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Fallow bucks at Chatsworth Park.

Peter Wolstenholme

Deer in the Peak District and its urban fringe

Ian D Rotherham and Martin J Derbyshire

Studies of British deer populations began in earnest with the problems of over-population of Red Deer *Cervus elaphus* in the Highlands and Islands. However, in recent decades, the issue of rapidly expanding populations of deer in Great Britain has received much attention. The establishment of the Deer Initiative focused concerns on matters such as road-traffic accidents (RTAs) and problems of impacts on native habitats (e.g. Dolman *et al.* 2010) and on human health through associated disease. However, whilst the phenomenon of urban deer has been noted, this is generally only in passing.

In effect, there is a pincer movement as deer populations actively expand and colonise urban centres, and as human settlements turn 'green to grey', with the countryside becoming increasingly urbanised. Furthermore, the urban and often industrial heartlands have received a makeover in recent decades and the 'grey and brown' have been 'greened'. The latter are often dominated by dense

plantings of trees, both native and exotic, as derelict and polluted lands are 'restored'. Combined with Highways Agency and other roadside planting schemes, the scene has been set to create a countrywide green network ideally suited to deer species. All the deer occurring in Britain, both native and exotic, have benefited from this situation, combined, of course, with the absence of any effective predators aside from the motorcar. This is the context for a regional study first reported in the 1990s (McCarthy *et al.* 1996).

The case study covers a core area of Sheffield and the Peak District, but extends east beyond to Doncaster and the Yorkshire lowlands, and north to the south Pennines and adjacent areas around Barnsley, Huddersfield and Bradford. Southwards the survey extends to the Dukeries and Sherwood parts of Nottinghamshire, and to north Derbyshire, too. Dr Derek Yalden of Manchester University very kindly supplied a considerable body of data on the western Peak District areas.

The landscape in which the survey is set includes major conurbations, but with substantial areas of 'encapsulated countryside' and open, National Park environments. The region falls in altitude from around 500m in the west to about sea level in the east, over a distance of perhaps 50km, running from high Pennine moorland to lowland farming landscape of the Humberhead Levels. The background to the research was described in earlier publications such as Rotherham (2001), McCarthy & Rotherham (1994), and McCarthy *et al.* (1996).

In the core part of the study area, the situation is especially interesting because, at the start of the research, deer were restricted to very localised long-established former park herds of Fallow Deer *Dama dama* and Red Deer, a handful of extant park herds, and some Roe Deer *Capreolus capreolus* in the eastern periphery. Over a 20-year period, deer of four species have undergone remarkable changes in status across this wide area of the northern English Midlands. Today, the Peak National Park has large herds of Red Deer on the moors of both its western and its eastern flanks, a well-established herd of Fallow in the south-east, and even Roe Deer now increasingly recorded. To the east, in the major industrial centres such as Sheffield, three species (including the exotic Muntjac *Muntiacus reevesi* but not Fallow) have colonised the urban area, and both Roe and Muntjac have been sighted almost into the city centre. Since the demise of all but a handful of ancient deer parks in the region, perhaps 300 to 400 years ago, these large, herbivorous mammals have been absent, and this changed situation represents a dramatic and perhaps unprecedented transformation. Furthermore, it is suggested that the next ten years will witness a further and major colonisation by deer of the urban environment.

In 1996, as part of a regional research project, the culmination of several years' work, a conference was held called 'Deer or the New Woodlands – managing Deer in Community Forests and the Urban Fringe'. The event, and the modest publication that accompanied it, were to a degree a landmark achievement. In their own way, they helped to draw attention to the emerging issues of a largely neglected topic, that of deer moving into and around the green spaces of our major cities and smaller towns. Since 1996, the issues raised have become more obvious and public aware-

ness has been increased. However, it is notable that there is still a lack of interest in these matters among key individuals and organisations, and that, for example, funding even on a modest scale to continue any work has been elusive. The original project partners considered that, with the conference, the issues had been addressed and resolved, and they moved on to pastures new. The facts are very different, and the potential problems suggested as possibilities at the 1996 conference have become realities. The situation for deer populations in recent decades is described below.

