

Current and Future Deer Management Options

Report on behalf of
Defra European Wildlife Division

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SUMMARY

1. There are six species of deer living in the wild in mainland Britain today with a total over-winter population probably in excess of 1 million animals. Red and roe deer are native species, whilst fallow are believed to have been introduced in the 11th century AD. Sika, muntjac and Chinese water deer are all relatively recent non-native introductions.

2. The main red deer populations in England are in the South West, East Anglia and the Lake District. Roe are probably the most numerous species and widespread throughout much of England except for central parts of the country. Fallow are widespread but patchily distributed, often still associated with ancient deer forests or deer parks. Muntjac are the most widespread of the recent introductions and are probably the second most numerous deer species in England. Sika are more locally distributed with main populations in Cumbria, Dorset and the New Forest, whilst Chinese water deer are confined to small populations in Bedfordshire, Cambridgeshire and the Norfolk Broads.

3. There is widespread consensus that most deer species present in England, with the exception of Chinese water deer, are increasing in numbers and extending their range. However, deer numbers are difficult to estimate and early figures may have underestimated population sizes. The greatest rate of range expansion has been seen in roe and muntjac deer. It is likely that in the next 10 to 20 years both these species will have colonised most of England. The larger species, red, fallow and sika deer, are likely to increase numbers and range but are more likely to be restricted by the availability of relatively large areas of woodland or other semi-natural habitats. There are likely to continue to be large areas of the country where these species are absent or occur only as transients or at low density.

4. Deer can cause damage to crops, woodlands and gardens, and can pose a safety hazard, for example, by causing road collisions. The absence of significant natural predators in the UK dictates that deer must be managed to reduce the damage they may cause and to avoid disease and starvation in the deer themselves. Fencing and deterrents can be used in some circumstances but to maintain stable deer populations or to reduce their numbers the main management method used is culling. The ways in which this can be done in England and Wales are governed by the Deer Act 1991. The Act specifies the types of firearms that can be used to cull deer and provides close seasons for four of the species. It makes no distinction between native and non-native species.

5. Deer culling using a high powered rifle is generally accepted as the most effective and humane method of controlling deer populations. It is estimated that the annual deer cull in England is from about 70,000 to over 100,000. Virtually all of these are culled by rifle. Previous studies have estimated that up to about 5% of deer culled may require a second shot, although these include 'insurance' shots to ensure a quick kill, and about 2% of deer shot might escape alive but wounded.

6. Hunting deer with hounds has declined over the last century and there are now only three hunts registered with the Master of Deerhounds Association (MDHA), all in the Devon/Somerset area. All three hunt red deer and, together, take a mean of about 180 deer per year. There are also believed to be two packs hunting roe deer in the West Country but these are not registered with the MDHA.

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7. The concept of managing deer co-operatively through a local Deer Management Group (DMG) has been promoted for almost 40 years. The principles and practice of DMGs have been refined and developed in recent years by the Forestry Commission, the Deer Commission for Scotland and, latterly, in England and Wales, the Deer Initiative. MAFF instigated a trial of DMGs in the early 1990s because of deer problems reported in the Exmoor area at that time. Two DMGs were started as a result of the trial and two established independent of the trial. One of the former is believed to have disintegrated following the issue of a night shooting notice, after the trial, because of continued deer damage. In another area, where problems had been persistently reported, attempts to establish a DMG failed. Nevertheless, subsequent MAFF policy was to encourage the formation of DMGs as the best way of achieving effective and humane deer management.
8. Government sponsored advice on deer management in England is available from the Forestry Commission, the Deer Initiative and Defra RDS. The Forestry Commission provides advice and guidance through published literature, direct to enquirers via their Forest Research staff and locally and informally through their field staff. The Defra RDS offers advice on deer and other wildlife through its regionally based National Wildlife Management Team.
9. The Deer Initiative (DI), first launched in 1995 under the chairmanship of the Forestry Commission, is now a fully independent partnership of statutory, non-statutory and voluntary organisations, which offers advice aimed at ensuring a sustainable, well managed wild deer population, particularly through the establishment of DMGs. The DI currently obtains its principal funding through the Forestry Commission (secure until March 2005) and has a small core staff. An independent review of the DI is due to take place shortly.
10. The National Trust and English Nature provide examples of organisations that have published deer management policies. Both organisations favour deer management through co-operation between neighbours and recognise that excessive deer numbers can cause damage, particularly to woodlands. The National Trust also operates a system of compensation for deer damage for some of its tenant farmers in the Exmoor area.
11. Defra (and formerly MAFF) receives few enquiries concerning deer. In the two year period April 2001 to March 2003 only 5 cases were recorded on WILD, the RDS National Wildlife Management Team (NWMT) computerised case-work recording system. This does not include general telephone enquiries. In the South West region 19 telephone enquiries out of a total of 471 received in 2002 concerned deer. In the late 1980s, before provision of statutory and advisory work was split, the predecessor of the NWMT dealt with about 170 deer enquiries per year.
12. Defra has no licensing powers under the Deer Act 1991. However, under the Agriculture Act 1947, the Agriculture Minister may serve a notice requiring the shooting of deer at night, which was otherwise prohibited following an amendment to the Deer Act in 1981. The same powers could, theoretically, be used to require the killing of deer during the close season but a defence exists for this under the 1991 Act and the Minister's powers appear never to have been used in this way. From 1982 to 2003 Defra (and MAFF) received around 25 requests from about 14 different individuals for notices to allow the shooting of deer at night. Notices were issued on two farms in the Exmoor area in the 1980s and 1990s. The last notices were issued in 1996.
13. Although a number of organisations and individuals refer to agricultural damage as an increasing problem it does not appear to be seen as a major concern. Damage to cereals, trees, grassland, hedgerows, banks, rootcrops, fruit, vegetables and oilseed rape has been reported but very few attempts have been made to objectively quantify deer damage to agriculture. The data available on deer damage to cereals and grassland suggest that significant damage is only likely to occur in particular local problem areas with high deer densities.

14. Deer in urban/suburban areas, especially muntjac and roe, are seen as an increasingly serious problem. Damage caused to gardens etc. may be relatively minor in economic terms but management is extremely problematic and the deer may cause increasing risks of road traffic accidents (RTAs). Potential culling in these areas presents particular safety and public relations problems but few effective alternatives exist. Use of tranquiliser rifles, and potential immuno-contraception, are seen by some as humane alternatives but these also present significant safety and welfare problems and are not yet sufficiently developed as practical alternatives. The use of smaller calibre rifles for the small species of deer, currently prohibited by the 1991 Act, may have some benefit but use of shotguns is not considered acceptable. The use of nets under licence may be feasible in some circumstances but the purposes for which this can be licensed under the 1991 Act are not clear.

15. Damage to conservation interests is seen as an increasing problem. Deer are reported to be a major threat to the biodiversity of woodlands causing significant damage to tree and coppice regeneration and to woodland ground flora. There is some evidence that conservation problems can be satisfactorily dealt with by current deer management practices and that the worst problems occur where there has been a reluctance to accept the need for culling. However, English Nature consider deer damage the single biggest issue in lowland woodlands and the Forestry Commission require deer management to be addressed as a condition of their woodland creation or regeneration grants.

16. Reluctance by some land managers to undertake culling highlights one of the often conflicting attitudes held by different landowners/occupiers. Different interests view deer as pests, a game meat resource, a valuable sporting quarry or a valued part of our wild fauna which many people simply enjoy seeing. These conflicting attitudes present particular difficulties in achieving co-operative deer management as envisaged in DMGs. The limited success of the MAFF DMG trial in the 1990s in the south west highlighted these problems.

17. Deer are susceptible to, or may act as a reservoir for, a number of diseases and parasitic infections. Bovine TB has been identified in all wild deer species in Britain, except Chinese water deer. The incidence of TB in deer appears to be low but it may be increased where deer concentrate at artificial feeding sites. TB is a notifiable disease in deer and around 20 statutory submissions of wild deer are received each year. In most years only one to 5 of these test positive. This is from an estimated annual cull of over 70,000 deer and it seems likely that the disease is under-reported. Deer are susceptible to FMD, and the disease can be severe in roe and muntjac, but only in fallow and sika has the virus been found to persist long enough for the deer to act as carriers. It is generally considered that the natural behaviour of wild deer will reduce the risk of FMD transmission between deer and livestock.

18. Lyme disease is an important tick-borne disease which may be spread by tick infested deer. The only effective ways of preventing possible infection in people is by their wearing suitable clothing and using insect repellent in high risk environments. Deer are not now thought to be competent hosts for maintaining this disease. The main hosts are believed to be pheasants and small mammals.

19. Deer RTAs are thought to have increased in recent years and some of these may result in human injury or deaths. Statistics on deer RTAs are not maintained but a survey to record deer RTAs, lead by the DI, has recently been launched. Evidence suggests that some currently used preventative measures, such as reflectors, have little impact in reducing accidents. The use of under- and over-passes has been shown to be effective in Europe and North America but the costs of construction are high and probably limit these to new road developments. Less expensive 'cross walks' used in conjunction with appropriate fencing, or the management of roadside vegetation and access may be more cost effective on established roadways. The dispatch of injured RTA deer is

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mainly carried out by volunteers. Deer stalkers and others, who may be called out to deal with injured deer in RTAs are concerned that .22 rimfire rifles are not permitted for the dispatch of injured animals. These weapons are probably used in some cases in ignorance. Police firearms units, which sometimes deal with such cases, may also risk being in breach of the legislation.

20. There is significant support for the revision of the firearms provisions in Schedule 2 of the Deer Act 1991 to allow the use of certain .22 centre fire rifle calibres for the culling of the smaller deer species. This would bring legislation more into line with that in Scotland. Agreement is widespread that these calibres are technically suitable for species such as roe and muntjac. There may be marginal safety benefits from using these calibres in urban/suburban areas, if culling is necessary, and benefits from the reduced noise of these calibres. Police firearms licensing sections may be more willing to licence these calibres where they are required only for the smaller deer species. There is also some support for amendment of Section 6(4) of the Act to allow use of .22 rimfire rifles, the most widely held rifle in the country, for humane dispatch of injured deer

21. The defence in Section 7 of the Act does not allow for action taken to preserve public health or public or air safety. Cases have arisen during the close season where deer were presenting a hazard on vehicle test tracks or airport runways and where action would appear to have been prohibited. Defra is currently examining options for resolving this anomaly. Clarification is needed on the definition of “any other form of property” in Section 7 in relation to possible health and safety cases and also on the purposes under Section 8 for which the removal of deer can be licensed. However, revision of Section 7 to include health and safety issues needs to be considered. Furthermore, the inclusion of a licensing provision for night shooting, rather than continued reliance on the provisions of Section 98 of the Agriculture Act 1947, could also cover health and safety issues.

22. There is some support for revision of the close seasons for female deer given in Schedule 1 of the Act. There was no consensus amongst consultees on whether the close seasons should be shortened at the beginning or the end and welfare concerns were expressed about either possibility. However, there may be scope for bringing forward the end of the doe/hind close seasons in England and Wales to 20th October, as in Scotland.

23. At present there are no close seasons for muntjac or Chinese water deer, or for red/sika hybrids. Muntjac may breed at any time of year so the imposition of a fixed close season would not be appropriate. However, Chinese water deer breed seasonally, giving birth in May-July, and have dependent young until autumn. The same close season specified for females of the other species would also appear to be appropriate for Chinese water deer but, as the sexes are not easily distinguished, this would have to apply to both bucks and does. Red/sika hybrid hinds should also be protected by a close season for welfare reasons but, to help prevent the spread of sika and their hybrids, it may be appropriate to remove the close season for sika stags.

24. Although there is no widespread support for compulsory training of those involved in culling deer training is generally seen as desirable. It is also considered increasingly likely to be seen as necessary in order to satisfy employer liability and insurance requirements. In addition, there are proposals from the EU which would require training of hunters commercially supplying game meat to the human food chain. The placing of the current voluntary training arrangements on a firmer footing, more closely linked to statutory agencies, could go some way to meeting these potential EU requirements.

25. **Summary of Main Proposals:** The main proposals from Part 4 of the review are shown here. These have been grouped into broad topic areas.

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Sources of advice on deer:

- ***A national, integrated system for providing objective, authoritative advice on deer management should be available, especially to assist those confronting new management problems.***
- ***Advice on co-operative deer management should be available, especially to assist those needing to manage the large, wide-ranging, deer species.***
- ***Effort in establishing and maintaining Deer Management Groups should be concentrated on problem areas with the larger wide-ranging deer species.***

Development of alternative methods for resolving deer problems:

- ***Development of novel non-lethal methods of control, such as immuno-contraception, should be kept under review.***
- ***Forest/woodland design and other vegetation management criteria for minimising RTA risks should be developed.***

Disease and animal welfare:

- ***Monitoring of statutory submissions of deer for TB testing should continue and efforts made to ensure adequate reporting.***
- ***Carcass examination for signs of disease, including TB, should form a major part of the training provided for deer stalkers & managers.***
- ***Disease contingency plans should remain flexible enough to allow sampling, testing and possible emergency control measures where deer population density or other local circumstances suggest that deer may pose a risk.***
- ***The supplementary feeding of wild deer should be discouraged to avoid causing artificially high concentrations of deer which might increase disease risk.***
- ***Information on the regional incidence of Lyme disease should be collated.***

Legislation issues:

- ***Consideration should be given to revising Schedule 2 of the Deer Act 1991 with respect to the smaller deer species to allow use of some of the .22 centre fire calibres as already permitted in Scotland.***
- ***Consideration should be given to revising Section 6 of the Deer Act 1991 to allow any smooth bore gun or any rifle, except an air rifle, to kill an injured deer, if to do so would be an act of mercy.***
- ***Consideration should be given to extending the provisions for shooting during the close season to allow action taken for preserving public health and safety.***

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- ***Consideration should be given to introducing provisions in the Deer Act to permit licensed shooting of deer at night for the purpose of preserving public health and safety or to prevent serious damage.***
- ***Consideration should be given to bringing the end of the doe/hind close season in England & Wales forward to 20 October, as in Scotland.***
- ***Consideration should be given to introducing a close season for Chinese water deer. This could correspond to that for females of the other deer species.***
- ***Consideration should be given to introducing close seasons for red/sika hybrid hinds in line with those for the parent species.***
- ***Consideration should be given to removing the close season for sika stags.***
- ***Consideration should be given to adding Chinese water deer to Schedule 9 of the Wildlife & Countryside Act 1981.***

Training for stalkers:

- ***The voluntary training of stalkers should be encouraged to improve humaneness standards in deer management.***
- ***The training and standards developed by Wild Deer Management (DMQ Ltd) and its predecessor organisations should be consolidated and formally accredited to meet European standards.***

PART 1: INTRODUCTION

1.1 There appears to be consensus amongst individuals and organisations concerned with deer that most of the deer species present in England are increasing in numbers and extending their range. These increases, and the fact that deer damage continues to occur, suggest that current deer management practice may not be adequately addressing the issue. If deer numbers and range continue to increase, as widely anticipated, deer damage and management problems are also likely to increase in the future.

1.2 There is no single Government body responsible for matters relating to deer and deer management in England. However, whilst the former agriculture ministry (MAFF) had limited statutory responsibility for wild deer under the Deer Act 1991 and the Agriculture Act 1947, the new Department, Defra, now encompasses additional bodies with interests in or involvement with deer, such as the Forestry Commission, which currently sponsors the Deer Initiative, and English Nature.

1.3 Furthermore, since the consolidation of the deer legislation in the Deer Act 1991 a number of issues have been identified where there may be scope for improving the provisions in the Act. Most notable amongst these is the lack of provision for taking or killing deer during the close season to protect public health or safety, for example where deer encroach onto airport runways. This problem is already being looked at by the Department. There is also a continuing need to ensure that deer management is humane and, in keeping with the new Department's objectives, that it is sustainable.

1.4 It is therefore timely for the Department to seek views on current deer management issues and its involvement in them. To help achieve this, this review aims to give an up-to-date summary of knowledge on the status of deer populations in England; to briefly describe current deer management practice and identify specific current and potential problems in effectively managing deer, using both published material and consultation with key organisations and individuals; to consider options for improved future deer management, including the possible need for changes in the legislation and requirements for stalker training; and to suggest proposals for the potential future role of Defra in facilitating such management. The review does not attempt to deal in detail with specific problems, such as deer impacts in forests and woodlands, rather the aim is to give an over-view of deer issues in the wider countryside and, where they are increasingly encountered, in the urban fringe.

PART 2: CURRENT SITUATION

Deer Populations and Trends:

2.1 There are six species of deer living in the wild in Britain today. Red deer (*Cervus elaphus*) and roe deer (*Capreolus capreolus*) are native species, although most English populations originate from introduced stock, fallow (*Dama dama*) have been present for almost 1000 years, whilst sika (*Cervus nippon*), muntjac (*Muntiacus reevesi*) and Chinese water deer (*Hydropotes inermis*) have all been introduced within the last 150 years (Appendix 1). Small numbers of other exotic species are also kept in enclosed deer parks and a herd of 80-100 domestic reindeer (*Rangifer tarandus*) is maintained in the central Highlands of Scotland (Harris *et al.*, 1995).

2.2 Deer numbers are difficult to estimate, even on a local basis, and early population estimates were little more than educated guesses. Thus population estimates in the past may have underestimated both numbers and range leading to exaggeration of the rate of increase and spread when compared to more recent estimates. However, on the basis of the best information available, it appears that deer numbers in the wild may have doubled over the last 25 years (Table 1).

Table 1: Estimated British deer populations in mid-1970s and mid-1990s. Figures taken from Gibbs *et al.* (1975b)* and Harris *et al.* (1995). Separate figures for England in 1990s given in brackets.

