

Deer Vehicle Collisions in Scotland & Cairngorms National Park.

As traffic grows can rise in DVCs be avoided ?



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LangbeinWildlifeAssociates

working with



&



Deer Vehicle Collisions

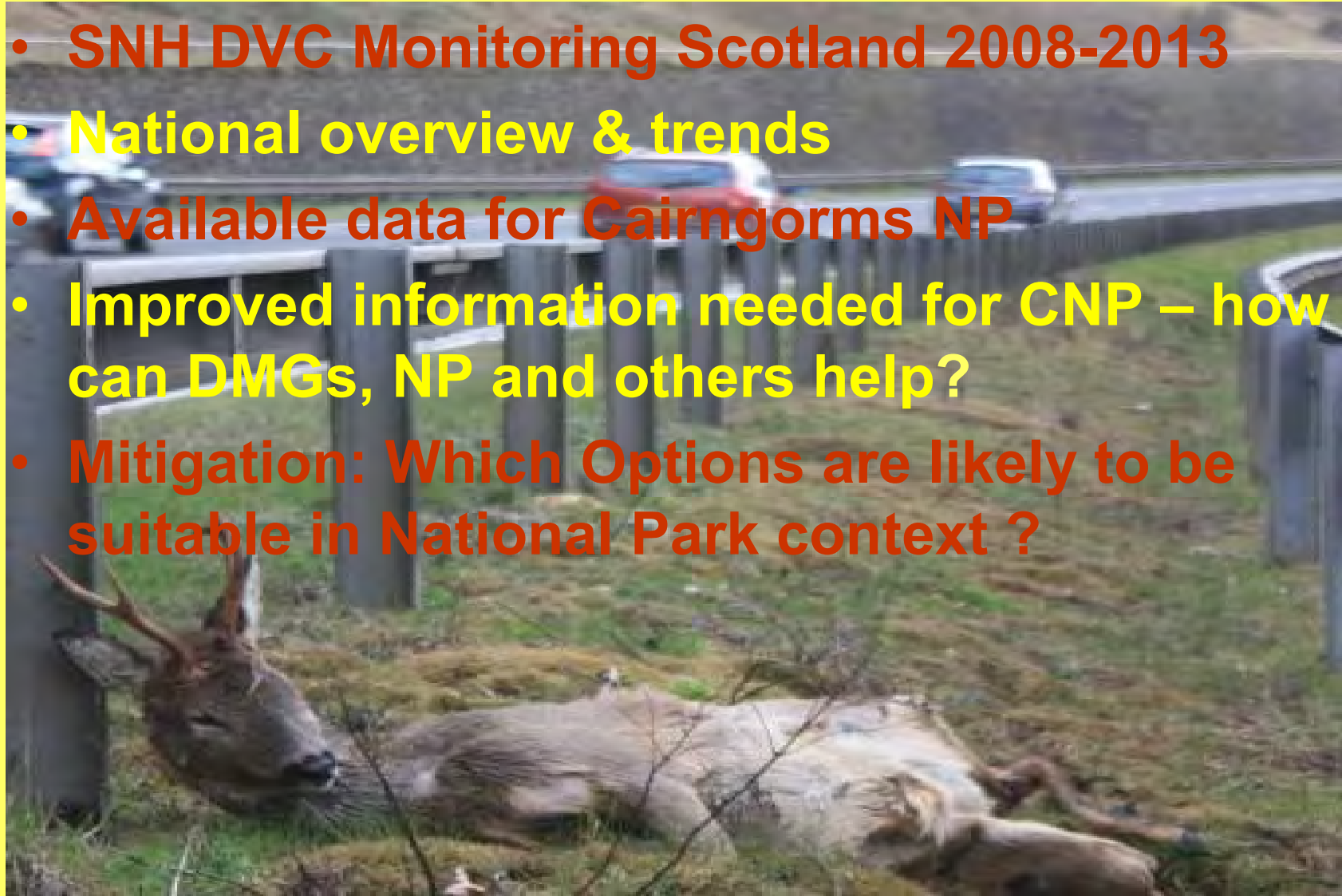
Talk outline:



Deer Vehicle Collisions

Talk outline:

- SNH DVC Monitoring Scotland 2008-2013
- National overview & trends
- Available data for Cairngorms NP
- Improved information needed for CNP – how can DMGs, NP and others help?
- Mitigation: Which Options are likely to be suitable in National Park context ?



Main DVC Projects

Pre DI involvement

- 1995/96: GB wide review / pilot study – Highways Agency (SGS)
- 2000/01: **Scotland-only review** - Deer Commission Scotland

Deer Initiative DVC monitoring Studies

- 2003-2005 DI DVC Database Phase 1 . Lead funding England - Highways Agency ; Scotland – **Scottish Executive**
- 2006 – 2010 DI DVC England Monitoring - Highways Agency – **ended**
- **2008-10 & 2011-13 DI DVC Scotland Monitoring – Scottish Natural Heritage - continuing.**

Post 2003 reports all available for download via at :

<http://www.deercollisions.co.uk/publications>

DVC Monitoring Scotland: 2008-2013

Main aims

To record a large and widely distributed annual sample of DVCs to serve as basis for :

- *monitoring of regional trends in DVCs on Trunk Roads as well as non-trunk roads*
- *identification of DVC hot spots by region.*



Main Data sources - Scotland

Table-1: Main Database Source Categories	
UT	<u>Trunk Road</u> deer casualty uplift requests or accidents involving deer (recorded by TfS' 4 Regional Trunk Operation Companies plus 3 DBFOs)
R	Rescue requests to SSPCA to treat or humanely dispatch ' <u>live</u> ' injured deer road casualties
ST & St-dam	<u>Recorded</u> road traffic collisions leading to <u>human</u> injury reported to have involved deer; plus some damage-only [St-dam] RTCs where these also recorded in similar detail by regional Police Forces & LA Road Safety Teams.
D	Records from 'deer-wise' contributors (e.g. FC rangers countrywide plus other deer managers, biologists and naturalists – post 2005 mostly restricted to 'Case Study Areas')
IC	Motor Insurance Claims sample (FORTIS Insurance; latterly re-named AGEAS)
UC	Regional Council road cleansing departments requests to uplift dead deer [predominantly for non-trunk incidents – v.variable availability across councils]
P	Police Force Control Room logs of reported of deer road casualties or deer RTCs (only available for some forces in some years).
G	General Public occasional contributors (via web-site, email or direct contact)

Motor Vehicle Traffic GB 2011

(measured in Million Vehicle kilometers)

SCOTLAND : **43,085**

WALES: **26,931**

ENGLAND: **418,866**

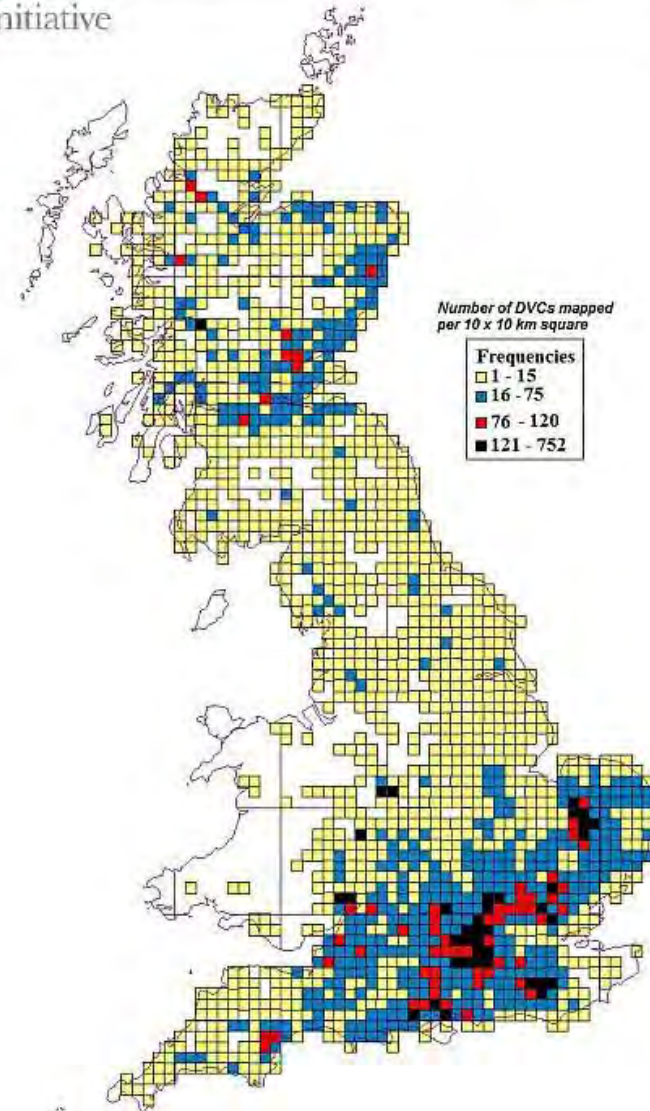
Total : **488,882**

Only approx. 18% of all GB Deer Collisions reported are in Scotland ...

*BUT occur among less than 10% of all GB traffic; therefore **'risk'** of motorists hitting deer per mile driven is **twice as high in Scotland !***