The 1970s and 1980s

By the late 20th century, in the Sheffield area and the Peak District, wild deer were largely absent. There were long-standing feral populations of Red Deer at Wharncliffe, to the north-east, and of melanistic Fallow at Stanton, in the west, but little else. The Goyt Valley, near Buxton, had a growing population of Red Deer from a captive herd released in the early 1940s and monitored in detail by Derek Yalden. To the south, the Sherwood Forest area had established populations of Red, Fallow and Roe. The Wharncliffe Red Deer occasionally made local news when individuals moved down the River Don into the heart of Sheffield. Tracks and droppings on small islands in the River Don at Kelham Island Industrial Museum indicated regular activity; startled members of the public also confirmed their presence. Roe Deer were also known to be present in the east of the study area around Doncaster, and they were actively monitored by Colin Howes, then of Doncaster Museum. Where deer were found in numbers, in both urban-fringe and rural areas, there were already problems of illegal poaching and persecution. Increasingly, however, records of deer began to come in from sources other than the local natural-history societies, formerly the leading and almost exclusive producers of regional records. Indeed, the received wisdom from such bodies was that there were very few, if any, deer to be recorded away from a very limited number of traditional sites. This was at odds with an emerging picture from observers across the region, some familiar with deer and others not.

The 1990s

Intensive research on regional deer populations began at the Sheffield City Ecology Unit in the late



Red Deer stag and hinds at Chatsworth Park in the Peak District.

Peter Wolstenholme

1980s and early 1990s. Day-to-day operations of the Unit involved contacts with a diversity of people, including farmers, gamekeepers, foresters, police officers, early-morning lorry drivers and others. It was through this informal network that evidence of deer began to accumulate. Individual, often anecdotal observations from these wide-ranging sources raised the possibility of a dramatic change in the fortunes of deer in the region. Excitingly, the core of the study area, which for perhaps 300 years had been a desert for deer, was being recolonised. Interestingly too, this turning point in deer fortunes had been missed by local mammal-recorders, but was being observed by members of the Hallamshire Branch of the British Deer Society (BDS). However, because of the interest of many BDS members in deer-stalking, there was little dialogue between them and the amateur naturalists. In fact, they had been refused membership of conservation advisory bodies such as the Peak Park Wildlife Advisory Group. This was ostensibly because they were a special-interest organisation, but the reason was largely a reflection of the perception of the Deer Society as being a hunting organisation. In truth, many members of the BDS are stalkers but others merely watch and observe.

Our response to these observations was to hold discussions with experts, including British Deer Society members, across to Doncaster in the east, and north up to Leeds and Bradford. In the early 1990s, one of the authors (IDR) gave a lecture to around 50 members of the Hallam-

shire Branch of the BDS. From the ensuing discussions, it was clear that deer were moving into the study area and even into the urban fringes, and it was decided to develop a publicity campaign to raise awareness and so to gather records old and new. This confirmed that interesting changes were happening, and for an invasion ecologist this presented a unique opportunity to observe at first hand the long-term dynamics of recolonisation. Indeed, the more northerly cities such as Bradford and Leeds already had well-established Roe Deer populations, and in Doncaster

their numbers were rising rapidly. It was decided to embark on a wide-ranging survey involving site work, but particularly to use media promotion to obtain and collate sightings and records of deer from the public across the region. This intensive effort over a four-year period generated around 1,000 records across an area of about 70 × 50 km. As well as contemporary records, the survey was able to collate observations from as far back as the 1960s and 1970s, to generate a unique archive of sightings across the study area.