Species	Population est. 1970s	Population est. 1990s
Red deer	190,000	360,000 (12,500)
Roe deer	200,000	500,000 (150,000**)
Fallow deer	50,000	100,000 (95,000)
Sika deer	1,000	11,500 (<2500***)
Muntjac	5,000	40,000 (40,000**)
Chinese water deer	None given	480-650 (480-650)
Approx Total	450,000	1 million (300,000)

*Gibbs *et al.* figures appear to be based on pers comms. from J. Rowe, R. Prior and O. Dansie.

Roe may now be over 220,000 and muntjac around 100,000 (Munro, 2002). *Probably now >3000 (J. Langbein, pers comm.)

2.3 **Red deer:** These are Britain's largest land mammal with live weights up to about 160kg and height up to 1.2m at the shoulder. They are a herding species and are usually associated with relatively extensive woodland, moorland or other semi-natural habitats. Rutting normally takes place from late September through October when mature stags compete to hold groups of hinds. Hinds give birth, usually to single calves, in May/June and in good conditions can produce their first calf at two years of age. The main red deer populations in England are concentrated in the South West, East Anglia and the Lake District, with smaller populations in the New Forest, Peak District and Sherwood Forest areas (see Appendix 1). Some recently established populations may have resulted from new escapes and all the English populations, with the possible exception of some of those in the Lake District, originate from introduced stock (Trout *et al.*, 1994). The main areas of distribution have changed little over recent decades (Arnold, 1993; Clarke, 1974; Johnson, 2001; Ward, 2003) but some increase in range has taken place (Ward, 2003). The current population of red deer in England probably numbers in excess of 13,500 (Table 2).

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Table 2: Estimated red deer numbers and population trend in England.

Area	Popn Est/Year	Current Estimate	Trend
South West	2400 (1990) ¹	10,000 ²	Increasing ³
New Forest	Introduced 1960s ⁴	150 ⁵	Increasing?
East Anglia	~350 (mid 1990s) ²	1000 ⁶	Increasing
Lake District	~1600 (mid 1990s) ²	2000 ⁷	Stable
Peak District	50-100 (late 1980s) ⁸	200 ²	Increasing
Sherwood Forest/Notts	No data	40 ⁹	Stable
Transients	No data	<300 ²	Increasing?

1. Allen (1990); 2. Harris *et al.* (1995); 3. J. Langbein *pers comm*; 4. Carne (1995); 5. M. Noble *pers comm*; 6. T. Banham *pers comm*; 7. N. Healy & J. Cubby *pers comm*; 8. Yalden (1990); 9. Staines (1998).

2.4 Roe deer: Roe are a small territorial deer species with live weights up to 30kg and standing 75cm at the shoulder. They rut in July/August and, following delayed implantation of the embryos, produce their fawns in May/June. Roe does typically have their first fawns at two years of age. They usually give birth to twins but triplets are also quite common. Roe are widespread throughout Scotland, northern, eastern and southern England, but are absent from parts of central England and sparsely distributed in Wales (Arnold, 1993; Johnson, 2001; Ward, 2003). Unlike red deer roe are not necessarily limited to areas with extensive woodland or other semi-natural habitats. Consequently there are no figures available for discreet regional populations. The total English population was estimated in the mid-1990s to be about 150,000 (Harris *et al.*, 1995) (Table 1). Changes in recorded distribution of roe indicate continuing range expansion, probably accompanied by continuing increase in numbers, as they recolonise their historic range.

2.5 Fallow deer: Fallow are a medium sized herding deer species weighing up to 100kg and standing about 1m at the shoulder. The main period of the rut is October/early November. Does usually give birth to a single fawn in June and produce their first fawn at two years of age. Although fallow are believed to have been reintroduced to Britain in the 11th century (Yalden, 1999) their distribution is still patchy and often associated with ancient deer forests or deer parks (Harris *et al.*, 1995). Nevertheless, numbers appear to have increased significantly in recent decades (Table 1) and records suggest that there has been some range expansion (Arnold, 1993; Johnson, 2001; Ward, 2003). Fallow deer can reach high density and high numbers locally with some herds consisting of 200 or more animals.

2.6 Sika deer: Sika are a medium sized herding deer species weighing up to 90kg and standing 85cm at the shoulder. They rut in late September/October and the hinds usually give birth to a single calf in May/June. Hinds normally produce their first calf at two years old. Sika were introduced to Britain in the second half of the 19th/early 20th century. They are still relatively local in their distribution and are mainly associated with dense woodland and scrubby vegetation (Corbet & Harris, 1991). The main populations in England are in Cumbria, Dorset and the New Forest (Arnold, 1993) with additional small populations elsewhere (Appendix 1). Sika pose a potential conservation threat to native red deer through hybridisation (Ratcliffe, 1987). This has occurred in parts of Scotland, Ireland and north west England. Sika and sika deer hybrids are now listed on Schedule 9 of the Wildlife & Countryside Act 1981 (W&C Act 1981) prohibiting their release into the wild (W&C Act 1981 [Variation of Schedule] Order 1992; W&C Act 1981 [Variation of Schedule] Order 1999).

2.7 Muntjac deer: Muntjac are a small territorial deer species weighing up to 19kg and standing 50cm at the shoulder. They are non-seasonal breeders and may produce their fawns, usually singles, at any time of year. Does first mate at about 7 months old and produce a fawn every 7 or 8

months thereafter. They were imported into collections in Britain in the 19th century and the first feral populations probably began to establish in the wild in the late 19th/early 20th century (Chapman, Harris & Stanford, 1994). Muntjac have now spread across much of the south of Britain (Chapman *et al.*, 1994) and over the last 30 years have shown the greatest range expansion and increase in numbers of all the deer species (Ward, 2003) (Table 1). It has been suggested that the muntjac population may now be around 100,000 (Munro, 2002). To prevent further releases the muntjac has been added to Schedule 9 of the W&C Act 1981 prohibiting their release into the wild (W&C Act 1981 [Variation of Schedule 9] Order 1997).

2.8 Chinese water deer: Chinese water deer are a small, territorial species, about the same size as Muntjac. They rut in November/December and produce their young from May to July. Does can produce their first young at one year old. Unusually for deer they can have litters of up to five or six young but in Britain they usually only produce one or two fawns (Corbet & Harris, 1991). They were imported into Britain around 1900 and in the 1920s and 1930s were released in various areas around England and Wales (Harris *et al.*, 1995). The total population of Chinese water deer in the mid-1990s was estimated to be no more than 650 (Harris *et al.*, 1995) and mainly confined to Whipsnade Park in Bedfordshire, Woodwalton Fen NNR in Cambridgeshire and the Norfolk Broads (Arnold, 1993). This species is not believed to have increased significantly in recent years and is not generally considered a problem. Nevertheless, a note of caution is required since introduced species often go through a period of low or moderate growth before population 'release' leads to rapid increase. It is possible that this could occur with Chinese water deer and consideration should be given to adding this species to Schedule 9 of the W&C Act 1981, alongside muntjac and sika deer, to prohibit their deliberate release into the countryside.

2.9 Trends in deer numbers & range: Ward (2003) compared deer distribution as recorded in the British Deer Society (BDS) deer surveys, compiled in 1972 and 2002, to estimate the rate of spread of each species over the last 30 years and possible future trends. Range expansion over this period was greatest for muntjac and least for red and fallow deer. Sika increased their range proportionately more than roe but as roe are more widespread their range increased more in absolute terms. However, it should be noted that the native roe is recolonising its range after having been driven to extinction throughout most of the country by the 18th century (Staines & Ratcliffe, 1987), whereas muntjac and sika are invading exotic species. Assuming the same rates of spread continued unchecked Ward speculatively predicted that all 10km squares in mainland Britain could be occupied by roe by 2016, muntjac by 2022, sika by 2038 and red and fallow by 2050. This does not take account of possible effects of new woodland creation or climate change. However, their large size and requirement for significant woodland or other semi-natural cover suggests that the figures for red, fallow and sika are unlikely to be achieved and that there will continue to be large areas of the country where these species are absent or occur only as transients or at low density. The predictions for roe and muntjac, at least with respect to England, may be quite realistic, but there are probably some upland areas in northern England and the South West moors, as well as Wales and Scotland, where muntjac are never likely to thrive.

Problems Caused by Deer:

2.10 The eradication of large predators from the UK has left no significant natural checks on deer populations other than disease, starvation and severe weather. The latter, for example, can result in significantly increased mortality in red deer populations in the Scottish Highlands (Clutton Brock & Albon, 1989), often indirectly, as a result of starvation. Up to 50% mortality has also been recorded in a muntjac population in Cambridgeshire as a result of starvation in late winter (Cooke, Green & Chapman, 1996). Such natural regulation of deer populations causes unacceptable welfare problems and is unlikely to take effect until population levels have exceeded those at which conflicts with human interests occur.

2.11 Deer have the potential to conflict with human interests by causing economic damage to agricultural, horticultural or commercial forestry crops, by causing a safety hazard, or by damaging sites of conservation value, gardens or amenity planting. They also have the potential to act as a reservoir for diseases transmissible to humans (zoonoses) and livestock. Crop or forestry damage may be caused directly by feeding or as a result of other behaviours, such as deer lying out in, and flattening, ripening cereals, or male deer fraying young trees whilst marking their territory or cleaning velvet from new-grown antlers. Where high deer densities occur they may also damage field boundaries such as hedges, fences or traditional stone walls. The most frequent safety hazard presented is that of deer causing collisions with road traffic but the Department has also been asked to advise on cases where deer have encroached onto airport runways or, in one case, a high-speed vehicle testing track. Damage to conservation interests primarily concerns woodlands and coppice, in particular, where deer may suppress tree regeneration and affect the composition of the ground flora (Putman, 2003).

2.12 The UK Forestry Commission produces a wide range of advisory booklets and guidelines dealing with deer problems in woodland and forestry. Much of this is based on the extensive research carried out by Forest Research (Armstrong *et al.*, 2003).

Deer Management Theory:

2.13 Some deer problems can be reduced or prevented by using appropriate deer-proof fencing. Guidance on fence specifications is given in Forestry Commission advisory literature (Pepper, 1992; Pepper, 1999). Limited success may also be achieved in some cases by the use of a chemical repellent (Pepper, Neil & Hemmings, 1996). However, in many circumstances these techniques are uneconomic and, where large numbers of deer are present, their effectiveness may be reduced or they themselves may aggravate welfare problems by excluding deer from part of their range. Current deer management theory is largely based on the premise that the number of deer present in an area should be maintained at a level which can be supported by the available habitat without causing unacceptable conflict with human interests.

2.14 Significant numbers of deer are killed in road traffic accidents (RTAs). There are currently no reliable records kept of the numbers killed in this way but in an unpublished report carried out on behalf of the Highways Agency (cited in Putman, 2003) it was estimated that there may be over 40,000 RTAs involving deer in the UK every year. Some of these may, of course, also result in damage to vehicles, human injuries or even fatalities (the problem of deer RTAs is discussed in Part 3). In addition, young of some of the smaller deer species are killed by foxes and some are killed by out-of-control dogs. However, where it is considered necessary to maintain stable deer population levels, or to reduce their numbers, it is normal practice to do this by culling.

2.15 To maintain stable deer numbers total annual mortality, through the above mechanisms, must match annual productivity. There is an extensive literature on deer management theory, how cull levels should be set and which components of a population should be targeted in culls. A great deal of this has its origins in Central European hunting traditions and practices. This approach is exemplified by De Nahlik (1987) but, for many situations, it assumes an unrealistic knowledge of deer numbers and population structure. Prior (1987) estimated that with a total UK deer population in excess of 750,000 (cf. Table 1) around 300,000 deer would need to be culled every year to maintain stable numbers. Practical guidance on estimating required cull and on likely cull levels in a range of conditions is given by Ratcliffe (1987) and Ratcliffe and Mayle (1992). Suggested cull levels typically range from about 15% to 30% but vary with species and productivity of the local population.

2.16 However, setting the cull as a percentage of the existing population assumes that the size of the population can be accurately determined and this is seldom the case. Consequently initial

estimates of population size and cull level need to be continually re-assessed and adjusted iteratively over a period of years. Setting a cull level is therefore usually dependent on establishing a trend in deer numbers, and adjusting the cull as necessary, rather than adhering to strictly prescribed percentages of the estimated population size.

Legislation:

2.17 The principal legislation governing how deer may be managed and controlled in England and Wales is the **Deer Act 1991**. In addition, authority to cull deer is conferred only by ownership of the relevant shooting or sporting rights. The responsibility for managing deer populations in the interests of the welfare of the deer and to maintain their impact at an acceptable level thus lies largely with landowners/occupiers or deer managers/stalkers or hunts acting with their authority.

2.18 Most current deer management in the UK involves culling animals with a rifle or physical protection measures such as fencing or tree-guards. The seasons and times during which deer can be shot in England and Wales, and the weapons which may be used, are governed by the Deer Act 1991 (in Scotland different provisions apply under the Deer [Scotland] Act 1996). These are defined by exclusion, i.e. by close seasons (when they may *not* be shot) and by specifying *prohibited* weapons. This occasionally leads to confusion where the firearms provisions are mistakenly interpreted as allowing weapons which *either* have a calibre of at least 0.240 inches or muzzle energy of at least 1700 foot pounds. In fact both these minimum requirements must be met. In addition, Section 3 prohibits the shooting of deer at night; “between the expiry of the first hour after sunset and the beginning of the last hour before sunrise”. The Act makes no distinction between native and non-native deer species.

2.19 The close seasons listed in Schedule 1 of the Act are as follows:

Red Deer	
Stags	1 st May to 31 st July inclusive
Hinds	1 st March to 31 st October inclusive
Fallow Deer	
Buck	1 st May to 31 st July inclusive
Doe	1 st March to 31 st October inclusive
Roe Deer	
Buck	1 st November to 31 st March inclusive
Doe	1 st March to 31 st October inclusive
Sika Deer	
Stags	1 st May to 31 st July inclusive
Hinds	1 st March to 31 st October inclusive

2.20 The prohibited firearms and ammunition listed in Schedule 2 are:

Firearms

1. Any smooth-bore gun.
2. Any rifle having a calibre of less than .240 inches or a muzzle energy of less than 2,305 joules (1,700 foot pounds).
3. Any air gun, air rifle or air pistol.

Ammunition

4. Any cartridge for use in a smooth-bore gun.
5. Any bullet for use in a rifle other than a soft-nosed or hollow-nosed bullet.

2.21 Section 7 of the Act provides a defence for the taking or killing of any deer by means of shooting during the close season, or by using any smooth-bore gun (i.e. a shotgun) of not less than 12 bore with (a) a cartridge loaded with a single non-spherical projectile (in practice, a rifled “slug”) weighing not less than 22.68g (350 grains) or (b) a cartridge purporting to contain shot each of which is 0.203 inches (5.16mm) in diameter (shot size “AAA”), provided that the person taking the action “had reasonable grounds for believing that deer of the same species were causing, or had caused, damage to crops, vegetables, fruit, growing timber or any other form of property; it was likely that further damage would be so caused and any such damage was likely to be serious; and his action was necessary for the purpose of preventing any such damage”.

2.22 There is no defence in the 1991 Act for shooting deer at night. However, Section 6 states that “Nothing in Section 2 (*i.e. close seasons*) or Section 3 (*shooting at night*) shall make unlawful anything done in pursuance of a requirement by the Minister of Agriculture Fisheries and Food under Section 98 of the Agriculture Act 1947”. Thus the Agriculture Minister can potentially serve a notice on an individual *requiring* him/her to kill deer during the close season or at night.

2.23 The Firearms Act 1968 (as amended) requires that, with specific exceptions such as low powered air weapons (maximum 12 foot pounds muzzle energy), any person possessing a firearm must hold an appropriate certificate issued by the Police firearms licensing section. Whilst applicants for shotgun certificates are not required to show ‘good reason to possess’ a shotgun, applicants for a firearms certificate (FAC) must do so. Persons possessing rifles of the types used for deer culling must have a FAC (Crown exemption may apply, for example, to Forest Enterprise rangers) and the culling of deer must be specified on the individual’s FAC. In addition, a FAC is required to buy or possess rifled slugs, even though these are fired from a shotgun.

Deer Management Methods:

2.24 **Deer Stalking:** Hunting deer with a high-powered rifle, commonly referred to as ‘stalking’, is normally carried out by a lone stalker, or by a fee-paying guest accompanied by a professional stalker, on foot or from a ‘high seat’. Deer are killed at ranges up to around 200 metres, although most lowland deer are probably killed at half that range or less. They are normally killed by a shot in the heart/lung area or to the neck. The former gives a greater margin for error, and is the target area recommended in the Deer Commission for Scotland’s Best Practice Guide on shot placement, but an accurate shot in either area should humanely kill the animal. Some stalkers claim that a good marksman should be able to kill deer cleanly and humanely with a shot to the head. However, this is widely seen as unacceptable because of the higher risk of a severely debilitating wound to the animal’s muzzle which, whilst not immediately fatal, could leave it unable to feed or breath properly and result in considerable suffering.

2.25 **Hunting with Hounds:** This is now believed to be restricted to the West Country and involves the active pursuit of deer with trained hounds, much as in fox hunting. The main hunts in the West

Country hunt only red deer but it is believed that there may still be less formal hunts involved in hunting roe deer. The red deer hunts follow hounds on horseback whilst the roe hunts may follow on horseback or on foot. Normal practice is to bring the hunted deer 'to bay', where it is killed at close quarters with a humane killer or a modified shotgun. A shotgun used for this purpose must have a barrel that has been cut to less than 24 inches length thus allowing it to be used as a "slaughtering instrument" under Section 6(5) of the 1991 Act. A shotgun modified in this way must be held under a FAC rather than a shotgun certificate.

