
The Ranging Behaviour, Habitat-use and Impact of Deer in Oak woods and Heather Moors of Exmoor and the Quantock Hills

(1997)

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Summary

Background

1. The largest population of red deer in England occurs in the 'West Country'. Here the best known and most readily viewed herds are those found within Exmoor and the Quantock Hills. Red deer are, however, also present in significant numbers in other parts of West Somerset, North Devon and North Cornwall. In the mid-1950's when Exmoor and the Quantock Hills were first designated as a National Park (NP) and an Area of Outstanding Natural Beauty (AONB) respectively, only around 1000 red deer were estimated to be present in this region. Recent visual censuses show that there are now at least three times that number. Red deer have been associated with the region throughout history, and the conservation of a healthy deer population is amongst the stated objectives of management plans for both Exmoor and the Quantock Hills.
2. The increase in red deer numbers noted in the West Country over recent decades, paralleled by similar increase in roe, fallow and muntjac deer throughout much of lowland England, have led to mounting concern about deer damage in this country. Such concern is now no longer confined to impact on commercial forestry, amenity woodland and agriculture/horticulture, but includes the possible prevention of natural tree regeneration in semi-natural woodland and damage to other sensitive vegetation in conservation areas. Previous research into impact of red deer, and indeed ecological research on wild red deer in Britain as a whole, has almost exclusively been undertaken on Scottish populations. The present study was initiated to investigate the utilisation and impact of deer on semi-natural woodland and heather moorland under the milder climatic conditions and differing landscape patterns offered in southern England.
3. While deer at high density can prevent natural regeneration in woodland and may contribute significantly to grazing regimes on moorland, in other cases no significant damage is recorded, and it remains unclear under which circumstances deer grazing / browsing becomes a serious problem in differing habitat types. Many factors including presence of domestic stock, climate, agricultural practices on surrounding land, and deer management will influence the extent to which deer utilise different habitats within their range. The impact of deer on any particular habitat type will depend not only on deer density, but also the feed and sheltering preferences of the deer, and the availability, degree of prior exploitation, and relative location of alternative habitats and feeding areas within their range. The present study has therefore combined botanical assessment of grazing impact with study of ranging behaviour of the deer, and collection of information on deer diet, condition and welfare.
More specifically the study has sought to:
 - a) Determine average red deer home range sizes, habitat preferences and utilisation.
 - b) Investigate effects of grazing on natural regeneration in semi-natural woodlands in Exmoor and the Quantock Hills, and the extent to which impact is attributable to deer rather than sheep and other factors.
 - c) Assess the levels of heather utilisation attributable to deer and other wild herbivores, as opposed to grazing by domestic stock (mainly sheep).
 - d) Investigate the population dynamics of red deer in the West Country, including gathering of information on deer numbers and distribution, as well as data on their physical condition, fecundity, diet, and welfare status in differing parts of the region.
4. The red deer population of the West Country also includes the only herds in this country which are still subject to hunting on horseback to a pack of hounds. Much controversy continues to surround this form of hunting, such that most previous deer related research in this region has focussed on that subject (Langbein & Putman 1992, 1996; Savage 1993; Bateson 1997). While few of the many organisations with an interest in the deer herds on

Exmoor and the Quantocks can agree a common line on whether hunting to hounds should continue to form part of deer management, most do agree that some form of population control is required. I therefore proposed the present study to address some of those ecological and management issues outlined above which are not directly related to hunting, but of mutual interest to organisations on opposing sides as well as those neutral in the hunting debate. To this effect the project has been jointly funded and overseen by:

The British Deer Society, The National Trust, Exmoor National Park Authority, League Against Cruel Sports, Royal Society for the Prevention of Cruelty to Animals, British Field Sports Society, Ministry of Agriculture Fisheries and Food, English Nature, Somerset County Council, Countryside Commission, and International Fund for Animal Welfare.

