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28 & 29 March 2003

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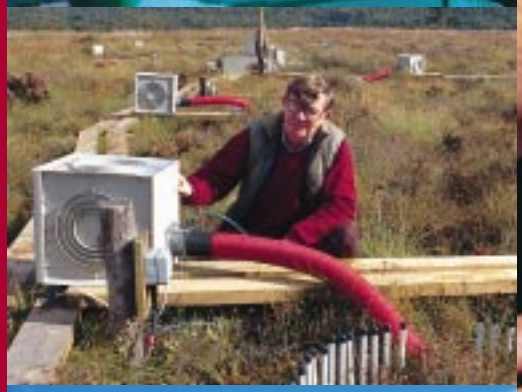

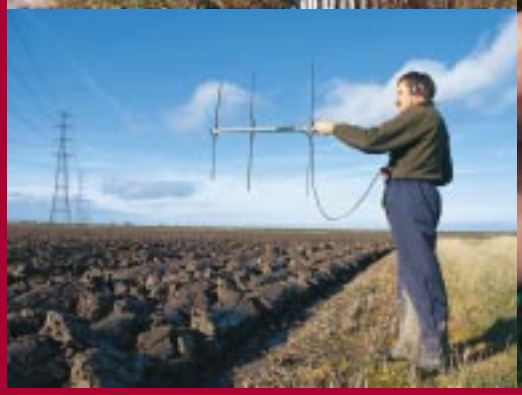

working today
for nature tomorrow

English Nature Research Reports

Number 548

Proceedings of the Future for Deer Conference 28 & 29 March 2003

Organised by The Deer Initiative

Edited by Emma Goldberg

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Preface

The Deer Initiative hosted a conference in Buxton on 28 and 29 March, 2003, entitled "The Future for Deer". This *English Nature Research Report* contains the proceedings from the conference, in the form of talks, papers or extended abstracts. The conference was well attended, with 250 people over the two days. Presentations given covered the wide range of aspects that deer are now affecting, from biodiversity to their growing urban presence, and issues surrounding the marketing of wild meats.

In undertaking the editing of the proceedings, I have taken the introductory and concluding comments made by the chairpersons, Sir Martin Doughty, Andrew Hoon and John Swift, and combined them to form the summary.

Some key messages that came out of the conference are that deer must be managed at the landscape scale; that no deer is as bad as too many deer, and the need for balance; and the importance of funding deer management, at a regional level. An effort must be made to increase public awareness of the importance of deer management to promote understanding and support; and finally that managing deer populations leads to the production of good, healthy venison.

Emma Goldberg
Forestry and Woodland Officer
English Nature

Acknowledgements

The conference would not have happened without the hard work of Simon Booth, Sue Goldfield, other Deer Initiative staff and partner organisations, in putting the conference together. Our thanks go to:

all the speakers, chairmen and all who contributed from the floor; to all the sponsors and exhibitors;

Patrick Gordon Duff Pennington for his fortifying after-dinner speech;

Andrew Hoon for his leadership of Deer Initiative.

Summary

Red and roe deer spread to England after the last Ice Age and are our largest native land mammals. They are part of our natural woodland communities, and red deer have also adapted to using open moors in Cumbria, southwest England and Scotland. Four other species have been introduced over the last 1000 years, fallow, muntjac, sika and Chinese water deer. Fallow deer were introduced to parks from Europe in the 11th century, and are considered "naturalised". Sika, muntjac and Chinese water deer were introduced in the 19th and 20th century from Eastern Asia. Of these three species, Muntjac has the most widespread effects, especially when it occurs in high densities.

Deer are an important part of our woodland ecosystems. Before people started to manage forests, the effects of deer, wild boar and wild cattle were probably vital to the survival of many plants and animals that depend on open woodland. Deer also alter the balance of herbs, ferns and grasses found below the canopy, and help to maintain gaps in the canopy. Furthermore, there are invertebrate and fungal groups associated with deer and their activities.

However, with lack of predators and additional winter food on farmland, wild deer are increasing in numbers and expanding their ranges. Larger woods can better cope with the effect of deer than at smaller sites; in smaller woods, or where deer numbers are high, the effects can be devastating.

The impacts of deer are now significant in the following areas:

- **Woodland biodiversity**:

Deer can substantially change the ground flora species, reducing the abundance and flowering of bluebells and primroses; woodland birds and mammals such as dormice depend on the structure of the shrub layer and brambles, which deer can diminish. Of 21,000 ha of woodland Sites of Special Scientific Interest in unfavourable condition, a significant amount can be attributed to the effects of deer.

- **Timber production**:

Deer can devastate new planting and coppice growth making expensive fencing necessary.

- **Agricultural production**:

Deer are now browsing on crops; there is a need for objective measures of their effect or damage.

- **Road traffic accidents and urban use**:

We notice deer more on the road now because of our increased road usage and their growing populations. There is real concern about increasing numbers of road traffic incidents. Furthermore, deer are increasingly using urban space.

Areas we need to address in deer management are equally wide-ranging:

- **Ecology and behaviour**

New research on the behaviour of deer is still providing important information that can guide deer management.

- **Deerstalking and Training**

Many issues were raised in relation to the profile of professional and recreational deerstalkers, the economics of stalking, and training standards and health and safety.

- **Quality game**

The Venison Quality Assurance Scheme run between Bestwick's and Forest Enterprise, supplying venison to retailers against commercial problems of cut price, low quality (even illegal) competition in the market place. European Game Meat Regulations and the importance of ensuring that training programmes for stalkers and processors complies with the regulations that we are likely to see in the future.

- **Public enjoyment and appreciation**

Our sustainable management of deer must take into consideration the public enjoyment of seeing wild animals, and focus on increasing awareness of the public on the issues surrounding sustainable deer management.

In his keynote address, the Forestry Minister, Elliot Morley, endorsed 5 priority principles:

- a deer population that is in balance;
- humane and sensitive management approaches;
- an experienced and knowledgeable capability in deer management;
- encouraging an informed public understanding of management; and,
- working in partnership.

To what extent have we made progress on these; what more needs to be done?

We need to appreciate the wider perspective of deer in the countryside in terms of enjoyment, tourism, recreation and the health and economic vitality of the countryside; to increase our understanding of, and improve upon, the management of deer; to gather and publicise a standardised dataset on populations and culling; and to take further training schemes for stalkers, building on the voluntary approach, which our partnership through the Deer Initiative and DMQ (Deer Management Qualifications) is adopting.

Martin Doughty, Chair, English Nature

Andrew Hoon, Chair, The Deer Initiative

John Swift, Chief Executive, British Association for Shooting and Conservation

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Keynote Address

By Elliot Morley MP
Forestry Minister For England

Introduction

Your conference is on the future for wild deer. The programme is wide-ranging and covers everything from the science and practice of deer management through to the environmental, economic and social impacts of deer. All the evidence points to a continued expansion, both in numbers and geographic extent, of deer populations.

Our aims for forestry include both creating new woodlands and the sustainable management of existing woodlands. Similarly our policies for biodiversity and the countryside aim to protect, sustain and enhance our rich natural resources. Deer are part of those resources, but can have a real influence on the quality of the countryside and its biodiversity. This means that we cannot ignore them if we are to achieve our wider aims.

The challenge of finding the right balance between healthy, viable deer populations and the impacts on our countryside is a very real one. So I'd like to share with you the Government's perspective on these issues and describe some of the ways in which we are playing our part to help achieve a balance.

Deer management groups

We know that wild deer can present problems where they cause damage to crops, woodlands or gardens. We believe that the best long-term approach to solving these problems is to manage deer populations in a way that keeps them at healthy and sustainable levels. Achieving this requires a co-ordinated approach. Local deer management groups provide the framework for achieving this co-ordination. This is preferable to individual estates and land managers acting on their own and in isolation from each other. Experience shows that acting in isolation is not normally effective. It usually creates a vacuum into which deer from the surrounding areas move. So deer management groups need to cover areas that are based, where possible, on deer herd ranges.

To gain support, the impetus for setting up deer management groups should come from landowners or managers themselves. This is the only way in which land management requirements can be taken into account. Neighbouring landowners can share information on the distribution and movement of deer populations between different properties and make their plans accordingly. This view draws on our own experience. Through the Forestry Commission, which is the largest land manager in England, we have considerable experience of the benefits of working in collaboration with our neighbours. The Commission's wildlife rangers have shown that the balance I referred to a few moments ago can be achieved. Co-ordination and collaboration of expertise and effort is the key.

We don't believe there is one model that will work in every individual situation. There will have to be variations of approach to reflect local circumstances, such as land ownership and land use patterns as well as the species and numbers of deer. But in all cases, the

combination of a collaborative approach backed up by competent management techniques is the key.

Deer management methods and hunting

In terms of management methods, we only support the use of humane approaches. You will all be aware of the Hunting Bill which is now before Parliament and that it contains an outright ban on deer hunting with dogs. The legislation is designed to recognise utility and prevent cruelty. All hunting activity will be judged on the evidence available as to whether they meet the tests of utility and cruelty. The evidence shows that deer hunting cannot meet the tests so the activity will be banned.

Hunting takes place only in a limited area and there is no need to perpetuate practices which the evidence clearly shows cause suffering to deer when there are other methods of managing the population that are available. Deer management is a national issue and there is every reason to believe that the management methods that have proved successful elsewhere will be effective in the South West.

Deer management groups need to be able to demonstrate competence with their management. Stalkers should be properly trained, and they need to keep this training up to date. Experience is invaluable. But on its own it isn't enough. Landowners and managers and others with an interest in the countryside have a right to expect that stalkers can demonstrate their competence. Verification of this, through training and a recognised qualification, is a tangible way of demonstrating this competence. Again, our first hand experience, through the Forestry Commission's rangers, bears this out.

Information to support action

Alongside management on the ground is a need to gather data and information in order to plan effectively and critically, measure whether or not the management is achieving the desired results. This includes carrying out census work to establish population levels and, following culling, reviewing the results of the cull to ensure that aims were achieved.

Of course, census work is fraught with difficulty. It is not a precise science. Knowing actual numbers of each species is not necessary, or in reality attainable. But over time, patterns and trends emerge which will help monitor the effects of culling and understanding. Again, this information cannot be meaningfully collected without collaboration between neighbours.

Building and achieving consensus

In many areas, deer management groups already exist and are working effectively. But more needs to be done. At the national level that was one of the reasons why we founded the Deer Initiative, which has organised this conference. Initially the focus of the Initiative's work was on building consensus between all those with an interest in the management of deer. These interests included landowners and managers, stalkers, environmentalists and those concerned with animal welfare. Achieving consensus was not easy, but it was achieved. The Deer Initiative's Accord is a tangible expression of the achievement of that consensus.

From this consensus came further recognition and agreement to encouraging action through more co-ordinated deer management. That was why we supported the Deer Initiative's

partners as they developed a strategy for achieving this. The financial support we continue to provide through the Forestry Commission, and through English Nature, has enabled the Deer Initiative to set up new arrangements. These include a charitable company, to promote and test effective approaches to deer management. Of course the Company can't address all of the issues on its own. It has to work in close collaboration with the wider Deer Initiative partnership.

Achieving consensus and strengthening co-operation has enabled the Deer Initiative and its partners to gain first hand experience of the issues. I am particularly encouraged by the work of the Initiative's Deer Liaison Officers who can provide landowners and managers with expert advice and guidance on setting up new deer management groups. They bring with them the knowledge and expertise of the whole partnership. I firmly believe that working through a partnership-based approach is the key to achieving success. The Initiative's partners cover a very wide range of interests. Partnerships like this are not just about sharing the cost. They are also about pooling and sharing knowledge and expertise, experience, contacts and networks.

Future of the Deer Initiative

Looking to the future, this summer the Forestry Commission and Defra will carry out an independent evaluation of the achievements of the Deer Initiative against its original aims. We will use the results of the evaluation to inform future support for deer management in England. And I know that the Initiative and its partners are also considering their future role and remit. I welcome that.

From the Government's perspective, we are committed to continuing to work with the Deer Initiative and its partners to achieve the aim of sustainable, well-managed populations of wild deer. I referred to the Deer Initiative's Accord earlier. The principles of this seem to me to sum up exactly the issues that need to be addressed. So I'd like to remind you of those principles:

First, a sustainable and balanced population of wild deer in England.

Second, a humane, responsible and sensitive approach to management.

Third, an experienced and knowledgeable capability in deer management.

Fourth, informed public understanding of management.

And finally, working through partnership to reduce the environmental and economic impacts of deer.

Closing remarks

The conference programme provides an opportunity to look at many of the issues that are directly relevant to achieving the Initiative's principles. I wish you a successful two days and look forward to hearing about the conclusions you reach and your plans for continuing to pursue the aim of ensuring the delivery of a sustainable, well managed wild deer population. The conference theme is The Future for Deer. I am very confident that deer can have a secure future in our countryside. In the Government, we completely share that aim with you.

A personal perspective on wild deer management

Charles Critchley
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Summary

During 2002 Brenda Mayle of Forest Research organised a series of meetings with wildlife biologists in North America to look at wildlife management issues. In a two week visit Brenda and I discussed current state of knowledge with a number of leading biologists in the field of deer management.

In 1998 I visited Finland to attend a 3 day excursion by the Continuous Cover Forestry Group and 3 days on the Åland Islands with the Ancient Tree Forum.

These journeys, supported by Forest Enterprise and others, over nearly 30 years of employment in wildlife management with Forest Enterprise, have helped to form a personal perspective of the patterns and practices in deer management.

Introduction

The *Population Ecology, Management and Welfare of Deer* symposium held at Manchester Metropolitan University in April 1997 and the 'Ecological impacts of deer in woodland' meeting at the University of East Anglia in April 2000 presented a wealth of information on the interactions between deer and the environment. Now the Deer Initiative *Future for Deer* conference, following hard on the heels of the 'Woodland Mammals' Autumn Symposium of The Mammal Society, will add yet more.

Deer are the subject of similar interest and concern elsewhere in the world, despite often fundamental differences in ecological conditions, land use patterns and cultural practices. Management options tend to be influenced by a whole range of factors in addition to the laws of the land. Deer occupy a special place in the collective mind of the public and exert a powerful influence over the people who manage them. The problems, costs and opportunities that may be associated with too many deer are likely to be experienced and understood by only a small proportion of the public at large.

The North American situation

In North America burgeoning deer populations have given rise to active research and debate on the impacts of deer and possible novel approaches to control. Deer present a particular problem in urban areas where the use of rifles may be unacceptable due to local regulation, safety concerns and the sensitivities of people living in the neighbourhood. Experiments have been conducted to capture and relocate, to immobilise and humanely dispatch and to test the efficacy of fertility control. None of these innovative techniques would seem at the moment to offer any practicable solution or advance in animal welfare for the management of wild deer populations. And yet in England the myth seems to be growing that fertility control

is an available and viable option and that euthanasia can be delivered more kindly than by conventional bullet.

Road accidents involving deer in the USA are estimated annually to number 1.5 million, to cost the lives of more than 200 people, injure nearly 30,000 and amount to more than $1 billion in vehicle repairs. Insurance companies pass on the cost to motorists via insurance premiums and Federal agencies will not accept responsibility. Deer movement sensors and advisory signs are being used to augment roadside measures such as reflectors considered ineffective on their own.

Deer damage to agriculture is most serious on palatable high value arable crops like Soya bean with an average cost of $115/acre being reported. Remote sensing techniques to monitor impact may yet show the relationship of damage not only to the pattern of surrounding land use but also to the variability in crop performance revealed by precision agriculture. Chemical repellents have so far failed to meet expectations, and easily movable, temporary fencing is being employed to allow routine crop husbandry to continue.

Finland

The extent of woodland cover and apparent sympathy between people and forests seem strikingly similar in North America and Finland. There are similarities too in the patterns and practices of forest management and in the typical integrity of forest plant and animal communities. Browsing by deer can influence the success of natural regeneration and the composition of tree species reaching the woodland canopy as well as affecting the understorey. In Finland, browsing by elk is particularly evident on rowan, aspen and Scots pine, with little, if any, impact to birch and spruce. Elk is the only cervid native to Finland although white-tailed deer and fallow deer have been introduced to the Finnish mainland and roe to the Åland Islands. It is feared by some that the presence of roe deer will adversely affect the extraordinary complexity of the flora of the Åland Islands and their historic relationship to wood pasture and coppice meadow management. The number shot had reached 5,916 by 1993 from a population of just 42 roe released between 1957 and 1965.

Probably the most intact forest community near at hand in Europe is Bialowieza forest on the border of Poland and Byelorus. Even here, in the presence of more natural levels of predation, browsing by deer appears to British foresters to be exacting an intolerable toll on young trees. Such impact may be entirely appropriate to the ecology of extensively forested landscapes but the sparsely wooded, fragmented landscape of lowland Britain may be unable to bear the strain. Perhaps it is naïve to look for analogues in woodland ecosystems relatively unaffected by the hand of man. Closer parallels to the intensively managed British countryside may be found elsewhere.

Conclusion

And so to the future. The measures being put forward today to meet the challenge of ever-increasing impact from deer are essentially the same as those proposed in 1964 in the first publication of The British Deer Society: *Deer Control. The Formation and Running of Local Deer Control Societies* by H. A. Fooks and John Hotchkis and it is appropriate that Advice Note 1 from The Deer Initiative should be entitled *Deer Management Groups advice and support in England*. Without support it would seem unlikely that the next forty years of deer management will have any more bearing on deer in the English countryside than the last

forty. And the support will need to take several forms because today there are many more obstacles to overcome. Landowner involvement is obviously crucial but ultimately the outcome is likely to be determined by stalker engagement and public opinion. A significant factor in the coming years will be the support and understanding of a wider public.

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Deer and biodiversity action plan targets

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Introduction

Following the Earth Summit in Rio in 1992 the UK government produced a biodiversity action plan (HMSO 1994). One development of this was a commitment to produce action plans for rare or threatened habitats or species. This process, while at times rather bureaucratic has helped to focus the attention of both government and non-governmental organisations on what our conservation aims should be for these habitats and species. The plans contain targets for the expansion of habitats or the establishment of new populations of species (Kirby 1999). They also contain a preliminary analysis of the threats to achieving the conservation targets: deer feature as one potential threat explicitly in a number of plans and are an indirect threat to the achievement of others.

As part of a separate, although related process, the nature conservation agencies have been carrying out a review of how we set our conservation aims for the protected sites - the Sites of Special Scientific Interest, National Nature Reserves and Special Areas of Conservation (Kirby *et al* 2002; Kirby and Solly 1999). The condition of these sites is being assessed in a more systematic way and for England a Public Service Agreement target has been agreed that 95% will be in favourable condition (or at least recovering, with appropriate management in place) by 2010.

This paper explores how deer may affect the achievement of these and other conservation goals in the next few years. The potential impact of deer on the target to reverse the decline in populations of woodland birds will be considered in the paper by R. J. Fuller of the British Trust for Ornithology.

Deer and favourable condition of SSSIs

An SSSI is deemed to be in favourable condition when its state is such that the interest in it can be sustained for the foreseeable future. We assess this in a relatively simple way using five broad attributes (Kirby *et al* 2002).

1. *Area* - includes the extent and distribution of the woodland across the site.

2. *Structure and Natural Processes* - includes the balance between canopy and shrub layers; the importance of old trees versus open space on a site; the level of dead wood present.

3 *Regeneration potential* - includes the level and distribution of saplings and young trees we expect to see; extent of regrowth from coppice or pollarding; what limits there may be on planting.

4. *Composition* (trees and shrubs) - includes the level of native trees and shrubs we expect to see overall; any minimum requirements to maintain particular species; plus

a target to alert us to rapid declines in native trees and shrubs, for example as a consequence of a new disease coming in.

5. *Quality indicators* - includes (usually) the broad ground flora composition (as indicated by vegetation type or typical common species), but also other things that are particularly important about that wood, which contributed towards its selection as an SSSI. Examples might be the occurrence of particular species, a series of rich flushes, or a good transition zone to another habitat.

Deer can have a major impact on regeneration, structure and the quality indicators and in the longer term can affect the woodland area and tree composition.

In most instances we are seeking structural variety in woodland to provide a range of nesting and feeding sites for different groups of organisms. As data from Wytham Woods (Oxfordshire) illustrate (Table 1) and at other sites such as Monks Wood (Cambridgeshire) (Crampton *et al* 1998), major changes to woodland shrub layers have occurred as a result of increased deer browsing.

Table 1. Composition of the tree layer in 1974, 1991 and 2001 for Wytham Woods based on % cover estimates across the south-west/north-east diagonal of each quadrat.

Standard errors are shown in brackets.

	Whole wood	**Ancient semi-natural**	**Recent semi-natural**	**Plantations in ancient woodland**	**Plantations in recent woodland**
No of quadrats	163	59	50	19	35
Overall canopy cover					
1974	81 (2)	84(3)	80 (4)	72(7)	83 (4)
1991	69 (2)	68 (4)	57 (5)	75(6)	83 (4)
2001	77 (2)	76 (3)	70 (3)	89 (3)	83 (4)
Shrub cover					
1974	44 (3)	41 (4)	41 (5)	56 (8)	45 (6)
1991	24 (1)	30 (7)	25 (3)	25 (5)	14 (3)
2001	17 (1)	17 (2)	19 (3)	10 (3)	6 (2)

Deer similarly affect regeneration: the Denny Exclosures in the New Forest are a dramatic demonstration of their effects (Putman *et al.* 1989), but this effect is widespread, eg in Roudsea Wood (Cumbria). Deer also influence the composition of the woodland, through altering the balance of species that regenerate.

Finally deer alter the ground flora and features such as the bramble layer which may be critical for birds or invertebrates (Kirby 2001). The Wytham Woods surveys show the decline of bramble and increase in grasses as deer numbers have increased (Table 2). There are indications that this change has contributed to the reductions in bird populations in the Woods (see paper by Fuller, this volume).

Table 2. Changes in the mean cover index (out of 14) for quadrats in which a species occurred for bramble *Rubus fruticosus* and the grass *Brachypodium sylvaticum* 1974 – 2001 for Wytham Woods.

Columns: WWF no of quadrats in which the species occurred; WWA mean cover index for whole wood; ASN cover index for ancient semi-natural occurrences; RSN cover index for recent semi-natural occurrences; AP cover index for ancient plantation occurrences; RP cover index for recent plantation occurrences. Values in brackets are standard errors.

	Whole wood		Cover index for quadrats where species occurred.			
Species	**WWF**	**WWA**	**ASN**	**RSN**	**AP**	**RP**
Rubus fruticosus						
1974	142	4.8 (0.2)	4.6 (0.4)	4.6 (0.5)	6.7 (0.6)	4.5 (0.6)
1991	127	3.5 (0.3)	3.3 (0.4)	4.7 (0.6)	2.8 (0.5)	2.6 (0.3)
2001	127	2.5 (0.2)	2.4 (0.2)	3.2 (0.4)	1.7 (0.2)	2.2 (0.3)
Brachypodium sylvaticum						
1974	63	2.3 (0.3)	2.1 (0.3)	2.7 (0.6)	3.0 (1.3)	1.8 (0.4)
1991	136	4.7 (0.3)	4.5 (0.4)	4.8 (0.6)	3.7 (1.1)	5.6 (0.9)
2001	142	5.8 (0.3)	5.8 (0.5)	6.1 (0.6)	4.6 (1.1)	6.1 (0.8)

The trends identified in a number of sites where there are long-term records seem to be matched by changes elsewhere in the country. In many woods identified through the condition assessment process as being unfavourable, deer have been highlighted as the most significant factor in that assessment.

