

***Exmoor's Other Deer : current status of Fallow, Sika, Roe and Muntjac
within Exmoor National Park and surrounding areas.***

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A report prepared for Exmoor National Park Authority



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1. Introduction

1.1 Background

Red deer are identified in the Exmoor National Park Management Plan (2007–2012) as one of the native wildlife species on Exmoor most valued for their conservation status and local cultural significance, and the maintenance of “*a stable and healthy herd of red deer in balance with its impact on the natural environment*” forms a specific management target within that plan. In March 2008 ENP produced a strategy to help deliver and monitor this target. The strategy proposed development of three key areas of work:

- i. Evidence gathering
- ii. Additional consultation, communication and support for those involved in deer management
- iii. Drafting of a Red Deer Management Plan

Although that strategy focuses foremost on Red Deer, monitoring of the status also of deer species other than red deer within the local area was included as one of seven main topics identified as requiring further ‘evidence gathering’, not least in view of the interrelationships of their status and impacts with those of red deer. This present report presents findings from a brief study commissioned by ENP to draw together available information in relation to the occurrence and present status of fallow, sika, roe and muntjac deer within Exmoor and surrounding areas.

1.2 Objectives

This study was commissioned to help answer the following main questions:

- In addition to red deer what other species of deer are present in the Exmoor National Park and surrounding areas?
- What is currently known about their distribution and densities?
- What is the best way of monitoring them in the future?

1.3 Scope and Approach to the study

Following initial discussion of the remit with ENP, it was decided that this study should be confined to desk-top collation and review of information from existing data sources, supplemented by limited consultation with other local deer experts. New field survey work to validate presence of the differing deer species or their abundance more directly was outside the scope of the present short-term assessment. More specifically the work would encompass:

- i. Review of existing presence / absence deer species records available via recognised national and local biological records sources (including but not confined to the National Biodiversity Network, British Deer Society’s UK deer surveys, and deer counts organised by Exmoor & District Deer Management Society).
- ii. Direct consultation with a range of deer managers, stalkers and other local deer enthusiasts familiar with Exmoor and the surrounding area (via a short questionnaire survey and/or by phone) to help verify and expand past information from i. above and to give some indication of relative levels of abundance by species.
- iii. Based on evaluation of the amount and quality of information obtained, make recommendations for future monitoring.

2. Methodology and data sources

2.1 Overview

A large and diverse range of national and local organisations and individuals maintain information on the presence and distribution of differing wildlife species in various parts of the UK, including amongst others local wildlife trusts, natural history societies, county wildlife recorders, national wildlife charities, and regional or national Biological Records centres. Although a great deal of such biodiversity information exists including for deer species, much of this has often been difficult to access and compare. However, more recently collaboration via the National Biodiversity Network (NBN) has enabled increasing numbers of data sources to pool and share their information more readily including through on-line access via the [NBN gateway](#). The NBN gateway was utilized in the present study for initial review of available on-line data sets on deer species in Somerset and Devon. However, not least as a number of important more recent data sets were not yet available via NBN, data was gathered also from a number of additional organisations able to provide their latest records direct to me, as well as through consultation with a range of local deer experts to help cross-validate information as far as possible by confirmed sightings of the differing species made during 2007 or 2008. The main national and local data sources consulted and type of information available from each are outlined in further detail below:

2.2 Nationwide data sources

- 2.2.1 NBN Gateway : Information accessible on-line via The NBN gateway was searched in turn for each of the six different deer species established in Britain for any available records uploaded prior to August 2008. The major constituent data sets with deer records for Exmoor and surrounding areas were in most cases contained within a) Biological Records Centre (CEH) mammal data used to create the 1993 'Atlas of mammals in Britain (restricted mostly to records for up to 1993, but with some later records up to 2002 including British Deer Society survey data; and b) Devon Wildlife Trust records again mostly up to 2002 only, as well as c) more occasional records from other primary sources. The great majority of deer records available provide information on whether the species had by then been recorded as present; usually at resolution of differing 10 km OS grid squares, with only a small minority logged at lower resolution showing location to nearest 2 km or 1 km square. Information on actual or relative abundance of deer was not available from these data, other than what can be inferred from numbers of different grid squares in which each species has been recorded.
- 2.2.2 British Deer Society 2007 Deer Survey data : A further update of the 'Great British Deer Survey' undertaken mostly via members of the British Deer Society, provides more recent deer data gathered post 2003 and up to 2007. Records again provide the grid coordinates for each 10km grid square where at least one sighting has been reported for each species. The full BDS survey data for up to 2007 for all deer species was kindly provided for use in this study by Alistair Ward on behalf of BDS. As at 2.2.1 above, resolution of records was limited to noting occurrence of each species within particular 10 x 10 km squares.
- 2.2.3 National Deer-Vehicle-Collisions database: The NDVC project administered via The Deer Initiative collates nationwide information on reported deer road casualties and related traffic collisions, with a database extending to a sample of 50,000 DVC

known incidents occurring since January 2000 (for which deer species detail is available for around a third). As national co-ordinator of that project on behalf of DI, I was able to search this database for all species-specific records for the Exmoor region. All those species-specific DVC records logged pre 2006 had also been provided for use by the most recent BDS survey (see above). Any further more recent local DVC reports retrieved for 2007 & 2008 were included with other recent deer records accrued from the local consultation and questionnaire survey outlined below [2.4].

2.3 Local deer counts and surveys

Additional local sources of information reviewed for the present study included recent results from annual visual deer counts organised by a) Exmoor & District Deer Management Society, b) Quantock Deer Management & Conservation Group and c) Monksilver DMG. Each of these counts are organised on one or two mornings per year using large teams of observers at good vantage points or allocated to specific walked routes. The first two are focussed particularly on counting red deer in their respective regions, while the latter is focussed mainly on assessment of fallow numbers. Although rather lower proportions of smaller deer species are likely to be seen during such large scale counts, any sightings of roe deer and more occasionally muntjac are also recorded. To date results from these counts include only very little additional information on occurrence of muntjac and sika, but do offer at least some indication of relative abundance of roe and fallow in differing parts of Exmoor, the Brendon Hills and the nearby Quantock AONB.

2.4 Questionnaire Consultation of local 'deer-knowledgable' individuals

Whilst invaluable for establishing the geographical distribution and spread of different species, national biological records schemes inevitably rely on input of information from a wide range of organisations and individuals with differing species identification skills. At a more localised level the reliability of individual presence / absence records is therefore difficult to assess; such that where a given species may have been recorded just once some years ago, it may be unclear whether this was due to simply to an occasional migratory movement or the species has actually become established.

For the present study it was therefore felt important to undertake some additional validation to confirm the recent presence of any of the other deer species reported within past biological records sources (see above). A list of around 60 local 'deer knowledgeable' consultees with good first-hand knowledge of the local area and its deer was therefore drawn up to include for circulation of a brief questionnaire-based consultation. A consultation letter and survey form was prepared (as shown in [Appendix I](#)), asking individual consultees to provide information on any sightings of muntjac, sika or fallow deer that they had made within Exmoor and surrounding areas at any time during the last 12 months or so. Survey forms requested details of the deer species and OS grid square reference to at least 10km or 1km where any such sightings had been made. In addition consultees were asked to indicate, based on their own perception and knowledge of the local area, whether for any of the OS 10km squares shown on the survey form Roe deer rather than Red deer are the predominant deer species present.

Those individuals consulted included a) E&DDMS deer count area co-ordinators [for which circulation was discussed and kindly arranged by Charles Harding], b) countryside rangers from SW Forestry Commission, Exmoor NP and Quantock

AONB and National Trust, c) local DMGs, Quantock DM&CG count helpers and organisers, and d) a number of other local deer stalkers, deer photographers, and SW British Deer Society Committee members known to me for their particular interest and knowledge of deer species. In addition it was hoped that some further relevant information on other deer species may accrue from the parallel project commissioned by ENP into culling rates on Exmoor.

I would like to acknowledge the assistance of all of the above individuals and other sources who contributed information for use in this study.