The joint support of all these organisations has been a great asset to this project, and demonstrates clearly the value of and ever increasing need for co-operation amongst conservation, field sports and animal welfare organisations, if the conservation of game species and habitats is to succeed.

Approaches

5. Red deer ranging behaviour and habitat selection was studied mainly in the northern parts of Exmoor, in an area where all major habitats of the National Park are well represented. Here sixteen wild red deer were tranquillised using a dart gun and fitted with collars to carry a small transmitter; their movements were then studied over periods between three months to two years using ground based wildlife radio-tracking equipment. Additional information on habitat usage by deer and also of sheep was gathered through direct observation.
6. Impact of deer on growth and survival of tree seedlings and ground flora was studied across a series of woodlands (mainly ancient sessile oak woods) on Exmoor and the Quantocks offering a range of deer densities, some of these but not others also being grazed by sheep. A number of small deer-proof exclosures and unfenced control plots were set up at each site and regeneration assessed biannually, study plots being matched across woods to sample similar sets with respect to canopy openness, aspect, and woodland structure.
7. Assessment of deer grazing on heather was also undertaken by reference to a range of different moorland sites, some with and others without domestic stock access for all or part of the year. The proportion of the annual growth of heather removed by deer and sheep was assessed using techniques developed by ADAS, based on widespread sampling of heather stems to establish average grazing indices per site. In addition, three small, permanently fenced exclusion plots and nearby control areas were set up at each site, to provide further measures of the effects of deer, rabbit and sheep grazing.
8. Information on deer numbers and distribution was based mainly on visual counts, including large-scale annual censuses undertaken in association with regional deer management societies, as well as more intensive replicated counts at specific study sites (including some preliminary trials of aerial counts from microlight aircraft and use of thermal imaging equipment at night). The relative utilisation of each study site by sheep, deer species, and other large herbivores was further investigated through counts of dung groups deposited by differing species.
9. Information on deer condition and diet was based on inspection and sampling of deer culled by a sample of 14 stalkers and two of the local Staghound Associations operating within Exmoor and the Quantock Hills, and also from various other parts of the West Country. Those deer managers willing to assist were asked to record data on carcass weights, pregnancy status, fat indices and signs of previous injuries for each deer culled, and to collect a sample of rumen (stomach) contents for dietary analysis, and retain the lower mandible (jawbone) for age-determination.

Numbers and distribution

10. The present study focussed especially on red deer within Exmoor NP and the Quantocks Hills AONB. Both these conservation areas, which in practice are separated by a mere 6 km wide belt of undesignated land, contain expanses of upland heath and ancient oak woodland of regional importance. Improved farmland (mainly pastures for sheep and beef production, with some cultivated land on lower ground) however makes up over 50% of the land cover overall.
11. Large-scale visual censuses show that a minimum of 3000 red deer are present within the combined area of the Exmoor ESA and nearby Quantock Hills. Sex ratios determined among mature deer (1 year and older) lies near 2.5 : 1 in favour of females in both areas. At least several hundred further red deer are known to reside in adjoining areas south of Exmoor towards Tiverton, Okehampton and Holsworthy. Although visual censuses are likely to underestimate actual numbers to some extent, even these figures suggest that the size of the population is greater now than it has been for most of this century, and indeed over the previous five centuries. Deer numbers in the region would seem to have peaked during the early 1990's, with the most recent information suggesting that they have perhaps begun to level off over the last few years.
12. Although the density of red deer based on the above figures averages less than 4 per 100 hectares for the Exmoor and Quantocks region as a whole, the deer population is distributed very unevenly. Within Exmoor more than 75% of the population is concentrated in eastern areas of the National Park, in particular along the wooded valleys of the rivers Exe, Haddeo and Barle, the coastal woodlands near Porlock, and around Horner Wood and Dunkery Beacon. Deer densities in these areas lie mainly between 5–10 per 100 hectares, rising to around 15–20 deer per 100 ha in some localities. By contrast only a quite small proportion of the deer reside within the treeless, more central moorland areas of Exmoor. The comparatively small area of the Quantock Hills AONB (95 km²) holds a very significant sub-population of c.500–700 red deer over winter, with densities here broadly similar to those in eastern Exmoor.
13. Some roe deer are also established in most woods throughout the region, but remain at fairly low to moderate densities; fallow deer are locally common just in the far eastern quarter of Exmoor NP (Brendon Hills), and muntjac deer though present for some years now on the Quantocks so far occur only in low numbers.

