

The Quantock Hills deer count 1991 to 2016

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Extracted from the Proceedings of the Somerset Archaeological and Natural History Society for 2015.

Volume 159

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Produced in Great Britain by Short Run Press, Exeter.

ISSN 0081-2056

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INTRODUCTION

Red deer (*Cervus elaphus*) are the largest of the six species of deer living in a truly wild state in Great Britain. The largest population of red deer outside of Scotland occurs in west Somerset and north Devon, with the best known and most readily viewed herds being those found within the Exmoor National Park and the Quantock Hills Area of Outstanding Natural Beauty (AONB). Although red deer on the Quantock Hills originate from a number of re-introductions undertaken over the past 150 years, they now form an important part of the ecology and cultural history of the local area. The opportunities to observe red deer, which are far less common elsewhere in England, are valued highly by locals as well as visitors to the area. However, unless carefully managed, excessive deer numbers may build up and lead to detrimental impacts on farming, timber production and biodiversity. Despite their relatively large size, in anything other than entirely open landscapes red deer numbers are notoriously difficult to count accurately, because of the large home ranges of the deer and the tendency of a significant proportion to be missed in concealing cover. To aid management of the population, a systematic visual count of red deer throughout most of the Quantock Hills AONB was introduced in 1991 by the Quantock Deer Management and Conservation Group (QDM&CG). This count, undertaken in late winter by a large number of volunteers, has been repeated annually in a comparable manner ever since. The Quantock deer count, having now taken place over more than 25 years, is one of the longest running visual deer counts in England. This paper describes the approach and methodology of the count, the results and what may be deduced from them, and the value and benefits (and limitations) of such large-scale deer counts undertaken by local volunteers.

Red deer

Red deer are by far the largest of deer living wild in Britain. Weights of mature males range from 90 kg to 190 kg, and adult females from 60 kg to 110 kg with height at the shoulder among adults from 115

cm to 140 cm. They are a 'herding' species, which on the Quantocks may often be seen in groups of 10-25 animals, but sightings of herds of 60 or more are not uncommon. Stags and hinds tend to form separate groups outside the autumn mating season, and may move to late-winter and summer ranges that can be several miles away from the rutting areas. The peak mating season (or 'rut') occurs around mid-October, when stags chivvy hinds to collect into a harem which the stags then defend. They may fight with other stags to re-affirm their place in the male hierarchy. During March and April stags shed their antlers, which can weigh as much as 8kg a pair, with a new set regrowing by the end of July. The hinds generally give birth to a single calf (sometimes two) at the beginning of June.

Red deer are well adapted for grazing on pasture and other herbaceous vegetation, and on tree mast and crops, but can also utilise woody vegetation such as tree leaves, twigs and heather. Nowadays, they are as likely to be seen feeding or lying up within grass leys and agricultural crops on low-lying farmland as they are in the woods and moorland on the Hills.

Other deer species on the Quantocks

At the end of the 19th century the red deer was the only deer species known to reside in the Quantock Hills, aside from occasional fallow deer (*Dama dama*) escaped from nearby deer parks at St Audries, Nettlecombe and Dunster. Roe deer (*Capreolus capreolus*) became extinct across much of England during the 17th century but have recolonised most regions since the 1920s, including the West Country. On the Quantocks roe deer were still seen only rarely until the 1960s, but have increased significantly since then, and are now present in small numbers in most woodlands in and around the Quantocks. They are much smaller than red deer, no more than about 70 cm at the shoulder and adults weighing 18-32 kg. Roe deer will utilise a wide range of habitats, but prefer areas offering at least some patches of dense cover. They are more selective feeders than red deer, browsing by choice on nutritious plant parts such as buds and leaves

of brambles and roses, herbs, grasses, young tree shoots and leaves of both deciduous and coniferous trees.

Muntjac deer (*Muntiacus reevesi*) is another species which is beginning to colonise the area. These Asian deer were originally introduced to Woburn Park in Hertfordshire, but have now spread through much of England, with numbers in the wild now estimated at over 100,000 nationwide. They were first noted on the Quantocks in the 1980s, and although sightings have been reported at several different locations their numbers appear to remain very low at present. Fallow deer are seen only rarely on the Quantock Hills but are common in the Brendon Hills just a few miles to the west. Sika (*Cervus nippon*) have also been seen only very rarely within the Quantock Hills AONB, although wild populations occur in nearby Dorset with occasional sighting in east Devon and south Somerset.