3. Deer species - background and ecology

Deer in Britain

3.1 Six different species of deer are established in the wild in Great Britain. Only two of these, red and roe, are truly native, but fallow had also been present here until the last ice-age and were reintroduced by the Normans or Romans. The other three species (sika, muntjac and Chinese water deer) originate from the Far East and were introduced around 100 years ago. The habitats preferred by all six species are associated with open woodland or woodland edge. With the advent of modern agriculture, the associated deforestation brought about parallel declines in deer populations. However, the national re-forestation schemes begun in the 1920's and continuing today, as well as tighter regulations on permissible firearms and close seasons introduced by the Deer Act (1963), have led to significant increases in deer numbers and distribution throughout the UK over the last fifty years. While no firm population figures are available, approximate nation-wide estimates of deer numbers have consistently be revised upwards over recent decades by most authoritative sources, for the UK as a whole are believed to now exceed > 350,000 red deer, >800,000 roe, 150-200,000 fallow; >150,000 muntjac; c. 35,000 sika , and <10,000 Chinese water deer (POST, 2009).

Red deer on Exmoor

3.2 Although all six of the above species have been recorded as present within Southwest England at one time or another, the predominant species traditionally associated with Exmoor are the Red deer (*Cervus elaphus*). It is widely believed that red deer have been present continuously since soon after the last Ice Age (Allen 1990), although many subsequent introductions from parks are also known to have been made. In the early 19th century red deer numbers are thought to have fallen to as little as 200 animals due over culling once the traditional Exmoor Forest was sold by the Crown, but recovered soon after to near 1500 head. Populations fell again during the war years in the first half of the 20th century, and by the 1960 were still believed to number less than 600 head on Exmoor (Lloyd, 1970). A first large-scale census organised during a previous study on Exmoor (Langbein & Putman, 1992) indicated numbers had risen to near 2100 on Exmoor plus a further 600 on the Quantocks. Development and annual replication of this large scale count by EDDMS over the last 16 years have consistently returned figures between 2500-3000 in most recent years (Harding, pers.comm). The distribution and abundance of red deer will be discussed further in parallel reports on the deer counts, and will not be covered in detail in this report.

Roe deer (Capreolus capreolus)

3.3 Roe are relatively small deer weighing up to 32 kg, with a maximum height of 75 cm at the shoulder, and are the most widespread species throughout Britain as a whole. They occur in a wide variety of habitats, most commonly based within or near woodland, but can thrive also in more open field/hedgerow systems where only small patches of woodland are available. Roe Deer are selective and versatile feeders, feeding predominantly on herbs and shrubs, buds and shoots of trees, as well as grasses, cereals and fungi. Mating occurs during July-August, and following delayed implantation young (up to three, more commonly one or two) are born in May or June. In summer, Roe Deer are usually solitary or occur in small groups consisting of a doe and her kids and sometimes a buck. Yearlings of both sexes may accumulate to form a non-territorial group, and larger feeding aggregations of 10 - 30 individuals may occur in large fields in some areas during the winter. Home range sizes vary widely but most European studies have determined average sizes from 30 – 170 ha, the smallest ranges occurring in woodland landscapes and largest in farmland areas. Over-winter pre-breeding densities in the UK commonly vary from around 3 – 30 per km², with highest densities usually achieved in areas offering a high proportion of woodland cover.

Fallow deer (Dama dama)

3.4 Fallow are medium sized deer (smaller than red deer, though larger than roe), with males and females weighing up to 100 kg and 50 kg respectively, and maximum height at the shoulder around 1.0 m. Their coloration may vary from common (chestnut with white spots), to pure white, to black, and menil (light fawn with white spots). Fallow are among the most social deer species and in open areas may congregate in herds of up to 150 or more; in large woodland habitats they are more commonly seen in groups of 2 to 8 animals. The rut takes place in late October and usually single fawns are born the following June. Fallow are non-territorial for most of the year, with annual home ranges covered by individual deer commonly between 50 to 100 hectares, but bucks may travel several kilometres in search of females during the rut.

Fallow are primarily a species of open woodlands or of the woodland edge where they may have access to fields of pasture or agricultural crops. Of the various British deer species the fallow is the closest to being a specialist grazer, by preference taking less browse and more grasses (or crops) than the other species; and as such fallow adapt well to living in agricultural landscapes so long as at least some small 'islands' of woodland are available for cover.

Fallow have traditionally been the preferred species kept in the hundreds of deer parks established around stately homes throughout much of England. Some two hundred such parks still flourish today, but many were disbanded during the war years of 1914-1918 or 1939-1945. The escaped deer gave rise to many of the wild populations now well established right across England, but often still centred on areas close to their park of origin. This is reflected by the local situation around Dunster and Monksilver where former deer parks were located, and the nearby parts of the Brendon Hills still remaining the main stronghold of fallow deer activity today.

Muntjac deer (Muntiacus reevesi)

3.5 Muntjac are relatively small deer measuring only up to 50 cm at the shoulder and weighing less than 20 kg. Characteristic of dense shrubby cover, they tend to be solitary and territorial and as a result are rarely noticed until numbers have reached quite substantial density. Muntjac may first conceive at around 8 months of age, and unlike our other deer species breed throughout the year, females producing single young at approximately 7 months intervals irrespective of season. Following their initial introduction to this country in Bedfordshire around 1900, they are now common throughout most of East of England and the Home counties, and have continued to expand their range (naturally as well as assisted by further deliberate releases – though such release to new areas is now illegal). Once well established muntjac may be found at densities as high as 15 - 30 or more animals per square kilometre. Individual home ranges are commonly smaller than 20 hectares, though animals may range more widely in search of food during the winter months.

Muntjac are usually found in woodland with dense understorey, and will also readily colonise coppice, areas of scrub and even neglected gardens in urban or suburban areas. Muntjac are not well adapted to digest fibrous bulky forage, and instead feed selectively to choose highly nutritious items from shrubby species, especially bramble and rose, and where available including broadleaved herbs, ivy, ferns, crab apples, tree mast, wheat, barley, rape, as well as native flora such as bluebells, honeysuckle, primroses and orchids.

Sika deer (Cervus nippon)

3.6 Sika are non-native deer from the Far East which occur as 13 differing races within their native range. Most sika in Britain are of Japanese islands origin and were brought firstly to Ireland in about 1860, and thereafter to a variety of places in England and Scotland. Some were released deliberately such as in Kintyre, the New Forest and Dorset, while other escaped from parks. Sika are distinct from other deer species found in GB, but can hybridise with red deer to produce fertile offspring, and hybrids now present in many parts of the UK (particularly in much of Scotland) are less readily distinguished in the field.

Although sika will hybridise with red deer, females are generally considerably smaller than red deer, and the most commonly established sub-species in UK (Japanese) around 65 to 80 cm tall at the shoulder, though some males may attain 70–120 cm. Conifer plantations tend to be their preferred habitat, but sika will adapt readily to live in mixed woods and moorland (e.g. New Forest) and estuarine reed beds (Purbeck), provided some woodland or other dense cover is available. Similar to red deer, sika are intermediate grazers well adapted to grazing on pastures as well as for browsing coarser vegetation such as heather, conifer needles and deciduous tree leaves. The rut occurs during from late Sept through October and often is more protracted than for other deer. Once familiar with the whistling type rut calls of sika these are readily distinguishable from the roar of red or groaning of fallow deer. As for red and fallow, sika are non-territorial outside of the rut.

3.7 For greater detail on the biology and habits of the various other deer species aside from red found around Exmoor a series of useful reference booklets are available from the Mammal Society and British Deer Society: for Roe Deer (Fawcett, 1997), Fallow Deer (Langbein & Chapman, 2003), Sika (Putman, 2000), Chinese Water Deer (Cooke & Farrell, 1998) and Muntjac (Chapman & Harris, 1996).

