

Deer density and the Cairngorms (3) – what average density of 10, 8 or 6 per square km means in practice

Description



170 deer on the Allanaquoich haughland or “flats” on the “regeneration” part of Mar Lodge Estate. There is a fence between the haughland and the woodland 3rd May 2024

Fourteen years ago, in 2010, the head keeper at Mar Lodge quit his employment with the National Trust for Scotland (NTS) claiming “deer numbers had fallen to dangerously low levels” on the estate ([see here](#)). His claims were not just poppycock, as this photo shows, they were a deliberate attempt to sabotage NTS’s effort to enable the Caledonian Pine Forest on Mar Lodge to regenerate naturally by reducing red deer numbers to below 2 per square km ([see here](#)). They are now closer to one in the regeneration zone.

This post explains further what deer density, the number of deer per sq km, means in practice and why the benchmark of 10 deer per sq km on the open hill which has been adopted by NatureScot ([see here](#)) is so damaging for the natural environment.

Deer density and livestock units



The large herd of deer in the top photo were not the only ones on the haughland. There was another more dispersed group to the right shown in this photo. When magnified I counted another 37 red deer but have rounded the total down to 200 to make the maths simple.



Photo, taken from the road between Braemar and Linn of Dee, across the haughland to Allanaquoich, the buildings centre left. The large herd of deer in top photo is just visible near the centre.

This photo, showing the main part of the haughland, is deceptive: according to the OS Map the distance from the road to Allanaquoich is c 750m and that from the River Quoich, on the left, to the scrub woodland on the right, about 1km. The total flat area in view is therefore less than 1 square kilometre, say 3/4 of a square km or 75 hectares.

According to the Scottish Government's guidance on "Conservation grazing for semi-natural habitats" ([see here](#)), which was updated in 2017, this area should be able to support at least 62.5 deer for a year. The calculation is as follows:

Table 2: Guideline stocking rates for semi-natural grasslands.

Quality of Grassland	Typical dominant grasses	Examples of NVC communities included	Indicative annual stocking rate (LU/ha)
Poor	Molinia/Nardus	U5, M25	0.25 (0.2-0.4)
Moderate	Sheep's Fescue/Common Bent	U4, CG10	0.50 (0.4-0.6)
Good	Red Fescue/Crested Dogtail	MG3, MG5	0.7 (0.6-0.8)
Semi-improved	Ryegrass/Crested Dogtail	MG6	0.8-1.0

My calculation assumes this area is classed as poor. If that is the case

Livestock type	Livestock Units (LU)
Cow and suckling calf	1.0
Other Cattle >24 months	1.0
Other Cattle 6-24 months	0.6
Ewe (incl. lamb)	0.15
Goat	0.15
Red Deer	0.3
Roe Deer	0.08
Sika/Fallow Deer	0.15
Mountain Hare	0.02
Rabbit	0.01

s support

18.75 Livestock Units for a year.

A red deer, however, is classed as being only 0.3 of a Livestock Unit. Hence why this 75 ha of land should, according to official figures, be able to support 62.5 deer for a year. A full sq km is apparently sufficient to feed 83.3 red deer for a year. While clearly nonsense, these figures are far far higher than NatureScot's benchmark figure for deer density of 10 per sq km and may help explain why that figure is so high. It represents not just a compromise with sporting interests but with farming interests too.

Interestingly, the UK Government's welfare guidance for farmed red deer ([see here](#)) gives no figure for stocking rates. Perhaps NTS could, as an experiment, fence off part of the haughland at Allanquoych for a year and enclose the recommended number of red deer Livestock Units within it to demonstrate

to the Scottish Government what happens? NTS could then reduce the number of deer Livestock Units by 10% a year until they established a level of deer density compatible with their welfare and with conservation interests.

In the case of the Allanaquoich haughland, the 1996 Mar Lodge Landscape Assessment suggested “more marshland type vegetation” as the conservation option which would conserve the general appearance of the area:

With regard to the floor of the glen, there are several land-use alternatives which could be considered. These are:

- The existing boggy unimproved pasture character could be extended by blocking drains and allowing the River Dee to flood the area as part of the natural cycle of the river. These measures would create an extensive marshy area which would vary its character relative to rainfall and snowmelt patterns, becoming predominantly water covered at these times whilst possibly drying out in periods of little or no rainfall. The character of this area would not be significantly different to that which currently exists, although there may be a gradual influx of more marshland type vegetation. The colour and texture of the floor would continue to contrast with the woodland and heather of the adjacent hillsides.
- The floor of the glen could become improved pasture which would have a similar character to that at Inverey. The bright green, well managed pastures would accentuate the contrast between the floor of the glen and the hillsides in terms of colour, texture and land-use, as well as emphasise the scale and flatness of the floor of the glen itself.