2.26 Non-lethal means of limiting deer numbers by restricting reproduction, for example, by immuno-contraception, are seen as a potentially humane alternative to culling. These techniques are still at a developmental stage and involve a number of practical difficulties which have yet to be overcome. The results of recent work on immuno-contraception are discussed under 'Alternative methods' in paragraphs 3.13-3.14.

Deer Management Practice:

2.27 The vast majority of deer culled in England are shot with a rifle. This may be carried out by a professional stalker (e.g. Forest Enterprise and some large estates), a professional or semi-professional stalker offering a deer management service, a non-professional offering a service perhaps because of his/her own interest in deer or stalking as a sport, or by a recreational stalker under the supervision of a professional.

2.28 The Deer Commission for Scotland collects cull data for all the major estates and woodlands in Scotland but no such data are recorded for England. Using unpublished British Association for Shooting and Conservation (BASC) survey data for the year 1995/96 Macdonald *et al.* (2000) estimated that the total cull in England and Wales was approximately 47,000 roe, 27,500 fallow, 3750 red, 1300 sika and 11,000 muntjac. There was insufficient data to give a figure for Chinese water deer. Munro (2002) estimated the annual wild deer cull for England and Wales, based on Forest Enterprise cull data and the amount of venison entering the food chain, as about 59,000 roe, 16,500 fallow, 1285 red and 1542 sika, plus up to about 20,000 muntjac. If roe, fallow and muntjac are presumed to be culled roughly in proportion to their range in the two countries as reported by Ward (2003) (red and sika are more or less absent from Wales) these figures suggest that the cull in England is in the region of 45,000-56,000 roe, 13,500-22,500 fallow and 10,300-18,800 muntjac. Relative to the population estimates given in Table 1 this suggests cull levels in England of 30-37% roe, 14-24% fallow, 10-30% red, over 50% sika and 26-47% muntjac. The available information suggests that the figures over-estimate the actual number of sika culled, but, since the roe and muntjac populations are likely to have increased since the mid-1990s, probably over-estimate the *proportion* of the population culled for these species. Munro (2002) suggests that the English roe population may now exceed 220,000 and muntjac may have reached about 100,000, in which case the estimated culls for these species are between 20-25% for roe and 10-19% for muntjac. In addition, Langbein & Putman (1992) estimated that more than 1000 red deer were culled annually from the Exmoor and Quantocks area alone, suggesting that Munro's figure of 1285 for this species for the country as a whole is probably a significant under-estimate.

2.29 Culling with a high powered rifle is generally considered the most humane method of killing wild deer. This view is shared by the RSPCA although their presumption is against killing wild animals unless it can be shown to be necessary. The rifles permitted for culling deer are easily capable of achieving a clean kill if the stalker places the shot accurately. However, because stalking is often a solitary pursuit, and there is likely to be a reluctance to admit mistakes, especially if they have resulted in the suffering of an animal, data on wounding rates are difficult to obtain.

2.30 The BDS have attempted to quantify wounding rates and estimate, though with some reservations about the data, that about 5% of deer culled may require a second shot (M. Squire pers comm.). It should be noted, however, that a second shot does not necessarily mean that the animal was wounded or suffered significantly more than if it were killed by a single shot. A second shot may often be taken as 'insurance' to be certain that an animal is killed quickly and humanely.

2.31 In a study undertaken on behalf of the NT, summarised by Bateson and Bradshaw (1999), information from stalkers and a sample of 40 red deer carcasses from game dealers and records of injured deer recovered by hunts in South West England was examined. These suggested that 10% of the animals from game dealers might have required a second shot. They also estimated that 20% of the *injured* animals recovered by the hunts had been wounded by shooting. However, when the hunt-recovered animals were considered as a proportion of the total rifle cull for the years studied they estimated that up to 4.5% of animals shot may have escaped wounded. This was similar to an estimate of 3.5% obtained by interviewing a sample of stalkers (Bateson & Bradshaw, 1999). The authors' overall conclusion was that about 2% of deer shot may escape wounded.

2.32 In a recent study in Scotland Urquhart & McKendrick (2003) examined the permanent wound tracts of 943 red deer culled in 2001 by over 50 different stalkers. They found that about 14% of carcasses had more than one permanent wound tract (i.e. had received more than one shot) but that the incidence was greater (17.9%) in adult males than in females and young (10.2%). They suggested that this might have been because more males were shot by sporting tenants, landowners or their guests, whereas females and calves were usually culled by full-time professional stalkers. However they also suggested that the high rate of multiple wound tracts in males, which peaked during the rut, might have been because of the heightened state of physical and mental arousal of the animals. They considered that the finding of more than one permanent wound tract did not necessarily show that the animals had experienced unnecessary suffering. They found that 80% of the carcasses had been shot in the heart/lung area and would probably have died rapidly. A further 15.3% were shot in the neck, the other main target area, but they suggested that the effects of wounds in this area needed further investigation.

2.33 There is currently no statutory requirement for recreational or professional stalkers to have been trained although voluntary training schemes have been available through organisations such as the BDS and BASC for over a decade. This contrasts with many EU countries where compulsory training schemes operate (see section on 'Stalker Training').

2.34 Prior to the Deer Act 1963 (subsequently consolidated, with amendments, in the current Act) a common method of deer control was to shoot deer at shotgun drives. This often resulted in wounding of deer and the passing of the 1963 Act was seen as an important step towards securing more humane treatment for deer (Fooks & Hotchkis, 1964; Prior, 1987). Shotgun drives were also used by the Hunts in the West Country at that time to remove perceived surplus deer not taken when hunting with hounds (Macdonald *et al*, 2000). Although the use of shotguns is still permitted under Section 7 of the 1991 Act, under certain circumstances, firearms experts consulted as part of this review considered their power and accuracy insufficient to ensure a humane kill other than at very close range.

2.35 **Hunting with Hounds:** Whitehead (1980) listed over 120 hunts which hunted deer during the 18th, 19th and 20th centuries but there are now only three hunts registered with the Master of Deerhounds Association (MDHA), all of which hunt red deer in the Devon/Somerset area. They are the Quantocks Staghounds, the Tiverton Staghounds, and the Devon & Somerset Staghounds. They hunt 'Autumn stags' (estimated 5-6 years or older) from mid-August to the end of October, mainly hinds from November until the end of February, then 'Spring stags' (estimated 2-4 years old) until the end of April (Macdonald *et al*, 2000).

2.36 Fallow deer were hunted in the New Forest by the New Forest Buckhounds until 1997 when the Forestry Commission banned hunting with hounds on its land. There are also believed to be two packs of hounds hunting roe deer in the West Country. Roe packs referred to in the report to the National Trust in 1993 (Savage, 1993) were the Laurence Clarke Bassethounds, based near Tiverton, Devon, and the Cheldon Beagles, based near South Molton, Devon. Macdonald *et al* (2000) referred to the Cheldon Buckhounds (presumably the same as the latter) and the Exe Valley Buckhounds. These packs are not registered or recognised officially by the MDHA.

2.37 In the 10 years to 1991/92 the three registered hunts in the West Country took means of 52 (Quantocks SH; range 38-98; data for 1985/6 missing), 35 (Tiverton SH; range 26-46) and 95 deer (Devon & Somerset SH; range 62-130) per year (Langbein & Putman, 1992). Around 28% of the deer taken were injured deer, for example from RTAs, which the hunts dealt with on hunt days or as a result of being specifically called out. Langbein & Putman estimated that, by 1991/92, hunting with hounds accounted for less than 2% of the autumn red deer population in the Exmoor area and about 5% on the Quantocks. They estimated that a total cull of about 20% or more (including hunting, stalking and RTAs etc) was required to maintain the population at a stable level.

2.38 Under current legislation there appear to be no legal reasons why further deer hunting packs may not be set up and other deer species hunted, as long as this is done outwith the relevant close season. There have been anecdotal reports of dogs being used to hunt muntjac in the Midlands (J. Langbein pers comm.).

2.39 Deer Management Groups: The BDS first promoted the concept of local co-operative management of deer almost 40 years ago with their publication "Deer Control" (Fooks & Hotchkis, 1964). In 1992 an updated publication "Deer Management" was produced (British Deer Society, 1992). Now normally referred to as Deer Management Groups (DMGs), the principles and practice of this approach have been refined and developed by the Forestry Commission, the Deer Commission for Scotland and latterly, in England and Wales, the Deer Initiative. The idea of such groups is to facilitate management of a local deer population over its natural range. In Scotland, the Deer Commission for Scotland has helped establish voluntary DMGs in all of its 45 deer counting areas and this approach is well established (Putman, 2003). In England, where land holdings are typically smaller, DMGs tend to involve larger numbers of landowners/occupiers and achieving co-operation between DMG members is particularly important.

MAFF Deer Management Group Trial:

2.40 During formal consultation, following the issue of night shooting notices by MAFF (see 2.22 above) in the late 1980s, widespread opposition to night shooting was found (see Appendix 2 for list of organisations consulted). As a result of this, and with the co-operation of the BDS, MAFF initiated a trial between 1990 and 1993 of local DMGs. A senior member of the south west branch of the BDS acted as co-ordinator and facilitator for the formation of DMGs in Exmoor and surrounding areas, where particular problems were being reported at the time.

2.41 Four DMGs were established in the south west; the Exmoor and District Deer Management Society (EDDMS; established in 1992), the Quantocks Deer Management and Conservation Group (QDMCG; established 1991), the Monksilver and District Deer Management Group (MDDMG; established 1993) and the Croydon Hill Deer Management Group (CHDMG; established 1993/4). However, the EDDMS and QDMCG were not set up as a direct result of the trial but in response to general local concern and interest in the deer. Both of these groups cover extensive areas and, although they perform a co-ordinating function and usefully organise regional deer censuses, they do not operate as local DMGs concerned with a specific local deer population. The DMG model as outlined by Langbein (1997 & 1998), and envisaged by the BDS (BDS, 1992) and in the MAFF

trial, is of a local group operating over a relatively small area covering the natural range of a local deer population; in the case of red deer probably around 1000 to 5000 hectares.

2.42 Of the other two groups, the MDDMG was established after an initial request to MAFF for a night shooting notice was refused. This group is believed to be still operating. The CHDMG was also established in an area where a night shooting notice had been requested and where staff (then MAFF/ADAS Wildlife Advisers) had conducted detailed monitoring and damage assessment. However, there were particular tensions in this area and following the issue of a night shooting notice in January 1996, because of continued serious damage, the group broke up. Attempts to establish a DMG in the Exe Valley area, surrounding the other farm where night shooting notices had been issued (see Appendix 3), failed.

2.43 Although the consensus remained that effective and humane deer management is best achieved through the establishment of local DMGs, the MAFF trial can only be said to have met with moderate success, at best, and clearly illustrated the difficulties in reaching the levels of co-operation required. Even in Scotland, where the number of landowners involved in any one DMG is relatively small, the experience of the Deer Commission for Scotland suggests that the voluntary approach to DMGs is not always sufficient in itself without statutory enforcement powers to back it up.

Government Sponsored Sources of Advice:

2.44 **Forestry Commission:** The Forestry Commission produces a range of authoritative advisory literature dealing with deer and deer management, particularly in relation to preventing forestry damage. Some of this is available as priced publications and some is available, free of charge, from the Commission or from their website (www.forestry.gov.uk). This material is largely based on the wealth of experience gained from deer management in Forest Enterprise woodlands and on the work carried out by Forest Research. Forest Research staff also offer an advisory service to direct enquirers. Responses to telephone, email, mail or personal enquiries are free of charge but site visits are normally charged for. Forest Enterprise do not have a formal advisory service but do give informal advice to enquirers, particularly relating to properties neighbouring FE woodlands. Forestry Commission field staff dealing with woodland management grants and licenses do not give advice per se, but the issue of grants and licenses are conditional on appropriate measures being taken to prevent deer damage. A summary of current knowledge on deer and forestry, listing many of the current publications available from the Commission, is given by Armstrong *et al.* (2003).

2.45 **The Deer Initiative:** The Deer Initiative (DI) was formally launched by the Agriculture Minister at the Royal Show in July 1995 as a partnership of interested organisations, led by the Forestry Commission, with the aim of:

“promoting a co-ordinated approach to the sustainable management of deer”

For the first three years of the DI's existence the Forestry Commission provided its Chairmen (Brian Hibberd 1995-96 and Mark Pritchard 1996-98) as well as administrative and technical support.

2.46 The DI adopted ten initial development objectives dealing with the provision of advice and related issues. These were to:

- Build consensus amongst partners and produce and endorse consistent and balanced advice on deer management.
- Raise awareness of the public, politicians, central and local government, policy makers and all land managers of the need for a co-operative and co-ordinated approach to deer management.
- Assist with the formulation of local deer management strategies within a co-ordinated national network of DMGs.
- Promote best practice with regard to deer management, monitoring and research.

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- Promote a humane and responsible approach towards deer stalking within a framework of sustainable population management.
- Encourage a stable venison market.
- Address the road safety and accident problems associated with deer and roads.
- Encourage sound deer management training and recognised qualifications.
- Identify research, survey and monitoring needs and priorities.
- Exchange and disseminate information on deer management.

2.47 In 1998 Andrew Hoon was appointed as the DI's first independent Chairman and in 2000 the DI was re-launched as a fully independent partnership of statutory, non-statutory and voluntary organisations with a small core staff. It became an independent public/private partnership on 1 April 2000 on the formation of a governing charitable company, the Deer Initiative Ltd. Technical staff in post at the time of writing are the Executive Director, one full time Technical Adviser/Deer Liaison Officer (DLO) in Central Region, one part time DLO in Southern Region and a full time DLO/RTA survey coordinator in Eastern Region, seconded from Forest Enterprise. In addition there is one DLO for the Welsh DI which was launched in November 1999.

2.48 In 2000 Andrew Hoon reiterated the DI vision to:

“ensure the delivery of a sustainable, well managed wild deer population in England”

and stated that the DI will have achieved its aim “when it has recognisable deer management covering all areas of England in which wild deer are present” (Hoon, 2000).

2.49 In an initial progress report (Firn Crichton Roberts, 2001) an attempt was made to assess the achievement of ‘tasks’ in six main operational areas set out in the re-launched DI’s first Annual Operations Plan (AOP) for 2000/01. The operational areas and number of tasks associated with each were as follows:

- Deer management assessment (3 tasks)
- Deer census assessment (3 tasks)
- Deer management research (3 tasks)
- Deer management implementation (7 tasks)
- Impact assessment and public relations (5 tasks)
- Impact management and public relations (4 tasks)

2.50 Individual tasks were not identified but the report commented favourably that 8 tasks were fully completed, 6 started and “well underway”, 8 launched and 4 delayed or re-scheduled. It identified a disappointing lack of engagement by “major national ministries”, and MAFF in particular, although it did recognise that MAFF had awarded research contracts on wild deer worth in excess of £600K (This included MAFF projects VC0308; 0314; 0315; 0317 dealing with lowland deer, regional deer distribution, deer damage levels, landscape features associated with deer, deterrents for deer etc.).

2.51 As part of their advisory role the DI has published two advice notes:

Advice Note 1: Deer Management Groups – advice and support in England

Advice Note 2: Culling deer out of season in England and Wales

They also publish the ‘Deer Accord’, which sets out the principles which DI members sign up to and two further Advice Notes are planned; one on Legislation and one on Lyme Disease. In addition, they give advice to the public and others by telephone and through their website

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(www.thedeerinitiative.co.uk) which provides information on deer and their management and from which their Advice Notes can be downloaded.

2.52 Offering guidance to, and helping to establish effective DMGs is central to the purpose of the DI. When the DI was re-launched in 2000 they report that there were about 10 properly functioning DMGs in existence in England whereas there are now over 40, concentrated in the central area of the country. In the southern area alone there are now 15 or 16 in the New Forest Area, where there were apparently only 3 or 4 prior to the appointment of the DLO.

2.53 The DI also now do consultancy work developing deer management plans (DMPs), in particular in relation to Woodland Grant Schemes under which up to 50% funding for DMPs can be provided. The Forestry Commission is currently working with the DI to agree areas of work for which they can charge without the risk of double funding.

2.54 The DI have also recently launched a national survey of deer RTAs with sponsorship from the Highways Agency, The National Forest, the Woodland Trust and the Deer Study & Resources Centre. The survey is being conducted in co-operation with Jochen Langbein. The DI Chairman, Andrew Hoon, is also Chairman of Wild Deer Management Qualifications Ltd and contributes on behalf of the DI to standards setting for deer management qualifications.

2.55 The DI clearly has a significant level of expertise available within its technical staff but it is currently constrained in achieving some of its objectives by the limited resources available to it. Current funding for the DI is secure until March 2005 and, at the time of writing, the Forestry Commission will shortly be initiating an independent review of the DI and its funding.

2.56 Defra RDS National Wildlife Management Team: The National Wildlife Management Team (NWMT) comprises a central administration unit, based at Bristol, and 25 technical Wildlife Management Advisers, organised in five regional groups, located throughout England. The Team is involved in three main areas of work:

- Processing and issue of wildlife licences and dealing with wildlife complaints under relevant legislation, including provision of advice to licence applicants, members of the public, conservation bodies, local authorities, Police and others on the ecology and management of a range of mammals and birds.
- Enquiries into suspected poisoning of wildlife and companion animals by pesticides.
- Authorisation and monitoring of the use of strychnine for the control of moles.

2.57 Deer issues, at present, make up a relatively minor part of the Team's work (see section 2.66 – 2.68) and mainly involve dealing with telephone enquiries. A small number of cases concerning requests for authority to shoot deer at night are dealt with. These have involved NWMT members (in previous organisational structures) in developing and carrying out detailed monitoring of deer problems and in trying to find solutions to these problems. The Team therefore has considerable expertise in wildlife management matters generally but in-depth expertise in deer issues is more patchily distributed.