History of red deer on the Quantocks

Red deer were present throughout much of postglacial Britain (Yalden 1999). In historic times their range contracted, with wild red deer becoming absent from much of England, Wales and the Scottish lowlands by the end of the 18th century (Lowe, 1961). Native red deer herds persisted in the Scottish uplands, and some remnant native reds are also believed to have survived near Exmoor (Lloyd 1975; Allen 1990), but the present day West Country populations have been supplemented with 'new blood' at various times using red deer from other parts of England (Staines *et al.* 2008).

On the Quantock Hills, very few (if any) red deer were present in the middle of the 19th century. Much of their recent history on the Quantocks has been closely linked to hunting with hounds. In 1862 Fenwick Bissett, master of the Devon and Somerset Stag hounds, introduced red deer caught on nearby Exmoor. After several further small-scale releases over the next 25 years, The Quantock Stag hounds (QSH) were established in 1901, but disbanded again a few years later. Around 30 red deer were present on the hills in 1917 when Sir Dennis Boles, the Baron of Bishops Lydeard and MP for Wellington, was asked to revive the QSH by the Controller of Food in Lloyd George's wartime cabinet (Whitehead 1980). The herd was supplemented at that time with several stags from Warnham Park in Sussex, and it gradually built up to several hundred animals. Numbers of red deer on the Quantocks and Exmoor

are thought to have fallen again during the Second World War. Hunting was resumed after the end of the War when positive efforts were apparently made once more by the farming community to encourage deer numbers to increase. However, prior to 1960 the red deer population was never reported to have exceeded 350 animals (QDM&CG 2005).

Although initially introduced purely for sport, hunting later developed as a means of controlling deer numbers through culling; it also helped to disperse large herds from farmland. Alongside rifle culls undertaken by stalkers on behalf of individual landholders, hunting has been a part of deer management on a high proportion of land in and around the Quantock Hills ever since. Legislation introduced by the Hunting Act (2004) came into effect in February 2005 and banned hunting of deer (as well as other mammals such as fox and hare), in the manner in which it was traditionally practised with a full pack of hounds in pursuit. Nevertheless, a more limited form of 'exempt hunting' remains legal and is still undertaken on many local landholdings in and around the Quantocks who give permission of access to the QSH for that purpose.

The QDM&CG was formed in 1991 to promote greater liaison on deer management matters between landholders, environmental organisations, the local hunt, deer stalkers and other interested parties concerned with the welfare and management of deer on the Quantocks. The wish to obtain better independent information on deer numbers across the area led to the first large-scale deer count on the Quantocks being organised on behalf of the QDM&CG by Eric Smith, who was then based on the Quantocks as the Forestry Commission's senior wildlife ranger in Somerset.

COUNTING DEER – APPROACHES AND METHODS

Background

There are many different ways of estimating deer population size. There are various types of direct counting methods – daylight open hill counts, drive counts, vantage point or aerial counts, night-time spotlight counts, and thermal imaging direct counts for example. Indirect approaches include methods based on assessing deer impact levels, track/slot counts, and various methods based on faecal pellet counts. Further information on all of these and their differing merits are reviewed by (Mayle *et al.* 1999). Those giving most accurate information

inevitably require the greatest amount of effort, repetition and/or resources, which, though perhaps justifiable for intensive scientific study, may be too costly and more than required by deer management groups for landscape-scale monitoring.

Direct counts carried out simultaneously over large areas of land by teams of observers do not tend to have a high degree of accuracy, unless undertaken in entirely open landscapes, as variable numbers of animals may be missed in concealing cover at the time of the count; and such counts will commonly produce lower figures than estimates extrapolated from, for example, faecal pellet counts or thermal imaging or other distance sampling methods (Langbein 1996; Mayle 1999). Large-scale direct counts do however have the advantage of being able to produce at least a *minimum* figure of total numbers of deer actually seen on the days of the count, and can give an indication also of the proportion of adult males among the herds. This may suffice as an *index* of long-term change in population size and sex ratio, even if the accuracy of figures in individual years will generally be unknown unless repeated several times within the same season.