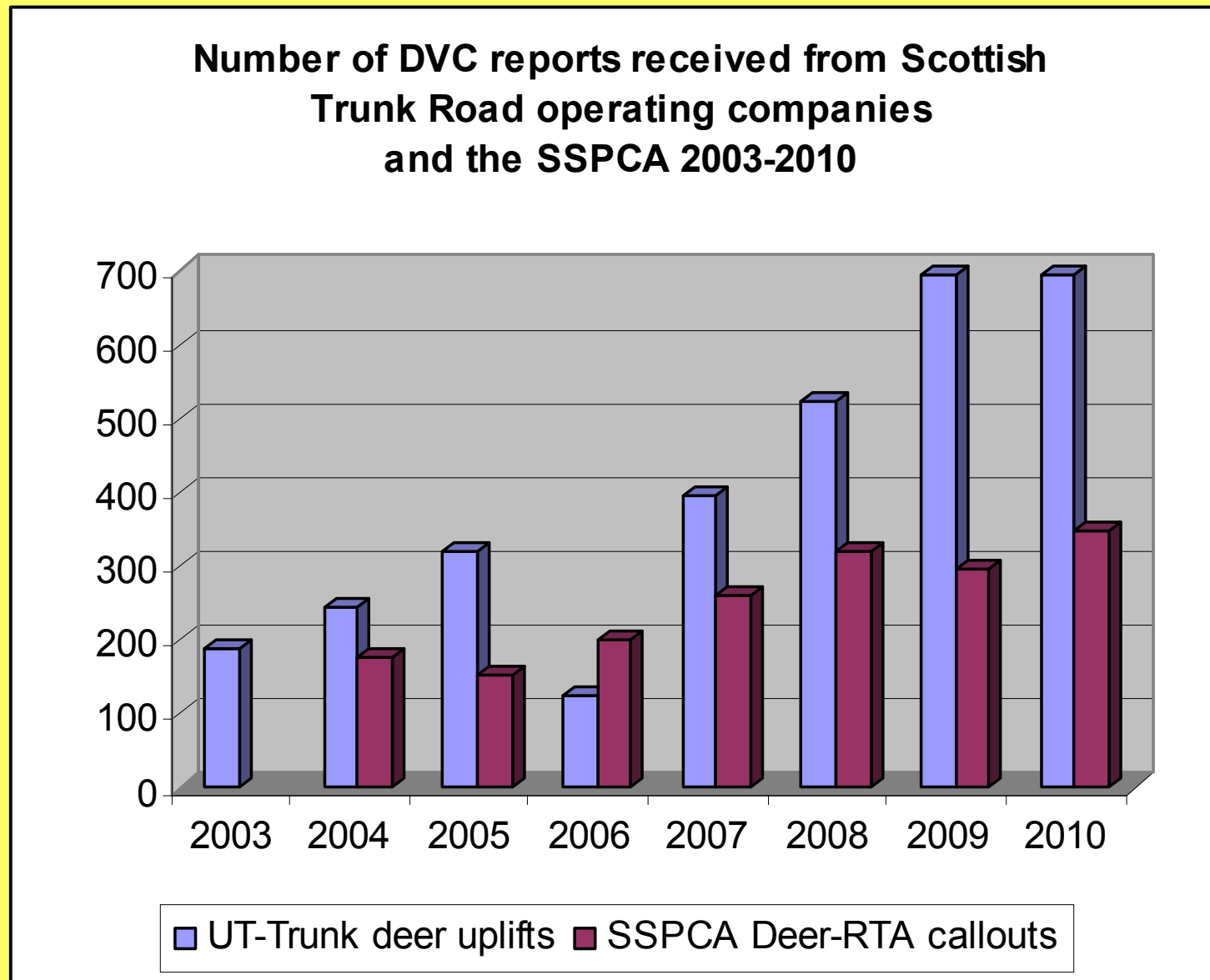


Relative Frequency of Deer-Vehicle Collisions for Great Britain reported to the DI National Deer Vehicle Collisions Project between January 2003 and December 2008 (based on 34026 records with adequate location details)



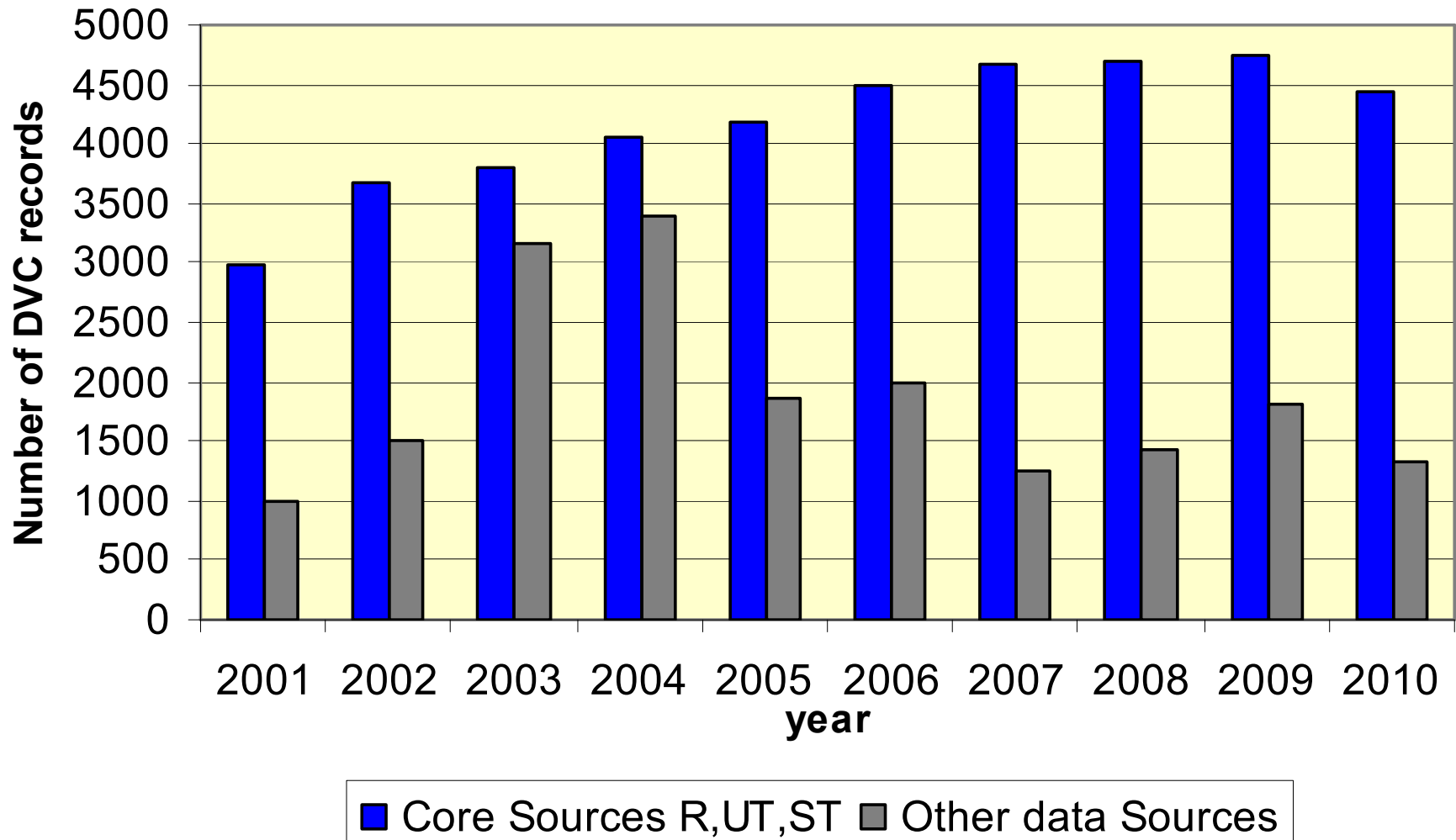
Total 34036 DVC records plotted
(based on 2003 – 2008 data only)

DVC Database SCOTLAND records to end 2010



(Full sample of DVC reports including also other sources for Scotland now available in database >12,000)

DVC Database ENGLAND records to end 2010



(Full sample of DVC records including also other sources for England now available in database >61,000)

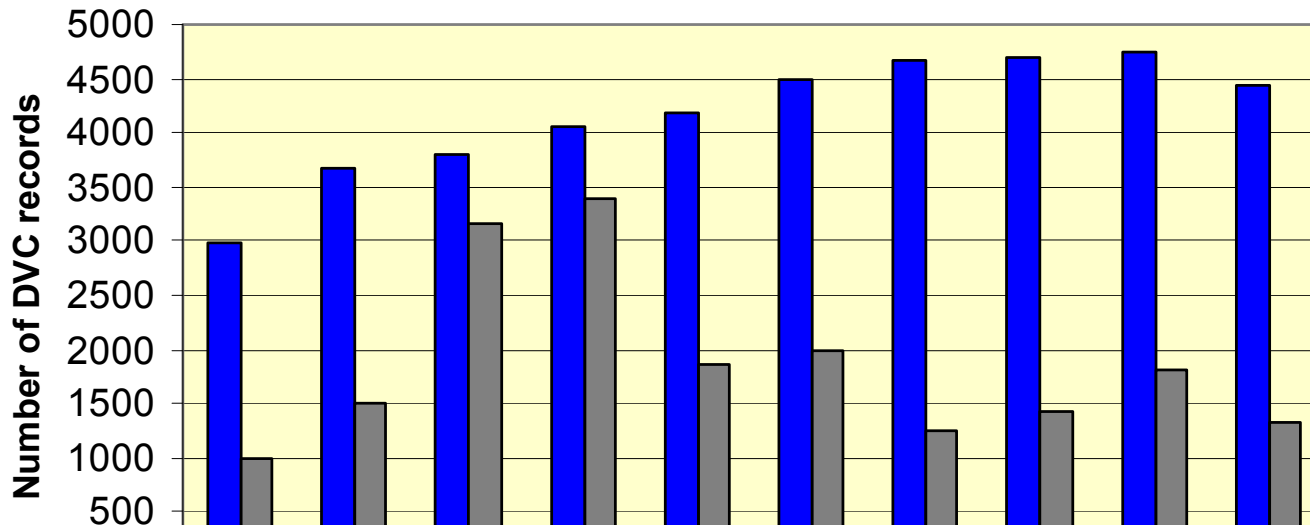
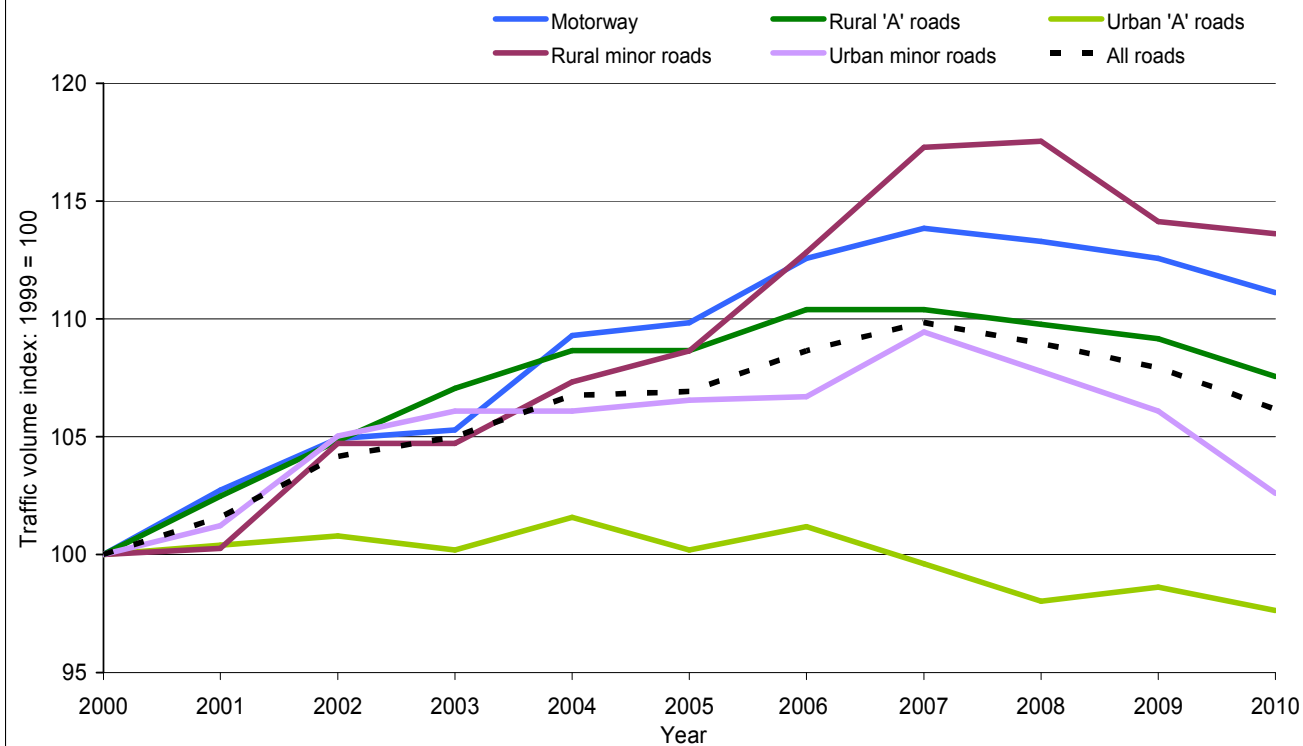


Chart TRA0102: Road traffic by road class, Great Britain: 2000 - 2010

Source: National Road Traffic Survey, Department for Transport



Have DVCs been increasing elsewhere in Europe ?