2.58 The NWMT produces a range of advisory leaflets on the main species and problem areas with which it is involved. At the moment there is no advisory leaflet on deer but one on urban/suburban deer problems is currently being drafted.

Examples of Deer Management Policy:

2.59 Both the National Trust and English Nature have published guidelines on deer management. These outline their current policy in relation to deer management and provide examples of policy for a major landowning organisation, with management responsibilities on its own land, and a public body with statutory responsibilities for nature conservation. In addition, both are likely to be subject to close public scrutiny. The key points of these policies are outlined below.

2.60 **The National Trust:** The Trust's guidelines (National Trust, 2001) do not appear to distinguish between the native and introduced deer species and state that deer are "generally a welcome and acceptable component of the fauna". They give its objectives in managing deer as:

- To protect valued wild plant communities.
- To contain damage to commercial crops (farming and forestry) and to ornamental produce.
- To reduce the incidence of road traffic accidents involving deer.

In relation to the second of these the guidelines state "Excessive damage does occur and must be contained. The Trust is aware of its obligations towards tenants and neighbours".

2.61 In achieving its objectives the Trust aims:

- To carry out all operations in a safe and humane manner.
- To co-operate with neighbours in the preparation of management programmes.

The Trust specifies that all new stalkers should hold the Deer Stalking Certificate at Level 2 or the BDS National Stalkers Competence Certificate, or a similar recognised qualification and specifically refers to the herding species (red, fallow and sika deer) as requiring co-operative management.

2.62 The Trust does not:

- Maintain populations of deer to maximise their revenue potential in any way.
- Sanction the capture and sale of wild deer.
- Permit commercial stalking on its land.
- Permit the hunting of deer with dogs on its land (though a trained dog may be used to track an injured deer so that it can be humanely killed).

2.63 Although not mentioned specifically in the Trust's guidelines, in the Exmoor area, where the ban on hunting with dogs on Trust land had the greatest impact, the Trust may pay compensation to tenant farmers suffering deer damage. The Trust views this as recognition of its responsibility towards its tenants but also considers it a wider responsibility of any landowner under an Agricultural tenancy (N. Hester, pers comm.).

2.64 **English Nature:** In the preface to EN guidance (English Nature, 1997) it is stated that EN "values deer as a part of our wildlife, but recognises that their numbers may need to be managed" and "Our aim is to achieve a balance between the sometimes competing conservation interests in the landscapes we manage". Again no distinction is drawn between the native and introduced species. EN considers that, if deer numbers are allowed to get too high for the area of available woodland, tree regeneration, coppice regrowth and vulnerable ground flora start to be adversely affected.

2.65 EN's statement of policies which they operate in National Nature Reserves (NNRs) and encourage owners and managers of SSSIs to follow is, briefly*, as follows:

- We prefer deer populations to be managed at a landscape scale. Therefore EN supports the DI in promoting a co-ordinated approach to the sustainable management of wild deer, particularly through the formation of DMGs.

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- For each woodland NNR we will have a deer management statement which sets out what deer are present, assesses their impact on that reserve and the measures being taken to offset that impact.
- Within individual woods we will encourage a mixture of habitat manipulation, reduction of the deer population, and fencing as appropriate to achieve nature conservation objectives but it is recognised that habitat manipulation is rarely sufficient in itself.
- Fencing of small stands will only be used as a temporary measure to achieve regeneration or coppice regrowth where impacts on ground flora are not considered damaging.
- In general we will avoid fencing whole woods because deer are often fenced in and also the pressure on the surrounding land is increased.
- Culling of deer within the wood will be considered where it will achieve the reduction in deer impact that is required, and where it can be done safely and humanely.
- EN will make the results of our experience of deer management available to others, will welcome the use of our reserves for research on the impact of deer where this is compatible with the objectives of the site, and will seek to learn from good practice elsewhere.

**These have been paraphrased to shorten them to the main points only.*

Current Defra Involvement and (MAFF) Policy:

2.66 Historically Defra (& MAFF) has had relatively few cases and enquiries concerning deer problems. The NWMT WILD records (Wildlife Intranet Linked Database) for the two complete years for which data exists (1 April 2001 – 30 March 2003) show only 5 records involving fallow deer and one involving roe. All of the fallow records concern requests for authority to shoot deer at night whilst the roe record concerned shooting during the closed season.

2.67 There are no national records of telephone enquiries currently kept by the NWMT but for the last two years the South West Group has maintained an Excel spreadsheet of technical enquiries with brief details of topics covered. In 2002, out of a total of 471 enquiries 19 concerned deer (2 red, 3 fallow, 5 roe and 9 unspecified) and in the first 6 months of 2003 out of a total of over 280 enquiries 14 concerned deer (10 red, 2 fallow, no roe and 2 unspecified). More than half of these enquiries were about the position regarding shooting during the closed season, one was about night shooting and three were general legislation queries. Most of these involved damage to agricultural crops but one concerned a deer problem on an airfield.

2.68 For a period during the late 1980s, prior to the provision of statutory and general advisory work being split, a predecessor of the NWMT, the MAFF Wildlife & Storage Biology section, kept records of all technical enquiries on the COSTER system (Computerised Summary of Technical Recording). Detailed data is only available for January 1987 to March 1989. Over this period 212 deer related enquiries were received in England (equivalent to about 170 per year). Of these 37 concerned red deer, 116 fallow and 59 roe. About 50% of these enquiries were about damage to field crops or grassland and a significant but unknown proportion were connected with requests for night shooting notices at the time. Putman (2003) cites COSTER data as one of the few sources available that offers an index of the frequency with which serious deer damage is encountered, or at least reported.

2.69 Under Section 8(1) of the Deer Act 1991 the Statutory Conservation agencies may licence the removal of deer from one area to another or the taking of deer alive for scientific or educational purposes. The purposes for which deer may be removed under this provision are not clear. Defra has no licensing powers under the Deer Act 1991 but under Section 98 of the Agriculture Act 1947 the Agriculture Minister can serve a notice requiring deer to be taken during the close season or at night (see 2.22 above). Enquirers and others often refer to these as close season or night shooting 'licences'. As a defence for shooting deer in the close season exists in Section 7 of the 91 Act it is not necessary for Defra to issue such a notice to permit this action and it appears that no such

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notice has ever been issued. However, as deer cannot otherwise be shot legally at night, a small number of night shooting notices have been issued (for details see Appendix 3).

2.70 I have collated all available records of formal requests for night shooting notices received by MAFF/Defra since the Wildlife & Countryside Act amendment became law (from January 1982). These are cases which resulted in a site visit by a Wildlife Adviser and, as a result of which, a recommendation on the issue of a night shooting notice was made. It is possible that a very small number of cases may not have been traced but those listed in Table 3 represent most, if not all, cases.

2.71 Because of the close scrutiny to which the issue of night shooting notices was subjected detailed monitoring and assessment of deer activity and damage was carried out by (then MAFF) Wildlife Advisers at the sites concerned. The data obtained as a result of this work are amongst the very few direct assessments of deer damage to agriculture in this country. As a result of the development of these methods detailed guidance on these is included in the Defra Working Instructions for dealing with Deer problems. However, this level of detailed assessment has not been used since.

2.72 Requests for night shooting notices during the period of the MAFF DMG trial (1990-1994) were rejected in favour of the trial policy of encouraging formation of deer management groups. The Policy Division conclusions following the DMG trial were that "providing the conditions are right, local deer management groups can be an effective and acceptable way for wild deer populations to be controlled. There will, however, be circumstances where it will not be possible to establish an effective deer management group. Night-shooting has to be retained as an effective method of controlling deer in exceptional circumstances when all else fails" (Countryside Division, 1995). These conclusions formed the basis of subsequent MAFF policy as announced in a subsequent News Release (MAFF, 1995).

2.73 Rejections of night shooting requests since 1995 have been made in the context of this policy, which has been closely adhered to. There have been a small number of cases since that time where a strong argument for the issue of a night shooting notice was presented (e.g. one Dorset fallow deer case and a Northumberland roe deer case) but it was considered that the options for more co-operative daytime control had not yet been exhausted, and the request was rejected.

2.74 Although it was not raised as an issue by consultees, currently night shooting notices under Section 98 of the 1947 Act are restricted to the purposes of preventing damage to "crops, pasture, animal or human foodstuffs, livestock, trees, hedges, banks or any works on land". Human health and safety is not covered. Clarification of this aspect of the legislation, and broadening to include health and safety, could be achieved by making provision in the Deer Act for the issue of night shooting licences in appropriate, exceptional circumstances.

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Table 3: Requests for Night Shooting orders received by MAFF/Defra, 1982-2003, showing outcome. Different applicants from the same county are referred to by different single letter suffixes.

Date	County	Species	Crop/commodity damaged	Outcome
~ 1982	Somerset <i>a</i>	Fallow	Unknown	Not issued*
~ 1982	Somerset <i>b</i>	Fallow	Unknown	Not issued*
Nov 1982	Somerset <i>c</i>	Red	Root crops	Not issued*
Jan 1983	Somerset <i>c</i>	Red	Pasture	Not issued*
Feb 1983	Somerset <i>d</i>	Red	Unknown	Rejected
Oct 1984	Somerset <i>c</i>	Red	Pasture	Issued 1985-89 inc.
Nov 1988	Somerset <i>e</i>	Fallow	Silage/cereals	Rejected
Apr 1992	Somerset <i>c</i>	Red	Pasture	Rejected (DMG trial)
Sep 1994	Devon <i>a</i>	Red	Cereals/roots/ field boundaries	Rejected (DMG trial)
Mar 1995	Devon <i>a</i>	Red	Root crops	Rejected
Nov 1995	Dorset <i>a</i>	Sika	Pasture	Rejected
Nov 1995	Somerset <i>c</i>	Red	Pasture	Issued 1996
Nov 1995	Somerset <i>e</i>	Fallow	Silage/cereals	Issued 1996
1996	Norfolk	Red	Sugar beet	Rejected
~ Oct 96	Somerset <i>c</i>	Red	Pasture	Rejected
~ Oct 96	Somerset <i>e</i>	Fallow	Silage/cereals	Rejected
Nov 1997	Somerset <i>c</i>	Red	Pasture	Rejected
Sep 1998	Dorset <i>b</i>	Fallow	Grass/cereals	Rejected
Feb 1999	Bedfordshire	Muntjac	Vehicle proving track (safety)	Rejected
Jul 2000	Northumberland	Roe	Forestry	Rejected
Feb 2002	E Sussex	Fallow	Broadleaf trees	Rejected
Feb 2002	Essex	Fallow	Cereals/OSR/ hedge banks	Rejected
Dec 2002	Essex	Fallow	Market garden crops	Rejected
Jan 2003	Hereford <i>a</i>	Fallow	Orchard trees	Rejected
Jan 2003	Hereford <i>a</i>	Fallow	Grass/cereals/ field boundaries	Rejected

* I understand that the legal position was still not agreed at this time.

PART 3: AREAS OF CONCERN

Key Problems:

3.1 A number of key problems have been identified, by discussion with consultees, from published information, and from other sources. Some of these relate to perceived increased difficulty in management resulting from sheer numbers of deer present, some ancillary issues such as RTAs, and potential disease problems. Others concern perceived problems with the current legislation and the need for changes. There is some overlap between these two but, broadly, technical issues are dealt with first and specifically legal issues in later sections. In addition, deer damage and management in forestry has been well studied over the last few decades, notably by the Forestry Commission, Forest Research agency, and there is extensive research and advisory literature on the subject. As management theory and practice is well established in this field and the Forestry Commission provides the lead in technical guidance, this area is not specifically dealt with here.

3.2 **Agricultural damage:** Damage to agriculture was *not raised as a main concern* by those consulted but is briefly discussed here for completeness. A recent survey by the NFU's DI representative on the extent of deer problems in their regions received little response and they do not receive unsolicited complaints about deer (M. Gloyer pers comm.). It was concluded that deer were not a significant agricultural problem generally but may be more of a problem in farm woodlands. The CLA/Forest Timber Association representative on the DI reported that they do receive enquiries about deer regarding woodland and agricultural damage but could not quantify this (J. Webb pers comm.). A preliminary estimate of the cost of deer damage to agriculture in England suggests that it may be around £4 million per annum (Wilson, 2003a).

3.3 The relatively small number of enquiries received by Defra (and previously MAFF; see 2.66 - 2.68) concerning deer damage to agriculture may reflect that deer damage is only a minor problem or that it is dealt with (or not) without seeking advice from Defra. Doney & Packer (1998), using a questionnaire designed jointly with MAFF Wildlife Advisers, surveyed and followed up farmers' reports of deer damage. Of 1192 responses received, 69% (822) reported that they had deer on their farm. Of *those with deer* 44% reported damage to cereals, 29% damage to trees, 6% damage to grassland, 3.5% to both rootcrops and fruit, 3% to vegetables and 2.5% to oilseed rape. Only 15% of respondents reporting cereal damage (i.e. 54 respondents) claimed that losses due to deer amounted to more than £500 per year. Subsequent ground truthing appeared to show cereal yield losses of up to 10% (Doney & Packer, 2002) but overall there was "little difference between yield in damaged and undamaged crops" (Packer *et al.*, 1998).

3.4 In 1998 J. Langbein conducted a questionnaire survey of landowners in the Quantock Hills in Somerset, an area with a substantial red deer population (Langbein, undated). Questionnaires were sent to 165 names/addresses and a response rate of about 43% obtained. Forty nine respondents (74% of those answering the question) reported what they considered "significant damage" caused by deer to their land or crops. About half (55%) thought the damage had stayed the same over the last 5 years and over a third (37%) thought it had increased. The most frequently reported categories of damage were grassland (leys & permanent pasture; 22%), cereals (21%), hedgerows and banks (19%) and other cultivated crops (12%). Of 36 replies which gave a financial cost for deer damage 11 (31%) reported zero cost, 3 (8%) £100-£250, 13 (36%) £250-£1000 and 9 (25%) over £1000 per annum.

3.5 Attitudes surveys and numbers of enquiries, as recorded on COSTER (see 2.68), reflect perceptions of damage rather than damage itself. There have been very few attempts to directly assess deer damage to agriculture in this country. Putman (1986) studied roe deer damage over a period of two years in Hampshire. Although roe foraged on wheat and barley fields from March to May, later feeding in June and July concentrated on broadleaf weeds within the crop and no

significant yield loss was recorded. Although only a single study this supports the expectation that roe, a non-herding territorial species and predominantly a concentrate feeder/browser (Putman, 1988) are unlikely to have a major impact on cereal or grass crops.

3.6 NWMT (then MAFF) Wildlife Advisers carried out damage assessments at the two sites subject to night shooting applications in the late 1980s/1990s which involved the larger herding species; red and fallow deer (various unpublished reports). At the red deer site damage to spring grazing was assessed using deer-proof enclosure cages. Twenty five enclosure cages were placed randomly along five equidistant transects across the main vulnerable field in early January, together with five additional cages within a deer-proof fence to act as a control. Just prior to turn-out of stock on 1 March 1989 loss of pasture due to deer grazing was assessed by comparing yield in samples cut from inside and outside the enclosure cages. This resulted in an initial estimate of 24% dry matter (DM) yield loss. However, because of a problem with enclosure cage effect identified in later trials, where yield appeared to be enhanced inside the cages rather than suppressed, as indicated by the control in this first assessment, yield loss was probably nearer to 14% DM. The same technique was used to assess loss of silage grass at first cut at the fallow site. In 1990 and 1995 this was estimated at 17% DM and 7% DM loss respectively. Cereal yield loss was also assessed at this site using a similar method to that used by Putman (1986). In 1995 a yield loss at harvest of 8.6% was estimated for a winter wheat crop. However, in 1996 and 1997 no yield loss was detected in winter barley and winter wheat crops, respectively. Since these results were obtained at sites subject to repeated complaints about deer damage and where night shooting notices had been requested it would seem reasonable to assume that they were amongst the more serious agricultural problems likely to be encountered. This is also the case for preliminary estimates of yield loss (up to 12% for wheat, 8% for oats and 5% for barley) in a recent study in an area of south west of England with a high red deer density (Langbein & Rutter, 2003). Thus the results are consistent with this type of damage *not* being a main concern in the wider countryside at lower deer densities.

3.7 **Urban/suburban deer:** There appear to be increasing problems with the smaller species of deer encroaching into urban gardens and other areas. This involves roe deer and, particularly, muntjac. This problem is reported by the BDS, DI, FE, in published literature (e.g. McCarthy, Baker & Rotherham, 1996) and is reflected to some extent in calls received by the NWMT. The seriousness of the damage caused to gardens may be a subjective matter but such populations may also bring an increased risk of RTAs in the urban/ suburban environment (Scanlon, 1998). Deer in such areas cause specific management problems which are likely to increase.

3.8 The only approved and effective deer repellent currently available is Aaproduct (a.i. ziram). This product is phytotoxic, and irritant to the skin, eyes, nose and throat (Pepper, 1978). It can give short term protection to the dormant stages of growing trees and shrubs (Armstrong *et al.*, 2003) but is likely to be of marginal use only in a garden situation. Initial trials of a micro-encapsulated formulation of the repellent Capsaicin showed some promise (Hodge & Pepper, 1998) but the use of Capsaicinoids against rabbits in the USA was found to be effective only if alternative food was available (Bosland & Bosland, 2001). Fencing may be practical and may be the best option in some cases but it is unlikely to be so in many others. Inevitably there will be some calls for deer to be 'removed'. In deer management terms such calls will be quite justifiable but there will be serious problems in using culling in the urban/suburban environment.

