

Dogs, access and nature conservation

English Nature Research Reports



working today
for nature tomorrow

English Nature Research Reports

Number 649

Dogs, access and nature conservation

Ken Taylor (Asken Ltd)
Penny Anderson (Penny Anderson Associates Ltd)
Ros Taylor (Asken Ltd)
Kath Longden (Penny Anderson Associates Ltd)
Paul Fisher (Penny Anderson Associates Ltd)

You may reproduce as many additional copies of
this report as you like, provided such copies stipulate that
copyright remains with English Nature,
Northminster House, Peterborough PE1 1UA

ISSN 0967-876X
© Copyright English Nature 2005

Acknowledgements

Asken Ltd and PAA wish to acknowledge the help and support of all those who responded to our enquiries – either by providing us with information of value to our literature search or by completing the questionnaire. We would also like to express our gratitude to Tom Sunderland and Graham Bathe of English Nature for their support and guidance during the course of the research.

Forethought

Something to bear in mind when considering this report about dogs and nature conservation:

Annie: *“I understand you help people who’ve got horse problems.”*

Tom: *“It’s kind of the other way round. I help horses who’ve got people problems.”*

From: *The Horse Whisperer*, by Nicholas Evans (with acknowledgements to S Jenkinson of the Kennel Club for drawing attention to this quote).

Executive summary

English Nature appointed Asken Ltd and Penny Anderson Associates Ltd (PAA) to prepare a report on *Dogs, Access and Nature Conservation* that will serve as a reference for managers of sites of nature conservation importance. An extensive literature search and review was undertaken, discussions held with researchers and site managers and a structured survey of site managers in England and Scotland was undertaken by email.

There were around 6.1m dogs in the UK in 2003 (a decline from 1998 when there were estimated to be 6.9m). The Kennel Club recognises at least 172 different breeds but groups them into seven major categories based on the characteristics for which they have been bred. There are also many dogs that are crossbreeds. In some of the most popular breeds (eg Labrador, golden retriever, terriers and crosses), their breeding has been to put up birds for shooting or to pursue mammals. However, all dogs retain an innate tendency to chase a moving object, such as a wild animal.

Research into dog walking and dog behaviour has shown that:

- around 5-7% of walkers in the uplands and 25-50% of walkers in lowland areas are accompanied by dogs;
- around 50-90% of these dogs were off-lead and up to 14% were deemed (by researchers/observers) to be running out of control;
- a walker with a dog has a larger 'sphere of influence' with regard to wildlife than a walker without a dog, and groups of dogs may exert a stronger influence than a single dog.

The research shows that disturbance is greater where:

- the animal reacts in the same way to a dog as it does to a predator;
- the stimulus approaches more directly;
- distance to a refuge is greater;
- the cost of fleeing is lower (and so the significance, in survival terms, is low).

However, the pattern of disturbance varies between species and at different times in their breeding cycle.

Disturbance is an effect that does not necessarily mean that long term impacts at population level will arise and it is important to recognise this distinction. However, very few studies have examined impacts at a population level.

For breeding birds there is clear evidence, both research-based and anecdotal, that disturbance exposes the eggs or young to a greater risk of loss to opportunistic predators, especially corvids. This appears to be the greatest risk arising from disturbance on sites where visitor and dog numbers are high. This effect is greatest for ground nesting birds in a variety of habitats.

Ground nesting birds have been the subject of most research (although little of the research examines disturbance by dogs independently from disturbance by humans with and without dogs) and appear to be the group most vulnerable to disturbance. Key findings for all bird groups or species are that:

- the presence of dogs provokes a disturbance response at greater distances and for longer periods than stimuli from recreational activities (including people without dogs) during the breeding season for most of the species studied, especially ground nesting ones, and for one

species this disturbance distance was twice as long in the breeding opposed to the wintering season;

- breeding success can be improved significantly when dogs are managed, including in beach environments;
- lekking birds may be particularly vulnerable to disturbance by dogs although research in the UK is limited;
- of the wader species, only the Eurasian dotterel has been shown not to be disturbed by dogs or people;
- although some species exhibit no behavioural response to disturbance by dogs or people, they appear to produce less fit young (eg marsh harriers) and this relationship is worthy of further study;
- the response to dogs differs between species of ground feeding/roosting wintering birds but dogs generally have a greater effect than walkers and (for some species) joggers;
- reaction to dogs has an energy cost and this can be significant in winter, although compensatory feeding (eg at night) is found in some species;
- evidence concerning possible habituation is mixed.

Very little work has been found about effects on mammals and other animals. Although effects have been observed (eg disturbance of deer, changes in behaviour patterns of badgers), the available information suggests that any effects of dogs on populations are not significant. There is a potential risk of dogs spreading disease amongst wild animals but, again, there is no evidence to suggest that this is significant.

Research and anecdotal reports show that dogs contribute to nutrient enrichment of infertile habitats through defecation and urination. These effects tends to be concentrated around car parks and site entrances as dogs tend to perform these bodily functions shortly after being let out of cars or taken off a lead, and in approximately a one metre zone beside the paths. Observed symptoms of enrichment are dominance of nutrient-loving species and reduced species diversity. Ideally, owners would pick up the faeces of their dogs (little can realistically be done about urination) but a significant proportion of owners do not. However, a significant proportion of owners are responsive to campaigns to encourage them to clear up after their dogs, particularly when they are made aware of the effects and are provided with facilities for convenient disposal.

The presence of dogs at a site can exert an influence on how it is managed, particularly where some form of grazing by livestock is thought to be the optimum management regime. The influence arises from:

- the need to consider the compatibility of livestock (especially breeding ewes and lambs) and dogs;
- concerns that may be expressed by users (not just dog walkers) about the presence of large grazing animals.

However, there are many measures that can be employed to assuage these concerns and, in practice, re-introduction of grazing can be effected at most sites without undue adverse effects. Even so, instances were found (as reported in the National Survey) of grazing being prevented or altered because of perceived difficulties arising from the presence of dogs.

It is important to recognise that dogs play an important positive role in British society. Benefits include:

- promotion of health and well-being of their owners (and their children);

- use as working dogs;
- use of dogs to assist people with illnesses or disabilities;
- economic benefits in terms of sales of dog-related goods.

Over all types of sites, a significant minority of regular access users are dog owners, although observers at some heathland sites in southern England have recorded that as many as 93% of all users were dog walkers. Their needs and preferences are similar to non-dog owners, although they like to have opportunities to let their dog safely off its lead. However, non-dog owners are not always welcoming of dogs, with a significantly proportion having been observed to take what appear to be evasive action when a dog approaches, and object particularly to finding dog faeces in public access areas.

The role of dogs differs in other countries, although north European societies and those developed from European origins (eg USA, Australia, New Zealand, South Africa) have a similar view of dogs. In these countries, management of dogs in national parks tends to be more restrictive than in the UK (eg with dogs being banned totally, or from sensitive areas, or only with permits), although it is important to recognise that there are many differences between British national parks and those elsewhere. In other countries and regions, the dog is perceived differently, and is a source as human food in southeast Asia, whilst viewed as unclean by some Muslims.

There are certain risks to health and safety associated with dogs' presence in the countryside (ie injury to people with dogs, injuries caused by dogs and zoonoses). Although incidents can occasionally be serious, these risks are not significant overall.