Deer density and the conservation carrying capacity of the Allanaquoich haughland

Were a square km of the haughland to be enclosed and effectively turned into a deer farm, it could support more than 10 deer year round without supplementary feeding. That, however, is not how the area is currently grazed or supposed to be managed.

The 200 deer in the photos do not at present graze the area year round, rather they were there to take advantage of the first flush of spring and feed on the new growth which happens earlier at lower altitudes. After recovering condition/fattening up the pregnant hinds the move up into the hills to give birth. Deer influxes to grassland by rivers like this are annual occurrences over much of the Highlands, which is not to say such areas are not grazed at other times of year too.



Looking east across the Haughland from near Linn of Quoich July 2022. Note how it is dominated by grasses – not a flower rich meadow.

The impact of even this relatively short period of very intensive grazing and trampling on the vegetation of the haughland is significant. Effectively, most of the spring plants that flower first get eaten and are unlikely to reproduce. That pressure, over time, transforms the vegetation into grasses that are more resistant to grazing and reduces biodiversity.

It's the same with any saplings that get established, they get eaten as soon as they first burst into leaf. The woodland on the right of the haughland is only there because it was once fenced and there is no sign in the photos of alder growing along the far bank of the River Dee, which would help stabilise it, or of any marsh woodland developing.



Postage stamp tree planting Glen Clunie, between Braemar and Glen Shee ski centre – note the move to more biodegradable tree shelters. 7th May

While the River Quoich is now re-wilding its course and sweeping flood debris across the haughland, the vegetation is not re-generating biodiversity because of the deer. Its the same problem over much of the River Dee catchment, hence the postage stamp planting you see everywhere, an expensive attempt to restore tree cover along river banks.

The Mar Lodge estate covers an area of 27,000 ha or 270 sq km, approximately half of which is managed as the regeneration zone with deer now at c1 per sq km. There are more deer in the top photos therefore than from the whole of the regeneration zone. Had all the deer from that zone got round the fences and moved down to the Allanaquoich flats, the temporary high numbers might not matter. It would allow other grassland areas by rivers within the regeneration zone to recover.

Most of the deer, however appears to have come from the sporting part of Mar Lodge, where deer numbers are nearer to 10 per sq km, from the Mar Estate and from Invercauld where there appear to be even higher numbers of deer. This honeypot effect, of deer being drawn into an area, helps explain why the conservation landowners who are members of Scottish Environment LINK were so keen on the idea of Deer Management Restoration Orders now being proposed by the Scottish Government. The idea is that where there are influxes of deer from neighbouring areas that are damaging conservation interests, NatureScot could take action to force landowners in those neighbouring areas to reduce their deer numbers too.

While this proposal might sound good, making it work in practice would be a bureaucratic and legal nightmare. Just assume for a moment that NatureScot agreed that nature on the Allanaquoich haughland should be protected. How would they establish who needs to reduce the deer – the sporting part of Mar Lodge, the Mar Estate or Invercauld and in what proportion? Is every deer going to be tagged like a farm animal to trace its origins? It's never going to work.

This is basically why we need a new official benchmark for deer density of two per sq km across Scotland. While deer will still congregate in areas with better grazing like Allanaquoich in the Spring, the impact on biodiversity would be far less and might actually start to play a beneficial role as some browsing and trampling can help vegetation to regenerate.

Deer Density – a thought experiment

In considering deer density, it is worth considering what an average of 10 deer per sq km on open hill ground, NatureScot's benchmark, actually means. Pick any 1 km square area in the Scottish uplands and imagine walking across the middle of it in a straight line. Every 200m a block of land 500m deep on either side of you has to support on average 1 red deer for a year.

On haughland, like that at Allanaquoich, that is not a problem. It will produce more than enough fodder to keep the deer in good health. However, such parts of the Highlands are the exception, not the rule, including much of the Cairngorms National Park.



Lower reaches of Glen Callater with fenced native woodland enclosure on left. The distance to the sea is 10 miles.

