# DEER MANAGEMENT PLAN FOR THE LOCHALSH sub-GROUP OF THE SOUTH ROSS DEER MANAGEMENT AREA

prepared on behalf of the Lochalsh subGroup of
THE SOUTH ROSS DEER MANAGEMENT GROUP
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**Introduction:**

A1.1 The South Ross Deer Management Group covers an extremely large area of ground and for logistic convenience is subdivided into a number of different sub-Groups as: Affric and Kintail, Glenstrathfarrar, Strathconon and Lochalsh (formerly the West sub-Group).Over a period of time the various subGroups have elected to prepare formal and collaborative Deer Management Plans in order to better coordinate and integrate management efforts and management strategies within their respective areas. This Plan for the Lochalsh sub-Group is part of that wider initiative and seeks to present agreedpolicy on deer managment within this (final) sub-Group Area.

A1.2 Detailed *Estate* Deer Management Plans have already been prepared for Inverinate and Achnashellach Eststes; these are integrated into the current Lochalsh Group Plan alongside new plans developed for Attadale and Arineckaig.

A1.3 After extensive consultation this Plan is presented as an agreed Deer Management Plan for a five year period from 2007-2012. Annual review of progress and approval of any minor changes in policy will be made at each Annual General meeting of the Management Group. After this time, during which active management will be accompanied by close monitoring of the condition of deer populations and habitats, the Plan will undergo full review with an update for the following 5 year period.

A1.4 This Plan is informed by an initial survey, commissioned by the South Ross Deer Management Group in 2001, of the open hill vegetation within the Management Area, and an assessment of the impacts of grazing and trampling by deer and other herbivores (Stolte, A.M., Alfaro, P., Nolan, A.J. and Henderson, D.J. (2001) ***Rapid Assessment of Grazing and Trampling Impacts on Upland Habitats for the South Ross Deer Management Area.*** Macaulay Land Use Research Institute for South Ross DMG.

A1.5 In development of the actual Management Plan which follows, the subGroup employed Professor R.J.Putman to collate other relevant information on deer populations themselves, to assist in establishing clear definition of objectives as well as help focus discussion on future possible management options within individual Estates or the wider Management Group Area.
Information was sought from all estates and the Chairman of the Management Group on deer counts for the different estates or other land-holdings over the past 10 years, recorded calf-hind ratios and cull data. Many stalkers were also extremely generous with information from their own private records of past management, with information on past carcase weights, reproductive rate and private counts.

A1.6 Detailed consultations were undertaken with individual landowners, or their managing agents, as well as all stalkers to establish
i) current deer numbers and distribution on their own estates; movement patterns within Estates and between adjacent properties; past and present management policy and procedures;
ii) current patterns of land use, plans and expectations for the future, as well as exploring aims and objectives of management for their deer for the future.

A1.7 Additional consultation was carried out with other interest groups such as Scottish Natural Heritage Regional staff, the DCS and Forestry Commission for Scotland to establish their interests and aspirations for future management of the area.

A1.8 Finally, independent assessments were also undertaken of the condition of the deer herds and the condition of the habitat during a series of visits to all the estates by RP through May and June 2002 (Achnashellach) , July 2004 (Inverinate), April and June 2005 (Attadale and Arineckaig).

**The structure of this document:**

A1.9 Since management decisions must be taken (and reviewed) in the context of a proper understanding of the deer populations of the area, their movements, impacts upon their habitat, and in the light of any specific problems perceived in the future management of this resource, this Plan begins by way of preamble (Parts A and B), with a brief overview description of the 'resource': a description of habitats and their condition, deer populations and changes in censused numbers and dynamics over the recent past (count data, recruitment rates, where available, trends in body weight) as well as a brief account of past management practices, as necessary background to formulation of future management. It seeks clear definition of individual and collective management Objectives, and explores possible issues arising from past management practices or future management aspirations, as well as any constraints on future management decisions.

A1.10 Against that background, in the second part of the report (Part C and D: The Plan), actual management decisions for the next five years are presented for individual land-holdings, and, where appropriate, for the Group as a whole, and a summary offered of the way it is felt that future management decisions will address issues identified or highlighted in the initial analyses of Part A,B.

**A2. The Lochalsh subGroup Deer Management Area:**

A2.1 The Lochalsh (formerly West) subGroup of the South Ross Deer Management Group comprises four private Estates: Attadale, Arineckaig, South Achnashellach and Inverinate, although this last itself includes the three distinct areas of Inverinate, Killilan and West Benula.
The Forestry Commission property also known as Achnashellach abuts the private Estate of the same name, and there is currently some exchange of deer with the hill ground (although perimeter fences may be reinstated in the near future (B3.21-B3.26). The separate plantations of the South Strome area are however exclosed from the open hill ground of the four main Estates by a major deer fence to the east of Attadale.

A2.2 This fence (supposedly) separates the properties of the Lochalsh Deer Group Area from the Kyle peninsula to the west, but has over recent years become somewhat porous. Agreement has been reached however with FCS and the Highland Council for refurbishment/reinstatement in the near future.
The fence runs from Loch Carron, south, to link with the plantation fence of South Strome, by Lochan Sgeireach, thence south to Loch na h'Onaich and Nonach. Here it links with the deer fence which protects the Crofters' Forestry Scheme on Inverinate. This runs from the head of Loch Long, along the north side of the track from Killilan up Glen Elchaig before turning west to Coille-righ following the chain of lochs from Loch nan Eun to Carn Bad a' Chreamha and via Loch Bhuic Mhor, Loch Gorm Mor and Loch a' Mhuilinn to Keppoch. A further fence extends from Keppoch and Sgurr Aoide, behind the woodlands of Carr Brae, to reach the road near the Morvich Causeway.

A2.3 Inverinate Home Beat and West Benula march, to the south, with Kintail and West Affric Estates, both owned by the National Trust for Scotland. The eastern end of West Benula marches with the private Estates of North Affric and East Benula South (Kintail and Affric Deer Group) before reaching the waters of Loch Mullardoch (at the junction of Loch Mullardoch and the old Loch Lungard, identifiable as a separate body of water before the closure of the Hydro dam and the raising of the water levels in Loch Mullardoch itself).

A2.4 North of the Loch, the Group march shows a somewhat complex interdigitation with Estates at the western end of the Glenstrathfarrar Group (as East Benula North, Pait and West Monar). The eastern march of West Benula first runs north to the Bealach Bholla, with East Benula North to its east before skirting the south side of Pait Forest to Loch Mhoidean. Here (with Killilan now to the west and Pait to the east), the march runs up the Allt Coire nan Each to its confluence with the Allt an Loin-fhioda.

A2.5 The northwest chain of lochs (Lochan Ghobhlach, Loch an Tachdaich, An Gead Loch) towards Loch Monar, separate the western edge of Pait from the Eastern Corries of Attadale, before the Attadale march makes a big swing back to 'circumnavigate' West Monar - west along the ridge of Doinn Mor, Meall Mor and Lurg Mhor, north to Bidean a' Choire Sheasgaich and Beinn Tharsuinn and then east again over the Bealach Bhearnais, Sgurr Choinnich and Sgurr Chaorachain. At this point the boundary (now separating Achnashellach Estate from Glencarron (in the Strathconon Group) runs due north to Sgurr nan Ceannaichean, to Creag an Ardaich, Meall an Fhliuchaird and to the A890 at the eastern edge of the Forestry Commission's Achnashellach Forest.

A2.6 The total area covered by the subgroup extends to some 46450 ha, in a transitional zone between the west and north-west Highlands.The geology is dominated by quartz-feldspar granulite but includes areas of Lewisian gneiss and mica-schist. The soils are predominantly peaty podzols, peaty gleys, peaty rankers and peat, with some brown podzolic soils at lower altitudes and on steeper slopes, and alpine soils at higher altitude

***Vegetation:***

A2.7 The principal vegetational communities associated with this area are the classic upland communities of blanket mire, wet grass-heaths, drier heaths and *Festuca – Agrostis* grasslands, although the Management Area also supports some very significant areas of wind-clipped, or moss heath on summit ridges and of native woodland .

A2.8 On the more acid soils and where peat accumulates on shallower slopes, or 'flats' the vegetation is dominated by extensive tracts of deer grass or cotton grass mires (*Scirpus (syn. Trichophorum) caespitosus - Eriophorum vaginatum* blanket mire; NVC M17). The most obvious species are deer grass and *Eriophorum*, with ling heather (*Calluna vulgaris*) and bell heather (*Erica tetralix*). In particular areas a more diverse community may develop containing a number of species of sedge (*Carex spp.*), bog asphodel (*Narthecium ossifragum*), *Drosera* species and locally dense stands of bog myrtle (*Myrica gale*), while in places where the vegetation is relatively undisturbed there may be widespread development of *Sphagnum* moss and other bryophytes.

A2.9 In areas which are somewhat better drained, the abundance of both bell heather and ling tends to increase and blanket mire gives way to wet heath (*Scirpus caespitosus - Erica tetralix* wet heath M15). Superficially similar to M17 this is characterised by the absence of cotton grass and the substantially thinner peat layer. Drier areas within this wet heath mosaic are often associated with an increased abundance of purple moor grass (*Molinia caerulea*) and greater dominance of *Calluna* and *Erica cinerea* within the dwarf shrub assemblage.

A2.10 On better drained soils of steeper slopes there are more extensive areas of pure dry heathland (where *Calluna vulgaris* becomes clearly dominant and approaches 100% cover). These are commonly modified by past and current management (in particular by muirburn) to produce a mosaic of patches of heather of different ages/stages of development, or (where heather recovery has been poor) may have led to increased dominance of grasses within burnt patches, leading to the subsequent development of a mosaic pattern of grass and heather patches within the heathland. At higher altitudes (and noticeably more apparent towards the east of the management area)areas of both wet and dry heathland are invaded by mat grass (*Nardus stricta*) and extensive areas of heath rush (*Juncus squarrosus*), which are associated especially with areas of late snow lie.

A2.11 In places, particularly on more exposed knolls or moraines, or steep, very well draining slopes, there are also patches of, naturally-developed Festuca-Agrostis grasslands (*Festuca ovina – Agrostis capillaris –Galium saxatile* grassland U4). Agrostis-Festuca greens are also associated with springs and 'green runners' through both wet and dry heath communities.

More exposed areas with thinner soils and high plateaux support a more montane vegetation type with hummocks of *Racomitrium* moss and *Cladonia* lichens (H13, H14), and widespread development of clubmoss (*Lycopodium*), while the higher tops support montane or subalpine assemblages.

A2.12 Throughout the Management Area, it is apparent that the nature of much the open hill vegetation is markedly affected by past and current management through sheep grazing, and in particular along-established history of regular periodic muirburn (for sheep and for grouse). This has clearly modified the heathland vegetation in particular, with grazing leading to a suppression of heather in general and an increase in grass inclusion within the sward overall (a higher percentage cover of grass even within the 'heather' patches), and with muirburn and subsequent heavy grazing tending to impose a mosaic pattern of alternating grass and heather patches within the overall matrix.

A2.13 There is also apparent within the management area as a whole something of a cline of vegetation from north to south with sites in the western part of the Management Area tending to be much grassier in nature than those further north. Thus further to the south (notably on Inverinate, Killilan and West Benula) the hill ground is for the most part grass-moor. There are relatively few areas of deep peat, with hags, or blanket bog communities, and areas of *Calluna* heath are extremely localised and restricted (primarily concentrated within the western, Inverinate beat). The vast bulk of the area is covered by grass-heath (herb-rich *Deschampsia* and *Molinia* grasslands, with some sparse *Erica tetralix*, at lower altitudes; some greater inclusion of deer grass *Scirpus caespitosum* at mid-altitude), with high altitude *Agrostis-Festuca* "greens" on the steepest faces. There are areas of wind-clipped summit heath, or moss-heath, on some of the summit ridges and screes, but these are of variable quality.

A2.14 Throughout the area there are remnant areas of native woodland, some of good extent and good quality; these are primarily of birch, with some rowan, holly and other broadleaved species. There are also Forestry Commission plantations within Inverinate/Killilan and Achnashellach, and areas of unfenced commercial forestry in the western part of Attadale.

***Mammals and Birds:***

A2.15 Red squirrels (*Sciurus vulgaris*), pine martens (*Martes martes*) and European otters (*Lutra lutra*) are all present within the Management Area; all species are of national importance. Foxes (*Vulpes vulpes*), weasels (*Mustela nivalis*) and badgers (*Meles meles*) are also present with the latter becoming increasingly common. Water voles *(Arvicola terrestris*) have been recorded in the past in a number of locations but the current status of these populations is unknown.

A2.16 There are significant populations of red deer (*Cervus elaphus*) throughout the area, which provide the main grazing impact over much of the hill ground and also the major sporting interest. Roe deer (*Capreolus capreolus*) are also widespread but at lower density and with a discrete, patchy distribution. Sika deer (*Cervus nippon*) have been regularly reported over recent years.

A2.17 Notable species of birds recorded as resident and/or breeding within the Management Area include Golden eagle (*Aquila chrysaetos*), peregrine (*Falco peregrinus*), merlin (*Falco columbarius*), hen harrier (*Circus cyaneus*), goshawk (*Accipiter gentilis*), sparrowhawk (*A.nisus*) and buzzard (*Buteo buteo*). There are also breeding populations of red-throated and black-throated diver (*Gavia stellata, G. arctica*), redshank (*Tringa totanus*), greenshank (*T. nebularia*), common sandpiper (*T. hypoleucos*), dotterel (*Charadrius morinellus*), Golden plover (*Charadrius apricarius*), and ringed Plover (*C. hiaticula*). (All species listed appear on Schedule 1 of the Wildlife and Countryside Act and are listed in Annex 1 of the EC Birds Directive).

Black grouse (*Tetrao tetrix*) and ptarmigan (*Lagopus mutus*) used to be relatively abundant throughout the area and there remain small numbers of native red grouse (*Lagopus scoticus*).

A2.18 The Area is recognised as being of Regional importance for both Reptiles and Amphibians. Although it is somewhat undersurveyed, there are known to be populations of adder, common lizard (*Lacerta vivipara*), slow-worm (*Anguis fragilis*), common frog and palmate newt.

**Designated Areas**

A2.19 Much of the ground, in the south, falls within the Kintail National Scenic Area (embracing the larger part of Inverinate Home Beat), which inevitably places some constraints upon management. In addition, (small) parts of two Sites of Special Scientific Interest extend into West Benula and Achnashellach.

A2.20 Thus, a small part of the West Benula beat of Inverinate falls within the Affric-Cannich Hills SSSI. This includes (to the north of Loch Lungard) the whole area to the east of the Allt Coire Lungard and (to the south of the loch) that whole area to the east of the Abhainn a' Choilich to the Bealach Coire Ghaidheil. The area was first notified as an SSSI in 1974 and renotified with an amended boundary in 1983. It was designated for a number of features which include alpine and boreal grasslands (montane grasslands on acid soils), blanket bogs, North Atlantic wet heaths with *Erica tetralix*, montane tall herb communities, siliceous rocky slopes with crevice communities (plant communities growing in rock crevices at high altitude), and summit scree communities such as moss heaths and wind-clipped heath. Of particular relevance to West Benula are the montane communities of herb ledges, rock crevices and summit screes.

A2.21 Similarly, a small section of Achnashellach (that part south west of the Allt Leathad an Tobair) lies within the larger Monar Forest SSSI (declared in 1974, once again largely in recognition of the plant communities of high altitude). The Designation Statement here notes the particular importance of the complex of habitats associated with the summit ridges, including summit moss-heath, dwarf shrub (wind-clipped) heath and tall herb ledges. It notes that the summit heaths are the most outstanding feature – dominated by woolly hair-moss with abundant cushion alpine plants and a variety of other species. There is a range of the plant communities characteristically associated with late snow-lie (so-called 'snowbed' communities), and the tall herb communities of the more inaccessible ledges are also of significance.