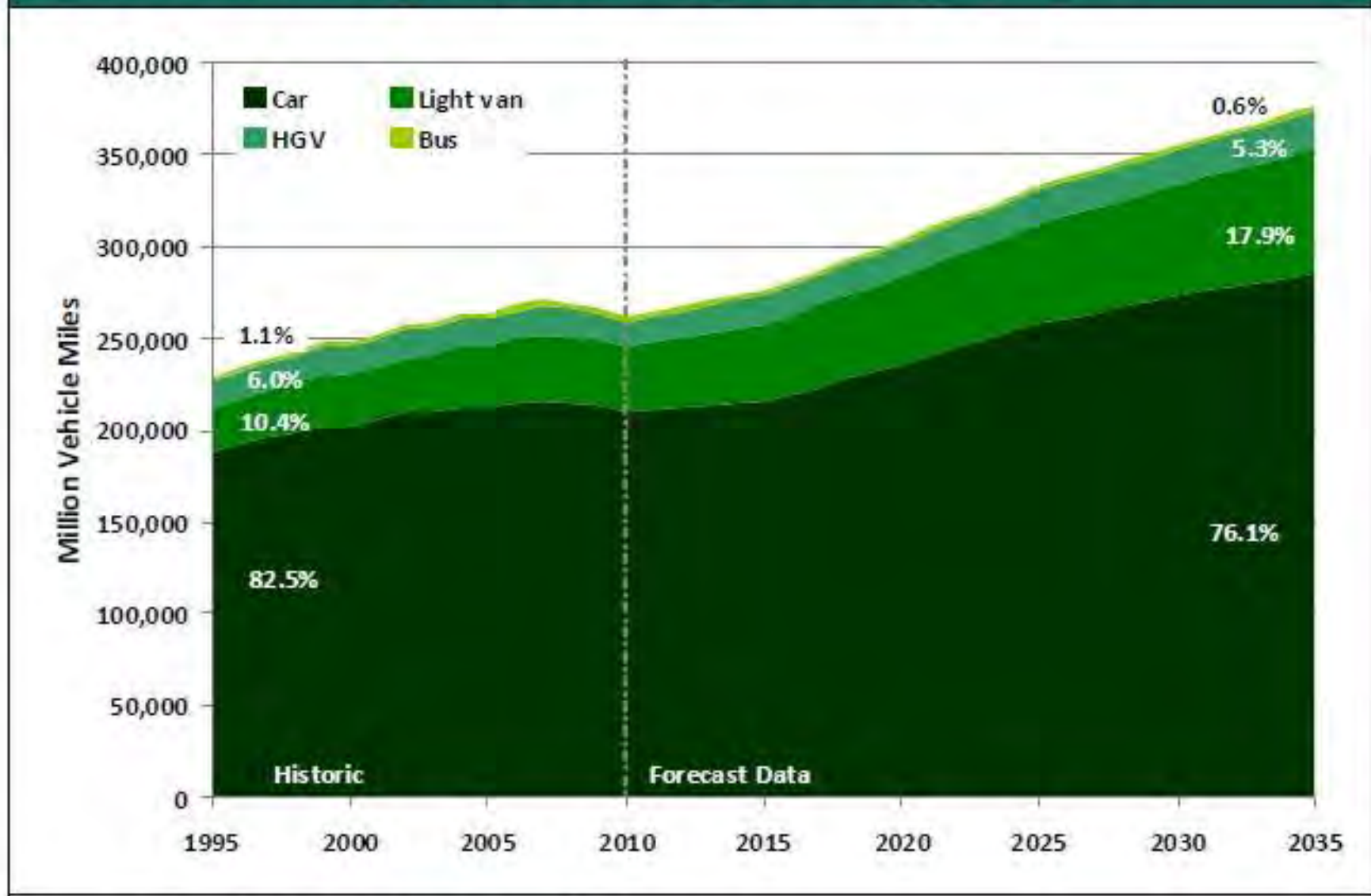
Country	Annual DVC estimate by Period		Orig. source of latter estimate
	1991 - 1996 ¹	2001 -2006 ²	
Germany	125000	227000	<i>Kerzel 2005 ; DJV 2006</i>
Sweden	55000	61000	<i>Seiler 2004</i>
Austria	35400	40500	<i>Austrian national statistics</i>
England ³	>20,000	>34000	<i>Langbein 2007</i>
France	-	23500	<i>Maillard et al. 2010</i>
Scotland ³	>4000	>8500	<i>Langbein & Putman 2006</i>
Switzerland	-	8000 - 10000	<i>Imesch-Bebie et al. 2010</i>
Norway	5500	8870	<i>Andersen et al. 2010</i>
Denmark	10100	6000	<i>Andersen & Madsen 2007</i>
Slovenia	-	6000	<i>Slovene Hunters Association</i>
Netherlands	2500	5400	<i>van Wieren and G-Bruinderink 2010</i>
Finland	-	5000	<i>Ruusila and Kojola 2010</i>
Spain	-	>4000	<i>Carranza 2010</i>
Hungary	-	3700	<i>Official Hungarian Hunting statistics</i>
Croatia	-	1000	<i>Official Croatian Statistics</i>

¹ based on Groot-Bruinderink & Hazebroek, 1996

² based Langbein, et al. 2011; orig. data sources and refs. see Appolonia et.al 2010

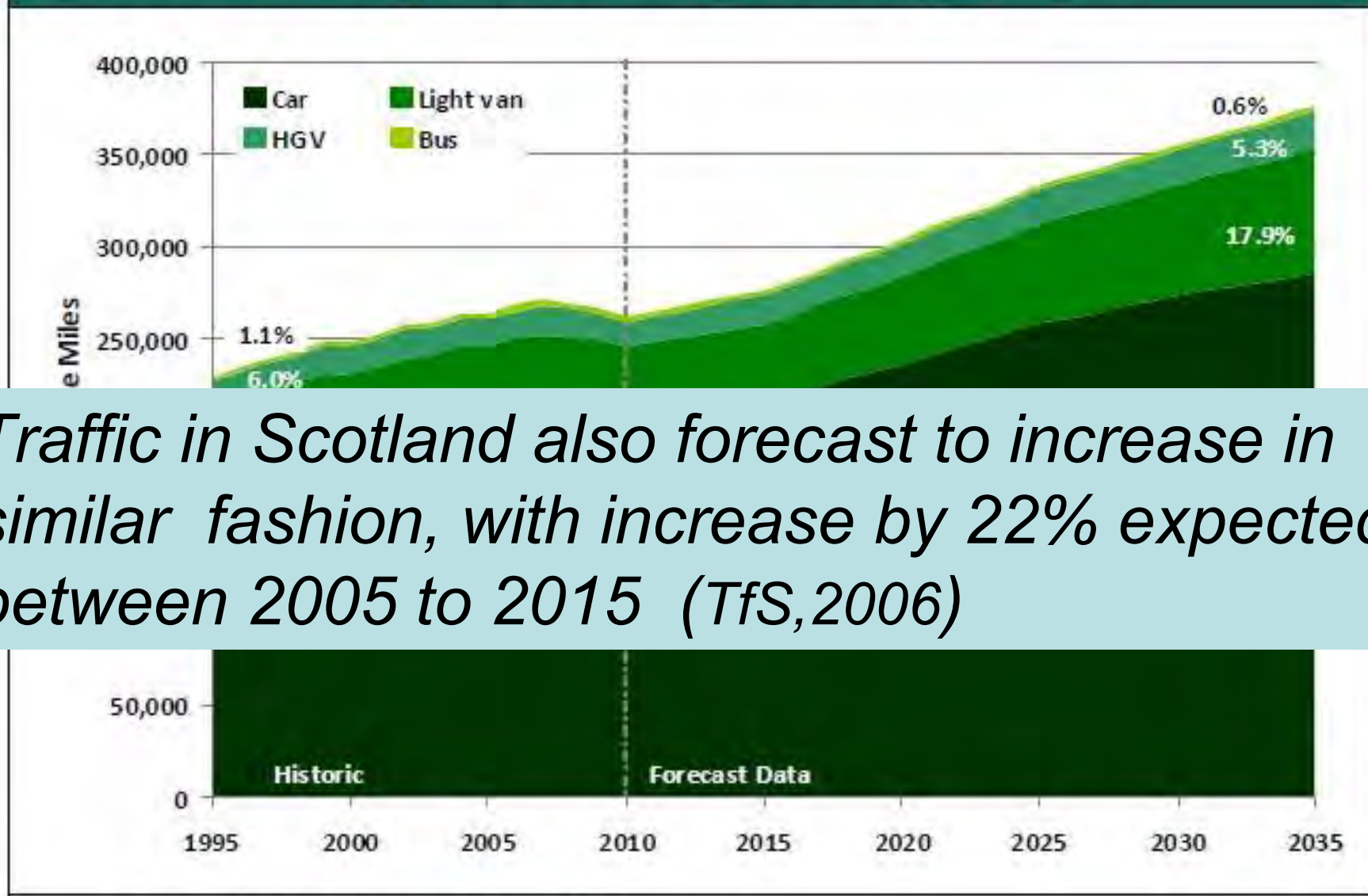
³ to 1996 based on SGS, 1998; later estimate from present project

