Signed……..

Print name……..

Date……..

7.0 Appendix C

Excel Population Model

Example of a simple deer population model (in Excel)

	A	B	C	D
1		**Stags**	**Hinds**	**Calves**
2	**Count (late winter or spring)**	1000	1000	300
3	**Mortality (late spring)**	10	10	30
4	**Population post mortality**	990	990	270
5	**Recruitment %**			35
6	**Population adjusted for recruitment count**	990	990	346.5
7	**Adult pop in July**	1163.25	1163.25	
8	**Target population**	1000	1000	300
9	**Cull target**	163.25	163.25	

Formulas entered into Excel to calculate the above results

	A	B	C	D
1		**Stags**	**Hinds**	**Calves**
2	**Count (late winter or spring)**	1000	1000	300
3	**Mortality (late spring)**	10	10	30
4	**Population post mortality**	= B2-B3	= C2-C3	= D2-D3
5	**Recruitment %**			35
6	**Population adjusted for recruitment count**	= B4	= C4	= C4*(D5/100)
7	**Adult pop in July**	= B6+(D6/2)	= C6+(D6/2)	
8	**Target population**	1000	1000	300
9	**Cull target**	= B7-B8	= C7-C8	

8.0 Appendix D

Population modelling in SA1 and the wider East Grampians

Modelling deer populations can enable us to

- predict population size in the absence of count data.
- predict how populations will respond to different cull levels.
- improve our knowledge of deer population dynamics and the factors influencing population change.

Currently we have good knowledge of the size of East Grampian deer populations as the helicopter count carried out in 2016 was accepted as accurate. The previous helicopter count in 2010 was also thought to be accurate. These two helicopter counts allow us to construct simple population models which we can use to test our knowledge of East Grampian deer population dynamics. We can use the 2010 count as a starting point and model forward to 2016 using known culls and other data. If the modelled estimate for 2016 is close to the actual count for 2016 we can have some confidence in the model and can also have more confidence in modelling population sizes beyond 2016. The type of data used in the population model is shown below.

Data	Assessment of accuracy
Helicopter deer counts total numbers	The level of accuracy is unknown, but thought to be high in terms of counting the number of deer present on open ground on the day of the count. Populations resident in woodland or temporarily sheltering in woodland during the count will not be counted. In some DMGs this could lead to a large under-estimate of the total number of deer using an area. Counts of each group of deer observed are accurate as each group is photographed and then counted using digital technology. Some groups of deer may be missed and others double counted as a result of deer movement in response to the helicopter or through human error. The extent of these errors is unknown.
Helicopter deer count classification in 2016	In 2016 each group of deer was photographed and each individual animal was then classified as a stag, hind or calf by experienced observers who carefully studied individual animals in the photographs. It is possible for different observers to compare the same photo and assess the consistency of classification, but it is not known if this was done. It is likely that there are some errors in the classification between young stags, hinds and calves but the extent of errors is unknown.
Helicopter deer count classification in 2010	Each group of deer was classified into antlered stags and "others". "Others" will include young stags, hinds and calves. Assumptions can be made about the proportion of each category of animal within the 2010 count from comparison with the complete classification of other counts.
Cull data	Cull levels are recorded by each estate. Some errors occur in recording culls but these errors should be small. However, some estates are culling deer on open hills and in woodlands. If woodland culls are recorded as part of the total estate cull, but woodland deer populations are not included in the count, then this will tend to exaggerate the culling rates on open hill deer.
Natural mortality	Natural mortality levels are usually low in East Grampians deer populations. Open hill ground is managed relatively intensively with lots of human operations occurring e.g. heather burning, grouse gritting, predator control, grouse counts, shepherding etc. It is likely that high levels of natural mortality will be noticed if they have occurred.

Recruitment	Accurate assessments of calving rates are not easily obtained. Assessing calf: hind ratios can be done at any point from early pregnancy to the late winter survival of live calves. Estimates made early in the breeding cycle are likely to over-estimate the productivity of a population as some calves will die throughout pregnancy and early life. Estimates made later in year e.g. in late winter may under-estimate population productivity as some calves will grow quickly and be miss-classified as hinds or knobbers. The extent of these errors is unknown.

Using the 2010 count as a starting point, the population was modelled forward to 2016 using the best estimates of the above data. Results were compared with the 2016 count to test our knowledge of deer population dynamics in the East Grampians. Population models were run for the following two areas

- SA1.
- SA1 and the SDNA DMG combined.

The 2010 starting population

In 2010 the count was classified into antlered stags and "others". "Others" included young stags, hinds and calves. For each area modelled, two different starting populations were calculated using different assumptions as shown below.