The laws relating to dogs in the countryside and their effects are described in Section 8. It is important to recognise that these may change over time.

The survey of site managers (to which there were 77 respondents) highlights the difficulty of observing effects of dogs on wildlife. Nevertheless, it has provided information about effects on wildlife that is entirely consistent with research findings. It also sheds some light on the effectiveness of different management measures and leads (tentatively) to conclusions that:

- dog management policies vary in effectiveness but wardening, steering and regulations appear to work best, whilst leaflets and signage are less effective, except as part of a comprehensive strategy;
- a multi-faceted policy is likely to be more effective than one or no policy.

Recommendations for site managers are offered. In brief, these are that site managers should:

- develop integrated strategies for dog management and control, including control of potential predators that benefit from the presence of dogs (such as corvids and gulls);
- consider zoning their sites to differentiate between areas where dogs are allowed/not allowed and where they can be on/off-lead at times throughout the year;
- plan strategically how the pattern of people's behaviour can be influenced (without breaching their rights), such as through steering, use of signs etc., to direct people towards areas where impacts of dogs (and humans) will be less significant on the not unreasonable assumption that they will take their dogs along the same route;
- exploit the tendency for dogs to urinate and defecate soon after their arrival at a site by creating 'sacrifice areas' between car parks and site entry points where feasible;
- implement campaigns to promote responsible behaviour amongst dog owners and where they can find dog-friendly sites;

- co-ordinate dog management with other aspects of site management (eg predator control, livestock management).

Although a lot of research literature has been brought to light during the course of the project, gaps in knowledge have become evident. Key gaps are:

- the stimulus that dogs represent for disturbance of different bird species and the interaction of different variables (eg speed of approach, size of dog, potential for habituation);
- effects of dogs in water and water margin environments (inland and coastal waters);
- population level impacts on the species showing negative effects of disturbance;
- various experiments into effects of dog management measures, with dogs as the key variable (as distinct from human disturbance generally);
- monitoring of effects on wildlife where new access has been provided;
- flushing distances for different species and how this distance is influenced by factors such as habitat, seasonality, availability of food and so on;
- more detailed study of the attitudes of different cohorts of dog owners and their reaction to different methods used to influence their behaviour.

In conclusion, whilst research has rarely tried, or been able, to distinguish the specific effects of dogs on wildlife, as distinct from effects of humans and dogs generally, the evidence that is available (both anecdotal and from controlled experiments) shows that dogs do disturb ground nesting birds in particular and that this disturbance can lead to adverse effects on individuals, and in some cases on populations. The greatest risk is from predation of eggs or young (particularly by corvids) when parent birds are flushed from nests, whilst other effects include reduced feeding opportunities coupled with higher energy costs leading to reduced fitness.

Yet, such is the benefit that dogs bring and the widespread expectation that dog owners can take their dogs into the countryside, it is impractical to consider banning dogs from all sites of nature conservation value. Evidence suggests that integrated management strategies can be devised (based on control of dogs and influencing their owners) that will reduce the impact of dogs on many nature conservation sites, and seek mutually beneficial solutions.

Contents

Acknowledgements & forethought

Executive summary

Abbreviations

Glossary of terms

1	Background	17
1.1	Background to the research.....	17
1.2	Methodology	17
1.2.1	Literature review	17
1.2.2	National survey	19
2	Dogs and disturbance in general	21
2.1	Key points	21
2.1.1	Breeds of dog	21
2.2	Introduction.....	22
2.3	Breeds of dog	22
2.3.1	Introduction.....	22
2.3.2	Breed differences	22
2.3.3	Breed categories.....	23
2.3.4	Dog ownership by breed	24
2.4	Dogs in the countryside – patterns of use and behaviour	25
2.4.1	Patterns of use	25
2.4.2	Dog behaviour	27
2.5	Direct and indirect effects of wildlife disturbance: A conceptual framework	29
2.5.1	How an animal may perceive a dog.....	29
2.5.2	Effects versus impacts	31
2.6	Effect of management measures	32
3	Dogs and birds	33
3.1	Key points	33
3.1.1	Effects on breeding birds	33
3.1.2	Wintering birds	33
3.2	Introduction.....	34
3.3	Breeding birds.....	36
3.3.1	Waders	36
3.3.2	Non-waders.....	42
3.4	Non-breeding birds	48
3.4.1	Waders	48
3.4.2	Other birds	52
3.5	Synthesis	52
3.5.1	Pre-incubation birds.....	52
3.5.2	Breeding phases	53
3.5.3	Wintering birds	54
4	Dogs and other nature conservation interests (excluding birds)	56
4.1	Key points	56
4.1.1	Mammals	56
4.1.2	Carriers of disease.....	56

4.1.3	Carriers of alien plants.....	56
4.2	Introduction.....	56
4.3	Impact on animals other than birds.....	56
4.3.1	Mammals.....	56
4.3.2	Synthesis of results.....	60
4.4	Dogs, diseases and alien plants.....	61
4.4.1	Diseases and parasites.....	61
4.4.2	Dogs as vectors of alien plants.....	62
5	Enrichment of habitats by dog fouling.....	63
5.1	Key points.....	63
5.1.1	Dog faeces and urination.....	63
5.1.2	Managing dog fouling.....	63
5.2	Introduction.....	63
5.3	Environmental impact.....	63
5.3.1	Faeces.....	64
5.3.2	Urine.....	66
5.3.3	Effects on habitats.....	67
5.4	Management of dog fouling.....	67
5.5	Synthesis of eutrophication effects.....	68
6	Dogs and land management.....	69
6.1	Key points.....	69
6.1.1	Dogs and livestock management.....	69
6.1.2	The impact of livestock on dogs.....	69
6.2	Introduction.....	69
6.3	Effects related to agriculture and conservation grazing.....	70
6.4	The impact of livestock on dogs.....	71
6.5	Synthesis of key points.....	74
7	Dogs and society.....	75
7.1	Key points.....	75
7.1.1	General points.....	75
7.1.2	Patterns of behaviour of dog owners.....	75
7.1.3	Benefits of dogs.....	75
7.1.4	Risks associated with dogs.....	75
7.2	Introduction.....	76
7.3	Perception of dogs in the countryside.....	76
7.3.1	General public.....	76
7.3.2	Dog walkers' perceptions.....	78
7.3.3	Management of dog walkers.....	79
7.3.4	Dog management in National parks in other countries.....	81
7.4	Cultural status of dog ownership.....	84
7.4.1	International context.....	84
7.4.2	Patterns of dog walking.....	86
7.4.3	Needs and demands of dog walkers.....	86
7.4.4	Preferences for different habitats.....	87
7.5	Professional dog caring.....	87
7.6	Contributions of dogs to society.....	88
7.6.1	Social and health benefits.....	88
7.6.2	Working dogs.....	91
7.6.3	Assistance dogs.....	93
7.6.4	Economic benefits.....	93