Figure 4.3: Forecast growth in Traffic by Vehicle Type, England



Source: Outturn Traffic Statistics (DfT) and NTM Forecasts

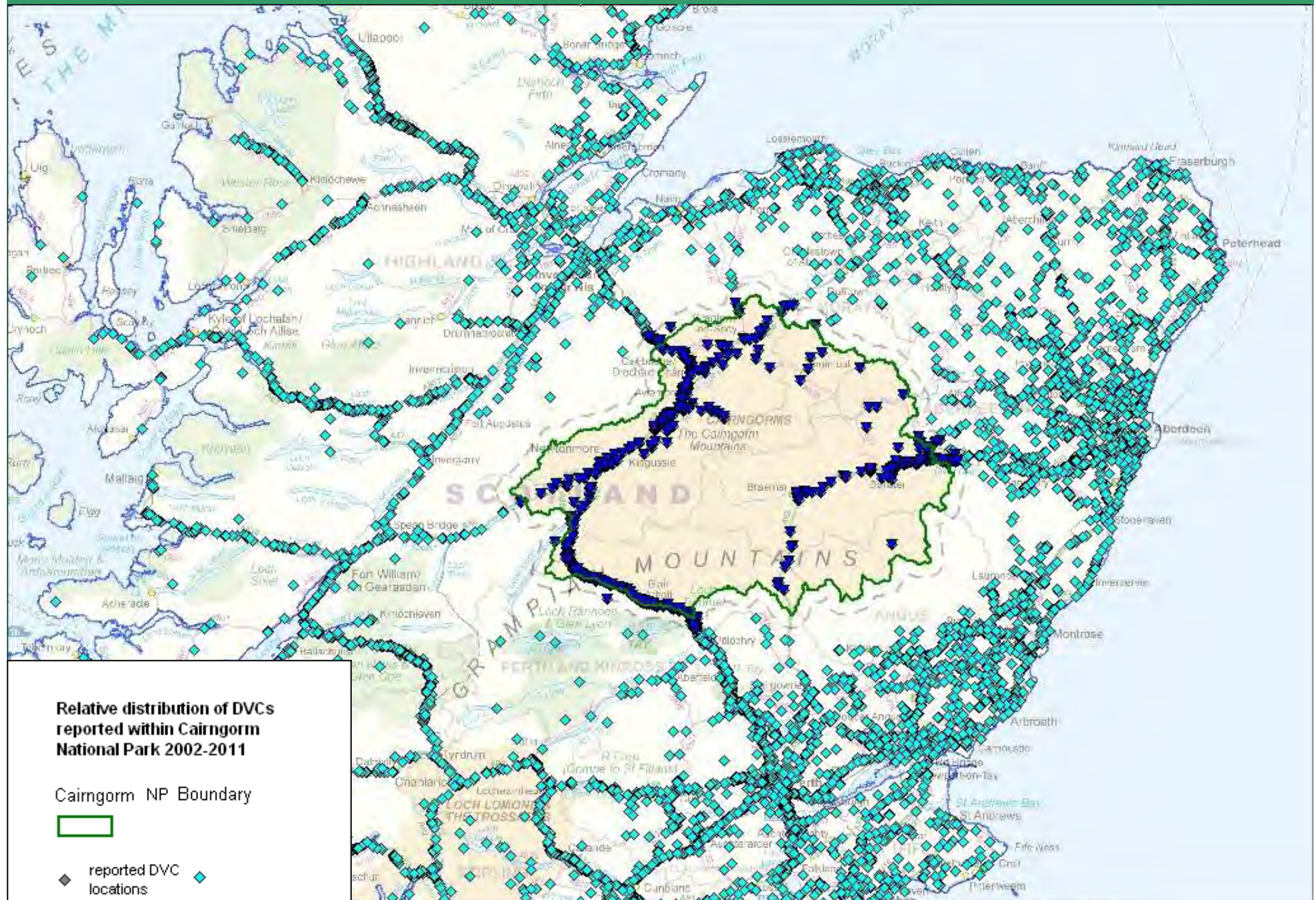
Figure 4.3: Forecast growth in Traffic by Vehicle Type, England



Traffic in Scotland also forecast to increase in similar fashion, with increase by 22% expected between 2005 to 2015 (TfS, 2006)

Source: Outturn Traffic Statistics (DfT) and NTM Forecasts

DVCs in Cairngorms National Park

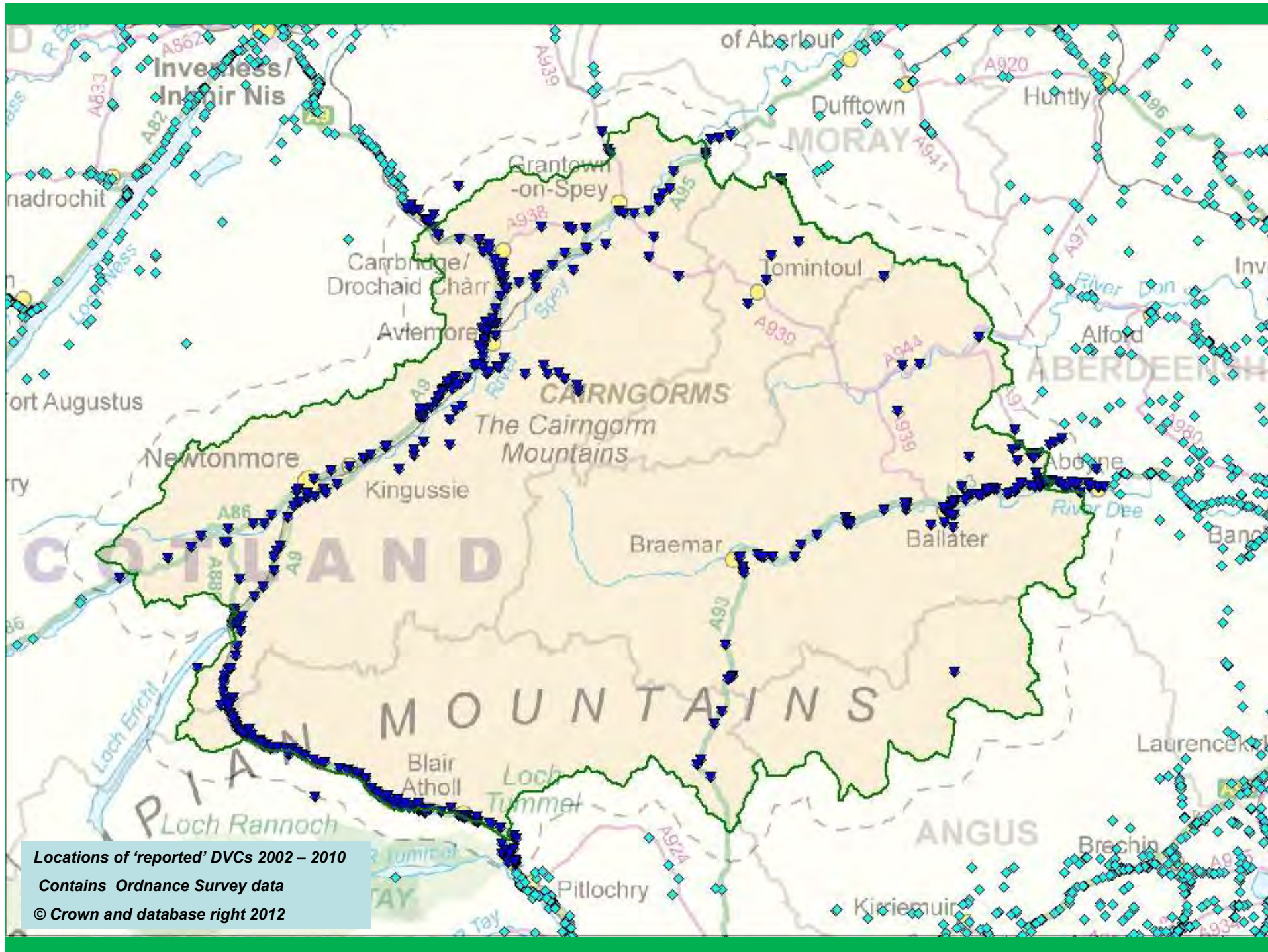


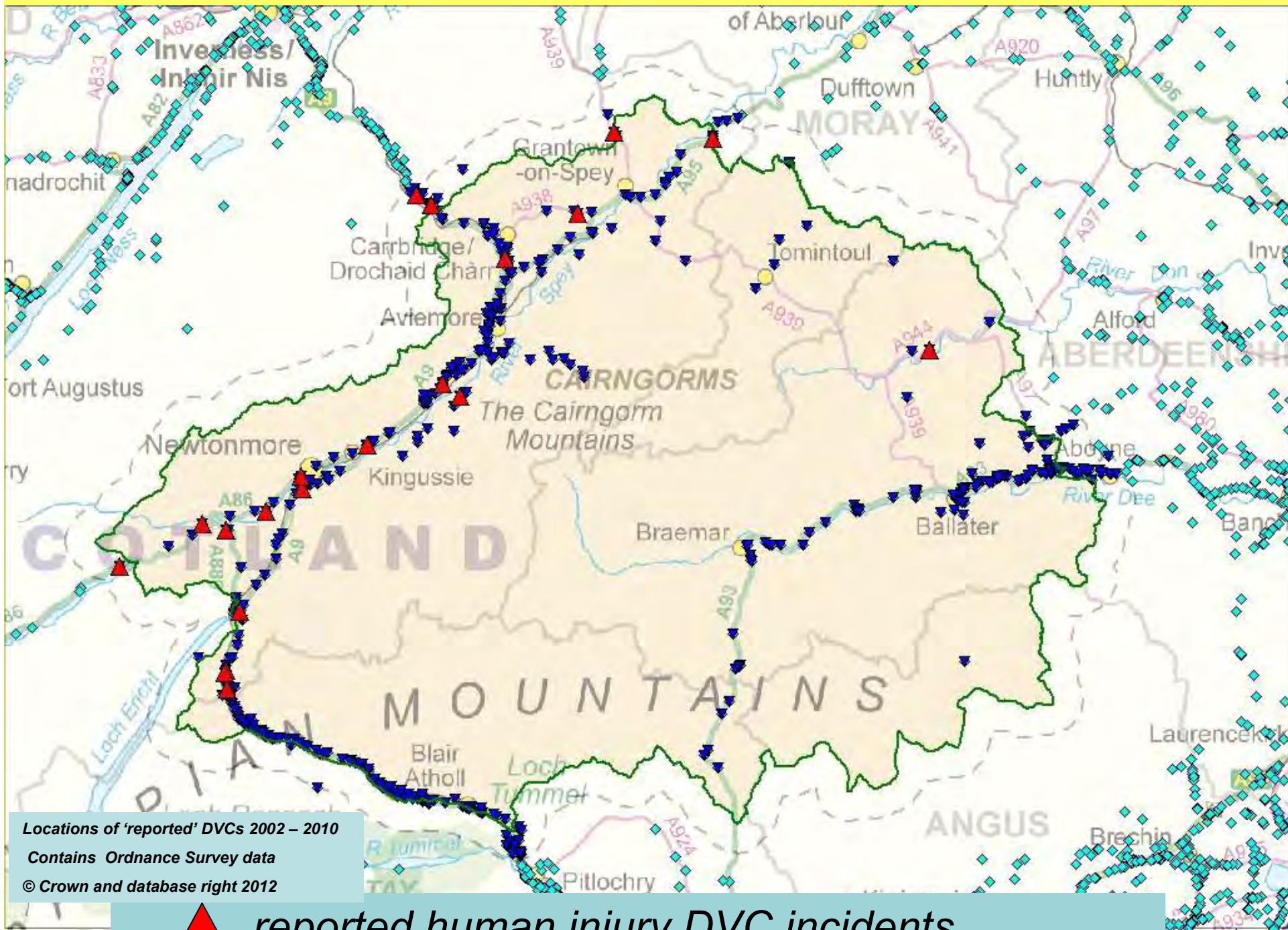
Cairngorms National Park

- *509 records of deer road casualties received by project over past decade.*
- *Ranging from 35 to 85 reports p.a.*
- *Just over ½ of all records reported by trunk road operating companies (A9 / A86 / A95)*
- *Local records for non-trunk (incl. A93) v. variable as quite few SSPCA records in CNP, and useable Council uplift reports not available for all years and or all Regional Councils overlapping NP.*