3.8 A comparative overview of some characteristics of deer species found in England is given in Table 1 below:

Table 1:

<i>Deer species established in the wild in Great Britain</i>						
Species	Native		Introduced > 1000 yrs ago	Non-native Introduced c. 100 yrs ago		
	RED	ROE	FALLOW	SIKA	MUNTJAC	C. WATER
Status	Spreading, Locally common	Increasing in number and range	Increasing, Locally common	Increasing, Locally common	Increasing, Locally common	Localised, Stable or slow rise
GB population [Eng&Wales - min [upper estimate]	350,000 [12,500] [34,000]	550,000 [250,000] [400,000]	175,000 [100,000] [200,000]	35,000 [5,000] [10,000]	150,000 [40,000] [150,000]	> 750 [>750] [3,000]
Home range approx. size	400 – 2,400 ha	10 – 90 ha	50 to 300 ha	50 (to 300?)	12 – 25 ha	10 (to 30?)
adult Weight range (kg)	m 90 -255; f 80 -120	m 20 - 30 f 18 - 27	m 60 - 110 ; f 32- 55	m 50 -120; f 30 -60	m 12 - 17 f 10 - 16	m 12 -19 f 12 - 18
Max. shoulder height m/f (cm)	120 - 140	60 - 75	85 - 95 / 70 - 90	70-120 / 50 -100	45-50	50 – 60
Tail	Beige tail.	Barely visible	Longish with black line.	White with black line; shorter than fallow	Wide tail, held erect when alarmed	Short tail, not held erect
Rump	Creamy rump; not outlined by black	White rump, caudal patch flared when alarmed.	White rump, horseshoe border & long tail	White caudal patch edged by black horseshoe	White rump	Creamy brown

source: based and up-dated from Langbein (2008)

4. Results

4.1 Of the six species of deer found freeliving in the UK, for five of them (red , roe, fallow, muntjac, sika) reliable recent sightings confirm their presence in at least small numbers either within Exmoor or else (for sika) no further than 10km from the National Park boundary.

4.2 The main results arising from review of the information obtained for each of these species from of all the various sources consulted (see 2.2 to 2.4) are presented in Map form in [Figures 1 to 5](#). On each of these maps (one per species) a grid showing separate 10km OS squares has been overlaid. Filled coloured (or shaded) symbols added to these squares indicate whether and by which of three main data categories presence of that species has been recorded. In each case: –

- a filled symbol placed left of centre indicates that presence was reported for that square in NBN data-sets for pre-2003,
- a filled symbol positioned along the centre line indicates that presence was (also) reported by the 2003-2007 BDS deer survey.
- A filled circle with star to right of centre line indicates that presence within that square was also confirmed by recent sightings during 2007 or 2008 reported in response to questionnaire consultation with local deer experts (the latter is

included in Maps for fallow, muntjac and sika only, as red and roe have been consistently reported as present and well established throughout Exmoor.

[We would like to acknowledge the free provision of biological records for use as part of this study from the NBN gateway and others, but note that individual Data Providers and NBN Trust bear no responsibility for the accuracy, further analysis or interpretation of that material presented in this report].

4.3 Red deer distribution and abundance

Findings for red deer shown in [Figure 1](#) confirm their widespread occurrence based on BDS 2007 survey as well as earlier records not only in all [15] different 10km OS squares coinciding or overlapping Exmoor National Park, but also in 38 of the overall total of 40 squares mapped including the surrounding areas. The only two 10km squares for which no past red deer records were identified lie east of the M5 and north of Honiton, although some records are available for just east of the Blackdown hills. Recent deer counts by EDDMS also confirm the continued presence of red deer in all 28 of their counting blocks, with latest (2009) count totals for Exmoor reported at 2934, and for the nearby Quantock Hills at [676] (QDM&CG).

4.4 Roe deer distribution and abundance

4.4.1 Roe deer findings are summarised in [Figure 2](#) and, as in the case of red deer, show roe occur in all 10km squares covering Exmoor, as well as confirmed in 39 of the 40 squares considered overall. The only 10km square where no record was logged by the 2007 BDS survey data or earlier lies near Ilfracombe; but their occurrence also in this square has been confirmed since through own recent observations.

4.4.2 While the widespread establishment of roe deer across the region has been known for some time, only little information is available on actual or relative density across the region. EDDMS annual red deer counts do also log any roe deer seen during those counts. However, total numbers of roe recorded during those counts in recent years across the entire Exmoor count region have amounted to only 100 – 150 per year. This figure is likely to vastly under represent actual numbers of roe deer present across Exmoor and surrounding areas: firstly, as the large scale visual counts primarily designed for and targeted at assessment of red deer, are much more likely to miss a high proportion of the more solitary and much smaller roe deer; and secondly as the red deer count does not extend to most of the Brendon Hills, where roe are also common.

4.4.3 Nevertheless review of the EDDMS counts over the last three years (2007-2009) does indicate some consistent differences between the differing counting blocks in terms of relative incidence of roe deer. Highest numbers of roe in recent years have been reported around North Molton, West Buckland and in some years Bray Valley, as well as Pixton and North Hill; in most (but not all) cases being areas around the wooded fringes rather than located more centrally within Exmoor. By contrast areas tending to show up lowest roe numbers during the annual counts include Exmoor Forest, Baronsdown, Upper Danesbrook and Barle Valley. Actual roe numbers seen per count block however fluctuate greatly from year (e.g. for North Molton from 62 in 2007, to just 5 in 2008 and 20 in 2009), illustrating the likely rather limited accuracy of the roe count in relation to true numbers present.

- 4.4.4 In return to the questionnaire survey undertaken as part of the present study (see 2.4 & Appendix I), those consulted were asked to indicate any 10km squares where they frequently see Roe deer AND believe them to be more abundant than either red deer or fallow within that square. Those areas where several respondents indicated this to be the case were located mostly on the south-eastern fringe of the Exmoor National Park including squares ST04 (Wiveliscombe), ST12 (Wellington), ST02 (Old Cleeve), as well as around the fringes of the Quantock Hills.
- 4.4.5 The fact that roe deer have thus far been able to establish in greatest numbers around the lower lying edges of Exmoor is to be expected, as roe thrive best in young woodland plantations and thicket areas offering good amounts of shrub layer, and tend to do less well in areas heavily grazed by sympatric larger deer and livestock, such as found in many of the ancient semi-natural oak woodlands in the more centrally parts of Exmoor; (and by way of comparison, for example The New Forest, where roe are also found at much lower density and to have lower reproductive and survival rates in the central parts of the Forest, shared with high densities of fallow deer as well as red deer, ponies and other domestic stock, than around the less heavily grazed edge habitats [Sharma, 1994, Fawcett, 1997; Putman and Langbein, 1999]). As such, future further increases in roe deer densities (and also muntjac) in more central parts of Exmoor are most likely to occur in areas where significant new thickets grow up as result of any recent woodland plantings or windblow, and/or as result of substantial reductions in grazing pressure from larger deer species and domestic stock.

4.5 Fallow deer distribution and abundance

- 4.5.1 Results for the distribution of fallow deer are presented in [Figure 3](#). Based on past data from national distribution surveys fallow have most consistently been recorded in the eastern half of the Exmoor national park, particularly on the Brendon Hills from Croydon Hill to Monksilver, but with some sightings also further west towards Withypool and Porlock. Overall among the forty different 10 x 10 km squares mapped in Figure 3, fallow were recorded as present in 11 squares within the pre-2002 NBN datasets reviewed, rising to 19 squares for the 2007 BDS survey data, indicating some limited range expansion more recently both west and south.
- 4.5.2 Those squares where recent fallow sightings were also confirmed by local deer experts consulted during the present study, again confirmed continued fallow presence in significant numbers throughout the Brendon Hills, but several respondent noting that fallow were now also being seen much more regularly in areas west of the Brendons around Tivington, Timberscombe, and Cutcombe, and including groups of both males and female fallow. While fallow had also been recorded occasionally in these areas and others out towards Porlock and Withypool for many years, they had then mostly related to occasional sightings of young bucks outside of the rutting season, whereas increasingly resident groups of fallow seem to be (slowly) expanding further west. Some recent reports of fallow were also received further west still within the ENP north of North Molton; occasional sightings of fallow also continue to be recorded on the Quantocks, but to date appear to relate mostly to dispersing young males.