Range size and habitat selection

14. Annual home range size of female red deer based on radio-tracking data averaged 428 ha (range 275 – 711 ha). Hinds used the same general range from season to season in most cases, but two marked females did exhibit moves to a separate winter range up to 7 km away in some but not all years of study. Stags were each found to use two separate core ranges during the year between 2 – 6 km apart, the combined area for both cores averaging 1066 ha (range 1005 – 1155 ha; based on cluster analysis including 99% of all available radio-locations). All those three stags over four years old which were tracked for more than 12 months, returned to the same range during the rut in consecutive years.
15. The largest direct distance measured between two fixes for any of the marked deer (range span) throughout the entire study period was 9.6 km among stags and 7.2 km for hinds. Range spans calculated within single months however very rarely exceeded 4 km for either stags or hinds. While none of the marked deer made extensive use of the central Exmoor Forest, for deer moving into these more barren central moorland areas for part of the year maximal ranges might be predicted to be somewhat larger, though by converse rather smaller home ranges are likely in areas where food availability remains fairly high year-round.
16. Home range areas for male and female deer were found to contain around three times more broad-leaved woodland, and also more bracken, scrub/plantation and transitional heathland (heath with significant cover of European gorse and bracken) than the proportional availability of these habitats within the North Exmoor study region as a whole. Within the confines of their selected home ranges stags still used woodland, transitional heath and bracken communities

more than in proportion to availability. Females used woodland approximately in direct relation to availability in their home range (still c.30% of total time), while upland heath, transitional heath and bracken dominated areas were selected for more strongly at this stage.

17. During the day only 8% and 10% of radio fixes located female and male deer respectively on improved pastures, but this rose to 23 % and 35 % during the night. That improved pastures were used less than in relation to availability is unsurprising in view of the superabundance of this habitat (c.50% of entire region; and >25 % of most home ranges), but also illustrates selection by red deer of areas offering a variety of habitats for feeding and shelter.
18. The high degree of positive selection for broadleaf woodland by red deer suggests that impact will be high in this compared to other habitats. For both hinds and stags >34% of all active feeding bouts as well as >32% of resting periods were recorded within broadleaf woodland. This is likely to reflect foremost a preference for remaining within or close to cover during the day, rather than necessarily a preference for feeds only available within these woods. The positive selection also of other areas which provide shelter from weather and disturbance (especially gorse and bracken), further highlights the attractiveness to red deer of cover in general. Habitat management aimed at provision of well distributed areas of cover, may offer one of the most practicable ways of manipulating deer distribution and thus prevent excessive deer numbers and impact being focussed on particular locations.