On moorland, there is generally less nutritious food for deer to eat. Deer generally favour grasses in summer, when the calorific requirements of both hinds (pregnancy and feeding young) and stags (antlers) increases and resort more to heather in winter. Rocky areas effectively take part of each square kilometre out of vegetation/food production. While muirburn is undertaken with the intention of promoting new and more nutritious heather growth, it also for a time creates further areas within each km square where there is nothing to eat. You can see from the photo what grass there is is grazed to the ground.



Looking across to Eagle Rocks from near the summit of Cairn Bannoch on the Balmoral Estate

On the high tops there is usually even less food as a result of bouldery or gravelly ground, crags and the shorter growing season. What vegetation there is may be covered by snow for lengthy periods or accessible only to animals like mountain hare, adapted to survival in extreme weather conditions. Create a 1 square kilometre enclosure here, place 10 deer within in it and most if not all would die of starvation

The important point is that most 1km squares in open hill country cannot support 10 deer for a year (or even the 6-8 benchmark of the Cairngorms National Park Authority) because there is not enough food. What this means for a large upland area like Caenlochan, where NatureScot has agreed with landowners an average deer density of 10 per square km, is that in the places with better food (like the Allanaquoich haughland) average deer density will be considerably higher than 10 per sq km over the course of the year.

Average deer density and the report of the Deer Working Group

The report of the Deer Working Group, which recommended 10 deer per square km should be the upper limit for deer density on hill ground, recognised the issues highlighted above, for example:

- *“Deer are mobile animals that move around their local range, for example, for better feeding or shelter”*
- *“The deer are not spread evenly over these areas and tend to be concentrated in different parts of their range in summer and winter. Within those parts, the deer are then further concentrated in the more favourable areas, for example, for feeding and shelter. The impact of the deer on the vegetation therefore depends on the numbers of deer occupying a particular place and the amount of time they spend on that ground”.*

The Report also stated in relation to the Cairngorms National Park that *“The current high densities of open hill red deer over large parts of the Park result in damaging impacts on the vegetation in many places, including designated sites and elsewhere”*