Today

Red Deer

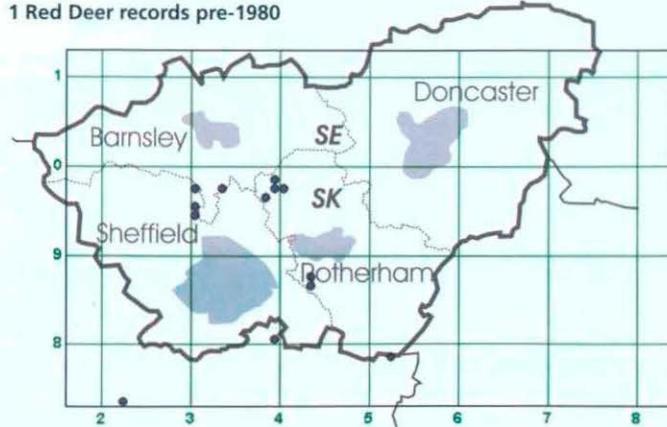
The surveys have been ongoing since the intensive work of the mid-1990s. As such, this has become the longest-running survey of its kind in the world. Uniquely, too, the study has involved the public across a wide area in sending in records and sightings over a period of 20 years. As deer numbers have risen, there has been the opportunity also to undertake detailed site surveys and to track the increasing numbers and the impacts on the animals' population structure and behaviour, and on local people.

On the Eastern Moors estate, in the Peak District, the Red Deer numbers have risen from only three individuals on Big Moor in the 1980s to around 30 or 40 individuals by the early 2000s. Over the subsequent ten years, the population has grown rapidly to three or more groups each of 35+ on Big Moor itself, and up to 400 in the wider

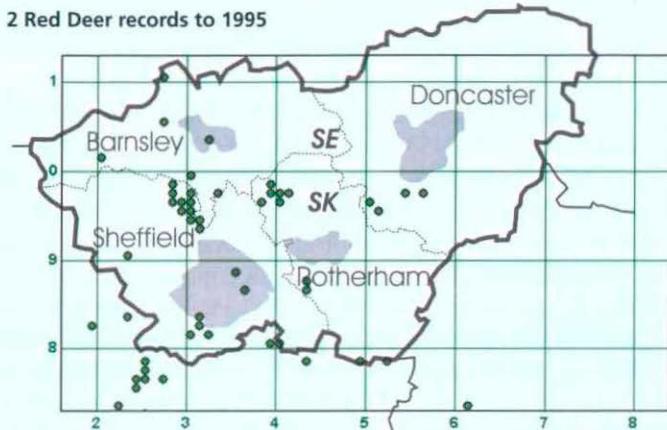
Eastern Moors area. It is believed that the original population came from escapees from the Chatsworth Park herd, which became difficult for the estate to control once the Eastern Moors became publicly owned lands in the 1980s. Prior to this, the estate managers shot any animals that were reported beyond the Park boundary. It is also suggested that there may have been deliberate releases of a small number of Red Deer hinds from private collections on the western fringe of Sheffield.

However, deer in a National Park, and especially deer colonising an urban area, raise issues and questions about management and about people's responses. There are deep-seated differences of opinion between those who see the deer as a welcome and exciting addition to local fauna, and those who do not. The latter often object to deer entering gardens, especially in hard winters, and damaging plants. Others are concerned about the spread of ticks and potentially Lyme disease. National Park managers are worried about the impacts on moorland vegetation because, as sheep numbers have been deliberately reduced, this decrease is paralleled by increased Red Deer. In addition, since we began the survey, back in the later 1980s, the problems of poaching have remained serious and something that many are aware of but few talk about. These issues and increasing risks of road-traffic accidents, especially in an urban-fringe area, are further matters that the research has considered. In the cold winters of 2009-2010 and 2010-2011, there appeared to be a step-change in Red Deer behaviour, in part as a response to the rapidly increasing core population. Sightings closer into the lower-lying suburbs of Sheffield have risen dramatically. It is now clear that the Big Moor population is