Starting population 1	Based on 10% of "others" being knobbers and 33% of hinds having a calf at foot.
Starting population 2	Based on 3% of "others" being knobbers and 25% of hinds having a calf at foot. This is undoubtedly a low proportion of knobbers and might seem a low calving rate. However, the winter of 2009/ 2010 was unusually cold with snow lying for several months and deer did experience above average levels of natural mortality. Reducing the numbers of knobbers and calves in "others" increases the number of hinds within the starting population.

Models were then run for two different starting populations and a range of calving rates. A large number of models can be run by varying the above. Some example results are tabulated below

Model run 1.

Area = SA1	Stags	Hinds	Calves
Starting population 2 from 2010 count	1376	2410	603
Estimated natural mortality rates	0.01%	0.01%	0.05%
Post winter calf survival rate = 40%			40%
Predicted 2016 population when modelled forward from 2010	958	1138	452
Actual counted population in 2016	2026	2433	767

When deer populations in SA1 are modelled in isolation, the culls which have been taken are predicted to dramatically reduce the deer population. Even when the starting hind population is inflated by using "Starting population 2" and post winter calf survival is set at the high rate of 40%, the population of both hinds and calves still declines. If we model the population using "Starting population 1" the modelled population crashes even more

dramatically. This result strongly suggests that the population from which deer are culled in SA1 is significantly bigger than the counted population. Deer were counted when the hills were covered in snow but culling mostly takes place during days when there is not complete snow cover. When snow falls, deer from SA1 could move into SDNA or move into woodland where they are not counted. However, most woodlands in SA1 are securely fenced and there is not thought to be much movement between hill and woodland.

Model run 2.

Area = SA1 and SDNA combined	Stags	Hinds	Calves
Starting population 1 from 2010 count	5562	6845	2259
Estimated natural mortality rates	0.01%	0.01%	0.05%
Post winter calf survival rate = 33%			33%
Predicted 2016 population when modelled forward from 2010	4754	3347	1116
Actual counted population in 2016	5974	7062	2341

When data from SA1 and SDNA are combined and "Starting population 1" is used in combination with a 33% post winter calf survival, the population still declines in response to historic culls. The actual population increases slowly between 2010 and 2016. This still suggests that the population from which deer are culled is bigger than the counted population or that we are significantly under-estimating recruitment rates.

Model run 3

Area = SA1 and SDNA combined	Stags	Hinds	Calves
Starting population 2 from 2010 count	4853	7849	1963
Estimated natural mortality rates	0.01%	0.01%	0.05%
Post winter calf survival rate = 40%			40%
Predicted 2016 population when modelled forward from 2010	6574	6880	2752
Actual counted population in 2016	5974	7062	2341

Model run 3 predicts a hind population which is close to the counted hind population. The predicted stag population is larger than counted. If Model run 3 accurately simulates the behaviour of the combined SA1 and SDNA population then some stags must be emigrating permanently from the area. In order to stop the predicted population from declining, Model run 3 uses "Starting population 2" to maximise the number of hinds in the starting population and assumes a high post-winter calf survival rate of 40% in each year between 2010 to 2015. Both these assumptions are possible but seem unlikely.

There could be a number of reasons as to why the modelled population tends to decline in most runs of the model. Counts could be under-estimating the true size of the population. This seems more likely when considering the combined SA1 and SDNA population as SDNA contains large unfenced woodlands which could conceal many deer, even though efforts are made to drive deer out of woodland for counting. Estate culls may include deer culled in woodlands. These woodland deer may not be included in the count so this may exaggerate the rate at which hill deer appear to be culled. In reality, hill deer may be being culled at a lower rate than the data suggests. Again this is more likely to happen within SDNA which contains much more woodland than SA1.

Alternatively, deer population growth rates may be consistently higher than we suspect due to the miss-classification of calves as hinds or knobbers. This would mean we need to cull at a higher rate just to maintain a stable population.

Conclusions and Culling Recommendations

Results from running the model demonstrate we do not fully understand the population dynamics of East Grampian deer. In particular we know very little about numbers of woodland deer and how many deer disappear into woodland from the hill when there is snow cover. It is clear we cannot have confidence in accurately predicting future population size using current data and models. This makes achieving a good quality annual count a vital task for SA1 and SDNA DMG. Without good quality annual count information, it will not be possible to estimate the size of culls required to achieve estate objectives.

We do know that across SA1 an average of around 560 hinds have been killed on open range each year between 2010 and 2016. This cull has not been sufficient to prevent population growth within SA1. Combined culls across SA1 and SDNA have maintained a broadly stable hind population across the combined area. Stag populations across the combined area have risen by around 400 in 6 years if “Starting population 1” is used for 2010. Under “Starting population 2”, which assumes a lower proportion of knobbers are present within “others”, stag numbers have risen by 1100 in 6 years. This suggests that at least 70 more stags can be culled across the combined area each year to maintain a stable stag population.

9.0 Appendix E

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