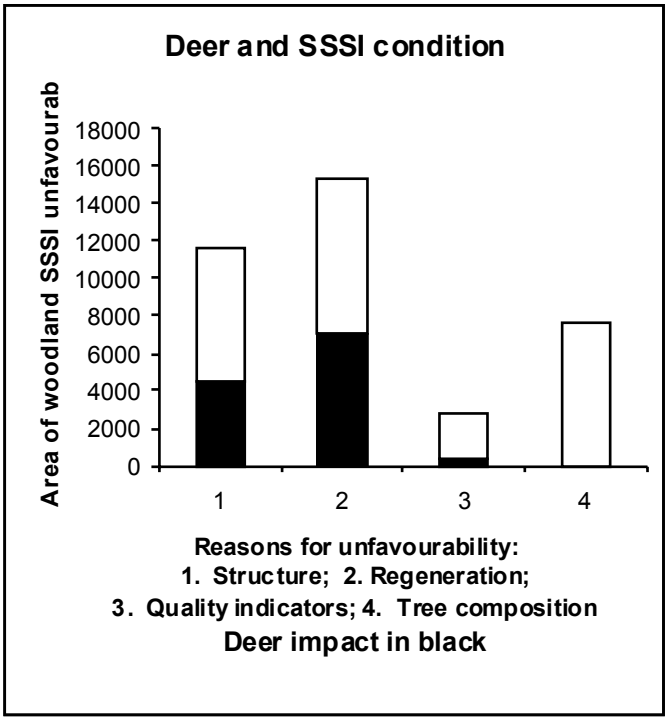

Figure 1. Woodland SSSI area classed as unfavourable and the degree to which deer have been identified as a major impact.

English Nature is addressing these impacts on the SSSI system in a variety of ways: for example by supporting the fencing of newly cut coppice or glades where regeneration is

required. However this is not a satisfactory option in the long term in most cases, where we wish to retain sustainable shrub or field layers, either for their own sake or for associated species. Permanently fencing out deer from areas is not a desirable long-term solution (even where it is practical) because the site can become as uniform, albeit in a different way to overgrazed areas.

Deer management measures are also encouraged within woodland SSSIs where appropriate, but these may not be effective if the deer removed are simply replaced by others from the surrounding countryside. Therefore both to ensure that the favourable condition target for SSSIs is met and to help promote woodland conservation in the wider countryside to meet the Biodiversity Plan targets, management at a landscape scale is needed.

Achieving the biodiversity action plan targets

For each of the priority habitats and species, targets have been set for what should be achieved in order to conserve the habitat or species in the long term. For the habitats these are generally couched in terms of maintaining the area of existing habitat, restoring areas that have been damaged in the past, and creating new areas, particularly to help off-set the effects of habitat fragmentation. For species the targets may be in terms of increasing the population size at certain sites or establishing new populations, often in places where the species used to occur (Table 3).

Table 3. Selected targets for a woodland habitat and species action plan (English Nature 1998).

(a) Upland mixed ashwoods • maintain current extent (considered to be 40 - 50,000 ha in the UK); • restore to upland mixed ashwoods at least 2,400 ha of replanted ancient sites; • initiate colonisation or planting of 3,600 ha of upland mixed ashwood on open ground
(b) Dormouse *Muscardinus avellanarius* • maintain and enhance the dormouse populations in counties where they still occur; • re-establish self-sustaining populations in at least 5 counties where they have been lost.

Achieving habitat action plan targets

Within the habitat action plans, as well as maintaining the extent of the woodland, there is a target to improve/maintain its condition, particularly the ancient semi-natural woodland resource, c.80% of which is outside the SSSI series. English Nature is working with the Forestry Commission to develop ways of assessing condition along similar lines to those for the SSSI series. Hence the same limitations on achieving the habitat action plan targets from deer may emerge as for the SSSI series: simplification of woodland structures, poor regeneration etc.

There are targets to promote the restoration of broadleaved woodland on ancient woodland sites that have been replanted with conifers (Goldberg 2003). Major restoration programmes

are planned, for example by the Forestry Commission, following surveys that show considerable potential to bring back some of the semi-natural communities that were thinned out under the conifers. Recent research has stressed that it is better to do such restoration in a gradual manner, not just clear fell and replant. Such small scale felling or widespread thinning will only be successful in promoting the necessary regeneration of broadleaves in the gaps if the deer pressure is low. Most of our native trees have a relatively high light requirement and while they can regenerate in quite small gaps, as is evident with oak on the Isle of Wight where there are no deer, they cannot cope with browsing and some shade. If larger areas are cleared regeneration may still fail because of the interaction between deer browsing and the growth of competitive vegetation such as *Calamagrostis epigejos* or *Deschampsia cespitosa*.

The third set of targets in the habitat action plans refers to the expansion of the semi-natural woodland resource through planting and natural regeneration either on open land or on the sites of recent conifer plantations. This can be protected by fencing during the establishment phase, but the consequence is that large areas are favoured and rapid spread by planting rather than use of natural regeneration (since the need is to cover a large area within the life time of the fence). The opportunities for more gradual spread, which is generally better both from a conservation and landscape perspective, are much reduced. There is less chance that small woods and patches of scrub will be encouraged or develop in odd corners of farmland, where they may have a significant impact on their surroundings.

Not only is achieving the targets more difficult with uncontrolled deer numbers, but this extra difficulty and expense may put some landowners off doing anything at all, whether inside or outside SSSIs.

Species Action Plans

If we are to establish new populations of dormice and maintain current ones, we need to encourage woods with rich shrub layers, dense understories, perhaps re-instate coppicing - not easy if there are high deer populations.

The FC Coppice for Butterflies challenge showed that coppicing could be promoted as part of the conservation programmes for fritillary butterflies very successfully but there was a high cost in deer fencing which limited the places where it could be adopted.

The song thrush and several of the bats need mosaic habitats, but the tendency is for the scrub element in particular to be reduced under high grazing pressures.

Conclusions

The paper has concentrated on the problems that may be caused by too many deer, but in many wood-pastures they play a critical and very positive role in helping to maintain the open conditions characteristic of this habitat. Various rare and threatened species benefit, directly or indirectly. We do not therefore want to eliminate deer and deer browsing from the landscape either nationally or regionally - they are a natural part of woodland systems.

However we do need to bring them more into balance with the communities and species that we value now - most of which developed in a cultural landscape in which deer were rare or

absent (Rackham 1986). It is naïve to expect that we can conserve such habitats and species without also managing deer numbers in the landscape as a whole.

The need to manage deer in future may be compounded by the effects of climate change. As part of the general conservation response to changing conditions we seek to increase the linkages between habitats, the number of stepping-stones and habitat mosaic patches through our predominantly farmed countryside. However if, as may be the case, deer populations increase further under climate change, then our ability to create the landscape patterns we want will be further eroded.

Therefore we may fail to meet many biodiversity plan targets if we do not, over the next few years, bring about effective, landscape-scale deer management.

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Deer: are they a problem for woodland birds?

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Several species of woodland birds have been declining in Britain in recent decades. The UK Government's Headline Indicator of woodland bird populations has fallen by 20% in the last 25 years. Conservation bodies have recently placed nine woodland bird species on the UK's red list of birds of high conservation concern. No single factor stands out as the principal cause of these declines and the problems differ between species. Nonetheless, increasing numbers of deer is one of the issues about which there is particular concern.

The structure of vegetation, especially in the field and shrub layers, is a major factor affecting habitat quality for woodland birds. Many woodland bird species depend on low vegetation for nest sites or as feeding locations. Where deer impacts are sufficiently high to reduce low vegetation, habitat quality will be reduced for these birds, and their populations will eventually decline. The declining woodland birds that are potentially affected by deer in this way include capercaillie, dunnock, nightingale, song thrush, willow warbler, marsh tit, willow tit and bullfinch. Deer can also potentially affect birds by indirectly altering their food supplies, by increasing exposure of nests to predators and by trampling nests. Not all woodland birds are negatively affected by heavy browsing pressure - some may benefit from the creation of an open understorey, for example redstart and wood warbler.

Effects of deer on vegetation structure and woodland bird populations have been demonstrated experimentally in two studies in North America (deCalesta 1994; McShea & Rappole 2000). In contrast, experimental work has commenced only recently in Britain. There is, however, strong circumstantial evidence that deer have affected woodland birds at least on a local scale. In Wytham Woods, Oxfordshire, deer – mainly fallow - have largely removed the field layer since the 1970s, including a massive reduction in bramble. This has been associated with a large decline in all bird species that depend on low vegetation, whereas hole-nesting species show no evidence of declines (Perrins & Overall 2001). In Bradfield Woods, Suffolk, increasing numbers of roe and muntjac during the 1990s have reduced the height and cover of coppice and browsed out the low growth beneath the canopy. This change in habitat structure coincided with a large decline in breeding nightingales (Fuller 2001). More recently warblers have also declined, possibly in response to continued changes in vegetation structure as a result of deer browsing.

A new joint BTO/RSPB project running over the next two years aims to assess the extent to which woodland bird populations have changed in different parts of the country. This will also give an opportunity to assess whether populations have changed more in woods where deer impacts have been high. Other research is needed into the specific microhabitat requirements of woodland birds to allow a better understanding of how deer may affect habitat quality. The responses of birds to deer are unlikely to be linear – for example, habitat quality for some species may be altered significantly only beyond some threshold of understorey reduction (Fuller & Gill 2001). Experiments and large-scale field studies are needed to examine the effects of different deer densities and combinations of deer species on vegetation structure and birds.

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The Economic implications of deer damage in forests and woodlands

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Introduction

Deer populations remain at high levels in Britain and numbers are continuing to increase in some areas. As a result, evidence of the economic implications of deer damage is sometimes sought to identify either an appropriate level of control or tree protection measures. Unfortunately there is still relatively little data linking damage with ultimate loss of yield, largely due to the long time delay that exists between the period when trees are vulnerable to damage and the age at which trees are harvested. It is therefore difficult to make predictions about economic losses both in general terms as well as specific cases. Nonetheless by making use of existing information on relatively short-term relationships between damage and yield loss and some reasonable assumptions about the long-term effects it is possible to estimate losses in hypothetical cases.

Deer have a range of effects on woodland trees which can affect economic returns. Browsing reduces the growth rate and survival rates of young trees, and can also reduce timber quality, by causing forking or other stem deformations. Mortality can result in under-stocking, which in itself compromises timber quality, due to increased branching or poorer stem form. The larger deer species (red, fallow and sika deer) will strip bark, which can result in the development of stain and decay from the exposed wound. Deer also cause antler damage to saplings, although this type of damage is usually less serious than browsing.

Estimating economic losses

Timber prices have been falling in recent years, due in part to the release of timber products from eastern Europe and Russia. Roadside prices for softwood logs are now (Febuary 2003) averaging £25/ tonne in contrast to £47 in April 1995, and standing sales have declined from £20/ tonne to only £6 over the same period (Purdy 2003).

Deer damage affects revenue in two ways. Loss of growth or mortality of planted trees will result in yield loss; stem deformation or staining from bark stripping will not reduce yield but will reduce value. To assess the potential effects of deer damage, the losses that could occur from various forms of damage are compared using a yield model for Sitka spruce, the only species for which a suitable model is available. All timber is assumed to be green sawlog quality unless damaged by deer, in which case it will be sold for pulp at 80% of sawlog prices, the price differential that existed in January 2000. The cost of tree establishment and protection operations (planting and fencing) have been 'discounted' using a rate of 3%, a figure normally used for investment planning in forestry.

Bark stripping

The extent of stain and decay developing from bark wounds is dependent on wound size, with larger wounds being associated with relatively more stain and decay. Although invasion

by decay-forming does not occur to all wounds, bark loss always results in structural weakness near the wound and development of stain, even if the wound subsequently heals over. Staining is regarded as an indication of *potential* decay in the timber industry and always results in logs being downgraded.

By making use of information on the average size and height of wounds inflicted by deer, and evidence of the relationship between the size of a wound and ultimate stain extension, the length of stem affected by an average-sized bark wound can be estimated at 1.40m for Sitka spruce (Gill *et al* 2000). On the assumption that this length can be sold for pulp and the remainder is suitable for sawlog timber, the total loss (if all trees in a stand were damaged) would amount to 6.0 –6.8% of final yield (table 1). However, in view of the fact that the proportion of damaged trees may be more typically in the region of 20-30%, actual yield losses for Sitka spruce are more likely to be in the region of 1-2%. In some other tree species, losses to bark stripping may be much greater. Lodgepole pine, and Norway spruce for example are more frequently stripped than Sitka spruce. Norway spruce, and to a lesser extent larch and Douglas fir develop more stain after wounding. However losses due to bark stripping are limited by the price differential between pulp and sawlog timber, which is currently low.

Table 1 Potential yield loss due to bark stripping. Estimates are based on a mean of 1.4m of lower log section lost to pulp, for an unthinned stand of yield class 12 Sitka spruce.

Felling Age	Volume m^3 ha^{-1}	Potential sawlog volume lost to pulp m^3	Loss in Value %
45	429	70	6.8
60	592	73	6.0

Browsing

Deer have preferences when feeding and tree species differ substantially in the amount of damage they receive. There are also differences in the ability of trees to recover after damage. As a result, some types of damage can be very serious to particular species but negligible to others. Comparisons of growth between protected and unprotected trees reveal these differences as well as showing how increased severity or repetition of browsing results in a greater height loss than one single event (figure 1). It is quite fortuitous that the forest industry has found two species (Sitka spruce and Corsican pine) that are growing rapidly in British conditions and are relatively resistant to damage. However, even amongst these species, examples of severe damage can occur.

Surveys of damage have suggested that browsing is typically severe enough to Sitka spruce to cause a loss of height growth equivalent to about one year's growth (Welch *et al* 1992; figure 1). If sustained until the end of a 45-year rotation, this would result in a reduction of 3.4% in timber yield (table 2). However much longer delays can occur. Growth of silver fir has been found to be delayed by between 9-13 years in central Europe, and suppression of height growth of the more palatable broad-leaved species, such as oak, rowan and willow may be almost indefinite. Thus the loss of the *entire* yield may be possible if the trees are not protected.

Leader browsing can lead to the development of a fork with two or more stems in place of a single main stem. Not only does this yield thinner stems, which will have proportionately

lower value, but the stems may retain a bend or deformity near the fork, or a structural weakness which will result in break during a storm. As the tree grows, one of the stems becomes dominant, and the tree may become single trunked again. The stem may however remain smaller than a single-trunked tree and retain some deformity. There are considerable differences between tree species in their ability to recover leader dominance, for example larch can recover much more readily than Sitka spruce (Perks *et al* 2003). In table 2, estimates of yield loss due to forking have been calculated on the assumption that none of the stems in forked trees would be suitable for sawlogs, but would nonetheless be suitable for pulp.

Table 2. Potential yield loss due to forking and a growth delay from browsing. Estimates based on yields from an unthinned stand of yield class 12 Sitka spruce

Felling Age	Volume m^3 ha^{-1}	Maximum % Yield loss if all stems forked	Yield loss estimated from reported proportions of forked trees*	% Yield loss due to a growth delay of			
				1	2	4	8 Years
45	429	28.4%	7.1%	3.4	7.2	16.0	29.8
60	592	34.7%	5.9%	1.6	2.8	6.5	15.2

* Actual proportions of forked trees have been reported to be 25% at age 45 reducing to 17% by age 60 (Welch *et al* 1995)

Mortality

Browsing can reduce survival rates of young trees as well as affecting growth. Seedlings of the more palatable species may be entirely eliminated by deer, particularly where browsing pressure is high. Survival after browsing is however very variable – smaller or younger seedlings, or those growing where competition is greatest (under shade, or amongst dense ground vegetation) are least likely to survive. Although it is not always clear to what extent deer are responsible, surveys have revealed that both young plantations as well as woodlands managed by natural regeneration suffer from under-stocking. Densities on planted re-stocks have been reported to be between 70 and 95% of the target density, in spite of the fact that beating up had already been done on more than 50% of the sites (Wright 1997; Smith *et al* 1998).

Protection and establishment costs

Estimates of the cost of deer damage are most useful when compared to protection methods. The cost of fencing varies costs vary in relation to the shape and size of the area concerned, and to some extent, the nature of the terrain being fenced. Fencing is relatively cheaper for large, evenly shaped areas, with a minimum number of turns, corner posts and bumps or gullies to go over. Individual tree guards are more likely to be a cheaper option for small areas (approximately 2ha or less) or for thin or awkwardly shaped areas. Nominal figures of £7/m and £1 each have been used for fencing and tree guards respectively, however it is possible to provide protection at both higher and lower costs than these. The cost of planting, and beating up, has been estimated at £0.25 per tree, or £0.50 if weeding is also needed. The usual discount rate of 3% has been applied to establishment costs to compare investment expenses with returns at the end of the rotation.

Depending on circumstances, tree protection may be up to 3 times the cost of establishment. It is clear that with the current low prices for timber, it is difficult to make an annual return of 3% if fencing costs are taken into consideration (table 3). Indeed, the actual costs of establishing a stand (planting, weeding and fencing combined), could even exceed the final sale value for small areas or stands with poorer growth. Further, low timber prices also mean that deer damage would have to be very severe to reduce yield enough to justify the use of anything other than a low-cost fence.

In view of the fact that tree species differ in susceptibility to damage, the least palatable tree species offer the best prospect of an economic return. Deer control alone may therefore be sufficient to protect trees if it can be provided at little or no cost to the timber grower. For the more palatable tree species, experience suggests that it will be very difficult, if not impossible, to reduce deer populations enough to establish the trees without protection. In these cases tree establishment needs to be justified for amenity or conservation objectives, rather than solely for timber production.

Table 3. Estimates of the cost of tree establishment and protection, in comparison to yield

Costs are discounted at 3% for 45 years. For comparison, revenue expected from standing sales of an un-thinned stand of Sitka spruce on a 45 year rotation.

	Trees ha^{-1}	**Cost ea.**	**Cost £ ha^{-1}**	**Cost ha^{-1} Discounted $*1.03^{45}$**	**Total Discounted establishment cost (planting + protection)**	**Yield Class**	**Yield m^3 ha^{-1} at 45 years**	**Revenue, Standing sale £6.00/m3**
Planting +weeding	2500	0.25	625	2362				
	2500	0.50	1250	4725				
Tree Guards	1000	1.00	1000	3780	4725			
	2500	1.00	2500	9450	11812			
Fencing Area (ha)	Fence length (m)	Cost £ /m						
2	565	7.00	1977	7475	9837			
10	1265	7.00	885	3347	5709			
100	4000	7.00	280	1058	3420			
						8	293	1758
						12	468	2808
						16	632	3792
						20	795	4770

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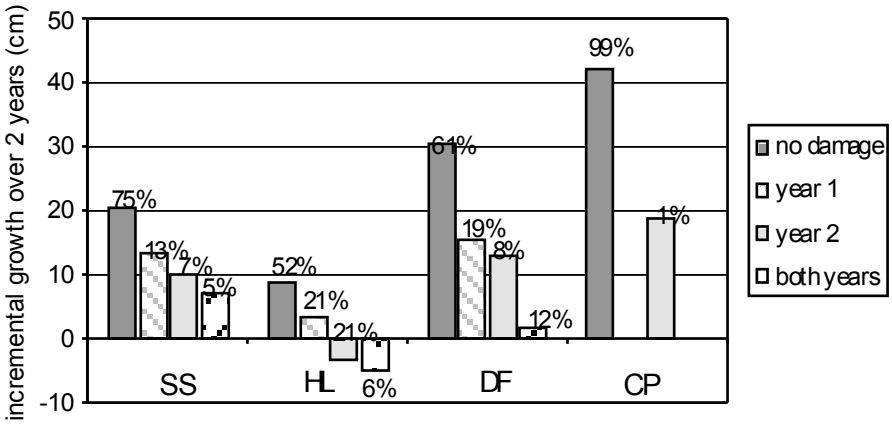

Figure 1. Incremental growth over two years in relation to the frequency of leader damage in the first and second year. The figures above the bars represents the proportion of trees of each species in each damage category.

Quantifying the damage wild deer cause to agricultural crops and pastures

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1. Introduction

Populations of all six species of deer occurring in the British Isles have increased substantially over the last fifty years in terms of numbers, and for most of the species also in their range. Recent nation-wide estimates suggest that the total number of deer now stands around 1.2 million, of which at least one third are thought to reside within England, around two-thirds in Scotland, with comparatively low but nevertheless increasing numbers in Wales.

While deer damage has long been regarded as of major concern in forestry, the recent expansions in deer distribution and build up of high local densities have resulted also in increasing complaints about perceived deer damage on agricultural crops and pastures. Deer are implicated in damage to a variety of agricultural crops, especially cereals, fodder crops, rape, orchard trees and grassland (especially loss of 'early-bite'); with fallow, red and roe deer tending to be the three species most frequently associated with such damage in this country (Putman & Moore 1998; Doney & Packer, 1998; Langbein, 1998; Putman & Langbein, 2003). However, to date only limited scientific data have been available to quantify ***actual*** rather than ***perceived*** levels of impact of deer in terms of agricultural losses in Britain. Assessment of deer impact tends to be complicated by concurrent crop damage by other species (e.g. lagomorphs and rodents), whereas farmers' perceptions of damage may to some extent be influenced by the comparatively large herds and individual size of deer (Putman & Langbein, 1999; Putman & Kjellander, 2003). The impact from free-ranging deer also tends to be highly variable between deer species, crop types, sites and seasons, and hence objective study must take account of likely influencing factors such as the local ranging behaviour and feeding preferences of the deer, and the distribution of affected crops in relation to other resources (e.g. alternative forage and shelter).

In this paper, we review briefly information from previous British studies on deer damage to agriculture, most of which have tended to be based largely on questionnaire surveys of perceived damage levels reported by landholders. Preliminary findings are then presented from our own ongoing research commissioned by DEFRA to provide quantitative data on the actual level, economic significance and seasonality of damage by wild deer to agricultural crops and pastures. This research integrates measurements of animal behaviour (from remote video surveillance and GPS animal tracking collars) with direct assessments of crop damage across a range of study farms in Southwest England. The aims are also to improve our broader understanding of the way in which deer tend to exploit agricultural resources, and how this translates into recorded damage.

2. Perception Surveys

Deer have long been implicated as causing some damage to a wide range of differing agricultural crops and pastures, but few studies have attempted to quantify the scale and distribution of such impact in Britain. Some of the earliest UK information on regional differences in deer damage to agriculture were provided by the COSTER database (Computerised Summary of Technical Reports) maintained by the Agricultural Development and Advisory Service (ADAS) between 1985-9 (reviewed by Putman & Moore, 1998). Among 220 reports of deer damage in England and Wales received by ADAS between January 1987 and March 1989, the highest number were recorded in Eastern England (88), followed by the South West (55) and South East (41), with far lower numbers of complaints from Northern England, The Midlands and Wales. The species implicated most regularly in Eastern England were fallow (74 of 88 reports) and red (12/88); whereas in South West England most reports related to red (22 of 55 reports), followed by fallow and roe.