- 4.5.3 The only good recent figures for minimum fallow deer numbers are available for the far eastern section of the ENP based on annual counts conducted by the Monksilver Deer Management Group (encompassing an area roughly from Elsworthy and Birdshill to Sticklepath, Combe Sydenham and around Monksilver). Over the last three years between 240 to 290 fallow have been recorded in that area alone (Eales, pers. Comm.). Comparable figures are not currently available for the rest of the Brendon Hills where around Croydon Hill, Luxborough and Dunster fallow occur at not dissimilar density, and likely to add at least a further similar number. Previous reports suggest that fallow numbers on the Brendon already stood at 300 – 400 twenty years ago (Allen, 1990), and were estimated to lie rather higher between 650 – 1000 in 1992 (ADAS, pers comm.; Langbein & Putman, 1992).
- 4.5.4 In general rates of range expansion for fallow tend to be relatively slow compared to other species provided they are maintained at moderate density, as fallow are relatively sociable and tolerant of large group size. Nevertheless, the increased recent spread of fallow shows that they are likely to continue to expand further into the main red deer range further west and east if numbers are not managed more closely.

4.6 Muntjac distribution and abundance

- 4.6.1 Results from review of all information received on muntjac distribution are presented in [Figure 4](#). This shows that while one report of muntjac was reported within northern parts of Exmoor within pre-2002 NBN data, all subsequent reports near Exmoor at present remain restricted largely to the southern fringes just outside the ENP or within the eastern end of the Brendon Hills. The only past record more centrally within Exmoor (OS grid SS84, nr Porlock Hill) was logged by Devon Wildlife Trust's incidental records data for between 1990-1994; but any later presence of muntjac there is NOT confirmed by either the 2007 BDS survey nor local deer experts consulted during the present study.
- 4.6.2 Muntjac records within the Exmoor region were however confirmed through several independent recent sightings reported by reliable sources in the areas close to the southern ENP boundary near Oakfordbridge, Exebridge and Raddington, as well as further east towards Wellington. First confirmed records of muntjac on the Quantocks date back to the 1990's, when at least one was culled in the south of the Quantock Hills and occasional records to the north; and further – but still only occasional sightings - were reported during 2008 on the Quantocks near Cothelstone, Cockercombe, Kennel Combe and St Audries. Most recently a report of a muntjac was also received for near Combe Sydenham (Healy, pers.comm). In addition muntjac are also known to occur in a number of areas some way southeast of the ENP south of Barnstaple as well as near Chumleigh. Overall among the forty 10km squares mapped in Figure 4, muntjac have been reported at one time or another in as many as 16, and confirmed by more recent sightings in at least 11.
- 4.6.3 In considering Figure 4, it is however important to note that for each 10km square showing muntjac as present, their occurrence remains confirmed by only very occasional sightings of usually a single animal. The really still very low (though increasing) numbers of individual sightings reported suggest that in most areas in and around Exmoor where muntjac have been noted to date

they still remain present in only quite low numbers. However, by virtue also of their quite small size, and their tendency to live most of the time in dense vegetation, as well as being territorial and hence spreading out until most suitable potential territories have been occupied, as well as many local people not yet being fully familiar with them, muntjac will often fail to be recorded until they have built up quite substantial numbers. Akin to roe deer, muntjac are most likely to colonise areas with dense scrub or wooded areas offering good amounts of understorey, and less likely to thrive in more open, more heavily grazed woodland; although left unchecked they are very likely to continue to spread throughout the Exmoor region.

- 4.6.4 As a non-native invasive species the fuller establishment of muntjac across Exmoor should be regarded as undesirable from view of potential detrimental effects on various other conservation targets for flora and fauna native to Exmoor. In many parts of Southeast England muntjac have already become the most numerous deer species present, and once established in high numbers they tend to be more difficult to control than many of the larger species. Even though muntjac would be unlikely to have direct negative effects on red deer through competition (though more likely to compete to some extent for resources with roe), any additional impact from another deer species occurring in significant numbers would be likely to affect the overall level grazing and browsing impact; and in turn the tolerance of landholders to deer numbers overall. Given the quite modest rate at which muntjac appear to have established themselves to date, it seems likely that at this stage their rate of spread could still be successfully slowed further if suitable policies are introduced to keep muntjac at low numbers where they already occur, and discouraging other landholders from allowing them to establish.

4.7 Sika distribution and abundance

- 4.7.1 From results shown in [Figure 5](#), Sika at present appear to have the most restricted distribution of any of the deer species recorded within Exmoor and surrounding areas.
- 4.7.2 Within ENP Sika have been reported in past surveys in two adjoining 10km squares along the Exe valley (SS93, SS92). However, the presence of any sika in recent years in that area is NOT confirmed by consultation with local deer observers; and it could well be that past sightings made of fallow bucks (that have at times been seen, including by myself, among herds of red deer on for example Haddon Hill) may have been misreported as sika at times. It is known that around a hundred years ago, sika were present in a former deer park at Pixton from which some subsequently escaped, but are believed to have been shot out soon after. Some of these were believed to have established in the Bray and Mole valley (Court, 1987), where some further reports of sika were also reported by later NBN data and on 2007 BDS survey, though the actual origin of these is unclear.
- 4.7.3 The only reliable report of a sika noted within 10 km of the ENP confirmed by local deer experts consulted comes from near Chittlehamholt. This relates to escapes of a small number of Manchurian type sika which had been kept in a small enclosure nearby. Although a number of these are known to have been culled out, some others are believed to still remain in woods between Chittlehamholt and Chittlehampton.

- 4.7.4 In addition, further away from Exmoor some occasional recent sightings of sika have been reported to the southeast of the Quantocks near Wind Down, as well as on the Blackdown Hills. In each case the above recent reports relate to sightings of just single animals, with no areas at present close to Exmoor where sika are known to have established resident self sustaining populations.
- 4.7.5 Particular concern regarding establishment of sika in and around Exmoor relates to the ability of sika to hybridise with red deer to produce fertile offspring, thereby threatening the genetic integrity of native red deer stocks. Sika-Red hybrids are already very commonplace throughout much of Scotland where sika have a much wider distribution than in England. The largest populations of sika in England occur in East Dorset, although some have gradually spread further west in recent years. Natural spread of sika from their main ranges may not at first be very fast, as sika are not territorial and fairly tolerant socially of high local density, but young and adult males do tend to make longer dispersal movements, and more likely to overlap with red deer ranges. Where hybridisation occurs in the wild (rather than through back-crosses where hybrid animals are accidentally released from farms or parks) this is thought to occur most commonly where sika stags colonise forestry plantations frequented by red deer and mate with red hinds (Pemberton et al. 2006).
- 4.7.6 Related to a large extent to the threat of potential for hybridisation, since 1997 sika deer have been added to Schedule 9 of the Wildlife and Countryside Act [1981, as amended 1997], making translocation and release of sika to areas outside their existing range illegal in any part of Britain. However, this is difficult to control and monitor; and further new escapes of sika as well as red-sika hybrids from parks and deer farms remain likely, unless tighter restrictions are imposed in future on keeping sika and sika hybrids in enclosures. In view of the conservation status of red deer with regard to Exmoor, and that as far as currently known little past hybridisation with sika has occurred, it would seem appropriate to put in place policies to minimise the likelihood of establishment of sika as far as possible within Exmoor and surrounding areas.

5. Discussion & Future Monitoring

5.1 This study was commissioned to help answer the following main questions:

- In addition to red deer which other species of deer are present in the Exmoor National Park and surrounding areas?
- What is currently known about their distribution and densities?
- What is the best way of monitoring them in the future?

By way of summary each of these questions is addressed briefly below.

5.2 Which 'other deer' species are present in ENP and surrounding area ?

Roe, Fallow, Muntjac and Sika have all been recorded at some time within the confines of the Exmoor National Park. The presence of roe, fallow and muntjac within the ENP itself was also confirmed during the present study by reliable reports of recent sightings since 2007, while some sika have been recorded at some locations within 10-20km of the park boundary.