History and development of Quantock Deer Count

The first large-scale direct count of deer, in May 1991, involved 44 people spread out across the area. That first count returned a figure of 753 red deer, including 677 hinds and followers, and just 76 adult males, as well as 14 roe and one muntjac deer. The timing had been decided on basis of waiting until after the end of the legal culling season which finishes at end of April each year for red deer. However, it was later felt that numbers of adult males may have underestimated due to most of them having already cast their antlers by May. The count in 1992 was therefore brought forward to mid-February, when even the oldest stags still have their antlers. Although not initially planned to become a regular event, members of the QDM&CG felt that the results of these first counts were helpful in providing an independent figure and give reassurance of minimum numbers of deer remaining present in the area, and have continued annually ever since. A trial Exmoor count in 1992 (Langbein and Putman 1992) was subsequently taken up and extended by the Exmoor & District Deer Management Society (E&DDMS) into an

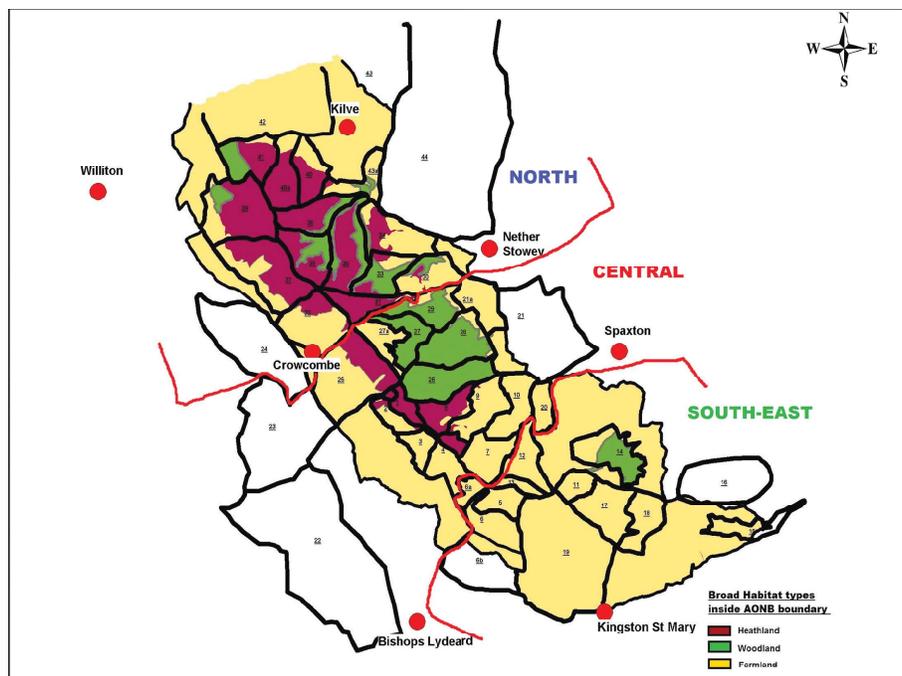


Fig. 1 Map showing deer count blocks and north, central, south-east regions

annual count from 1994 onwards. Since then, between 2500 to 3000 deer have been counted in most years within Exmoor National Park and some surrounding areas on its southern fringe.

The Quantock count continued to be overseen for ten years by Eric Smith, before handing over organisation to me, closely assisted by Andy Harris (Quantock Hills Ranger) until 2011, and a number of AONB rangers (Tim Russell, Owen Jones and Rebekah West) in more recent years. The methodology for the count, which has gradually been refined but maintained closely comparable over the years, is described in further detail below.

Quantock Count Methodology

The Quantock Deer count aims to encompass the main contiguous range of red deer herds based in and around the Quantock Hills AONB. The area is divided up into 44 main count blocks used each year, as shown in Fig. 1, with six sub-divided for assessment by different observers if possible. One or two observers are allocated to each of the main blocks or sub-compartments, with usually 50 to 60 volunteers taking part in total on the morning of the count. The volunteers come from a very wide range of backgrounds, including wildlife watchers and photographers, hunters and deer stalkers, as well

as countryside rangers from the AONB, Forestry Commission and National Trust. A high proportion of the counters participates every year, and will often be allocated to the same count block each year. While many counters have now taken part for ten or even 20 years, up to five novice counters are recruited each year, and as far as possible allocated to join one of the more experienced counters in their area.