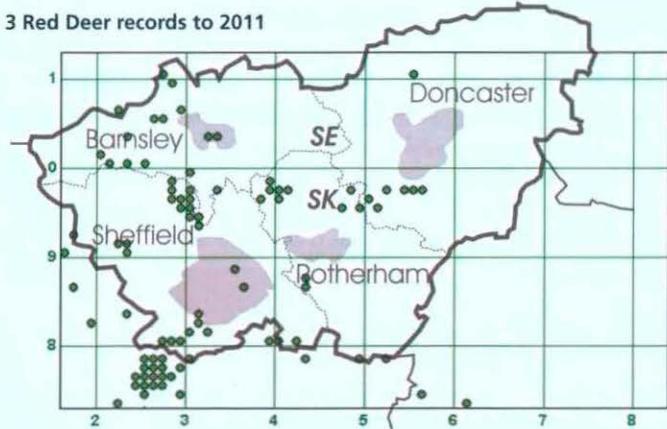
1 Red Deer records pre-1980



2 Red Deer records to 1995

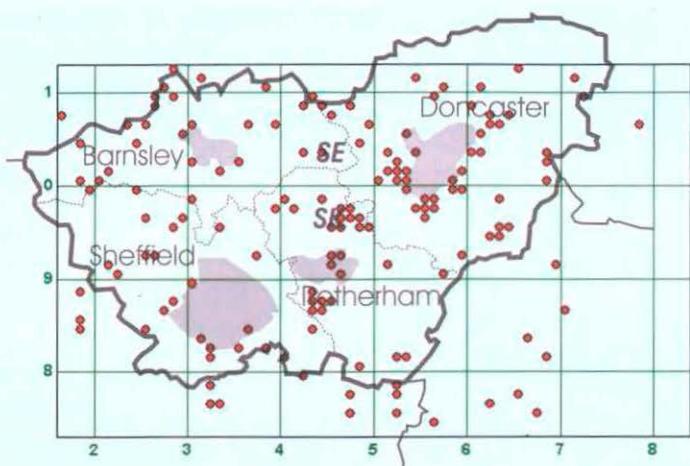


3 Red Deer records to 2011



Maps showing the core area of the study, the Peak District National Park is to the west of this, with records of Red Deer sightings for the three recording periods.

pushing outwards, as was expected, and adjacent moorlands are being populated. However, the deer are also moving downslope along the sinuous river valley of the well-wooded western fringes of Sheffield. Potentially this will bring the Red Deer right into the heartlands of urban Sheffield, and



Records of Roe Deer at 1km resolution in the study area to 2011.

it is likely that, during the next ten years, urban sightings of Red Deer will become commonplace.

There are still scattered populations of Red Deer across Rotherham and Doncaster in the eastern lowlands, and the well-established Wharncliffe herd between Sheffield and Barnsley. This population survives, but is prone to road-traffic accidents on the main roads which surround the core site, as well as 'control' by local farmers.

Roe Deer

The strongholds for Roe Deer continue to be in the east and the north of the region, but over the last ten years they have penetrated right into the Peak District as well. Moving along green corridors such as disused railway lines, roadside plantings of trees (as on motorways, parkways and

Roebuck feeding on farmland. Richard Revels



ring roads) and benefiting from extensive tree-planting (as on former coal-mining sites and in newly built townships), Roe Deer are spreading rapidly. Recent records have been from quite urbanised locations. Richard Wilson states (pers. comm.): 'the landscaped pit stacks through South Yorks now have a Roe population even if only very transient. The pheasant-shooting season seems to move more deer from the rural fields and onto the restored coal stacks. It is a similar picture with most of the broad-leaved

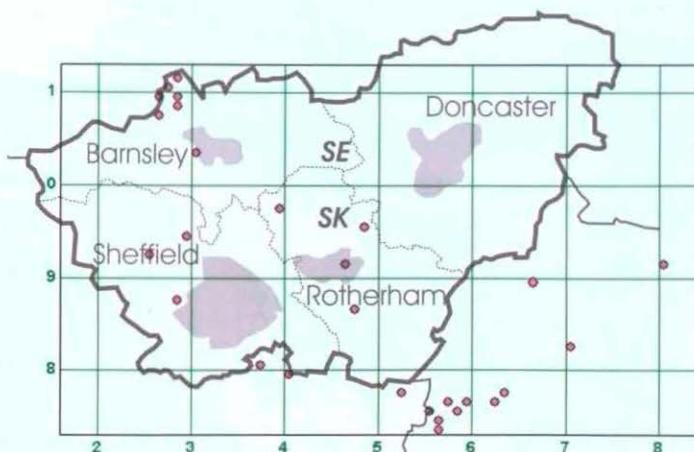
woods around Rotherham...' However, there are still serious problems of persecution and, as in earlier papers in which we reported how the first Sheffield records of Roe Deer were animals shot or 'dogged', Richard continues: 'The attrition rate is horrendous...dogged...shot with illegal firearms...habitat destroyed by illegal off-roaders.'