While the above data relate merely to complaints received rather than a structured study, quite similar results have been obtained by the most comprehensive of a number of recent questionnaire surveys (Doney & Packer 1998; Packer *et al* 1998). Questionnaires were distributed by ADAS to 2560 farms across four regions of England (Gloucestershire/Somerset; Essex/Suffolk; lowland Yorkshire; and Northamptonshire). Deer were present on the holdings of 69% of the 1192 agricultural respondents, and 38% believed that deer cause significant damage. When asked about changes in deer damage noted over the previous 5 years, most farmers felt this had either increased (42%) or stayed the same (48%). The agricultural crop type thought to be most likely to be damaged by deer was cereals (44% of respondents), followed by farm woodland (29%), grass (6%), root crops (3%), fruit (3%) and rape (3%). However, the focus by this question on the 'most' likely crop to be damaged on any one holding may have underestimated levels of concern about other crops such as grass and root crops. In a similar study confined to within the Quantock Hills Area of Outstanding Natural Beauty (where high densities of red deer are present), Langbein (1998) found that 54% of farmers believed that cereals were affected, but a high proportion stated that they also suffered deer damage to permanent pasture and sown leys (41%), physical damage to boundary hedges and banks (34%), as well as farm woodland (34%).

Perceived significance of damage

In the 1995 ADAS questionnaire the majority of farm respondents agreed or else strongly agreed that "the damage caused by deer causes significant economic loss" in Avon and Somerset (45% of 294 with deer present), and Essex and Suffolk (36% of 141), but disagreed or strongly disagreed in Northamptonshire (51% of 35) and North Yorkshire (49% of 100). In the Quantock Hills AONB, 74% of landholders considered that deer caused significant damage on their land, with most ranking deer as more damaging than rabbits, badgers, or foxes (Langbein, 1998).

Asked to estimate the actual losses from deer damage, 17% of respondents to the ADAS survey growing mainly cereals perceived no significant cost, and 85% estimated damage to be £500 or less. The median annual agricultural losses from deer damage was also estimated at around £500 per holding (mean holding size 92 ha) on the Quantocks (Langbein 1998). However, accurately estimating the cost of deer damage to agriculture is not straightforward, as without experience, deer damage to crops is often difficult to distinguish from that caused by other mammals such as rabbits and hares. Doney & Packer (1998) found that while

farmers were mostly (75-80%) accurate in reporting deer species and approximate abundance, they were generally incorrect about the economic value of damage to cereals. Farmers were as likely to underestimate the cost as to exaggerate it. Actual losses by grazing winter wheat were assessed during follow-up ground-truthing of a limited sample of farms at up to 0.57 tonnes per hectare on sites which were regularly visited by roe or fallow deer, but at lower levels of grazing a negligible economic loss, or an actual gain in yield, was recorded (Doney & Packer, 1998; 2002).

Assessment of the final costs of deer damage to cereal and other crops is further complicated as plants may recover or even benefit to some extent from grazing or browsing. For example, in Hampshire roe deer were noted to cause substantial levels of apparent damage to cereal fields in early spring, with up to 30% of the total crop area affected, but this proved of no economic significance if most grazing activity ceased by mid-May (Putman, 1986).

3. Current field research to quantify actual impact and deer grazing behaviour

Objectives & approaches

Our own field studies were initiated to:

a. quantify the actual level and economic significance of damage caused by wild deer to agricultural crops in Southwest England (where results of the perception studies discussed above indicated that damage may be of greatest economic significance), focussing in particular on damage to cereal crops and pastures, and

b. improve understanding of foraging behaviour by deer on differing crop types and the seasonality of their use of agricultural resources.

This is being addressed in the field through use of a combination of three main approaches:

- assessment of damage levels within crops using a variety of direct plant measurements, including the use of 'deer' and 'deer + rabbit' proof enclosures to allow distinction between deer damage and that caused by lagomorphs;
- monitoring of these same fields using remote video surveillance, incorporating infra-red cameras and illumination so that they can operate 24 hours a day, and to enable determination of the level of deer utilization associated with crop damage at different times of year;
- fitting Global Positioning System (GPS) tracking collars to a sample of wild deer; to record the spatial and temporal patterns of their foraging behaviour, and thus to determine the specific locations of feeding sites (and hence crop types). Such collars can provide location fixes to an accuracy of < 5m several times per hour (or other pre-set interval) as well as information on the proportion of time the deer spend foraging or resting on different crop types.

It was intended that all three of these methodologies should be integrated fully at each of several study sites, so as to gain better understanding of the manner in which deer exploit agricultural and other resources available to them. However, to date only very limited GPS tracking data are available to us, and hence preliminary results presented below are confined

mostly to deer impact as measured using exclosure trials, supported by data from remote video monitoring.

Yield losses and deer activity in cereal fields

Our assessments of damage to cereals have so far focussed mainly on three large low-lying estates on the edge of Exmoor and the Quantock Hills in Southwest England; all in areas frequented predominantly by red deer at medium to high density, with some presence also of roe. During 2001 sets of eight exclosure cages (2.4 m x 2.4m x 1.3 m) were set up during February at each of three winter wheat sites, and during 2002 at six cereal sites (3 wheat, 2 oats, 1 barley). Half of the exclosures at each site were designed to prevent access by deer and half to prevent access by deer as well as smaller herbivores such as rabbits. An unfenced control plot was established within 10 metres of each exclosure cage. Cereal crop yields were assessed immediately prior to harvest within each exclosure and control area by cutting and collecting all ears from cereal stems within a $1m^2$ quadrat positioned at the centre of each plot. Following threshing and oven drying of all samples the total yield of dry grain per m^2, 100-grain weight, and moisture contents were determined for each plot.

The Foot & Mouth Disease outbreak and consequent restrictions to farm access prevented any monitoring of the study fields during the 2001 growing season prior to harvesting. However, in 2002 deer activity and foraging behaviour were assessed in all of those fields where exclosure cages had been installed through use of remote video surveillance systems. Filming at any one field usually extended over 3 to 4 days, giving around 70-100 hours of near-continuous footage (excluding 0.5 hours for daily battery replacement) per session; between two to three such monitoring sessions were completed for each of the study fields between April to July 2002.

Preliminary results from exclosure studies and video surveillance for are summarised in Tables 1a & 1b. Yield reductions measured at the three different farms during 2002 in unprotected plots as compared with fenced plots ranged from just 1 to 12% for winter wheat, 0 to 8% in oats, and 5 % in barley. These findings are closely in line with mean losses ranging from 2.5 to 11% recorded for three different winter wheat fields at the same farms the previous year. Differences between the 'deer' and 'deer+rabbit' treatments were insignificant within five of the six cereal fields assessed during 2002, indicating that most of the losses could be attributed there to deer and not smaller herbivores; differences in yields between the two fencing treatments were significant in just one field (T1) whilst down to winter wheat during 2001, and again when sown with oats during 2002.

At least some deer activity was recorded during remote video monitoring of all six cereal fields, and in the case of five of the sites deer were captured on video tape during more than half of all filming days completed. (Other animals regularly captured on tape at most sites included badgers, pheasants, and, more occasionally, rabbits and foxes). Average deer activity recorded in this manner on cereal fields ranged from just 3 to a maximum of 463 'deer minutes' ha^{-1} day^{-1} across the sites. The two cereal fields showing highest yield losses based on exclosure sampling were also those where greatest overall deer activity was recorded on film, and here included high levels of deer presence during ripening of the crop in June/July. However, direct relationships of this preliminary, fairly crude measure of deer activity with damage levels remain rather tenuous; more detailed analysis of video footage has yet to be undertaken to split recordings into periods when deer were seen to be actually feeding rather than resting within the target crop.

Deer activity and recorded damage were usually very patchily distributed even for the most severely affected fields; while some individual unfenced plots showed yield reductions of over 35%, the highest yield loss when averaged for any one entire cereal field equated to ca. 0.96 tons per hectare. Based on an average yield of 8 t ha^{-1} and the March 2003 price of £62.50 t^{-1} for feed quality wheat, this translates into a maximum recorded loss of c.£60 ha^{-1} or £24 $acre^{-1}$ for the most severely affected field in our sample. However, most deer damage within each farm tended to be centered on a small proportion of fields (often those close to at least some woodland cover), and as such grain losses averaged for the entire cereal area per holding are unlikely to exceed 5% for any of our study farms.

Assessments of deer utilisation of improved pastures

Measurements of the actual impact of wild deer grazing on pastures cannot be addressed as readily through use of exclusion plots as done for cereals (see above). This is because it is impossible to use plant measurements to distinguish between grazing done by domestic livestock kept on the pasture and that caused by wild deer. It was, therefore, planned to use GPS tracking collars to monitor the foraging activity of wild deer, to determine the proportion of time the animals spent foraging on different crop types. Although three red deer were successfully tranquillised and collared by early 2000, at this point the darting of wild deer for the present project needed to be suspended because of changes in legislation affecting the use of the tranquilliser (Large Animal Immobilon) specified for use with wild deer. Efforts to retrieve the GPS collars were then further interrupted by access restrictions imposed by the 2001 Foot and Mouth outbreak, and consequently only one GPS collar was retrieved. Nevertheless, even the information available for just one hind tracked using a GPS collar scheduled to provide a fix every 20 minutes, produced over 1000 good locations during February 2000, and showed the great potential of this technique for assessing the detailed foraging behaviour of deer. During that one winter month, this animal spent the highest proportion of its foraging bouts within an area of scrub and woodland, whereas time spent on surrounding pastures was split approximately evenly between periods spent foraging and resting. Earlier data on red deer habitat use gathered within the Exmoor National Park (based on three adult female and three adult male deer fitted with ground based radio-tracking collars and tracked over a full year, Langbein, 1997), showed that while during day-time only 7% and 13% of fixes, respectively, located hinds and stags on improved pastures, this rose to 23% and 34% of fixes on improved pastures during the night.

Exclosure trials have also been undertaken on grassland to assess the loss of hay crop yield following the removal of domestic stock at just one of our study farms where consistently high levels of deer activity have also been recorded using remote video-monitoring (as outlined above). At this site an 'average' of 2055 deer min ha^{-1} day^{-1} were recorded during regular day/night filming sessions between late April to late June. This was at a level over four times higher than recorded at any of our cereal study fields, and equivalent to the presence throughout each day of about 1.5 deer per ha. Six exclosures and six control plots were established at this site once domestic stock had been removed at the end of April, which were then sampled prior to hay making at end of June. Despite the high levels of deer activity, herbage cut within and outside of these grassland exclosures indicated only a 3.5% reduction for the unprotected plots; no significant difference was apparent between the deer and deer+rabbit fence treatments.

4. Discussion

Review of the results of several recent perception surveys indicate that the majority of farmers across England and Wales do not, as yet, regard agricultural damage by deer as being of economic significance. Damage from deer on agricultural land may, however, be quite serious at a local level, especially for cereal yields or where there is concern about loss of 'early-bite' from spring grass. Grazing damage to cereals observed in late winter and early spring may often be partly negated though compensatory growth and tillering, and tends to be less serious than browsing and trampling by deer during the ripening phase (Putman, 1986; Doney & Packer, 1998). Although roe deer, by virtue of their wide distribution throughout the UK, tend to be implicated in some damage to a wide variety of agricultural crops in most regions, 'severe' levels of damage (mostly by fallow or red deer) seems restricted mostly to areas where large herds, sometimes of 40-200 animals, aggregate on favoured farmland feeding grounds (Langbein, 1996; Scott & Palmer, 2000; and this study); with such damage at present likely to be more significant in parts of the South-West England and in East Anglia than in any other regions of England (Packer et al. 1998; Doney & Packer, 1998). There appears at present to be only limited evidence of significant damage to agricultural crops by muntjac or Chinese water deer (Putman & Moore, 1998), although Doney & Packer (2002) reported that muntjac were perceived by farmers to cause some damage, especially to cereals. While muntjac do tend to venture out of woodland to graze on crops, their impact on cereals is likely to be much reduced compared with other species because of their closer spatial association with woodlands, and probably also their smaller size, making them less likely to feed on high cereal crops once ripe. Potential damage by red deer, partly by virtue of their larger individual size, tends to be viewed most seriously by farmers (Langbein, 1998; Putman & Langbein, 1999, 2003; Scott & Palmer, 2000).

Preliminary results presented from our ongoing research in Southwest England relate mostly to impact by red deer, the largest of our native species, occurring there at relatively high density (>10 km^{-2}). Assessments undertaken in cereals show losses ranging from less than 1% to a maximum of 12% in the most severely affected fields, which at current prices for feed quality wheat equate to a maximum loss of around £60 ha^{-1} or £24 $acre^{-1}$. The average losses for the entire area given over to cereals within any one holding is likely to be considerably lower, with the majority of damage often focused on a small proportion of fields abutting or close to woodland cover.

Results from remote video-monitoring and limited radio-tracking data provide evidence of very high levels of utilization by red deer of agricultural pastures in parts of Southwest England, but very few data are as yet available for actual losses to grass yields. GPS tracking provides one of the most promising techniques to study wild deer foraging and its likely impact on pastures used also by livestock and other herbivores. During the remainder of this project, we hope to recommence GPS tracking studies for red deer, and integrate these more fully with measurements of yield losses and forage intake rates. While our studies have focused to date on impact of red deer in Southwest England, it is hoped that similar studies can be initiated in future to replicate this work for other species and regions, perhaps in particular for areas of high fallow deer and red deer density in Eastern England.

5. Acknowledgements

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Biotechnology and Biological Sciences Research Council. This research was carried out in accordance with the welfare standards approved by the Institute of Grassland and Environmental Research's Ethical Review Procedure.

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Table 1. a) Average yield-losses (2002) assessed within fenced and unfenced (control) plots within cereal fields frequented by wild red deer in West Somerset. [relative deer activity score given in "deer-minutes / ha" based on video surveillance of the same fields Apr-July 2002]

Crop type/ (Deer act.)	Field	Plot type	Average Yield g/m^2	No. of plots	Stdev	% Yield loss cf. fenced
WHEAT	**P2**	**Control**	**706.8**	**8**	**254.6**	**-11.93%**
(88)		**Fenced**	**802.5**	**8**	**147.4**	
	of which:	*deer fenced only*	*819.3*	*(4)*	*114.3*	
		deer+rabbit mesh	*785.7*	*(4)*	*192.0*	
WHEAT	**C2**	**Control**	**783.0**	**8**	**74.8**	**-4.95%**
(33)		**Fenced**	**823.8**	**8**	**116.5**	
	of which:	*deer fenced only*	*838.6*	*(4)*	*166.5*	
		deer+rabbit mesh	*808.9*	*(4)*	*57.9*	
WHEAT	**T2**	**Control**	**1108.7**	**8**	**109.8**	**-1.22%**
(75)		**Fenced**	**1122.5**	**8**	**97.1**	
	of which:	*deer fenced only*	*1127.8*	*(4)*	*93.1*	
		deer+rabbit mesh	*1117.1*	*(4)*	*115.2*	
OATS	**C1**	**Control**	**595.4**	**8**	**62.0**	**-8.04%**
(463)		**Fenced**	**647.5**	**8**	**82.4**	
	of which:	*deer fenced only*	*648.3*	*(4)*	*77.2*	
		deer+rabbit mesh	*646.6*	*(4)*	*99.3*	
OATS	**T1**	**Control**	**713.4**	**8**	**117.6**	**0.06%**
(8)		**Fenced**	**712.9**	**8**	**76.6**	
	of which:	*deer fenced only*	*690.4*	*(4)*	*106.2*	
		deer+rabbit mesh	*735.5*	*(4)*	*32.7*	
BARLEY	**P3**	**Control**	**643.7**	**6**	**63.8**	**-5.60%**
(37)		**Fenced**	**681.9**	**6**	**82.3**	
	of which:	*deer fenced only*	*675.4*	*(3)*	*127.4*	
		deer+rabbit mesh	*688.3*	*(3)*	*24.0*	

Table 1. b) Average yield-loss (2001) assessed within fenced and unfenced (control) plots within cereal fields frequented by wild red deer in West Somerset.
(no video-surveillance possible due to FMD access restrictions)

Crop type	Field	Plot type	Average Yield g/m^2	No. of plots	Stdev	% yield loss cf. fenced
WHEAT	**P1**	**Control**	**582.9**	**8**	**110.3**	**-10.79%**
		Fenced	**653.4**	**8**	**63.3**	
	of which:	*deer fenced only*	*652.9*	*(4)*	*80.5*	
		deer+rabbit mesh	*653.8*	*(4)*	*53.6*	
WHEAT	**C1**	**Control**	**688.4**	**8**	**120.1**	**-4.39%**
		Fenced	**720.0**	**8**	**75.8**	
	of which:	*deer fenced only*	*722.1*	*(4)*	*71.6*	
		deer+rabbit mesh	*717.8*	*(4)*	*90.8*	
WHEAT	**T1**	**Control**	**728.7**	**8**	**65.0**	**-2.45%**
		Fenced	**747.0**	**8**	**68.7**	
	of which:	*deer fenced only*	*690.7*	*(4)*	*33.0*	
		deer+rabbit mesh	*803.3*	*(4)*	*38.2*	

Deer in urban and urban fringe areas – trends, issues and challenges

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Introduction

In 1996 as part of a regional research project and as the culmination of several years work, a conference was held called *Deer or the New Woodlands – managing Deer in Community Forests and the Urban Fringe*. The conference and the work leading up to it were supported by the Forestry Commission, the South Yorkshire Forest Partnership, and in particular by the Deer Society. This event and the accompanying publication were to a degree a landmark achievement. In their own way they helped to draw attention to the emerging issues of a largely neglected topic – that of deer moving into and around the green spaces of our major cities and smaller towns.

Since 1996 the situation has sharpened and the issues and predicted problems have rapidly come into being. However, it is notable that there is still a lack of interest in these issues by key individuals and organisations and that, for example, funding even on a modest scale to continue any work has been elusive. The Community Forest partners and local authority representatives felt that with the conference the issues had been addressed and resolved.

Background to the project

The 1996 conference was based on a major regional survey of deer populations across the South Yorkshire area. In order to gain effective insight into trends and changes, the work extended beyond the county boundaries to include parts of north Nottinghamshire, north Derbyshire, West Yorkshire, and the entirety of the Peak District. Dr Derek Yalden of Manchester University supplied a considerable body of data on the western Peak District areas.

The landscape in which the South Yorkshire Area Deer Survey is set includes major conurbations, but with substantial areas of 'encapsulated countryside' and open national park environments. The region falls in altitude from around 500 metres to close to sea level, over a distance of fifty kilometres, running from the high Pennine moorland to the lowland farming landscape of the Humberhead Levels. Once rich in both deer parks and wild deer, until very recently deer have been largely absent.

The background to the research is described in earlier publications (Rotherham 2002; McCarthy & Rotherham 1994; and McCarthy, Baker & Rotherham 1996). The current research is continued by the team at Sheffield Hallam University and the South Yorkshire Biodiversity Research Group, as part of the South Yorkshire Biodiversity Research Programme. (More details can be found on our web site: www.shu.ac.uk/sybionet).

The situation in the 1970s and 1980s

For the Sheffield area, deer were largely absent in this period. There was a long-standing feral population of red deer at Wharncliffe to the northeast, a long-standing feral (and melanistic) herd of fallow at Stanton in the west, but little else. The Wharncliffe red deer occasionally made the news when individuals moved down the River Don into the heart of the Sheffield City Centre; tracks and droppings on small islands in the River Don at Kelham Island Industrial Museum indicated regular activity.

Roe deer were being recorded well to the east in Doncaster. To the south, in north Nottinghamshire there were populations of roe, fallow and red. Where deer did occur there were already problems of illegal poaching and persecution.

The situation in the 1990s

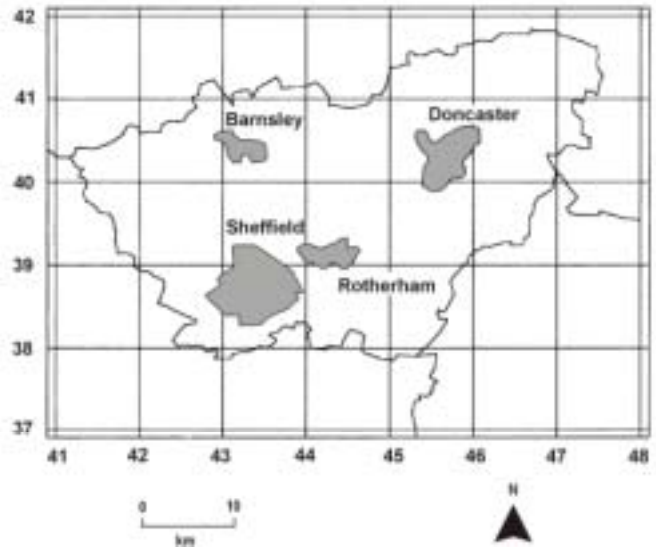
Research work at the Sheffield City Ecology Unit developed contacts with a diversity of people including farmers, gamekeepers, foresters, policemen, and early morning lorry drivers. Informal and often anecdotal records and observations from this wide-ranging source began to tell a different story, and one that was counter to the opinions of local naturalists. Quite clearly deer were moving in to the wider area and even into the urban fringes.

Discussions with experts including Deer Society members across to Doncaster in the east, and north up to Leeds and Bradford suggested that interesting changes were happening. The more northerly cities already had well-established roe deer populations and in Doncaster their numbers were rising rapidly.

It was decided to embark on a wide-ranging survey involving site work, but particularly media promotions to get and collate sightings and records of deer across the region. This effort generated around 1000 records across an area of about 70 x 50 kilometres.

The survey results in the mid 1990s

The Survey Area:



The data were used to produce distribution maps of the four species found (Red, Fallow, Roe and Muntjac). The maps here are based on the latest version of the database but should be

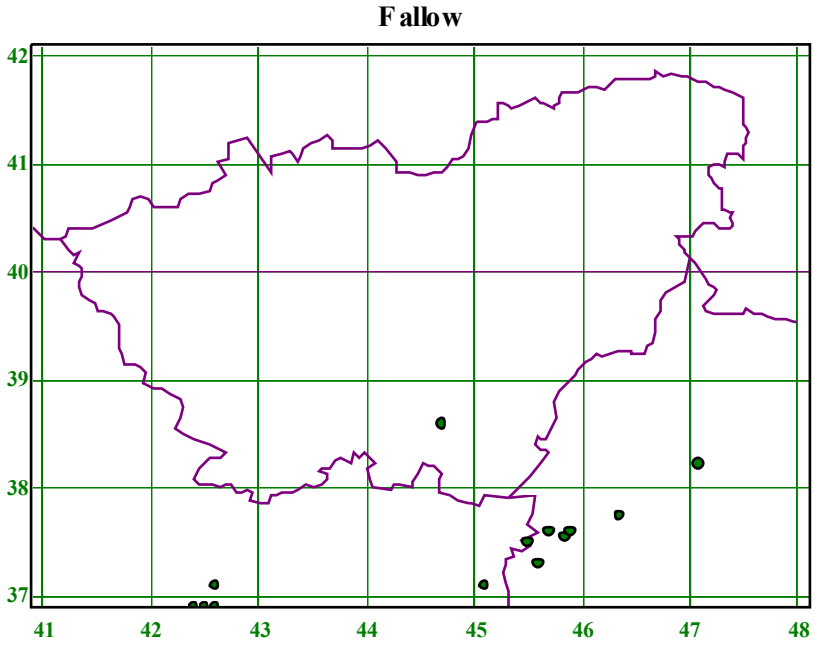
regarded with caution since the data input has yet to be fully completed and proofed. Also, due to the on-going problems of poaching and persecution only broad information is given in terms of specific numbers at good sites. Further information may be given to *bona fide* enquirers, and all the datasets have been made available to local natural history society recorders and biological records centres.