(current reports quite unlikely to amount to any more than 30% of all incidents)





Locations of 'reported' DVCs 2002 – 2010
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 *reported human injury DVC incidents*

Relative distribution of DVCs reported within Cairngorm National Park 2002-2011

Cairngorm NP Boundary



reported DVC locations

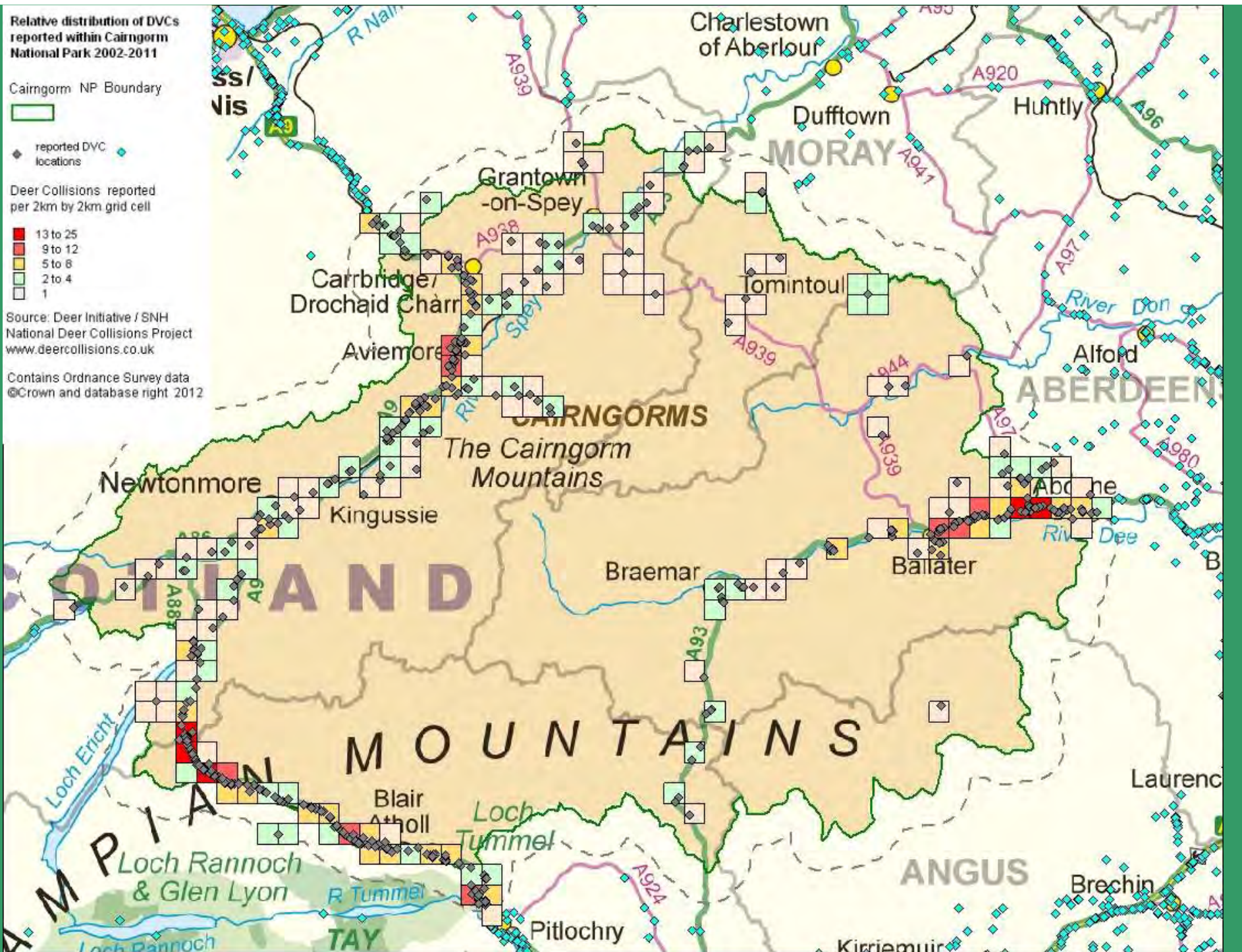


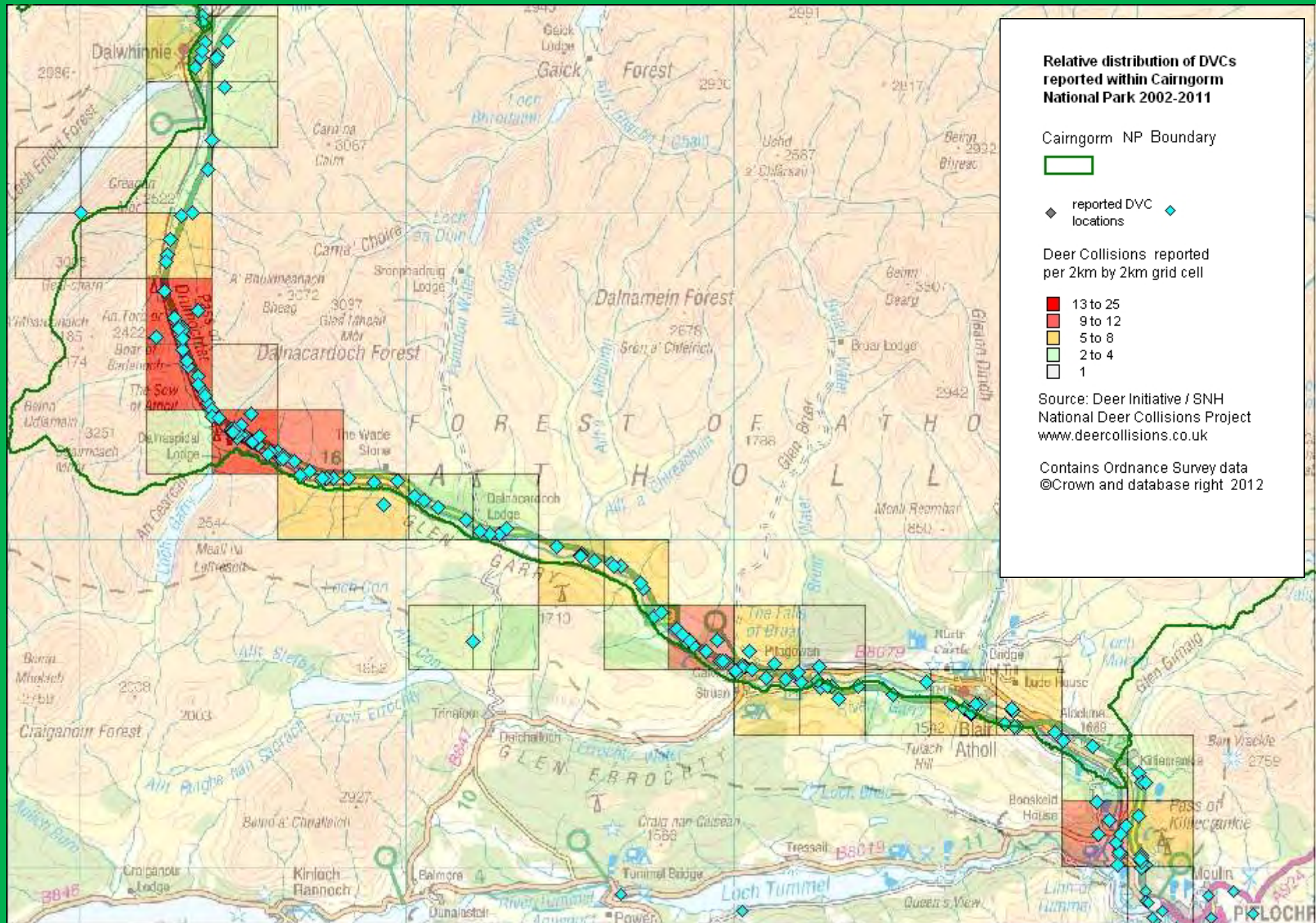
Deer Collisions reported per 2km by 2km grid cell



Source: Deer Initiative / SNH
National Deer Collisions Project
www.deercollisions.co.uk

Contains Ordnance Survey data
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Relative distribution of DVCs reported within Cairngorm National Park 2002-2011