An early record of a Roe Deer was of one reported running across Abbeydale Cricket Ground, in Sheffield, during a televised cricket match (Rotherham 2000). A similar incident was recorded more recently when a Roebuck was sighted by many witnesses as it stood in the middle of the Cricket Ground at the rural location of Bradfield, to the north-west of Sheffield (John Brown pers. comm.). Several sightings of Roe in the Bradfield area up to Strines have been

noted recently, possibly indicating Roe expanding from the Loxley Valley and moving west and south into Sheffield and the Peak District. It is believed that there is now a population of around 25 animals in the rural woodlands around Bradfield (Richard Wilson pers. comm.). A very recent development from this movement has been confirmed by several sightings of Roe in the Derbyshire Hope Valley, to the west of Sheffield. Roe were first seen here in 2005, and have since been sighted frequently by local gamekeep-

ers. The well-wooded valleys around Ladybower Reservoir appear to provide good habitat, and the deer have been seen on a number of occasions around Win Hill. In 2006, two Roe Deer were observed swimming across the upper part of Ladybower Reservoir. Roe have also been reported feeding with sheep as far north as Bleaklow, and it seems that further westward movement will be limited only by the altitudinal imposition of the Kinder Scout and Bleaklow Massifs with their extensive blanket mires.

Whilst anecdotal records of Roe in the suburbs to the south of Sheffield are reported occasionally, there are few confirmed sightings. Evidence of Roe around Ecclesall Woods has been noted through sightings and observed browsing damage. One interesting recent record (October 2006) was of a probable Roebuck running out of Ecclesall Woods, stopping at the busy main road (Abbey Lane) and running back into the woods (Zoe Hepworth pers. comm.). This animal must have crossed at least one major arterial road into Sheffield to get to this part of the woods. Roe have been reported recently in the Moss Valley, down towards low-lying Eckington. Two Roebucks were also observed around the more upland Barlow area in Derbyshire (south of Sheffield) in 2005. Additionally, Roe have regularly been heard barking since the mid-1990s around the Moss Valley and the urban-fringe Oakes Park, and browsing damage has been observed in the area. In recent years, sightings of pairs of Roebucks around Sheffield have increased, and probably reflect Roe Deer expansion as the bucks search for new territories. It is likely that as planted woodlands of land-restoration projects and the South Yorkshire Community Forest mature, Roe Deer will become firmly established across the whole region and into the urban centres, too. Unlike Red Deer, where clearly some farmers are not keen on their establishment, it seems that farmers are more tolerant of Roe Deer. Therefore, whilst persecution is a problem, particularly in the urban fringe and the former deep-mining areas, active control of the population is unlikely to occur.

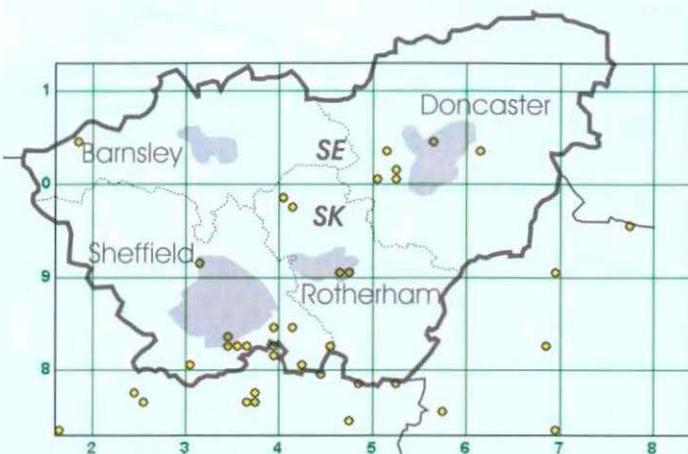


Records of Fallow Deer at 1km resolution in the study area to 2011.