Red deer were established in their traditional locations, linked mostly to ancient deer parks. Some of these were abandoned and the herds feral (eg Wharncliffe), and others such as Chatsworth had captive herds. However, although deer parks such as Chatsworth had a policy of shooting escapees, it was clear that some did survive, were ranging quite widely and might persist. Local farmers were occasionally keeping a few red deer too, and again they sometimes escaped. In one case red deer lived for some months in a very urbanised but well-wooded valley to the south of Sheffield, leaping over hedges and startling elderly ladies, and in one case an individual was trapped in a very urban schoolyard on Sheffield's Arbourthorne Estate, to be rescued by the RSPCA.

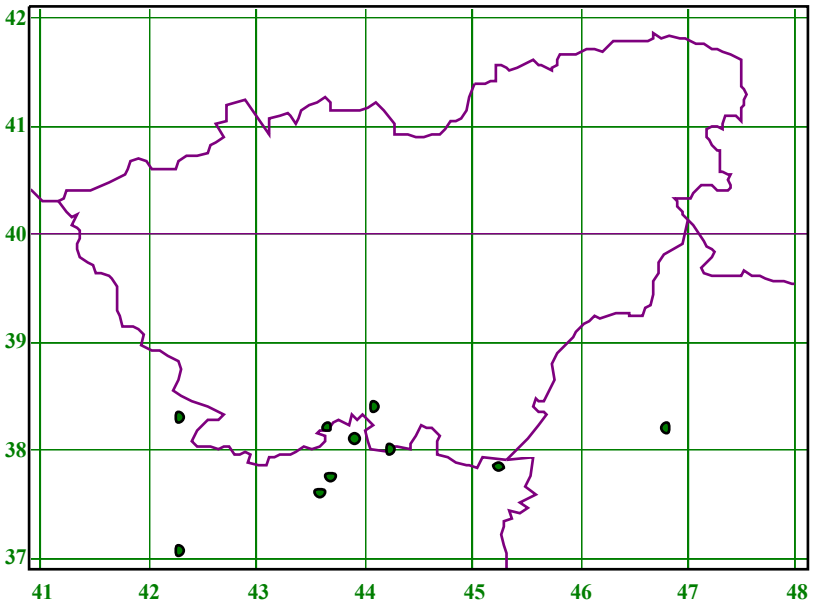
Fallow deer were established in their traditional haunts but not spreading further. The Dukeries of Nottinghamshire, and the Matlock area of Derbyshire were the strongholds.

Roe deer were well established across most of region. The urban centre of Sheffield was being penetrated in a pincer movement with populations moving in from the east, from the north and from the south. With only anecdotal records from Sheffield's western suburbs, evidence proved hard to come by. However, even the cynics were convinced when a roe deer ran across a televised Yorkshire cricket match at Abbeydale! Further records then came in from the well-wooded suburbs of both south-west and north-west Sheffield.

Muntjac were firmly established in the Doncaster area and were colonising the suburban fringe of south Sheffield during the 1990s. They were not widespread but certainly established.



Muntjac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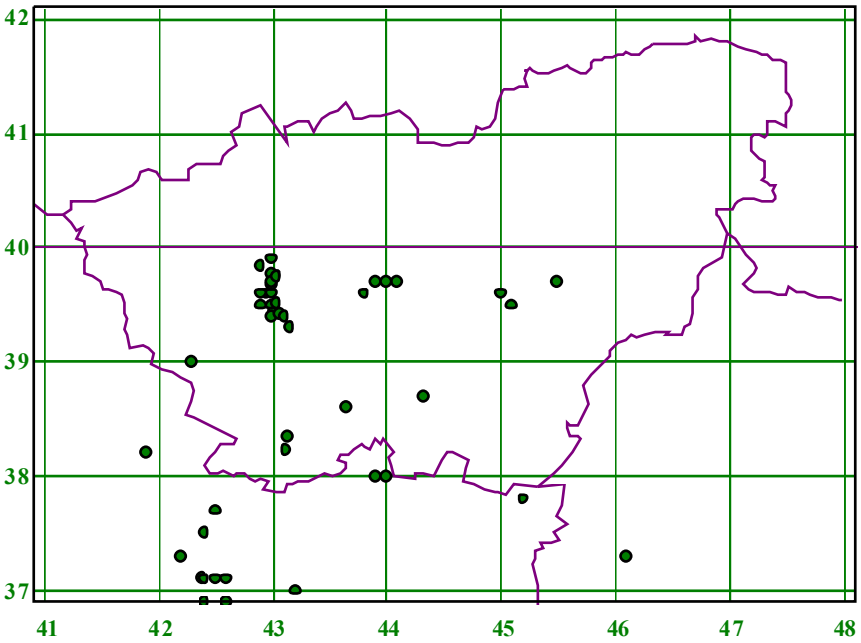
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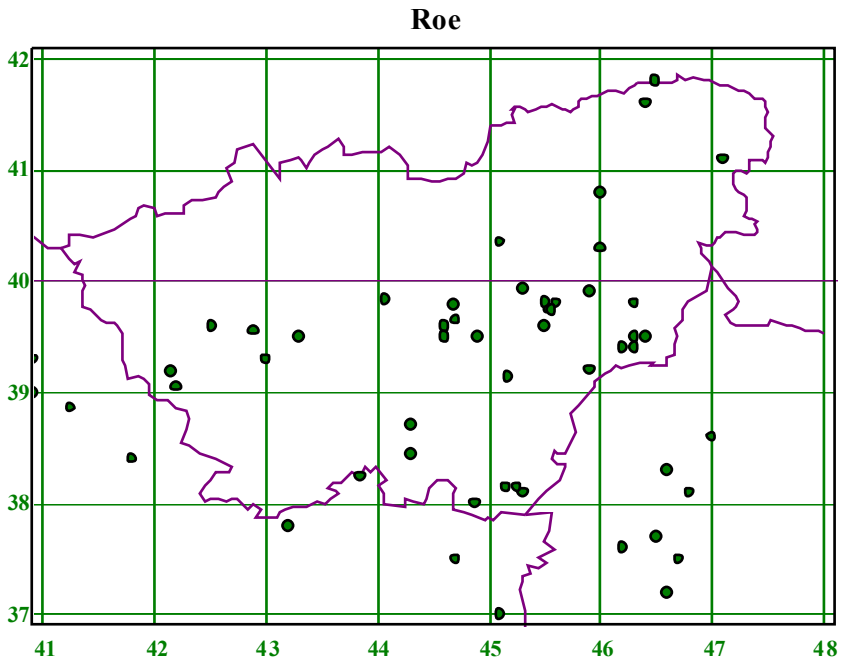

The problems and issues of deer in urban areas
Not just people and deer, but *Urban People* and *Urban Deer*

At the 1996 conference individuals such as Mike Squire and David Stewart commented on the potential problems of deer and urban people. These issues range from road traffic accidents and hazards, to animal welfare and stress, to impacts on the way in which woodlands and other habitat-types are managed. Increasingly they also involve the relationships and contacts between deer and people and particularly damage to farmers' crops, and to people's gardens. Some of these are things that in the wider countryside are perhaps expected, and to an extent tolerated or dealt with. When the deer come to town then things are different.

Deer in urban areas encounter many unfamiliar problems, and their impacts have potentially major consequences for landowners and managers. The new woodland plantations for initiatives such as the Community Forests and the edges of new highways present wonderful opportunities for expanding deer populations. These new woodlands (including both plantations and semi-natural successions) on abandoned industrial land, derelict farmland, along major highways, and along old railways, all provide excellent habitat. Local Authorities and others have conservation and environmental strategies that emphasize the need for networks of interconnecting 'green corridors'; all good news for deer!

However, the increasing numbers and more widespread occurrence of deer have serious implications both for new plantations and ancient woodlands. Furthermore some of the most serious issues relate to a basic lack of awareness and a lack of understanding or preparedness by many key players and organisations. This applies equally to issues of site management and deer management, and to matters of animal welfare and public safety and education. In well-wooded cities such as Sheffield and Barnsley (see Rotherham 1996; Jones & Rotherham 1996 and 2000; and Rotherham & Avison 1998) woodland managers have not needed to manage for deer. In future they will need to consider issues of deer grazing and damage when managing or regenerating their woods, and there will be a cost. Establishment of muntjac could have implications for the conservation of flagship plants such as bluebells in ancient

woodland. It will be interesting to see whether the public's love of deer turns sour if the local bluebells take a downturn.

Deer, particularly red and fallow, present a serious hazard in terms of road traffic accidents (RTAs), and the risks and costs have been demonstrated in the UK, Europe and the USA. Expanding populations in urban areas are a particular issue, since not only are urban areas becoming more wooded, but also rapidly creeping urbanisation is an increasing feature of much of the UK landscape. Associated with these changes are animal welfare issues for which the urban public and relevant authorities are often totally unprepared. (See Squire 1999; Rotherham, 1996 and 2000.)

Furthermore, attempts to control or manage deer populations become increasingly difficult in the urban catchment. At the 1996 Symposium Mike Squire described the potential conflict between necessary control measures and urban sensibilities. Much of the UK's urban community has been separated from its environmental roots for more than a century. While most people care about wildlife and about nature conservation, they often know very little about land management or wildlife management. (This incidentally applies not just to the general public, but to many decision makers too.) Effective control necessary to prevent damage to woodlands, to minimise RTA risk, or to minimise animal suffering through food shortage and stress in winter, would be totally unacceptable to the majority of the urban or sub-urban community. (None of these is needed now in the South Yorkshire area, but they are all real possibilities in the future.)

There is a further problem in and around urban areas and particularly around the big metropolitan districts. This is illegal poaching and persecution of deer and of course other protected species of wild mammal also. These are generally different from, but may overlap with problems in rural areas. It is worth noting that Sheffield's first confirmed roe deer records ended up either as RTAs or killed by dogs. The risk of poaching is also a problem in terms of the free sharing and dissemination of distribution data.

It was previously raised as an issue that in the light of these trends and the issues they present, it is surprising and perhaps alarming that Local Authorities and other agencies in urban areas seem to have no coherent strategies in place to respond. This lack of preparedness and absence of information was also apparent during the most recent Foot and Mouth crisis. Our regional Local Authorities presently have no policies or mechanisms for either monitoring deer populations or responding to any problems that arise. The scale of the problem was illustrated at the 1996 Symposium by one of our Local Authorities that banned its officer from speaking about deer because they had no policy on deer issues.

Since the 1990s

Since the original survey and publications the work has broadened out, though in an essentially low-key way due to an absence of funding. The research now incorporates national surveys of urban and of garden deer records. These are basically reliant on people sending in their records from all across the UK. The results so far are very encouraging and interesting.

The regional deer surveys have been continuing and the intention is to produce a full update within the next 3-4 years. It is very clear that the numbers of deer being recorded and the

areas populated by deer, have increased dramatically since the mid-1990s. Even with our rather low-key survey effort at present there are clear trends emerging.

The numbers of red deer on moorland to the southwest of Sheffield have increased considerably. From the original records of ones and twos, with occasionally up to three (confirmed when they got rather embarrassingly rounded up with the sheep by a local farmer), numbers increased to give sightings of groups of up to eight, then fifteen individuals. During 2001 and 2002 the recorded numbers have increased to 25-35 with five stags.

Muntjac and roe have continued to increase and to strengthen their status in the south and east of the region. In the last few years, roe have also penetrated into the areas around the Upper Derwent Valley and the Ladybower district.

However, some of the previously suggested problems are also now beginning to emerge and cause potentially serious confrontations.

The red deer population on the eastern moors has become something of an attraction to visitors and a cause of excitement and interest to many local people. When the moors were closed to ramblers during the Foot and Mouth crisis, it was possible to sit in a local pub and watch red deer stags come down to graze on roadside pastures, a scene that attracted new and old customers alike. The locals now regard these as 'their deer'. However, it has already emerged that some of the deer are moving into the 'des. res.' gardens of the nearby village of Curbar. Irate gardeners (probably recent colonists themselves from the nearby suburbs) are now demanding that the deer be culled. (They are also apparently calling for a stop to early morning cockerel crowing, although this may just be a rumour.) However, in the absence of reliable data of populations and trends plus distribution and feeding behaviour, it will be difficult to present a coherent and well-argued case for either conservation or control.

Another recent development is that the regional police force are becoming concerned about applications for firearms licences for 'deer control'. It is unclear whether these are genuine applications, whether the applicants are trained or experienced deerstalkers, and from the police point of view, even whether or not there are deer in the target areas, and if the deer should be controlled.

The apparent increasing likelihood that at least some big cats are also establishing in and around the urban fringe may add a further touch of excitement to the issues of deer population expansion. The relationship between deer and a top carnivore might be very interesting indeed! Once again good and accessible information will be increasingly important.

These issues are beginning to be taken more seriously, the necessary work and structures are beginning to be put in place; this conference represents an important step along the way.

Acknowledgements

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See our web sites: www.shu.ac.uk/wildtrack and www.shu.ac.uk/sybionet

The human impact of wild deer road traffic accidents

Tony Sangwine
Highways Agency

Introduction

The Highways Agency's role is the operation and improvement of the trunk road network in England. It is responsible for design standards and advice for trunk roads throughout the UK. The trunk road network carries 35% of all traffic and 60% of all HGV movement in England. The trunk road network is high capacity, high speed: result- habitat fragmentation.

The Highways Agency Estate, including the trunk road network, encompasses 50,000 hectares of land. Of this, 30,000 hectares is the soft estate beyond the edge of the carriageway; 18,000 hectares is the size of the motorway soft estate and 12,000 hectares surrounds the all-purpose roads. The soft estate is divided between planted areas, about 45 % and grassland, which is 55 % of area. 49 million trees have been planted on the estate since 1958. We have created substantial linear woods and scrub- attractive to deer as a refuge and a corridor.

Deer and traffic

Road Traffic Accidents (RTAs) involving deer are a major problem in the UK as well as in many other countries in Europe. There is no system for central data gathering of road traffic accident records involving deer or other wildlife in the UK and statistics on the scale of the problem in this country are not available. However, a survey commissioned by the Highways Agency and carried out in 1997-98 estimated, that the number of RTAs involving deer in the UK is likely to be between 30,000 and 50,000 per year. These accidents have a considerable impact: they present one of the main causes of mortality among wild populations of deer; they are a major animal welfare issue, because a high proportion of deer which are hit by cars are not killed outright, but instead often need to be put down at the roadside or else may escape to die later of their injuries. In addition traffic accidents involving deer present a safety hazard to road users, and cause numerous human injuries as well as a number of human fatalities in most years and lead to substantial damage to vehicles.

Keeping deer off the road

Traditional approach is to provide deer fencing. However, the drawbacks of this approach are that it is expensive to install and maintain, is visually intrusive and exacerbates the barrier effect. Connectivity using tunnels, underpasses and bridges provides optimum solution. Deterrents have been explored as an option, but the use of reflectors has not been proven and has its own drawbacks: they are easily disturbed and require cleaning and re-aligning. Olfactory and audio systems are similarly not proven to work effectively. Restrictive speed limits and warning signs have been employed, although enforcement can be difficult.

Design considerations

The Highways Agency has looked at landscape changes to improve forward visibility for drivers. By removing scrub and tree cover from the road edge, visibility for drivers can be increased, and this also limits cover for deer close to the carriageway. Special treatment can be focussed at known crossings on existing networks, for example, locating bridges or underpasses in appropriate positions on new sites.

Current research project with the Deer Initiative

Previous efforts to build a picture of the full extent and geographical distribution of deer-related road traffic accidents and incidents in the UK have been hampered by the need to rely on retrospective abstraction of records which, if available at all, are maintained in an incomplete and inconsistent way within a number of different organisations (eg Police, County Councils, local authority road/carcass clearance departments, RSPCA, Wildlife Hospitals, Insurance companies, forest rangers, private deer stalkers etc.). The Highways Agency is making a major contribution to a project to set-up a stratified national system for recording information on deer related road traffic incidents occurring throughout England (and Wales). The database being produced will be sufficiently rigorous to provide a firm basis for analysing the key factors associated with occurrence of deer accidents, help to identify present and aid prediction of future locations of high deer accident risk, as well as for assessment of effectiveness of differing methods of accident mitigation. Complimentary field research projects are also envisaged to address such aspects of deer behaviour and deer management that are relevant to improving the design and effectiveness of deterrents aimed at reducing traffic collisions.

The Deer Initiative RTA Project will ascertain the level of deer related RTAs in differing regions and land-type classes within England and Wales. Data collection will be designed not only to maximise the overall proportion of deer accidents logged, but to ensure in particular that the information gathered is well stratified to support sound estimates of total losses by area and differing land classes.

It will determine the key factors associated with increased frequency/risk of accidents in differing parts of the country and in relation to road types, deer species involved, traffic volume, presence/absence of differing types of mitigation and other influencing factors (daylight, time of day, roadside habitats, fencing, road signs, type of vehicle involved etc.).

The project will assess likely levels of deer accident risk for different areas and/or roads by analysing the new and other past deer accidents collected in relation to deer distribution, habitats and traffic density, including use of GIS mapping and modelling where appropriate. It will assist in increasing public awareness of deer related traffic collisions and how to avoid them.

For further information on this project and for on-line reporting of deer road traffic casualties see the project website: www.deercollisions.co.uk

A European perspective on wild deer management

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Introduction

Formally speaking there is no such thing as a "European" deer management policy or strategy. Unlike a number of other areas for which the European institutions, and in particular the European Union, have a specific competence – I only refer to the *Common Agriculture Policy* or the initiatives in relation to the Internal Market – this is not the case for the management of so-called "Game" species. Instead I will try to develop the perspective of a European (outwith the UK) citizen on deer management in the UK.

I will first present a short overview of the main European legal instruments or policies, having a direct or indirect impact on deer and their management and then the different socio-cultural and bio-geographical approaches to this issue across Europe. Finally, I will make some suggestions that may be taken into consideration by deer managers, at different levels, in the UK.

Overview of European legal instruments

The first European "law" that is relevant to wild deer doesn't come from the EU but is a Convention adopted in 1979 under the auspices of the *Council of Europe*. Its initiatives, unlike those of the EU, do not take the form of legally binding instruments but rather that of Recommendations and Resolutions, but they may also lead to international agreements, the so-called Conventions, which are binding to the Contracting Parties that have signed and ratified them.

The UK is one of the 45 Parties to the "Convention on the Conservation of European Wildlife and Natural Habitats", usually referred to as the Bern Convention, which was agreed on and opened for signature in September 1979. Under the heading "Protected fauna species" we find in the Convention's Appendix III, next to a number of other "game" species, the "*Cervidae* – all species". Protection" in this case is covered by Article 7 of the Convention, stipulating that "*each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the protection*" of these species. Their exploitation "*shall be regulated in order to keep the populations out of danger*" and that measures shall include:

a. *closed seasons and/or other procedures regulating the exploitation;*
b. *the temporary or local prohibition of exploitation, as appropriate, in order to restore satisfactory population levels;*
c. *the regulation as appropriate of sale, keeping for sale, etc, of live and dead wild animals.*

For these species, Parties "shall prohibit the use of all indiscriminate means of capture for killing and the use of all means capable of causing local disappearance of, or serious disturbance to, populations … and in particular the means specified in Appendix IV". Listed

in there are for instance snares, artificial light sources, devices for illuminating targets, sighting devices for night shooting and semi-automatic or automatic weapons with a magazine capable of holding more than two rounds of ammunition.

The current UK rules on deer stalking and deer hunting are fully compatible with these provisions. The fact that there is no closed season for muntjac and Chinese water deer shouldn't constitute a problem as Article 11 paragraph 2.b foresees that Parties must "strictly control the introduction of non-native species".

This is in fact the only European text that goes in such detail. The only European Union "law" that might apply to deer species is Directive 92/43/EEC *on the conservation of natural habitats and of wild fauna and flora*, often called the "FFH" or "Habitats Directive". In Annex IVa "Animal species of Community interests in need of strict protection" we find only one deer species, or rather sub-species, namely the red deer from Corsica. In Annex Va, "Animal species of Community interests whose taking in the wild and exploitation may be subject to management measures" we see indeed a number of "game" mammal species, such as *Lepus timidus*, the blue or mountain hare and *Mustela putorius* or polecat, but not one single deer species or population.

Directive 91/477/EEC *on control of the acquisition and possession of weapons* introduces a categorisation of firearms as well as the *European Firearms Pass*, meant to foresee more flexible rules for hunters travelling with their shotgun or rifle from one Member State to another without "*impeding the free movement of persons more than is necessary*". I will come back briefly to this last point, as you are probably aware that the current UK rules for visiting stalkers go well beyond this requirement. However, the main conclusion at this stage is that there are no specific EU rules in relation to firearms or ammunition for deer management.

Directive 92/45/EEC *on public health and animal health problems relating to the killing of wild game and the placing on the market of wild game meat*, usually referred to as the "Game meat" Directive, imposes a number of rules on the "production" of venison. This Directive is in the process of being completely reviewed and incorporated in a new set of regulations on food of animal origin (see later paper).

These rules will probably be felt by quite a number of stalkers, deer managers, estate agents and game dealers to be over-prescriptive but we have to take into account public feelings, resulting from some recent food safety scandals, even if they were totally unrelated to wild game.

Finally, Directive 92/118/EEC *Laying down animal health and public health requirements governing trade in and imports into the Community of products of animal origin*, establishes in Chapter 13 of its Annex specific rules for trophies. In particular, in the case of import from non-EU countries, trophies must have undergone a complete taxidermy treatment or other measures (such as boiling, treatment with hydrogen peroxide and being protected by individual, transparent and closed packages), each time with the appropriate documents or certificates from the veterinary authority of the country of origin.

For the sake of completeness I will briefly mention the Washington *Convention on international trade in endangered species* or CITES, transposed within the EU to Regulation 338/97/EC *on the protection of wild fauna and flora by regulating trade therein*. However as

none of the deer species living in the wild in the UK are listed there, this instrument is not relevant to the topic of my presentation.