3.9 The rifle calibres permitted under the Deer Act 1991 have potentially lethal ranges of several hundred metres (in normal use - several kilometres if aimed into the sky, allowing for bullet trajectory). The use of these in confined areas, such as gardens or allotments, raises serious safety issues. In addition, it is an offence under the Highways Act 1980 for any person, without lawful authority or excuse, to discharge any firearm within fifty feet of the centre of any public highway if, in consequence, any user of the highway is injured, interrupted or endangered. The

loud report of these weapons may also cause public disturbance and alarm in some situations, although sound moderators for use with full-bore rifles are now available.

3.10 Under the provisions of Section 7 of the 1991 Act shotguns could be used to cull urban deer, if they were causing damage to property on the land concerned, further serious damage was likely, and the action was necessary to prevent that damage. This might be considered a safer alternative to a rifle but the type of single non-spherical projectile permitted by S7(2)(a) (i.e. a 'Brennica slug') is vulnerable to ricochet and could, potentially, be more dangerous than a rifle. This is unlikely to be suitable in an urban/suburban environment. The shot size permitted by S7(2)(b) (size AAA) gives too dispersed a pattern (spread of the shot after firing) to be humane at anything other than very close range; only up to about 15 metres. Most of those consulted in compiling this review considered shotguns unsuitable for culling deer.

3.11 **Alternative methods:** The general lack of sympathy amongst many members of the public for culling as a wildlife management 'tool' is likely to result in vociferous protests in urban/suburban cases. The RSPCA accept that culling may be necessary in some circumstances, where there is a serious problem and there are no alternative methods available to deal with it (C. Booty pers comm.), but in suburban situations they consider that culling is "rarely acceptable" and there "must be other methods available" (B. Dalton pers comm.). Alternative methods they suggest are deer repellents, the use of tranquiliser rifles (they have a small number of staff trained in the use of these), or netting under licence. They also consider techniques, such as immuno-contraception, worthy of further investigation.

3.12 Some of these alternative methods appear attractive but come with their own set of problems. Use of tranquiliser rifles would require a licence from English Nature (or CCW in Wales) and are only effective at close range. Potentially serious risks could arise if drugged animals were subsequently culled and entered into the food chain or if drug-charged darts were lost and later found by third parties. One chemical apparently used in the USA to immobilise deer, succinylcholine chloride, is a muscle relaxant and leaves the animal fully conscious and therefore likely to suffer extreme stress whilst being handled (C. Critchley, pers comm.).

3.13 The use of chemical or immunological methods of suppressing reproduction is a potentially promising alternative to culling in some situations. Much of the research into immuno-contraception in the USA has been driven by public pressure to find non-lethal alternatives to culling (Fagerstone *et al.*, 2002). Putman (1997) reviewed the options for possible reproduction control in deer and other wildlife. Hormonal and immuno-contraception techniques were both considered although the latter method appears to have been more favoured in recent years. He raised concerns about possible behavioural effects of hormonal treatments and physiological side-effects of either type of treatment. For example, the possible long term effects of preventing pregnancy in animals adapted to seasonal breeding remain unknown. One of the main current candidate materials is Porcine Zona Pellucida (PZP) which induces an immune response in the target female animal which, in turn, inhibits fertilisation of the ova (Putman, 1997). The use of this technique has been shown to inhibit reproduction in a number of deer species in captivity, although some reports suggest that it is not effective with fallow deer (Moore, 1998). Recent trials in the USA have demonstrated that immuno-contraception has the potential to be effective in limiting white-tailed deer (*Odocoileus virginianus*) numbers in suburban situations (Rudolph, Porter & Underwood, 2000; Walter *et al.*, 2002). However, the need for initial capture in order to inject the animals and possible re-capture for repeat or 'booster' treatments limits, for the time being, its potential use with wild deer. The lack of species-specificity of currently available treatments means that it would not be safe to apply such treatments via a bait (Moore, 1998).

3.14 Thus immuno-contraception and related techniques merit further investigation but, for the moment, are still at a developmental stage. Defra Central Science Laboratory (CSL) and NWMT

staff are currently involved in preliminary discussions with researchers from the USA on a technique involving the generation of antibodies against gonadotropin releasing hormone (N. Moore/R Brand Hardy, pers comm.). This appears to have the advantages over some other techniques in that it can inhibit reproduction for two years or more following a single treatment and its effects are reversible (Fagerstone *et al.*, 2002).

3.15 The use of nets can be permitted by a licence under Section 8 of the 1991 Act. The licensing authority under this section is English Nature which can issue licences “for the purpose of removing deer from one area to another”. The reasons for which removal of deer can be permitted are not clearly specified in the Act. Translocation for the prevention of damage would therefore appear to be possible under the Act but this is not consistent with English Nature’s other licensing responsibilities. Under the Scottish legislation the Deer Commission for Scotland do, occasionally, use live-capture to remove deer or to facilitate a cull, but they have not used this in urban/suburban situations (D. Balharray pers comm.). Thus there are a number of potential alternatives to culling with a rifle, but these techniques are largely untried or still at a developmental stage. Until acceptable alternatives are developed urban/suburban deer problems are likely to continue to increase and will be difficult to resolve with current deer management practice.

3.16 **Conservation damage:** There has been increasing concern about deer damage to conservation interests in England over the last ten to 15 years. Damage has been shown to adversely affect coppice regeneration (Bows, 1997), rare plants, such as the oxlip (Tabor, 1999) and rare invertebrates, such as the high brown fritillary butterfly (Petley-Jones, 1995), a UK Biodiversity Action Plan species listed on Schedule 5 of the Wildlife & Countryside Act 1981. Browsing by fallow deer can inhibit establishment of new farm woodlands and reduce their environmental value (Moore, Hart & Langton, 1999; Moore *et al.*, 2000). English Nature considers deer damage to be the single biggest issue affecting woodland conservation in the lowlands. Even relatively low population levels are reported to prevent regeneration of semi-natural woodland or coppice and high density populations can impoverish ground flora and shrub layers. Langbein (1997) found that although red deer did not appear to affect maintenance of existing heather moorland in south west England regeneration of oak woods was affected and was unlikely with deer densities at, or above, 5 per km². Because of the high densities that can be reached by muntjac they have been reported to be a particular problem in some woodlands (Cooke & Farrell, 1995).

3.17 In a survey of 162 National Nature Reserve managers (woodland and non-woodland reserves) Putman (cited in Putman & Moore, 1998) found that 18% of managers considered damage caused by deer to be sufficient to cause difficulty in meeting the management objectives for their sites. All the sites for which damage was reported were woodland sites and in most of these damage reported was to coppice or tree regeneration. However, Putman (1998) suggested that caution should be exercised in assessing the impact of suppressed woodland regeneration caused by deer because of the long-term nature of woodland cycles. He pointed out that there need only be limited regeneration each year or the ‘escape’ from browsing of a larger cohort once every 40 years or so, for regeneration to adequately maintain semi-natural woodlands. Nevertheless, Rackham (2003) considers deer browsing the chief threat to ancient woodland and states that “For the foreseeable future, ancient woods in England are more threatened by deer than by people”.

3.18 Some conservation problems may, in part, be exacerbated because of reluctance on the part of conservation managers to have deer culled until the perceived problem is so serious that they feel they have no option. This was mentioned as a factor by some of those consulted in compiling this review and experience and anecdotal evidence also suggest that it may sometimes be the case.

3.19 Monks Wood NNR is probably the best documented example of deer damage to conservation woodland and the steps taken to deal with it. This site is described by Rackham (2003) as a “muntjac slum”. Muntjac were considered to have caused unacceptable damage to coppice regrowth since the mid-1980s and Cooke (1995) described the measures taken to reduce this damage at the time. Electric fencing was used to protect newly cut coppice from 1988, and was fairly successful, but there was evidence of more widespread damage to tree regeneration and ground flora outside these protected areas. The level of culling which would have been needed to reduce damage to acceptable levels was described as impractical and none was carried out. Subsequently Cooke & Lakhani (1996) found that, although electric fences reduced damage to regrowth they sometimes failed to give adequate protection. It was also later concluded that widespread flora could not be protected using small enclosures and, in 1998, a cull was started (Cooke, 2002). About 100 deer were shot in 1998/9 and in 1999/2000. This reduced the mean numbers of deer seen in dusk counts from about 17 per hour in 1998 to about 6 per hour in subsequent years and the ground flora now appears to be making a slow recovery.

3.20 Thus there are problems caused by some deer species in habitats managed for conservation, in particular in semi-natural woodlands and coppice woodlands. However, this may not necessarily reflect inadequacy of current management techniques or limitations imposed by legislation. Current management approaches can be effective in resolving these problems, and have been shown to be so even in the most serious cases, if managers are willing to accept some culling and effective local deer management can be put in place.

3.21 **Conflicting aims in management:** Reluctance by some land managers to undertake culling is an example of one of the many different attitudes to deer management. Deer may be variously viewed as pests of forestry or agriculture, a game meat resource, a valuable sporting quarry, destructive of conservation interests or a valued part of our wild fauna, or an asset which many people simply enjoy seeing. These views may be held in varying degrees, with varying overlap, and to varying extremes. Because deer, particularly the larger species, are wide ranging, it is not uncommon for the attitude of one landowner, on whose land the deer may harbour, to be at odds with those of his neighbours, where the deer may feed.

3.22 Differences in attitude towards deer, their value and how they should be managed, present significant difficulties in achieving the type of co-operative deer management envisaged by the DI and others. Because of the sporting value of stalking, and the fact that areas for non-professional stalkers are not easy to come by, individual deer stalkers/managers may often be protective of their own interests and resistant to divulging cull/census data or to following a DMG agenda, which may not coincide with their own. These difficulties were highlighted in the problem areas on the fringes of Exmoor during the MAFF DMG trial where there was also the additional involvement of the Hunts and the League Against Cruel Sports (LACS). Attempts to establish DMGs in the two main areas where night shooting orders had been requested failed, largely because of failure to reach a consensus on how the deer should be managed (see above and Appendix 3). The establishment of a system of co-operative deer management in this area in the near future, if/when hunting is banned, is likely to prove to be difficult. The Exmoor National Park Authority itself may be the body best placed to have a significant chance of providing leadership in establishing a deer management strategy.

3.23 The BDS publication “Deer Control” (Fooks & Hotchkis, 1964) advocated co-operative deer management, along similar lines to that promoted by the DI, almost 40 years ago. One consultee suggested that it is the difficulty inherent in achieving co-operative management that has prevented more widespread establishment of DMGs over the last three decades. Thus, whilst the aim of co-operative deer management through a DMG is appropriate in many circumstances, it is likely that there will continue to be some situations where compromise and voluntary agreement cannot be achieved.

3.24 Disease: Deer are susceptible to, or may act as a reservoir for, a number of diseases and parasitic infections of potential economic or public health significance (Simpson, 2002). Trout *et al.* (1994) listed diseases and parasites carried by deer which may affect humans (i.e. zoonoses) or livestock (Table 4). Those which are most frequently raised as points of concern are bovine tuberculosis (TB) and foot and mouth disease (FMD), which affect domestic livestock (and potentially people, in the case of TB), and tick-borne Lyme disease, which can affect people. Transmissible spongiform encephalopathies (TSEs) have been recorded in some deer species overseas (e.g. Chronic Wasting Disease in North America; R. de la Rua, pers comm.) and a recent survey of the deer industry in the UK aimed to look at ways of monitoring for this type of disease here. However, to date, there have been no TSEs recorded in wild British deer (Munro, 2002).

3.25 TB The badger has been the wildlife species most implicated as a reservoir of TB in the UK since 1971, when the disease was first detected in this species in the Cotswolds Hills in Gloucestershire (Gallagher and Clifton-Hadley, 2000). Roe deer and red deer have been found to be infected with *Mycobacterium bovis* (the causative agent of bovine TB) in some other countries and in some cases have been thought to have re-infected cattle and possibly badgers (various refs. in Little *et al.*, 1982). Bovine TB was first recorded in farmed deer in GB in 1985, in red deer imported from Hungary (cited in Bodé, 1995), but may have been present in wild deer populations before then. However, in a small sample of roe, sika and fallow deer tested in a TB breakdown area in Dorset in the late 1970s none were found to be infected with *M. bovis* (Little *et al.*, 1982). In a review of TB in deer in Britain from the mid-1980s to the mid-1990s small numbers of cases were reported in wild sika (8 cases), fallow (1) and roe deer (9) (Bodé, 1995). Some of the TB cases recorded in red deer have been due to organisms of the *Mycobacterium avium* complex (the group of bacteria responsible for so-called “avian” TB) (Matthews *et al.* 1981 cited in Simpson, 2002), which is not a significant pathogen in livestock or people. In a sample of 236 roe deer examined in an infected area in South West England in the mid-1990s only one fawn (the animal which prompted the study) was found to have clinical disease and *M. bovis* was isolated only from this, and two other deer (1.28% of the sample). The infection rate in a sample of 56 badgers in the same area was 25% (Proud & Davis, 1998). Slightly higher infection rates have been reported in farmed and park deer in Ireland and in a high density white-tailed deer *Odocoileus virginianus* population in the USA (studies cited in Green, 1998).

Table 4: Diseases of deer potentially of significance to humans or livestock. From Adams & Dannatt (1989) cited in Trout *et al.* (1994).

Viruses	Bacterial diseases	Trematodes (flukes)	Cestodes (tapeworms)	Nematodes
Adenovirus A	Bovine TB	<i>Fasciola hepatica</i>	<i>Taenia hydatigena</i>	Lungworms <i>Dictyocaulus</i> spp.
Reovirus 1	Avian TB		<i>Cysticercus tenuicollis</i>	<i>Capillaria bovis</i>
Reovirus 2	Lyme disease		<i>Echinococcus granulosus</i>	<i>Trichostrongylus vitrinus</i>
Bovine viral diarrhoea (BVD)	Leptospirosis			<i>Cooperia</i> spp.
FMD	Brucellosis			<i>Oesophagostomum</i> spp.
Louping ill	Pasteurellosis			<i>Ostertagia</i> spp. <i>Nematodirus</i> spp.

3.26 TB was made a notifiable disease in deer by The Tuberculosis (Deer) Order 1989 (Statutory Instrument 1989 No. 878). This requires that clinical signs and suspect lesions of TB found in any live deer or their carcasses must be immediately notified to the local Divisional Veterinary Manager (DVM) of the State Veterinary Service (SVS). Bacteriologically confirmed cases of bovine TB in

wild and farmed deer have been recorded since 1990 in the annual reports of the Chief Veterinary Officer (MAFF/Defra 1990-2002). The SVS does not currently carry out pro-active surveillance of TB in deer but receives around 70 statutory submissions for examination each year. The majority of these are farmed red deer but around 20 each year may be from wild deer (R. de la Rua pers comm.). In 2002 12 out of 30 red deer submissions tested positive for *M. bovis* by bacteriological culture, two of which were wild deer (R. de la Rua data published in the Report of the Chief Veterinary Officer 2002). Twenty four submissions of other deer species were examined. Of these, one fallow deer sample was found to be positive (R. de la Rua unpublished data). In most years from one to five wild deer are found positive for TB. This compares with an estimated annual combined cull of red, fallow, roe, sika and muntjac, in England alone, of 70,000 to over 100,000 (see 2.28).

3.27 Results from an ongoing CSL/VLA study of TB in wildlife in SW England, due to be completed later this year, have found TB in all UK deer species except Chinese water deer (R. de la Rua pers comm.). Recent submissions have also found bovine TB in roe deer in Wiltshire and farmed red deer in Cumbria (A. Barlow pers comm.). It has been suggested that published figures underestimate incidence of TB in wild deer and one consultee quoted the results of a cull in Herefordshire where 12% of the deer were allegedly found to have TB. However, there were no deer submissions from Herefordshire in 2002 or 2001 and only one positive submission in 2000 (R. de la Rua pers comm.). There has also been recent concern that there may be a higher risk of TB where deer concentrate in sanctuary areas. Self-sustaining TB infection in white-tailed deer in Michigan, USA, is thought to be due to the concentration of deer at artificial feeding sites (Schmitt *et al.*, 2002). As a result, the feeding and baiting of deer in the infected counties has been banned since 1998. Currently available data for the UK suggests that badgers are probably still the only significant self-maintaining wildlife reservoir of bovine TB (Delahay *et al.*, 2002). However, it is possible that the disease is under-recorded in deer, particularly in areas where the disease is endemic in cattle and badgers, and the potential for deer to act as a reservoir of the disease needs to be kept under review.

3.28 **FMD** Deer have been implicated as significant vectors of FMD in a number of countries. For example white-tailed deer in California, in the 1920s (cited in Thrusfield & Fletcher, 2002), reindeer *Rangifer tarandus* in Russia (cited in Forman & Gibbs, 1974) and moose *Alces alces* and roe deer, as well as saiga antelope *Saiga tatarica*, also in Russia (Froelich, 2000). The latter three species are said to be the main hosts of FMD in the Russian Federation, whilst reindeer are also reported to be subject to frequent outbreaks of the disease. In the case of white-tailed deer in California, an attempt was made to eradicate the deer population in an area of about 1000 square miles. Over a period of about 12 months, more than 22,000 deer were killed, of which 2,279 showed lesions (Thrusfield & Fletcher, 2002). However, a recently discovered adenovirus has been recovered from archived material from previous epidemics in Californian deer and it is quite possible that the deer slaughtered in the 1920s did not actually have FMD at all (Woods *et al.*, 1995, cited in Thrusfield & Fletcher, 2002).

