



Deer on our Roads

Counting the Cost

ROAD ANGEL™
Driver Safety Systems

Working in partnership with
The Deer Initiative

Deer-Vehicle Collisions

The first national study



HIGHWAYS
AGENCY

Road traffic accidents involving deer have presented a major and under-recognised problem in Britain for many years. Increases in both the numbers and distribution of deer in Britain, combined with a continuing rise in traffic volume, means that this problem will continue to worsen unless action is taken now. Until the Deer Initiative began this work on behalf of the Highways Agency, there was no system for central collection of data on road traffic accidents involving deer. This lack of information has posed a major handicap to effective management of deer on our roads.

We have collected reports on over 30,500 Deer-Vehicle Collisions (DVCs) occurring in Britain between January 2000 and December 2005, of which 24,500 reports were from England and 6,060 from Scotland. Our sources included the Police, Local Authorities, Motor Insurance Companies, Trunk Road Maintenance Agents, Council Road Cleansing Departments responsible for clearance of carcasses, RSPCA and other animal welfare organisations. Additional information was provided by those involved in dispatch of injured deer or clearance of carcasses from their own area, such as the Forestry Commission, MoD, the National Trust and private estates. Finally, members of wildlife organisations and the general public were asked to report any deer vehicle incidents or dead deer seen at the roadside via a dedicated website www.deercollisions.co.uk by email or post.

Our data provides a far larger sample of DVCs than has been available to any previous assessment of the deer collisions issue in Britain. It is clear

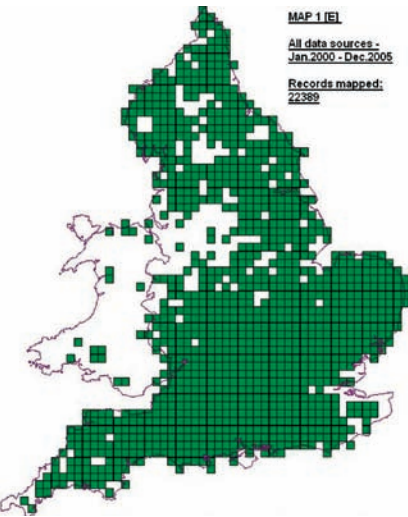
however, that even our large annual samples of incidents represent merely a small proportion (most likely less than 20%) of all deer road kills or related incidents nationwide. Estimates of DVCs based on the levels of overlap between deer related incidents reported by differing independent sources indicate that the true toll of DVCs may well exceed 60,000 per year in England alone, and 74,000 for Britain as a whole. Relatively little detailed study has been made of the situation in Wales, but although deer populations are known to be increasing there, it is unlikely that so far DVCs in Wales number more than a few hundred per year.

These figures are far from unusual if seen in the context of other countries in Europe and the US. In Germany, reported DVCs regularly exceed 120,000 per year and are estimated by many to actually lie nearer 200,000, while the most recent figures from North America suggest that close to 1.5M DVCs occur there per year; with several States reporting over 70,000 deer collisions.

**The true toll of deer collisions
may exceed 74,000 for Britain
as a whole**

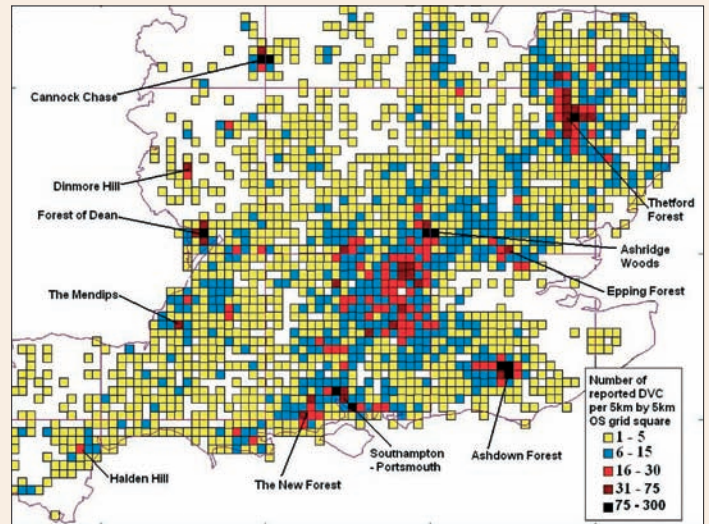


MAP 1 (E)
All data sources -
Jan 2000 - Dec 2005
Records mapped:
22389



Map 3

Overview of frequency of Deer-Vehicle collisions in southern England within 5km by 5km grid squares (based on available records for 2003-2005 with adequate location details for mapping at this scale)