Other EU initiatives may have an important *indirect* significance for deer management – in the first place the new orientations of the Common Agriculture Policy, giving greater priority to the so-called pillar of rural development and to environmentally friendly farming, inclusive agro-environmental measures, reduced use of agro-chemicals, set-aside and other measures likely to have a positive impact on the habitat and food resources of wild deer. It would, however, lead me too far to incorporate these aspects in my paper, also because other people may be much more qualified to deal with them.

Different socio-cultural and bio-geographical approaches

Based on my regular contacts with, and missions to, all the European countries represented in FACE, I believe that a more or less clear distinction can be made between four major "hunting" models, each one characterised by specific aspects, methods, traditions and cultures. To a large degree, this diversity is also expressed itself in the different approaches to deer management, even if there are many intermediate models, gradations and "grey areas".

The **Nordic** or **Scandinavian** model is marked by the highest proportion of hunters in Europe, with up to one hunter for each seventeen people, in Finland. Hunting – and I use this term in the European sense, covering all disciplines involving the chasing and taking of game species, shooting, wildfowling, stalking, hunting with hounds, falconry, and so on – is a widespread, popular and democratic activity. For the Nordic people, hunting is simply one way of sustainably using a renewable living resource, just as is angling or picking mushrooms or berries. City people show great understanding for the countryside and the hunters' community maintains a constructive dialogue with politicians, media and conservationists, always trying to find consensus solutions.

The most popular game species are moose, roe or whitetail deer, fox, blue hare, waterfowl, woodcock, the different grouse species, but also beaver, brown bear, wolf and lynx.

Deer are shot through stalking, waiting from a high-seat or – most commonly – driven with one or several hounds. Rifles are used in most cases, except for shooting driven roe deer in autumn, when shotguns with pellets are the rule. Fluorescent orange garments are mandatory, and hunting accidents are extremely rare. With the exception of Denmark, where there is no minimum size for a hunting area, and no bag limit for roe deer, the management is based on sufficient large areas and on an official shooting plan, laying down the exact number of animals in the different age classes and sexes that may be shot. Seasons are relatively short, usually not starting before mid August for roe bucks, and September for all other deer species.

Deer are first of all considered as a valuable source of high quality meat – a moose bull may have a live-weight of 1000 pounds and fill up the average family deep freezer rather well. Deer trophies are appreciated, but until some years ago is was not uncommon that a fairly good trophy would simply remain outside the barn where the carcass had been butchered, or even left in the wood as too heavy to bring home.

In the **Germanic** model, with a relatively low number of hunters, a rather elitist atmosphere and great attention for codified rules and traditions, "management" can be considered as the

leitmotif for all hunting, but in particular for deer hunting. In no language other than German are there so many books available on deer management under all its aspects. Detailed official shooting plans apply for all deer species, and they are properly enforced through a strict system of social control, mandatory "trophy shows", a lot of paperwork and bureaucracy.

The overall results are satisfactory to impressive, in particular for red and fallow deer, but too a much smaller degree for roe deer. The so-called "selective" shooting or "management with the rifle", whereby less desirable specimens are eliminated, has not resulted in any improvement of average body weight, trophy quality or general condition. The main cause for this failure, which in fact has been going on for almost three quarters of a century, is probably the imbalance between roe deer stocks and the available habitat. In certain areas, roe deer densities of 40 to 50 specimens per 100 hectare of suitable cover are not exceptional, and they often have too high a proportion of females. The vast majority of deer are shot from high-seats – the other methods being stalking and driving female deer - and seasons are very long. The trophy, however small or insignificant it may look to the neutral observer, has a considerable importance and value for the individual hunter.

The **Latin** or **southern** model is, just as the Nordic one, very democratic and popular. Hunting is above all a group activity, and good social contacts, a pleasant company and if possible fine food and drinks are considered more essential than the size of the bag. The concept of "management" is fairly new, and while shooting plans exist for all deer species, they are mainly intended to prevent too many specimens being shot. Most deer are shot during driven days, with packs of hounds and dogs, often crossbreds, with twenty to thirty hunters (or even more, as is the case in the Spanish *monterias*) standing with their rifle or shotgun, waiting for the deer – and often wild boar as well - to come out at full speed. In France for instance, roe deer, irrespective of age or sex, may be shot until February, so that regularly bucks are killed without their antlers or already with growing antlers in velvet. However, as for most hunters the trophy has only a secondary importance, nobody seems to mind too much.

Despite this absence of "selective" management – or maybe precisely because of that – deer condition, as expressed by their trophy quality, is often surprisingly good.

This categorisation of European models and traditions is slightly simplistic and partly misleading, because there are too many exceptions and because there may even be important differences within one country. The eastern, Alsatian part of France and the northern part of Italy for instance are clearly applying the Germanic "management" model, and to a lesser degree this is also the case in certain Scandinavian estates. In central European and partly German-speaking Switzerland, roe deer are traditionally shot at driven days, using shotguns and pellets.

The Anglo-Saxon model?

How does the Anglo-Saxon deer management model fit in this picture? And is there such thing as a typical Anglo-Saxon model? I have had the privilege and the pleasure to visit your country for stalking purposes every season for the last 29 years, and believe to be in a position to make some comparisons.

As far as the more traditional highland stalking and management of, in particular, red deer is concerned, I see certain similarities with the Nordic approach, in so far as deer are considered

as a natural "crop" that can be harvested in a sustainable way, providing as a bonus some excellent sport, with much less emphasis on the trophy. As far as trophy quality and general body condition are concerned, the Scottish Highlands present serious limitations due to unfavourable climatic and habitat factors. However, there are other bio-geographical regions in Europe where the weather may be as bad, in particularly during winter, that produce nevertheless red deer of considerably high quality.

There is evidence that deer from Scotland, when brought in to another environment, usually grow into much larger and stronger stags. There can be little doubt therefore that Scottish deer populations are generally – a) – too high and – b) – unbalanced because of a dramatic overpopulation of hinds and calves. To change this situation would probably require changing the mentality and views of many estate owners and managers, but even then there remain many practical, legal, administrative and logistical problems. Would it not be possible to bring the start of the season for hinds forwards, as for instance in Germany and Austria where yearling hinds may already be culled from 1 June? Are mandatory management plans, with the obligation to realise a minimum cull of non-antlered deer, possibly in conjunction with financial or tax incentives and other encouraging measures, totally incompatible with the Scottish system? Why are so many estates complaining about too many hinds, but when interested visitors enquire about the stalking conditions during the winter months, they face fairly high fees per outing – very recently, a fee of £300 a day was quoted - or per animal shot? Would it not be in the interest of good deer management and of rural development, to promote "package deals", including one week's accommodation and stalking, irrespective of the number of hinds and calves shot? I am aware that I don't know enough about the practical constraints for such schemes, but I believe it should be possible to come up with innovative ideas and pilot projects.

The more recent woodland stalking, as practised in most other parts of the UK – mainly for roe, fallow and muntjac – seems to me as being "inspired" in its origins, by a Germanic approach to "management", namely the elimination of less desirable specimens in order to allow for the better ones to reproduce themselves. Over the years however, thanks to the views promoted by some people with considerable experience, this kind of management has focused on a more biological approach, aiming to keep deer numbers in balance with their habitat, and to maintain or restore a more natural sex ratio.

With woodland deer stalking having become recently much more popular with British sportsmen, there is, however, a risk that, as a result of competition for stalking opportunities, these principles may – at least locally – be sacrificed to short-term profits. I know of too many places in southern England where a "shoot on first sight" policy applies to roe deer in particular, and where the local stalkers have not even a basic knowledge of this species' biology and behaviour. They have a rifle with a powerful scope and a camouflage jacket, and know how to put a small high-seat where the farmer allows them to kill deer, preferably in a field next to the woodland of a large private estate.

I have therefore some slight doubts when I read in a recent issue of a popular shooting magazine that 2002 was an "outstanding" year for roe buck trophies in England and that – I quote – "*it would be a mean-minded individual who would not accept that our management practices here in the UK have contributed to this extraordinary success*". It is more likely that other factors, such as the available genetic pool, the diversity of the habitat, the quality of the soil, the climatic conditions and – last but not least – the "no-nonsense" approach to deer management in many larger estates that have played a role.

The soundest advice I can give is simply: *if it ain't broken, don't try to fix it*! It would be a fundamental mistake to try to translocate foreign deer management models to the UK, simply because they look good on paper. There is no need for a sophisticated system of generalised shooting plans, tags for individual carcasses, mandatory presentation of trophies, and so on. It would probably be unacceptable for the vast majority of UK deerstalkers and managers, but above all, unlikely to result in better results.

Does this mean that all is for the best and that no improvements are needed or possible?

I believe it might be good to have a closer look at the current open seasons for the different deer species to see if they should not be changed for biological and practical reasons. Is it wise for instance to have a nine-month season for fallow bucks, while for does and calves this is much shorter? Could a higher cull be achieved through other methods than individual stalking, for instance during days with a small team of beaters, possibly with some slow dogs, moving deer to bring them within range of several "rifles" waiting from a high seat or platform from where safe shooting is guaranteed? What can be done to make sure that all people involved with deer management and culling have at least a basic knowledge of deer biology, of how to judge deer "in the field", on management principles, and so on. There is again no need for elaborated training and testing schemes, but satisfactory results may be achieved through simple brochures or booklets, like the early publications by the *British Deer Society*.

What should be introduced perhaps is a serious and reliable deer bag record scheme, in order to monitor population levels and trends. Is it not a bit illogical that nobody can tell today with a fair degree of certitude how many of Britain's largest land mammals there are and how many are killed and become available for human consumption – either for personal consumption, or for sale to other people or for export?

A last point concerns the fact that so many stalkers from the Continent like to visit the UK, something which some of their British colleagues might see as "unfair competition". Such visitors are sometimes treated with suspicion and scepticism, in particular with regard to their abilities to use a rifle safely and efficiently or to judge the quality or the age of a deer. While some have only limited opportunities back home to stalk deer, and are therefore relatively inexperienced, many other will only come to the UK after many years of practical deer stalking and management experience. The Continental systems of hunting training and tests may not be an absolute guarantee for ethical behaviour, but they usually provide these hunters with an excellent basis and knowledge. Any British host, gamekeeper or professional stalker should try to use this potential source of information for his own good.

Visiting stalkers are of course also excellent customers, willing to pay good money for stalking opportunities that many local people consider to be "normal" and therefore having to be free of charge. This applies in particular to muntjac stalking, or for roe and fallow does. However, fees of £120 a day for the stalking (accommodation not included), plus between £120 and £320 for one muntjac buck, or up to £700 for one male Chinese water deer, as I have seen advertised, are simply unrealistic and counterproductive. What is the point of complaining about an overpopulation of muntjac, and that nobody is really keen to shoot these little creatures, when interested customers are de-motivated in this way? By becoming too greedy, one may kill the deer that lays the golden eggs, if you allow me this mixed metaphor.

Continental visitors are also discouraged by the heavy bureaucracy of British authorities as far as the import of a rifle is concerned. Not only do they need to send in their original *European Firearms Pass* – with the risk that this official document gets lost, and for a period that person cannot go anywhere else with his firearms – but also they need to apply and pay for a *Visitor's Firearm Permit* as an additional document. What does this system add to a – real or perceived – feeling of "public security" when in many cases the British "sponsor" has never met or talked with his future client and only knows his name from the bank transfer with the first payment for the stalking? A Russian guest, or even one from Iraq, has less problems for his very first visit than a Belgian stalker, having been to the UK many times, because the former does not need to bother about sending in advance his Firearms Pass. This system is unfair, inefficient, and meaningless and totally in breach with the letter and the spirit of EU rules. It would therefore be a very special "European perspective" if one of the recommendations of this Conference could be to review this system.

Research to meet the changing policy environment for red deer management in Scotland

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Background

The people of Scotland have had a chequered relationship with red deer *Cervus elaphus*, the largest native land mammal in the UK. Historically, red deer provided them with meat, skins and antlers for making tools and weapons. However, with the increase in domestic stock, particularly sheep and cattle, deer were seen as competitors for the scarce vegetation and they were removed from large tracts of land brought into agricultural production. From the 18th Century onwards, some large landowners removed the native people from the same land in their drive to encourage the red deer population to provide them with sport hunting. This culminated with Queen Victoria's enthusiasm for everything Scottish which encouraged wealthy English gentry to purchase large tracks of land which they managed solely for the sport it provided from deer stalking and the modern sporting estate was born. With the new landowners came a culture, which today is seen as quintessentially Scottish. Scottish law states that nobody owns red deer themselves but that the right to shoot red deer remains with the owners of the land upon which they roam. This, in effect removed the deer from having any value for the majority of the people of Scotland.

The aim of landowner for the past half century has been to ensure that adequate stocks of male red deer (stags) are available for them and their guests to stalk. This has encouraged landowners and their managers to increase the stock of red deer roaming their land through practices such as the provision of supplementary feeding during the winter to reduce overwinter mortality and keep the stags hefted to a piece of ground rather than migrating to new feeding areas.

In the late 1950s the Red Deer Commission was established. It was a statutory organisation whose remit was to ensure that the welfare of the wild red deer herd was not compromised and that the deer population in Scotland did not damage the agricultural and forestry interests which exist side by side with the deer. In effect this meant that the Red Deer Commission was responsible for maintaining the status quo and ensuring the deer were managed to meet the cultural and economic objectives of the landowners be they estate owners, farmers or foresters. This has lead to increasing numbers of deer, with the population currently standing at around 350,000 individuals.

In past 15 years the growing enthusiasm of the urban majority to have Scotland's landscape return to its past condition, with more trees, has led to an increasing concern about the impact that these high numbers of deer have had on the landscape, particularly tree regeneration. This pressure, in part, led to a change in the remit of the new Deer Commission for Scotland (the ex-Red Deer Commission) to include the protection of biodiversity ("natural heritage" in

Scottish Executive language) in a change in Scottish law in 1996. This change, along with the probability of Land Reform Bill being passed as law in Scotland has encouraged landowners to, at least, think about the possibility of changing their management of the red deer herd which roams on their land. However, the possibility that changes in management, to reduce numbers to meet biodiversity objectives has led to a potential conflict between the environmental desires of the urban majority and the economic requirement of the landowners and those reliant on them for their livelihoods.

Research

Research on red deer, started in the early 1970s, has shown that the high number of deer has led to poor performance of many populations with lower reproductive success of females, poorer survival of the calves born, high stag mortality and poorer quality trophies of adult males. The Highlands of Scotland are a harsh environment for deer to live. The poor soils and inclement weather lead to seasonal restrictions on food availability, and it appears that the historic management of red deer has been misplaced if economic objectives are to be met.

The scientific community, therefore, advised the Deer Commission for Scotland in the early 1990s that the deer population could be substantially *reduced* to the benefit of both the environment and the economic returns from trophy hunting. In effect the environmentalists and the landowners could both meet their different objectives by reduced deer numbers.

This view ran directly counter to traditional views of deer management, and initially the advice of the scientists was not taken on board by either the government's statutory organisation responsible for deer management or the estate owners. However, due to the persuasive use of computer-based scenario generation models by the scientists, combined with strong pressure from the environmental lobby, there has been a change in attitude of many landowners over the past eight years. In their 1998 Annual Report, for example, the Chairman of the Deer Commission for Scotland exhorted landowners to reduce their deer numbers to benefit their own economic goals.

More recently, computer modelling and studies of the ranging behaviour of deer using satellite tracking technology have demonstrated the necessity for deer managers to cooperate in the management of deer populations which span a number of land holdings. This strengthens the need for effective Deer Management Groups (DMGs), which bring together the landowner, land managers and interest bodies, to be put in place and supported.

Conclusions

This example shows how the use of scientific data can be used to help resolve conflicting approaches to deer management in a world that is changing its management goals. Deer Management Groups are the way forward for collaborative deer management which takes into account the fact that deer range over a number of holdings and that a broad range of participants are now involved, or at least interested, in the ways which deer are managed. Whilst no formal analyses have been conducted, the Scottish experience seems to suggest that the most effective DMGs have a strong chairperson and secretary and/or an executive committee. The active participation of the majority of members of the DMG in drawing up deer management plans is also a prerequisite for effective participatory involvement in deer management. This indicates that, in the future, more research will be needed on the process of development and implementation of deer management plans.

Standards in deer management

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Introduction

The first part of the presentation will set the baselines in regard to the deer management scene in the UK and give a general overview about the circumstances surrounding deer stalking operations and the second part will concentrate on the standards that have been developed to meet the needs of the industry.

Background to initial survey

BASC aims to contribute to the formulation of Government policy, ensuring that all decision makers are aware that the most humane method of managing deer is culling by shooting. In 1996 BASC initiated a survey of its deer stalking membership, which was the first major in-depth study of deerstalkers and deer management practices across Great Britain. As with any detailed survey on this scale, the cost and resource implications are very substantial.

BASC believes that the trends researched within its membership are indicative of the national position because BASC is the largest shooting organisation in the UK, and the research survey indicated that there is a huge overlap and multi organisational membership from those involved.

For example, 70% of BASC stalking members are also members of the British Deer Society and 70% of members are also members of the Game Conservancy Trust.

Who were our target audience?

We canvassed 10,000 members at random from our total membership of 110,000 and we then sent out follow up questionnaires to any one who had identified themselves as a deer stalker or interested in becoming involved in deer stalking. The report was finalised and written up in 1997 with the data referring to activities conducted during 1996. Of the 10,000 members contacted, responses were returned from 6717 (67%), which is a very high return rate from a postal survey of this type. The main findings of the study provide a comprehensive understanding of the deer management industry within the UK.

The survey showed that 9% of the BASC membership, or approximately 10 000 stalkers, were active deerstalkers in 1996, where "deerstalker" was used to describe anyone involved in culling deer, whether they called themselves deer managers, deer controllers or deerstalkers. Fifteen percent, or approximately 16,000 members, were interested in deerstalking. Those who declared an interest in taking up stalking but were still inactive had varying reasons for non-participation but the most numerous indicated:

- 37% lack of time;

- 22% lack of opportunity;
- 21% cost as a barrier to taking up deerstalking.

Whether or not the costs were actually researched/investigated by the members involved or merely perceived was not explored.

Employment structure within the deer industry

The survey defined a full time professional stalker as one who derived more than 50% of income from deer management activities whether directly employed or self employed. A part time professional was defined as less than 50% of income from deer management whether directly employed or self employed.

- 13% responses were professional
    - 33% full time
    - 67% part time
- 87% responses were recreational

This compares with 1995 figures from a survey conducted by BASC Scotland that found 67% of stalkers in Scotland were professional and 33% were recreational. This reversal north of the border is probably a reflection of the land-ownership differences between Scotland and the rest of the UK, in that the larger estates in Scotland can afford to employ professional stalkers to manage their deer.

The Scottish survey indicated that 41% of the professional stalkers were employed on a part-time basis with the remainder (59%) being in full-time employment. The Scottish survey did not, however, differentiate between self-employed and employed individuals. Again the higher percentage of full-time deerstalkers in Scotland compared to England and Wales is probably indicative of the land ownership pattern.

There are relatively few full-time employed deerstalkers in Great Britain. The calls that are heard on a regular basis that only professionals should be involved in the culling of our wild deer are economically unrealistic. Landowners' attitude to deer management is often "why pay for something when there are people adequately skilled who will do the job for free?"

Many professional stalkers started their careers on a recreational basis prior to becoming employed within the industry. The disparity between the types of stalker has obvious potential pitfalls when designing standards of competence.

Comparison of time spent on the ground

The time spent stalking for professional stalkers was on average only 72 days per year. This result is obviously affected by the definition of professional in that two thirds of professionals are part time. The close seasons will also restrict the days spent stalking depending on the main quarry species.

Effectiveness of professionals and recreational stalkers

The actual cull achieved within the industry showed that professionals shot 8 times more deer than recreational stalkers, but due to their numerical superiority the non-professionals still accounted for 47% of the total cull. This highlights the contribution being made by the recreational sector to the overall effectiveness of the industry.

Species culled

Roe deer	49%
Red deer	24%
Fallow deer	17%
Muntjac	7%
Sika	4%
Chinese water deer	0.2%

When this exercise is repeated it will be interesting to note what has happened to the percentage in relation to Muntjac since 1996

How the venison is utilised

Other speakers will cover the venison quality assurance and the European Consolidation of Food Hygiene but this gives a breakdown of how the culled venison has been utilised as a combined figure for all species.

- 73% sold to game dealers;
- 9% for personal use;
- 17% retained.

There was little difference in the method of utilisation between professional and recreational stalkers. The majority of red, roe and fallow deer, which account for nearly 90% of all deer shot, were sold to game dealers. This highlights the importance of the venison market with around 70% of red, roe and fallow carcasses being sold. The survey and other data would suggest that upwards of 200,000 carcasses are processed each year. Technical skill in the ability to inspect and prepare deer for human consumption is obviously important for anyone placing venison into the food chain.

Conclusions

The information is now somewhat dated and it is intended to compile an updated register of the deer stalking members of BASC within the next three months and to commit considerable resources to repeating a similar survey of stalkers and stalking practices in 2004.

I would appeal to any of you who are members to please complete any questionnaires received, as accurate data on the industry is continually sought after and those who make decisions affecting deer management in the UK should be doing so from an informed position which is backed up by verifiable information derived from those practitioners actively involved in the industry.

Training and assessment

Why manage deer?

There are 2 main reasons why we are concerned about managing deer correctly:

1. To further human interests

- by manipulating the deer population (which implies the ability to manipulate numbers up or down as we choose);
- by limiting deer damage to crops and habitats;
- by sustaining recreational interests;
- by providing a safe source of food;
- by ensuring the safety of the public and the stalkers (from deer, from stalkers)

2. To ensure the welfare of deer

- by ensuring healthy deer populations;
- by ensuring a future for deer with minimum conflict with human interests;
- by ensuring the humane treatment of deer.

A standard for deer management

Culling deer and managing deer populations are complex tasks that have to be learnt and practised if a high standard is to be achieved and maintained. The standard that we should strive to attain is that:

- deer are stalked and culled safely and humanely and that their carcasses are fit for human consumption;
- deer populations are manipulated in such a way that they remain healthy and viable and are humanely treated; and
- human interests are not unacceptably compromised by deer

What requires training?

1. Stalking deer is a skill that requires knowing how and where to find deer, how to get close to them, and how to recognise and select individuals by species, age and sex.
2. Culling deer must be safe, humane and hygienic.
3. Deer carcasses should be fit for human consumption with waste disposed of safely.
4. Part of the aim of stalking involves managing deer populations. In order to do this, stalkers or land managers must learn how to set objectives, set culls and cause them to be carried out, plan habitat management and cause it to be carried out, and do this within humane, hygienic and safe bounds.

For a stalker starting from scratch, achieving a good standard is difficult; each aspect requires considerable knowledge and practical skills to achieve. Points 1 – 3 are essential, basic "skills" that all stalkers must have. When stalking and culling deer, we affect the welfare of

individual deer and of deer populations most directly. At this level any distinction between recreational, part- and full-time professional stalkers is irrelevant. Deer give no thought to the fact that they were culled as part of a carefully crafted plan or that their body will be treated hygienically before being consumed, but it is unforgivable that they should have to suffer physical pain because the stalker could not get the basics right.