5.3 What is currently known about their distribution and densities?

5.3.1 Aside from red deer, the most widespread other local deer species by far are **Roe deer** ([Figure 2](#)). Roe occur in every 10 km square covering Exmoor, as well as through all adjoining squares within 10 to 20 km of its boundary. Only very limited good information is available on their total numbers or local densities. EDDMS annual deer counts designed mostly to assess red deer numbers usually also record around 100-150 roe, but this is likely to represent merely a small proportion of true numbers within that count area, as the smaller roe deer are less likely to be seen during such large scale counts; and also exclude most of the Brendon Hills where roe are also common. Based on assumption that roe would be likely in time to colonise most wooded areas within ENP and reach average densities here of 5 to 8 roe per km², Langbein & Putman (1992) predicted tentative overall roe population numbers eventually between 450-700 head for the park as a whole; based on the increasingly common sightings of roe in most parts of Exmoor it seems likely that this number may now already have been reached or exceeded. However, more detailed study is required to assess actual roe deer densities in differing parts of Exmoor.

5.3.2 **Fallow deer** ([Figure 3](#)) are the next most widely distributed species. They have been established throughout the eastern half of the ENP for a long time, and in more recent years are seen with greater regularity also further west within Exmoor NP and in adjoining areas to the south. Numbers of fallow in the far eastern corner of ENP based on Monksilver DMG counts are known to exceed at least around 240-280 head, but this excludes substantial further herds of fallow at comparable density around Croydon Hill, Dunster and Luxborough, as well as smaller numbers further west. Actual numbers of fallow throughout the whole of the Brendon Hills plus other parts of ENP are very likely to lie in excess of 650 and possibly nearer 1000.

5.3.3 **Muntjac deer** ([Figure 4](#)) have also been recorded present in a wide range of different areas locally, particularly around the east and southeast fringes of ENP, as well as some way to the southwest. However, although recorded as present, reports for each 10km square remain based on merely quite few occasional sightings at the present and suggest population numbers remain relatively low, but increasing. No current estimate of numbers is possible at

this time. However, unless management is put in place early to maintain muntjac at very low densities, and discourage landholders from allowing this non-native species to become established, muntjac are likely to increase in numbers more rapidly in future, particularly in areas offering high amounts of scrub or woodland with dense understorey.

- 5.3.4 There are no validated recent sightings of **Sika deer** ([Figure 5](#)) recorded during the past two years (post 2007) within the Exmoor National Park boundary itself; but some earlier reports of sika during the past decade suggest they may be or have been present within the Exe valley near Dulverton. Some isolated confirmed recent reports of sika are available within 10-20 km of the ENP boundary near Chittlehamholt to the southwest, as well as east of Quantocks and on the Blackdown Hills. Overall sika are not well established in and around Exmoor as yet. From view of the potential of these non-native deer to hybridise with red deer (as has already occurred extensively in many parts of Scotland), their presence within the red deer range in Southwest England poses some threat to the genetic integrity of our native local red deer stocks. Sika are already on Schedule 9 of the Wildlife and Countryside Act [1981, amended 1997], making their translocation and release to areas outside their existing range illegal in any part of Britain. In view of the ENP Management Plan conservation targets for red deer, for which as far as is currently known little past hybridisation with sika has occurred, introduction of additional policies aimed at minimising the likelihood of establishment of sika within Exmoor and surrounding areas should be considered.

5.4 What is the best way of monitoring other deer species in future?

National recording schemes

- 5.4.1 Records obtained for the present study via a number of national recording schemes (including in particular the British Deer Society's deer survey, as well as various other data providers that contribute to the National Biodiversity network) show these to form a good starting basis from which to assess changes in the gross distribution and range expansion of differing deer species across Exmoor and surrounding areas. Limitations of such large scale national sources include that thorough coverage tends to be repeated only every five or more years, and to date majority of deer records are not available at lower resolution than 10km OS squares. However, most of the annual deer counts undertaken by EDDMS, Monksilver DMG, QDM&CG currently already record some deer species at somewhat better location accuracy.
- 5.4.2 Recommendation: Regular annual collation of all deer records from the local deer counts to identify all 1km squares found occupied by each species, and submission of that data (possibly via ENP) to the NBN gateway would help to further improve the usefulness of that latter resource.

Local annual large-scale deer counts

- 5.4.3 The annual large scale red deer counts organised by EDDMS and QDM&CG ever since the early 1990's, and fallow counts by Monksilver DMG have proven extremely valuable for monitoring at very least minimum numbers of red and fallow deer. Although only an unknown proportion of deer will tend to

be seen in such large scale visual counts, and that proportion itself is likely to differ between deer species, results accumulated over many years also help to indicate overall trends in abundance as well as distributional changes between counting blocks.

- 5.4.4 Some current drawbacks of the visual deer counts include in particular that a) that geographical coverage of Exmoor NP by the present annual deer counts remains incomplete, b) counts of roe deer undertaken at the same time and using same approach as for the larger deer species are likely to miss a greater proportion of true numbers of roe, and c) species remaining at relatively low density at present, such as muntjac and sika, are quite unlikely to be noted during large scale counts undertaken on just one or two days per year. Nevertheless, the system and structure for the annual deer counts already in place are likely to offer the best basis of improving also monitoring of the 'other deer' species within Exmoor and surrounding areas.

In order to firm up the monitoring of other deer species, I would make the following **recommendations**:

- 5.4.5 The annual deer counts undertaken at present by EDDMS and Monksilver DMG between them currently cover a high proportion, but not yet all areas of the Exmoor National Park. The possibility of expanding the Monksilver count or organising additional separate annual counts for all those parts of the Brendon Hills not currently covered by one of the existing annual deer counts should be investigated.
- 5.4.6 All the separate annual deer count organisers within Exmoor should be encouraged to ensure that aside from red deer, all fallow, roe, muntjac or sika seen during the counts are also recorded systematically including split into males, females and young as far as possible.
- 5.4.7 As those species that are not yet well established throughout all of Exmoor (fallow, muntjac, sika) are, however, not necessarily likely to be noted during the days of the count itself, it is suggested that all deer count area organisers are asked annually to complete a form similar to the questionnaire used during the present study ([Appendix I](#)) to record any locations that they are aware of where these other species have been sighted over the last 12 months.
- 5.4.8 Some count organisers and helpers may not at this stage be fully familiar with field recognition of the other deer species not yet established in their area. Provision of summary details to assist with correct identification of in particular sika, sika-red hybrids, muntjac and fallow might be useful either in paper format or by means of a workshop or presentation at an annual feedback meeting or training day (e.g. see Langbein, 2008).
- 5.4.9 The present large-scale EDDMS count for red deer also records any roe deer seen on the day, but it seems highly likely numbers recorded in that way represent only a quite low proportion of true numbers of roe present for many counting blocks. Organising more detailed assessments of roe deer numbers throughout that area could be very labour intensive and costly. However, a study to undertake some more intensive sample assessments of roe deer densities (by means of a number of replicate counts, or possibly thermal imaging) undertaken in just a sample of perhaps 5 to 10 of the 28 current counting blocks used in the EDDMS census, could be very useful to

assess the actual average level of undercounting for roe (and/or red) per block, and hence assist with estimation of true numbers in other blocks assessed less intensively.