***Ownership:***

A2.22 The current ownership and management of the major Estates is

Achnashellach Estate (total area approx 6000 ha, with c.4,000 ha south of the A890 falling within the Lochalsh subGroup Area) owned by Major M.T.H. Wills

Attadale Estate (approx 30,000 acres; 12,150 ha.) owned by the Attadale Trust, and leased to Mr E Macpherson

Arineckaig Estate (approx. 2000ha) owned and managed by Mr and Mrs A.G. Macpherson

Inverinate Estate (Inverinate, Killilan and West Benula; a total of 28,300 ha) owned and managed on behalf of SMECH Holdings Ltd.

**Issues:**

A3.1 A survey of grazing and trampling pressure carried out within the South Ross Deer Management Group Area as a whole, by the Macaulay Land Use Research Institute (Stolte *et al.* 2001) concluded that impacts were generally light or light-moderate within the Lochalsh subGroup area and heavy primarily in areas where deer share the grazing with domestic livestock, or in specific winter feeding areas.

A3.2 However, following a routine survey of Habitat Condition within the Strathglass Complex Special Area for Conservation SNH raised some concerns to the Deer Commission for Scotland (DCS) about possible deleterious effects of deer grazing and trampling on natural heritage values within the SAC. While the bulk of the SAC area lies outwith the Lochalsh sub-Group Management Area specific concerns were expressed about condition of some habitats lying within the West Benula beat of Inverinate,and it is clear that management on this beat (and others) will also be affected by any necessary action to be taken on neighbouring ground to address additional concerns on Pait and East Benula (North).

A3.3 Specific proposals for management changes targeted at addressing SNH's concerns were incorporated into recent Group Deer Management Plans prepared by the Glenstrathfarrar, and Affric and Kintail sub-Groups of the South Ross Deer Management Group and within Inverinate's (at that time Draft) Estate Management Plan. These proposals were presented to SNH and DCS (meeting at the Deer Commission offices in Inverness on 15th July 2005) and were accepted as a very positive initiative.

A3.4 In consequence, the DCS Board has agreed that there would appear at present no need to reclassify the Strathglass Complex SAC as Priority Site for Action. Rather they consider it should be retained simply as an Area for further Assessment. We should note however

a) that it does remain a site for assessment and some further action may be required following the next major survey of Habitat Condition within the SAC and
b) that management measures proposed on neighbouring ground may have the potential to influence deer populations and management within the Lochalsh sub-Group,

A3.5 This Plan has thus been developed in full awareness of management changes agreed on neighbouring properties and the possible implication of these for Estates within the Lochalsh sub-Group, and also encapsulates agreements formulated within the Inverinate Estate Deer Management Plan deliberately targeted to address SNH's concerns about heavy impacts on those parts of the SAC falling within that latter Estate.

A3.6 One further issue which may affect management of, particularly, Achnashellach, is the recent decision by FCS to fence the entire southern march of their holdings at Achnashellach. In the past, much of the march was unfenced (and management within the Forestry Commission's land was based on internal fencing); deer from neighbouring Estates thus had access to these woodland areas as thermal cover during winter or during other periods of bad weather. A policy shift within the Commission means that they will no longer renew any internal fences within their property and the decision has been made to fence their entire southern march at Achnashellach. This will indubitably have significant implications on distribution and movement of deer within that local area, especially over winter.

**A4 General assumptions**

A4.1 Calculations of
i) population size and structure required to support a given stag quota on sporting Estates and
ii) culling levels required to maintain these or other populations at some given steady state,
are based on a number of general assumptions. Any population projections such as these require as inputs, information on overall recruitment rates and natural mortality levels, as well as the way these may respond to changing overall densities. Assumptions made in the calculations used to develop population models in this Plan are summarised below.

*Recruitment rates:*
A4.2 In analyses for each Estate, calculations have been based on the actual recruitment rate recorded for that Estate (as an average post-winter calf:hind ratio over the past 4 years where these are available). To ensure some measure of conservatism, no adjustment has been made for any change (increase) in recruitment rates which might accompany any future reductions in density. Although theory suggests that a reduction in overall density of a resource-limited population may result in an increase in recruitment rates (through and increase in reproductive rates and a decrease in natural mortality) it seems unlikely that any substantial increase in recruitment could be expected in response to a reduction of density in the current context (especially in view of the relatively small scale of change considered in most cases).

A4.3 Further, there is no ready paradigm on which to base any adjustment. Application of the general relationship between recruitment rates and hind density developed by the Deer Commission (and summarised in, for example Clutton-Brock *et al*, 1972) was not considered appropriate in the specific conditions of the South Ross Management Area - in that figures are averages derived over a range of Management blocks throughout Scotland, and not restricted to the West coast.

*Mortality levels*:
A4.4 Population estimates throughout are based on post-winter counts, when any cull and natural mortality of calves should have occurred; in all calculations which follow, therefore no further allowance is made for calf mortality. Beyond this, projections were modelled on two different scenarios. In 'minimum number' calculations, a minimum allowance made for additional natural mortality of older animals (both stags and hinds) as 10% of post-winter calf numbers. Thus recruitment to maturity is calculated as numbers of hinds post-winter multiplied by estate-specific recruitment rate multiplied by 0.9. This presumption of extremely low post-calf mortality in managed populations is in line with assumptions made in models of, for example Buckland *et al.* and others.

A4.5 However, mortality levels in open hill populations may in practice be somewhat higher than this, both through natural mortality and imposed cull mortality of individual young stags in selecting out those of poorer quality. A more conservative model was therefore also applied in which mortality rates among yearling hinds and stags are assumed in the region of c. 10% per annum; losses of older stags are assumed in this second model to be on average 3% per annum; natural mortality of mature hinds is allowed for at a rate of 2% per annum. These figures relate more closely to mortality rates which would be expected among unmanaged hill populations (Clutton-Brock *et al* 1972).

A4.6 Culling of calves is usually related to culling of milk hinds, although additional lone calves will be shot by stalkers in late winter, where the mother may be presumed dead, or the calf has become separated from its dam in some other way. In projecting future calf-culls for each Estate, minimum figures are based on the existing ratio for that Estate of calves: hinds in the cull (average over past 4 years), although in many cases the suggested calf cull will exceed that minimum figure.

*Calculations of required population size:*
A4.7 In consideration of the appropriate size of current and future populations maintained on primarily sporting Estates, analyses above are deliberately engineered towards presentation of a specified number of mature stags for stalking each year. Throughout the calculations it is presumed that that desired quota should be composed of stags of at least 8 years of age (see also, Clutton-Brock and Lonergan, 1994; Buckland *et al.*, 1996).

A4.8 In theory, minimum population size and structure may be calculated from these figures to provide a residual population capable of sustaining an annual offtake of a specified quota of stags. Calculations undertaken here do not necessarily promote this theoretical minimum figure but allow some margin for variation in recruitment rates and mortality and the effects of stochastic variation in winter weather conditions. In addition, it should be remembered that there is considerable exchange of animals across the boundaries of neighbouring Estates, and not all Estates are 'self-sufficient' in production of shootable stags. Some Estates are net exporters of mature stags - and maintain only a proportion of stags overwintered into the stalking season; others (largely hind-forests) are net importers, and may shoot more mature stags than their hind population is actually producing. Minimum population sizes are thus adjusted to take account of this.

A4.9 *Calculating the cull:*
Except where otherwise indicated (where a transitional cull may be designed to effect a phased reduction from current population levels), all annual cull figures presented are calculated (whether for sporting Estates or those seeking primarily to manage grazing and browsing impacts) to balance net growth rates within the population and maintain the population at steady-state.
Overall population size on sporting Estates is specifically calculated to produce a required (sustainable) harvest of mature stags (above). Stag cull figures are thus predetermined.

A4.10 Assuming an equal sex ratio at birth, and allowing for differential mortality rates between stags and hinds in subsequent years, required level of the hind cull might be expected to be close to the stag quota to maintain a stable population and is seen to be so for a number of Estates, which may be considered effectively self-contained, or closed populations. Figures will in general be slightly higher than those for stags, simply because of lower natural mortality in general among hind population (e.g. Clutton Brock *et al.* 1972). However, it is acknowledged that some Estates are net exporters of stags (which are shot on other estates), and may thus feel it appropriate to maintain hind populations higher than those required merely to produce their own quota of stags in order to offset this ‘net loss’ of stags exported to other Estates, yet maintain sufficient to satisfy their own sporting quotas.
With higher breeding populations overall, these Estates are thus also producing more hinds than they themselves require; for these Estates, culls of hinds will thus exceed those required for stags to maintain the population at steady state.

## B. Individual Estates

### B1. Attadale Estate:

B1.1 Attadale Estate extends to approximately 30,000 acres (12150 ha) to the south and southwest of Loch Carron. The western boundary (with FCS South Strome) is defined by the line of the deer fence south from Loch Carron itself, which links to the perimeter fencing around the Forestry plantation at Carn na Creig and then runs south from c NG921332 to Nonach.
In the southwestern corner, the land to the east of this fence up to the Shepherd's Burn (Allt Loch Innis nan Seangan) has been sold off to a separate syndicate, but the Estate maintains the stalking rights over the area.

B1.2 The boundary to the north west is defined by Loch Carron (and the A890). Much of the south side of the road is again fenced, to prevent deer straying onto the road and this roadside fencing now links with the perimeter fence of the Crofters' Forestry scheme at Achintee. To the south (against Killilan) the march follows the line of the River Ling and the Allt an Loin-fhiodha to Cnoc a' Mhoraire and then runs northwest along the chain of lochs (Lochan Ghobhlach, Loch an Tachdaich, An Gead Loch) which separate Attadale from Pait Forest to the east (A1.5).

B1.3 The eastern march is more complex as it swings back in around the western boundary of West Monar, west along the ridge of Doinn Mor, Meall Mor and Lurg Mhor, north to Bidean a' Choire Sheasgaich and Beinn Tharsuinn and then east again over to the Bealach Bhearnais.
At this point Attadale is "attenuated" to a long finger of Coire Bearneas sticking out between West Monar to the south east and Achnashellach to the north. The march with Achnashellach is indeed defined by the line of the Abhainn Bhearnais in the foot of the corrie, below the steep Sgurr na Feartaig of Achnashellach .
The march then runs north (from approximately NH020430) to Eagan, before turning southwest along the low ridge of Creag a' Chaorainn and following the line of the old stalking path past Creag Dubh Mhor, down to the River Taodail, thereafter following this to the road junction at Strathcarron. As already noted (B1.2) an area of ground at this point, between the Attadale house policies and Achintee, is fenced out of the deer range in a Crofters' Forestry scheme (244 ha).

B1.4 Attadale Estate rises from sea level in the north, and rises to over 900m at the eastern boundary with West Monar Estate (along the ridge from Bidein a' Choire Seasgaidh to Meall Mor), with its highest point (986m) at the summit of Lurg Mhor. Most of the Estate ranges between 200m and 500m. Soils and geology are described in Susan Watson's 1999 Deer Plan for Attadale Estate.

B1.5 An area of low-lying ground along the lower part of the River Attadale is leased to a local farmer and grazed by both sheep and cattle. The bulk of this area is exclosed from the hill ground by a deer fence; one 16 acre field on the eastern edge of this area however, remains open to deer. There are three crofting tenancies at Achintee, but as above, these areas are now fenced out from the Lochalsh deer range within a Crofters' Forestry Scheme and previous problems with occasional marauding animals are no longer an issue, although animals continue to get in to the woodland area from the road side and across the River Carron.

B1.6 There are policy woodlands immediately surrounding the house and a further area of (exotic) coniferous plantation established in the 1960s south of the River Attadale and immediately west of the track to Loch am Droighinn. This was never intended primarily as a commercial plantation and is 'checked' in many areas where trees have failed successfully to establish; fences have largely been removed, or are otherwise in disrepair and the area is thus available to the deer for feeding/cover.

B1.7 There are also numerous patches of native woodland within the Estate – chiefly concentrated on the lower ground towards the west, and commonly associated with steeper bluffs or deeper burns where it is in consequence less accessible to browsing animals. While the majority of areas are of mixed birch woodland, there are also some good fragments remaining also of Caledonian pine (*Pinus sylvestris, var. scotica*; W18).

B1.8 There is for example an extensive area of mixed birch woodland along the steep scarps above the south side of the A890 road and there are further patches of broadleaved woodland associated with the gullies of the burns at (e.g) NG900365; 929375. There is also a more extensive area higher up the River Attadale and along its various tributaries (Eas Ban).

B1.9 Much of this latter area has more recently been fenced to encourage natural regeneration. An initial area was fenced in 1986 in order to test the actual potential for regeneration (centred NG948382); 12 additional areas were subsequently enclosed in 1995 (to the east of the initial enclosure: NG952382; to the south and southwest (centred NG951379; 947378); 2 more along the Eas Ban (NG959380; 963385) and four along the Eas an Larain (NG957375; 958378; 958370; 961372). The other enclosures are to the west of the Attadale River, centred NG928375; 932382; 936377. Detailed maps are included as Appendix 5 of Susan Watson's 1997 Plan. A further regeneration exclosure is under discussion at the present time with Trees for Life and may enclose that area of mixed woodland to the north of the track and some part of the area between the two parts of the 1960s plantation at NG943370, although leaving a downfall to facilitate free movement of deer.

B1.10 The vegetation of the remaining 12000 ha of hill ground is described by Stolte *et al.* (2005) as: "typical of the situation in the wetter West Highlands, being dominated by dwarf-shrub heath with co-dominant heather (*Calluna vulgaris*) and purple moor-grass (*Molinia caerulea*), along with associated species such as cross-leaved heath (*Erica tetralix*) and deer grass (*Trichophorum cespitosum*). This is a variant of M15 *Scirpus cespitosus-Erica tetralix* wet heath according to the National Vegetation Classification (NVC) of Rodwell (1991). On steeper slopes, a drier relatively herb-rich variant of the vegetation was more typical, often in mosaic with coarse grassland, dominated by white bent (*Nardus stricta*), heath rush (*Juncus squarrosus*) and purple moor-grass, or communities transitional to smooth grassland with the presence of more palatable grasses and forb species".

B1.11 The bulk of the lower and middle ground of the main glen is rather undifferentiated wet heath / grass moor [*Scirpus*/*Molinia*, with some heathers: ling heather (*Calluna vulgaris*) and the Ericas: *E. tetralix* and *E. cinerea*. Throughout, heathers are present as scattered clumps or individual plants within the *Scirpus/ Molinia* matrix, rather than as discrete patches of heath, so that the whole presents an integrated single community rather than a mosaic pattern of separate areas, although changing dominance of *Scirpus/Molinia,* or *Scirpus/ Erica* does create some heterogeneity within the whole. This changing dominance of grasses or heathers within the sward reflects underlying soil depth and drainage patterns, and past patterns of muirburn.

B1.12 This general grass moor style of vegetation is further interspersed by "green runners" (stretches of *Agrostis/Festuca* grassland associated with spring or seepage lines and hill burns, which increase mineralisation of soils), while the steepest faces of eg. Beinn Dronaig, Sail Riabhach/Creag Dubh, Beinn Tharsuinn etc. offer more extensive areas of high altitude *Agrostis/Festuca* grassland. These 'high greens' are however restricted to the steepest faces; the upper slopes and summits of more rounded, or lower hills (eg. Meall Ruadh) simply present the established pattern of heather and grass, although the heather tends towards a more prostrate growth form.

B1.13 Heathers are generally rather sparsely represented on the lower ground, except on the driest areas, and the only extensive areas of *Calluna* were restricted to Meall Ruadh, around the 'nose' of Aonach Dubh and on the steeper, south-facing slopes of Carn Ruairidh.
Lack of *Calluna* more generally and the tendency of the general vegetation to be dominated by grassy swards, may usually be seen as indicative of a long history of heavy grazing (by livestock) and associated muirburn; however the abundance of flowering species characteristic of open grassland, such as orchids, milkwort and self-heal, suggest that the underlying vegetational style may always have tended towards grass moorland rather than heath.