Hygienic handling of carcasses is desirable to ensure both human health and a sustainable venison market that will help to sustain continued herd management.

Both the professional and recreational stalker should care that culling is done safely, humanely, for the right reason and that the carcass is fit to eat.

Point 4 is concerned with ensuring that human interests are satisfied as well as assuring the long term health and future of deer populations. This is deer management in the true sense and uses 1 – 3 as tools to achieve its aims.

The only real difference between the professional and the recreational stalker is that the former may be able dedicate more time to deal with larger numbers and may concern themselves more with managing deer populations, and on a larger scale than a recreational stalker. However, the more a recreational stalker can strive to meet the levels of efficiency of a professional, the better.

What is training?

Training involves the acquisition of knowledge, practical skills and the "right" attitude. It is achieved by theory delivery ("Tell"); practical demonstration ("Show") and practical training and practice ("Do").

Training can be reinforced by more practice, and at some stage a stalker may seek affirmation that they have reached a level of competence that is viewed as desirable, and one way to do this is via assessment to a recognised standard. Assessment should ideally be part of learning process, not an end in itself.

Assessment

There are many different attitudes to the idea of being tested. Some people thrive on it; others are wary of it; most are glad to have done it when they succeed. Privately, many people try to improve their own knowledge through personal interest, by reading an item of interest which they find in a book, magazine or website; many will go further and attend a conference, seminar or meeting involving deer, or may be active in local deer groups. Some will actually attend a specialised course (which vary in quality). A few are prepared to check their knowledge and skills against a standard (be "tested").
Nearly everyone is uncomfortable about being "tested" or do not offer themselves up for testing, usually because they:

- are not fully informed about what is required to "pass";
- lack opportunity;
- do not like to risk "failure";
- are not confident of their abilities;

- are so confident that they cannot see the need for confirmation.

Points 1 and 2 should be addressed by the organisation(s) that set standards. The risk of failure and lack of confidence (points 3 and 4) can be overcome by the stalker gaining the confidence that learning, practice, training and testing can give. Hopefully stalkers in category 5 will still undertake assessment if only to set an example; if they are that good passing the assessment should be easy?

What training and assessment is available now?

Currently individual stalkers improve their knowledge and skills via a varied mixture of perceived (and real) wisdom from friends and acquaintances, and from reading and examining web sites. They may attend one of the many and varied courses available, and will have their own practical experience to rely on.
Currently, one inexperienced stalker may emerge with a different level of skills compared with the next one. This begs the question as to whether a standard method of training is desirable or whether it is sufficient to maintain a common standard to test stalkers against regardless of the route by which they come to assessment (this is the principle applied to the UK driving test for example).

The Deer Stalking Certificate

The only national standard that is open to all and that has a wide uptake is the Deer Stalking Certificate (DSC) levels 1and 2. To date, nearly 6000 stalkers possess a level 1 certificate and approximately 1200 possess a level 2. The DSC standard parallels four of the elements of the Gamekeeping NVQ (SVQ) and can be admissible as evidence for the NVQ although is not in itself an NVQ. The DSC system also uses a method of validation that is nationally recognised.

The DSC is supported by courses offered by the British Deer Society, the British Association for Shooting and Conservation, Colleges and others as well as published texts and videos. The British Deer Society will shortly publish a new paper manual as well as making a web-based training package available.

The DSC 1 has evolved from earlier standards (the Woodland Stalkers Competence Certificate WSCC and National Stalkers Competence Certificate NSCC) and, with the exception of the Safety and Range shooting elements, is largely theory-based. (In NVQ terms it forms the "underpinning knowledge" element of the standard).
DSC Level 2 adds a practical element and is the means by which stalkers can demonstrate that they can safely and humanely cull deer and deal hygienically with the carcass.

Acquisition of the DSC does not imply any competence in managing deer populations, only that the holder has demonstrated that they can cull deer in what is generally considered a safe, humane and hygienic manner. It should be remembered that the DSC is equivalent to a UK driving test – a minimum standard which is greatly enhanced by experience.

The DSC standard is set by Deer Management Qualifications Limited (DMQ Ltd) who represents most of the organisations with an interest in deer management in the UK, including many of those who are partners in the Deer Initiative, as well as others that are not, particularly across the Scottish border.

There should be no doubt that in general the level of competence of British stalkers, in particular those who have taken up stalking in recent years, has been raised by their willingness to take the DSC.

What training/assessment is required for the future?

The DSC standard is probably close to any future requirement although it and the methods by which it is assessed could and should evolve, as should the courses and materials that support it. The principles of stalking and culling deer, while they may be refined, will not change greatly in the near future.

As our awareness of meat hygiene develops and regulations change, carcass-handling techniques are being developed to the point where the principles will be recognised by all and can be readily assessed. The DSC standard will continue to reflect changes as they occur.

Road traffic accidents (RTAs) are a concern that is being addressed by this conference and joint publications as well as the DI-sponsored study now ongoing. There may be a demand for training in this area.

There is a demand for training and perhaps assessment in cull-planning and other "strategic" aspects of deer and habitat management. This may result in the equivalent of a DSC "Level 3" or its equivalent in the future.

Frequently asked questions

1. Who should set standards?

As long as the standard is a good one and is credible and widely available, it does not matter who administrates it. The DMQ system is supported by all of the major players but DMQ is a non-profit making organisation with limited resources. DMQ relies heavily on the voluntary support of both organisations and a small number of individuals, which can mean that administration and progress are not always as tight and fast as they should be.

Although the Deer Commission for Scotland and the Deer Initiative have both chaired DMQ, neither organisation has offered to take on the important role of DMQ as part of their remit. However, training fits in very well with the stated aims of both organisations and although neither have unlimited resources, a little administrative input could enable the DMQ to function more effectively.

Affiliations with organisations such as LANTRA, and attracting Government funding are worth exploring, provided that this highly specialised standard is not compromised by the modern tendency towards generic assessment.

2. Is the current standard credible?

In order to complete the level 2 standard, the stalker has to shoot three deer, monitored, at least one of these in front of an "accredited witness". The objective is to give the stalker the opportunity to demonstrate that they can safely and humanely cull a deer and deal hygienically with the carcass.

In general this system has worked well although some stalkers have struggled to gain access to stalking or assessment for three animals. There have been examples where the standard has been compromised by poor or dishonest witnesses but these are small in number and validation checks within the system have exposed most of them.

One way of providing greater control might be to adopt an "assessor" system similar to that used by the chainsaw proficiency or driving test systems where employed assessors oversee a one-off test. This has the advantage in that it is easier to maintain standards and would not require three deer to be shot, but might limit assessment opportunity on a regional basis, and with deer stalking being somewhat unpredictable may still require repeated stalking to cover all of the elements. There is no doubt that adopting such a system would increase costs to the extent that some potential stalkers would be priced out of the system.

3. Should there be a standard training system?

In a highly specialised field there is certainly room for a system of training that is standardised. However, while there are many centres across the country that are willing to provide training, not all of them have access to the facilities required to put on a "one size fits all" course. Similarly there are financial advantages to be gained by one organisation putting on a "better" course than another and this has to be accepted. It is to be hoped that where possible, examples of best practice are taken up by all of those involved in training.

4. Why haven't some well-known professionals taken the DSC?

Some may be unwilling to be tested against a standard because they cannot see any relevance to their own situation. They may have worked full time on an Estate where many hundreds of deer were culled each year. They may have worked under the guidance of a talented mentor and were allowed to make mistakes and encouraged to learn by them. Consequently they feel no need to take an assessment.

Courses and assessment, while no substitute for sound experience, are a good grounding for those stalkers who are just as committed to correct deer management as the experienced stalker and are very keen to know more and become more proficient, but do not have the same opportunities.

However, a professional may have to change jobs, possibly to an entirely new situation where skills learnt in one employment may not be readily transferable to another; they would benefit from a wider training. Even the most respected professional will not be in post forever but would still wish for deer to be well-managed in the future. They are in a position to set an example to the less experienced by embracing all credible methods of improving competence. If they do not believe in the credibility of a standard then they are uniquely placed to advise on improvements.

5. The DSC is being used as a "job ticket" or "passport" to stalking, is this acceptable?

Acceptable or not it is perhaps inevitable that it would happen. It is up to employers and landowners to judge whether the holder of the DSC is a better candidate for a job or lease than a stalker without the DSC. It should be remembered that the DSC is equivalent to a driving test – a minimum standard which is greatly enhanced by experience.

Sooner or later voluntary standards may end up enshrined in legislation; the forthcoming changes in the meat hygiene regulations may be one example of how this might come about.

Economics of deer management

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Introduction

Deer have been here for about half a million years, commercial plantations started less than 100 years ago with the setting up of the Forestry Commission in 1919. Deer are woodland animals, and they have at least an equal right of occupation.

Furthermore, in the South of England, there is a significant body of landowners, not necessarily represented here, who support deer as a priority. They are prepared to accept some damage; after all, even 5% of agricultural yield loss pales into insignificance when compared with annual price and yield differentials of up to 40%, based on deficits of weather, husbandry and crop prices. Agricultural damage by deer is negligible when compared to that of pigeons, pheasants and rabbits. Deer damage in woodland is negligible when compared to losses through problems of ground preparation, plantation maintenance, insects, and other mammals such as sheep, squirrels, voles, rabbits and hares.

There is a significant body of opinion that does not accept the concept of deer as a problem – a problem that somehow necessitates a centralised solution. In our part of the country we think that the deer are rather well managed and under control. Damage is bound to occur in areas of high deer density where the trees are not protected, but don't forget that the deer were probably there first.

This presentation is about the management of deer that *sustains* their place in our environment. Our objectives are to manage deer humanely, with minimum stress, and to their optimum quality. In other words we manage deer because we like them.

Before we can talk about management, it is important to realise that it costs money. Argument arises not about what it is going to cost, but who is going to pay. I'd like to address this by creating a costing example.

A worked example

Let us assume a southern estate of 1500 acres (600 hectares), including 300 acres (120 hectares) of woodland. This gives 20% woodland coverage, which is just above the national average. This habitat could sustain a spring population of 60 roe at a density of 50 deer per square kilometre *of woodland*. Some of you think this rather high, especially when compared to previously published density figures (see Watson and Mahony, this volume). However what must be remembered is that this density is not based upon single species, large block forest of uniform age class, but on amenity woodland distributed in small blocks of mixed species and age class, with relatively long woodland edge and good access to agricultural and game crops. Indeed a situation commonly found in the private sector, where density figures can range up to 75 roe per kilometre square of woodland. Remember that full time professional deer managers, managing deer over a number of years on a sustainable basis, are *culling* between 16 and 23 roe per kilometre square.

So a maintenance cull from 60 roe would typically amount to some 18 deer (at 30% of spring population), of which 11 (60%) would be female and 7 (40%) would be male. This is based upon British Deer Society policy founded on the experience of many years, and practised by many of us successfully. Let us first look at the labour costs associated with this scenario.

Labour costs

Firstly culling costs: assuming 2 outings per cull, and 3 hours per outing, then a total of 108 hours will be required to cull the 18 deer. At £10 per hour, based on the total labour cost of employing a full time agricultural worker, this amounts to £1080. In addition to the actual culling, there are other labour costs associated with a deer management operation, which are the annual census and the twice-yearly report writing. Census for this example, based upon simple direct counting techniques, might amount to 4 days at £80 per day, and report writing another 10 hours again at £10 per hour, making a grand total of £1500 or £1.00 per acre (£2.47 per hectare) (Table 1). Remember that if dung or thermal imaging census is to be considered, then the costs will be very much higher. Indeed all these costs are minimum costs, because quite clearly the more time spent on the ground, the better (but more expensive) the job will be done. Thus for a typical southern estate, to cull 18 roe in a structured way within a structured plan is going to incur labour costs of *at least* £1.00 per acre (£2.47 per hectare).

Table 1. Minimum costs for a 1500 acre estate

Cost description	Cost	Total
18 deer cull: 2 (3 hour) outings per deer		
108 hours	£10/hour	£1080
Annual census, 4 days	£80/day	£320
Report writing, 10 hours	£10/hour	£100
Total labour costs		£1500
Power and machinery	£1/acre	£1500

Power and machinery costs will add a further £1.00 per acre (£2.47 per hectare), which creates *total unavoidable costs* of *at least* £2.00 per acre (£4.94 per hectare). This converts to a cost of about £130 per animal culled. With fallow however, being much more difficult and time consuming to stalk, the costs will be even greater, amounting to at least £3.00 per acre (£7.41 per hectare).

Converting these costs to the cost per *woodland* hectare in our Estate example equates to a figure for total costs of at least £10.00 per woodland acre (£24.70 per woodland hectare) for roe, and £15.00 per woodland acre (£37.05 per woodland hectare) for fallow.

For example, a professional deer manager, typically regarded as being able to manage about 15,000 acres (6,073 hectares) of land in the south, may find that managing deer at very low density might reduce this manageable area to as little as 2,000 acres (810 hectares), thus increasing the costs of management by at least sevenfold.

Revenue

In the normal world of business, costs are usually mitigated through revenue. Some organisations may not be interested in this way of covering costs. Nevertheless, it is

important to have an understanding of how revenue might be generated. The potential (not automatic) returns from good deer management include 'direct' revenue, such as venison and stalking sales. Less appreciated are the potential 'indirect' returns available through increased arable crop yield, and increases in woodland net present value (NPV). Briefly NPV is a way of annualising the value of long rotation crops. Cereals of course are planted and harvested in a single season. Woodland however may develop within a rotation of between 60 and 100 years.

An increase of 1% in cereal crop yields represents an average annual revenue increase (costs based on 2000 figures) of £2.75 per cultivated acre (£6.79 per cultivated hectare). Although this represents a real revenue increase (amounting to £1500 per annum in our example, based on normal rotational cropping policy), it is completely lost within the annual and seasonal fluctuations of price and yield differential.

For woodland, phasing out tree shelters in new plantations represents an average annual NPV increase of £34 per woodland acre (£85 per woodland hectare) over the 100-year life of the plantation. Now you might think that doing without tree shelters would be a bit of a risk, but tubes sink capital and £85 per woodland hectare *per year* can buy an awful lot of deer management which, if flexibly and responsively applied during the establishment stage, can yield major downstream savings. Indeed in our example, (assuming all woodland is under full commercial management) this amounts to some £10,000 per year to spend on protecting the 10% of woodland in its vulnerable establishment stage. Damage would not necessarily disappear, but an interesting equation develops between savings in planting costs as against increased damage.

Turning now to direct revenue, the figures are very much more straightforward. Venison income in our example amounts to £540 (18 carcasses @30 lbs @ £1.00/lb), or £0.36p per acre (£0.89 per hectare). Fallow, although larger, command a historically lower value and income is therefore comparable. Stalking income will vary enormously according to quality and locality. The value of stalking sales is developed through what is being culled, the number of outings needed to make that cull, the price per stalking outing and any trophy fees. In our example, which represents relatively high-density, good quality roe, total stalking sales amount to some £3050 or £2.04 per acre (£5.04 per hectare). However this level of revenue is only available to enterprises where deer are present at this relatively high density. If the deer population were reduced to say a third of its present density, then the potential for income through stalking sales would be unavailable.

Taking venison and stalking sales together, a *total maximum sustainable direct* revenue of £2.40 per acre (£5.93 per hectare) per annum is suggested. It is not possible to exceed this figure without either short-term over-exploitation of the deer, or equally short-term over-exploitation of stalking clients. The *maximum* potential surplus from a roe management enterprise is therefore just £0.40p per acre (0.99p per hectare), based on total revenue £2.40/acre (£5.93/ha) less total costs £2.00/acre (£4.94/ha). If you are getting more than this, then the alarm bells should be ringing. With fallow of course, the extra labour costs mean that instead of a surplus, there is a deficit amounting to at least £0.60p per acre (£1.48 per hectare).

The message remains that in the best habitats with relatively high density and high quality roe, deer management may be able to wash its financial face. In the majority of situations good deer management is likely to incur you in net costs. If this were more widely

understood, then perhaps there would be a more logical approach taken to the valuation of stalking. Values are not contrived, but calculated and based on various tangible and measurable criteria. Before going to market, it is essential to make a full audit of the deer and the infrastructure, including the following information (see Figure 1):

A. What is the population of deer on the Estate? What species, or mix of species, are present? At what density are the deer present and at what quality? What is the sex ratio and age profile of the population?

B. What are the Estate's objectives? Are they short-term control, or long-term sustainable management?

C. Of what is the cull composed? Is it a restorative cull after a period of mismanagement? Is it female dominated? Is it fallow dominated? What is the overall size, and can the prospective tenant achieve it bearing in mind the restricted winter culling times?

D. Are there any particular positive, *or negative*, amenity considerations that affect the value?

E. Is the Estate providing any support in terms of infrastructure (larder, high seats, extraction rides, maintained stalking paths etc, or of labour. Bear in mind that the most *profitable* enterprises are associated with situations where the Estate provides a full support package, where the cost of providing that support is more than covered by increased rental values.

F. Having arrived at a value (full valuation tables are found in the 'Lowland Deer Management' booklet [Clifton-Bligh and Griffith] page 101), what consideration has been given to

G. Selection of Tenant: Has he/she the time to undertake the required task? Has he/she the skills? Is he/she trained, and if so is he/she current, competent and mature, thus complying with Health and Safety requirements. Above all, has the Estate taken up references?

H. Finally, is the Estate competent to carry out a valuation in this way, or should it seek expert advice?

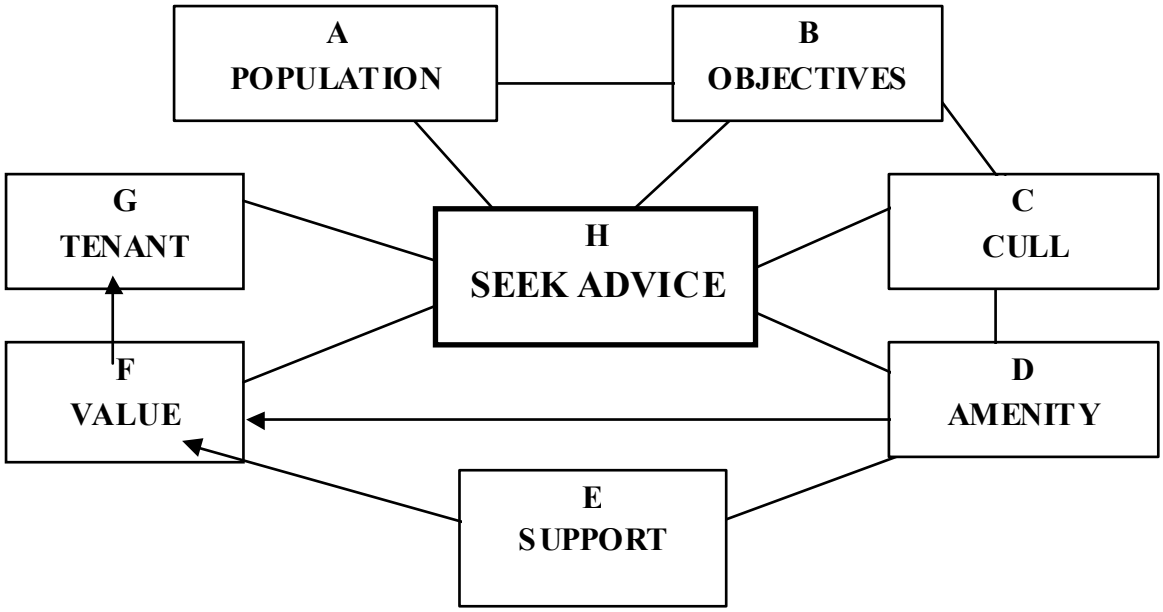
A
POPULATION
B
OBJECTIVES
G
TENANT
H
SEEK ADVICE
C
CULL
F
VALUE
D
AMENITY
E
SUPPORT

Figure 1.

The status of deer management in England

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Introduction

This paper starts with a brief summary of an extremely limited appraisal of deer issues and impacts carried out in the last few months to help inform the debate on the future of the Deer Initiative. It gives Forest Enterprise's views on deer management, and a view of the private sector.

The perception of deer issues

Different people have their own views of what the issues relating to deer are, influenced by their interaction with deer and their location in the country. There is a lack of baseline facts on deer impacts and so this presentation is based on perceptions to try and identify the scale or geographical spread of the issues. Clearly if we are to influence decision makers and the general public we need to have some ammunition. We as an Initiative also need such facts to allow us to better target our limited resources. We therefore recently started an ongoing exercise within the Initiative to try and provide some background information to allow us to prioritise our work and better inform all our work.

A survey questionnaire was circulated to all relevant Deer Initiative partners for completion by their regional representatives. It started with a list of potential issues and impacts of deer that included forestry, biodiversity, agriculture, road traffic accidents, public perception, urban deer, and venison market.

Each area of concern was sub-divided, eg Forestry was broken down into existing woodland, new planting <10 years, further sub-divided into broadleaf etc.

Regions were divided into counties, and the areas of concern into the sub-categories, and respondents were asked to score, on their perception, whether each was a major issue (3), a minor issue (1) or not an issue at all (0). These scores were then totalled for each category; because regions vary in size, the results are merely a crude tool to aid discussion. We deliberately skewed the scores to differentiate areas where there is a major issue.

The charts show totals for all respondents to date but: even with those organisations that did respond, some regions did not. This is not necessarily a failure of the research, as if a region does not respond it suggests that deer are not a major concern in that region. The following organisations responded:

- English Nature, NFU, CLA, FTA, National Forest, Forestry Commission Conservancies, and the Woodland Trust.

What is the breakdown of the issues?