Map 1
Filled squares shows the distribution of all 10km Ordnance Survey Grid squares for which at least one or more DVC has been reported to the project. Map 1 shows distribution of all records for which adequate location details are available for incidents during January 2000 to December 2005

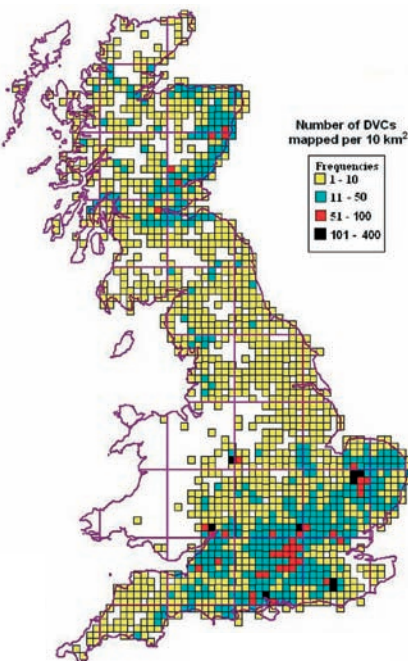
Where and how often do DVCs occur?

The main objective of our recent work was to not to determine precise numbers of deer road casualties, but rather to build up a sufficient body of data to enable investigation of regional differences and to identify hot-spots where greatest effort at reducing problems should be targeted. Mapping of the distribution of data for England (Map 1, above left) shows that at least some DVCs have been recorded in the majority of all 10km OS grid squares. Distribution is most continuous throughout the south east, which is also the area where by far the highest frequencies of DVCs have been recorded (Map 2, left). Frequency of those DVC reports where it was possible to map with confidence (at a finer scale of 5 km by 5 km OS squares) enables many

major hot-spots to be identified more clearly (Map 3, above).

In England the major roads for which the highest numbers of DVCs have been reported during 2003 to 2005 include the A22, A14, M3, A303, A30, A11, M4, M27, A34, A4136 and A4146. The total number of DVC records available for these roads show DVCs ranging from 0.15 – 0.85 per km per year averaged out across the entire length of each road. However, for a number of minor roads, including the B4506, B1106, B2188, B2026, B1393, as well as for specific sections of the above major roads, average recorded deer collision rates rise to near 5 DVC/km. They reach over 10 DVC/km for the A22 near at Ashdown in East Sussex (Table 1, below).

Number of DVCs mapped per 10 km²
Frequencies
1 - 10
11 - 50
51 - 100
101 - 400



Map 2

Relative frequency of Deer-Vehicle Collisions for Great Britain reported to the project between January 2003 and December 2005 (based on 17,035 reports with adequate location details)

Table 1

DVC rates recorded for the main roads (class B and above) where the highest average numbers of records are available per year during 2003 – 2005.

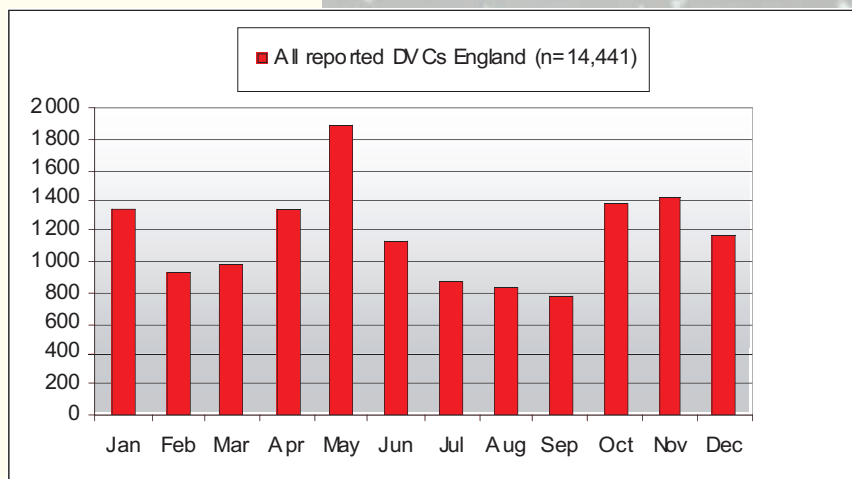
The rate of 'reported' DVCs per km per year is shown calculated as:
a) averaged out across the entire length of that road; and b) the highest rate per km for any one stretch of 5km or longer within each road where rates exceeding 1.0 per km have been logged.