B1.14 In general, there was a gradation of vegetational 'quality' from west to east. It was notable that the open ground to the west of the 1960s plantations (around Aonach Baile na Creige and Carn nan Iomairean) tended to have a somewhat greater depth of peat accumulating and thus supported a somewhat more 'sour' vegetation, more heavily dominated by coarser grasses, *Scirpus* and *Nardus stricta*. By contrast, towards the eastern end, on the north side of Loch Calavie and beyond (below the boundary ridge with West Monar) even the lower ground presented a much grassier appearance, with relatively little heather inclusion and a high representation of sweet grasses (cf. Killilan/ West Benula, both of which also present essentially 'grass hills' with surprisingly high inclusion of forbs and fine grasses)

B1.15 Most parts of the hill ground are sloping, or gently undulating (morainic) rather than flat. But there is an extensive area of flat ground in the 'basin' of the Black Water (Uisge Dubh) to the north of Bendronaig Lodge, supporting grass-*Eriophorum* (cotton-grass ) mire – and a further area of deep peaty flats towards Loch Feith a' Mhadaidh (at NG992380). Smaller areas of *Eriophorum* mire/blanket bog occur in patches amongst the wider grass-moor matrix in other areas of poorly-drained and deeper peat.

B1.16 To the east of the Estate lie the two deeper corries Coire a' Charra and Coire a' Ghraigh-fhear. Both are rather open, sloping corries (draining to the south) rather than classic 'basin' corries of peat, although the upper part of Coire a' Charra is more of an enclosed basin with steep walls. In the lower three-quarters of this corrie, the slopes of the sides once again support a rather grass-dominated wet grass-moor, while the actual floor grades to a peaty, haggy grass-mire. The Coire a' Ghhraigh-fhear is also a open corrie, with grass-heath slopes flanking its sides, and with steep/sheer walls at its very upper end, against the Monar march. There is markedly more heather in the vegetational matrix of the slopes of this latter corrie, although it is very prostrate and 'cushioned' in form; but on the floor, once again, the vegetation grades to grass-mire and there is significant exposure of bare peat.

B1.17 As noted (B1.5), livestock are largely restricted to the fenced areas of the Home Farm, although both sheep and cattle do graze on the slopes of Carn nan Iomairean above the farm. However, Attadale's hill ground is rather subject to disturbance from hill walkers. The Estate has two Munroes that are situated in the heart of the deer range and there are obvious paths to both peaks. In addition, several lower level paths cross the Estate and are in regular use. Both Ben Dronaig and Tharsinn are Corbetts and these, too, are suffering increasing levels of disturbance. On both the north and south marches there are bothies run by the Mountain Bothies' Association (at Bearneas on Achnashellach, and on Killilan at Maol-buidhe); in addition the old stalkers' house at Beinn Dronaig (owned by the Estate) is left open for use by walkers.

Deer Populations

B1.18 There are few roe present on the Estate (indeed none at all have been recorded in recent years) and sika are only occasionally sighted. The primary deer population is therefore red deer.

Formal counts have been undertaken in late winter of (1969), 1972, 1984, 1995 and 2003 as part of wider DMG counts organised by the Deer Commission for Scotland. A full helicopter count of the Estate was also carried out in 2006. The more recent of these counts are summarised below (throughout, making an adjustment from raw counts on the basis of a 10% misclassification as hinds, of young stags (knobbers):

| | 1972 | 1984 | 1995 | 2003 | 2006 |
|---|---|---|---|---|---|
| Stags | 587 | 402 | 555 | 629 | 619 |
| Hinds | 793 | 1009 | 778 | 595 | 700 |
| Calves | 300 | 301 | 255 | 238 | 232 |
| Total | 1680 | 1712 | 1588 | 1462 | 1551 |

These counts suggest a late winter density of c.12.7 per 100 hectares (square kilometre) of unenclosed hill ground and an average post winter recruitment rate (as surviving calves per 100 hinds) over recent years at 33.7 calves per 100 hinds (1995, 2003, 2006).

B1.19 Additional **summer** counts have been carried out over more recent years (1999- 2005) by the Estate's own staff). Due to lack of resources however, counting has been restricted to the three main centres of population established within the Estate at Beinn Dronaig, the Calavie Boat (between Sail Riabhach and Bidein a' Choire Sheasagaich), and the Far Corries (Coire a Charra and Coire a Ghraigh-fhear below the Meall Mor ridge). These counts are thus indicative only and do not include animals resident elsewhere on the Estate on lower ground, or high ground towards the north west.

B1.20 Further, these Estate counts, undertaken during the summer, offer a somewhat different perspective on Attadale's deer numbers. Winter numbers may be 'distorted' since a proportion of animals drawn to the low ground of Attadale overwinter – particularly overwintering groups of stags- may have dispersed elsewhere by midsummer; summer counts (if complete) thus offer a better estimate perhaps of actual numbers of stags on the ground at the start of the stalking season (below C1.10 – C1.12).

B1.21 Summer counts are summarised below to 2005, with figures for a count of the same ground (Beinn Dronaig, the Calavie Boat, and the Far Corries) in April/May 2007

| **Beinn Dronaig** | 1999 | 2000 | 2001 | 2002 | 2004 | 2005 | 2007 |
|---|---|---|---|---|---|---|---|
| Stags | 67 | 91 | 73 | 60 | 82 | 53 | 26 |
| Hinds | 243 | 253 | 271 | 234 | 246 | 306 | 176 |
| Calves | 70 | 67 | 87 | 66 | 79 | 68 | 63 |
| Total | 380 | 411 | 431 | 360 | 407 | 427 | 265 |

| **Far Corries** | 1999 | 2000 | 2001 | 2002 | 2004 | 2005 | 2007 |
|---|---|---|---|---|---|---|---|
| Stags | 162 | 252 | 217 | 182 | 168 | 160 | 127 |
| Hinds | 378 | 380 | 336 | 226 | 322 | 170 | 260 |
| Calves | 119 | 131 | 127 | 55 | 79 | 62 | 81 |
| Total | 659 | 763 | 680 | 463 | 569 | 392 | 468 |

| **Calavie Boat** | 1999 | 2000 | 2001 | 2002 | 2004 | 2005 | 2007 |
|---|---|---|---|---|---|---|---|
| Stags | | 20 | 5 | 3 | 18 | 8 | 9 |
| Hinds | | 153 | 101 | 89 | 129 | 73 | 39 |
| Calves | | 34 | 36 | 21 | 45 | 27 | 7 |
| Total | | 207 | 142 | 113 | 192 | 108 | 55 |

B1.22 These represent total counts for the three areas combined, of:

| **Total** | 1999 | 2000 | 2001 | 2002 | 2004 | 2005 | 2007 |
|---|---|---|---|---|---|---|---|
| Stags | [229] | 363 | 295 | 247 | 268 | 221 | 162 |
| Hinds | [621] | 786 | 708 | 549 | 697 | 549 | 475 |
| Calves | [189] | 232 | 250 | 142 | 203 | 157 | 151 |
| Total | [1039] | 1381 | 1253 | 938 | 1168 | 927 | 788 |

B1.23 Despite the fact that these counts are restricted to census of the main concentrations of animals within the Estate only, and might thus be presumed something of an underestimate, total counts of hinds and calves especially are close to those censused in winter counts (compare especially 2003 counts winter and summer, here and B1.18 above); this perhaps endorses Tom Watson, the stalker's own estimation that hind numbers in other parts of the Estate total <100, although in response to recent managment efforts, numbers here are now rising.
As anticipated, numbers of stags returned in summer counts are indeed lower than those censused overwinter and show remarkable consistency over recent years.

B1.24 As suggested, during the summer months, hinds are concentrated in three main areas –in the Far Corries (Coire a Ghraigh-fhear below the Meall Mor ridge), on the south faces of Beinn Dronaig and around the Calavie Boat (between Sail Riabhach and Bidein a' Choire Sheasgaich) - although this latter (smaller) group is more mobile and drifts to and fro across the march with West Monar (B1.19). Summer stags have also tended in the past to be mainly centred on the Far Corries (Coire a Charra) and Beinn Dronaig, although this aggregation is becoming more dispersed due to increasing disturbance from hill walkers.

B1.25 Resident stags, plus others from neighbouring high ground move down over winter to the low ground towards the west of the Estate (around Meall Ruadh, Aonach Dubh and on to the lower ground towards the coast, or towards Glen Ling). Some of the latter are drawn across to visit the feed sites of Killilan on a transient basis but then return to Attadale to lie back on the slopes of Carn Luib an Ath Ruaidh and the rockier scurrs to the west. [In a similar manner, stags from Killilan use these same slopes in sunny weather or in certain winds, but do not stay as more than temporary visitors]

B1.26 Hinds from the Far Corries likewise may visit the north-facing slopes of the Lurg Mhor-Meall Mor ridge in certain wind and weather conditions, while those on Beinn Dronaig will visit the flats of the Ling around Maol-buidhe (on Killilan), but again tend to do so on a purely transient basis and return afterwards to their own 'side' of the march. Finally there is some movement between Attadale and Achnashellach on the southern slopes of Sgurr na Feartaig.
In winter, the hinds from the Far Corries, Beinn Dronaig and the Calavie Boat move, in the first instance, to the north-facing slopes of Beinn Dronaig and west slopes of Sail Riabhach; once this higher ground is covered with snow, they congregate in the flats of the Bendronaig Basin (above B1.15). In snowy conditions up to 100 hinds come in to Coire Sheasgaich from West Monar.

*Population condition:*

B1.27 Estimates of the body weight of hinds and calves in particular are a sensitive indicator of any changes in condition of a deer population. While weights of adult males often seen by sporting Estates as the crucial indicator, this is actually a measure highly prone to year to year variation depending on the proportional representation within the cull of males of different age. As illustration: if in one year the majority of stags included within the cull are of 8 years or more in age, average weight may be significantly higher than that of some subsequent year when perhaps the cull included a slightly higher number of 4 or 5 year olds; this difference is simply a consequence of that difference in age-composition within the cull as a whole, rather than due to any underlying trend in condition (and is due to the fact that males continue to grow and increase in weight up to about 6 or 7 years of age).

B1.28 By contrast, weights of adult females, yearling stags or hinds (and calves) show far lower intrinsic variation and are more reliable indicators of changing population condition (Putman and Langbein, 1992). (Yearling females would also be a valid indicator, but sample sizes are usually rather small). Weights do vary somewhat depending on weather conditions, but if a running average is calculated across a three-year interval, changes in this average weight are indeed an excellent indicator of changes in general herd condition (and by extension, changes in range quality)

B1.29 The profile of hill weights of hinds and calves culled on Attadale are shown by Watson (1999) in her Statistical Analysis of data compiled by the South Ross DMG between 1989-1998. These show that in most years, the majority of hinds culled are between 40 to 50 kgs, with calves between 20 and 25 kgs. Watson reports no significant directional change in either hind or calf weight with time.

*Current Management:*

B1.30 Attadale is run primarily as a sporting Estate. Stalking is reserved to the family and their guests. Hind-shooting is entirely undertaken by the stalker.

B1.31 The main objectives of management are formally declared in the Estate Deer Management Plan (1999) as:

- To establish and maintain a stock of healthy deer, subject to the sustainable carrying capacity of the available range; also to maintain high standards of deer welfare, carcase handling and range management

Subsidiary objectives are noted as:

- Establish arrangements for the collaborative management of deer in the area
- Produce and distribute an agreed public access policy

B1.32 Culls taken over recent years are summarised below. We should note however that these are not necessary fully indicative of the expected situation at steady-state since the period includes a time when a deliberate effort was made to reduce numbers on the Estate (and a subsequent relaxation of culling to permit populations to re-establish)

| Year | 1988/9 | 89/90 | 90/91 | 91/92 | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stags | 51 | 50 | 50 | 59 | 61 | 64 | 56 | 62 | 72 | 68 | 70 |
| Hinds | 141 | 142 | 100 | 109 | 130 | 94 | 92 | 80 | 76 | 98 | 159 |
| Calves | 73 | 34 | 55 | 26 | 62 | 32 | 25 | 27 | 34 | 52 | 63 |
| Total | 265 | 216 | 205 | 194 | 253 | 190 | 173 | 169 | 182 | 218 | 292 |

| | 1999/00 | 00/1 | 01/02 | 02/03 | 03/04 | 04/05 | 05/06 | 06/07* |
|---|---|---|---|---|---|---|---|---|
| Stags | 88 | 96 | 85 | 64 | 58 | 54 | 74 | 72 |
| Hinds | 141 | 163 | 162 | 16 | 32 | 54 | 69 | 43 |
| Calves | 60 | 61 | 58 | 2 | 18 | 27 | 28 | 25 |
| Total | 289 | 320 | 305 | 82 | 108 | 135 | 171 | 140 |

B1.33 Natural mortality overwinter has also been recorded since 1999, though it is accepted that carcases found will represent an underestimate of total mortality (particularly among calves)

| | 1998/99 | 99/00 | 00/1 | 01/02 | 02/03 | 03/04 | 04/05 | 05/06 | 06/07 |
|---|---|---|---|---|---|---|---|---|---|
| Stags | 70 | 12 | 4 | 31 | 4 | 4 | 10 | 14 | 16 |
| Hinds | 28 | 6 | 0 | 24 | 2 | 1 | 34 | 6 | 4 |
| Calves | 45 | 8 | 2 | 24 | 3 | 2 | 32 | 3 | 4 |

B1.34 Some muirburn is carried out on the Estate, time and weather conditions permitting. Since opportunities tend to be restricted relatively large areas are burnt when circumstances do permit. No supplementary food is offered overwinter (as silage, or cobs) but feedblocks (Rumevite) are put out from late October until the end of April in 9 sites distributed through the main stag wintering area. The ground around these feed sites tends to be badly poached; in addition some damage to small trees has been observed in the vicinity of the feeding stations (Watson, 1999) which argues that they may be a strong case for not always sticking to the same locations but moving the feedblocks around on a regular basis.

*Independent Assessments*

B1.35 The condition of the vegetation on the Estate (and an assessment of the level of grazing and trampling) was carried out in 2000 as part of the wider survey of grazing and trampling impacts throughout the South Ross Deer Management Area (Stolte *et al.* 2001). In general, impacts were assessed as light-moderate to moderate over the bulk of the ground, although it is noted that impacts were generally light to the northwest (Carn Ruairidh to Achintee and southwest of the 1960s forestry plantations.

Impacts were recorded as moderate-heavy around the Allt Loch Innis nan Seangan and the lower part of Glen Ling, and towards the A890 on the northern slopes of Aonach Baille na Creige. Heaviest impacts with signs of intensive grazing and significant tracking were recorded in the Far Corries (Coire a Charra and Coire a Ghraigh-fhear) – corresponding to Tom Watson's impressions that these are indeed the main area of concentration of animals on the Estate.

*Issues:*

B1.36 While the Kyle deer fence is in good repair to the west of Nonach and along the south side of the forest block north of Nonach, it is prone to wind damage along the eastern end of the same forest plantation and its potential weakness is always something of a risk for Attadale, should animals draw through future breakages and fail to return to the Estate due to subsequent closure of the fence, or due to being culled within the FC land. As noted above however, agreement has been reached for the entire 'Kyle Peninsula fence' to be repaired and reinstated.

1.37 A further issue arises due to the fact that over the summer period both stags and hinds are for the most part concentrated into one (stags) and two (hinds) main areas within the Estate – Coire a' Charra (stags); Beinn Dronaig and Coire a Ghraigh-fhear (hinds; with a subsidiary group focused on the area by the Calavie Boat). As a result of this restricted distribution, the animals are also congregated in large aggregations – in groups of a hundred or more, rather than scattered in small parcels over a wider area. While during the period of the rut, these aggregations do disperse to a degree, as stags move harems of hinds with them more evenly over the wider area, the core of the Estate and the western end nonetheless still remain comparatively empty – despite the fact that much of the ground in the centre of the Estate, to the west, or north seems perfectly suitable both from the point of view of feeding and topographic shelter.