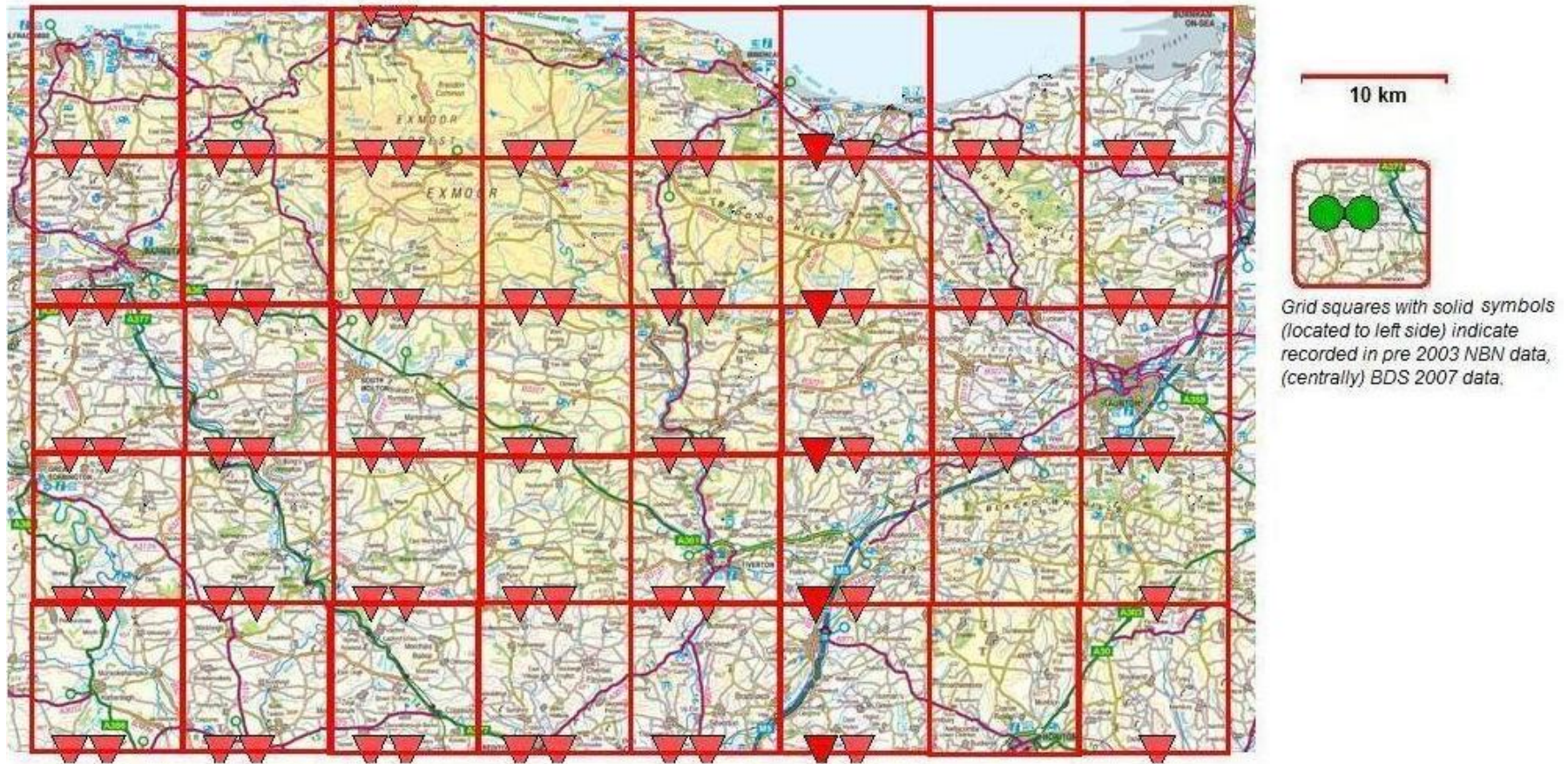
5.4.10 Finally, improved recording and central collation of all deer (of any species) culled within the Exmoor NP area would assist with many aspects of deer management and monitoring their populations and condition. For the species currently least common (muntjac and sika) in particular, for which further increase and spread is considered undesirable, all landholders should be encouraged to report locations of all muntjac or sika culled to either their respective DMG or the ENPA.

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Figure 1:

Red Deer (*Cervus elaphus*)

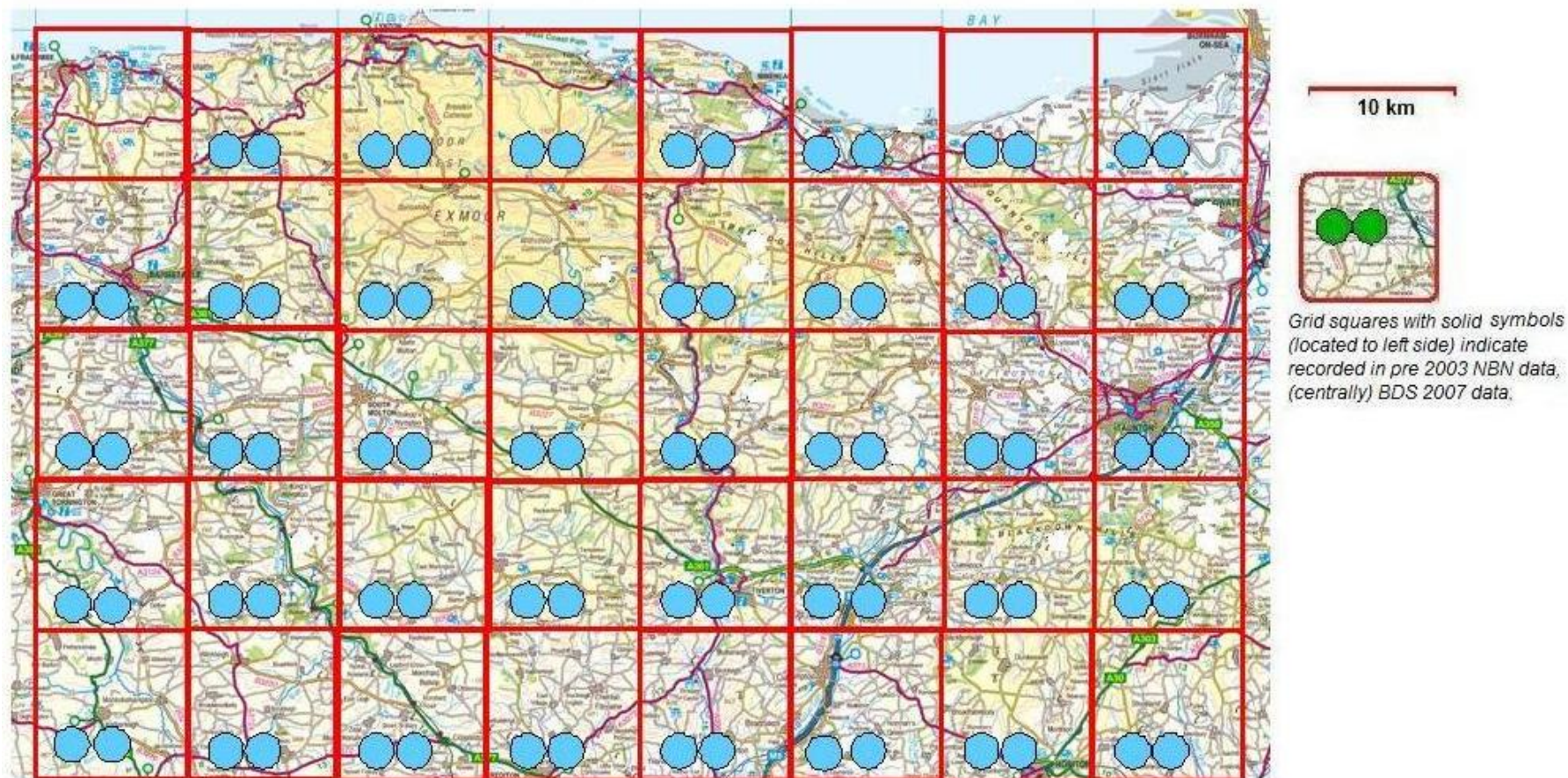


Grid squares with solid symbols (located to left side) indicate recorded in pre 2003 NBN data, (centrally) BDS 2007 data.