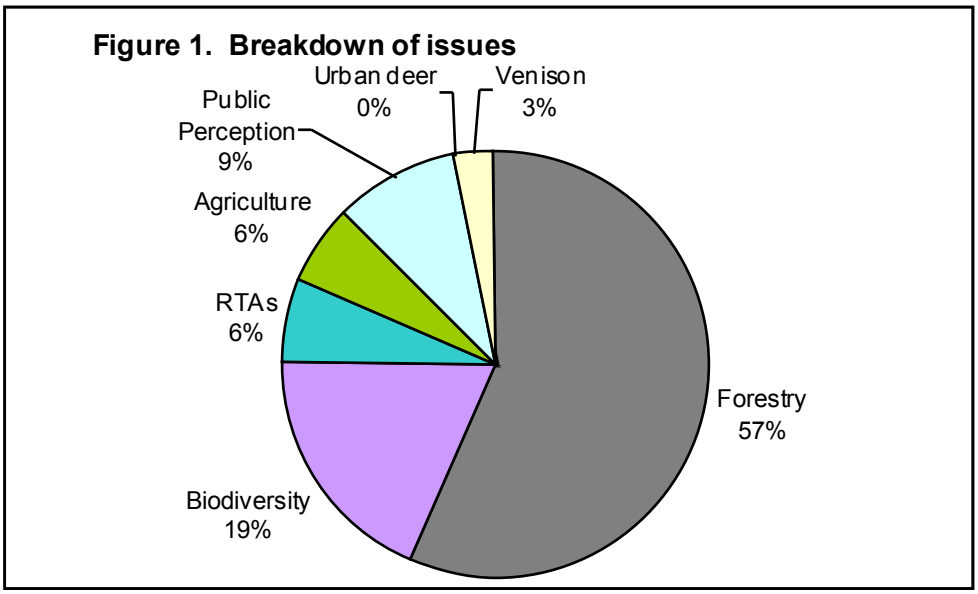
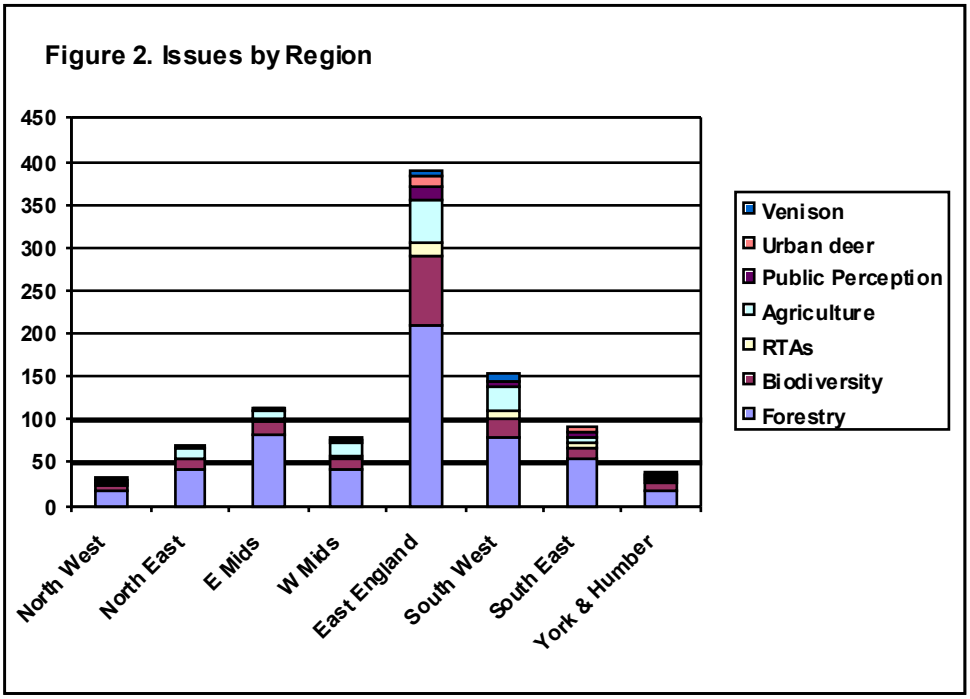


Figure 2 shows how the issues are broken down by region. This is an ongoing exercise, and we have already identified that one issue that is missing from the list is that of deer health and welfare, which is an issue in limited areas.



It may seem strange in a talk about the status of deer management in England to talk about regionalisation, but increasingly it seems likely that the regions will have far greater autonomy.

We have already identified that the impact of deer on forestry remains the major issue with deer and the England Forestry Strategy envisages a far greater role for the regions in the future. In particular each region is in the process of setting up woodland forums and producing framework documents that will reflect the priorities for woodlands for the next ten years.

Those priorities will in turn be reflected in funding for new planting, protection and even training and venison marketing, we fail to influence these documents at our peril.

Deer management and the Forestry Commission Estate

The Forestry Commission, through its Agency Forest Enterprise, manages 19% of English woodlands. The larger forests are in Kielder, the North Yorks Moors, Thetford, the Lake District, the Forest of Dean and the New Forest whilst the balance of the estate consists of smaller woodlands scattered throughout England. Deer policy aims to protect tree crops and maintain or enhance biodiversity values, through exemplary and humane management of deer populations in balance with their environment. Deer management has been developed over many decades and is undertaken by a team of specialist wildlife management staff.

Three key issues are identified for the future of the FC's Deer Management over the next five years:

- the changing nature of the Estate;
- the need to clearly demonstrate accountability;
- the need to make best use of available resources.

The changing nature of the Estate

The impact of Forest Design Planning is transforming relatively even aged and uniform plantations into woodlands that are diverse in age, species and habitat structure. Areas of woodland vulnerable to deer damage are now much more geographically widespread. Increasingly management and planning is taking place at a landscape scale in collaboration with external partners, including neighbouring landowners.

There are significant changes to Management Objectives. In addition to the traditional clearfell and restocking regimes applied to much of the estate, there is now an increased emphasis on management through continuous cover with small scale felling and the use of natural regeneration. This includes a commitment to more than 20 000 ha of restoration to broadleaved woodland of plantations on ancient woodland sites. Biodiversity values, including the presence of a balanced deer population, increasingly feature as an important management objective in their own right. The Forestry Commission Estate is significantly expanding on sites close to urban areas, creating new woodlands that the public is encouraged to recognise as their own.

Following on from changing management objectives are changing Management Prescriptions, which centre on increased use of broadleaved species, natural regeneration, ambitious plans for coppice management and pressure for a smaller scale of operation.

All of these changes have implications for the way that we manage deer and our success will depend on our ability to meet this challenge.

The need to clearly demonstrate accountability

Leadership - As the largest single woodland manager in England, and custodians of the public forest estate, Forest Enterprise must be at the forefront of practice and development of all aspects of deer management.

Professionalism - Forest Enterprise must demonstrate the highest standards of professionalism in its approach. This is the rightful expectation of the public and is achieved through the operation of its recently developed "Ranger Standard" which covers all aspects of the deer management activity under the headings of Policy; Proficiency; Procedures in the Field, Transport and Larder; and Audit.

Discretion - We require our Wildlife Ranger staff to have many qualities. The ability to operate with discretion is paramount if we are to avoid undue and uninformed reaction.

Rationale - We must develop, understand and communicate the rationale for our deer management activity, supporting this through the collection of relevant data and research evidence.

Communication, Education and Understanding - It is a major challenge to communicate our policy and practice to the public and interested groups and organisations. This involves developing our understanding of the position of others and putting our information across in a way that is appropriate, accessible, relevant and easily understood.

Dealing with the Unexpected - We need to be able to deal with the unexpected whether it is the release of adverse publicity, the reaction of a member of the public, outbreak of disease, an accident or an instance of alleged malpractice. Our staff need to be conversant with contingency planning and dealing with the media and know from where to draw support.

Regulation - We need a good awareness of developing regulation, involvement in the process of development and to be "ahead of the game" in achieving compliance.

Certification - Third party credible endorsement of our forest management through Certification against the UK Woodland Assurance Standard is vital in demonstrating the sustainability of all of our operations. This has also enabled us to place the Forest Stewardship Council logo on our venison product.

The need to make best use of available resources

There is no indication that significant additional resources are to be made available from traditional funding sources. We must therefore explore new opportunities, making sure that deer management, for example, is built into broader funding bids. We must match commitments to resources, eg before embarking on coppice management. We also need to obtain best value from our resources. We can do this by:

- A joined up approach, collaborating at all levels where there is benefit from doing so.
- Developing good authoritative, accessible sources of information on all aspects of deer management.

- Working with an assured and reliable venison marketing outlet, enabling our specialist staff to concentrate on deer management in the field.

The private sector

- increasing regional autonomy
- a strong base of trained and competent deer stalkers.

So where are we now in the private sector…..
There is a limited but increasing awareness of deer in both Central Government and among landowners but not necessarily the general public. But there remains a lack of knowledge of deer numbers and the effects of manipulating those numbers, and we are still debating whether an absolute knowledge of deer numbers is necessary.

We have increasing regional autonomy, which offers both threats and opportunities and we already have a strong base of trained and competent deerstalkers. However many of those stalkers are parochial in their views and are still not aware of the impacts of deer, or do not believe that too many deer are an issue.

Too many stalkers are simply not shooting enough deer: blaming lack of venison market, or lack of time, or any one of a number of factors. In truth, many stalkers simply do not want it to be hard work or time consuming to shoot their deer. Therefore they take on too much ground and do not achieve the level of cull needed now, let alone in the future. We heard from English Nature (Kirby, this volume) that the Government is committed to having 95% of our SSSIs in favourable condition by 2010, yet Robin Gill of Forest Research (this volume) has stated that with the current level of culling deer numbers in the UK will double in that time – these two statements are not compatible.

The private sector and the future

The result of this is that the Government must either change the targets or we must change our management regime. We need a joined-up approach to deer management at a landscape scale and increasingly there is recognition that one of the most powerful tools in providing this collaboration is through Deer Management Groups (DMGs). There have been a number of Groups that have been in existence in England for some time, and we have learnt valuable lessons from them, and from the Scottish experience. In particular we have learnt that Groups must be landowner- or manager-led, with an emphasis on addressing local issues but at a landscape scale.

Even in the last two years we have seen a significant increase in landowner and manager awareness of deer issues and a willingness to discuss a collaborative approach, whether on a very local scale, such as the West Notts DMG, or on a broader scale such as the Lincs DMG. I believe that in the future we will see increasing awareness of the need for structured Deer Management Plans and the collation of relevant data on impacts and deer numbers.
This does not mean that we are playing down the role of recreational stalkers – on the contrary, we see an increasing need for a pool of competent trained stalkers that can carry out the necessary cull.

Public perception

Clearly we do not have time today to look at each of these issues in depth, but I would like to pick up on one at this stage and that is the issue of public perception. Whilst it did not score very highly on this survey there is little doubt that locally even a single individual can have a significant impact on any attempt to manage deer. It is imperative that throughout the deer management process we are able to demonstrate a sound scientific basis for our decisions on culling and that we carry out any culling that is necessary in a safe and humane way. We must also ensure that the general public is aware of the benefits of sustainable deer management both in terms of protecting the habitat and the resulting high quality venison.

Summary

Progress is being made in a number of key areas:

- Collaboration is developing more quickly than previously. Promotion through the Deer Initiative has seen an increase in the number of Deer Management Groups. We need to continue this development and work to ensure that they are effective. Deer Management Plans, developed and owned by the Groups, are an important part of this process.
- The Voluntary Approach to Standards has developed through DMQ to the DSC Levels I and II Qualifications with an excellent level of participation which must be maintained.
- The Research and Science of Deer Management has received considerable input. It now needs to be further developed and kept relevant and up to date as management objectives change.

Resources are a key issue. Significant additional funding from core Government sources or the private sector is not readily identifiable. There are significant new opportunities arising through the devolution of funding responsibilities to the Regions as part of the English Devolution process.

Access to these funds will depend upon:

- A persuasive case being made in an accessible format that addresses the key priorities in each Region. This will depend upon understanding the priorities of others and looking to identify and develop the linkages. There are good examples in the work being done on road traffic accidents and in rural development and tourism linkages.
- The case for deer management being included in key Regional documents. Regional Forestry Frameworks are currently in preparation and are close to completion in at least two Regions. These will define the priorities for ensuring that forestry meets the needs of the Region. Inclusion in these Frameworks is essential.
- An understanding of competing and complementary interests. Deer management is too small an interest area to be able to impact on its own. Alliance with agricultural, forestry, biodiversity and tourism interests will be essential.
- Making data and the rationale for management relevant at Regional level. The Deer Wealth Appraisal currently underway in Eastern England, and the Regional "issues" work being undertaken by the Deer Initiative are good examples of this approach.

- The ability to deliver. Funding will be conditional on the achievement of targets and results. The sector needs to be geared up to deliver.

Public Perception of deer management will be crucial in acceptance of the activity by the public and by their elected representatives at all levels. These representatives will increasingly exert an influence over funding. The public as a minimum requires the deer sector to show:

- A professional and responsible approach to deer management with a clear rationale.
- Understanding of the broad range of interests both within and outwith the deer sector.
- Good communication which is vitally a two way process involving a high degree of listening as well as clear messages in an accessible format and language.

The responsibility for meeting these requirements rests firmly with all involved in the deer management sector - it cannot be achieved solely by the staff of the Deer Initiative.

Venison quality assurance

Rick Bestwick

Introduction

Why do we need to talk about quality assurance …… because In England, a lot of people dispose of their venison themselves: skin it, butcher and pack it into plastic bags and sell it down the pub. It is untagged, processed in a garage or outbuilding, no hygiene, no vets, no worries! The bulk of English venison isn't marketed, and tags are almost non-existent. What's wrong? The Scottish are far advanced of the English in this respect, they have a tremendous comprehensive tagging system and traceable carcass system.

The dictionary defines quality as a degree or standard of excellence, and assure as the promise or guarantee or insurance against loss of life. How many of you who cut your own venison insure against public liability? With the premises you use, would you get insurance? Are you being reckless?

Quality assurance schemes

Do we need more legislation on top of existing onerous high-hygiene, fully vetted factories? Although it will be costly, we can't afford to ignore it when selling large volumes of venison.

Scotland has grasped the nettle and one estate has passed the SQVAS first inspection. Forest Enterprise has several larders this month due for inspection to come into this scheme. Why does the Forestry Commission bother? They can market all their venison through Bestwick's. To demonstrate what can be achieved by a specific, concerted effort to market many thousands of carcasses from one supplier, it is worthwhile considering the Forestry Commission's past.

The Forestry Commission used to sell venison purely on price, with little regard to marketing nationally or internationally. About eight years ago I spoke to Brian Mahony and Ian Forshaw to dual market their venison through Bestwick's, but what was important was the 3-year minimum term supply in which to market the product and obtain a customer base that would acknowledge a supply of quality with accepted high levels of presentation and hygiene and traceability.

Let me explain why I was keen to obtain an assured supply of quality venison. Very little attention has been paid by any estate to the marketing of wild venison in either Europe or the UK. From the producing estates' point of view, it had simply been "get the highest price you can in July and hope the larder is cleared and payments follow!" Very little attention was paid to who was buying the product, or the standard of their premises or their outlets. I have never known an estate or group of estates prepared to attempt to market venison under a brand image or indeed any image – price was paramount and marketing not considered relevant. Quality was not considered a priority.

Many dealers have tried to upgrade premises with full veterinary control, without sufficient throughput to cover the increased overheads. Consequently they have overpaid estates in an attempt to increase their throughput. This has resulted in a severe cash flow problem and an

end product unsaleable at a profit, and as a result ceased to trade. The last fully vetted EEC factory to go into liquidation in Scotland 2 years ago was actually losing £93 on every deer carcass put through the plant during the previous 2 years.

What is worrying is that it always seems to be the EEC approved, fully-vetted, hygiene premises which go bust – never "Fred in his Shed" who has made no investment in proper hygiene facilities. He is very dangerous to the industry and not just in venison terms. He always offers a high price at the start of the season and sadly that causes a higher than justifiable price to be set across the market. Who supports Fred? Why does he receive so much support? Is it justified?

What is venison?

It's wild, it's natural, it's healthy, it's low in fat, it's not drug-injected, it's free range, it's not factory farmed or intensively reared, it eats natural foods: it is a niche product that must not be undersold and it should not need to be "got rid of" cheap, but marketed as the high quality food that it is. Red deer venison medallions at a high quality restaurant would sell on the table for up to £50 per plate. That's not being "got rid of" – it's being marketed on the menu as wild venison from the Highlands with a distinct air of nicheness – if there is such a word. It's not being "got rid of", because it is in demand: it is a desirable product that attracts a price that reflects its quality and image and will stand any amount of razzamatazz.

Where can we get help to improve our image?

I had a visit from representatives from the Scottish Executive Environment and Rural Affairs Department (SERAD), the Food Safety Agency (FSA), the Department for Environmental Rural Affairs (Defra) and the Meat Hygiene Service (MHS), together with 2 inspectors from EC Brussels at my factory 2 years ago. Their brief was to inspect and assess the UK's competence in following the EC Wild Game Meat Directive properly. We, as a company, were fine, but they told me afterwards that the UK was the second most offending country for illegal export of game to Europe – mostly on technicalities, but there were signs of blatant illegal activity also.

One of the Maff officials, tongue-in-cheek, said that some of the game produced by "Fred in his shed" should carry a government health warning! Since that meeting I have heard of no prosecutions or investigations taking place. I believe, in their eyes, we are seen as a cottage industry and not worth helping, so we need to put our own house in order.

Legally enforced inspection of all deer carcases by vets before processing would push out "Fred in his shed" and destroy the cottage industry status that we have inherited. Legally enforced tagging of all deer would give traceability and greater confidence to the processor and consumer. Tagging is commonplace in Scotland but virtually non-existent in England other than by Forest Enterprise.

Marketing to quality markets

As a company we not only process game on three sites but have two public cold stores which provide other food services for large, well-known retail multiple PLCs, one customer being Marks and Spencer. Several months ago we had their quality technician arrive at one of the cold stores to carry out periodic hygiene audit. When she had finished, I asked her to my

office to talk about the possibility of her giving the factory a quick once over regarding the supply of wild game and venison.

After a short briefing on what wild game was and how it was killed, transported and stored in game/deer larders, she took a 12" plastic ruler out of her briefcase and laid it flat on my desk. It must have been 1.5mm thick. She asked if this ruler could be pushed under a supplier's larder door or through the seal on the side of the door, or through a crack in an air vent. She said if it could, then a fly or other insects could enter and all the meat or carcasses inside would be viewed as unacceptable for sale in Marks and Spencer.

She also required refrigeration equipment in the game/deer larders to run at +2 degrees C (this of course is commonplace in EEC food processing factories). It had to be monitored by 24-hour thermographic recorders with an automatic alarm and phone message being sent to the person in charge of the larder if the temperature rose about the +2 minimum.

I thought for a moment about some of the larders we collect deer from. Some have fridges but they often don't work. Some have inadequate refrigeration that does work; some larders have no refrigeration at all; some have doors with no rubber seals; some larders have no doors and some estates have no larders!

So where can we sell our venison, where do we start? To find a niche market firstly we must raise the image and status of venison as a healthy nutritious and safe food. Not only must we ensure all deer carcasses are tagged and traceable, but also fully vetted, ie inspected by a trained vet, and processed in high hygiene factories. Equally important is that they are presented to the customer in a bright and clean sales environment – innovative packaging makes a great difference.

Marketing initiatives

Two very interesting joint marketing initiatives have been developed over the past 3 years which demonstrate a close working relationship from a guaranteed supply and the quality aspect through to a joint packaging and promotion scheme.

First the FE in conjunction with us has successfully marketed its own venison in a very attractive point of sale retail box bearing FC's well-known 2-tree logo. An attractive outer box complements this. Full traceability to the consumer is assured due to the comprehensive tagging system. Producing meat in this format has enhanced the status of venison, lifted the image, raised the profile and created customer awareness and recognition based on greater customer confidence. Forest venison is now an accepted and recognised product that is being asked for by brand name both in the UK and on the continent. The stalkers are very much a part of this process.

A second promotion, again with the distinctive packaging, has been started on the Isles of the West of Scotland – Arran, Islay, Mull and Skye. Wild venison packaged in this way not only adds value to the product but it means the whole process is undertaken in a more professional way by linking the suppliers (yourselves) to the processor. We all share and benefit in a dual marketing strategy. Marketing ventures of this magnitude take time and serious long-term commitment over several years: not just "How much are you paying this season?"

To go forward with wild venison

I would recommend a phased development towards a geographic group pooling carcasses to a central point and marketing as a group. This is difficult in a fragmented industry but it will assist in reducing collections costs.

Secure markets and secure payment are needed to target consumers. Together, producers want an acceptable return on effort put in as a result of supplying a quality product, new product development, product recognition, to identify venison product as a retail commodity, and a company that continues to research and develop prospects and opportunities in Europe, as the sophistication of retailing increases there is a growing demand for more venison to be retail packed. The breeding herd is expanding. In the UK consumer awareness and consumption of wild venison is very low compared to Europe.

Companies that supply high street retail outlets in both England and Scotland (but more emphatically in England) report good demand and growing portfolios. They consider that the response to planned or unplanned exposure of venison, by point of sale brochures, TV cookery shows, cookery magazines or trying the product when eating out, is very positive.

The development of the UK market especially the high street is being planned, the investment required to pursue this market is high. In the short term there is a growing demand for secondary processed retail packed products in all markets. A review of the market prospects has concluded that the interests of the estates would be well served by further development of the UK market. The implications are that collaboration must in time replace the current fragmentation. Would such change be successfully implemented with enthusiasm and commitment? It is down to you!

European Game Meat Regulations

Hugh Rose - British Deer Society

The current legal situation

The shooting and control of sale of venison is laid down in a number of laws. Primary national legislation includes:

Deer Act 1991 (England and Wales)
The Deer (Scotland) Act 1996
Wildlife (Northern Ireland) Order 1985

Other relevant legislation includes:

Game Licences Act 1860 (shooting deer on "un-enclosed" ground)
Food Premises (Registration) Regulation 1991 (registration of larders)
Animal By-Products Order 1999 (disposal of waste)

Game processing

The requirements of the **EC Wild Game Meat Directive (1992)** are transferred into UK law by:

- **Wild Game Meat Regulation 1995** which applies to all game requiring a health mark or being exported across member state boundaries.
- **The Food Safety (General Food Hygiene) Regulation 1995 which** covers all other processing of venison for sale in UK.

Problems and shortcomings of current legislation

- EC did not intend that ALL game for home consumption be exempt veterinary inspection;
- major differences exist in law between England and Scotland e.g. out of season sales;
- confusion exists between food safety legislation, anti-poaching legislation and taxation legislation.
- wide variation in requirements are imposed on processors licensed by SEERAD/DEFRA/ local authorities;
- widely differing standards required of game dealers by EHOs in different local authority areas;
- little attempt by FSA, police or local authorities to enforce the law or hygiene standards;
- "uneven playing field" makes it difficult for responsible dealers to compete financially;
- even large producers are deterred from long-term marketing initiatives;

- traceability from "forest to fork" is impossible to achieve without a single carcass tagging and record system;
- standards of hygiene particularly in transport remain very low;
- deer larders / "collecting centres" are currently exempt from current EC law so no legal compulsion to upgrade standards;
- larder refrigeration is only being introduced very slowly/practically no larders are registered with the local authority;
- few small scale stalkers or estates have adequate deer larders or refrigeration;
- field processing and transport of carcasses and game is only improving slowly;
- there is a slow uptake of health and hygiene training particularly among professional stalkers and keepers.

Future European legislation

European Union has recently consolidated 17 different Food Hygiene Directives into five new Food Hygiene Regulations. All but one of the drafts are agreed and are expected to be adopted by early in 2004 (one has already been adopted). If any have not been adopted before the new EU Parliament is elected, it has the option to confirm or redraft them:

- **Hygiene 1 - General Hygiene of Foodstuffs. 2000/0178 COD** It is the overarching legislation and contains general hygiene rules for business operators including Hazard Analysis Critical Control Point (HACCP) system.
- **Hygiene 2 - Specific Hygiene Rules for Food of Animal Origin 2000/0179 COD** It contains the specific rules for the different food sectors (including wild game.)
- **Hygiene 3 - Specific Rules for the Organisation of Official Controls on Products of Animal Origin intended for Human Consumption 2000/377 COD** It covers the organisation of official controls.
- **Hygiene 4 - Animal Health Rules Governing the Production, Processing, Distribution and Introduction of Products of Animal Origin intended for Human Consumption 2000/0181 COD (2002/99/EC of 16 Dec 02)** General animal health rules governing all stages of intra-community trade (Adopted 16.12.02)
- **Hygiene 5 - 2000/182 COD**. This is the formal repeal of previous EC Directives.