B1.38 Such restricted dispersion – and the aggregation of animals into large groups – poses a number of problems.

i) Much suitable ground is rather underused, and 90% of all the animals maintained on Attadale are concentrated in a very small part of the total area. This 'wastes' available resources elsewhere while imposing unnecessary and potentially unacceptable heavy impacts in those areas where they are concentrated. [We note in this context that the areas of Coire a' Charra and Coire a Ghraigh-fhear were highlighted in the 2000 MALURI survey as sustaining heavy to severe impacts (B1.35)]

B1.39 In addition
ii) Concentration of animals into a relatively small part of the Estate, particularly in early summer, restricts stalking options during the early part of the stag season, resulting in no real choice of different places to go depending on wind and weather conditions or earlier human disturbance, and making it difficult to 'rest' certain areas between stalking outings.
iii) While after the breakout, the stags do distribute themselves somewhat more widely over the eastern and central part of the Estate, taking groups of hinds with them, this only occurs at the time of the actual rut, **and therefore restricts wider stalking opportunities to the last few weeks of the season**. [The Estate does take some early stags on Nonach and Carn nan Iomairean early on, but the main stalking is restricted to the final 2-3 weeks of the season]

B1.40 The observed pattern of distribution is blamed in part on regular disturbance by hill-walkers, with the result that the animals concentrate in large groups in open areas where visibility is good and they can readily escape, or concentrate in those areas which a relatively less disturbed. However, the current lack of animals more to the north may also reflect past efforts to reduce numbers in this particular area to prevent damage to adjoining croft land at Achintee - and numbers would appear now to be building up again once more in this area.

B1.41 Total numbers of animals to be maintained on Attadale also warrant careful consideration – especially in the light of a commitment to "maintaining high standards of deer welfare, carcase handling **and range management**" (1999 Estate Deer Plan). Currently numbers of hinds in particular would appear to be somewhat in excess of what is required to sustain present stag quotas.

## B2 Arineckaig

*Description:*
B2.1 Arineckaig is tucked into the north-western corner of Attadale, against the march with Achnashellach. Its march with Attadale runs in the west, from Strathcarron, up the River Taodail to the lower slopes of Creag Dhubh Mhor, thence along the ridge of Creag a' Chaorainn to Eagan. From this highest point (675m) the march with Achnashellach runs north west, virtually in a straight line, down towards the foot of Loch Dughaill.
The Estate extends to about 2000 ha, and consists of two main ridges running southwest – northeast: (Carn Mor rising to just over 500m and the watershed with Attadale rising to 675m.) separated by a central corrie, Coire Taodail.

B2.2 Arineckaig was acquired from Achnashellach as a separate sporting estate in the mid 1970s. The non-resident owner was primarily interested in fishing but did take a few stags each year. Hinds were occasionally culled by a professional stalker from another estate. The current owners acquired Arineckaig in June 1983; at this time there was a significant resident hind population but few resident mature stags. Of the entire Estate approximately 200ha comprise inbye and low ground supporting 300 sheep and 50 cattle. A further 250ha in the southwest corner towards Strathcarron was fenced off in 2000/01 under a Crofter Forestry Scheme.

B2.3 There are no designated sites of special or conservation interest. Indeed, fundamental to its management, it is important to note that the whole Estate is subject to crofting tenure, mostly as common grazings. These formally extend over the entire area, although in practice the grazing (chiefly of sheep) is concentrated on the river flats and the lower north-facing slopes of Carn Mor. Crofter sheep numbers with access to the common grazings are still in excess of 300 and are still have the primary impact on habitat condition.

*Vegetation:*
B2.4 Native broadleaved woodland covers intermittently about 100ha on the steep north east face of Carn Mor. While primarily of birch this includes rowan, some holly and some oaks; much of the Estate's management is directed towards encouraging regeneration within this (unfenced) woodland.

B2.5 The alluvial flats of the Carron valley itself are composed of natural or semi-improved grasslands. Some of these are fenced as sheep or cattle parks, and one small area is fully deer-fenced, but much, particularly to the north around the old crofting township of Arineckaig, is open to grazing by deer.

B2.6 The remainder is open hill. Between the woodland areas, the northern face of Carn Mor supports dense, mature, *Calluna* heath with good inclusion of blaeberry (and also currently, in many areas to leeward or above existing woodland patches, extensive inclusion of tree seedlings).
On the south face of Carn Mor, the heather is less vigorous. There are some patches of shorter *Calluna* in better-drained areas on knolls and where mineral soil is nearer the surface, but the main matrix here is of a wetter grass-heath (*Molinia/Scirpus/Erica*) in a mosaic of patches of greater/lesser grass/heather dominance. Soils become noticeably thinner towards the western end, towards the Crofters' Forestry fence with increasing exposure of bare rock/boulder and some increase in *Calluna* cover.

B2.7 The opposing (south) face of the ridge dividing Arineckaig from Attadale presents a similar vegetation: with again a wet grass-heath of primarily *Molinia/Scirpus/Erica* covering the lower and middle slopes, but these are more regularly interspersed with some greener patches (areas of Molinia with a higher inclusion of 'sweet grasses') and pure *Agrostis/Festuca* "green runners" associated with seepage and spring lines. There are also on this side, on the steepest faces, some true high altitude *Agrostis/Festuca* grasslands (high altitude 'greens') in a few places along the actual Creag a' Chaorainn ridge. The highest ground, on the actual plateau ridges of Carn Mor and Creag a' Chaorainn, is stony and undulating, and while it still supports essentially a grass heath community, there is a greater inclusion of *Calluna* on the drier knolls and a degraded summit heath community (wind-clipped *Calluna/Cladonia/Racomitrium*) on stonier areas.

B2.8 The flatter ground of the bottom of the Coire Taodail accumulates a greater depth of peat and in consequence, dominance of *Scirpus* and *Molinia* increases. To the north east, at the top of the corrie and around the head of Carn Mor, there are more extensive peaty flats, interspersed with hill lochs. Here the ground has a sourer aspect; it does not develop as true blanket bog, but the inclusion of deer grass (*Scirpus cespitosum*) is greatly increased to become fully dominant.

*Deer Populations and Movements:*
B2.9 As noted, when the present owners took over Arineckaig in 1983 there was a significant resident hind population but few resident mature stags. A significant number of stags did winter on the southeastern end of Carn Mor causing damage at times to the gardens in Strathcarron. However, these were clearly migrant and since the completion of the crofter forestry fencing, Arineckaig holds few stags overwinter.

B2.10 Arineckaig offers a relatively small land area and, more particularly, is somewhat 'enclosed' by Achnashellach and Attadale. It is probably therefore not relevant to consider its deer populations in isolation as a separate resident population, but rather a part of the larger population shared between Arineckaig and these latter two properties.
There was certainly regular movement of hinds in the past between Arineckaig and North Achnashellach, across the river flats around Coulags and Balnacra (according to the Achnashellach stalker Christopher Mackenzie), but this is now believed to be far less than it was formerly after the flat grazings were fenced off by the Coulags crofter.

Once animals have drawn to higher ground over the summer, inevitably at the marches, groups of hinds and summer stags animals drift regularly between Arineckaig and South Achnashellach along the face of Creag a' Chaorainn at Eagan, and between Arineckaig and Attadale over the top of the march ridge, depending on wind and weather conditions.

B2.11 Over the winter period, there is a core population of about 50 hinds and calves dispersed along the north face and the summit ridge of Carn Mor, within the core of the Estate, and a proportion of these probably remain resident year round, ( in recent years the Carn Mor summer hind population has probably been 20 at most ). However, as above, the bulk of the animals are found on the high ground of the eastern and northeastern marches and are effectively 'common' to Achnashellach and Attadale. Until recently, mature stags in summer have only been resident around their 'favourite knoll', MR998431, although a group of younger males used to spend the summer at the southwestern end of Carn Mor. Although these were culled within the Crofters' Forestry Area after closure of the fenceline, numbers of young stags are beginning to increase again elsewhere on Carn Mor.

B2.12 The 2003 DCS count recorded 42 stags, 131 hinds and 59 calves for Arineckaig. However, estate boundaries were incorrectly recorded and of this total only 36 stags, 60 hinds and 25 calves were actually on Arineckaig. However, as noted elsewhere such counts represent a snapshot only; the other animals recorded were not far the other side of the boundary, and in other weather conditions could well have been properly included in the Arineckaig total.
Given such uncertainties, deer management within Arineckaig places greater reliance on observation and on habitat assessment than on formal counts.

*Current Management:*
B2.13 Gordon MacPherson records the objectives of deer management at Arineckaig as:

- Prevention of damage to crofter agriculture
- Prevention of garden damage in Strathcarron
- Deer welfare
- Regeneration of native woodland on Carn Mor, without need for fencing
- Maintenance of existing habitat
- Co-operation with neighbouring estates
- Enjoyment of watching deer
- Recreational stalking

There are no public roads in or adjacent to the estate, so RTAs are not a concern.

B2.14 After completion of the Crofters' Forestry fence in 2000/01, the primary aim of management is thus enhancement of habitat – both on the open hill, but also, and specifically in encouraging regeneration and extension of the woodland areas on the north face of Carn Mor.
Given that this area is within the outrun for common grazings, the primary impact remains that of the crofters' sheep, but overall grazing and browsing impacts may be reduced by significant reduction at least of deer numbers. Management is directed towards this – but, as B2.12 above, not in relation to actual formal counts of deer on the area or estimates of total population *number*. Rather the aim is to keep individual hind groups on the Carn Mor small in size (no more than 2-4 animals per group) and well-dispersed across the available area; thus culling aims to remove one or two individuals from each group over winter (to balance recruitment) rather than to take any particular total number.

B2.15 Culling effort for hinds is thus focused on this core area of the Carn Mor. Management of the 'back land' is considered less critical, but recreational stalking does have some part in the overall management philosophy and between 10 and 12 stags are taken each season.
Stalking and hind culling is the responsibility of one part-time stalker.

B2.16 Until recently annual hind culls, including calves, have been between 20 and 30 – almost entirely from Carn Mor because of the focus on protecting the woodland regeneration (and also due to the problem of carcase recovery in winter from the high ground). Culling at that rate eventually resulted in substantial population reduction and in the elimination of large hind groups. Thus, from 2000 cull rates have been reduced. The reduction in hind numbers has permitted some increase in resident stags.

B2.17 Actual cull levels since 1997/98 are summarised below:

| | **1997/98** | **98/99** | **99/00** | **00/01** | **01/02*** | **02/03** | **03/04** | **04/05** | **05/06** | **06/07** |
|---|---|---|---|---|---|---|---|---|---|---|
| Stags | 10 | 10 | 12 | 12 | 20 | 7 | 10 | 8 | 7 | 10 |
| Hinds | 5 {H+C} | 16 | 6 | 9 | 16 | 1 | 5 | 3 | 1 | 4 |
| Calves | above | 5 | 4 | 2 | 9 | 0 | 0 | 3 | 1 | 1 |

*NB 2001/02 figures mark the removal cull following enclosure of the Crofters' Forestry Scheme

*Assessments and issues for consideration*:

B2.18 Assessments of grazing and trampling impacts on the vegetation , carried out as part of the wider survey of such impacts within the whole South Ross Deer Management Area (Stolte *et al*., 2001), recorded impacts on Arineckaig as largely light, or light-moderate. Moderate, or moderate-heavy impacts were recorded only on the north face of Carn Mor and the improved grasslands of the Carron valley, and coincide with areas where sheep tend to be concentrated.
Independent survey by RP on 27th April 2005 assessed impacts as almost universally light, with some areas light-moderate. The north face of Carn Mor was also assessed as suffering moderate or moderate-heavy impacts, but it was notable that there was a steep gradient in grazing pressure from the river flats up the face, with grazing pressures showing marked decline over a distance of only 50 - 100 metres and with impacts assessed on the bulk of this north facing slope as moderate, or even light-moderate, the further away one travelled from the road. Usage was in addition clearly patchy, with some areas preferred more than others, as evinced both by vegetational condition and distribution of (deer) dung groups.

B2.19 Vigorous regeneration was apparent in many places, within the open heath in small gaps between existing woodland areas, and on the leeward and upper margins of these more established blocks. There is good establishment of birch, with some rowan, holly and even a few oaks; seedlings/saplings are of a variety of ages, suggesting successful regeneration now over a period of some years. This remains patchy – at its most advanced at the eastern end - but in practice some measure of regeneration is apparent along most of the length of the Carn Mor face. Even at the more heavily grazed western end there are patches of good regeneration evident above the upper margin of the current woodland cover.

B2.20 There have clearly been episodes of damage – most notably bark-stripping and thrashing of young saplings, rather than damage through browsing- which has resulted in the death of a proportion of the newly-established trees in one or two areas. Such damage however is localised, and even at its most severe has not completely taken out entire areas. It would appear that, as long as incidence remains sporadic and localised, it does not represent a serious threat to longer-term woodland recovery.

B2.21 Despite the fact that the primary influence on the north face of Carn Mor remains that of sheep (especially on the lower slopes) current management efforts seem to be being successful in encouraging restoration of the woodlands in this area. These efforts are doubtless of benefit also to neighbouring Achnashellach, who are keen to see active regeneration and extension of woodlands in the Golden Valley, and should thus be seen as a positive contribution in this context also.

B2.22 However, it is noted that while the hinds on the Creag a' Chaorainn ridge all tend to drift to and fro between Arineckaig and Attadale/Achnashellach, those resident on Carn Mor, winter and summer would appear to have a daily pattern of movement where they remain on the hill, or within the woodland during the day, but move down to graze on the improved grasslands of the Carron flats at night. Stags too, share this pattern of daily movement to and from the river flats.
In consequence, there is a regular movement of animals through the woodland, and while animals may be migrating primarily to feed on the improved grasslands below, they will indubitably be browsing on occasional trees in transit, as they move to and fro through the woodlands. Thus browsing pressure within the woodlands could be still further reduced (even for the same number of deer), if this pattern of regular movement could itself be reduced (C2.2).

**B3. Achnashellach**

*Description*:
B3.1 Achnashellach Estate (approximately 14,800 acres; 6000ha) consists of two main sections to the north and south of the A890 road between Lochcarron and Achnashellach. The two parts of the Estate may be considered relatively independent for management purposes, only the southern section falls within the Lochalsh Deer Group. Plans for future management of deer populations north of the road are included within the separate South West Ross Group Deer Plan.

B3.2 The southern part of the Estate (hence **South Achnashellach**) lies south of the road, with its boundaries defined to the north by the A890, to the south by the watershed of Abhainn Bhearnais, across the Bealach Bhearnais to the summit of Sgurr a Chaorachain, and to the east by the slopes of Choire a Chonais. A shared track up this latter corrie leads to the Glenuaig beat of Glencarron Estate. The ground here is notably different from that of the north, being largely underlain by gneiss and schists as opposed to the sandstones of the north beat. While the vegetation is broadly similar the ground is clearly more fertile and productive, particularly in the broad strath of Choire a' Chonais, where there are numerous patches of true *Agrostis/Festuca* grassland particularly in association with the river flats in the main corrie.

B3.3 Elsewhere within this southern beat is largely a mix of grass-heaths with *Molinia*, *Scirpus*, *Calluna* and *Erica*, but, the ground is noticeably better-drained than that of the north beat and there are fewer areas of peat mire. The higher tops offer largely montane vegetation, with dense moss carpets, abundant stag's horn lichen and montane saxifrages on the stonier ridges where the bedrock is exposed. There are good grazing 'greens' along the east face of Carn na Geuraidean, along both north and south faces of Sgurr na Feartaig and Meallanan Buidhe.