7.7	Health and safety issues	94
7.7.1	The fear and risks of injury to people from dogs	94
7.7.2	The risks of injury to people with dogs	94
7.7.3	Risks to people from zoonoses transmitted by dogs	95
7.8	Synthesis	98
8	Dogs and the law	99
8.1	Key points	99
8.1.1	Practices and byelaws	99
8.1.2	Statutory enactments	99
8.2	Introduction	99
8.3	Laws (updated to mid-2005)	99
8.3.1	Accepted practice and local byelaws	99
8.3.2	Statutory enactments	100
8.4	Other regulatory issues	104
9	National survey	105
9.1	Key points	105
9.1.1	Sample characteristics	105
9.1.2	Dog control policies	105
9.1.3	Observed effects	105
9.2	Introduction	105
9.3	Nature of the responses	106
9.3.1	Number and types of respondent	106
9.3.2	Indicators of value of sites for nature conservation purposes	107
9.3.3	Characteristics of sites managed by respondents	108
9.3.4	Conclusion	110
9.4	Analysis of results	110
9.4.1	Dog management policies and techniques	110
9.4.2	Success of dog management policies and techniques	112
9.4.3	Impacts on birds	114
9.4.4	Effects of dogs on species other than birds	119
9.4.5	Other effects	120
9.4.6	Impacts of dogs on land management practices	121
9.4.7	Linking impacts to management policies	123
9.5	Synthesis	126
10	Recommendations for site managers	128
10.1	Overview	128
10.2	Integrated strategies	128
10.3	Dog management	129
10.4	Access management	129
10.5	Reducing eutrophication	130
10.5.1	Good practice guidance	130
10.5.2	Other management measures	131
11	Areas for further research	133
11.1	Introduction	133
11.2	Dogs and wildlife	133
11.3	Management of dog owners	134
12	Summary of conclusions and recommendations	135
12.1	Introduction	135

12.2	Summary of conclusions.....	135
12.3	Recommendations.....	136
13	References.....	138
Appendix 1	Scientific names of species mentioned in the text	151
Appendix 2	Examples of good practice.....	155

List of tables and boxes and figures

Table 1.1:	Key words and phrases used in the search	18
Table 2.1:	Categories of dog breeds	23
Table 2.2:	Numbers of pedigree dogs recorded by the Kennel Club by breed.....	25
Table 2.3:	Range of dog numbers accompanying walkers on sites.....	26
Table 2.4:	Disturbance distances for a variety of bird species	31
Table 3.1:	Flushing distance of golden plover by dogs or walkers	36
Table 3.2:	Nest survival of ringed plover on Lindisfarne in relation to disturbance	38
Table 3.3:	Survival Rates under different management regimes.....	40
Table 3.4:	Anecdotal comments on breeding wader numbers and disturbance with or without dogs.....	42
Table 3.5:	Summary of the effects of dog disturbance on other breeding birds.....	42
Table 3.6:	Levels of disturbance to shorebirds by dogs	49
Table 5.1:	Nutrient content of dog faeces.....	66
Table 7.1:	Summary of public perceptions of dogs in the countryside	76
Table 7.2:	Methods of preventing problems from people with dogs on forest enterprise property. ...	80
Box 7.1:	Proposed management strategies for bunurong marine national park.....	83
Table 7.3:	Summary of cultural attitudes to the dog	84
Table 7.4:	Types of dog care services	88
Table 7.5:	Level of agreement with statements by dog owners.....	90
Table 9.1:	Numbers of respondents by type	106
Table 9.2:	Other designations applying to sites managed by survey respondents.....	108
Table 9.3:	Numbers of sites by type of restriction and site setting.....	111
Table 9.4:	Range of restrictions used on sites	111
Table 9.5:	Summary of observed effects of dogs on species of birds and groups of bird species....	114
Table 9.6:	Non-bird animal species respondents say have been affected by dogs	119
Table 9.7:	Management measures used to control dog fouling.....	121
Table 9.8:	Data relating to health and safety	122
Table 9.9:	Reported effects on other users of people with dogs.....	123
Table 9.10:	Occurrence of effects by number of management policies	125
Table 9.11:	Breeds of dogs which respondents say affected wildlife and birds.....	126
Figure 9.1	Categorisation of sites	107
Figure 9.2	Distribution of sites by size	108
Figure 9.3	Annual number of visitors by type of site location	109
Figure 9.4	Percentage of sites on which effects of dogs on birds has been observed (by type of restriction policy)	112
Figure 9.5	Measures used and their effectiveness by respondent.....	113
Figure 9.6	Reported frequency and timing of flushing.....	116
Figure 9.7	Frequency and Timing of Interference with Breeding	117
Figure 9.8	Frequency and timing of interference with breeding.....	119
Figure 9.10	Numbers of visitors and the level of dog-related effects on wildlife	124

Abbreviations

Asken	Asken Ltd
BSAVA	British Small Animals Veterinary Association
BTO	British Trust for Ornithology
CRoW	Countryside and Rights of Way Act 2000
DTI	Department of Trade and Industry
FDW	Friends of the Dog Walkers
GAP	Grazing Animals Project
HSE	Health and Safety Executive
JNCC	Joint Nature Conservancy Committee
LNR	Local Nature Reserve
NARP	National Association of Registered Petsitters
NNR	National Nature Reserve
PAA	Penny Anderson Associates Ltd
PAT	Pets As Therapy
RoSPA	Royal Society for the Prevention of Accidents
RSPB	Royal Society for the Protection of Birds
SAC/cSAC	Special Area of Conservation/Candidate Special Area of Conservation
SANP	South African National Parks
SCAS	Society for Companion Animal Studies
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WeBS	Wetland Bird Survey
WWT	Wildfowl and Wetlands Trust

Glossary of terms

Canid	Belonging to the dog family
Carnivore	Meat eater
Crepuscular	Active at dusk or dawn
Disturbance	A behavioural response by an animal to an event that is not a continuous part of its environment, for example to sudden noise, appearance of another animal or human
Eutrophication	Addition of nutrients into soil or water. Although nutrients may be from natural sources, the use in this report is to enrichment from anthropogenic causes.
Guild	A group of species with similar ecological requirements, for example shorebirds
k-strategist	Long-lived animals, with a slow reproduction rate
Lek	Display site where males congregate to attract females for mating, for example, some grouse species
Mustelid	Mammal family producing strong glandular secretions, for example stoats and weasels
Predation	Capture and consumption of animal at any stage in its life cycle by another animal
r-strategist	Short-lived animals that reproduce rapidly, and have a high metabolic rate
Sarsen stone	A stone, often large, with a high silica content found mostly associated with chalk downland. Many have been used as standing stones.
Turbidity	The lack of clarity of water.

1 Background

1.1 Background to the research

In late 2004, English Nature commissioned Asken Ltd (Asken) working in association with Penny Anderson Associates Ltd (PAA) to undertake research into dogs, access and nature conservation. It is intended that the work will provide a comprehensive source of information and act as a reference document for managers of sites of nature conservation importance where the presence of dogs is a concern. The information contained in the report will also be used to validate and inform nature conservation advice provided by English Nature to relevant authorities under Section 26 of the Countryside and Rights of Way Act 2000 (CRoW Act). It may also help develop a strategic and consistent approach to the management of dogs on National Nature Reserves (NNRs) and on other land managed by English Nature where the public either has a statutory right of access or where visitors are otherwise welcomed.