Cairngorm NP Boundary

◆ reported DVC locations

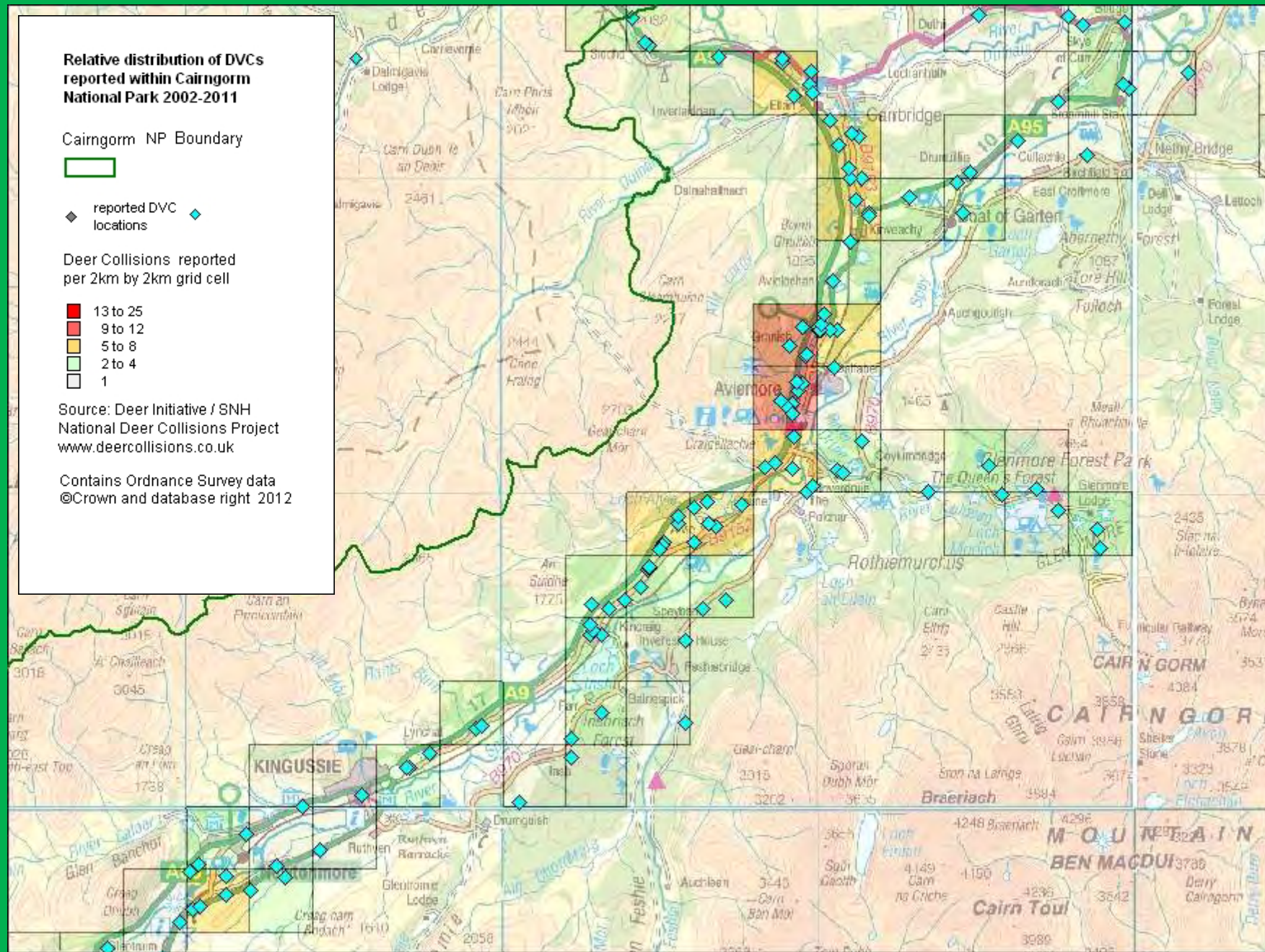
Deer Collisions reported per 2km by 2km grid cell

- 13 to 25
- 9 to 12
- 5 to 8
- 2 to 4
- 1

Source: Deer Initiative / SNH National Deer Collisions Project www.deercollisions.co.uk

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A9 trunk Blair Atholl to Dalwhinnie

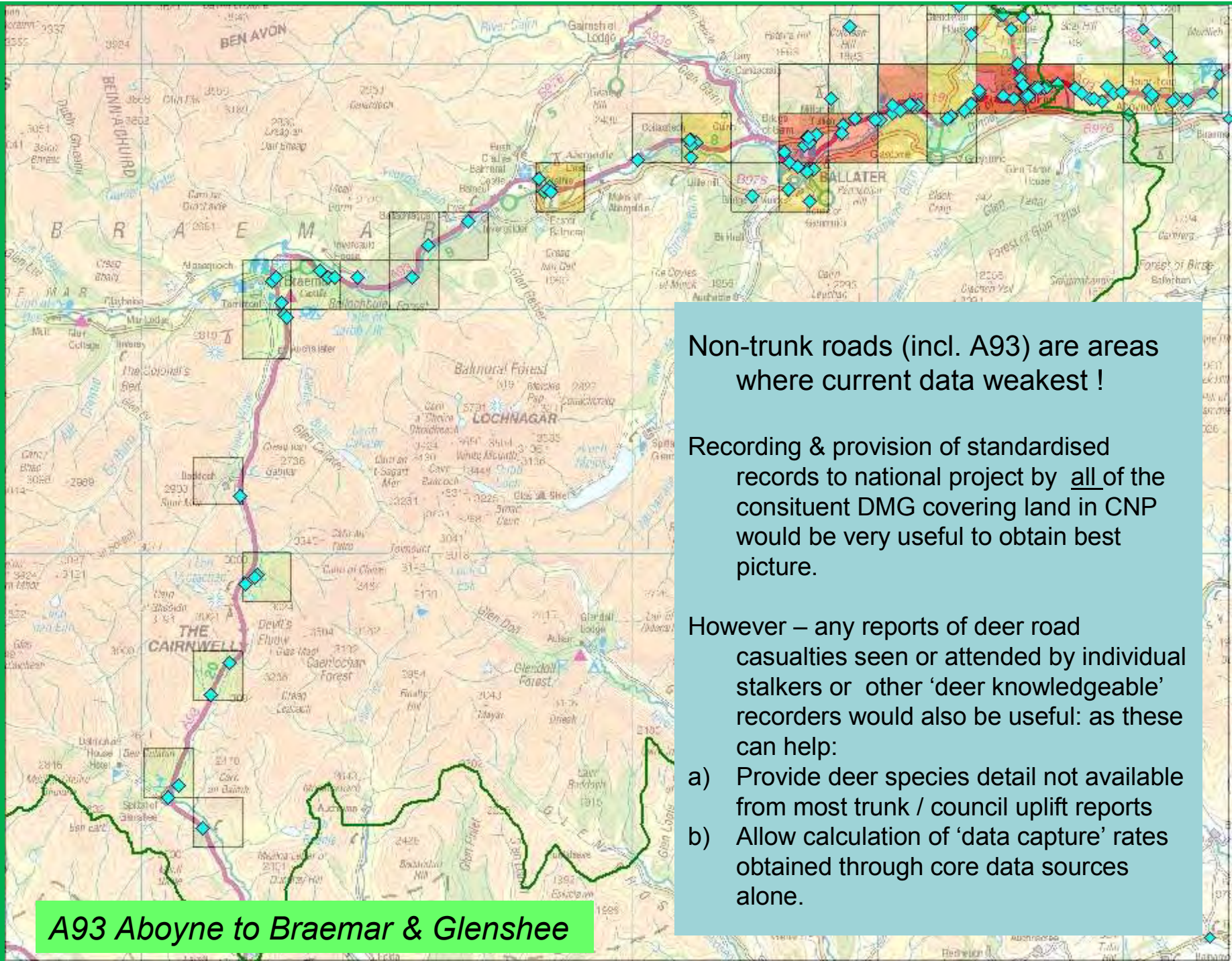


A9 trunk Kingussie to Carrbridge

Change in nos. of Deer Collisions reported by Trunk Operating Company on differing sections of A9 trunk road

Trunk Road Section	dist. km	2003	2004	2005	2006	2007	2008	2009	2010	Total
<u>A9 Kingraig to Inverness</u>	56	4	4	3	2	9	10	14	23	69
A9 Pitlochry to Dalwhinnie	46	8	5	7	3	4	1	7	13	48
<u>A9 Bankfoot to Pitlochry</u>	33	5	4	5	5	2	9	11	11	52

*All above sections of A9 subject to Annual Average Daily traffic (AADT) exceeding 6000 to 8000 vehicles per day i.e.
 = > 4 to 5 fold A93 traffic levels (AADT c. 900 to 1400)*



A93 Aboyne to Braemar & Glenshee

Non-trunk roads (incl. A93) are areas where current data weakest !

Recording & provision of standardised records to national project by all of the constituent DMG covering land in CNP would be very useful to obtain best picture.

However – any reports of deer road casualties seen or attended by individual stalkers or other ‘deer knowledgeable’ recorders would also be useful: as these can help:

- a) Provide deer species detail not available from most trunk / council uplift reports
- b) Allow calculation of ‘data capture’ rates obtained through core data sources alone.

Approaches to Deer Mitigation

❖ Preventing, or controlling crossing:

- ❖ e.g. highway fencing; wildlife warning reflectors; local reduction of deer density;

❖ Provision of safer crossing places

- ❖ e.g. dedicated over / underpasses; adaptation of existing structures for joint use.

❖ Driver behaviour / awareness

- ❖ e.g. Fixed signage; Dynamic speed or animal activated signage; Speed limits / Traffic calming;
- ❖ Driver Training / hazard awareness

Overview of approaches to Deer collisions Mitigation and their advantages and disadvantages in different contexts (after Langbein et al., 2011).
 [Note – that the authors stress that in general best results are achieved through use of a range of complementary measures, rather than reliance on any one of the individual approaches listed]