3.29 Concern was raised about the possible involvement of deer in the 2001 FMD outbreak. Current knowledge about FMD in deer and other wildlife in Britain is mainly based on the results of research carried out in the late 1960s/early 1970s, following the outbreak in 1967-8. In a series of experiments with deer it was shown that red, fallow, roe, muntjac and sika were all susceptible to FMD. The disease was mild or sub-clinical in the larger deer but severe in roe and muntjac. Six of the nine muntjac in trials died as a result of the disease and one roe died as a result of secondary bacterial infection (Forman & Gibbs, 1974; Gibbs, Herniman & Lawman, 1975a). Animals from which virus can be isolated from oropharyngeal samples more than 28 days after infection are considered potential carrier animals (Moonen & Schriver, 2000). The levels of virus excreted by all five species were high enough to potentially cause infection in cattle, but only in fallow and sika did the virus persist long enough for the animals to be considered as carriers (Forman *et al.*, 1974;

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Gibbs *et al*, 1975a). The authors concluded that “the natural behaviour of free-living deer in the United Kingdom suggests that they are unlikely to be an important factor in the maintenance and transmission of virus during an epidemic of (FMD) virus in domestic livestock”. The same research team examined samples from 190 wild deer collected between 1961 and 1973 for the presence of antibodies to a range of livestock diseases and no FMD was detected (Lawman *et al*, 1978). It should be noted that, although deer in the above experiments were infected through “direct” (housed with infected stock) or even “indirect contact” (housed in a loose box which had contained infected pigs shortly beforehand), as well as by inoculation, the proximity to infected stock used to induce infection in no way paralleled that which is likely to occur in a natural situation.

3.30 During the 2001 outbreak, about 107 diagnostic samples (shot animals and RTAs) and over 400 sera samples (mainly farmed deer from Northumberland) were tested and all were negative for both virus and antibody (T. Garland pers comm.). The Veterinary Risk Assessment published by the SVS in June 2001 recommended that no action should be taken against deer but that livestock normally confined to fields should be housed to reduce the risk of contact with deer (Veterinary Risk Assessment No. 5, 2001). However, in the event that disease is confirmed in wildlife, Annex XVIII of the new Foot & Mouth Disease Control Directive (2003/85/EC) requires Member States to draw up plans, to be approved by the Commission, for the eradication of the disease in wildlife. Measures must be taken, among other things, to establish the extent of infection, prevent the spread of disease and reduce the population of wild susceptible animals in the infected area (F. Landeg pers comm.).

3.31 **Lyme disease** Deer can often be heavily infested with the sheep tick *Ixodes ricinus*, the vector for Lyme disease and tick borne fever (Walker *et al.*, 2002). Tick borne fever, caused by the bacterium *Ehrlichia phagocytophila*, is primarily a disease of sheep but humans are occasionally affected. Lyme disease, caused by the spirochaete *Borrelia burgdorferi* is, however, one of the most important tick-transmitted zoonoses (Simpson, 2002). Lyme disease initially causes flu-like symptoms in humans and can be serious if left untreated. The incidence of Lyme disease currently appears to be localised in areas such as Devon and the New Forest, but this could change with increasing deer range and numbers.

3.32 Previously it was thought that deer provided an effective reservoir for the Lyme disease organism but this is now not considered to be the case and pheasants or small mammals are believed to be main hosts (Kurtenbach *et al.*, cited in Simpson, 2002). Deer can, however, be important in maintaining the adult ticks (Hoodless *et al.*, 1998). Counts of ticks on deer from a number of areas have suggested that they may be the major host for all growth stages of ticks in woodland habitats (Walker *et al.*, 2002).

3.33 There does not appear to be an effective vaccine available to protect against Lyme disease. The best protection still appears to be preventative physical or chemical protection against ticks, such as tucking trousers in socks, wearing long sleeves and using insect repellent.

3.34 **Population size and cull numbers:** Some consultees suggested that the size of the national deer population not being known was, in itself, a problem. However, when asked why this was important it was then suggested that it was trend in numbers which is important, not absolute numbers. Approximate estimates of national populations exist (e.g. Harris *et al.*, 1995) but most authorities agree that obtaining accurate counts of even local deer populations is extremely difficult. Numbers, and particularly trends, are important in determining management priorities for local deer populations. Estimates of national population size may be of interest but are unlikely to be of much value in management.

3.35 Cull figures are recorded in Scotland by the DCS. This enables the amount of venison entering the human food chain to be estimated. No such system exists for England and Wales and

several consultees considered this a matter of concern. Estimates of the size of the annual deer cull in England are discussed at 2.28 above. In view of the sensitivity of matters relating to the human food supply the lack of more reliable information on this may be seen as a problem. Improved traceability of venison, which again a number of consultees favoured, could also help with prevention of poaching. Reliable cull figures would give an approximate 'index' of population size, which would allow population trends to be monitored, thus fulfilling some of the functions of a population census.

3.36 Road traffic accidents: RTAs were cited as an increasing problem by most of the general consultees. RTAs involving deer and other ungulates have increased in a number of European countries in recent years (Groot Bruinderink & Hazebroek, 1996). It has been estimated that in continental Europe as a whole nearly 300 people are killed each year, and 30,000 injured, in collisions with hoofed game (Staines, Langbein & Putman, 2001). Data on wildlife related RTAs are not recorded in the UK but a survey of deer RTAs has recently been launched by the DI with the sponsorship of the Highways Agency, The National Forest, the Woodland Trust and the Deer Study and Resource Centre. SGS Environment (cited in Staines *et al.*, 2001) estimated that there may be between 20-42,000 deer-related accidents each year. Staines *et al.* (2001) suggested that between 2% and 5% of these would be expected to result in human injury or death. RTAs caused by deer may cause damage costing around £10.5 million per year in England alone and may result in around 14-15 human fatalities in the UK as a whole (Wilson, 2003b). Particular factors reported by consultees as exacerbating the RTA problem were general increase in deer numbers and, specifically, increases in urban/suburban areas. Increase in RTAs involving wildlife in France has been shown to coincide with an increase in ungulate numbers and distribution (Mouron *et al.*, 1998) but data from elsewhere in Europe does not show a clear relationship between animal numbers or traffic volume and accident rate (Groot Bruinderink & Hazebroek, 1996). Disturbance caused by recreational use of the countryside was suggested as a factor in increasing RTAs by one consultee, who reported that RTAs virtually ceased in his local area during the FMD outbreak and re-started again when the countryside was opened up again to recreational use. Another consultee advised that in the Cannock Chase area the number of RTAs occurring today (around 120-130 per year) is not significantly greater than in the mid-1970s.

3.37 Current efforts to reduce deer RTAs employ methods such as fencing, roadside reflectors, warning signs and management of roadside vegetation (Staines *et al.*, 2001). Fencing can be effective in preventing deer crossing at accident 'black spots' but is best used in conjunction with, and effectively to channel animals to, appropriate wildlife crossings (Groot Bruinderink & Hazebroek, 1996; Staines *et al.*, 2001). In parts of Europe and North America crossings, such as under-passes and over-passes, have been used successfully to reduce wildlife/vehicle collisions (Groot Bruinderink & Hazebroek, 1996; Müller, 1998; Robbins, 2003; Van Wieren & Worm, 2003). However, these are expensive to construct on existing roads; Lehnert & Bissonette (1997, cited in Staines *et al.*, 2001) estimated the cost of installing an underpass on an existing road as US\$92k (2-lane) to US\$173k (4-lane). Consequently they are best considered at the planning stage where major road building works cut through high deer density areas. The same authors described the cheaper, but still reasonably effective alternative of 'cross walks', where the animals are channelled to where it is 'safe' to cross on the road surface, for example because of good visibility or low traffic speeds. They estimated the cost of these as US\$15k (2-lane) to US\$28k (4-lane).

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3.38 Cheaper still is the installation of roadside reflectors (£13.30 each, including materials and installation; Hodge & Pepper, 1998). These may be simple polished metal 'flash' reflectors or colored reflectors designed to create a continuous 'barrier' of white, red, or blue-green light (Staines *et al.*, 2001). In either case they reflect light from car headlights, at right angles, back towards any deer which may be approaching the road. It follows that they only operate when a vehicle is approaching (i.e. when they are needed) and when it is dark and vehicles have their headlights on. The latter point means that they may not operate fully at dawn and dusk when many accidents occur (Staines *et al.*, 2001). There is little evidence of the effectiveness of reflectors in reducing RTAs and most studies are inconclusive (Groot Bruinderink & Hazebroek, 1996; Hodge & Pepper, 1998; Staines *et al.*, 2001), suggest that the deer readily habituate to their presence (Ujvári, Baagøe & Madsen, 1998), or that they are ineffective (Waring, Griffis & Vaughn, 1991). The way in which they operate, and the risk of habituation, suggests that they are more likely to be effective on roads with low traffic volume than on roads with frequent traffic.

3.39 Other potential mitigation measures include ultrasonic warning whistles attached to vehicles and the use of scent 'barriers' along roadsides. However neither of these methods have been adequately demonstrated to be effective (Staines *et al.*, 2001) and in a study of ultrasonic whistles the authors were not even sure if the deer could hear the sound generated (Romin & Dalton, 1992 cited in Groot Bruinderink & Hazebroek, 1996).

3.40 Management of roadside vegetation to reduce cover and attractiveness for deer may be one of the most promising methods for reducing deer RTAs (Madsen, Strandgaard & Prang, 2002). At present, some roadside planting policy may even increase RTA risk (Staines *et al.*, 2001) and this is a factor which should certainly be taken into account at accident 'black spots'. The pattern of cropping in roadside fields may also influence the accident rate (Madsen *et al.*, 2002). Forest design, including the establishment of refuge areas and careful positioning of footpaths, and other public access which may result in disturbance to the deer, may help prevent RTAs, for example in the new Community Forests. The use of vegetation management, together with appropriate road signs may be one of the most pragmatic measures that can be taken and merits further investigation. In addition, to avoid *driver* habituation to signs the use of electronic signs displaying accident tallies, or even triggered by the approach of the deer themselves, may be cost effective at particular problem sites.

3.41 A significant concern of those currently involved in dealing with deer injured in RTAs are the restrictions placed by the 1991 Act on the firearms that may be used and the legality of firearms use at the roadside. The Act prohibits all rifles less than .240 inch calibre and 1700 footpounds muzzle energy, with no exception for humane despatch. Thus commonly held and suitable weapons, in particular the .22 rimfire rifle, cannot be used. These weapons are probably quite widely used for this purpose in ignorance of the legislation. In addition, one consultee suggested that some Police firearms sections deal with RTAs using 'standard issue' firearms and that this may be in breach of the 1991 Act. Section 6(4) does, however, allow the use of any smooth bore gun (i.e. shotgun) for killing an injured deer as an act of mercy.

3.42 Concern about the ownership of public roads and verges, and thus who can authorise the person shooting the injured deer, have also been expressed. In addition, the Game Acts (Game Act 1831; Game Licences Act 1860) require that persons taking or killing game must hold a current game licence. Although deer are not classed as game a game licence is, nevertheless, required if they are killed or taken, other than in enclosed land by the owner/occupier or authorised persons. The shooting of deer on most farmland would therefore not require a game licence but, assuming the highway and verge are not classed as enclosed land, a game licence may be required here.

Legislation Issues:

3.43 A number of perceived problems were identified in the legislation. These concerned the types of firearms permitted for killing free-living deer and RTA deer, suggested changes to close seasons and exceptions for close season shooting for purposes other than those currently listed in the 1991 Act.

3.44 **Permitted firearms:** Schedule 2 of the Deer Act 1991 limits rifles which can be used to cull any species of deer in England and Wales to those with a minimum calibre of .240 inches and muzzle energy of 2,305 joules (1,700 foot pounds). Under the Deer (Scotland) Act 1996 (Section 21) the Secretary of State has power to make an order specifying the classes of firearms which can be used in that country. The Deer (Firearms etc)(Scotland) Order 1985 still stands and specifies the following **minimum** calibres etc.

Deer species	Bullet weight	Muzzle velocity	Muzzle energy
Roe deer only	50 grains	2450 feet/second	1000 foot pounds
Red, sika (and red/sika hybrids) and fallow deer	100 grains	2450 feet/second	1750 foot pounds

This allows .22 centre fire rifles such as .222 Remington and .22-250, which would be illegal for deer in England and Wales, to be used for roe deer in Scotland. The inconsistency between permitted firearms north and south of the border is seen by many as illogical and unnecessary.

3.45 Most of the consultees with stalking experience favoured the addition of .22 centre fire rifles for the smaller species of deer, in line with Scottish legislation (**NB:** these calibres are distinct from the .22 *rim* fire rifle, which is much less powerful and most commonly used for rabbit control). Arguments in favour included flatter trajectory (therefore greater accuracy at varying ranges), quieter report, so less disturbing to neighbours etc, and milder recoil. The latter factor reduces the risk of the shooter becoming 'gun shy'; an unconscious wariness of the heavy recoil of the larger calibres which can reduce shooting accuracy. All agreed that these calibres are perfectly adequate for roe and muntjac deer. Two stalking consultees, on balance, favoured the status quo, although apparently the BDS is putting a case forward for the possible review of use of .22 centre fire rifles in England and Wales. An argument that has been made against the use of .22 centre fire rifles has been that stalkers using a .22 for roe or muntjac might be tempted to shoot at one of the larger species of deer if the opportunity presented itself. However, the same argument would be just as valid for those currently using .22 rifles for fox control. Furthermore, there is no evidence that such behaviour has been a particular problem in Scotland.

3.46 Potential benefits of the smaller calibres would be for use in culling the smaller deer species, especially muntjac (and Chinese water deer). The main increase in muntjac numbers has largely taken place subsequent to the original establishment of the current firearms provisions in the Deer Act 1963. The existing requirement to use the same calibres for a 9-18kg muntjac as may be used for a 150kg red deer, simply because they are both 'deer', is illogical. Such 'over kill' might not be considered a problem but for the (perhaps) greater safety concerns and potential disturbance caused by the larger calibres. Currently, in England and Wales, the .22 centre fire rifles are most commonly used for foxes, which typically weigh from 6-10kg.

3.47 Where the small deer species occur in urban/suburban areas there may be some advantages to the use of the smaller calibres. Because of the high velocity of these calibres the potential lethal range is no less than for the larger calibres. However the higher velocity and lighter bullet weight make them more prone to shatter on impact. Thus a bullet is less likely to pass right through a deer and, if the target is missed, is more likely to break up on hitting another obstacle such as a twig/fence etc. However, in some circumstances, this could pose an additional hazard as the direction of flight of pieces of the shattered bullet would be unpredictable. The safety arguments

are not clear cut and two consultees felt that the smaller calibres would be no more safe in such circumstances than those currently permitted.

3.48 The quieter report of the smaller calibres may be a significant advantage in urban/suburban situations. Because of the conflicting attitudes to deer management it is often best to conduct such operations as discreetly as possible. The very loud report of the larger calibre rifles make this particularly difficult.

3.49 **Humane dispatch:** Currently the only firearms allowed for the humane destruction of injured deer, for example at the scene of an RTA, are the normal permitted rifle calibres or “any smooth-bore gun” (Section 6(4) of the 1991 Act). A number of consultees felt that it was an anomaly that .22 rifles were not permitted in these circumstances, particularly .22 *rim* fire rifles which would be adequate for humane destruction at close range.

3.50 The BDS and BASC jointly produce an advice note on dealing with deer RTAs (BDS/BASC, 2001). In such circumstances the Police may deal with an injured deer themselves but it is often the case that this is done on a voluntary call-out arrangement with a local deer manager/stalker. Individuals are unlikely to have specialist equipment to deal with these but in many cases the use of a ‘full bore’ deer rifle would be inappropriate. The .22 rimfire is sometimes claimed to be the most appropriate weapon in such cases but only one consultee considered this (albeit strongly!) to be the case. Another consultee expressed concern about the vulnerability of the .22 rimfire to ricochet in such circumstances. Further consultation on this specific topic would be necessary before a firm recommendation could be made.

3.51 **Shooting in the close season:** The defence provided in Section 7 of the 1991 Act for shooting deer during the close season, to prevent damage to crops, vegetables, fruit, growing timber or any other form of property, excludes some problems where such action might be considered necessary. Whilst the interpretation of “any other form of property” could be wide, and could perhaps include damage to vehicles on a private vehicle testing track, issues of public health and safety are not explicitly covered. This omission has been highlighted in a small number of cases where deer have encroached onto airport runways. In Scotland, under Section 5(6) of the Deer (Scotland) Act 1996, the Deer Commission for Scotland may authorise an owner or occupier, or someone nominated by them, to take or kill deer and to sell, or otherwise dispose of the carcasses, during the close season, where they are satisfied that it is necessary, amongst other reasons, “in the interests of public safety” and no other reasonable means of control would be adequate. Defra is aware of the lack of equivalent provisions in the legislation covering England and Wales and is currently examining options for resolving this issue. It should be noted that the licensing powers currently afforded in Section 8 to the Statutory Nature Conservation agency to remove deer from one area to another appear not to be restricted in terms of time or purpose.

3.52 **Close Seasons:** The widespread perception of increasing deer numbers and range and associated increasing problems has led to the view that, in many cases, insufficient deer are being culled to maintain populations at acceptable levels (e.g. Putman, 2003). The most common concern is that the current close seasons are too long to allow sufficient female deer to be culled each year to stabilise or reduce populations. This has been reported to be a particular concern with fallow deer (Trout *et al.*, 1994).

3.53 The close season for female deer in England (red, fallow, roe & sika; there are no close seasons for muntjac or Chinese water deer) is from March to October inclusive. This allows culling for only four months through the autumn/winter from November to February (compared to males which may be culled August to April inc. [red, fallow & sika] and April to October inc. [roe]). The female cull, which is the most critical to population control, is therefore limited to a short season at the time of year when days are shortest. There are also significant differences between close

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seasons north and south of the Scottish border (see below). The greatest differences are in the close seasons for red and sika stags (there are no close seasons for red/sika hybrids in England). In England close seasons for male deer broadly correspond only to the period of antler re-growth. In Scotland the red/sika stag close season also allows for the period following the rut when the male deer are exhausted and in poor condition. Although this means the close season starts *six months later* in England and Wales, this may be justified because of the more favourable feeding and climatic conditions in the south. Nevertheless there may be some justification for re-examining the basis for these differences.