It is expected that the results of the research will be of use to other organisations that manage sites with nature conservation interests like local authorities, the National Trust, County Wildlife Trusts and so on, all of which manage Sites of Special Scientific Interest (SSSIs) (and sometimes NNRs), plus Local Nature Reserves (LNRs) and other wildlife sites.

The research was conducted in two parts:

- a review of literature (the findings of which are covered in Sections 2 to 7); and
- a national survey of site managers (covered in Section 9).

After the literature review sections, information is provided about the law relating to dogs in the countryside (Section 8), as this has a significant bearing on how dog owners can be managed. Drawing from the earlier discussions, Section 10 sets out some recommendations for site managers. The research has revealed significant gaps in knowledge, so Section 11 provides suggestions for future research. The implications of the findings are discussed in Section 12 in the form of conclusions and recommendations. References are listed in Section 13.

1.2 Methodology

1.2.1 Literature review

The literature review has focused on examining a number of aspects of dogs being on sites of nature conservation importance. In order to set the scene, and to understand the variation between sites, the review has sought information on the numbers of dogs found in diverse sites, and attempted to understand the patterns and variations found. Secondly, an appreciation of the implications of this for the visits to sites of nature conservation value is assessed. Finally, research and information, views and circumstantial evidence have been reviewed and evaluated in order to present an account of the possible impacts of dogs on wildlife. These potential impacts break down into:

- disturbance to breeding birds;
- disturbance to wintering birds;
- disturbance to mammals;
- disturbance to other animals;
- fertilising effect of urine and faeces (ie eutrophication); and
- issues related to stock and site management.

The literature review has been undertaken by searching through the recreation-ecology literature for any research or commentary that examines the potential impact of dogs on wildlife, by searching the internet with key words in search of further information, by discussing the issues with several key site managers and others, and by asking for comment and feedback from selected internet discussion groups.

In addition to the effects of dogs on wildlife, the terms of reference called for the review to cover cultural attitudes to dogs, how they are perceived and other aspects of the role of dogs in society – in England and internationally. Research was conducted in essentially the same manner.

Published and unpublished literature

The first approach employed a search for published and unpublished literature pertinent to the study through the use of journals, research reports, books and other materials. This was achieved through the use of the consultants' own libraries on the impacts of recreation on wildlife of all kinds. This collection includes scientifically refereed papers and reports, other reports produced by various organisations over the period concerned, notes on presentations and papers at conferences, both scientific (such as the British Ecological Society) and more habitat or regionally based (such as the British and European heathland conferences) and a variety of items that would be classified as the grey literature collected throughout the last 30 years. This collection has been augmented by searching for dog and wildlife research papers on the internet, through various library search engines, and then, where necessary, by requesting full copies of any that appeared to be relevant from their authors or from the British Lending Library. In addition, the references in relevant documents have been obtained where appropriate.

The authors have also been able to draw on previous studies undertaken on related subjects such as the *Guidance for Statutory Authorities* (English Nature 2001), *A Review of the Effects of Recreation on Woodland Soils, Vegetation and Fauna* (Anderson and Radford 1992, summarised in Anderson and Radford 1994) and other work that supported the Moorland Management Project in the Peak District (Anderson 1990).

Key words and phrases

The second approach involved collating a list of key words and phrases, and authors that were used in a general search of resources available on the internet other than those used to find research reports and articles. The key words and phrases used in the search are presented in **Table 1.1**. In addition, the internet or various contacts have been used to find the home page of some authors, and their papers requested directly.

Table 1.1: Key words and phrases used in the search

Dogs countryside	Dog faeces
Dogs impacts on wildlife	Dogs predators
Various authors and key words from the paper titles	Dog bans New Zealand reserves
Dogs	Dog walking
Eutrophication dogs	Wildlife and dogs
Stock worrying	Recreation dogs
Visitor surveys, dogs	Chemical composition dog faeces
Management dogs national parks	Chemical composition dog urine

Other contacts

In addition to the above sources, requests for information have been posted onto the internet discussion groups 'Nibblers' (run by the Grazing Animals Project (GAP)), and onto 'Heathnet' (a

discussion group managed by the RSPB) for those interested in heathland. Discussions that have been posted onto these groups over the past 24 months or so have also been tapped where they focus on issues relating to dogs that are relevant to this study. The information retrieved from these sources is in addition to that provided in the national survey of site managers (see Section 9). Contact has also been made with most of the researchers who were completing their studies in 2005 on disturbance effects on specific bird species that have been supported by English Nature (and their partners).

As well as these contacts, a number of other discussions have taken place directly with various personnel in organisations known to have an interest in the subject. These are:

- National Trust;
- various officers in English Nature;
- Peak District National Park Authority;
- Game Conservancy;
- RSPB.

1.2.2 National survey

The areas of interest were itemised in the project tender document, and these were confirmed at the initial meeting with English Nature. Asken drafted and finalised the questionnaire in consultation with English Nature and PAA. It was hoped that with wide distribution, and interest in the subject, that there would be around 100 respondents. The questionnaire was produced as a Microsoft Excel spreadsheet for distribution by email. A copy of the questionnaire is available as an Excel file. This had advantages of making distribution and analysis easier.

It was decided that the best means of reaching the target audience for the questionnaire would be to make contact with key people in a number of selected organisations. The objective was to seek the support of the key people and ask them to act as a conduit for distributing the questionnaire within their organisation. Organisations were selected that:

- have responsibility for managing sites of nature conservation importance;
- are governmental and/or have national coverage;
- are focused on nature conservation interests.

It was decided to send the questionnaire to Scottish and Welsh organisations to increase the number of respondents. The thirteen people were contacted by telephone and asked to receive the questionnaire with a view to sending it on to colleagues who manage sites on a day-to-day basis. This they agreed to do. The organisations contacted were:

- Association of Local Government Ecologists (ALGE)
- Association of National Park Authorities
- Countryside Agency
- Countryside Council for Wales
- English Nature
- Forest Enterprise
- Ministry of Defence (Defence Estates)
- National Trust
- Royal Society for the Protection of Birds

- Scottish Natural Heritage
- Wildfowl and Wetland Trust
- Wildlife Trusts
- Woodland Trust

A follow-up contact was made to ensure that the questionnaire had been distributed. A further call was made to those contacts representing organisations from which little or no response had been received.

In addition, the questionnaire was posted onto websites accessed by wildlife site managers, these were:

- the Countryside Agency's Learning Network;
- Heathnet and Nibblers' chat rooms.

On receipt of replies, the answers were analysed using Excel.

The survey was carried out between 1 November 2004 and 24 January 2005.