Fallow Deer

The distribution of Fallow Deer in the Sheffield region remains static, although the species is perhaps more widely distributed than once believed. Fallow Deer are common in suitable habitat in the well-wooded landscapes of the Dukeries and Sherwood to the north of Mansfield and south of Worksop. There is also a breeding population of around 60 animals near Bawtry and west of Gainsborough. As is often the case, these originate from a former deer park (Richard Wilson pers. comm.). There is some evidence that this population is dispersing northwards.

The stronghold for Fallow in the region remains to the south of Sheffield and the south-east Peak District, around the Matlock and Darley Dale area. This is the melanistic Fallow population that originated from the ancient Stanton Hall herd, released about 40 years ago. The population was previously estimated to number around 100 animals (McCarthy *et al.* 1996), but recent observations suggest that there may be between 300 and 400 animals. The Clough Wood Fallow Deer herd alone has had up to 130 animals. This may suggest that the herd has increased substantially in the last ten years, but, of course, the earlier estimates may have been too low. There is anecdotal evidence to support this suggestion. One local deer-stalker was asked to assess the size of the Stanton herd in the mid-1990s. At this time, the estate suggested that there were four herds in the area, each with between 12 and 15 animals. However, whilst undertaking the field count, the stalker had 95 animals in a single herd. It is believed that the herd



Records of Muntjac at 1km resolution in the study area to 2011.

had increased, but the distribution seems remarkably unchanged, remaining strongly established around Stanton, Bonsall and Gratton.

Whilst this is a rural location, being in a busy National Park means that traffic has increased and RTAs appear to be increasing. A stalker regularly called to incidents reported that around ten animals a year are injured in RTAs. As might be expected, this population also attracts poachers, and since the winter of 2006 there have been reports of butchered remains of Fallow Deer.

Muntjac buck. Records of this species are now widely distributed in the study area. Richard Revels



Muntjac

Muntjac Deer, being small, secretive and largely nocturnal, are not easy to track as numbers increase. However, like Roe Deer, the barking territorial calls can make the locating of a population relatively easy. Of the four deer species, the distribution of Muntjac around the Sheffield area is the most difficult to determine. They were previously well established around Doncaster, and the situation is little changed today, with reliable sightings from around the Doncaster area and north towards the M180.

However, there are increasing reports from widely scattered locations, for example the north of Rotherham in 2001/2002, a single record around Crow Edge, west of Penistone, also in 2001, and around Darley Dale in the south. Muntjac is now reported as resident to the south of Chatsworth Park Estate, where dense Rhododendron *Rhododendron ponticum* provides excellent cover.

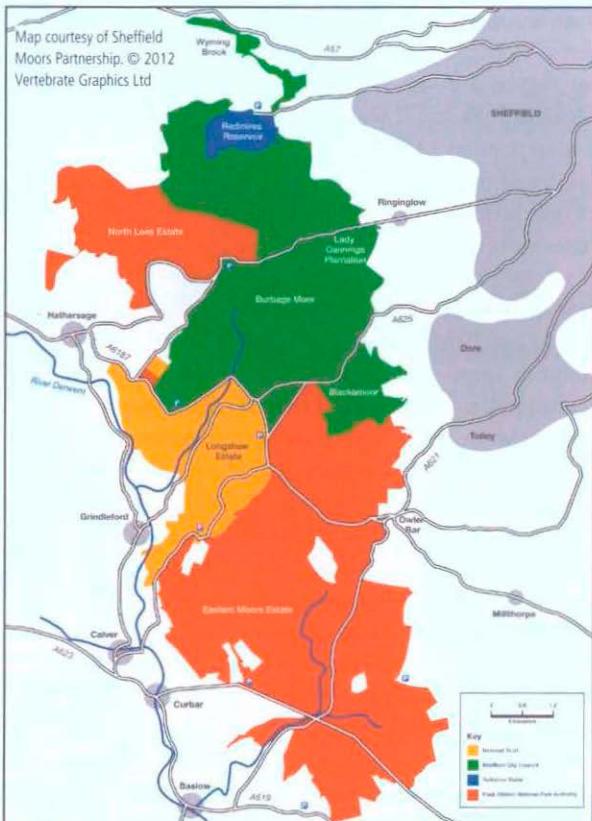
The present pattern is of occasional sightings across the wider region, but with a particular stronghold in the south and south-east of Sheffield. There have been numerous reports of Muntjac along the urban fringe of Sheffield, and also spreading east towards Worksop. In 2006, Muntjac was recorded around the large urbanised green space of Graves Park, well within urban Sheffield. Shortly afterwards, another was spotted (possibly the same animal) within a residential back garden farther into the city. Additionally, Muntjac have been heard or seen only two miles from the city centre. Muntjac, despite their reportedly slow rates of colonisation (Chapman *et al.* 1993 cited in McCarthy & Rotherham 1994), are now becoming more widely distributed and established throughout the Sheffield and the Peak District region. Deliber-