Woodland regeneration

19. The present study has sought mainly to quantify the extent to which grazing by deer and sheep rather than other factors is inhibiting tree seedling establishment and survival in semi-natural oak/birch woodlands; with focus especially on the even-aged stands of neglected coppice last cut around 80-100 years ago and common throughout this region. That seed production and potential for regeneration within most of these woods remains very high was shown most clearly during surveys in autumn 1996 following a very heavy oak mast the previous year. Abundance of newly established oak seedlings in differing woods averaged from 2-25 per m² (i.e. 20,000 to 250,000 per hectare), with some of the highest seedling densities recorded in some of the most heavily grazed woods.
20. The abundance and extent of browsing on seedlings, saplings and ground flora was highly variable even within differing parts of the same woods in relation to canopy openness as well as other factors. In broad terms however, tree saplings taller than 35 cm and protruding significantly above other field layer vegetation were found to be almost entirely absent in most of the old oak coppice stands, except those grazed very lightly (that is, with little or no access by sheep and estimated deer densities of less than 5 per 100 ha). The majority of the 50m² fenced experimental plots set up in other woods of that stand type, even after the relatively short period of enclosure at last survey (2.5 years), do now contain at least some tree saplings > 35 cm, as well as increased growth of coppice or other regrowth below the height of the browse line which is readily apparent outside most fences.
21. Comparison of seedling counts in early summer and re-surveys in late autumn showed significant summer mortality of seedlings in most areas. The proportion of seedlings lost during summer, however, tended to be similar in fenced and unfenced plots within the same site, suggesting that summer mortality occurred for the most part independent of grazing by deer and sheep. The largest reductions in oak seedling abundance and heights in grazed compared to fenced plots arose over winter and spring, reflecting not only browsing on seedlings already established but also relative depletion of the seed source and uprooting / grazing on newly germinated seedlings.
22. Apart from plots within canopy woodland, a number of enclosures were also erected in clearings, some of which were coppiced (with all vegetation cut down to below 35 cm) at the beginning of the study. Prolific regrowth of coppice to over 2m high was recorded inside protective fencing within two years at all such sites. No regrowth of coppice or other vegetation any higher than 50 cm was recorded outside fences, except in the two sites

without sheep grazing and estimated deer densities of less than 5 per km². Clear signs of browsing and significant check of regrowth were noted also in one of the low deer density sites (< 2 deer per km²) but only during the first year after cutting, with much regrowth reaching heights out of reach to deer by the second year.

23. In considering the above results it must be noted that much of the investigation focussed on stand types most vulnerable to overgrazing, with much more variable regeneration in other types. General conclusions on 'optimum' deer density with regard to regeneration are not thought possible, and decisions on acceptable grazing levels should be made on a site-by-site basis. Many factors other than deer density will influence local tree regeneration, such as abundance of other vegetation, light conditions, availability of cover, and soil fertility. Likewise, whether the levels of impact noted are to be viewed as detrimental or even beneficial will depend on the particular type of woodland structure sought at each site. (Thus, although heavy grazing pressure within such even-aged stands of ancient woodland may lead to concern about lack of replacement canopy trees, removal of such grazing may lead to decline in other valued woodland habitats and associated fauna and flora; e.g. bird species such as wood warblers, redstarts and pied flycatchers rely on the particular conditions associated with heavy grazing.)
24. Nevertheless, it would appear that significant regeneration of tree saplings within most of the old oak coppice sites is unlikely even where canopy gaps appear, in the presence of deer (and/or sheep) at densities much above 5 per 100 hectares; and possibly not even at much lower densities where long periods of heavy grazing with sheep as well as deer in the past have led to very sparse understorey vegetation over the years. Reduction of deer densities to levels at which significant natural regeneration within broad-leaved woodland will occur is likely to conflict in many areas of Exmoor and the Quantocks with the aim to maintain a reasonably large and visible deer population for amenity reasons, as well as maintenance of grazing on adjoining unfenced heather moors. In order to achieve aims for more structural diversity within the ancient oak woods and encourage sustained regeneration in the presence of grazing, integrated management plans are therefore recommended, using both temporary fencing of regeneration in woodland clearings and measures to raise herbage production inside the woodland boundary, alongside direct control over sheep and deer numbers.