2 Dogs and disturbance in general

2.1 Key points

2.1.1 Breeds of dog

- **The behaviour patterns of dogs that result in disturbance of wildlife is innate but does vary from breed to breed or mixes of breeds (ie mongrels, also referred to as crossbreeds).**
- **The dog breeds that have been bred for hunting (eg to put up birds for shooting) or to follow scent are likely to be the greatest source of disturbance, although all dogs have this capacity and tendency.**
- **Which dogs most commonly cause disturbance is a function not only of the dog's inherent tendencies but the popularity of the breed, or crossbreeds, amongst dog owners.**
- **The consistently most popular breeds of dogs in the UK are retrievers (Labrador and golden), German shepherd, spaniels and terriers. With the exception of German shepherds, each of these breeds has been bred for finding or killing animals.**

Dog use patterns

- **Dog numbers at nature conservation sites vary. In the Peak District around 5% of visitors on the moors are accompanied by a dog. In sites closer to residential areas and popular recreational sites, the proportion of the visitors with a dog is as high as 100% but generally varying between 27% and 63%.**
- **Numbers of dogs off leads varies from 90% on some southern heathland sites, to around 50-66% on the high moors of the Peak District.**
- **Dogs out of control off the lead average from 6-18%.**
- **Unless too old or overweight, most dogs, if not under close control, will search out potential prey, mostly on the ground, although they do not always kill it.**
- **Many dog walkers have more than one dog with them and one individual has been recorded in one survey with seven dogs.**
- **Dogs cruising without minders can travel 3-5 miles from their home.**

A conceptual framework for examining effects/impacts of dogs on wildlife

- **A conceptual framework is provided that suggests that:**
 - **Animals disturbed by dogs react as if the dogs were predators.**
 - **They react more when the disturbance stimulus approaches more directly, when distance from a refuge is greater, and when the cost of fleeing is lower.**
 - **If parent birds are flushed from eggs or young (even if temporarily), other opportunist predators (especially corvids) can move in and take advantage.**
 - **If there are high levels of predation risk, this may affect survival and reproduction.**
- **It is important to distinguish between an effect and an impact. An effect is a behavioural response of an individual (eg to disturbance), but an impact is felt at the population level and is more important for nature conservation.**

Effect of management measures

- **A combination of measures was successful at one site and involved reducing overall disturbance by restricting people to prescribed areas, signs giving advice about appropriate behaviour and wardening. People complying with the guidance were thanked.**
- **At a number of beach sites, signs asking for dogs to be kept on a lead increased compliance by three fold compared to no signs, and by four fold with moderate enforcement. Total compliance was achieved only with full time enforcement by rangers.**

2.2 Introduction

This section sets the scene for later sections by:

- reviewing the inherent behaviour patterns of dogs, and how these differ between breeds;
- reviewing research that highlights the pattern of dog use and how dog owners behave when with dogs in the countryside;
- reviewing research into the reaction of wildlife to the presence of dogs, and setting a conceptual framework for considering the effects of dogs on wildlife.

Mintel (2004) estimate that there are 6.1m dogs in the UK. This shows a decline from the 6.9 million estimated for Britain by the Pet Food Manufacturers' Association derived in 1998.

2.3 Breeds of dog

2.3.1 Introduction

It is self-evident that dogs come in many different shapes, sizes and colours. A system of classifying dogs into different breeds has developed. However, like many other branches of taxonomy, this is not an exact science and there is no definitive list of breeds; for example classification systems differ between the UK and the USA. The most definitive source of information about dog breeds in the UK is the Kennel Club. It maintains a register of pedigree dogs by breed. In a recent survey, undertaken in collaboration with the British Small Animals Veterinary Association (BSAVA), 172 different breeds were recognised.

2.3.2 Breed differences

Early man recognised that dogs have natural traits that can be developed, harnessed and used for man's benefit (Hamer 2001); and each category of breed reflects the different uses to which the modern day breeds were once put and the human benefits derived as a result. These instincts survive even if there have been no working dogs in the family for generations.

However, different breeds have different in-built tendencies, and each will tend to respond differently to a particular stimulus. Many breeds of dog have been bred to help man hunt and capture animals and thus it is not surprising that dogs have an in-built instinct to chase wild animals. Therefore, the sight hounds (eg greyhounds, whippets) tend to respond to a moving object – usually mammals rather than birds; they are fast but become quickly exhausted. The scent hounds (such as foxhounds and beagles) will chase their prey on scent.

All dogs have an inherent tendency to chase wildlife. The tendency is accentuated in certain breeds such as gun dogs, scent hounds and terriers.

2.3.3 Breed categories

Dog breeds are often grouped into a small number of categories. **Table 2.1** shows the seven categories of dogs recognised by the Kennel Club in the UK. Crossbreeds will tend to show mixes of characteristics proportionate to their mix of breeding.

Table 2.1: Categories of dog breeds

Category	Characteristic	Examples
Hounds	Breeds originally used for hunting either by scent or by sight. The scent hounds include the Beagle and Bloodhound and the sight hounds such breeds as the Whippet and Greyhound. They require a significant amount of exercise and can be described as dignified, aloof but trustworthy companions.	Greyhound, Fox hound, Beagle, Dachsund, Whippet.
Working	Over the centuries these dogs were selectively bred to become guards and search and rescue dogs. Arguably, the working group consists of some of the most heroic canines in the world, aiding humans in many walks of life. This group consists of the real specialists in their field who excel in their line of work.	Boxer, Great Dane and St Bernard, Doberman, Rottweiler
Terrier	Dogs originally bred and used for hunting. 'Terrier' comes from the Latin word <i>Terra</i> , meaning earth. This hardy collection of dogs were selectively bred to be extremely brave and tough, and to pursue fox, badger, rat and otter (to name but a few) above and below ground. Dogs of terrier type have been known here since ancient times, and as early as the Middle Ages, these game little dogs were portrayed by writers, and painters. It is commonly believed that the British Isles are the origin of most terriers. Originally, these canines were bred to best fit the purpose for which they were used, and looks did not particularly matter. Nowadays, the terriers have become attractive, whilst still retaining jovial, comical and in some cases fiery temperaments.	Jack Russell Terrier, West Highland White, Fox Terrier, Staffordshire Bull Terrier, English Bull Terrier.
Gun Dogs	Dogs that were originally trained to find live game and/or to retrieve game that had been shot and wounded. This group is divided into 4 categories - Retriever, Spaniels, Hunt/Point/Retrieve and Setters although many of the breeds are capable of doing the same work as the other sub-groups. They make good companions, their temperament making them ideal all-round family dogs. It is said that they are perhaps the most intelligent of the breeds, resulting in their wide variety of uses and their ease of training. They are active dogs requiring plenty of exercise and attention.	German Short Haired Pointer; Springer Spaniel, Labrador Retriever, Golden Retriever, Pointer, Red Setter, English Setter, Cocker Spaniel; Weimaraner.
Pastoral	Herding dogs that are associated with working cattle, sheep, reindeer and other cloven footed animals. Usually this type of canine has a weatherproof double coat to protect it from the elements when working in severe conditions.	Corgi, Collie (Border, Rough and Smooth), Old English Sheepdog, Samoyed.
Utility	This group consists of miscellaneous breeds of dog mainly of a non-sporting origin. The name 'Utility' basically means fitness for a purpose and this group consists of an extremely mixed and varied bunch, most breeds having been selectively bred to perform a specific function not included in the sporting and working categories. Some of the breeds listed in the group are the oldest documented breeds of dog in the world.	German Shepherd, Poodle, Dalmatian, Chow Chow, Lhasa Apso, Schnauzer.

Category	Characteristic	Examples
Toy	Small companion or lap dogs. Many of the Toy breeds were bred for this capacity although some have been placed into this category due to their size. They should have friendly personalities and love attention. They do not need a large amount of exercise and some can be finicky eaters. They are intelligent companions but owners must be discretionary with their attention as spoiled dogs can become protective of their owners. Ideally these dogs are extroverted companions and not untouchable ornaments.	Cavalier King Charles Spaniel, Chihuahua, Pekinese, Pug, Yorkshire Terrier.