Full texts can be down loaded from FSA website:
www.food.gov.uk/foodindustry/regulation/europeleg/104739

Note: The difference between an EU Regulation and Directive is the former is binding on member states in detail while the latter can be interpreted in national legislation as long as its intention is reflected.

In addition to food hygiene regulations, a second piece of EU legislation was adopted in October 2002 and will apply in all member states from 1 May 2003 namely:

The EU Animal By-Products Regulation (EC) 1774/.2002. This Regulation mainly addresses the disposal of fallen domestic stock and animal waste and the licensing and use of incinerators. All on-farm burial will be forbidden except in remote areas which will be

restricted to some of the Western Isles and North-West corner of Scotland. The guidance being more than 100 km from the nearest licensed disposal plant. In addition it requires the registration and upgrading of all small incinerators [under 50 kg/hr] as well as new larger models and lays down requirements for burial of ash in registered landfill etc. The Regulation specifically excludes wild animals which die in the countryside and any green offal removed at point of killing but both DEFRA and SEERAD believe larder waste should be incinerated - particularly if "it is the product of processing", ie a Game Dealing license is held.

This Regulation will require national legislation to bring it into force in UK. The full text is available on the European Commission's: www.europa.eu.int/eur-lex website and draft guidance on DEFRA's website: www.defra/animalh/by-prods/default.htm and www.defra.gov.uk/animalh/by-prods/incinerators.htm

Implications to Venison Production of new EU Legislation (as currently drafted)

Veterinary inspection of ALL game entering the food chain will be required.
The only exemptions allowed are for the **producer or hunter** to supply (which includes gifts):

- "small quantities" of game or game meat;
- either direct to the final consumer or;
- to a "local" retailer who is directly supplying the final consumer.

The exemption and conditions above only apply to veterinary inspection not to the requirements of HACCP or processing facility standards. The Regulation requires Member States to lay down rules ensuring the aims of the Regulation are still achieved by those using the exemptions. How this will be achieved in UK and the definitions of the terms used is still being discussed with Food Standards Agency (FSA) by the FACE (UK) Working Group but:

- "Small quantities" - a suggested threshold of 100 deer and 10,000 small game per annum has not been accepted (despite a precedent in the small poultry producers threshold.) - an alternative FSA suggestion is awaited.
- "Local" - within the local authority area or those immediately adjacent may be accepted.

Training and qualification of hunters

The Hygiene 2 Regulation also introduces a new concept of training and qualifying hunters to carry out field inspection of game. Certification by a "**trained person**" of nothing unusual in behaviour before killing or the viscera/ head of the animal and attaching a numbered label to the carcass stating this and giving time, date and place of killing will allow the game to be sent to the processor without the associated pluck and head also being required for veterinary inspection.

If no trained person exists or an anomaly is found, the viscera and the head [less any antlers] must accompany the carcass for veterinary inspection at the licensed venison/game processors premises.

Member states are instructed to liase with their national hunting organisations over training and qualification requirements for hunters which must be ratified by the competent authority

- in UK this is FSA. The FACE (UK) Working Party is recommending to FSA that DSC Level 2 should be the basic qualifying standard - possibly with a small add-on to cover the small game requirement.

Likely future legal developments and other implications

It is unlikely that time will be found in the Government's legislative programme to repeal or revise large sections of our primary deer and game legislation therefore:

- game and venison dealing licenses will continue to be required for the legal SALE of ANY venison or game;
- out of season sales of game and venison will remain restricted in England and Wales;
- HACCP will require all dealers and processors to take more interest in the standard of their supplier's larders, training and records;
- sub-standard dealers who cannot upgrade the standard of their transport and buildings will probably be forced out of business;
- stalkers may have to co-operate at a local level to establish refrigerated collection centres if they only shoot small numbers and are not close enough to a dealer to allow economic collection.

Conclusions

1. All estates and small scale processors should start a programme of plant/larder improvements now.
2. All stalkers should take steps to obtain the necessary training and hygiene qualifications.

Appendices

www.thedeerinitiative.co.uk
www.deercollisions.com

The Deer Initiative Accord

Signed up to and the principles adhered to by the partner members

The Deer Initiative Accord Principles

The aim of the Deer Initiative (DI) is "***to ensure the delivery of a sustainable, well managed wild deer population in England***". The DI is a partnership comprising a wide range of statutory, private and voluntary organisations, and individuals with an interest in wild deer and their management.

Throughout the Accord the term "deer" is used to describe the six species of deer commonly found in the wild in England; that is, red (*Cervus elaphus*), roe (*Capreolus capreolus*), Fallow (*Dama dama*), Sika (*Cervus Nippon*), Muntjac (*Muntiacus reevesii*) and Chinese Water Deer (*Hydropotes inermis*).

The signatories to this Accord and other members of the DI recognise that wild deer, both native and introduced species, are an important part of England's natural resources and play a major role in the economy, environment and history of England. In addition they recognise that many individuals provide a significant contribution in many forms towards managing deer populations, either through their recreational or professional activities. They will endeavour to actively facilitate and support these efforts insofar as they are compatible with the policies of their own organisation, and so long as the principles outlined below are upheld.

Signatories to the Accord have agreed to the fundamental principles stated below and to encourage others likewise to make such a commitment as an integral part of their deer management approach and priorities.

Principles

A sustainable and balanced population of wild deer in England

We will work to ensure that populations of wild deer are in sustainable balance with the natural resources available to feed and shelter them throughout the year.

A humane, responsible and sensitive approach to the management of wild deer

We will work to prevent deer populations growing to exceed a sustainable balance with the environment and natural resources by planning the delivery of active deer management programmes, which will often include culling. Such management will always be undertaken legally and in a humane, responsible and sensitive manner.

An experienced and knowledgeable capability in deer management

Achievement of best practice knowledge and skill is a pre-requisite of deer management. We will encourage and promote the development and delivery of accredited training for all those with deer management remits and interests.

An informed public understanding of wild deer management

The presence of deer in an area can add greatly to people's enjoyment but deer can also cause various problems. Their management may therefore pose a dilemma. Information needs to be provided to extend the understanding of the general public of the nature, role, contributions and impact of wild deer populations throughout England. In educating the public about wild deer management, the benefits of planned and humanely carried out deer management may be explained. We will work to improve knowledge, and encourage and promote better public understanding as an integral and essential component of deer management.

A partnership approach to reducing the adverse environmental and economic impacts of deer

The full benefits and objectives of the management of wild deer in England will require the active contribution to a nation-wide deer management programme by all public, private and voluntary organisations associated with wild deer populations. We will achieve this through the provision of financial, in-kind and operational support to the Deer Initiative and The Deer Initiative Limited (DI Ltd), and a commitment to the Accord objectives and principles.

DI Ltd objectives:

The objectives of the DI Ltd are "***the advancement of education in the management of the wild deer population in England and benefit to the natural environment and the public through the development of strategies and best practice for its management***." It will execute this by supporting the Deer Initiative Council Members in their deer management activities and in their pursuit of the DI strategic priorities; promoting the principles of the Deer Accord; and contributing to enhanced deer management throughout England. Signatories will endeavour to support the objectives of DI Ltd, through the relevant policies and activities of their own organisation, in partnership with other signatories.

The objectives are as follows:

- Maintain the DI's position as the Government's preferred means for co-ordinating the delivery of deer management throughout England.
- Advise Government on national needs, support and priorities for deer management and its appropriate standards.

- Act as a central focal point for improved communication with the public on all matters connected with wild deer and deer management.
- Seek to become the recognised endorsement for best practice in deer management and training.
- Develop and promote best practice in all aspects of deer management.
- Co-ordinate the mobilisation of deer management resources in DI member organisations.
- Identify and promote relevant practical research on wild deer and their management.
- Become the prime "first stop shop" for all matters connected with wild deer and their management, and transfer knowledge, skills and activities to other organisations.
- Encourage and support networking amongst landowners, stalkers, specialists and professional deer related organisations, government departments and agencies, local authorities, land managers, and environmental and animal welfare organisations.
- Develop links with similar organisations in other countries and to thereby share experiences on effective communication messages and deer management methods.

The founding partners who form the Deer Initiative Council are:

The Woodland Trust
The Royal Society for the Prevention of Cruelty to Animals
The Ministry of Agriculture Fisheries & Food (now Defra)
English Nature
The Highways Agency (formerly part of the Department of Environment, Transport and the Regions)
The National Farmers' Union
The Country Landowners Association (now Country Land & Business)
The Forestry Commission
Forest Enterprise
The Game Conservancy Trust
The British Association for Shooting and Conservation
The National Trust
The British Deer Society
The Timber Growers' Association – now the Forestry & Timber Association (FTA)
The North West England Association of Deer Management Groups
The Association of Chief Police Officers

The Association Members are:

The National Forest Company
National Gamekeepers' Association
Union of Country Sports Workers
Countryside Alliance
Wye Valley Area of Outstanding Natural Beauty

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

Introduction

In general, wild deer are increasing in range and number throughout England. In some areas the adverse impacts on the environment, economy and human interests can be severe.

The Deer Initiative (DI) is a broad partnership of statutory and voluntary bodies, and private interests, sponsored by the Forestry Commission, aiming to: *"ensure the delivery of a sustainable, well-managed wild deer population in England"*. The DI advocates a properly planned approach to deer management and endorses the use of Deer Management Groups (DMGs) to co-ordinate deer management efforts across landholding boundaries within natural deer ranges.

In general terms a DMG is a group of landowners and managers who agree a common deer management aim and where necessary, execute a deer management plan.

The nature of a Deer Management Group

There is no "standard" DMG model that applies universally. Effective working of each Group will depend on many variables, not least the degree of enthusiasm displayed by the landowners and managers concerned and the species and distribution of the deer themselves. Landowners' attitudes will vary widely but, as a starting point, all should agree on the need to maintain deer numbers in balance with their environment.

The boundaries of each DMG should be based on the range of the deer to be managed. The size will vary by species, but may be influenced by the obvious identifiable [if not impenetrable] barriers to deer movement such as rivers, motorways or major landforms.

Setting up a Deer Management Group

The pre-requisite to setting up a DMG is to gather together a group of landowners and/or land managers who are willing to co-operate towards common objectives in managing deer which roam across their land. Having identified such a group, an enthusiastic organiser with the skill and means to communicate effectively should be chosen to co-ordinate the effort.

To be most effective, the Group must be made up of land owners/managers or representatives who are able to take decisions on behalf of the principal stakeholder. The initial need is to

obtain sufficient deer management advice and knowledge of deer numbers, distribution and impact, to be able to develop a deer management plan, matched to the aspirations and aims of the landowners and land managers. This expertise may come from within the group but may also have to be sought independently. It would be normal for the group to meet initially to discuss the whole concept before developing a detailed plan. Thereafter meetings should take place at least annually to review progress and agree any changes that are required to the deer management plan.

Deer management advice

Advice on deer management and establishing DMGs may come from many sources. However, if the expertise is not available locally the DI can provide objective advice through dedicated DI Deer Liaison Officers or through accredited representatives of the DI Partner Organisations. Seeking advice early is recommended.

Deer Initiative support

Apart from the advice mentioned above, the DI may also provide other support, including a modest start-up grant, should this be required. It is expected that established DMGs should reach financial self-sufficiency rapidly. General support is not, however, exclusive to new DMGs, and requests for help from existing DMGs will be considered equally on merit. Bids for assistance may be made directly to the DI at the contact address given on this Advice Note. It is expected that bids will include the following:

- details of the proposed or existing DMG, including the major contacts and significant land holdings;
- an explanation of the background and nature of the assistance required;
- a location map at a scale of 1:50K, showing overall boundaries;
- any letters of support, particularly from the Forestry Commission Conservator and from the local branches of the CLA and NFU.

Activities eligible for support are not restrictive and could include:

- gathering and exchange of information (eg deer census, determination of land ownership, surveys of environmental impact, advisory visits);
- communications costs (eg administration, meetings);
- awareness raising (eg seminars, leaflets).

The terms and conditions of any support will be determined on a case-by-case basis. In general, however, any support brings with it the obligation to communicate regularly with the DI, and to provide periodic reports and data.

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

Legal requirements

The Deer Act 1991, provides for the culling of deer in certain situations during the close season for the purposes of crop protection.

Section 7(1) allows an authorised person (see below) to shoot deer out of season on cultivated land, pasture or enclosed woodland provided that the conditions in section 7(3) apply. These conditions are:

(a) deer of the same species are causing or had caused damage to crops, vegetables, fruit, growing timber or any other form of property on the land;
(b) it is likely that further serious damage would be caused; and
(c) action was necessary to prevent it.

Although the Act does not define the meaning of crops, the scope appears to be very wide. The exception specifies crops, fruit and vegetables, but it may be possible to justify a case to include pasture especially when used for grazing. The term 'timber' implies any form of woodland or forestry, be it wild, managed or commercial. Areas of set-aside or private gardens are unlikely to be classed as crops but it could be argued that they come under the term 'or any other property on the land'.

Authorised persons

The definition of 'an authorised person' is:

(a) the occupier of the land on which the action is taken;
(b) a resident member of the occupier's household authorised in writing by the occupier;
(c) a person in the occupier's service (eg an employee) authorised in writing by the occupier; or
(d) a person having the right to take or kill the deer on the land on which the action is taken or any person acting with the written authority of a person having that right (eg the shooting tenant or person authorised by him).

Where an authorised person takes action against maraudi ng deer to protect his crops etc, the killing of the deer must take place on the land where the damage is occurring, not the land where the deer come from.

Selling venison

In the open seasons the occupier or stalker can only sell venison to a licensed game-dealer. In the close seasons only a licensed game-dealer may sell venison. Therefore, unless the deer manager is a licensed game-dealer, he may only use venison shot out of season for his own consumption, or give it away.

For further information on this or other legal requirements regarding the culling of deer the following publications may be useful:

Deer: Law and Liabilities, by Charlie Parkes and John Thornley. ISBN 1-84037-096-3

Fair Game – The Law of Country Sports and the Protection of Wildlife, by Charlie Parkes and John Thornley. ISBN 0-7207-2065-6

Statutory close seasons for deer in England and Wales
(all dates inclusive)

Species	Sex	Dates
Red	Males	1 May - 31 July
	Females	1 Mar - 31 Oct
Fallow	Males	1 May - 31 July
	Females	1 Mar - 31 Oct
Sika	Males	1 May - 31 July
	Females	1 Mar - 31 Oct
Roe	Males	1 Nov - 31 Mar
	Females	1 Mar - 31 Oct

There is no statutory close season for Muntjac or Chinese Water Deer.
It is recommended that when culling female Muntjac immature or heavily pregnant does should be selected to avoid the risk of leaving dependant fawns

Advice note number 4: High seats for deer management

Introduction

The use of high seats for deer and other wild life management has been a common practice on the continent for many years. They may not always be the most productive method of culling deer but they are usually the safest. High seats come into their own perhaps in the control of roe and muntjac and in the control of the larger species when the conditions are right; usually high density populations in predominately thicket stage plantations and in areas of high public access.

Whilst the main reason for use is to permit safe shooting, high seats offer a number of other advantages. They give the deer manager a position from which to shoot that is out of wind and sight allowing a steady, unhurried shot. They also minimise disturbance allowing observation and photography.

Design

There are any number of designs of high seats ranging from temporary portable metal seats, which may be lean to, or free standing to permanent purpose built structures in timber or metal. The only constraints on size and complexity are time, labour and cost.

Siting

There is no doubt that the most critical factor in high seat design and use is siting. Many inexperienced deer managers initially erect permanent high seats in locations that look suitable only find that the deer hardly use that area or are sighted just out of range. The first priority must be to establish those areas that deer regularly frequent; their favourite feed areas and "racks" which criss-cross woods, across rides and fields. These will indicate the deer's general movement and seats can be placed accordingly. To avoid wasting time and money in erecting a permanent seat in the wrong place stalkers should consider buying a portable metal seat, which dismantles easily for transport and can be erected by one person. A range of these seats are available and at varying costs. With a portable seat one can try out various locations until the right place to build a permanent one is found. They also offer the flexibility to respond to short term problems and can be used for short periods in areas where public access and therefore safety are important considerations.

Having selected the area to be covered, the next stage is to seek a suitable tree against which to build a seat. If none exists a free-standing seat will be required. Thought needs to be given to range to the killing area, prevailing wind, unseen approaches,[up wind if possible] and safe areas of fire. If possible the seat should have a background and not be silhouetted although this is not essential as cladding can be used. Seats may have a limited life at each location, as the trees grow up and fields are used for different crops from year to year. Ideally they should be used where a safe shot can be taken and in an area you know deer use regularly such as woodland edges, overlooking young plantations, deer lawns, as well as on forest fire breaks and rides.

Permanent or semi-permanent seats?

If a semi-permanent or permanent wooden structure is to be built the best materials are conifers, particularly larch, for the main beams and ladder. Do not use birch, which rots and breaks without warning. Treated timber should be used for the load bearing timbers, and one inch thick planking as a minimum for the floor. The rungs must, in addition to nails or bolts, be secured by stapling a wire over the rungs, along the full length of the ladder. The public often take a dislike to high seats, and have been known to saw through rungs and uprights or to tip over the seat. Seats should therefore be securely fastened, checked regularly and sited away from footpaths if possible.

Habitat management

Having gone to the trouble of building a good seat, it is worth considering prolonging its life if possible by some habitat management. Try attracting deer to the area by planting attractive food plants, for example willow or simply re-seeding and fertilising. Cut shooting lanes in the trees (with the forester 's permission)particularly in growing plantations and do some coppicing down the edges of rides that are within range.

Health & Safety

When considering erecting a seat, due consideration must be given to safety and the law. Whatever seat you choose to put up, remember it must be safe, well maintained and inspected regularly. *The landowner* is liable if a member of the public should climb up and injure him/herself, whether they are allowed to be there or not. All farms and estates should be insured for third party liability in the event of accident, but if the seat was found to be unsafe, insurers would be unlikely to meet any subsequent claim. Do not leave old seats in position once they are no longer in use, or decaying.

Legal requirements

High seats are essential for the deer manager; there are however legal constraints for employees using them. A number of regulations apply, including:

a) Health and Safety at Work (etc) Act – 1974
b) Agriculture (Ladders) Regulations – 1957

Advice note number 5. Deer larders and the law in England &Wales

Introduction

The legal status of deer larders is often confusing. There are a number of pieces of legislation which may apply to larders and their interpretation by local authorities varies throughout England and Wales. The exact requirements for any deer larder depend on the purpose for which the larder is used. In addition to general health, safety and food hygiene requirements, there are four specific pieces of legislation that may affect the operation of a larder:

1. The GB Wild Game Meat (Hygiene and Inspection)Regulations 1995
2. The Food Premises (Registration)Regulations 1999
3. Animal By-Products Regulations
4. The Environmental Protection Act 1990

The Wild Game Meat (Hygiene and Inspection) Regulations 1995

The requirements of the above regulations are generally well known and understood and a comprehensive guide to their implementation and interpretation is given in two documents:

- *The culling and processing of wild deer*, J.C. Adams & N. Dannatt, Arun District Council/FC 1989
- *Wild game: Guidance on recommended standards for wild game*, LACOTS 1997.

The Food Premise (Registration) Regulations 1999

The Food Premises Regulations require that any premises that are used for the preparation or storage of foodstuffs for more than five days in any five consecutive weeks must be registered as a food business with the relevant local authority.

The Animal By-Products Regulations (ABR)

The new EU legislation, the ABR, bans the routine burial and burning of animal carcases. However, the carcases of all wild animals will be exempt from the scope of the Regulation unless they are thought to be diseased (or all or part of them are used to produce game trophies).Where a deer larder has a small incinerator (less than 50kg

per hour capacity)and is only used for incinerating wild, on-diseased animals, it would not be controlled by either the ABR or the Waste Incineration Directive (which exempts animal carcase incinerators).

The Environmental Protection Act 1990 (EPA)

The Local Authority has powers under the statutory nuisance provisions of the EPA to deal with "accumulations or deposits which are prejudicial to health or a nuisance ". Whilst burial is not illegal under the ABR, before burying animal by-products, operators of deer larders are advised to check with the local authority that burial is acceptable. Defra would prefer it if material produced in a larder continued to be disposed of by rendering or incineration.

If it is agreed that burial is the only option, the person responsible should follow the guidelines laid down in The Water Code which is available free of charge from Defra Publications,tel.08459 556000.This warns about avoiding pollution of a water source, for which you can be prosecuted, and gives advice including minimum distances from water sources for burial, and depths to which you must dig. In addition, burial must be done in such a way that carnivorous animals cannot gain access to it and it does not contaminate the environment or pose a disease risk.

Deer larders are therefore likely to fall into three categories:

1. Those acting as a "collection centre " where deer carcases are eviscerated and then stored in the skin for onward transmission to a game dealer (or "wild game processing facility ")but not in use for more than 5 days in any 5 consecutive weeks. Such premises do not need to register and may dispose of their by-products without legislative control but are still subject to EPA.

2. Those acting as a "collection centre " where deer carcases are eviscerated and then stored in the skin for onward transmission to a game dealer (or "wild game processing facility")and the premises are in use for more than 5 days in any 5 consecutive weeks. Such premises must be registered with the Local Authority who may stipulate disposal options in accordance with EPA.

3. Those acting as a game dealer and either selling game in the skin direct to the public or operating as a "wild game processing facility " ie removing carcases from the skin and possibly butchering the carcase and the premises are in use for more than 5 days in any 5 consecutive weeks. Such premises must be registered with the Local Authority who may stipulate disposal options in accordance with EPA. Such premises require a Game Dealers Licence from the Local Authority and are subject to the full inspection regime.

Game Dealer 's Licence (England and Wales)

Two licences – a local authority licence and an excise licence are required to trade in game (including deer).An excise licence is obtainable from a Post Office; it is a condition of issue that a council licence be produced at the time of application. The council licence will specify the business premises; an excise licence is required for each one.

For further advice please contact:

The Deer Initiative Office

tel 0870 774 3677 or fax 0870 774 3688
or e-mail info@thedeerinitiative.co.uk

The Central Region Deer Liaison Officer

tel 01691 718606 or fax 01691 718607
or e-mail central@thedeerinitiative.co.uk

The Southern Region Deer Liaison Officer

tel 01722 411974 or fax 01722 412646
or e-mail deer@longford.org.uk

Eastern Region Deer Liaison Officer and RTA Project Officer

Tel 01842 890 798 or Fax 01842 890 759
Mobile 07970 141 512 or email eastern@thedeerinitiative.co.uk

Wales Project & Deer Liaison Officer

Tel 01874 636 148 or Fax 01874 636 840
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Peter Wakely/English Nature 17,396
Middle left: Co_2 experiment at Roudsea Wood and Mosses NNR, Lancashire.
Peter Wakely/English Nature 21,792
Bottom left: Radio tracking a hare on Pawlett Hams, Somerset.
Paul Glendell/English Nature 23,020
Main: Identifying moths caught in a moth trap at Ham Wall NNR, Somerset.
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