Effect of deer grazing on heather moorland

25. Overgrazing by sheep is considered to be one of the main contributing factors causing continued decline in condition and extent of heather moorland in many parts of the country including Exmoor. In the region of half a million sheep are reared within the boundaries of Exmoor NP, of which approximately 40,000 or more are grazed on the grass and heather moorland areas for all or part of the year. Total deer numbers are dwarfed by comparison, and as a high proportion of deer on Exmoor and the Quantock Hills are based more along the wooded river valleys and upland fringes rather than in the open moorland areas, grazing by deer on heather is not likely to present a problem in most parts of the region. Nevertheless, at those locations where red deer do occur at high densities on moorland, their contribution to overall grazing is of interest and should be considered when deciding appropriate local domestic stocking levels.
26. Heather biomass utilisation 'BU' (the percentage of annual growth removed through grazing) was assessed in a number of heather moors on Exmoor where deer at densities of between 3 – 16 per km² were the only large grazing animals present either just during winter or else throughout the year. BU estimates obtained in spring 1996 lay between 5.5 – 12.4 % across these sites (and between 2.2 to 17.3 % the previous year, though then based on less extensive sampling). Values approaching or in excess of 10% were obtained only at the two sites where deer density exceeded 9 – 16 per km², one of these areas being also grazed by sheep during summer. Although mainly well below the average value of 22% BU in sheep grazed moors on Exmoor determined recently by ADAS (1997) using the same methods, these results show that at least at high local densities deer may be contributing significantly to heather off-take.

27. Maximum recommended stocking levels for maintenance of existing dwarf shrub heath areas (i.e. for entry to Tier 1 part 5 of Exmoor ESA grazing agreements) are 0.15 Livestock Units (LU) per hectare overwinter and 0.225LU/ha for the remainder of the year. Stocking by deer alone would approach even the winter stocking limit only if deer occurred at around 50 km² (taking 1 red deer to equal 0.3 LUs). In those areas of moorland on Exmoor and the Quantocks which are regularly used by deer, red deer more commonly occur at no more than around 5 – 15 per km², and hence would be estimated to contribute only between 10 – 30% of the winter stocking levels thought sustainable to maintain existing heather cover.
28. In areas where the aim is to increase rather than merely maintain heather cover and condition (i.e. Tier 2 ESA equivalent) it may be rather more important to take local deer numbers into consideration when deciding appropriate stock levels. Stocking guidelines for Tier 2 agreements are currently set at a maximum of 0.1 LU/ha between Apr-Oct, and removal of all stock overwinter. Where local deer densities exceed around 15 per km², which is the case on at least some moorland sites on Exmoor, this represents nearly 50% of the summer Tier 2 stocking limit. The continued presence of high deer numbers also over winter, at a time when removal of domestic stock is recommended in such areas, should be taken into careful consideration therefore when deciding whether any additional grazing by stock during summer is in fact required or desirable if the aim is to extend the area of heather cover.

Deer condition and population dynamics

29. Individual cull records were obtained for over 1200 deer culled in the West Country between 1993-6, of which 957 related to red deer. Information available usually included at least carcass weights, sex and approximate age, while data and samples to provide details of pregnancy status, more accurate age, and diet were collected for substantial sub-sets of animals.
30. Carcass weights (hog-dressed) of mature red hinds one year and older, culled within the boundaries of the Exmoor NP and the Quantocks AONB, averaged 107 lb (48.6 kg). This lies around 11% higher than for equivalent mean red hind weights determined across 12 Scottish commercial forests (Ratcliffe, 1987), and more than 20% higher than among most Scottish 'Open-hill' red deer herds (e.g. see Mitchell et al. 1976).
31. Although body weights and condition were found to be consistently high throughout Exmoor and the Quantocks, with only minor variation apparent within that region, deer culled south of Exmoor and further into mid-Devon were found to be significantly heavier still (mean 121 lbs cf. 109 lbs for hinds two years and older; 118 lbs cf. 99 lbs for yearling males). These differences are likely foremost to relate to the even better feeding conditions offered on low lying pastures.
32. Fecundity of red deer and in particular the age when females first conceive is closely linked to body weight, with only quite low percentages of hinds in many Scottish open-hill populations known to conceive as yearlings. The present study showed very high pregnancy rates of red deer within Exmoor and the Quantocks, with 72% of yearling hinds and 89% of older hinds shot after 31 December found to be pregnant. Pregnancy rates recorded among deer culled in areas adjoining Exmoor to the south and further into mid-Devon, again showed slightly higher pregnancy rates (74% among yearlings, 94% among older hinds). Even allowing a generous margin (10%) for pre-natal losses, based on the above reproductive rates and other data available on proportion of hinds observed to be in milk, we may be confident that on Exmoor and the Quantocks at least 75% of hinds overall (including older hinds as well as those conceiving as yearlings) will usually produce live calves during summer.
33. The general body condition among deer culled in the west Country was also very high, with some form of obvious physical injury, disease or deformity recorded only among 58 (4.7%) of the 1216 cull records received. The highest proportion of injuries noted (1.7% overall) related to either confirmed involvement in road-traffic accidents, or consisted of broken limbs for which such accidents are perhaps the most likely explanation. Only 0.6% of records among this full sample were found to show previous wounds from rifle bullets or shot guns. These figures may underestimate injury rates to some extent, as not all contributors to the study may have