Source: Kennel Club website: www.the-kennel-club.org.uk/

Gundog is the category likely to cause the greatest disturbance to wildlife, and birds in particular. They have been bred to search out and retrieve animals shot by the hunter. They are amongst the most ‘intelligent’ of the breeds and have also had the final killing instinct reduced because the game was required to be brought back unharmed (and so be available for human consumption). Spaniels, pointers and setters have been bred to run around in the undergrowth with the intention of ‘putting-up’ birds. The retrieving dogs such as the Labrador and golden retriever have been bred to go into the undergrowth – or water – to bring back the shot game undamaged.

Terriers have been bred to kill animals, usually in specific situations like holes and warrens. Other terriers (such as the bull terriers) were bred as fighting dogs, and these breeds tend to be favoured by people still undertaking these illegal activities.

Conversely, there are the non-sporting categories, whose instincts have been developed into other areas such as rescue, livestock work and those who are simply companion animals. It is much less likely that these will be interested in searching out birds and game. Even the Border Collie which has a highly developed instinct to round up animals, also has a strong instinct to watch and obey its handler’s commands and is the breed of choice for obedience and other competitions.

For all dogs, the attitude of, and training by, the owner plays a major part in how a dog will actually behave. Because the gundogs are also bred to be obedient, their instincts can usually be controlled and channelled elsewhere, for example, into chasing after and retrieving balls.

2.3.4 Dog ownership by breed

Your Dog magazine (2005) recorded the numbers of pedigree dogs registered by the Kennel Club by breed (for the 10 most popular breeds) in 2003 and 1995 (see **Table 2.2**). These were the top ten breeds in both years. However, these are for pedigree dogs in the UK and will not be representative of the total population of dogs in England, as many will be crossbreeds. Whilst Labradors remain the most popular pedigree breed, their dominance has become more pronounced – in 2003, almost three times more Labrador dogs were registered than any other breed, whereas in 1995, registrations of Labradors exceeded those of the next most popular (German Shepherd dog at that time) by only 50%. No data have been found that categorise popularity of different crossbreeds; given the wide range of mixes, often unknown provenance and difficulty of distinguishing between pure bred dogs (in some instances) this is perhaps not surprising.

Table 2.2: Numbers of pedigree dogs recorded by the Kennel Club by breed

Breed	2003	1995
Labrador Retriever	41,306	32,429
German Shepherd Dog	14,892	24,261
Cocker Spaniel	14,832	14,437
English Springer Spaniel	13,877	12,768
Staffordshire Bull Terrier	11,325	7,053
Golden Retriever	10,710	15,925
Cavalier King Charles Spaniel	10,614	14,449
West Highland White Terrier	9,823	15,331
Boxer	9,542	9,406
Border (2003)/Yorkshire (1995) Terrier	6,447	11,941

Mintel (2004) also provide data for the top 5 breeds (whether pedigree or not). These were:

- Labrador
- Border collie
- German shepherd dog
- Yorkshire terrier
- Jack Russell.

2.4 Dogs in the countryside – patterns of use and behaviour

2.4.1 Patterns of use

In order to understand the potential impact dogs may have on a site, the nature of dog use is relevant. Some counts from a variety of sources, both recreational surveys and those directed to exploring the effects of dogs on wildlife, have been collated in **Table 2.3**.

These figures suggest that day visit areas like the Peak District Moors see only about one dog per 20-25 walkers, although this has been higher, up to one dog to 13-15 visitors. There is some evidence (Anderson 1990) that there were more people with dogs on lower than on higher moors, which Defra (1999) suggests is related to the longer, rougher walks being undertaken on the higher compared with lower areas, although the reason for this was not given. In contrast, the level of use can be higher on more tourist-oriented sites such as the Scottish Forests listed, although the sample here was very small. Much larger numbers of dogs occur, however, on sites which are local to residential areas – one dog for every two to four (25-50%) walkers on sites close to residential areas. In some cases, the ratio of dogs to people was approaching one dog per walker on average.

Numbers of dogs in the countryside vary from around 1 dog for every 15 to 22 walkers (5 - 7%) in the uplands, and 1 dog for every 2 to 4 walkers (25-50%) on sites close to residential areas. In some cases, the ratio of dogs to people was more than 1 dog per walker on average.

Table 2.3: Range of dog numbers accompanying walkers on sites

Location	Period	Numbers	Comments	Author(s)
Six areas of Peak District heather moorland	1969	1 dog to 20 hikers (5%)	5.9% running wild	Picozzi 1971
Brook Meadow Hants	2004	44% of 100 visitors had dogs, 49 dogs altogether	Single day survey, most of dogs under control and on leads in this wet meadow site	Osborne 2004
Burnham Beeches	2003	42% of visitors at weekends had dogs, Average: 35%	Ave. nos. dogs/walker 1.4 Max. recorded per walker = 7	England Marketing 2003
Cairngorms	2004	11% of visitors have dogs		Cairngorms National Park Authority 2004
Cannock Chase	2000	27% of walkers had a dog	This is 22% of all visitors	Ball and others 2000
Chichester Harbour AONB Land-based Recreation Survey	2002/3	19% visited to walk dogs		Walton 2003
Cwmcarn Visitor Survey, Ebbw Vale	2002	11% of groups had a dog, 15% of respondents came to walk dogs	Forestry Commission land	Harper and West 2002
Dorset Heathlands: Analysis of the Heathland Visitor Questionnaire Survey	2004	45% of respondents visited to walk dogs	80% of dog walkers visited every day	Rose and Clarke 2005
Dorset Heaths	2004-5	62.9% ($\pm 29.4SD$)	Range 5 to 100%, 90.3% off leads	Mallord 2005
Glenmore and Abernethy Forests, Scotland	2004	21-26% of visitors had dogs	Two parts of the forest.	Summers and others 2004
Les Quennevais sand dunes, Jersey	1984	50% Wednesday 16% Thursday 16% Sunday	Most visitors are local and visit often daily (limited survey only)	Milwain 1984
Northants visitor survey, Maulden and Rowney Warren Forestry Commission sites.	2000	48% of all groups had dogs with them	29 of visitors had 2 1 dog, 13% had 2, 3% had 3 and 1% had 4 dogs with them.	Balachandran 2002.
Saltfleetby Theddlethorpe Dunes NNR	1997	200 dogs visit/day	11% on leads, 18% roaming widely	J Walker pers. comm.
Snake Pass, Peak District moors	1986	1 to 25 hikers (4%)	55% off lead April 69% off lead May 66% off lead over 2 months, 8% running wild	Yalden and Yalden 1988
Snake Pass, Peak District moors	1996	1 to 21 hikers	14% running wild, 58% off lead	Pearce-Higgins and Yalden 1997
Variety of Peak District moors	1986-7	1 dog in 22 people (4.5%)	51.6% on lead, 49.9% off lead	Anderson 1990
Variety of Peak District moors	1989 Easter to October	1 dog in 13 to 15 people (6.7-7.6 %)	28% off lead Easter, 32% at Whit, 51% in August, 38% in October	Peak Park Joint Planning Board 1989

The numbers of dogs on leads or under tight control (ie walking alongside the walker) and, conversely, the number running around and out of control, or the number running for sticks thrown by the visitor, is also very relevant. Again Table 2.3 provides an idea of the variation that can be expected.