The count is usually scheduled to take place during the first week of March, with a back-up date the following weekend in case dense fog or other extreme weather making it impossible to count the deer. The count is undertaken in early morning, within 1.5 to 2 hours of first light. Each observer (or team of two) is provided with i) an A4 OS map copy showing their count block and adjacent areas, ii) an aerial photo of the area for extra context orientation, and iii) a recording form. They will also usually carry binoculars and/or a spotting scope. For most count blocks observers walk a route that enables them to view as much of the area as possible in the time available, starting from the low ground and working up to the ridge that runs the length of the Quantock Hills. In other blocks observers may move between a small number of fixed vantage points that together provide wide views across the area being investigated. Observers are asked



Fig. 2 Young stags, hind and calves

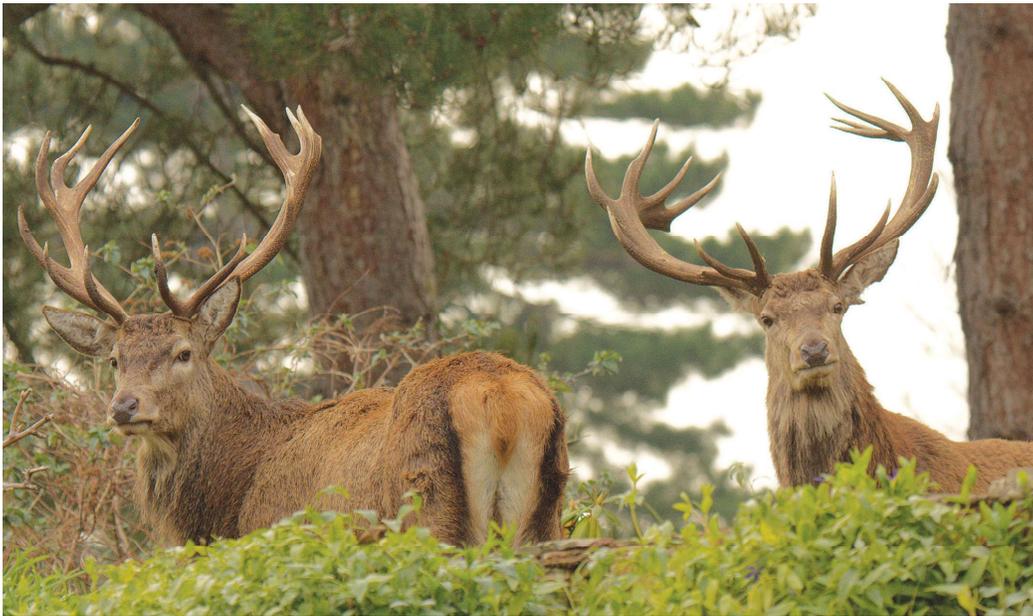


Fig. 3 Older stags ≥ 4 years (one 4.5 or 5.5 yrs old; other 10+ yrs old)

to note the location of each group of deer they see by a numbered cross on the map or by reference to well-known landmarks on the recording form, and to indicate the direction of travel if the deer are on the move and thought likely to move out of that count block before the end of the count. On the recording form the size of each group of deer is recorded, broken down in case of red deer into hinds and calves, prickets (males in their second year carrying only unbranched spike antlers), young stags (estimated to be two to four years old) and older stags (estimated to be five years old or more). Figure 2 gives an indication of what would generally be classed as young stags, and Fig. 3 for older stags, although classification of stags at the boundary of those age bands can be very difficult. For deer other than red deer (roe, fallow, muntjac) the species is recorded in the notes column and broken down if possible into does and adult bucks.

After completion of the count all forms are collected and then assessed by the count organisers, to identify any likely duplicate sightings (e.g. where deer groups of similar size and/or age/sex structure were recorded in adjoining count blocks) before collating total numbers and breakdown by species, age and sex classes.

RESULTS – TRENDS IN DEER NUMBERS, SEX RATIO AND DISTRIBUTION

Trends in total numbers of red deer across years

Following the count in 1991, a large-scale late winter deer count has now been undertaken annually in late February or early March throughout the past 25 years, missing just one year (2001) due to access restrictions during the Foot and Mouth outbreak.. The total number of deer seen each year, and numbers of hinds and calves, prickets and stags, is shown in Fig. 4. This shows that since 1992 red deer totals have never fallen below 300 or exceeded 960 animals. In fact, fewer than 380 red deer were recorded in just one count (in 2012) when dense fog covered the great majority of count blocks on both the initial as well as the scheduled back-up date. Results suggest that there was a decline in numbers between 1992 (650 animals) and 1996 (381), followed by a year-on-year increase over the next decade with a peak count for the 25-year period in 2005 (958). Thereafter, numbers once again declined, with another low in 2013 (386) followed by a steady recovery in the past three years. Possible reasons for these changes are explored in the Discussion below.