Mitigation measures	Suitable situations and supporting measures	Potential effectiveness / Advantages	Disadvantages
Fencing	Major high risk roads of high traffic flow; most effective when leads to safer crossing point, and contains escape ramps / leaps.	Well proven effectiveness where of appropriate mesh size and height, and sufficient length to prevent 'end-runs'. [1,2,3,4,5]	High maintenance cost; barrier effect also to other wildlife. [6]
Overpasses & Green bridges	Major high risk roads; most effective with lead-in fencing, and natural ground cover.	Well proven effectiveness; ungulate usage increases with width; but smaller structures can also help alleviate wildlife collisions. [7,8,9]	High cost; feasibility dependent on landscape. More readily installed on new-build than for existing roads. [8]
Underpasses & Viaducts	Major high risk roads; most effective with lead in fencing, and natural ground cover.	Good - where of adequate specification. Mostly lower cost than overpasses of similar size. [7,9,10]	High cost; feasibility dependent on landscape. Often longer delay before used by ungulates than in case of overpasses. [7,9]
Highway cross-walks	Low to medium speed routes; needs to be supported by fencing, signage, speed restriction, and ideally deer-grids.	Good – if well signed. [11]	Not likely to be acceptable on major routes where traffic has to be kept flowing.
Optical wildlife warning reflectors	Roads of low traffic volume providing some traffic free periods. Vegetation around reflectors needs to be kept clear.	Limited convincing evidence of success. Relatively low cost; do not prevent normal range use. [12,13]	Rapid habituation where lit up by frequent traffic. Can at best only function during night. Many trials indicate ineffective. [14,15,16,17,18]
Acoustic wildlife warning devices	Roads of low traffic volume, where habituation least likely, and providing safe crossing periods.	Variable evidence. Lasting effects likely to depend on type and variability of signals. [19,20]	General effectiveness remains unproven. Limited potential on roads of high traffic volume. Much higher (x10) cost than optical reflectors. [17,21]
Chemical / Olfactory deterrents	Roads of low to moderate traffic flow	Limited convincing evidence of success. Most intend to raise level of alertness, rather than prevent animals crossing. [22]	Limited independent evidence of effectiveness. Requires renewal at regular intervals. Likely habituation [17,19,23,24]
Vehicle mounted ultrasound whistles and electronic horns		Poor effectiveness. [25] Some types very cheap to install.	No convincing evidence of effectiveness. Signals mostly drowned out by traffic noise. [26,27,28]
Standard wildlife warning signage	Any road type, but should be targeted to forewarn of short, well defined sections of high risk.	Can help absolve legal responsibility of road authorities or population managers. Moderate cost.	Over-abundance of wildlife and other signage leading to reduced effect on driver behaviour. Low effectiveness (if any) at reducing collisions. [29,30,31]
Interactive speed-activated wildlife + speed signage	Any road type, but should be targeted to forewarn of short, well defined sections of high risk.	Some potential , but yet unproven for DVC reduction. Increased driver perception. [32,33]	Driver habituation over time, if not reinforced by seeing animals near the crossing point, and as digital signage in general becomes more common. [34,35]
Interactive animal activated signage	Major well-defined animal crossing points on roads of moderate traffic flow.	Promising effects on driver awareness and local speed reduction. [36,37,38]	High cost compared to standard or speed activated signage. Variable reliability of differing sensor types. [35]
		for refs. see 4]	
Reduction of local deer density	Prevention of increase, if not reduction, of deer numbers required in order for most other measure (including fencing) to remain effective.	Good – provided undertaken over wide area, and as one part of overall DVC reduction strategy. [39,40,41,42]	Localised culling may shift rather than reduce collisions, and destabilise population. Public understanding of need to control wildlife limited. [14,43]
Immuno-contraception	Isolated, self-contained populations.	Non-lethal; higher public acceptability in some countries / situations than culling. Limited / short term effectiveness. [44]	Requires high proportion of herd inoculated. Ethically questionable. Very high cost. [5]
Reducing animals disturbance	Forests with high human / dog disturbance.	High potential – where dog walking and human activity often panics deer to cross roads. Low cost if achieved through restrictions on activity in specific high-risk areas.	Difficulty to achieve compliance; e.g. keeping dogs on leads. May be contrary to other policies to increase public use of forests and countryside.
Verge clearance and maintenance	All roads. Ideally verges re-sown with grass mixtures of low digestibility. Clear verges also a pre-requisite if reflectors in use.	Promising. Improved forward visibility for drivers and animals; dependant on width possible to clear. [45,46,47]	Effect on collisions reduction not fully proven. Increased forage production on verge may attract animals if not timed carefully. [17,48]
Public awareness raising and driver education	Increasing importance as traffic and collision risk escalates. Animal hazard awareness should be built into national driver syllabuses.	High potential – relatively low cost if based on leaflets and printed media. Can be integrated with other road safety campaigns.	Effects unclear; may be short-lived unless replicated. Responsiveness of driving public questionable.

For Fuller review of DVC mitigation options in differing situations see :
 Langbein et. al (2011) – at: <http://www.deercollisions.co.uk/pages/avoid.html>



(1) Deer Fencing remains only well proven method at high risk sites -

•but should ideally combine with leading animals to safer crossing places.

•Long fences - costly to maintain ; barrier and landscape impact.



Effectiveness: HIGH



2) 'Green' wildlife bridges and underpasses



Figure 7.50 - An underpass below a railway line in the Czech Republic. It is combined with an agricultural track which is not tarmacked. Its height also makes it suitable for large mammals. (Photo by J. Dufek)



Effectiveness: HIGH

May offer ideal localised solutions well suited to National Park context but come with relatively high cost outlay.

(3) Enhancing existing structures for joint use



*M25 Bridge & tunnel
both now used by
fallow and muntjac*



Effectiveness:
Promising / HIGH

M25 – unsuitable bridge?



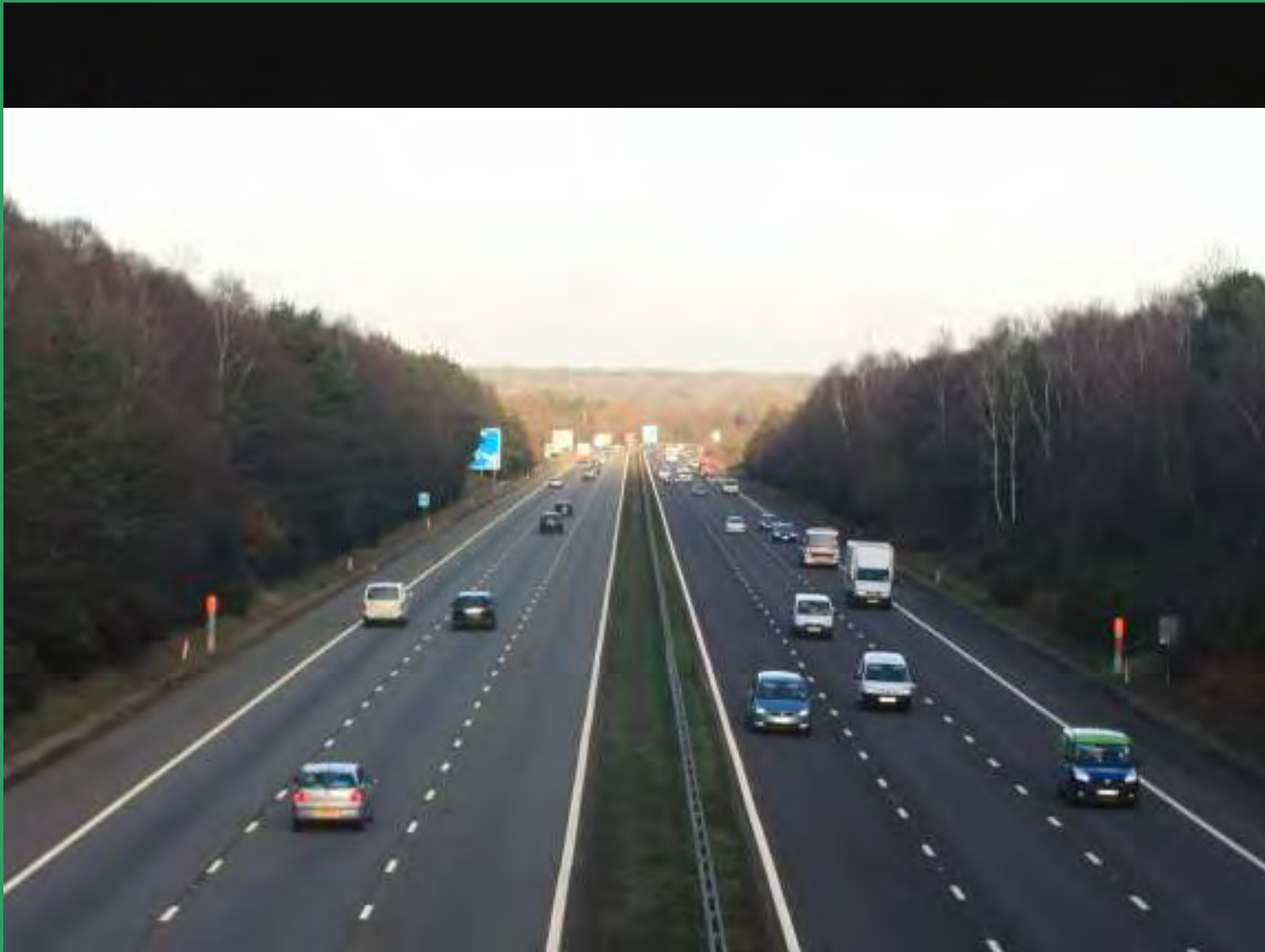
Fallow deer - crossing over UK's busiest Motorway (M25)



To view video clips shown go to:

<http://www.youtube.com/user/jochenlangbein>

Fallow deer - crossing over UK's busiest Motorway (M25) in daylight



Fallow deer - crossing over UK's busiest Motorway (M25) in daylight



To view video clips shown go to:

<http://www.youtube.com/user/jochenlangbein>

New Forest Red deer –
crossing through narrow underpass
(courtesy © Lee Muttock)



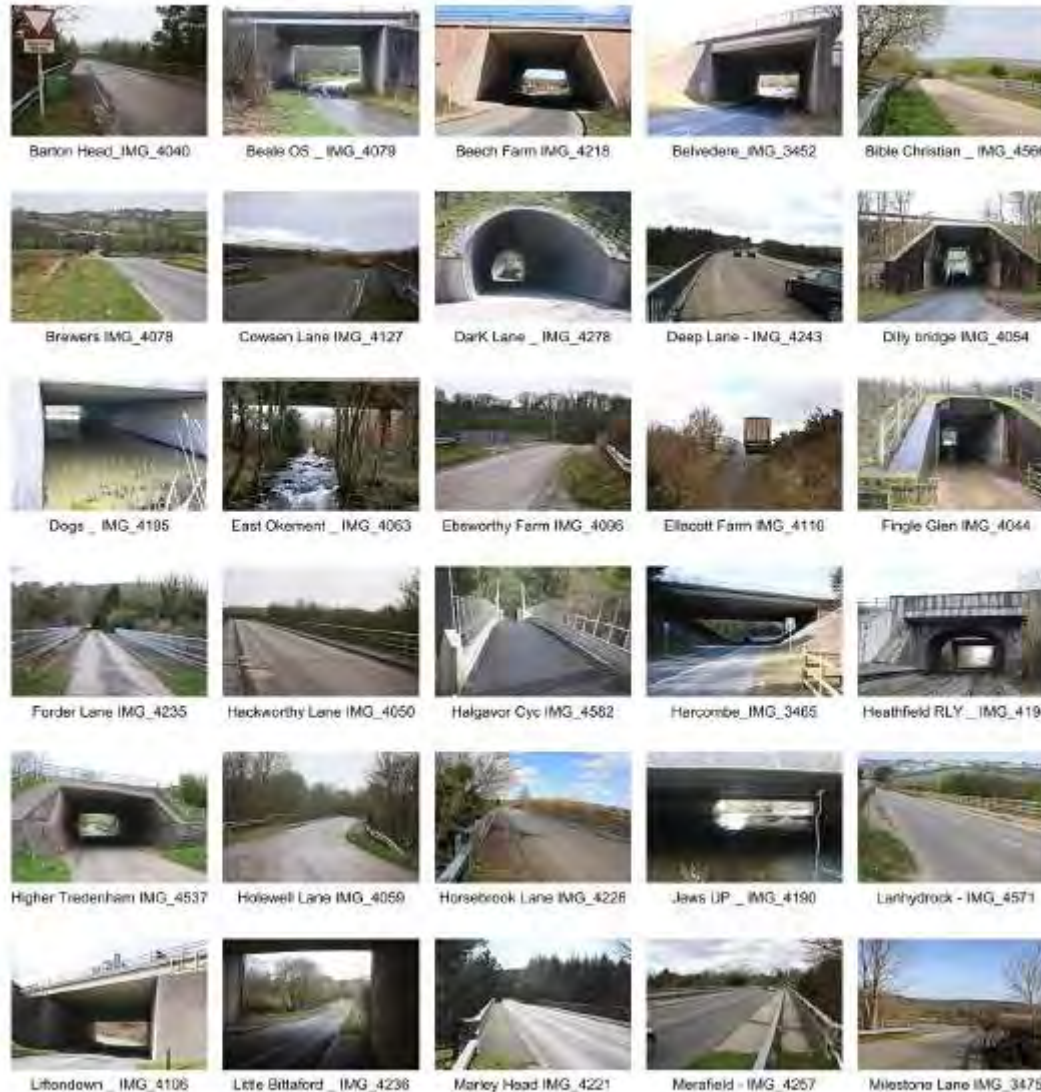
WILDVIEW

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Pilot study to assess the potential of selected existing structures on the A30 and A38 trunk roads in Southwest England to provide safer crossing places for deer (Langbein, 2010).