ate human intervention in dispersal was noted in earlier papers, where Muntjac enthusiasts carried animals in vans up the A1 for release into new territories. It is likely that Muntjac is actually far more numerous and widespread than the present records suggest.

Assessing and predicting populations

The main thrust of this long-term observational study has been the compilation and analysis of records of deer across the region. Because of the original paucity of deer, apart from a few strongholds, in-depth behavioural, impact or even population-count studies were inappropriate. However, as the Big Moor Red Deer population has grown, and being an open-habitat and easily counted population, this has lent itself to a more in-depth analysis. Courtesy of the Macauley Institute, Aberdeen, we were able to apply the HillDeer computer modelling package in order to predict likely population trends under differing scenarios of starting population, mortality and recruitment.

HillDeer assumes that the deer being studied belong to a single isolated population, and this was the case when the Big Moor Red Deer herd became established. However, now that the population has grown, the situation is becoming more complex, with satellite herds and even interaction with other populations across the region. HillDeer will be less reliable in its predictions where immigration or emigration of Red Deer is substantial. The habitat model describes the interaction between vegetation on the open hill and the main large herbivores present, namely Red Deer, sheep and Rabbits *Oryctolagus cuniculus*. This model considers the growth of different vegetation communities, the selective grazing by the Red Deer and other herbivores, and the resulting changes in bodyweight and in vegetation community composition. Additionally, this model can be used to explore the impact of a particular number of Red Deer on vegetation. The population model describes the dynamics of the Red Deer, accounting for changes in size and structure of a population resulting from four basic demographic processes: birth, ageing, natural mortality and culling. The population model can be used



Map showing the ownership of the Eastern Moors area.

to predict the long-term consequences of a wide range of culling strategies, and the habitat and population models can be used simultaneously. This allows interaction between the two models for more reliable forecasting.

For the purposes of population-modelling, an initial area of 2,000ha was used based on the approximate total size of Big Moor, parts of the National Trust Longshaw Estate, Blackamoor, and Totley Moor. For the first model, a 25-year simulation length was used to evaluate the period of formation and establishment of the herd. For the other models, a length of 30 years was used to project herd growth and possible future stabilisation. Models used include options with and without culling or other intervention, and in the first instance applying an initial population of two stags, two hinds and two calves in 2,000ha of heather moor. Various scenarios were modelled and are to be reported in detail elsewhere. However, a summary is that the population would be predicted to total about 20 animals after ten years, just over 40 in 15 years, and around 200 in 25 years. Then,

given a population expanding in the subsequent 30 years, we predict over 400 animals in the 2,000ha, but maybe around 850 over 4,000ha (the wider available habitat). If we assume a zero population at a start point of 1980, and then two stags, two hinds and two calves shortly after that date, then the predictions above can be compared with estimates and counts over the period. These are of eight to ten in 1990 (ten years), ten to 15 in 1995 (15 years), 20-30 in 2000 (20 years), and finally 150 in 2,000ha in 2010, and 400 in 4,000ha in 2010 (30 years). It seems that the model, developed largely in Scotland, provides a good fit to the Peak District Eastern Moors data. The model also suggests that, in order to maintain a stable population level of around 70 hinds from this point on, it would require an annual cull of 25-30 animals made up of 15-18 stags and 13 hinds. Clearly, at this point, the core population has dispersed, new areas have been colonised, and there are several independent but interactive herds. The model will now be less reliable, but, even so, it does provide an interesting insight into potential trends.