B3.4 There are a number of significant areas of native woodland. Mixed broadleaves (primarily birch) stretch along the southern shore of Loch Dughail, on the north-west slopes of Creag an Eilein. While the northern end of these woodlands remain unfenced, a strategically positioned enclosure (WGS) at the southern end, established in 1994, not only protects the 43.2 ha actually enclosed within the fenceline but also provides a significant barrier to movement along the loch side and into other unfenced sections of the wood, by crofters' sheep from Arineckaig. A further small WGS enclosure (9.2 ha) was established at the same time, above the existing woodland fragments of Coire Dubh (grid reference 050482) filling in a corner of ground between these riverine fragments and the perimeter fence of Forest Enterprise plantations in this area. Finally, there is an extensive area of mixed broadleaves with scattered clumps of Caledonian pine, associated with the steeper slopes of the streams draining Loch nan Cabar in the Golden Valley.

B3.5 As in the north of the Estate, a large central section of the ground comprises separately-owned Forest Enterprise lands (Forestry Commission, Scotland). While there is a definitive perimeter fence to this FE property, it is old and until recently had not been maintained.

Western compartments (as northern extensions of the woodlands of the Golden Valley) and eastern compartments (from effectively grid line 040) were independently fenced; there is also internal fencing of the lower ground of the Coire a Bhainidh. The woodlands of the upper part of the Coire a Bhainidh however were not fenced and provided important shelter for deer populations in this central part of the southern beat.

*Designations:*

B3.6 The northern slopes of Sgurr Coinnich and Sgurr a Chaorachan (Leathad Dubh/Coire Choinnich) form a part of the Monar Forest SSSI declared in 1974. This SSSI (5420 hectares in total area) protects the upland massif which supports a complex of habitats including summit moss heath, snowbeds and tall herb ledges.

*Deer populations:*

B3.7 Spring counts of deer are carried out on the Estate as often as practicable.
In the North beat (that area falling within the South West Ross Management Group), a DCS count of 1997 estimated a total of 103 stags, 162 hinds and 56 calves; more recent counts by the Estate (1999 - 2005) suggest a stable (winter) population in the north beat of somewhere in the region of 25 stags, 130 hinds, and an average recruitment rate of 31 surviving calves per 100 hinds (average 2002-06). Densities in the less productive North beat are somewhat lower than those in the south, at approximately 9 deer per 100 hectares.

B3.8 Like the north beat, **South Achnashellach** is also predominantly a hind forest. Some stags are overwintered in the Choire a Chonais (and some feeding is offered in this area), but they are not restricted solely to Achnashellach, and actually drift between this Estate and Glencarron on a regular basis as they move north east or southeast around the faces of Sgurr nan Ceannaichean (Am Eilich-choire or on the southern slopes towards Glenuaig). Some of these wintering stags will stay on the Estate into the early part of the stalking season); in addition, there is a regular influx of stags in the summer onto the ground at Sgurr na Feartaig.

B3.9 The main concentrations of hinds of the South beat are in the Coire na h-Eilde above the Forestry, in the Golden Valley, on the slopes of Sgurr na Feartaig to the south and around Coire Coinich (in the SSSI). Hinds in the area around Coire Coinnich move freely between Achnashellach and Glencarron/ West Monar; those in the southeastern corner on the faces of Sgurr na Feartaig may move across the boundaries to West Monar and Attadale around Bearnais.

B3.10 Counts from 1999 are summarised below:

| | 1999 | 2002 | 2002* | 2003** | 2004* | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|
| Stags | 98 | 116 | 250 | 82 | 187 | 141 | 98 | 120 |
| Hinds | 227 | 223 | 320 | 325 | 360 | 247 | 295 | 338 |
| Calves | 29 | 47 | 93 | 130 | 108 | 56 | 83 | 98 |
| Total | 354 | 386 | 663 | 537 | 655 | 444 | 476 | 556 |

* Helicopter count
** Counts carried out over the summer; all other are spring counts.

B3.11 Variation in hind numbers from year to year reflects the "position on the day" of a group of perhaps 100 hinds 'shared' with neighbouring Attadale, and 'resident' figures are estimated at between 250 and 300. Winter stag populations are relatively stable at between 100-120, while the summer counts in both 2002 and 2004 show clearly the increase in number of stags on Achnashellach recorded over the summer months (B3.8).

B3.12 Average recruitment rates (surviving calves at the end of winter per 100 hinds) are generally quite low, at 26.8. Population numbers translate to a (winter) density of approximately 10 animals per 100 hectares.

B3.13 Detailed records are maintained of weights recorded in the cull for hinds and calves in each part of the Estate; data have not similarly been separated for stags. Average weights are summarised below for South Achnashellach hinds (older than one year) and calves and for Stags (both beats).
[There are no consistent differences in average stag weight between the beats]

**Weights in lbs.**

| Year | 1989/90 | 90/91 | 91/92 | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stags | 190.0 | 188.5 | 192.2 | 182.5 | 194.4 | 194.3 | 189.6 | 191.1 | 194.1 | 195.5 | 192.0 |
| Hinds >1 | 105.4 | 108.8 | 99.4 | 94.1 | 105.1 | 107.4 | 105.7 | 104.3 | 109.1 | 106.0 | 106.7 |
| Calves | 51.6 | 54.3 | 47.1 | 42.2 | 53.0 | 55.2 | 52.8 | 53.1 | 53.7 | 49.0 | 53.6 |

| Year | 2000/01 | 01/02 | 02/03 | 03/04 | 04/05 |
|---|---|---|---|---|---|
| Stags | 190.1 | 186.5 | 186.4 | 193.4 | 189.9 |
| Hinds >1yr | 109.4 | 98.7 | 111.2 | 104.6 | 103.5 |
| Calves | 52.6 | 47.2 | 57.2 | 56.8 | 49.8 |

B3.14 Finally, for hinds older than 1 year, rates of pregnancy recorded in the cull show an overall average (from 2000) of 46% pregnant for the South beat.

*Recent Past Management:*

B3.15 As already noted, there is some (limited) supplementary feeding of stags in the Coire a' Chonais area of the South beat, simply in some attempt to hold some stags on the ground in this predominantly hind forest. Feeding is not extensive, confined only to the provision of feed blocks, but this may attract upwards of 60-80 stags in this area. Little or no direct vegetational management is carried out in the sense of burning or liming, but such improvements are in any case not necessary on the gneiss and schists of the South beat.

B3.16 Detailed cull figures are available for the number of animals culled in each year from 1989/90. Cull figures for animals taken on the South beat are summarised below for hinds and calves from 1989/90, and for stags, hinds and calves from 2000/2001

**South Achnashellach only:**

| [ Year | 1989/90 | 90/91 | 91/92 | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [Hinds | 28 | 21 | 30 | 27 | 25 | 27 | 33 | 28 | 36 | 51 | 46 ] |
| [Calves | 14 | 13 | 19 | 21 | 12 | 13 | 15 | 15 | 17 | 27 | 24 ] |

| **Year** | **2000/01** | **01/02** | **02/03** | **03/04** | **04/05** | **05/06** | **06/07** |
|---|---|---|---|---|---|---|---|
| Stags | 15 | 15 | 15 | 18 | 20 | 15 | 19 |
| Hinds | 47 | 45 | 21 | 35 | 34 | 30 | 32 |
| Calves | 25 | 27 | 6 | 21 | 23 | 8 | 11 |

Average culls over the past 6 years have been of the order of 17 stags (15-20) and 33 hinds.

*Issues and Assessments:*

B3.17 Grazing impacts were assessed by RP during site visits in May/June 2003. The lower slopes of Creag a' Chaorainn were primarily grass heath (*Molinia/Erica/Calluna*) and showed moderate to heavy impact. While heather cover was fairly dense it was well-browsed in this area around Coire Leiridh. Higher up the grazing pressure appeared more dispersed. There were good greens on the eastern face of Carn na Geuraidean, and the moss heath of the higher ground showed only light impact.

B3.18 To the east (descending into Coire a' Chonais) there was a thicker cover of heather on the higher ground than notable at the western end of the Estate (thicker both in terms of percentage cover and in individual growth form: clumps were denser, bushier and showing less evidence of browsing impact), although the impact increased towards lower ground, with moderate to high impact observed on lower slopes around the Allt Coire a' Chonais - consistent with the recognition of this area as an important wintering concentration for stags.

B3.19 Overall therefore it would appear that impact was patchy, with heavily used areas (characteristically those associated with wintering grounds of both stags and hinds) showing moderate to heavy impact, but with grazing pressure more dispersed in other areas, particularly on the higher ground (spread more evenly over the more extensive grazings available during the summer) so that much of this higher ground showed only light impact. No 'negative' reports have been received from SNH about the condition of designated habitats within the SSSI.

B3.20 The main factor affecting management of the Estate is the 'enclosure' within it of Forest Enterprise woodlands both north and south of the A890 (B3.5). The Forestry Commission landholding in effect occupies a central island within the Estate. As noted, there was until recently no effort made to maintain the perimeter fence, except along the roadside, and deer from Achnashellach have had ready access to woodland areas, particularly those in the upper parts of the Coire a Bhainidh.

B3.21 Significant damage has been experienced and FCS have recently determined to replace all deer fences along the perimeter of their landholding, including the areas in Coire a Bhainidh. It is understood this fencing will be completed in 2007 and it is likely to have a significant effect on deer populations of Achnashellach, and their distribution.

B3.22 At present it is hard to predict what may be the effects of this on Achnashellach either in the short- or the longer-term, and thus the likely requirement in terms of an appropriate management response is uncertain.

B3.23 Some significant mortality may perhaps be expected during the first winters as deer try (and fail) to gain access once again to areas within the woodland used traditionally for shelter. Some losses are also likely to result from animals enclosed within the woodland areas after fence closure and subsequently shot by FCS. Clearly in the short-term it is essential that close liaison is maintained between the Estate and FCS while fences are erected, and particularly in negotiation a timetable of actual fence closure, so that this is done at a time when at least the majority of those deer which use the woodland blocks only seasonally have drawn back out onto the open hill.

B3.24 An average harvest of some 15-20 stags has been taken on this south beat of Achnashellach in recent years. In a 'fully-enclosed' population this would suggest a requirement of a resident stag population of the order of between 120 - 140, to be entirely sustainable - but it is clear that Achnashellach benefits from a seasonal influx of stags from further afield (B3.8) and thus is not dependent on its overwinter stocks. It is likely therefore that ability to fulfil quotas is unlikely to be compromised in the immediate future, unless significant numbers of stags are enclosed within the FCS woodland blocks after completion of the fence, or significant numbers are lost to overwinter mortality through lack of access to thermal cover.

B3.25 In the longer term, maintenance of quota is of course dependent on recruitment of stag calves to grow through to maturity to support the adult cull. Recruitment rates on Achnashellach itself are consistently rather low (at an average of 26.8; B3.12) . Support of a quota of between 15 and 20 mature stags would thus require maintenance of a hind population of between 130 and 180 (based on these recruitment rates and average levels of natural overwinter mortality; A4.4, A4.5). Once again, average counts of hinds are well in excess of this figure, and thus current quotas should indeed be sustainable in the longer term.

B3.26 There remains however the uncertainty of what will be the longer-term effect of the loss of woodland cover on population condition and productivity. While there is significant woodland cover along the shore of Loch Dughail at Creag an Eilein, in the Golden Valley and in the gullies of Coire Leiridh, this is really within the heft of a different population of animals, different from those currently frequenting Coire Nan Eilde and Coire a'Bhainidh. The woodlands associated with Coire Dubh are sparse, and although there is a regeneration scheme (WGS scheme) in this same area, it would not appear to be doing particularly well at present and it will be some time before it may be opened to offer alternative cover to the deer.

## B4 Inverinate Estate

*Description:*
B4.1 Inverinate Estate comprises a land-holding of some 69,930 acres or 28,300 ha situated to the south of Attadale. For management purposes, the Estate is divided into three main beats, each the responsibility of a fulltime stalker and underkeeper, as the home or Inverinate beat, Killilan and West Benula.

B4.2 A draft Deer Management Plan was completed for the Estate in November 2004. Although not formally adopted by the Estate as official policy until somewhat later (April 2007), deer management has, in the meantime, effectively followed completely the provisions of that draft Plan. Given the separate existence of a detailed Estate Plan, it would be gratuitous to re-present it in full in the current document. But Inverinate is a participating member of the Lochalsh sub-Group so that some mention needs to be made of its deer management objectives and future plans within this Group Plan, while in addition, decisions made on that latter Estate clearly have some implication for management decisions made elsewhere within the Group. Accordingly, a summary of the Estate's Deer Plan is included here.

*Description:*
B4.3 The Estate is bounded to the west and north-west by the waters of Loch Duich and Loch Long and reaches east to the headwaters of Loch Lungard (Loch Mullardoch). The northern boundary (for the most part marching with Attadale estate to the north) follows Glen Ling and the line of the River Ling to Loch Cruoshie and the Allt an Loin-fhiodha. With the forest of Pait (Glenstrathfarrar sub-Group) now to the west, the boundary then turns south along the Coire nan Each (and Allt Coire nan Each) to Loch Mhoidean, before turning northeast to follow the ridge of hills skirting the head of Coire Lungard to An Socach and the Bealach Bholla. From this point the boundary between the Estate and neighbouring East Benula (North) runs due south down to the shores of the former Loch Lungard (which, since the raising of water levels after the building of the Hydro dam at Mullardoch is now subsumed within the enlarged Loch Mullardoch).

B4.4 On the opposite side of the loch, the eastern boundary between West Benula beat and the small Estate of East Benula (South) runs up the Allt na Coire Lochain to the summit of Carn Eige. At this point there is a meeting of the three estates of Inverinate (West Benula), East Benula South, and North Affric.[Both East Benula (South) and North Affric fall within the Kintail and Affric subGroup of the South Ross Deer Management Group].
The march with North Affric continues along the ridge from Carn Eige to Mam Sodhal and west towards the Bealach Coire Ghaidheil. While now run as a separate Estate North Affric was formerly one beat of the larger Affric holding of the present-day North Affric, South Affric and West Affric. Inverinate's southern boundary now follows the ridge that separates West Benula from that West Affric 'beat' to the south, from the Bealach Coire Ghaidheil across An Socach to Sgurr nan Ceathreamhan to Sgurr Gaorsaic.

B4.5 The ground of the Gleann Gaorsaic itself, to the Falls of Glomach and the Allt a Ghlomach no longer belongs to the Estate but was gifted by a previous owner of Inverinate to the National Trust for Scotland. Inverinate Estate however does retain the sporting rights over this area.

B4.6 From the Bealach an Sgairne (below Meall a' Bhealaich), the southern boundary of Inverinate follows the track in the bottom of Gleann Choinneachan to Strath Croe and follows the river to the lochside.

B4.7 Of the total area of the Estate (28,300 ha), lochs, rivers , roads and fenced woodlands account for some 3500 ha. In addition a large area of crofter's Common Grazings in the west (c 2800 ha.) is deer-fenced and excluded from wider deer-range. This fence extends from Carr Brae, along the face of Sgurr Aoide towards Keppoch, before following the chain of lochs (Loch a' Mhuilinn, Loch Gorm Mor, Loch Bhuic Mhor) along the ridge of Boc Mor and Carn Bad a' Chreamha to Loch na Euan, Coille Righ and down to the road in Gleann Elchaig. The fence then runs back along the north side of the road to Killilan and the head of Loch Long.
This leaves an area of open ground of approximately 22,000 ha.

*Vegetation:*
B4.8 There are two areas of Forestry Commission plantation within the Estate perimeter, at Inverinate and at Dorusduain. The Estate leases the stalking in both these woodland blocks.
In addition, there are native woodland restoration schemes under WGS at Carr Brae (15 ha, planted 1998), in 4 blocks up the lower reaches of Glen Ling and in 15 separate small blocks up Gleann Elchaig and Strath Duilleach to the Iron Lodge. These areas have been planted with (Carr Brae) birch, aspen, rowan willow, with some oak in moister areas, and (Gleann Elchaig) with birch, alder and willow to try and re-establish blocks of riparian woodland along the River Elchaig and Loch na Leitreach.