(Note: even these high rates of Deer-Vehicle Collisions represent merely those reported to the study, and true figures are likely to be significantly higher in many cases)

Road Number	Total length of route (km)	Reported DVCs 2003-2005	Average no DVCs/year	DVC per km/year	Highest rate/km recorded over any 5km stretch (& location)
A22	83	203	68	0.82	>10 / km Ashdown Forest
B4506	11	124	41	3.76	>5 / km Ashridge Forest
B2188	17	37	12	0.73	>5 / km Ashdown Forest
B4226	9	40	13	1.48	>4 / km Forest of Dean
B1106	31	125	42	1.34	>4 / km Thetford Forest
A4136	26	67	22	0.86	>4 / km Forest of Dean
B2026	28	49	16	0.58	>4 / km Ashdown Forest
A134	111	116	39	0.35	>4 / km Thetford Forest
M27	49	113	38	0.77	>3 / km So'ton-Portsmouth
A4146	42	50	17	0.40	>3 / km nr Ashridge
A35	159	117	39	0.25	>3 / km New Forest
A31	120	70	23	0.19	>3 / km New Forest
B1393	10	26	9	0.87	>2 / km Epping
A1066	30	60	20	0.67	>2 / km Thetford Forest
B1107	21	37	12	0.59	>2 / km Thetford Forest
A1065	64	112	37	0.58	>2 / km Thetford Forest
A4130	48	47	16	0.33	>2 / km nr Henley
A419	58	50	17	0.29	>2 / km nr Coates
A38	239	114	38	0.16	>1.5 / km Halden Hill
A49	228	76	25	0.11	>1.5 / km Dinmore Hill
A303	152	140	47	0.31	>1.5 / km Dover
M3	96	142	47	0.49	>1.0 / km several (Hants)
A11	111	129	43	0.39	>1.0 / km nr Thetford Forest
A143	118	83	28	0.23	>1.0 / km nr Thetford Forest
M4	310	127	42	0.14	>1.0 / km several (Berkshire)



Figure 1
Seasonal variation in the occurrence of Deer Vehicle Collisions in England



Which deer species are involved?

In England the three most common species involved are fallow (40%), roe (32%), and muntjac (25%), with red, sika, and Chinese water deer contributing less than 3%. In Scotland, where fallow are far less widespread, roe (69%) and red (25%) are most commonly recorded in DVCs. However, in both England and Scotland the species most commonly associated with localised hot-spots of accident risk is fallow.

What is the effect of season and time of day?

There is seasonal variation in DVCs, with an overall trend (Figure 1) but with further variation between species:

- For fallow and red deer, highest numbers of collisions occur during October to January, most likely associated with the increased movement of deer during and after the rutting period and also co-incidence at this time of year of peak daily activity periods of deer with highest levels of daily traffic flow.
- For roe deer in England, the highest numbers of DVCs consistently occur during May, when almost twice as many incidents are reported as in other months. This peak occurs around the time when young males tend to disperse from natal ranges and when adult females accompanied by young may be more vulnerable. A secondary peak also occurs from October to December when day length shortens.
- For muntjac, the frequency of collisions is less variable between months, though some increase tends to occur from October to January in relation to day length change and possibly lasting longer into winter related to a need for them to forage more widely while vegetation is scarce.

Based on those DVC records for which time of incident is recorded most accurately (PIAs), the periods of highest incidence occur from early evening until midnight (1800-2359 hrs) and early morning (0600-0900 hrs). This pattern remains broadly similar across all seasons, though peak accident times tend to occur rather earlier into the evening in winter and later in summer.

What other factors affect DVCs?

Other factors which may influence frequency and severity of DVCs include driver speed, vehicle type, roadside vegetation, road tortuosity, deer behaviour and the presence or absence of effective mitigation. In practice, we have only so far been able to reach limited conclusions regarding the effects of these factors from the data recorded. To identify fully the effect of such factors we believe it is essential to investigate individual DVC records, particularly those involving personal injury, to determine in detail the characteristics of the sites where the incidents have occurred.

What are we doing to reduce DVCs?

In parallel with our data collection, we carried out a comprehensive literature review of the different mitigation measures currently being used in Europe and North America, together with an analysis of effectiveness of the different measures. This report is available online on the Deer Collisions website at www.deercollisions.co.uk/ftp/mit_review.doc. The review considers the entire range of mitigation measures available and patterns of usage, and summarises the conclusions of the various studies which have been undertaken to assess efficacy.

Systematic research into deer mitigation options has nearly all been carried out in North America or continental Europe where the deer species, deer management and traffic situations are often different from Britain. In addition a number of new types of mitigation have recently been brought onto the market including new types of acoustic reflectors, rumble strips and novel types of digital signage activated by animals at the roadside and/or speed of approaching vehicles.