Aside from illegal poaching and two or maybe three stags injured in the rut, there has been no population control exerted on the Big Moor Red Deer population. Furthermore, there have been no records of RTAs, though that is surely just a matter of time.

Some concluding thoughts

Over a period of around 30 years since 1980, a most remarkable change in status of deer has occurred across the study area. Four species of deer have colonised or, in the cases of Red and Roe, recolonised the region. Of these, the Fallow has changed the least and remains locally abundant, but only in two or three main strongholds. Roe, Red and Muntjac are actively moving into rural and urban-fringe areas, and will in the next ten years have penetrated deep into urban heartlands. The population levels are now rising to a point where on-site counts and behavioural studies become possible. At present, the population remains unmanaged and so represents an exciting example of an unplanned 're-wilding' project. However, whilst hugely exciting to many locals, and even from an academic standpoint, the situation does cause anxiety to the Peak National Park Authority and to the partnership of the National Trust and the RSPB now charged with caring for

this landscape. Expanding into a series of wider subpopulations, the Red Deer are now moving downslope and into the well-wooded river valleys of urban west Sheffield. This exciting process is the subject of ongoing monitoring.

Acknowledgements

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References and further information

- Derbyshire, M J 2007 A critical evaluation of changing deer populations on the urban-fringe. Unpublished MSc Dissertation, Sheffield Hallam University, Sheffield
- Dolman, P, Fuller, R, Gill, R, Hooton, D, & Tabor, R 2010 Escalating ecological impacts of deer in lowland woodland. *British Wildlife* 21: 242-254
- Jones, M 1996 Deer in South Yorkshire: An Historical Perspective. In: *Deer or the New Woodlands - Managing Deer in Community Forests and the Urban Fringe. Journal of Practical Ecology and Conservation, Special Publication 1:* 11-26
- Jones, M, Rotherham, I D, & McCarthy, A J (eds) 1996 *Deer or the New Woodlands - Managing Deer in Community Forests and the Urban Fringe. Journal of Practical Ecology and Conservation, Special Publication No 1*
- McCarthy, A J, & Rotherham, I D 1993 Muntjac (*Muntiacus reevesi* Ogilby) on the Sheffield urban fringe – introduction or natural colonisation? *Sorby Record* 3: 3-6
- McCarthy, A J, & Rotherham, I D 1994 Deer in the Sheffield Region including the Eastern Peak District. *Naturalist* 119: 103-110
- McCarthy, A J, & Rotherham, I D 1996 Urban Deer, Community Forests and control – Roe Deer in the urban fringe – a Sheffield case study. *Deer* 10: 26-27
- McCarthy, A J, Baker, A, & Rotherham, I D 1996 Urban-fringe Deer Management Issues – A South Yorkshire Case Study. *British Wildlife* 8: 12-19
- Rotherham, I D 1996 Deer or the New Woodlands? – A local Authority Perspective. In: *Deer or the New Woodlands - Managing Deer in Community Forests and the Urban Fringe. Journal of Practical Ecology and Conservation, Special Publication 1:* 59-63
- Rotherham, I D 2000 Deer on the Peak District's urban fringe – a South Yorkshire vase study. *Peak District Journal of Natural History and Archaeology* 2: 75-88
- Rotherham, I D 2001 Urban Deer: A South Yorkshire case study. *The Deer* 11(10): 566-569
- Rotherham, I D 2003 Deer in urban and urban fringe areas – trends, issues and challenges. In: E Goldberg (ed) *Proceedings of the Future for Deer Conference, 28th-29th March 2003*. English Nature Research Reports, No 548: 40-48. English Nature, Peterborough
- Squire, M 1999 Deer Control in the Urban Fringe – a personal view. In: *Deer or the New Woodlands - Managing Deer in Community Forests and the Urban Fringe. Journal of Practical Ecology and Conservation, Special Publication 1:* 72-77

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