recorded such information in the same detail. A sub-set of 276 cull records submitted by a group of five stalkers who provided the most consistently detailed information, suggested a slightly higher level of physical injuries (6.1%), of which previous wounding by bullets or lead shot was confirmed for 1.8%, and broken limbs or RTA injuries accounted for a further 2.2%. Breakdown of injuries or debility noted among the 50-90 'casualties' dealt with annually by the local Staghound packs were unfortunately not available; detailed investigation and monitoring of such casualties in future could provide a useful source of better information on the welfare status of the local deer herds.

34. Results from dietary analysis illustrate a great predominance of grasses (> 50% of rumen contents in most samples) in the diet of red deer in the West Country throughout the year, for deer shot in the moorland areas as well as those from adjoining lowland regions. While red deer in harsher climates tend to take increased amounts of alternative feed such as heather in winter, the continued high use of grass during winter by West Country red deer is consistent with the long grass growing season in the Southwest of England. The proportion of dwarf shrubs (mostly heather) in rumen samples of deer from most parts of the region was below 5 %, though rising to around 22 % for those deer actually culled close to moorland areas in North Exmoor and the Quantocks during winter or early spring.

Other Conclusions & Suggestions for management

35. The present study was initiated to improve understanding of the way in which red deer use and impact upon ancient woodland and moorland. And it is hoped that some of the findings on deer ranging behaviour and habitat preferences, as well as on their influence on regeneration, will be of practical use for estate managers concerned with deer and habitat management in such areas. It is not within the remit of the present project to recommend what should be the objectives for management of deer on Exmoor and the Quantocks, or propose what would be the most appropriate deer density in different parts of the region. Such decisions must be made by local land owners and interested parties from within, to obtain a suitable compromise between conservation of semi-natural habitats and the interests of farming, forestry, stalking and hunting, amenity and tourism.
36. It is not in any case possible from results of the present study, nor previous research elsewhere, to recommend precise or 'optimum' red deer and/or sheep grazing levels in for example particular woodland types. It has become increasingly accepted over recent years that a low level of grazing is preferable in semi-natural woods in the uplands to maintain or create high structural and species diversity, than either very high levels of grazing or elimination of grazing animals by fencing woods entirely against both deer and domestic stock. From the point of view of woodland conservation the right grazing level should be judged locally and based not solely in terms of numbers of animals per hectare, but must take into account also herbage production and the availability per animal of its preferred plant species (see Mitchell and Kirby, 1990).
37. The need to formulate deer management objectives and plans at a local rather than solely a regional level for Exmoor or the Quantocks as a whole, is also implicit from findings from several other parts of the study. Simple inspection of the distribution of deer counted during annual censuses already shows the considerable variation of deer densities across the region, with densities ranging from less than 1 to over 25 per km² in differing counting blocks used for the Exmoor wide census. Study of habitat use and ranging behaviour has illustrated the high degree of selection by deer of woodland and other hiding cover, contributing to the localised build-up of high deer numbers. While deer were noted to make quite significant contributions to heather off-take in some sites, this again seems to be of only localised importance at present.
38. For the reasons outlined above, formation of a network of relatively small deer management groups to help co-ordinate deer management efforts at a local level between neighbouring landowners is thought essential. Ideally such local groups might be set within the context of a regional policy or strategy, to define clearer regional objectives in terms of population size and distribution, and facilitate the setting up and co-ordination of local groups to put policies