Appendix III: Thumbnail images of existing structures surveyed. See CD (Appendix IV) for larger and additional images for each structure)

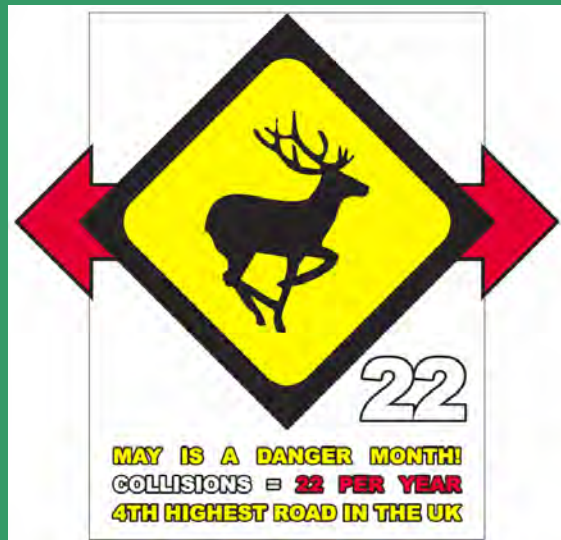


(continued page 2)

2012/13: SW Trunk Agents are taking forward action to provide lead-in fencing and other adaptations to enhance potential for deer and other wildlife use for an initial four structures, selected as of having best potential to help minimise DVC risk on the trunk roads; plus monitoring effectiveness.

A Similar survey may be worth considering for A9 - Not least in view of planned improvements to upgrade this trunk road to dual carriageway in the near future.

(4) Driver / Public Awareness



Effectiveness: Promising / Intuitive

Scottish Natural Heritage DVC Priority Site: A82 Bridge of Orchy to Glen Coe

Comparative distribution of deer carcasses recorded by SNH roadside carcass surveys during 28 month BEFORE and during 28 months AFTER Sept. 2008 installation of Vehicle Activated Deer Warning Signs (black triangles).

Coloured squares indicate numbers of deer casualties found per 1km OS map square.



(i) Before Signage (May 2006 – August 2008)



(ii) Post Signage Installation (Sep. 2008 – Dec. 2010)

No. of deer casualties found

- 6 to 12
- 3 to 5
- 1 or 2



Scottish Natural Heritage
Scottish Natural Heritage

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5) Management of Verge Vegetation —

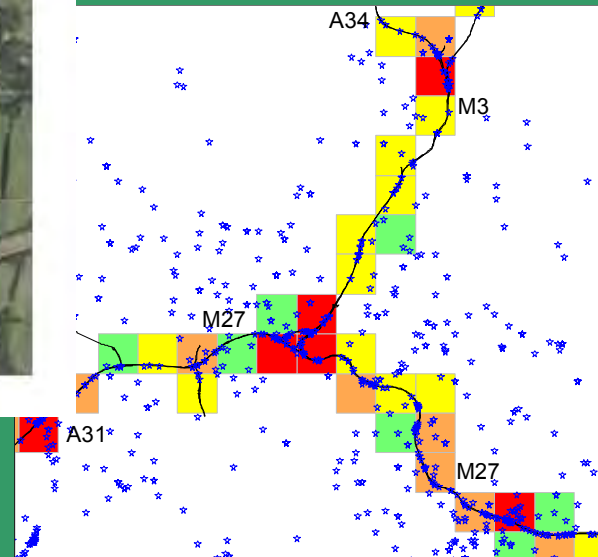
improving forward visibility for drivers and deer



Effectiveness: *Promising*



Figure 18. Ariel view of M3/M27 Links DVC priority site.



High Scrub and woodland allowed to develop between sliproads and on roundabouts at major junctions, can lead to deer settling there (esp. during in late spring) and lead to high localised DVC incidence.

(6) ? Roadside Wildlife Deterrents ?

Optical wildlife warning reflectors are widespread

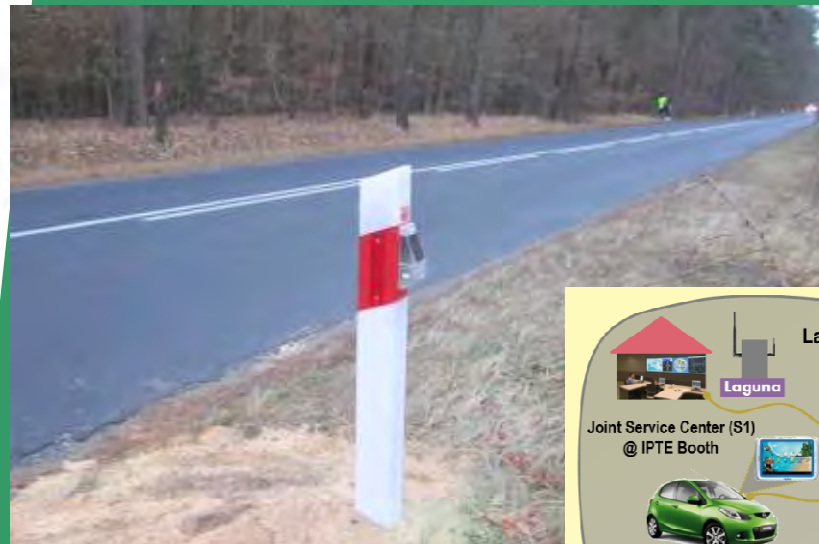
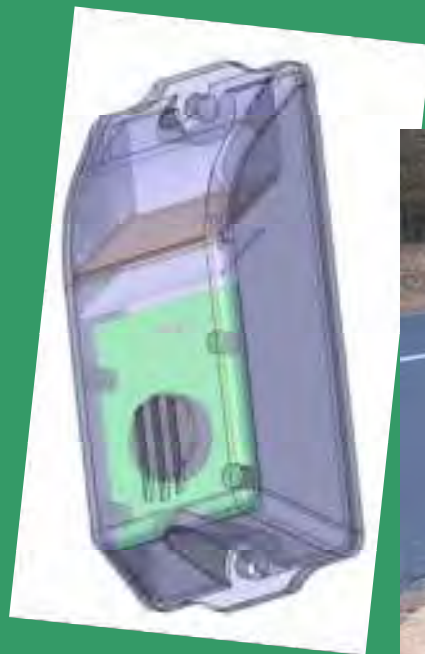
- but there is little evidence for lasting effectiveness.
- particularly not under high traffic flow conditions as in much of GB
- & **RED** reflectors likely to appear Grey/ or black to deer !



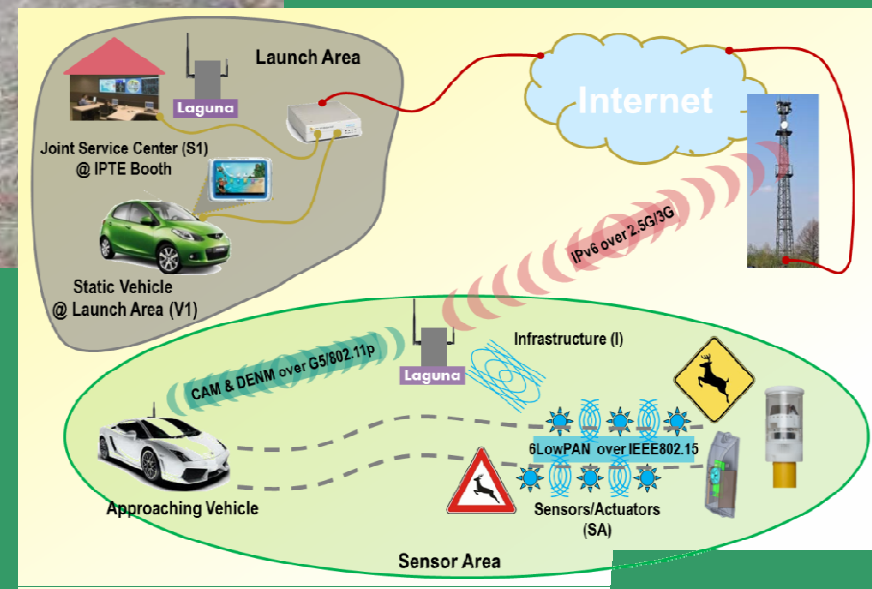
Effectiveness: Limited / Poor

(6) However – a trial of ‘DeerDeter’ could be worth exploring.

An Austrian product developed with variable sound module and ‘blue’ strobe signal into verge ; which has provided some more promising results in a number of countries .



Successive devices interlinked and with network update capability



**Integration of several measures required
matched to local situation**

**DVC reduction strategy for Cairngorm NP
might include e.g.**

- **Driver awareness e.g. Interactive signs**
- **Public DVC awareness e.g. seasonal media; posters**
- **Verge management esp. junctions / slip roads**
- **Fencing – if leading to safer crossing points**
- **Adapt / enhance existing crossing structures**
- **Enforcement of speed limits, traffic calming**
- **Co-ordinated deer control**
- **Wildlife DeerDeter (trial -?)**

Thank you for your attention



To view video clips shown go to:
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Langbein Wildlife Associates



• **Advice to Drivers re Deer-Collision avoidance**

- Take note of wildlife warning signs
- Peaks in deer related traffic collisions occur October through December, followed by May.
- Highest-risk periods are from sunset to midnight followed by the hours shortly before and after sunrise.
- Be aware that further deer may well cross after the ones you have noticed.
- After dark use full-beams when there is no opposing traffic. The headlight beam will illuminate the eyes of deer near roadway BUT if deer noted dim headlights to avoid causing animals to 'freeze' rather than leaving the road.
- Don't over-swerve to avoid hitting a deer. If a collision with the animal seems inevitable, hit it while maintaining full control of your car. The alternative of swerving into oncoming traffic or a ditch could be even worse. An exception here may be motorcyclists, who are at particular risk when in direct collisions with animals.
- Only break sharply and stop if there is no danger of being hit by following traffic.
- Report any deer-vehicle collisions to the police (who should be able to contact the local person best placed to assist with an injured deer at the roadside)