We are now carrying out a number of practical trials in England to evaluate some of these newer forms of deterrent.

What is the human cost?

Records of Personal Injury Accidents (PIA) arising through direct collisions or swerving as a consequence of trying to avoid deer form an important element of the present study. Information on human injury accidents involving deer in the DVC database to date extends to over 1,150 incidents. Not all local authorities were able to abstract the relevant data for all these years, however between 2000 and 2005 we identified 785 different PIAs which specifically mentioned deer as a hazard at the scene of the accident, including 20 that led to human fatalities, 134 to serious injury and 635 causing one or more slight casualties per accident; but even within these counties the figures are likely to present only a proportion of all PIAs involving deer.

The economic 'value of prevention' of that level of PIAs may be calculated as at least £30M for Britain as a whole, of which over 80% may be expected to be incurred within England.

Even that figure is likely to be a conservative estimate, as recent research into the level of under-reporting of all human injury accidents by police demonstrates that although most fatal accidents tend to be recorded in national statistics, serious and slight injury PIAs are likely to be under-reported by factors of 2.5 to 1.7 respectively. This suggests that the actual number of human injury accidents involving deer may well be in excess of 700 each year.



What does the damage to vehicles cost?

Based on extensive claims data provided by one major insurance company we have estimated that around 11,000 privately insured vehicles are likely to suffer significant damage as a result of DVCs in Britain each year. This costs approximately £13.9M in material damage. Inclusion for likely involvement of commercial vehicles at similar frequency and claims costs increase estimates to at least £17M per year. In addition to material damage there are often further hidden costs such as necessity of hire of replacement vehicles, loss of time and lost output in case of commercial vehicles, for which no allowance has been made in the above estimates.

What is the impact on deer welfare?

The vast number of deer injured or killed in traffic incidents every year probably presents the single greatest welfare issue for wild deer in Britain. At an estimated total population in England of around 700,000 deer, the average risk per deer of being involved in one of the estimated 34,000 to 60,000 DVCs may be as high as one in twenty to one in eight. The risk is higher for deer in south east England where traffic density is greatest.

From an animal welfare perspective a more important concern than the overall numbers of deer killed through DVCs are those deer which are not killed instantly through collision, but which instead may suffer for prolonged periods from their injuries until a suitably qualified person can attend to humanely dispatch them.



Many others may run off to suffer or die of their injuries later. Over 3,500 live deer casualties were reported to the project for 2006 alone. Although reporting of live injured deer is likely to be somewhat better than for DVCs in general, it is highly unlikely that even half of all such instances are reported to the study. As many as 33% of DVCs involving fallow deer and around 20% of those involving roe and muntjac will tend to leave live casualties needing dispatch at the roadside. Thus the overall toll of severely injured deer which are not killed outright is expected to exceed 8,500 in England and over 10,000 for Britain as a whole.

The total mortality imposed through DVCs in England as a proportion of national population sizes is estimated to lie between 3 to 7% for roe deer, 1 to 3% for red deer and from 7 to 13% for fallow deer; making DVCs almost certainly the major cause of annual mortality among our wild deer, aside from deliberate culls taken as part of management.



*What more
needs to be
done?*



It is clear from our work so far that DVCs in Britain represent a serious and increasing problem in terms of human injury, the economic costs of damage and the welfare of deer. We have for the first time identified the broad overall scale and distribution of DVCs across Britain. This information will be of greatest use at a local level to the Department for Transport, the Highways Agency and Local Authorities for assessing and prioritising the need for measures to reduce deer accident risk on local roads and the trunk road network.

We believe that:

- Immediate action should be taken to implement remedial measures in the hot-spots we have identified, using the combined resources of the Deer Initiative Partnership and other agencies.
- A wider campaign to raise driver awareness of the risk of DVCs should be undertaken.
- An efficient nationally agreed system to deal with casualty deer as quickly as possible should be instigated.
- Long-term monitoring of the number of DVCs should continue. In practical terms data collection should be focused on key sources identified in our report to the Highways Agency.

This is a summary of a report prepared for the Highways Agency by the Deer Initiative. The full report can be found at www.deercollisions.co.uk. We gratefully acknowledge the contribution made by our Partner organisations, other agencies and individuals, details of which may be found in the full report.

The Deer Initiative is a broad partnership of statutory, voluntary and private interests dedicated to ensuring the delivery of a sustainable, well-managed wild deer population in England and Wales. For further details contact:



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