B4.9 The open hill ground beyond is for the most part grass-moor. There are relatively few areas of deep peat, with hags, or blanket bog communities, and areas of *Calluna* heath are extremely localised and restricted (primarily concentrated within the western, Inverinate beat). The vast bulk of the Estate's area is covered by grass-heath (herb-rich *Deschampsia* and *Molinia* grasslands, with some sparse *Erica tetralix*, at lower altitudes; some greater inclusion of deer grass *Scirpus caespitosum* at mid-altitude), with high altitude *Agrostis-Festuca* "greens" on the steepest faces. There are areas of wind-clipped summit heath, or moss-heath, on some of the summit ridges and screes, but these are of variable quality.

B4.10 The comparative lack of either wet or dry heath is remarkable –on ground which, from its location and soils, might be expected to support more typical heathland vegetation. Indubitably, the current vegetational mix is in some part the consequence of a long history of herbivore grazing in the past which has led over long years to the suppression of heathers and has encouraged the expansion and ultimate domination of the area by coarse grasses. However, it is clear that the present grassy nature of the sward is also partly influenced (as is the similar vegetation of neighbouring West Affric, for example) by the underlying geology.

B4.11 The rocks of this part of Scotland are classically those associated with the Moine series: an assemblage of sedimentary rocks laid down in shallow waters over a basement of Lewisian Gneiss. In the Inverinate/Kintail/ Affric area, two of the three main units into which the Moines are divided are represented, present essentially as sandstone and mudstone schists. The sandstone elements tend to support a rather more acidic vegetation, while the mudstones are characterised by a series of lime-rich inclusions; where these are apparent at the surface they tend to be associated with a richer, more calcicolous vegetation. While this in itself will not in general lead to the development of pure grasslands (except at lowest altitudes, or on alluvial plains and fans), the neutral or even basic nature of the soils will certainly help speed up the process of grass expansion (and subsequent replacement of heather cover), where these communities are subjected to any significant grazing. The elimination of heather cover and replacement with grassy swards will proceed more rapidly (and more completely) on such geology – explaining perhaps the unexpected grassiness of the entire site.

B4.12 Whatever their historical origin, these grass-heath areas are remarkable for their current botanical diversity and are for the most part extremely species-rich, with abundant inclusion of species such as milkworts (*Polygala sp*.), tormentil (*Potentilla erecta*) and spotted orchis, together with self-heal (*Prunella vulgaris*), wild thyme (*Thymus polytrichus*), alpine lady's mantle *(Alchemilla alpina*) and a diversity of other herbaceous species. Extensive areas of bitter stonecrop (*Sedum acre*) are also found in association with disturbed areas and the bare stones of streamsides.

***Designated areas***

B4.13 A small part of the area (wholly contained within the West Benula beat) falls within the Affric-Cannich Hills SSSI/ Strathglass SAC.. This includes (to the north of Loch Lungard/ Loch Mullardoch) the entire section of hill to the east of the Coire Lungard itself and, to the south of the Loch, that area to the east of the Abhainn a' Choilich (the slopes and ridges of Beinn Fionnlaidh, Carn Eige and Mam Sodhal).

B4.14 The area was first notified as an SSSI in 1974 and renotified with an amended boundary in 1983. It was designated for a number of features which include alpine and boreal grasslands (montane grasslands on acid soils), blanket bogs, North Atlantic wet heaths with *Erica tetralix*, montane tall herb communities, siliceous rocky slopes with crevice communities (plant communities growing in rock crevices at high altitude), and summit scree communities such as moss heaths and wind-clipped heath. Of particular relevance to Inverinate (West Benula) are the montane communities of herb ledges, rock crevices and summit screes.

B4.15 **During the course of a routine assessment of habitat condition within the wider Strathglass SAC, SNH expressed concern that heavy deer impacts were causing damage to designated features within the site and in particular in the area around Coire Lungard.**

B4.16 There are a few roe deer and some sika within the Forestry areas on Inverinate, as well as a small herd of feral goats (c. 150 head), but the main deer populations of open ground are of red deer (below).

B4.17 In addition to its populations of wild deer and goats, Inverinate Estate is grazed by the Estate's own stock of blackfaced sheep and Highland cattle. As at January 2004, sheep stocks totalled 1410, with 818 ewes, 286 gimmers, 293 hoggs and 13 tups. Clearly, there is seasonal variation in numbers and after lambing, stocks may rise to approx 2000 head. At January 2004, a total of 107 head of Highland cattle was maintained on the Estate (as 47 cows, 59 followers and one bull)

B4.18 The bulk of the Estate's Highland cattle are pastured in the main Gleann Elchaig towards the Iron Lodge. Although they do not tend to wander far from the valley floor and the lowest slopes, they do impose a significant grazing pressure within the glen, and on the lower edges of the Loch na Leitreach birchwoods. Smaller numbers are run out along Glen Ling to the north.

B4.19 A significant number of the Estate's sheep flocks are also hefted within Gleann Elchaig. These are distributed more widely (on both sides of the river, thus also into West Benula) , penetrating up the Allt Domhain from Carnach, on both sides of the Crom-allt beyond the Iron Lodge, and with a significant heft centred on the Glas Coire and the lower slopes of Sgumann Coinntich.

B4.20 There are crofting tenancies and Common Grazings which extend over Inverinate Home beat. As noted, the major part of these common grazings is contained within the area which has been fenced out from the main Estate by the deer-fence behind Dornie (B4.7). However, the former Estate Manager, David Glover, has the assignation of the croft at Ruarach. While sheep grazing here is held within fenced parks, a small number (10-12) of cows are grazed up Coire Dhuinnid.

***Deer Populations***

B4.21 Estimates of population size are available from censuses carried out by the Estate, or Deer Commission for Scotland, for a number of years since 1995. While these figures may be separately analysed for each individual beat, it is apparent that there is considerable movement of animals between beats (and especially between Killilan and West Benula), such that while numbers for the Estate as a whole remain relatively consistent from year to year, there is enormous variation in the actual counts recorded in any one beat.
Counts are thus provided here for the entire Estate.

| **Year** | **1995** | **1999** | **2003** [Estate count] | **2003** [DCS] |
|---|---|---|---|---|
| Stags | 706 | 1337 | 1340 | 1160 |
| Hinds | 2037 | 2480 | 2508 | 2684 |
| Calves | 570 | 1031 | 907 | 747 |
| Total | 3313 | 4848 | 4755 | 4591 |

All counts except 1995 were undertaken by helicopter.

B4.22 Deer populations on the Estate were estimated in two post-winter counts in 2003, both undertaken by helicopter. There is remarkable consistency between these count figures which gives some confidence in this as an accurate baseline count for future management.

Overall, population figures would appear to have been relatively static over the period of the last five years, although there has been a slight increase in hind numbers. Recruitment rates between 1995 and 2003 averaged 33.5 surviving calves, post-winter, per 100 hinds and numbers recorded in 2003 are equivalent to some 20.9 deer per 100 ha over the Estate as a whole.

B4.23 Results from more recent counts in 2006 and 2007 respectively recorded

| | 2006 | 2007 |
|---|---|---|
| Stags | 999 | 1100 |
| Hinds | 2465 | 2474 |
| Calves | 765 | 1363 |

B4.24 It is noted however that these counts reflect wintering populations only; it is apparent from (admittedly more informal) summer counts that stag populations, at least, may be very significantly higher through the early summer. While hind populations remain relatively constant year-round, it is known that there is a significant increase in stag populations on the Estate over the early part of the summer and up until the break-out. The extent of this summer influx of stags is however unknown and there have been no formal counts carried out over the Estate over the summer months.

***Deer distributions:***
*1. Killilan:*

B4.25 Partly in response to grazing pressure and hefts of domestic stock, and past concentration of cull efforts, deer are not evenly distributed across Killilan. Hinds tend to be concentrated, winter and summer, towards the eastern side of the beat, around Aonach Buidhe and the main corrie which follows the Argo track from the Iron Lodge to Maol-bhuidhe; around Coire Dhubh, in scattered parcels up the length of the main Coire Mhor, and (overwinter) on the faces of Strath Duilleach between Carnach and the Iron Lodge. Numbers are unexpectedly low in Coire Dhomhain, Coire Dail Aiteil and the Glas Coire (which is heavily grazed by sheep).

B4.26 Coire Domhain and the Glas Coire also support few stags. The main winter congregations of stags on Killilan are focused around the feed sites in the lower part of Glen Ling, and up Gleann Elchaig (see B4.34, B4.35). In summer, stags are more widely distributed, with significant concentrations between Coire Domhain and the bothy at Maol-buidhe, around Carn na Sean-luibe, and on the main ridge between Cadha Ruadh to Sron na Gaoithe, and to the west side of the Argo track to Maol-buidhe.

B4.27 As noted elsewhere, it is apparent that summer stag numbers are considerably higher than those which remain on Killilan overwinter. Since this seems a feature of the other beats as well (especially West Benula) this is clear that this winter reduction/summer influx is not simply due to movement between the various different beats of Inverinate as a whole, and suggests significant winter movement to low ground off the Estate.

*2. West Benula:*
B4.28 Such winter stags as remain on West Benula tend to be concentrated within Coire Lungard, Creag Ghlas, and around the feed sites maintained in Gleann Elchaig/ Strath Duilleach. Coire Lungard retains a significant concentration of stags into the summer too, so does sustain significant grazing pressure year-round. Summer stags are otherwise relatively widely distributed across the beat, with parcels of animals all the way along (both faces of) Gleann Choilich and into Coire na Dheiragainn, Coire Aird, Gleann Sithidh, Fraoch-Choire and Sgurr na h'Eige, Coire Lochan, Coire Thuill Easach to the south, etc.

B4.29 Hinds are equally widespread, winter and summer, on the green faces of all the main corries, using both higher and low ground in summer (although tending to exploit the lower slopes only at night) and concentrating on the lower slopes when poorer weather draws them down in winter.

*3. Inverinate:*
B4.30 Summer stags (before the breakout) are concentrated in general around Sgurr an Uillt Tharsuinn, and across the whole ridge from Sgurr an Airgid to Beinn Bhuidhe and Beinn Bhreac. After the breakout they are more widely dispersed wherever there are parcels of hinds. During winter, those stags which remain are concentrated onto the lower ground in Gleann Elchaig, or around the sheep parks at Lienassie, where feed is provided.

B4.31 Hinds are generally more widely dispersed on greener faces across the beat as a whole, but there are high numbers around Sgurr an Uillt Tharsuinn, on the faces above Gleann Elchaig and to the east (across the flats around the Bealach na Sroine and across the slopes of Ghlas Bheinn itself).

**Recent past Management:**

*General:*

B4.32 Sporting management on Inverinate Estate seeks to maintain a stag cull of around 200. The Estate also supports populations of sika and roe (largely within woodland areas) and some 150 feral goats. Some minimal stalking of these species is also undertaken.

B4.33 Culls of red deer over recent years are tabulated:

| **Cull year** | **96/97** | **97/98** | **98/99** | **99/00** | **00/01** | **01/02** | **02/03** | **03/04** | **04/05** | **05/06** | **06/07** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stags | 180 | 188 | 184 | 215 | 216 | 167 | 198 | 188 | 277 | 177 | 226 |
| Hinds | 250 | 256 | 281 | 317 | 341 | 289 | 91 | 279 | 492 | 314 | 406 |
| Calves | 69 | 84 | 107 | 108 | 133 | 143 | 22 | 175 | 207 | 94 | 142 |

The low hind cull taken in 02/03 was a deliberate 'holding-back' in response to a heavy natural mortality recorded over this period.

B4.34 On the Killilan beat, supplementary feeding is provided over the winter period at a number of separate feed sites, behind the woodlands at Killilan itself, and along the lower part of Glen Ling. Additional feed sites are maintained along Strath Duilleach (largely between Carnach and the Iron Lodge); given their location, these feed sites are utilised by stags both from Killilan and West Benula. Stags are fed on Inverinate beat within the parks at Lienassie

B4.35 Within Killilan and West Benula, silage is provided *ad lib*. at each feeding station (a bale is presented at each site, and replaced when it is more or less consumed). In addition, 8 bags of cobs are provided daily, at feed sites along Glen Ling, and a further 6 bags daily along Strath Duilleach. Together with cobs fed at Lienassie this equates to a very significant annual provision of between 55-65 tonnes of deer rolls per year with an additional 6 tonnes of feed blocks. Deer also have access to feedstuffs put out in the main glen for sheep and cattle.

B4.36 A limited programme of muirburn is carried out on Killilan and West Benula beats, when occasion permits. This is not done on any regular schedule however, nor consistently in every year. Simply small areas of heath are burnt opportunistically, as and when weather permits.

*Killilan:*

B4.37 Culls on Killilan since 1995/6 are summarised:

| **Cull year** | **96/97** | **97/98** | **98/99** | **99/00** | **00/01** | **01/02** | **02/03** | **03/04** | **04/05** | **05/06** | **06/07** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stags | 60 | 55 | 55 | 60 | 60 | 50 | 63 | 55 | 100 | 55 | 80 |
| Hinds | 80 | 91 | 108 | 74 | 111 | 129 | 32 | 108 | 181 | 95 | 150 |
| Calves | 22 | 29 | 35 | 26 | 49 | 53 | 6 | 57 | 69 | 22 | 55 |

Average annual stag cull over the 8 year period from 1996-2003 was 57.25

B4.38 Estate records show carcase weights for hinds shot on Killilan in the seasons 1995/6, 1996/7, 1999/2000 and 2000/01. Sadly recording is somewhat inconsistent and there are clearly some incorrect attributions. Further, no estimates of age are presented for any animals in the cull record. Since the proportion of yearling and 2 year old hinds which feature within the cull may change substantially from year to year, average weights of a statistical population of hinds whose ages are unknown, are subject to a degree of variation from year to year simply because of a differing proportion of younger or older hinds within the overall cull in those different years.

B4.39 For the record however, the average weights recorded for samples of mixed (and unknown) age hinds in the four years concerned were

| Year | 1995/96 | 1996/97 | 1999/2000 | 2000/01 |
|---|---|---|---|---|
| Average weight (lbs) | 111.09 | 99.04 | 97.64 | 90.03 |

*West Benula:*

B4.40 Cull figures on West Benula since 1996/7 are summarised (Glomach and Benula combined):

| **Cull year** | **96/97** | **97/98** | **98/99** | **99/00** | **00/01** | **01/02** | **02/03** | **03/04** | **04/05** | **05/06** | **06/07** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stags | 80 | 80 | 81 | 100 | 100 | 63 | 85 | 70 | 112 | 66 | 80 |
| Hinds | 120 | 122 | 103 | 127 | 158 | 79 | 31 | 103 | 181 | 115 | 151 |
| Calves | 31 | 38 | 42 | 43 | 66 | 46 | 9 | 78 | 89 | 35 | 54 |

Average annual stag cull over the 8 year period from 1996-2003 is 82.4

As noted these figures include animals culled within the leased ground of Falls of Glomach. It would seem advisable in the future (as indeed was the practice till 1998) to keep records clearly separated if only in the interests of being able to make a separate report on animals culled within the Falls of Glomach area to NTS if requested.

B4.41 Carcase weights for hinds shot on West Benula in the seasons 1999/2000 and 2000/01 are shown below. Sadly, weights were not recorded by previous stalkers, and as for Killilan, no estimates of age are presented for any animals in the cull record.

B4.42 The average weights recorded for samples of mixed (and unknown) aged hinds in the four years concerned were

| Year | 1999/2000 | 2000/01 |
|---|---|---|
| Average weight (lbs) | 112.6 | 106.1 |

- with recorded weights notably higher than those of Killilan over the same period.