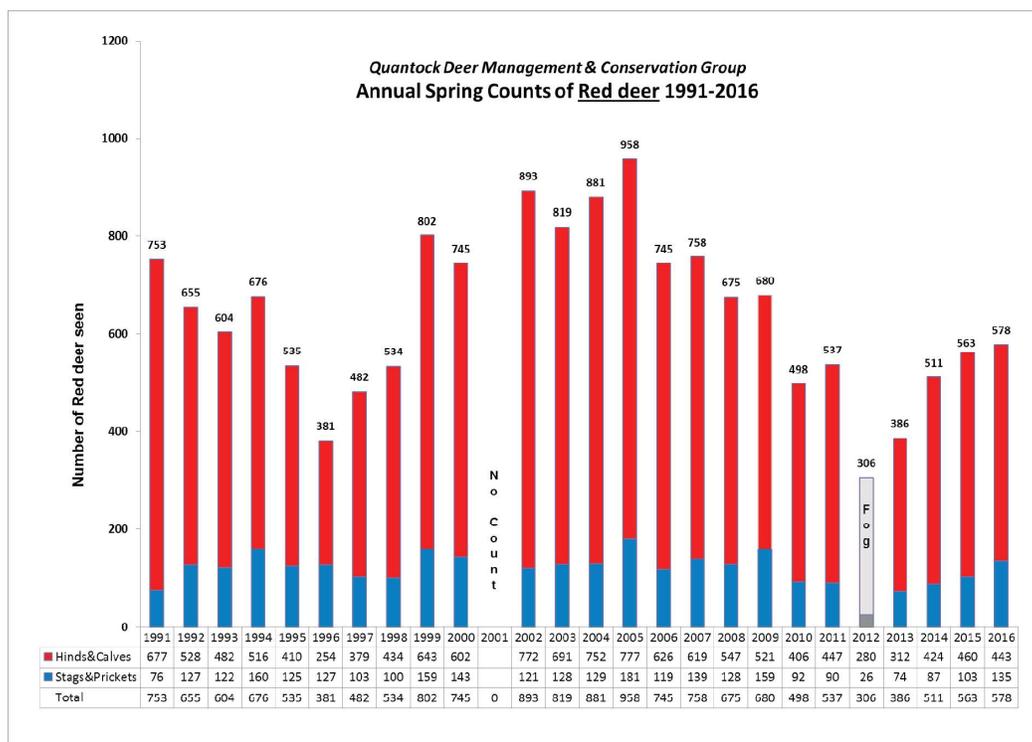


Fig. 4 Red deer totals and breakdown by year 1991–2015

Variation in sex ratio

Much emphasis has been placed on regular assessment of not only total numbers but also the proportion of adult males among any red deer groups seen, as there is concern among local deer enthusiasts and public about the relatively low and possibly falling proportion of fully grown stags among the population. However, accurate assessment of the age of stags in the field is tricky, even for experienced deer watchers, not least when animals are being viewed through binoculars at great distances. At close range it is possible to identify prickets (yearling males), as they will nearly always have unbranched antlers with only a single spike on each side. These spikes vary greatly in length, and while many prickets have spikes 15 to 30 cm long, some even in late winter may only show coronets with spikes less than 5 cm long; these latter animals will be difficult to distinguish at a distance among large groups of hinds. Two and three year old stags tend to be readily classified as 'young stags' (Fig. 2), but classification of those that are four or five years old (often called 'in-

betweeners' locally) is much more difficult. Some stags may already have 12-point antlers when four years old, while others at that age may still have far fewer tines and indeed may not necessarily ever grow sets of antlers with more than ten points even when in their prime around eight to ten years old. Nevertheless, Fig. 4 shows that despite the quite wide variation in total numbers observed over the years, the proportion of prickets and stags has remained between 13.5% and 24% throughout the study period, with just one exception being in 1996 (33%). In order to estimate changes in the true sex ratio for the population the (unknown) numbers of male calves within the 'hind and calf' category must be taken into account. From spot counts undertaken by the author on the Quantocks over many years, calves may be estimated commonly to make up approximately 30% of all the animals classified as 'hinds and calves' during the late winter counts, and close to half the calves may safely be assumed to be male. On the assumption therefore that 15% of the 'hinds and calves' will be male calves, an overall sex ratio (including stags and prickets) may