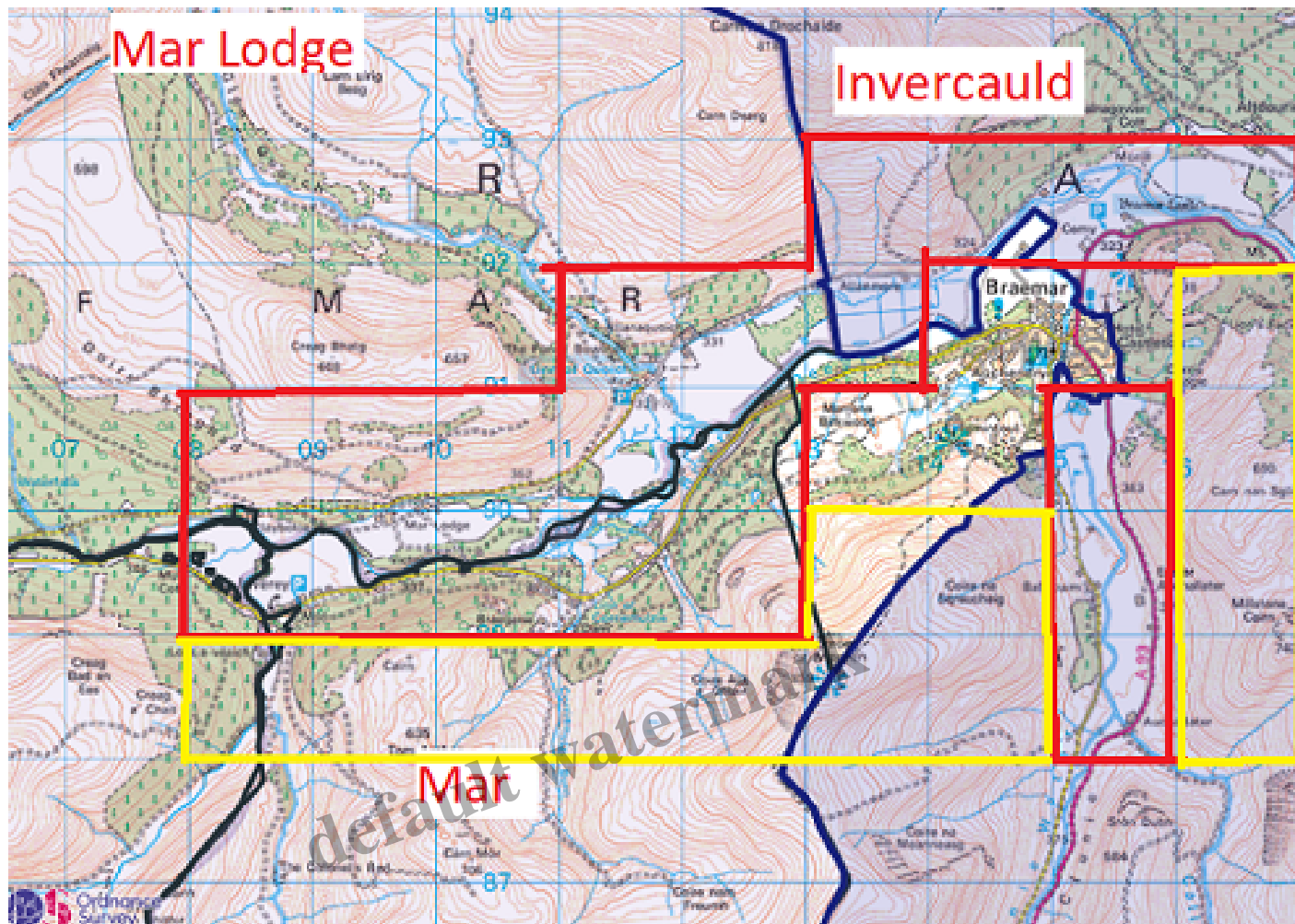
AND

“The Group considers, as discussed in Section 16, that with many habitats such as native woodlands and peatlands requiring densities well below 10 deer per square kilometre, the average density on open range across the Highlands of 10 red deer per square kilometre strongly indicates that deer will be causing damaging impacts..... due to the patterns of occupancy.”

In my view, however, though identifying the correct issues the report did not go nearly far enough. An average density of 10 red deer per square km has a damaging impact on vegetation EVERYWHERE. With average deer densities in the more favourable locations being higher than this they get hammered, like the Allanaquoich haughland.

Then, when deer go in search of food on less favourable terrain, every inch of accessible land gets browsed. This means, for example, that as soon a relatively nutritious sapling protrudes above the surrounding vegetation a deer is bound to come across it. That sapling will then get eaten as offering the better bite, if not in summer then in winter when it may be the only food source protruding above the snow.

Average deer density at scale



Map credit, with estate boundaries (blue lines) Who Owns Scotland. The Allanaquoich haughland is the white contourless area near the centre of the map.

My annotations to this map provide a very crude illustration of the problems. The red lines demarcate 20 square kilometres, the minimum amount of ground that the 200 deer I saw on the Allanaquoich haughland need to sustain themselves according to NatureScot and the report of the Deer Working Group. The yellow marks the further area that would be needed if the Cairngorms National Park Authority's lower benchmark of 6 deer per square km on the open hill were to be implemented.

While I have excluded four km squares around Braemar, the map takes no account of the fact that some of the planted forestry is inaccessible to deer because of deer fencing, of buildings and their fenced gardens or of actual deer density in the Mar Lodge regeneration zone. This means those 200 deer would need to have come from a significantly larger area than I have shown to meet official benchmarks.

To meet the benchmark of 2 deer per square kilometre, which the evidence shows is the level of deer density that enables natural regeneration to take place, the deer would have had to come from an area almost three times that covered by the map extract!

These crude and simplified illustration is based, however, on an assumption that the 200 deer on the Allanaquoich flats that evening were the ONLY deer within this area. They weren't! I saw other deer

around Muir Cottage, at Inverey, where I was staying and I am confident that if you had counted all the deer in the map area that evening it would have been far more than 200.



Red Deer at Inverey on the Mar Estate on the evening of 6th May. They hardly moved away when I got out the car to take photos, tame, not wild!

Scotland's deer failure – staring us in the face

That herd of 200 deer on the Allanaquoich haughland in my view provides clear evidence of our failure in Scotland to reduce deer numbers to levels compatible with restoring the natural environment (or allowing local residents to grow vegetables without having to erect a deer fence). So why aren't the Scottish Government, NatureScot and the CNPA, who are responsible for addressing the issue with landowners, not jumping up and down about this? Why are they still adhering the benchmark of 10 deer per square km?

My next post in this series will look at the evidence of the damaging impacts that red deer are having on the "sporting half" of the Mar Lodge estate, a complete contrast to the regeneration zone and where deer density is around 10 per square km.

Category

1. Cairngorms

Tags

1. CNPA
2. conservation
3. Deer
4. natural environment
5. natural regeneration
6. NatureScot

Date Created

May 21, 2024

Author

nickkempe

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