*Inverinate Beat:*

B4.43 Culls on the open ground since 1996/7 (excluding Forestry plantations) are summarised :

| **Cull year** | **96/97** | **97/98** | **98/99** | **99/00** | **00/01** | **01/02** | **02/03** | **03/04** | **04/05** | **05/06** | **06/07** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stags | 40 | 43 | 48 | 55 | 56 | 54(+3) | 50 | 63 | 65 | 56 | 66 |
| Hinds | 50 | 43 | 70 | 116 | 72 | 81 | 28 | 68 | 130 | 104 | 105 |
| Calves | 16 | 17 | 30 | 39 | 18 | 44 | 7 | 40 | 49 | 37 | 33 |

*[Cull in 2001/02 included 3 sika stags]

B4.44 Average annual stag cull over the 8 year period from 1996-2003 is 52.3 (and has clearly increased over recent years).

**Assessments:**

*Grazing impacts:*

B4.45 An analysis of impacts of deer through grazing and trampling was carried out by the Macaulay Land Use Research Institute in 2000 (Stolte *et al.,* 2001) as part of formal analysis of herbivore pressures within the entire South Ross Deer Management Group Area.

B4.46 Additional, subjective assessments of grazing and trampling pressure were undertaken during the course of site visits to Inverinate in July 2004 by Professor Rory Putman (RJP). During site visits , note was taken of the general character of the vegetation itself, and any gross indicators of impacts of grazing herbivores (deer and sheep) - this last in a subjective assessment of the density and distribution of dung groups within the site, evidence of trackways in regular usage, and signs of erosion along tracks, or hagging of peat, which might be indicative of heavy animal impact.

B4.47 General habitat condition and estimation of grazing impact (light, light-moderate, moderate, heavy) were otherwise assessed largely through qualitative application of the criteria recommended by MacDonald *et al.* for condition assessment of upland habitats - in considering the general composition of the 'sward', species inclusion and relative percentage cover, growth form and 'habit' (MacDonald, A., Stevens, P., Armstrong, H., Immirzi, P. and Reynolds, P. (1998) *A Guide to Upland Habitats – surveying land management impacts.* Scottish Natural Heritage, Perth; and see also: SNH/DCS ( 2002) *Wild Deer In Scotland and Damage to the Natural Heritage.*) For further detail see Appendix One.

*Killilan:*

B4.48 Impact assessments carried out in 2000 as part of the wider MALURI analysis of grazing and trampling impacts within the whole South Ross Deer Management Area (Stolte *et al.*, 2001) for the most part map impacts as light or light- moderate in the core of the beat. By contrast to impressions recorded in later surveys (B4.52), only light impacts are suggested on higher ground from Sgurr na Cloiche across to Ben Killilan and Cadha Ruadh and impacts are again recorded as light on the higher ground of Aonach Buidhe. Light-moderate impacts are mapped for Coire nan Each, but actual survey squares assessed within the area were recorded as suffering moderate, to moderate-heavy impacts.

B4.49 The only areas which are mapped in that MALURI assessment as suffering heavy impacts fall within Strath Duilleach, from the head of the loch to the Iron Lodge, and within Glen Ling. Both areas correspond to sites grazed by sheep and cattle as well as by deer, and, notably, also correspond to the locations of the main winter-feeding sites (B4.35, B4.36). Areas immediately surrounding these 'hotspots' (the lower slopes of Sgurr na Cloiche/Creag Mhor, the south facing slopes along Gleann Elchaig and Loch Leitreach) record more moderate impacts, despite the fact that these too, lie within areas grazed by sheep and cattle as well as by deer.

B4.50 General assessments of grazing pressure within Killilan carried out by RJP in July 2004 would confirm that impacts were generally moderate, or light to moderate, but that there were

certain localised areas (corresponding to areas where animals are known to congregate at particular times) where impacts were moderate-heavy or even locally heavy.

B4.51 Recorded impacts were clearly heavy in the immediate vicinity of winter feed sites, and also in the main glens where livestock as well as deer are present. On the open hill pressures were generally lower. Heaviest usage was recorded more towards the centre and towards the east of the beat (reflecting known distribution patterns of the animals, above) but areas of such heavier use tend to be localised 'hotspots' within otherwise generally more moderate impact levels.

B4.52 Specific 'hotspots' were for example noted on the flatter tops of the Ben Killilan/Sgurr na Cloiche/Creag Mhor complex –which supports high numbers of stags, year-round, in a small pocket west of the Swan Loch (NG989288) – a small basin corrie which, again, happens to be heavily used by stags), and around the flats of Loch na Maoile Bhuidhe. Even in sites of heaviest usage, however, there was very little evidence of actual erosion of vegetation to bare soil on trackways, but in places regular tracking was apparent on the hillsides (evidenced as stunted and 'compressed' vegetation along regular through-routes).

B4.53 General grazing pressures within the beat would not appear to constitute an issue from either a conservation point of view, or from the point of view of the area's carrying capacity for current deer stocks.

*West Benula:*

B4.54 Assessments carried out during 2004 suggest that (outside the main drag of Gleann Elchaig/Strath Duilleach, where livestock grazing tends to be more concentrated and where provision of supplementary winter feeding also concentrates a significant proportion of Benula's stags overwinter), grazing pressures were in general light-moderate. Signs of heavier usage were noted towards the east, along the flats of Gobh-altan , in the bottoms of Gleanns Choilich and Sithidh, and notably along the green faces of Leathaid Choinneach and Coire Lungard.

B4.55 Moderate to heavy impacts were noted on Leathaid Choinneach, within Coire Lungard, and on the ridges of Meall a'Chaisg, with some considerable tracking evident in this whole area from subsequent aerial survey by helicopter.

B4.56 Surveys of the summit ridge from Carn Eige to Mam Sodhal and across An Socach as far as Coire na Cloiche, were undertaken as part of work carried out on North and West Affric in 2003. The sparseness of vegetation on the exposed screes was such that it was hard to assess actual impacts from grazing and trampling. I noted at the time (3/10/03) "Vegetation on the summit screes is in any case sparse and it is in consequence hard to assess deer impacts". Surveys of the summit vegetation to the north of the SSSI (the ridges of Meall a' Chaisg, above An Nead: 28/8/04) suggested that grazing pressures were moderate and not severe, but that the quality of the summit heaths was in any case rather poor and degraded in the first place, possibly due to a past history of heavy sheep grazing.

B4.57 General impacts were earlier mapped by the MALURI survey of 2000. The survey reports generally moderate impacts of grazing and trampling across the site, with, notably, light-moderate impacts recorded on all summit ridges at the boundary with West Affric and the upper slopes /summit ridge from Beinn Fionnlaidh to Mam Sodhal, on Druim Bheag – and indeed on all summit areas in the southern part of the beat (confirming impressions above).

Moderate–heavy impacts were also recorded on the middle and lower slopes of east side of Gleann Choilich (that part within the SSSI); actual field survey squares recorded in this area however were returned as moderate, and moderate impacts again were recorded on the western side of this glen and into Coire na Dheiragainn. Heavy impacts were noted only along the Allt na Doire Garbhe from Loch Mhoidean to the Iron Lodge and on the south side of Loch Leitreach, corresponding to areas grazed by sheep as well as deer.

B4.58 Subsequent survey within the Strathglass Complex SAC by SNH as part of wider Site Condition Monitoring however suggested that impacts within the SSSI were heavy enough to be causing deterioration of the qualifying features, specifically in the areas around Coire and An Nead and across into East Benula itself (A3.2).

*Inverinate Home beat:*
B4.59 Based on the growth form and condition of heather, inclusion of blaeberry, and the distribution of droppings, surveys in 2004 suggest that deer pressure on the ground is generally moderate (with some areas light-moderate) but with a significant number of patches which were sustaining of relatively heavier grazing/trampling impacts overall (and this still apparent even though assessments are carried out at the 'wrong' time of year to detect such impacts)

B4.60 Thus heavier impacts were noted to the east of Sgurr an Uillt Tharsuinn (stags and hinds), on the greens around the Bealach na Sroine, and over the flats in this wider area (c.NH005254) across to Carnan Cruithneachd. Heavy grazing impacts and clear signs of tracking (apparent even at the end of the summer) were also apparent over the north and north-east slopes of Ghlas Bheinn and around the 'head' of A' Mhuc (between the Argo track and the public footpath to the Falls of Glomach). Additional areas of tracking were also very apparent from the air, during the helicopter survey on 30th July 2004, and grazing pressures are also heavy on the steep slopes above Gleann Elchaig.

B4.61 Heavy grazing impacts in the Coire na Coille are also recorded by the 2000 MALURI survey of grazing and trampling impacts (Stolte *et al*., 2001) on their impact maps. This survey recorded heavy impacts again at Ruarach and along to Lienassie (corresponding to areas of livestock grazing (on the crofts at Ruarach) and winter feeding) to the west of the Forestry at Dorusduain, on the southern slopes of Sgurr an Airgid and Beinn Buidhe. A greater proportion of the beat as a whole thus records heavy impacts than is the case for Killilan or Benula.

B4.62 Moderate grazing pressures are scored by the MALURI survey along the rest of the (north facing) slopes above Gleann Elchaig (from Creag na h'Iolaire eastwards towards Coire Sgeilm) and along the west faces of Sgurr Aoide, Sgurr na Uillt Tharsuinn and up the main Coire Dhuinnid (although actual field survey squares in these latter two areas are recorded as showing **heavy** impacts). Moderate impacts are also scored for the area around A' Mhuc and around the slopes of Ghlas Bheinn, with light-moderate impacts only shown for the summit ridges.
Moderate-heavy impacts are reported only in small patches around Boc Beag (to the west of Coire Dhuinnid) and around the track running north from NG931249 to the ridge); both areas would appear to correspond to focal points of (current) livestock grazing.

*Issues, and factors affecting future management proposals:*
B4.63 First, it is noted that the Estate seeks to maintain current sporting quotas and thus to maintain deer populations sufficient to sustain those quotas, alongside existing numbers of domestic livestock (sheep and cattle)

B4.64 At the same time, the Estate is aware of the need to minimise impacts from deer on the areas within the Affric-Cannich Hills SSSI which fall within the West Benula beat of the Estate, or

indeed on immediately adjacent ground of Pait, East Benula North, East Benula South, or Glencannich.

B4.65 Deer populations are not 'enclosed' within the boundaries of any given Estate. It is clear that there is a very considerable movement of stags to and from neighbouring Estates. Inverinate holds over the summer period many more stags than overwinter on the Estate; these deer then help sustain the sporting quotas of neighbours as stags break out onto neighbouring properties for the rut. By the same token, the fact that Inverinate holds more stags over the early part of the summer than are maintained on the Estate over the winter, implies that these stags are overwintering elsewhere within the wider Management Area.

B4.66 **The Estate thus acknowledges responsibilities**

**i) to maintain more stags on the ground over the summer period than are formally required in support of the Estate's own sporting objectives, acknowledging that it is a net exporter of stags to neighbouring properties**

**ii) to ensure that stag populations do not rise excessively, to a level where those which do not winter on Inverinate itself, do not cause damage to neighbours' interest on those properties where they do spend the winter period.**

B4.67 While hinds are generally less mobile, those towards the marches of the Estate may have home-ranges which include ground on either side of that march, and may thus spend some proportion of their time on neighbouring ground. Inverinate acknowledges its responsibilities to engineer its own management where possible to take account of problems experienced by immediate neighbours with heavy impacts (eg. above at B4.64), or who for other reasons may seek to reduce deer populations on their land.

# C. Future Management Plans of Individual Land-holdings: 2007-2012

**C1. Attadale:**

C1.1 The Estate accepts that a spring count is more effective in establishing recruitment rates and will aim to undertake annual counts at the end of winter where possible. The target date would be April although it is acknowledged that calves can continue to die after that date depending on weather conditions. Where time and resources permit, the Estate will however also continue to try and do summer counts from time to time.

C1.2 The Estate will aim to maintain current stag quotas at between 55 and 60. Subject to getting a better fix on hind numbers, hind cull levels will be increased from the 65/70 of the recent past to 75/80, as a deliberate strategy to try and reduce hind populations overall (B1.41). Such increase in hind targets has already been implemented.

C1.3 **Cull targets are however seen as indicative only** and may be adjusted in response to ongoing monitoring of animal numbers and distribution. Actual culling levels will be reviewed each year and adjusted as appropriate as more reliable information becomes available on actual population sizes and trend, to ensure the target population of around 600 hinds is reached by 2012.

C1.4 Culling is also increasingly being targeted, where practicable, on the high ground in an attempt to reduce local concentrations which build up in the summer around Beinn Dronaig and the "Far Corries" [Coire a Ghraigh-fhear].

There remains however some concern that if numbers on the high ground are reduced by too great a figure this will affect the Estate's ability to attract sufficient stags in the rut to maintain the stag quota and reductions here will be complemented by specific efforts to increase hind numbers in other areas more towards the core of the Estate (C1.6, C1.7).

C1.5 Reductions thus need to be done carefully (and with careful monitoring the while), to ensure that overall numbers of hinds on the Estate as a whole do not drop below the target figure determined for final steady-state (in other words that numbers in the Beinn Dronaig and the Far Corries concentrations have not been reduced too low before numbers in new areas have built up to compensate), and indeed it is entirely appropriate that numbers overall should be maintained in the meantime at slightly higher levels than whatever might be aimed at in the final population (C1.3), to ensure an adequate 'source' population to feed the redistribution.

C1.6 Where practicable (and except where increased culling is required in response to complaints of damage to crofter's land), culling in more central areas of the Estate (around Meall a Chapuill, Creag Dubh Mhor and Creag Dubh Bheag) is being restricted simply to a welfare cull of old or injured animals in an attempt to build up numbers again within the core part of the ground; such a policy alrready appears to be being rewarded with a steady increase in hind numbers.

C1.7 In support of this attempt to try and build up numbers of animals in the core of the ground - a programme of targeted habitat improvements is to be initiated to try and increase availability and attractiveness of grazing in key areas. This will be done through a targeted programme of muirburn to try and create small areas of improved grazing scattered through the central part of the Estate.

C1.8 Small areas of grass will be selected in different areas (albeit concentrated in areas which one suspects *should* be potentially good for deer and areas selected which have already a reasonably high proportion of sweet grasses in the sward. A number of small areas will be burnt, rather than more extensive areas and the 'ambition' should be that each potential heft has within it two or three candidate 'greens'.

C1.9 These areas will be selected based on the stalker's knowledge of past (and present) deer distribution patterns, wind directions (and thus availability of topographic shelter) - as well as some practical constraints in terms of where burning may be possible. But it is suggested that in the first instance some burns are undertaken in the western and southwestern parts of the Estate including areas within, or to the west of the 1960s plantations, which have themselves considerable potential in terms of the cover they provide; around Carn Luib an Ath Ruaidh and Meall Ruadhas well as on the north side of Beinn Dronaig itself, the west face of Sail Riabhach/ Creag Dubh and on the central ground around Meall a Chapuill, Creag Dubh Mhor and Creag Dubh Bheag.

C1.10 Most of this relates to the need to redistribute (and adjust population levels of) hinds. Stag populations over the summer (and winter) are broadly at acceptable numbers – and the efforts outlined above, while primarily directed at redistribution of hinds, will indubitably result also in a wider distribution of summer stags. This is particularly true of the coarser grass areas around and to the west of the 1960s plantations, which is why these are emphasised above as to be included in the candidate areas for improvement (C1.9).

C1.11 Further measures might be specifically directed at stags. Feed blocks will continue to be offered overwinter, but moved to new locations each time they are replaced in order to try and reduce the environmental impacts which tend to accumulate around fixed feed sites (B1.34). Blocks will also be moved over time to try and draw feeding stags into new locations, to try to even up impacts over the ground and increase use of areas which are currently under-utilised, as well as "introduce" wintering stags into areas more likely to hold them for longer over the spring and summer, to delay/prevent their movement at the end of winter back towards the Far Corries, try to break up the current aggregated distribution pattern and reduce the consequent heavy dependence on the rut for stalking (B1.39).