Comparison of Statutory Close Seasons (all dates inclusive)			
Species	Sex	England & Wales	Scotland
Red	Stags	1 May – 31 July	21 October – 30 June
	Hinds	1 March – 31 October	16 February – 20 October
Fallow	Bucks	1 May – 31 July	1 May – 31 July
	Does	1 March – 31 October	16 February – 20 October
Roe	Bucks	1 November – 31 March	21 October – 31 March
	Does	1 March – 31 October	1 April – 20 October
Sika	Stags	1 May – 31 July	21 October – 30 June
	Hinds	1 March – 31 October	16 February – 20 October
Red/Sika hybrids	Stags	none	21 October – 30 June
	Hinds		16 February – 20 October

3.54 The female close seasons exist primarily to protect the does/hinds whilst they are heavily pregnant or have dependent young and there is less difference in seasons north and south of the border. There is limited scope for extending the shooting season (i.e. shortening the close season) in England & Wales without compromising welfare standards. Views also differ as to which end of the season should be changed. On the one hand starting the shooting season earlier (e.g. mid October), as suggested by some, would avoid more heavily pregnant animals being shot late in the season. However, it might lead to more young animals being orphaned before they are fully independent. There was no clear consensus amongst consultees on this issue. Some suggested that difficulty in meeting doe cull targets was a result of pheasant shooting interests taking priority over deer management in the winter months. However, since there do not appear to be welfare concerns in Scotland, where the close season ends on 20 October, there may be scope to bring the end of the English close season forward to this date also.

3.55 The lack of close seasons for muntjac, Chinese water deer and red/sika hybrids was not raised as an issue by consultees but this is also a welfare concern, especially with respect to the breeding cycle of the females. However, muntjac are non-seasonal breeders. Individual does usually give birth at about seven month intervals and young may be produced at any time of year. Consequently there is no scope for the introduction of a close season for muntjac does to address this concern. Chinese water deer do appear to breed seasonally (Corbet & Harris, 1991). The rut takes place in November/December and the young are born in May to July and remain with the doe until the autumn. The same close season as for females of the other species would therefore also span the period of late pregnancy and dependence of the young in this species. However, because the bucks lack antlers, distinguishing between the sexes is more difficult than for the other species. It may therefore be necessary to have the same close season for bucks and does. Since red/sika hybridisation has been reported in England (Ratcliffe, 1987) it appears that close seasons for red/sika hybrids would also be appropriate here, as in Scotland, for welfare reasons and to avoid dispute over the status of deer taken during the existing close seasons of the parent species. However, as the welfare issues apply only to the hinds, there is an argument for providing a close season for hinds only and, indeed, removing the close season for sika stags. This could help to prevent further expansion of the non-native sika and their hybrids by allowing dispersing stags, often the first to appear in a new area (Ratcliffe, 1987), to be culled at any time of year.

3.56 In as much as the relatively low cull which may be achieved in the doe/hind season results in a bias towards bucks/stags in the cull, the sex ratio in the cull may be viewed as inappropriate. One consultee suggested that, perhaps, the males' close seasons in England and Wales needed to be extended in order to push the cull closer to a 1:1 ratio. This, however, would not help achieve a higher female cull and would not help limit numbers.

Stalker Training:

3.57 Formal training in deer management has become increasingly established over the last 10 to 15 years. This began with schemes such as the BDS Woodland Stalkers Certificate and the BDS/BASC National Stalkers Competence Certificate and Advanced Stalkers Certificate. The Woodland and National Stalkers Competence Certificates have now been replaced by the Deer Stalking Certificate (DSC), which is awarded at two levels, whilst the BDS continues to offer an advanced level award known as the Deer Management Diploma. The awarding body for the DSC is now Wild Deer Management Qualifications, a non-profit making organisation trading as Deer Management Qualifications Ltd (DMQ). It is a consortium of interested bodies and is responsible for:

- Monitoring existing, and developing new standards
- Accreditation of Assessment Centres, Assessors and Internal Verifiers
- Accreditation and appointment of External Verifiers
- Quality assurance of the award through verification systems reporting to a Quality Assurance Group
- Maintaining and distributing a database of Accredited Witnesses
- Administering the award and awarding certificates

3.58 Training is provided by BDS, BASC, some agricultural colleges and others. Andrew Hoon, Chairman of the DI, is also Chairman of DMQ. BDS, BASC, the DI and others form the co-ordinating body which develops standards for the training. Whilst the qualifications are not themselves NVQs the evidence collected for the awards is recognised as valid for the deer elements of the Gamekeeping NVQ (A. Hoon pers comm.). They are currently awarded at DSC Level 1 and Level 2 and a further level of training is under consideration dealing in more detail with management issues rather than the practicalities of stalking.

3.59 Hunter training is compulsory in a number of European countries, e.g. Sweden, Finland, Belgium, Germany, France and Portugal (Scull, 2001). It is not BDS or BASC policy to promote compulsory training in this country although they have been heavily involved in voluntary training for many years. A number of consultees considered that 'compulsory' training would evolve by default for those carrying out deer management on behalf of others because of insurance and employer's liability requirements. Some considered training the preferred option and the National Trust require their own stalkers to have been formally trained to a recognised level such as those listed in section 3.58 or their equivalent. DMQ are lobbying to have DSC Level 2 recognised as meeting the requirements for potential food hygiene regulations (see below).

3.60 **Potential European requirements:** Current EU law on production of wild game meat is set out in EU directive 92/45/EEC. The British regulation implementing this directive is the Wild Game Meat (Hygiene and Inspection) Regulations 1995 (S.I. 1995 No. 2148). This only applies to wild game meat which is being **sold to other Member States and** wild game meat which is intended for **meat products**. The definition of 'wild game' includes all wild land mammals which are hunted, including wild mammals living within an enclosed area under conditions of freedom similar to those enjoyed by wild game. The production of wild game meat for the **domestic market** and export to third countries, is governed by the Food Safety (General Food Hygiene) Regulations 1995 (S.I. 1995 No. 1963). These provide for supervision of wild game meat production by the environmental health department of the relevant local authority and impose a general requirement that the meat is

fit for human consumption, rather than detailed specifications on buildings, equipment and procedures or official inspection of each carcass. The Wild Game Meat Regulations 1995 do specify detailed requirements for buildings, equipment and procedures and require post mortem health checks by the Meat Hygiene Service. At present, producers supplying for third country export or the domestic market may choose to produce to the more demanding standards of the Wild Game Meat (Hygiene) Regulations if they wish, thus enabling the meat to be 'health marked'.

3.61 Further pressure for stalkers to obtain a recognised level of training may come from a proposal submitted by the European Commission in July 2000 (Proposal for a Regulation of the European Parliament and of the Council laying down specific hygiene rules for food of animal origin: 2000/C 365 E/03) which includes provisions for ensuring the satisfactory condition of wild game meat being placed on the market for human consumption. Chapter I of the proposal states that "Persons responsible for hunting wild game and for placing it on the market for human consumption must have sufficient knowledge of wild game hygiene and pathology in order to undertake an initial examination of wild game on the spot". It further states that:

"For that purpose, Member States shall organise training and education schemes for hunters, game managers, game keepers, etc..."

3.62 Chapter II of the proposal, dealing with handling of the game after it has been killed, requires that the animal "must be examined by the hunter, a qualified person as referred to in Chapter I point 2 or where appropriate a veterinarian as soon as possible after killing...". If the carcass is not then "accompanied by a certificate from a qualified hunter" the viscera must accompany the carcass to enable inspection of the viscera together with the rest of the carcass at the "game handling establishment".

3.63 If these or equivalent proposals were to be implemented they would have the double effect of (a) requiring that any stalker regularly supplying venison commercially to a game dealer would have to be 'qualified', since if he were not competent to examine the carcass himself the game dealer would have to incur the cost of this so the price paid to the stalker would, presumably, be greatly reduced, and (b) the attachment of a 'certificate' to the carcass would effectively introduce carcass tagging. This would potentially provide a basis for a scheme to record the supply of venison (at least that supplied commercially) to the human food chain.

3.64 The requirement for Member States to organise training might also imply a need for more direct statutory involvement in training schemes than is the case with the voluntary schemes at present.

3.65 The targeting of requirements for qualifications in this way would allow training to continue to be on a voluntary footing but place strong pressure on those supplying significant amounts of venison to the food chain to obtain appropriate training. Stalkers culling small numbers of deer recreationally, e.g. as fee paying guests (where the venison would normally be retained for sale by the Estate in any case), or for their own consumption, would remain free to take training on a purely voluntary basis.

PART 4: DISCUSSION & PROPOSALS

4.1 The main conclusions from this review are set out below, particularly in relation to the main problem issues identified. Suggested proposals following from these are given after the relevant paragraph(s) in bold. Where the same or similar proposals are appropriate to more than one section (e.g. provision of advice on deer management) they are repeated after each section.

Deer Numbers and Trends:

4.2 Evidence suggests that most deer species in England are increasing in numbers and extending their range. However, knowledge of deer numbers is sketchy and extrapolation from early, probably inaccurate, estimates of population sizes are likely to exaggerate trends. For example Trout *et al.* (1994), extrapolating from estimated growth rates in the late 1980s/early 1990s, estimated that the red deer population on Exmoor would exceed 9,000 by the turn of the century. Current (2003) estimates of numbers on Exmoor vary but the current population is probably nearer half that size (J. Langbein pers comm.). Numbers of the larger species will probably increase but they tend to be discreetly distributed and should be containable by means of co-operative deer management. The situation over most of England cannot be compared with the Highlands of Scotland where deer can establish themselves in extensive and relatively inaccessible areas where management then becomes difficult. In addition, some of the apparent past extension of range of red deer, for example, appears to have been associated with new farm escapes.

- ***Advice on co-operative deer management should be available to assist those needing to manage the large, wide-ranging, deer species.***

4.3 The main concern with the larger species may be the possible extension of range and increase in sika deer, a non-native. This species should be contained, as far as possible, within its current range. However, 'base line' information on the current range of this species is inadequate. Although the BDS and other distribution maps are useful, there are, for example, some small peripheral populations, the existence of which seems to be in doubt. It could be prudent to encourage the eradication of any such small localised populations but their status first needs to be confirmed.

- ***The current regional distribution and status of sika deer should be confirmed.***

4.4 The increases in the smaller species, which are less dependent on extensive woodland or other semi-natural habitats, are likely to present greater problems. In the case of roe deer there is no reason to believe that available management methods, if properly applied, cannot cope with new populations in recently colonised rural parts of the country. However, the continued expansion of muntjac range and encroachment by both muntjac and roe into suburban areas is likely to cause significant problems in the future.

- ***A national system for providing objective, authoritative advice on deer management should be available, especially to assist those confronting new management problems – i.e. new species in new areas.***
- ***Consideration should be given to reviewing the options available for management of the smaller deer species – see Legal issues below.***

4.5 The potential future status of Chinese water deer should not be taken for granted. Although there currently appear to be ecological reasons, such as habitat preferences, which may limit the potential spread of this species this should not be taken as reason for complacency.

- ***Consideration should be given to adding Chinese water deer to Schedule 9 of the Wildlife & Countryside Act 1981.***

Deer Management & Deer Management Groups:

4.6 Culling by rifle is the preferred and most humane method of killing deer where this is necessary. Available data on wounding rates suggest that this is at an acceptable level, given the inherent difficulties involved in culling any free-living wild species, and that it should also improve as more and more stalkers undertake voluntary training.

- ***The voluntary training of stalkers should be encouraged to improve humaneness standards in deer management.***

4.7 The range of attitudes to and interests in deer are likely to continue to make the establishment of Deer Management Groups difficult – in some cases, very difficult. Co-operative management through a DMG may not always be necessary for the smaller territorial species where an individual management unit is reasonably large or informal co-operation can be achieved between key neighbours. Conversely, in some areas, for example Exmoor, where opposing views on deer issues may be particularly strong, successful co-operative management may be dependent on leadership which can hold the trust of people and organisations from the full spectrum of opinion.

- ***Effort in establishing and maintaining Deer Management Groups should be concentrated on problem areas with the larger wide-ranging deer species.***

Government Sponsored Sources of Advice:

4.8 The roles of the different government funded bodies providing advice need to be clarified. The Forestry Commission currently carries out research, produces advisory literature and provides advice through Forest Research and, informally, through Forest Enterprise; the Deer Initiative helps set standards, provides technical advice within the constraints of its limited resources, aims to help facilitate DMGs and has started to produce its own advisory literature; the RDS National Wildlife Management Team provides 'first stop' advice to enquirers and detailed advice for Defra on statutory complaints, and has recently started drafting an advisory leaflet specifically on urban/suburban issues. Clearer definition of objectives would allow more efficient use of the resources available.

4.9 The Forestry Commission is about to undertake a review of the performance and funding of the DI. The current DI's aims are to help establish a national network of DMGs, to provide advice and information on deer management, to promote best practice through training and qualifications, and to raise public awareness of deer and deer management issues. The DI does not currently have statutory powers, unlike the DCS, but its 'independence' is seen as one of its strengths and best maintained by being separate from the statutory enforcement agencies (this view was expressed by some of the consultees and at the 'Future for the Deer Initiative in England' workshop in February 2003).

4.10 The Chief Executive has suggested that the DI needs about double its present staff to achieve its objectives. However, the aim of a *national network* of DMGs is probably unnecessary and over-ambitious and the production of advisory literature, such as their Advice Notes, risks overlapping with those produced by the Forestry Commission.

4.11 The future options for the DI will be explored more fully in the Forestry Commission's review. However, on the basis of the information gathered in the present review the following more general proposals are suggested.

- ***There is a need for a body to advise on and to help establish local DMGs in problem areas where co-operative management is needed – the aim of a network of DMGs across the whole country is unnecessary and over-ambitious.***
- ***The advice and guidance on deer issues provided by such a body should be fully integrated with that of the Forestry Commission and Defra RDS to avoid overlap and duplication in production of written and other advisory materials.***

4.12 The RDS National Wildlife Management Team has technical Wildlife Management Advisers, based throughout the Country, with a wide range of expertise in wildlife management issues. Deer currently make up a relatively minor part of the Team's work and involve dealing with telephone enquiries and a small number of cases concerning requests for authority to shoot deer at night. The Team is well-placed to provide advice on general deer enquiries but some training would be required to ensure that an appropriate level of expertise is available across the Country.

- ***The RDS National Wildlife Management Team should ensure that Wildlife Advisers are adequately trained and have access to appropriate advisory materials in order to provide 'first stop' advice on deer enquiries across the Country.***
- ***The National Wildlife Management Team should continue to advise Defra on statutory complaints about deer damage and requests for notices concerning deer control under the Agriculture Act 1947.***

Agricultural Damage:

4.13 Agricultural damage was not raised by any of the consultees as a major concern. Although much has been written and a great deal said about deer damage to agriculture there is little objective information to show that it is a significant problem. Anecdotal evidence of the larger deer species, particularly fallow and red deer, causing significant damage to ripening cereals by lying out in the crop does exist and localised damage to root crops can also be serious. However, the little data available on the impact of grazing on cereals suggests that this is seldom a serious problem and losses to pasture or silage grass are only likely to be significant in particular problem areas where the larger herding species are involved. Preliminary results of a Defra sponsored study of deer damage in south west England support this general view (Langbein & Rutter, 2003).

4.14 Deer can and do cause some localised losses to agriculture but there is no evidence of a rising tide of serious deer damage problems. Current management and control methods appear adequate to deal with most problems that may arise. Especially with the larger wide-ranging species the establishment of DMGs may be necessary/desirable in some cases. Even so, limited close season shooting is likely to continue to be undertaken because of the co-incidence of the close season and the ripening of cereal and other crops. Current legal provisions allow for this. In a small number of cases there may be legitimate cause for individuals to seek a night shooting notice.

- ***A national system for providing objective, authoritative advice on deer management should be available.***
- ***Specialist advice and assistance should be available to help establish and maintain local DMGs in problem areas where co-operative management is needed.***
- ***The 'farmers defence' for close season shooting and Defra powers to serve notices for night shooting in especially difficult cases should be retained.***

Urban/suburban Deer:

4.15 This was raised as an issue by most of the consultees and is likely to become an increasing problem in the future. It is also likely to be exacerbated by lack of understanding by the general public of wildlife management issues generally and the justification for culling in some circumstances. These problems will usually involve the smaller species of deer; roe and particularly muntjac.

4.16 Culling in urban/suburban situations raises problems of safety as well as likely opposition from members of the public. Nevertheless, despite potential safety benefits, more widespread use of shotguns is not considered acceptable on humaneness grounds and one consultee said it would be a public relations disaster. There was no consensus as to whether or not the use of .22 centre fire rifles would confer any safety advantage in these circumstances (see Legal issues, below) but any such advantage is likely to be marginal. The relatively quiet report of these calibres could, however, be an advantage over the larger calibres, in some situations.

- ***Consideration should be given to adding some .22 centre fire rifles to those permitted for culling the smaller deer species – see Legal issues below.***

4.17 Alternative methods in urban/suburban areas would be welcomed but few effective alternatives exist. Only one effective repellent is currently available, this is only suitable in limited circumstances and there are no other generally effective deterrents. Alternative potentially acceptable methods, such as immuno-contraception, have their own difficulties and are not likely to be a practical option in the short term. In particular circumstances the use of nets and translocation under Section 8(1) of the 1991 Act might be an option. In addition, urban/suburban areas may often be sub-optimal habitat for deer and there may be some truth in the suggestion that if management in the surrounding rural fringe is working there should be less of a problem in such areas. The only other practical options are culling, in some circumstances where possible, or fencing, if the level of damage is considered to justify this.