into practice. A system of local DMGs is not suggested here as an 'alternative' to hunting and other existing management activities, but as a necessary additional tier of local co-ordination of any form of deer management. Such a system is thought important in order to resolve some of the current problems over deer impact, and the present lack of co-ordination between, and of differing forms of deer management undertaken by adjoining landowners.

Selection of suitable local deer management areas in addition to those already in existence, should be a matter of thorough local consultation. However, for such groups to function effectively they should be of manageable size to maintain close co-operation between all landowners, while large enough to include the main range of relatively distinct sub-populations. Based on studies of ranging behaviour and knowledge of deer distribution within the region, some general suggestions on size (c. 1000 – 5000 ha) and location of possible management areas are made within the full report, and might form a starting basis for such consultation.

39. Local deer management groups should define 'optimum' population levels acceptable to all members. They should also formulate management plans beyond merely control of numbers, but integrate this with habitat management and protection of vulnerable crops or natural regeneration. In much local ancient semi-natural oak woodland increased natural regeneration is likely to require temporary deer fencing.
40. The annual censuses organised by QDM&CG and E&DDMS provide a very useful basis for future monitoring of population trends. Members of other local DMGs should be encouraged to participate in these regional counts, and possibly arrange additional replicated counts within their own areas to further refine information on local numbers.
41. In order to monitor and refine the effectiveness of cull targets, gathering information on all deer culled in their area should be a priority for each local DMG set up. This should include information on age, sex, weight, health and reproductive status of each deer culled. Local groups should also make information on culls available for collation at a regional level. Introduction of a national system of carcass tagging is also recommended with the view to assisting in the closer monitoring of deer culls and impeding the sale of poached deer.
42. It is recommended that a detailed regional deer management strategy be drafted (either jointly or separately) for Exmoor and the Quantocks, and for the wider South-West Region, and be developed through local consultation, with landowners and land managers, and local statutory and voluntary conservation organisations, into a widely supported policy. A policy document of this kind would also serve to guide local deer management groups. Issues to be addressed within the policy might include:
 - Setting of broad upper and lower limits for regional deer population size from the point of view of public amenity/tourism, protection of agriculture and conservation habitats, and corrective action to be taken at a regional basis if populations fall outside these bounds.
 - Facilitation of the setting up and co-ordination of local deer management groups. Collation and monitoring of numbers and annual cull at the regional level.
 - Assistance to DMGs with formulation of management plans, to encourage adoption of an integrated approach considering conservation of semi-natural habitats, protection of agriculture and forestry, and sustainable use of deer populations for hunting, stalking, venison and public amenity.
 - Desirability of a more even distribution of the red deer population to divert damage from the most sensitive habitats and crops. Guidance on local acceptability in differing parts of the region of various methods of habitat manipulation which might be employed to achieve a less aggregated deer population (e.g. such as encouragement of limited scrub and woodland cover or enhancement of food supply in the more barren moorland areas, where at present deer densities are comparatively low).
 - Definition of requirements and priorities for further research, and objective schemes to monitor the impact of deer on semi-natural habitats and damage to farming and forestry.

*The full version of this report is available from:
The British Deer Society, Fordingbridge, Hampshire, SP6 1EF. (Tel. 01425 655434)*