**C2. Arineckaig:**

C2.1 Hind culling will continue to be focused on Carn Mor, and should continue to be determined by reference to calving ratios, family group sizes and by monitoring the birch regeneration - primarily targeted as at present by restricting size of individual groups to between 2 and 4 individuals.

C2.2 Some thought will also be given to management intervention to try and reduce the amount of travelling through the wood which may be undertaken to and from the improved grasslands of the Carron valley (B2.22). Consideration will thus be given to the creation of some small areas of improved grazing in the core of the Estate - on the upper slopes of Carn Mor itself, towards the north-east, or on the south-facing slopes above the Coire Taodail - in an effort to intercept this regular movement by providing the same resources (good greens), within the hill range itself.

C2.3 Provision of alternative foraging areas in this way, while it will not prevent entirely the use of the grasslands of the Carron valley, might at least reduce the numbers trekking through the woodlands each day, and thus reduce the amount of incidental browsing in transit.
Provision of this alternative grazing resource might indeed enable Arineckaig to tolerate somewhat higher densities of deer overall on its middle ground, and on the back ridge – while still reducing damage to unfenced woodland regeneration.

C2.4 It is felt that this might in turn enable the Estate to enhance the profile of recreational stalking within its overall package of management objectives, allowing increased sporting use of this 'back ground' around Coire Taodail, without compromising the primary objective of enhancement of the native woodland cover on the north face of Carn Mor.

C2.5 However, in light of current crofting legislation, timing and extent of any implementation of these recommendations will need to be given careful consideration.

C2.6 It is noted that numbers of sheep run on the ground have declined in recent years and further decrease in numbers is anticipated. Given that the most significant impact on regeration at the present time is from resident sheep stocks, this will clearly be of significant benefit to the Estate in achieving its woodland restoration objectives. At the same time, it is recognised that it is common experience elsewhere that reductions in sheep stocks (and the competition resulting from these) is often accompanied by a steady increase in deer numbers (particularly an increase in hinds and calves) on the ground. With overall levels of impact on woodland regeneration reduced with the removal of sheep, some modest increase in numbers of deer might, again, be comfortably accommodated without increased risk of damage.
Such changes might also support development of a slightly greater element of recreational stalking within the Estate's overall package of management objectives. However it is recognised that this is unlikely to affect management within the five year period of the current Plan.

C2.7 In the interim while stag numbers are showing some signs of increase on Carn Mor, Arineckaig still remains largely dependent for its stag stalking on an influx of stags during the rut from neighbouring Estates. Quota should thus be determined by agreement with Attadale and Achnashellach in annual DMG meetings.

*Monitoring:*
C2.8 Arineckaig has not generally pursued a policy of annual counts. In the interests of monitoring future changes in population which may result asa consequence of changes in crofting, or other management practice, the Estate will attempt more regular census. However, such census will be reliant more on regular observation over the winter rather than on the results of single or infrequent annual counts.

C2.9 A major factor in the management of Arineckaig is and remains a commitment to maintenance and enhancement of environmental quality and both open hill and woodland habitats.
Woodland regeneration in particular requires regular monitoring, and proper assessment of the effectiveness or otherwise of management policy can only really be based on objective, rather than subjective measurement of levels and progress of seedling/sapling establishment and damage.

C2.10 More formal methods of monitoring are to be adopted for woodland areas, with regular annual assessment of the numbers of trees present of different age (properly: **height**) classes in each species, and some formal estimate of levels of browsing and thrashing damage sustained. Protocols will be based on those developed for the monitoring of similar woodland regeneration on Creag Meagaidh NNR (Putman 2002).

**C3. Achnashellach:**

C3.1 The main issues affecting management of the Estate are those already aired in relation to the new perimeter fence proposed by FCS along the southern boundary of their property. Clearly in the short-term it is essential that close liaison is maintained between the Estate and FCS while fences are erected, and particularly in negotiation a timetable of actual fence closure (B3.23), to ensure that as small a number of animals as possible are trapped within the fenceline when it is finally closed.
Close liaison needs to take place between estate and FE over the timing of this closure (and which should be the last section to be closed).

C3.2 Calculations above(B3.24, B3.25) suggest that, as long as this is achieved, and as long as there is not excessive natural mortality in the initial winters, population levels of hinds and stags on Achnashellach remain sufficient to support existing quotas. **There is thus no case for immediate response by reducing current cull levels of either hinds or calves, but it is clear that the situation must be carefully monitored in continuing regular annual counts over the ground.**

C3.3 Fencing of the FCS woodland areas primarily will affect animals whose home ranges are in the central part of the Estate, around Coire Nan Eilde, Coire a'Bhainidh and Coire Dubh. The WGS at Coire Dubh will in due course offer some alternative woodland shelter in this area, but it will be some time before this may be made available to the deer. Woodland enclosures on Glencarron, behind the Lodge in Coire an t'-Seilich (their Compartment 4) will in a similar time span be of considerable significance in providing additional shelter for stags wintering on both Estates in this area. The Woodland Grant Scheme enclosure at Creag an Eilein will also in due course provide useful cover in this eastern part of the South beat.

C3.4 The Estate intends that this is only the first phase in a rolling programme of enclosure along this face, with a further area to be enclosed once the initial area has grown to a stage where is no longer vulnerable and can be opened again to deer. Some similar system of rolling enclosure (of perhaps one-third of the area in each coupe) might also be considered to allow regeneration within (and perhaps extend the total area of) the woodlands of Golden Valley. All such initiatives will in the longer term enhance the quality of the area for deer and ensure adequate provision to the future of winter cover.

C3.5 In the meantime, while, it is not felt that there is any need at the present time to reduce current cull levels or alter established management practice from that of previous years (C3.2), the Estate must maintain some degree of flexibility in future 'commitment' in order to adjust cull levels where appropriate in response to any sustained change in deer numbers or condition.

**C4. Inverinate:**

*Deer Populations and culls:*
C4.1 Future management on the Estate seeks to maintain existing quotas in the longer term as 200 stags per annum across the three beats.

C4.2 Because of the significant movement of stags recorded on the Estate between winter and summer seasons, and thus the difficulty of basing management decisions simply on recorded winter counts, the Estate will initiate a programme of summer census of stag populations on the various beats towards the end of July each year, better to inform future policy, in addition to routine census currently carried out at the end of winter (February /March)

C4.3 In the interim, numbers of stags (post-winter) will be reduced to 1000 animals over the period of this Plan. Numbers of hinds will be reduced to 2100 over the same period, as being consistent with sustaining existing annual quotas of stags on the Estate while maintaining a slight positive surplus in recognition of Inverinate's position as a net exporter of stags to neighbouring Estates, which may be to a greater or lesser extent dependent on such export.

C4.4 On the basis of recent counts, suggesting stag numbers are close to this target, annual culls of 225 will be maintained towards maintenance. Annual counts of 475 adult hinds per year are proposed in the first instance in order to effect required reductions in hind population number.

Given the uncertainties involved in any calculation of required cull levels (because of inevitable uncertainties in relation to true starting population size, recruitment rates, rates of natural mortality, or the extent of emigration which may result from increased disturbance), **cull levels established at this stage must be seen as provisional only.** Actual culling levels will be reviewed each year and may be adjusted in the light of actual changes observed in deer numbers and distribution (and whether deer numbers appear to be declining as fast or faster than anticipated) and also in relation to recorded changes in habitat condition revealed by monitoring programmes (C4.11). Once targets have been reached, cull rates will return to maintenance levels appropriate to maintain populations at the new stable level.

C4.5 The cull of hinds (and where possible, stags) will be concentrated on the marches of the Estate. This is designed to create major concentrations of animals at the core of the estate, well away from sensitive or vulnerable areasand other locations where heavier deer pressures may have a negative impact on natural heritage interests or other legitimate interests of neighbours.

C4.6 Finally, such reductions of the numbers of both stags and hinds in these peripheral areas also acknowledges the independent efforts of neighbours in Kintail, West Affric, Pait and East Benula North, to try and reduce deer numbers on their own Estates in these same boundary areas.

C4.7 In an attempt further to enhance this 'zonation' in deer densities across the Estate, management will also seek to initiate a programme of habitat improvement schemes to improve attractiveness of core areas where they may wish to consolidate the main deer populations. This will involve mechanical topping of grasslands in selected areas, together with the application of appropriate fertilisers - as a direct extension of the present programme of bracken spraying, currently nearing completion.

C4.9 The Estate will also consider the desirability (both from a conservational, and from a deer management point of view) of a phased programme of restoration of some of the existing native woodland areas (particularly within West Benula and Killilan), and consideration will be given to some such programme of restoration of existing native woodland areas.

*Supplementary feeding:*
C4.10 After some consideration, it has been determined that the current programme of supplementary feeding of stags overwinter will continue, in the interests of reducing the number of summer stags off-wintering and thus potentially imposing damaging impact on neighbouring Estates, and also as a diversionary tactic to try and concentrate over-wintering animals in those parts of the Estate where they are least likely to cause damage to Forestry, or sensitive vegetation within the SSSI.

*Monitoring and review of progress:*
C4.11 Since it aims to effect changes in the future, inevitably management aims at a moving target; circumstances and external conditions change; management prescriptions themselves cannot always be sufficiently precisely defined *a priori* to deliver exactly the objectives sought. For all these reasons it is essential to monitor the effects of any management policies adopted in order to check that they are achieving broadly what is required of them and, in the light of experience, to refine or adjust them, so that they more closely deliver the desired objectives. Successful management will therefore depend on monitoring both deer populations and the vegetation to ensure that policies adopted are indeed achieving the desired outcome.

C4.12 To this end the Estate will continue to commit resources to an annual count of deer post-winter by helicopter, and initiate an additional programme of counting in early summer to assess summer stag numbers (C4.2).

## D. **General Considerations:**

*General stocking rates:*
D1.1 Count numbers over recent years have been relatively consistent. Taking figures from the helicopter count for 2006 for Attadale/Arineckaig and average values recorded for red deer populations of Achnashellach and Inverinate from 2006 and 2007, we may estimate current populations within the entire Management Area at some 1818 stags, 3447 hinds and 1410 calves (total 6775). If we consider the available area of open hill to be in the region of 46,000 ha, such figures imply an average density over the Management Area as a whole of 14.7 deer per square kilometre of unenclosed ground.

D1.2 If proposals by Inverinate Estate to reduce their deer numbers to 1000 stags and 2100 hinds (plus calves) were to be carried out effectively (and if such reduction was not in the process to affect deer numbers on neighbouring Estates) this would result in populations of the order of 6230 with effective densities overall of 13.5 deer per $km^2$ (and densities of hinds at around 7.0 hinds per $km^2$)

*The Need for Monitoring:*
D1.3 Since it aims to effect changes in the future, inevitably management aims at a moving target; circumstances and external conditions change; management prescriptions themselves cannot always be sufficiently precisely defined *a priori* to deliver exactly the objectives sought. For all these reasons it is essential to monitor the effects of any management policies adopted in order to check that they are achieving broadly what is required of them and, in the light of experience, to refine or adjust them, so that they more closely deliver the desired objectives.

D1.4 In addition it is clear that a number of significant changes are taking place which are likely to affect deer numbers and distributions over the area in the future (e.g. the proposed reduction in both hind and stag populations on Inverinate, and the closure of the southern boundary of the FC forest holding at Achnashellach). In such circumstances it is even more crucial to undertake a careful programme of monitoring to assess any wider effects of these management changes.

D1.5 It is suggested that all Estates should commit resources to an annual count of deer post-winter), and that where possible these are coordinated so that neighbouring estates (between which there may be substantial movement from day to day) are counted simultaneously, to allow some adjustment for such movement. (Thus if one estate's count is unexpectedly high, one can perhaps excuse it as an artefact of the day, if the neighbouring estate's simultaneous count is lower than expected by the same margin; if both are higher than expected, populations have genuinely increased!).

D1.6 A number of Estates also propose to undertake formal counts of animals over the summer months, where it is felt that, due to seasonal movement patterns, numbers of animals on the ground may show significant difference winter and summer (B1.23; B3.8; B4.24).

D1.7 Successful management of a deer stock depends not only on monitoring population trend, and ensuring that numbers and population structure (ratio of stags: hinds: calves) remains as desired; management also requires careful assessment of cull levels to be taken to sustain a population at steady state, or engineer a desired reduction (particularly in terms of hind numbers) where appropriate. Towards this, a close eye should be kept on recruitment rates and rates of natural mortality. Calving rates - or at least recruitment of surviving calves, may be assessed from calf:hind ratios in spring counts, as long as these are reasonably accurate and there is no gross misclassification of for example well-grown stag calves as young hinds.

D1.8 All animals found dead (hinds as well as stags) should be recorded (as is currently the case on a number of Estates – though not all), and where possible aged as accurately as possible from tooth wear. Estimates of mortality rates of yearling stags and hinds, and more mature animals may be used to refine projected rates of population increase based on calf recruitment. In addition levels of recorded mortality are one possible indicator of general population condition.

D1.9 Much information may also be obtained from the cull itself and all Estates are committed to ensuring more comprehensive recording of information from the cull. [Fuller recording is in any case required under new Food and Hygiene Regulations to ensure full traceability of any carcase sold for human consumption]. It is suggested that all, for all animals culled, a record is kept for each animal cull of location shot, approximate age (from the stage of tooth eruption in the lower jaw), whole carcase weight (entire eviscerated carcase) as well as dressed carcase weight (head off, feet off). State of pregnancy (pregnant/not pregnant,) should be recorded for all females culled at least after December 1st when foetuses should be readily visible. In the interests of monitoring population condition, a record should also be kept of any evidence of disease, external or internal parasites (fluke, or lymphatic cysts). Many stalkers may already keep such records, but there is inconsistency between Estates in exactly what information is kept and the format in which it is recorded.

D1.10 Where a major objective of management is to engineer some improvement in vegetation quality, it is appropriate also to undertake some simple monitoring of the vegetation itself, to see if adjustments of animal density are sufficient to deliver the vegetational recovery required. Simple monitoring of density of heather within the sward, or estimates of recruitment rates (number of trees per $m^2$ surviving) within woodland regeneration plots, should be considered.
Such measures are actually of value for 'sporting' managers, too, outwith areas designated for primarily conservation objectives, since simple measures such as these offer some information the relative balance of animal numbers with the capacity of their vegetational environment to support them – and continue to support them in a sustainable way. Suitable methods are outlined in paragraphs A3.2-A3.5 of this report, or in MacDonald *et al.* (1998)

D1.11 Specific monitoring protocols for woodland regeneration at Arineckaig are modelled on those developed for Creag Meagaidh (Putman 2002)

***Shelf-life of the Management Plan***

D2.1 As already noted, the development of any Management Plan is inevitably an attempt to hit a moving target. None of its prescriptions should be considered rigid or inflexible. Given the necessarily imprecise nature of suggestions presented here (based on interpretation of data which are themselves of variable quality) it is absolutely crucial that the effects of future management are closely monitored (particularly where this involves significant change from the *status quo*).

D2.2 Census figures and any data from vegetation monitoring should be carefully reviewed each year in order to monitor progress and check whether or not projected changes are on target; where necessary cull targets and policies may be refined/revised on the basis of each year's monitoring to ensure a closer fit to target objectives and to accommodate any stochastic variation (such as another run of bad winters adversely affecting survival and recruitment rates). Any proposed alterations to management or cull targets presented in this Plan should be discussed with other members of the sub-Group at the Group's regular meetings.

D2.3 **Cull plans for each year thus need to be reviewed annually; the entire Plan itself should be more thoroughly reviewed after a period of five years, with targets for the next five years then set to take account of successes and failures of the current Plan, and any subsequent changes in land-use or objective.**

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