The numbers of dogs off leads in the Peak District studies are of interest. The general average of about 50% of dogs off leads was noted from the 1986-7 surveys conducted by Anderson (1990), but variation between seasons was evident from Yalden and Yalden's (1988) counts, with higher levels in May than April (both in the bird breeding) season, but lambing takes place in April on these moors. In 1989 the National Trust and Peak District National Park Authority ran a 'Take the Lead' campaign, and the counts in 1989 suggest an impact of this with only 28% off the lead in April at Easter, and 32% at Whitsun in May, rising to the more normal 51% in August. (The low number in October cannot readily be explained).

The later counts by Pearce-Higgins and Yalden (1997) on the Snake Pass in the Peak District found that fewer dogs were off leads in 1996, 58% compared with the overall 66% that Yalden and Yalden recorded in 1986. This is still much higher than those that Anderson (1990) recorded prior to the 'Take the Lead' campaign.

The later counts by Pearce-Higgins and Yalden (1997) on the Snake Pass in the Peak District found that fewer dogs were off leads in 1996, 58% compared with the overall 66% that Yalden and Yalden recorded in 1986. This is still much higher than those that Anderson (1990) recorded prior to the 'Take the Lead' campaign.

Numbers of dogs off lead vary from around 50% to 90%, and can be reduced by campaigns like 'Take the Lead'.

2.4.2 Dog behaviour

This study focuses on the impact of dogs which are being taken for a walk or are accompanying the walker or hiker on longer walks in the country. There will be some dogs found on sites that have ventured there unaccompanied by their owner or minder, and Sime (1999) notes that these can travel in a 3-5 miles radius. Stray or feral dogs are also a factor. These have much greater impacts (eg Brickner 2003) since they hunt, often several together, to find food. This is a problem in many wildlife areas world-wide but one not shared on any significant scale by Britain and some other parts of Europe where dog ownership laws are relatively strict.

As far as domestic dogs are concerned, Sime (1999) points out that there are no peer-reviewed studies on the behaviour of dogs on or off leads in a recreational site setting, but anecdotal evidence suggests that this varies with training, breed, experience, stimuli encountered and owner attitudes (see Section 2.3 above). However, in general, she regarded the domestic dog as extending the sphere of influence of the walker, particularly if off a lead and running around. This also increases the unpredictability of disturbance, which can impact more on some species (Miller and others 2001, van der Zande 1984).

Dogs off the lead may be walking close to heel, or within 1-2m of their human companion, or they may mostly or occasionally be running wild, out of close control, away from the path. The greater impact on wild animals, especially birds and mammals, is likely to occur when dogs are running around freely, and not under close control beside their companion. Yalden and Yalden (1988) recorded 8% of the dogs running wild over the Snake Pass, whilst Pearce-Higgins and Yalden (1997) found that this proportion was higher in 1996 over the same area, with 14% running wild. The period of survey coincided with the bird breeding and lambing seasons from the end of March to mid July. They state that:

Numbers of dogs running out of control will vary from site to site but has been recorded on one site as being as high as 14%.

"The majority of dog owners continue to ignore the byelaws, which do not permit this (ie dogs not under close control) on access land and fail entirely to control their dogs."

Walker (pers. comm.) found that on Saltfleetby and Theddlethorpe Dunes NNR the number of dogs running around was higher than these moorland counts. Bearing in mind that this is a long (8.2kms) but narrow (250-350m wide) site, then the coverage by dogs is fairly comprehensive.

As noted earlier, dogs have not lost some of their original characteristic behaviour in relation to predation. They will search out potential prey by smell, mostly, and chase and sometimes capture and kill some (rabbits and hares for example), or seek out and eat items such as young ground nesting birds that cannot fly. The opinion of several moorland managers and keepers consulted in the Peak District was that any dog, unless it was too old or over-weight, could potentially be running around investigating any smells it finds.

In the open moorland of the Peak District, the same consultees felt that this sphere of influence could be as wide as 300-400m across a footpath, but could be less in more confined spaces or in woodland where walkers may try to keep animals closer to them so that they can maintain visual contact (Nick Squirrel pers. comm.).

Dogs can run 300-400m across paths when not in close control, and naturally seek out wild animals.

The same Peak District consultees also considered that if more than one dog were running around together, these would have a greater impact than a single dog, but would be disproportionately greater than the number of dogs would suggest as they interact with each other.

Bearing in mind that there are reports of an increasing tendency on some sites for large numbers of dogs to be exercised by commercial dog walkers, if some or all of these were off the lead, their impact could be greater than the same number of dogs with separate walkers. For example, England Marketing (2003) found one dog walker with seven animals.

Walkers often have more than one dog with them; groups of dogs running freely have been observed to be more interactive than dogs alone and so can have a greater effect on wildlife.

The species that could be affected by dogs running around would essentially be any that live or utilise the ground or low vegetation. Dogs do not climb significantly, for example into trees etc, although they can jump and cross walls, low hedges or up onto ledges etc. to explore an area. Dogs retain instincts to hunt and/or chase, and these instincts can be triggered in different settings given the appropriate stimulus.

Sime (1999) notes, however, that some dogs have lost the instinct to kill for food, and instead are more likely to chase and harass animals without necessarily killing or eating them. However, Yalden and Yalden (1990) found golden plover chicks that were killed but not eaten by dogs. This suggests that whilst all dogs will have an instinct to chase wildlife, this is not necessarily related to a need to catch prey for food. Moreover, even if this chase instinct is not activated, the mere presence of a dog may be a disturbance stimulus and agent of stress to wildlife.

The most vulnerable wildlife is ground dwelling. Dogs retain their hunting instincts, but do not always eat the 'prey items' found. Dogs can disturb and cause stress to sensitive animals.

There is increasing interest in the effects of dogs, as well as other types of recreational disturbance in Europe, North America and other areas as the pressure on sites for nature conservation and recreation increases as a result of urban expansion, industrial intensification and economic growth (Abraham undated). There are often conflicting interests among local stakeholders that complicate land management decision-making (eg Fawkes 2001, Abraham undated). This was evident in the different reactions of site visitors to the presence of dogs reported in the National Survey (see Table 9.11), with some visitors to sites taking evasive action to avoid dogs, whilst others welcomed their presence.

The direct or indirect effects of dogs on wildlife focus on the disturbance effects on birds and mammals in particular. There is little mention of the effects of dogs in the scientific or semi-scientific literature on other species groups in terms of disturbance.

2.5 Direct and indirect effects of wildlife disturbance: A conceptual framework

2.5.1 How an animal may perceive a dog

As part of the assessment, it is important to consider how the animal involved may perceive a dog. This seems to be related to whether the animal is programmed or had experience of the dog, or canids¹ in general as predators and to the behaviour of the animal affected in relation to this perceived threat. Frid and Dill (2002) have put the notion of risk aversion behaviour into context in relation to disturbance from human-induced activity in general rather than from dogs in particular. However, this provides the conceptual framework against which the more specific research related to dogs can be judged.