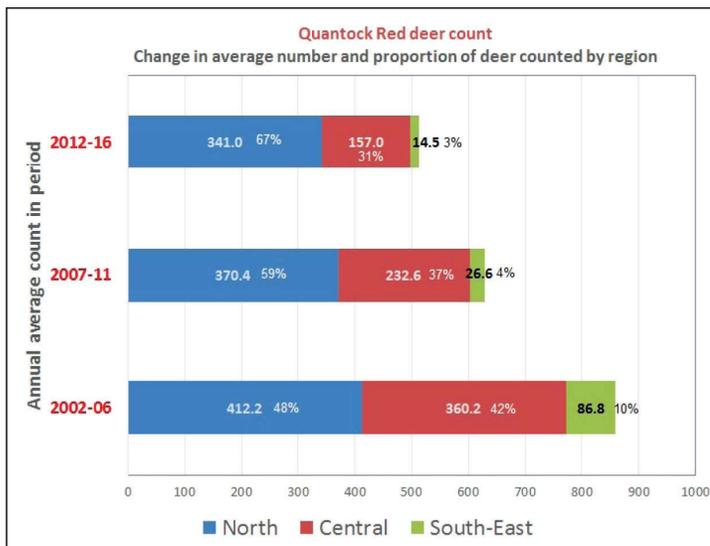


Fig. 5 Red deer abundance change by region

be calculated. On this basis, the overall late winter population sex ratio has remained fairly stable over the past 25 years averaging 2.2 females per male with a standard deviation of just 0.3 (n = 24). If the sex ratio is calculated without factoring in an estimate of males amongst the calves (i.e. yearlings + older hinds: prickets + stags) then the average sex ratio between 1992 and 2016 has been 3.6:1 (females:males) (st. dev 0.8). Whichever method of calculation is used, the results (in Figure 4) show that the proportion of adult males among the population has shown a very slight downward trend if any over the past 25 years.

Changes in distribution across the Quantock AONB

Details on locations of deer sightings, such as numbers of deer seen per individual count block are not presented here, because of the potential sensitivity of such information with respect to poaching, and in order to maintain confidentiality for landholders who provide access for the counts. However, for reporting purposes the annual results for the last 15 years have generally been broken down into three sub-divisions of the count area – distinguishing between North, Central and South-East sections as shown in Fig. 1. Between about half and two thirds of red deer sightings have nearly always been recorded within the North section (Fig. 5). The North section contains most of the open moorland and semi-natural sessile

oak woodland present within the AONB, which are habitats that local red deer tend to occupy at highest concentrations. Here they also have access to lower lying improved grazing and agricultural land nearby. The Central section, has an overall higher proportion of woodland, but a more limited amount of open heathland. It includes the large conifer plantations and mixed woodland that form Great Wood in the centre of the Hills, as well as further substantial areas of mixed woodland around Crowcombe Heathfield. The proportion of deer in the Central section has tended to be between 30% and 45% of the total for the whole study area. The South East section is made up predominantly of undulating farmland with scattered areas of woodland, and has always been the section where fewest red deer have been sighted during the count. Up until 2005, this section generally held between 7% and 12% of the total across the whole area. However, there has been a marked reduction in both numbers and proportion of red deer recorded in this area (Fig. 5), falling from a mean of 10.1% for the period 2002 to 2006, to 4.2% (2007 to 2010), and just 2.8 % for the most recent period (2011 to 2016).

Observations of other deer species

Whilst sightings of roe, muntjac and any other deer are also recorded, the Quantock deer count is primarily aimed and best suited to assessing trends in red deer numbers. Numbers of roe deer recorded

during the counts have varied widely from just 14 in 1991 to a maximum of 95 in 2004, with an average of 53 over the last decade. Although it is clear from the counts that roe deer have increased significantly in numbers and spread across the area over the last 25 years, they are most abundant in copses and woodland along the foothills and lowland fringe surrounding the Quantock Hills. I would estimate that numbers of roe deer recorded during our counts are likely to represent no more than perhaps 30% of the actual population, and a count dedicated specifically to assess roe deer and muntjac numbers would be required to obtain better information on these species, both of which have relatively small home ranges and are associated with denser vegetation than red deer.