- ***A national system for providing objective, authoritative advice on deer management should be available, including advice on non-lethal damage prevention methods.***
- ***Public awareness of wildlife management issues should be improved so that the public are willing to accept necessary deer management.***
- ***Clarification should be sought on the purposes for which the Section 8(1) licensing powers of the Statutory Nature Conservation Agencies for removing deer from one area to another may be used and consideration given to whether these could be delegated to Defra, for the purposes of resolving damage or health and safety problems.***
- ***Specifications and advisory material (leaflet) should be developed by the advisory bodies on fencing types appropriate to urban/suburban situations.***
- ***Development of novel non-lethal methods of control, such as immuno-contraception, should be kept under review.***

Conservation Damage:

4.18 Good evidence of damage to some conservation interests has been demonstrated, especially in woodland habitats, and deer damage is seen as a major issue in the conservation of semi-natural woodland and coppice. However, there is also some evidence to suggest that this has not occurred because of failings in the legislative provision for control or because of overwhelming deer numbers. Sufficient techniques for containing such damage are available – destructive and non-destructive. At least some of the more serious problems have arisen where managers have been reluctant to address the issue of culling or it has not been possible to establish effective area deer management and deer numbers have been allowed to build up.

- ***A national system for providing objective, authoritative advice on deer management should be available.***
- ***Public awareness of wildlife management issues should be improved so that the public are willing to accept, and land managers are willing to undertake, necessary deer management.***

Disease:

4.19 The evidence available so far suggests that deer are unlikely to be a significant reservoir or vector of the main livestock diseases although the level of monitoring in deer, as with wildlife generally, has been very low. Monitoring of deer for bovine TB through statutory submissions is ongoing. Incidence of TB appears to be increasing but most animals submitted on suspicion of TB infection are farmed or park deer. There may be an increased risk of TB in wild deer where they are concentrated as a result of supplementary feeding. Evidence following the FMD outbreaks in the 1960s and 2001 suggest that deer are unlikely to be a significant factor in harbouring or spreading FMD other than in exceptional circumstances.

- ***Monitoring of statutory submissions of deer for TB testing should continue and efforts made to ensure adequate reporting.***
- ***Carcass examination for signs of disease, including the ability to recognise typical lesions of TB, should form a major part of the training provided for deer stalkers & managers.***
- ***Illustrated advisory material should be produced to aid stalkers and deer managers in disease identification. This could be based on revision of that already jointly produced by FC & Arun District Council (Adams & Dannatt, 1989).***
- ***Training and advisory material should stress the need for all deer stalkers to be aware of the obligation (under the TB (Deer) Order, 1989) to notify suspect lesions of TB found in deer to Defra's DVMS.***
- ***Disease contingency plans should remain flexible enough to allow sampling, testing and possible emergency control measures where deer population density or other local circumstances suggest that deer may pose a risk.***
- ***The supplementary feeding of wild deer should be discouraged to avoid causing artificially high concentrations of deer which might increase disease risk.***

4.20 Lyme disease appears to be a localised phenomenon at present. Although deer can be significant hosts for adult ticks in areas where the disease occurs they are not currently thought to

be a main host for the disease itself. The main preventative measures for those at risk of exposure to Lyme disease are to wear appropriate protective clothing in tick infested areas and to check for and remove ticks as soon as possible. Effectiveness of a recently developed vaccine appears to be in doubt.

- ***Information on the regional incidence of Lyme disease should be collated.***
- ***Guidance and advisory literature on Lyme disease and appropriate preventative measures should be developed.***

Road Traffic Accidents:

4.21 There are limited current mitigation measures, such as signage, fencing and speed restrictions, which are used to reduce the risk of RTAs involving deer. More radical measures, such as under- or over-passes may be feasible, especially in new road developments, and have been found to be effective in reducing RTAs in Europe and North America. These are likely to be expensive (guidance on costings is readily available for the USA/Canada) but may have a place in particular accident 'black spots' where the habitat adjacent to the road lends itself to this approach. The less expensive option of 'cross walks' in combination with appropriate fencing may be an effective alternative for existing roads.

- ***Highways authorities should be encouraged to consider wildlife under- over-passes or 'cross walks' as a long term solution to RTAs in high deer density areas.***

4.22 Other long term preventative measures concerning woodland/forest design near roadways; road layouts; and positioning of public access areas and routes in relation to potential deer 'refuge areas' and roadways may help reduce RTAs. The effect of different cropping patterns may also be worth exploring. These factors could be particularly important in the new community forests in urban fringe areas. In addition, effective deer management in the rural surrounds of urban/suburban areas may help keep deer densities, and thus RTAs, down.

- ***Forest/woodland design and other vegetation management criteria for minimising RTA risks should be developed.***
- ***Advisory guidelines/materials should be produced to provide guidance to Local Authorities etc based on the above.***

Legislation Issues:

4.23 There are some aspects of the deer legislation which are seen as flawed, or at least, likely to benefit from revision. Those most commonly highlighted are the types of firearms permitted for culling free ranging deer and for dispatching injured deer, the purposes for which close season shooting can be defended, and the duration of the close seasons themselves.

4.24 The permitted firearms for free ranging deer specified by exclusion in Schedule 2 of the 1991 Act differ from those allowed in Scotland. If the English/Welsh provisions were to be aligned with the Scottish, the use of .22 centre fire rifles would be allowed for roe deer (and also in this case for muntjac and Chinese water deer). There is no consensus on whether or not this would be a significant safety gain but in view of the increase in the smaller species there may be other advantages. Relatively large numbers of Firearms Certificate holders, such as gamekeepers, possess these calibres for fox control. Some, at least, of these might provide a significant additional force for controlling exotic species such as muntjac. Police firearms licensing sections may also

prefer to licence smaller calibres where only the smaller deer are likely to be encountered. There may be a marginal safety advantage and noise disturbance advantage in urban/suburban areas.

- ***Consideration should be given to revising Schedule 2 of the Deer Act 1991 with respect to the smaller deer species to allow use of some of the .22 centre fire calibres as already permitted in Scotland.***

4.25 The restriction of weapons allowed for killing an injured deer as an act of mercy to any smooth bore gun, under Section 6 of the Act, or those specified in Schedule 2, prohibits the use of the most commonly held rifle – the rimfire .22. This unnecessarily and illogically restricts the use of these calibres for humane purposes. It is commonly, but incorrectly, believed that any suitable weapon, including rimfire .22, can be used to kill a deer as an act of mercy.

- ***Consideration should be given to revising Section 6 of the Deer Act 1991 to allow any smooth bore gun or any rifle, except an air rifle, to kill an injured deer, if to do so would be an act of mercy.***

4.26 The restriction of purposes for which shooting during the close season can be defended, under Section 7 of the 1991 Act, is unnecessarily restricted and excludes potentially serious health and safety issues.

- ***Consideration should be given to extending the provisions for shooting during the close season to allow action taken for preserving public health and safety.***
- ***Clarification on the timing and purposes for which Statutory Nature Conservation agencies can issue licenses to remove deer from one area to another should be sought.***

4.27 Shooting of deer at night is currently prohibited except where it is carried out under a notice served by the Agriculture Minister under Section 98 of the Agriculture Act 1947. Whilst it continues to be the case that the shooting of deer at night is only likely to be considered in exceptional circumstances the purposes for which a Section 98 notice can be issued are restricted and the process for issuing such a notice is complex. The inclusion of provision for night shooting for health and safety issues and the establishment of a licensing provision in the Act would overcome these shortcomings.

- ***Consideration should be given to including provisions in the Deer Act to permit licensed shooting of deer at night for the purpose of preserving public health and safety or to prevent serious damage.***

4.28 Arguments have been made for extending the doe/hind open season because of difficulty in meeting doe/hind cull targets. However, there is no clear consensus on the real need for this, if deer management is given sufficient priority, and there is no consensus as to whether the season should be extended at the beginning or the end. Nevertheless, there may be justification in bringing the end of the doe/hind close season in England & Wales forward to 20 October, in line with Scotland, since there do not appear to have been significant welfare problems associated with this in that country.

- ***Consideration should be given to bringing the end of the doe/hind close season in England & Wales forward to 20 October, as in Scotland.***

4.29 There are currently no close seasons for muntjac, Chinese water deer or red/sika hybrids in England & Wales. As muntjac are non-seasonal breeders there would be no welfare benefit in introducing a close season. However, Chinese water deer do breed seasonally, with birth of fawns

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and lactation occurring in the summer months. Because of difficulty in distinguishing between bucks and does it may be necessary that the same close season apply to both sexes. Welfare concerns also suggest that red/sika hybrid hinds should be protected during the calving season. However, the sika is a non-native species and removal of the stag close season may help prevent its further spread and hybridisation with the native red deer.

- ***Consideration should be given to introducing a close season for Chinese water deer. This could correspond to that for females of the other deer species.***
- ***Consideration should be given to introducing close seasons for red/sika hybrid hinds in line with those for the parent species.***
- ***Consideration should be given to removing the close season for sika stags.***

Stalker Training:

4.30 None of the bodies representing the interests of deer managers and stalkers is supportive of making training compulsory. However training is seen as an increasingly necessary requirement for all but recreational stalkers because of employers liability issues, insurance, and potential EU regulations. To ensure satisfactory handling and condition of venison entering the human food chain, and to enable compliance with potential EU regulation, the provision of recognised accredited training standards is desirable.

- ***The training and standards developed by Wild Deer Management (DMQ Ltd) and its predecessor organisations should be consolidated and formally accredited to meet European standards.***

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APPENDIX 1

Status and Distribution of British Deer

1. **Red deer:** The main red deer populations in England are concentrated in the South West, East Anglia and the Lake District, with smaller populations in the New Forest, Peak District and Sherwood Forest areas. There also appear to be some in the Sheffield/Doncaster area (Staines, 1998) plus other small or transient populations elsewhere. Native populations are probably confined to Scotland and north west England (Trout *et al.*, 1994). Recently established populations (e.g. south and north Yorks) and supplementation of small existing populations (e.g. Peak District) probably resulted, at least partly, from escapes from deer farms in the late 1980s/early 1990s following a collapse in venison prices (C. Critchley pers comm). Some introductions of red deer in England are believed to have involved crosses with animals of European stock and North American elk (*Cervus elaphus canadensis*) (Trout *et al.*, 1994). Some additional 10km squares shown on the more recent distribution maps may reflect the accumulation of transient records but it is clear that significant increase in range has taken place (Ward, 2003). However, this may be explained, to some extent, by the additional recent escapes referred to above.

2. **Roe deer:** Roe deer became extinct in England by the 18th century. Subsequently a number of reintroductions took place in the south, East Anglia and the Lake District, involving animals of Scottish and Continental origin (Trout *et al.*, 1994). Following these reintroductions natural dispersal resulted in further expansion of their range south, from Scotland and the Lake District, and north and west from Dorset and other southern centres. More recently there appear to have been at least two unpublicised introductions in the Midlands in the 1970s (Prior, 1995).

3. **Fallow deer:** Fallow deer disappeared from Britain during the last ice age and are believed to have been reintroduced by the Normans in the 11th century (Yalden, 1999). Despite their continued patchy distribution, their numbers do appear to have increased significantly in recent decades and records of distribution suggest that there has been some real range expansion (Arnold, 1993; Johnson, 2001; Ward, 2003). The high densities that fallow can reach locally has meant that they are the species most frequently involved in damage complaints/enquiries recorded by Defra (and former MAFF) Wildlife Advisers.

4. **Sika deer:** Sika deer are indigenous to east Asia but have been introduced to a number of countries in Europe as well as South Africa and the USA (Corbet & Harris, 1991). The main sika populations in England are in Cumbria, Dorset and the New Forest (Arnold, 1993) with additional small populations in Lancashire, Northamptonshire, Bedfordshire and Lundy Island (Trout *et al.*, 1994). Following heavy culling the New Forest population was reduced from about 200 in the 1980s to about 100 in the 1990s (Harris *et al.*, 1995). It is believed to have remained at about this level although some dispersal out of the Forest may have occurred (Putman & Langbein, 1999). The main Dorset population is in south east Dorset, including Purbeck and Brownsea Island. In west Dorset there is a herd of at least 40 in the Melbury area (own obs.) and sika are now said to be extending into Devon in the Axminster area. In the mid-1990s the Dorset (+Devon) population was believed to be no more than 2000 (Harris *et al.*, 1995) but the population in the Poole basin area of south east Dorset itself is now probably around 3000 (J. Langbein, pers. comm.). A small population which established in the Dulverton area, Exmoor, about 1915 is now thought to be extinct (Horwood & Masters, 1981) but another small population is believed to be present in north west Devon (Johnson, 2001; J. Langbein, pers. comm.). There are about 40 on Lundy and about 200 now confined to the Forest of Bowland, Cumbria (N. Healy & J. Cubby pers. comm.). Hybridisation with red deer has occurred in parts of Scotland, Ireland and north west England. Sika genes now occur widely across red deer populations in Scotland (D. Balharry pers comm). It has been suggested that sika in the Lake District have been virtually eradicated but since red deer in Martindale in the Lake District may be the only remaining pure native red deer in England (N.

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Healy pers. comm.) the threat of hybridisation may be a serious conservation issue. Sika spreading west from Dorset may also pose a potential hybridisation threat to West Country red deer but in view of the mixed origins of these reds (see above) this is arguably of less concern.

5. Muntjac deer: The muntjac is native to south east China and Taiwan (Corbet & Harris, 1991). The feral muntjac population in Britain was first established in Bedfordshire and adjacent counties and remained fairly localised until the late 1960s, probably partly due to a succession of hard winters (Chapman *et al.*, 1994). They have now spread across much of the south of Britain and it is believed that this was probably aided by deliberate translocation and releases (Chapman *et al.*, 1994).

6. Chinese Water Deer: The Chinese water deer is native to north east China and Korea (Corbet & Harris, 1991). Not all of the introductions of Chinese water deer in Britain in the 1920s and 1930s survived and free-living populations are now believed to be restricted to Bedfordshire/Hertfordshire, Berkshire, Cambridgeshire, Norfolk and Suffolk (Harris *et al.*, 1995). The British Deer Society (BDS) deer distribution survey 2000 (Johnson, 2001; Ward, 2003) indicated that there may have been some spread from these areas but some outlying records were probably due to mis-identification (A. Ward pers comm.). Although this species is not believed to be well adapted to British conditions and can suffer high mortality in hard winters (Corbet & Harris, 1991) it does have the potential for rapid increase because of its relatively large litter size. Litters in Britain are usually limited to one or two fawns but the does often carry larger numbers of embryos (Corbet & Harris, 1991).

APPENDIX 2

Organisations consulted following 1986-1990 Night Shooting Trial

British Deer Society

Countryside Commission

Country Landowners Association

Exmoor National Park Committee

Federation of Deer Management Societies

Forestry Commission

League Against Cruel Sports

National Farmers Union

Nature Conservancy Council

APPENDIX 3

Summary of Night Shooting Notices issued by MAFF during the 1986-1990 Night Shooting Trial and subsequently.

1. The shooting of deer at night was prohibited by an amendment to the Deer Act 1963 made by the Wildlife & Countryside Act 1981. Prior to 1981 a farmer in the Dulverton area of Exmoor had shot deer at night to help prevent agricultural damage. Following the ban, which came into force at the beginning of 1982, and on the basis of advice from the Reader's Digest Association legal adviser, the same farmer requested permission to shoot red deer at night in 1982 and again in 1983. Following detailed assessment of the case and advice from MAFF Legal Division a Notice under Section 98 of the Agriculture Act 1947 was served on the farmer in March 1985 requiring him to shoot up to a maximum of 20 red deer at night. This was to be done in accordance with a Code of Practice drawn up by MAFF Wildlife Advisers, based on the Code of Practice for Shooting Deer at Night published by the (then) Red Deer Commission in Scotland.

2. Night shooting notices were served on the same farm for a further trial period (Table A1), and monitoring by Wildlife Advisers during this period showed that the night shooting was carried out effectively and humanely. Exclosure-cage assessment of the impact of deer grazing on one grazing meadow in Spring 1989 indicated a yield loss of up to 24% DM, at turn out of stock on 1 March. However, because of possible 'cage effect' problems identified later, where the yield inside the cages was found to be enhanced because of the sheltering effect of the mesh, the actual yield loss may have been as low as 14.5% DM, but still statistically significant ($t = 3.749$, 1-tailed $P < 0.001$).

3. After wide consultation following the night shooting trial a moratorium on night shooting was announced whilst a three year trial of DMGs was conducted. No further night shooting notices were issued until 1996, after the DMG trial.

Table A1: Details of Night Shooting Notices 1985 to 1996.

Date of Issue	Duration	Permitted Maximum to be Shot	Actual Number of Red Deer Shot at Night (Additional number shot in daytime shown in brackets)			
			Stags	Hinds	Calves	Unknown
Mar 85	31.3.85-30.3.86	20	5	3	0	0(2)
Dec86	10.12.86-28.2.87	20	0	3	0	0(7)
Sep 87	1.11.87-28.2.88	20	7	5	0	0(2)
Oct 88	1.11.88-28.2.89	20	8	6	0	0(7)
Nov 89	30.11.89-28.2.90	20	3	5	0	0
Jan 96	22.1.96-29.2.96	10	3(2)	3(1)	0	0

4. In January 1996, following further assessments on this and another farm in the nearby Brendon Hills, night shooting notices were issued on both farms. On this occasion the order on the Dulverton farm was for up to 10 red deer and that on the Brendon Hills farm for up to 10 fallow deer. Yield loss on one silage grass field at the Brendon Hills site had been assessed by Wildlife Advisers at up to 17% DM. However no deer were shot under this order.

5. Although a small number of requests for night shooting notices have been received by Defra (& previously MAFF), since that time (see Table 3, main text), no further night shooting notices have been issued since 1996.