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Figure 2:

Roe deer (*Capreolus capreolus*)

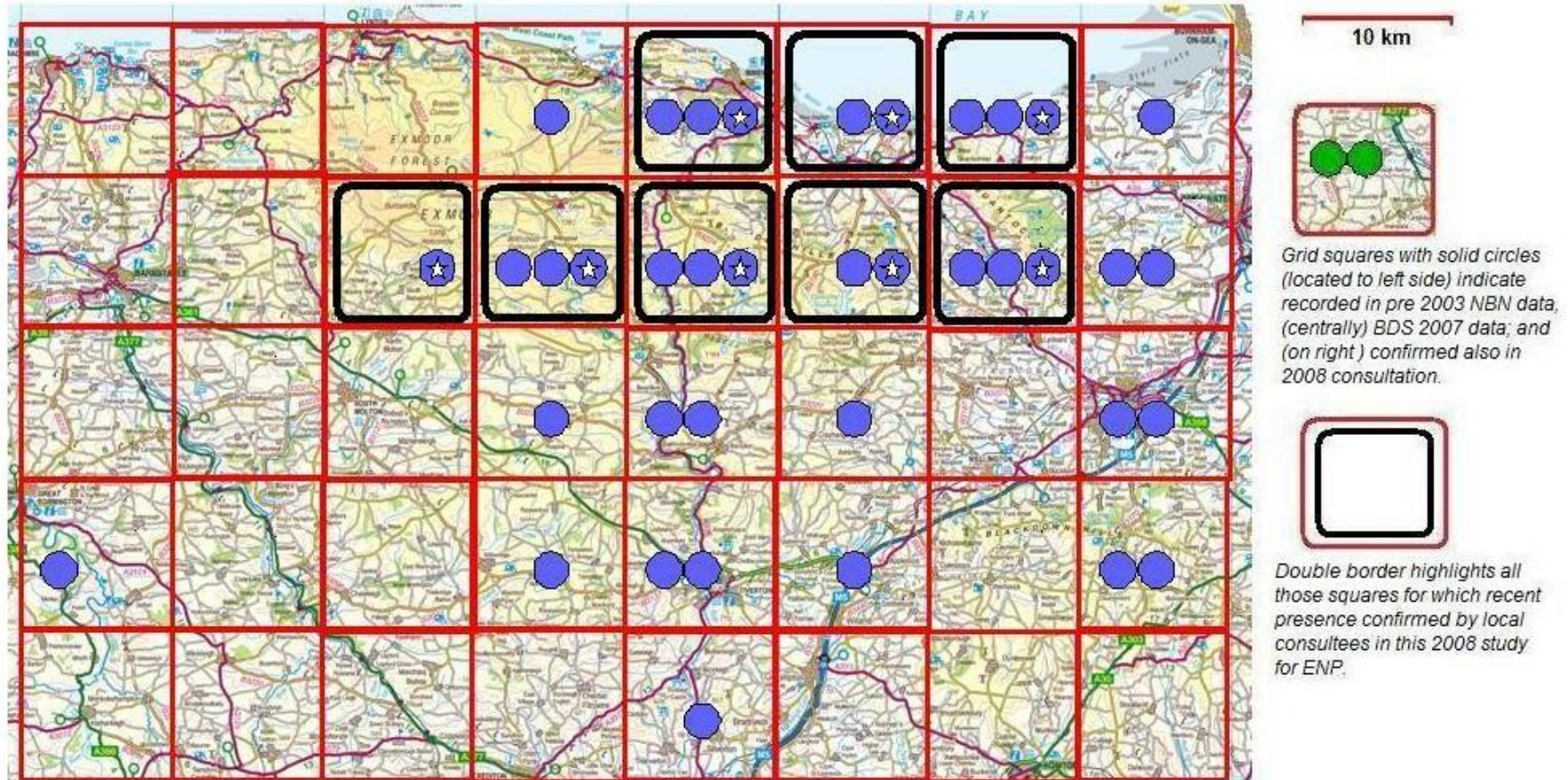


Grid squares with solid symbols (located to left side) indicate recorded in pre 2003 NBN data, (centrally) BDS 2007 data.

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Figure 3:

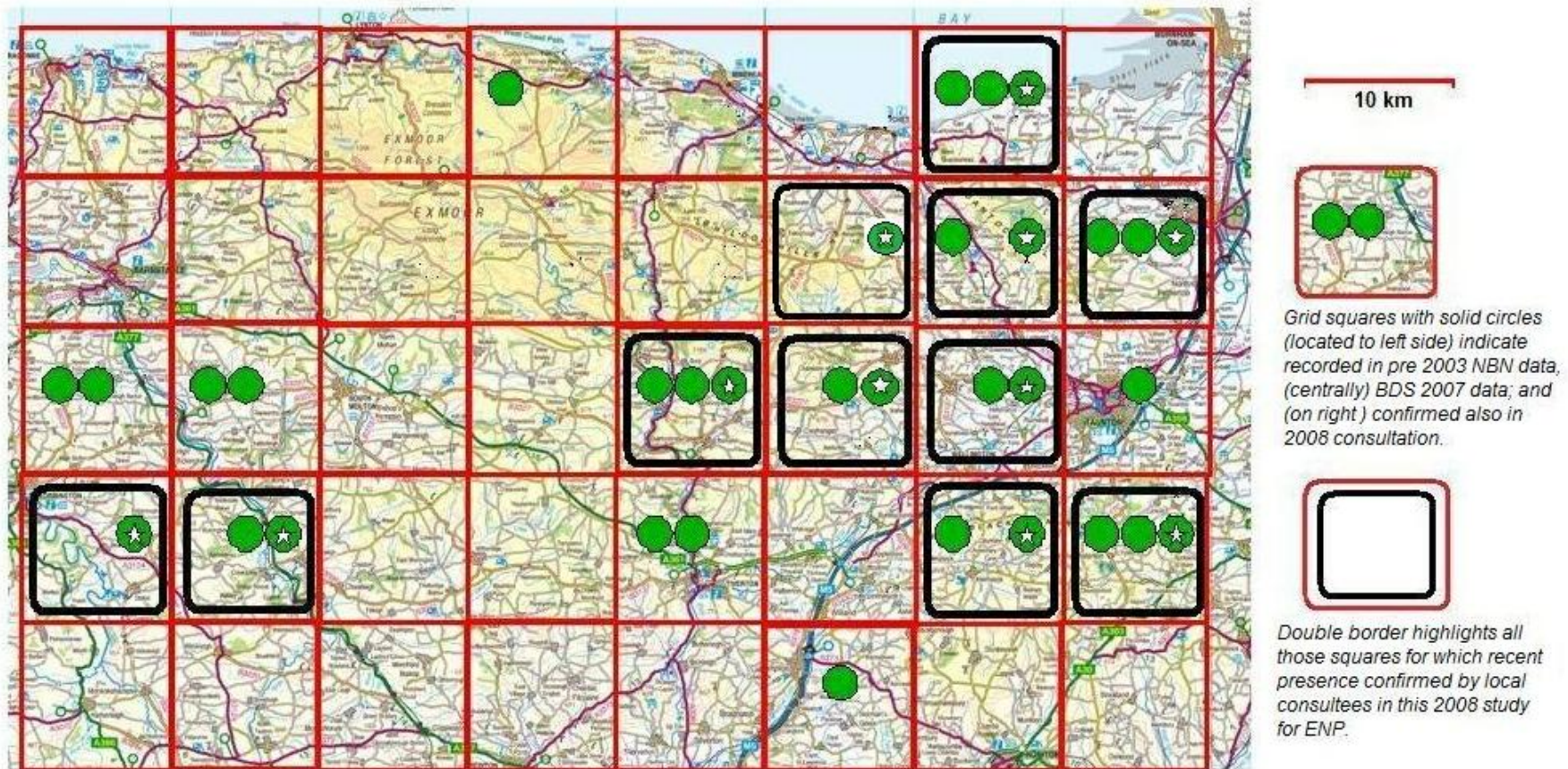
Fallow deer (*Dama dama*)



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Figure 4:

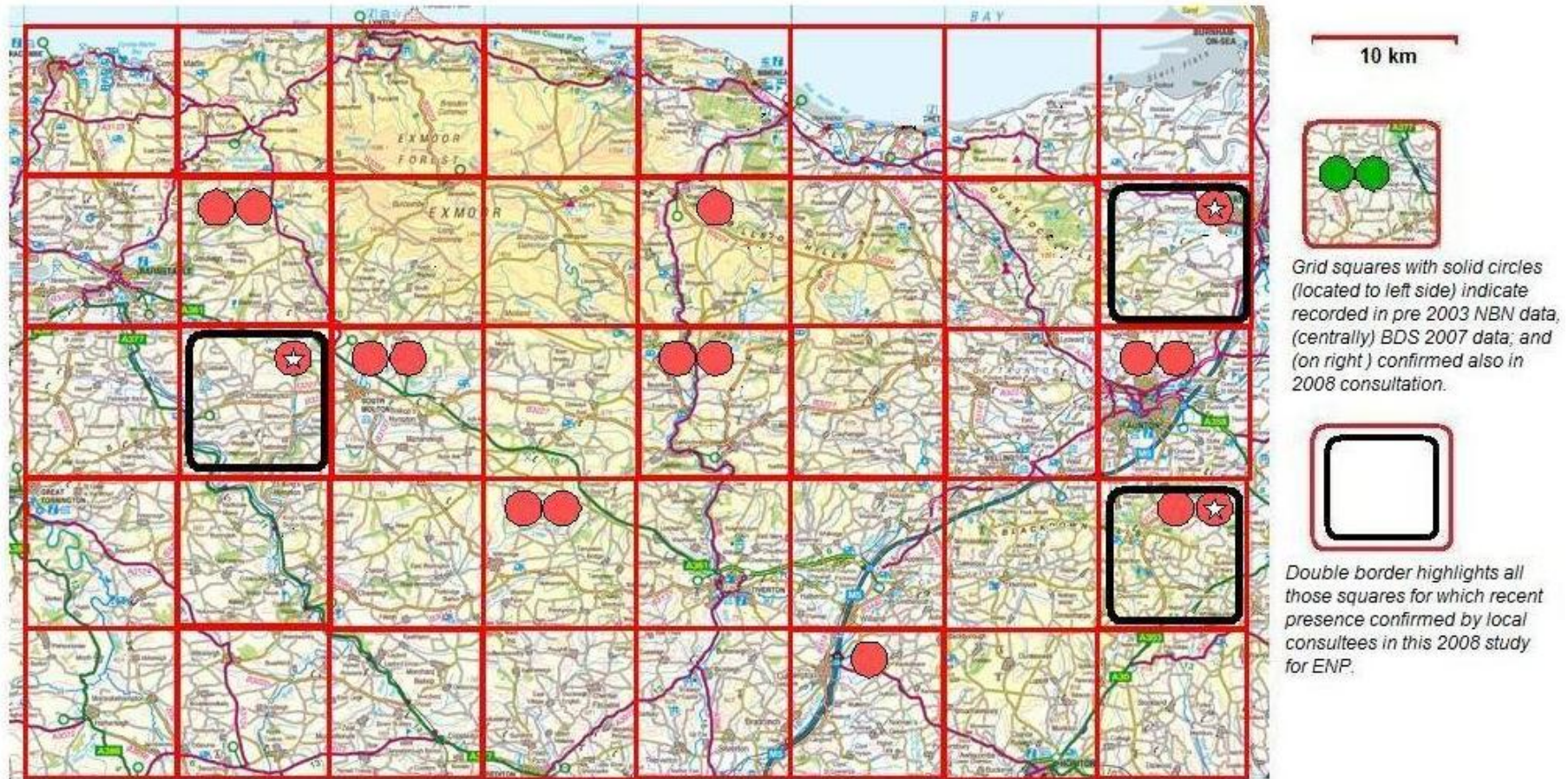
Muntjac deer (*Muntiacus reevesii*)



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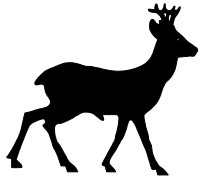
Figure 5:

Sika deer (*Cervus nippon*)



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Appendix I: Local Consultation Questionnaire regarding other deer species



Dr. J. Langbein, M.I.E.E.M.
Langbein Wildlife Associates



Greenleas , Chestnut Avenue , Chapel Cleeve, Minehead , TA24 6HY

xxxxxxxxxx Tel: 01984 641266 xx email: deer@langbeinforseer.co.uk xxxxxx

20 August 2008

Dear

I am undertaking a brief assessment on behalf of Exmoor National Park Authority into the status and distribution of deer species other than Red deer present within Exmoor National Park and surrounding areas. In particular better information is sought on any confirmed sightings of, and where, Muntjac, Sika, Fallow and Roe deer are now established, and as far as possible some general indication of their abundance. In case of all of these deer species at least some limited presence/absence information is already available for ENP from past distribution surveys undertaken by the British Deer Society and County Wildlife Trusts. However, as for some species indication of their presence is often based on just a single sighting recorded several years ago for any given 10 x 10 km grid square, I am writing to you and a number of others with good first-hand knowledge of the local deer population in order to help us update and verify available information for each species.

I would be most grateful therefore if you could assist us by completing the attached form with any information that you are able to contribute about each of the four different deer species of interest for the present assessment.

In the case of **Muntjac**, **Sika**, and **Fallow** deer the primary aim is to confirm in which of each of the 10 by 10 km OS grid squares shown on the map overleaf those species are currently present (based on sightings within the last 12 months or so). To complete the species sections on the enclosed form please enter on a separate row in the table the letter/number code for each 10km Grid square where you have observed that species. Any additional detail you can give of the name of wood(s) or other locations where you know the species to be present, and indication as to how commonly you see that species would also be very helpful. (i.e. whether 'only seen once' or 'seen occasionally' or 'frequently').

In case of **Roe** deer available distribution data already confirms that this species has now become re-established at least in low numbers in almost all different 10 km OS grid squares covering Exmoor NP and surrounding areas. For Roe deer therefore, it would be useful if you could simply place a 'tick' in all those grid squares (if any) on the map shown in the 'Roe-deer' section of the enclosed form where you yourself regularly see Roe deer AND consider them to be the MOST abundant deer species for that particular map square (i.e. more common than either Red or Fallow).

As this brief assessment needs to be completed for Exmoor NPA by next month, I would be most grateful if you could complete and return the form to me either by email or in the SAE envelope provided as soon as possible ideally before 15 September. Your help with this survey is very much appreciated.

Yours sincerely ,
 Jochen Langbein

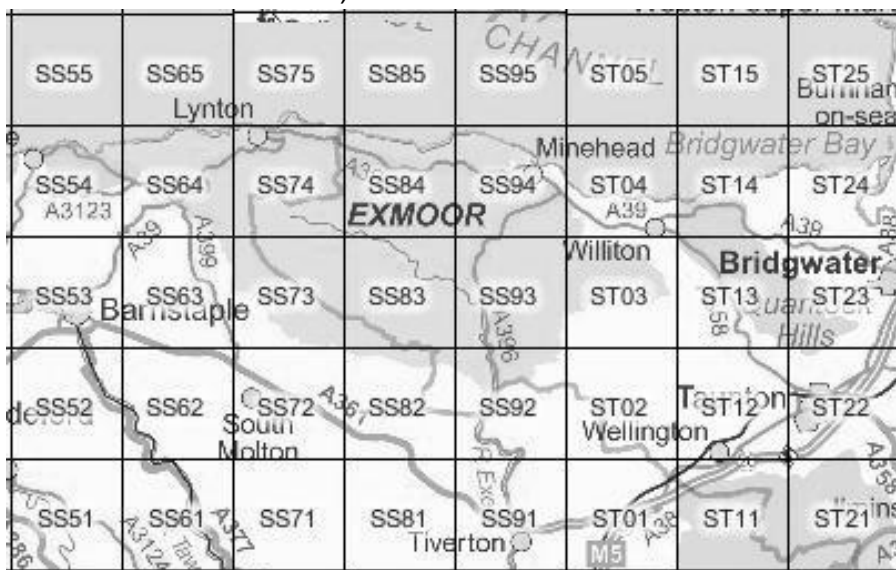
FALLOW [*Dama dama*]



Map Square Letter/Number	Name of wood(s) or other	How often seen ? [once / occasionally /	Approx date of most recent sighting	
e.g. SS94	Grabbist Hill	Once only	Jan	2008

ROE [*Capreolus capreolus*]:

Please mark with a tick all those map squares below – IF ANY – where you frequently see Roe deer and believe them to be the MOST ABUNDANT species of deer present within that particular 10 x 10 km square. (i.e. in your view likely to be more common there than either red or fallow deer)



[PI] ease return form no later than 15 September to J Langbein by email or in SAE envelope provided