The first sighting of a muntjac deer on the Quantock Hills was in 1991. Numbers had been expected to rise, but in fact sightings of just one or, at most, two muntjac have been recorded in just five of the last 25 years. A number of reports of muntjac culled or found as road casualties have been reported at other times, and although we cannot offer an estimate of their numbers, it would appear that they are colonising the Quantocks at only a slow rate so far.

DISCUSSION AND CONCLUSIONS

The Quantock Deer Count is one of the longest running landscape-scale deer counts of its kind and has been undertaken annually using a consistent methodology for over 25 years. Similar annual visual counts elsewhere in England include, for example, the counts of fallow deer since late 1970s at Ashridge Forest in the Chilterns (Barton not dated) and in the New Forest (Putman and Langbein 1999), and since 1994 of red deer on nearby Exmoor (Langbein and Putman 1992). Any method of estimating the size of mammal populations based on direct observation over large expanses of mixed habitat is bound to have significant limitations. Although the results presented here may not accurately indicate 'true' population size, it is likely such counts provide a reasonable reflection of at least population trends (Putman and Sharma 1987). They also provide a reasonably robust annual minimum figure for red deer numbers, as well as numbers of adult males, occurring in and around the Quantocks Hills each year. It is helpful to have such information when concerns are raised by the public about seeing fewer deer during the rut,

or when localised excessive damage from deer is reported by landowners.

On the Quantocks control of deer numbers through culling by rifle (as for much of England) is undertaken largely independently of one another by numerous different landholders, though in some cases locally in association also with 'exempt' hunting through the QSH. The QDM&CG is a group of landholding organisations, private landholders and other interested parties that provides foremost a forum for exchange of information on deer, but does not have any statutory powers nor does it attempt to set annual cull levels. As part of its policy (QDM&CG 2005) the group supports the view that a population based on between 400–450 red deer noted at the annual spring count constitutes a sustainable population size for the longer term provided it is reasonably well distributed. In addition, the group agreed in 2005 that if consecutive annual counts should ever indicate that numbers are likely to have fallen to below about 300 head the QDM&CG will call on its members and others to introduce minimal or zero cull policies, until such a point that numbers and age/sex breakdown are considered to have recovered. The results presented here show red deer numbers seen during individual counts have fluctuated widely over the years, with around 600 noted in most years during the early 1990s but falling to below 500 later in the same decade. Thereafter counts rose steadily up until 2005 to a peak of 958, but have fallen back again steadily since, to reach a low of 386 during 2013 and recovering again to well over 500 by 2016.

Multiple different reasons are likely to have contributed to the trends observed, including changes in the size, spread and manner in which deer culls have been undertaken, but also variations in farming and cropping practices off the Hills and public pressure on the Hills. It is interesting to note that during the five year period (2002 to 2006) when highest numbers were recorded overall, not just the number but also the highest proportion of deer were noted to have spread into the farmland areas on the south eastern fringe of the Quantocks, but reduced again in recent years as overall numbers have fallen.

Another factor that may have led to a somewhat higher proportion of red deer being missed in recent count years, is the expansion (mostly since 2005) of high *Miscanthus* (Elephant grass) crops being grown on low lying farmland, particularly south east of the Quantock Hills, though also in some central areas west of the A358 as well as north of the A39. *Miscanthus*, being a perennial crop

that is left standing overwinter and generally not harvested until late spring or summer, provides close to 500 hectares of high, dense cover on low ground surrounding the Quantocks, in which some groups of red deer are known to lie up during daytime. The possibility is being looked into of separate assessment, probably using an unmanned video enabled drone to fly over to these crops, to help determine how many deer may commonly lie up in such fields during late winter. It is feasible that the introduction of the Hunting Act (2004) in early 2005 also led to some lesser tolerance of red deer on some areas of farmland, and may have contributed to the decline noted in overall numbers from 2006 onwards, although average numbers of near 550 in late winter in more recent years are similar to the average numbers counted during the 1990s.

The QDM&CG does not aim to dictate what may be appropriate cull levels for individual landholdings or the Quantocks as a whole. It is hoped nevertheless that the ready accessibility to annual summary results from a consistent and independent community based deer count as outlined here, has aided local landholders in their own deer management decisions over the years. This may have led to more restrictive localised culls overall if and when counts have indicated that total numbers or proportion of adult males in that region of the Quantocks have fallen, or by converse higher culls following years when peak numbers were reported, helping to maintain the overall population near a sustainable level.

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