From the rich literature on animal behaviour (including mammals, birds and fish), the authors suggest that when the animal encounters any kind of disturbance stimulus, it should follow the same principles used by prey in their response to predators. This suggests that responses should be stronger when the perceived risk is greater. However, the level of perceived risk is likely to result from a combination of factors.

Gill and Sutherland (2000) argue that disturbance stimuli and predation risk indirectly affect survival and reproduction through trade-offs between perceived risk and energy intake.

Disturbed animals respond to dogs as if they were predators.

It could be argued that disturbance is usually a non-threatening stimulus, but Frid and Dill (2002) point out that many animals have developed anti-predator responses to a variety of stimuli such as loud noises or rapidly approaching objects, even if they are not predators. In addition, the risk of predation differs from predation itself. Death is obviously the outcome of successful predation and so animals will take action to reduce this risk to ensure their survival. However, degree of predation risk varies and a potential prey victim has to decide at what point it needs to take action. But, any action carries a cost (in terms of feeding opportunities foregone and/or energy cost of flight). Therefore, the decision made by the potential prey has to balance the rate of resource acquisition or other activities against the need to reduce the risk of death. The anti-predator behaviour is also affected by how close to cover or safety the animal is, the distribution and abundance of predators (they may flee at a longer distance if several predators rather than one is approaching), and the behaviour of the predators (whether they are hunting for the animal or not).

Frid and Dill (2002) take the argument further and, based on the literature on animal behaviour, predation and disturbance, suggest that fleeing probability and flight initiation distance, as well as the amount of time spent being vigilant, increase:

- when the disturbance stimulus approaches more directly;
- when distance from a refuge is greater;
- when the cost of fleeing is lower (eg the habitat in which it is feeding is poor, and there are better ones nearby).

Disturbance response probability increases if stimulus approaches more directly, when the distance from a refuge is greater, and the cost of fleeing lower.

¹ See Glossary for technical terms

However, the literature is ambivalent on the theory that disturbance behaviour is initiated more quickly if the approach is more rapid, or the agent of disturbance is larger.

Vigilance levels amongst different species are not consistent in relation to the size of the group that causes disturbance (a group of bird watchers versus one for example), and when the disturbance remains close to the 'prey'. Frid and Dill (2002) observe that a variety of species have been found to spend less time in resource-rich habitats where these are associated with danger. However, Gill and others (2001) present a predation risk framework that suggests that such species would only leave the resource-rich area if there were others in the vicinity within the range of their knowledge. There are a number of studies that show, for example that some bird species react less to disturbance stimuli than others, and remain on the site in which the stimuli occur. Gill and others (2001) suggests that these are not necessarily the less susceptible species, but could be those that have no other resource-rich habitat within their range to which they can move.

Several researchers have recorded no behavioural responses for example to disturbance yet found that a population was less fit or breeding success was reduced as a result of it, (Fernández and Azkona 1993, Beale and Monaghan 2004). Only studies that show the longer term population demographic trends would be able to show whether these species are affected significantly or not by disturbance.

With respect to habitat selection, Frid and Dill (2002) conclude that long-term disturbance will cause habitat shifts at the cost of access to resources, and these can result in density-dependent processes in the new habitat that could affect the demography of the species. However, when the habitat provides some feature that cannot be found, or is of lower quality, elsewhere within the animal's range, then it is more likely to remain in the disturbed site, with the net benefit of remaining outweighing the costs of moving.

When considering issues related to parental investment, a parent animal that has been disturbed by a dog (or other predator) has to make decisions on whether to defend its young and face potential death, or whether to flee and expect its future reproductive ability to compensate for the loss. If young are deserted, then there can be secondary effects such as predation by other animals (such as crows that have been noted to follow closely where human activity is greatest, Murison 2003, Lafferty 2001, Watson 1988), or they can die of cold.

A number of studies have shown this relationship to disturbance (eg Tremblay and Ellison 1979, Pienkowski 1984, and others quoted by Frid and Dill 2002), although none of these implicate dogs specifically.

There is also the suggestion that some of these predators can learn to associate visitor disturbance with higher feeding opportunities. Strang (1980) tested this ability for glaucous gulls and two species of jaegers (skuas) in the tundra associated with research into wildfowl breeding. The only disturbance was that by the researchers. Only parasitic jaegers were found to follow the human who was recording the wildfowl nests, but other gull species have been known to follow parasitic jaegers to benefit from their prey finds. Not all these predators however, destroyed all the eggs or chicks in a nest.

MacInnes (1980) confirmed Strang's findings, and even comments that he could always find his fellow researcher in the McConnell River area 4km away by the circling jaegers above him. This finding is shared by Picozzi (1975) who

Vigilance levels amongst different species are not consistent between different species and in relation to the size of the group that causes disturbance (a group of bird watchers versus one for example), and when the disturbance remains close to the 'prey'. There is an inconsistency in response to disturbance effects between different species and different group sizes for that species.

If parents desert a nest or young (if only temporarily), they are vulnerable to opportunistic predation by other species.

Some opportunistic predators eg corvids have learnt to associate disturbance (not just by dogs) with available prey.

tested the ability of crows in Scotland to find cryptically coloured artificial eggs in nests on heather moorland that were or were not marked by a cane 5m away. The marked nests were ‘predated’.

Frid and Dill (2002) consider that high levels of predation risk may affect survival and reproduction by causing disturbed animals to divert a large proportion of their time and energy to investment in anti-predator behaviour rather than resource acquisition (for themselves or their offspring). In such a scenario body condition can deteriorate, and this would affect survival and reproductive rates. Animals in poor condition could also be subjected to greater predation rates.

The authors quote a number of papers to support this, such as Madsen (1995) who found a reduction of breeding success of pink-footed geese from 46% in undisturbed areas to 17% where they were continuously moved off arable fields by farmers.

High levels of disturbance (from all sources) may affect survival and reproduction.

It is possible that the response taken by the threatened animal could follow theoretical predictions based on parental investment theory (Frid and Dill 2002). This predicts that parents with low residual reproductive value (essentially r-strategists) would compromise provisioning of young less than self-feeding, whilst parents with high residual reproductive value (k-strategists and younger animals) would do the opposite.

A variety of the authors of relevant papers give disturbance distances for a number of species, which are quite variable. **Table 2.4** summarises those available, but more research or observation will be needed for other species specific to the site in question.

Table 2.4: Disturbance distances for a variety of bird species

Species	Disturbance distance	Author
Capercaillie	75m minimum breeding season	Marshall 2005
New Zealand dotterels	Dogs 100m from nests, people 50m on busy beaches, 70m on remote ones at minimum	Lord and others 2001
Snowy plovers	Breeding birds react at 80m, wintering 30-40m	Lafferty 2001
Golden plover	50m once Pennine Way was surfaced for breeding birds	Finney and others 2004
Dunlin	50m for breeding birds	Yalden and Yalden 1989
Piping plover	160m disturbed chicks	
Nightjar	fewer nests 100m from paths	Liley and Clarke 2003
American robin	9–26m to dog in breeding season	Miller and others 2001
Western meadowlark	18-33m to dog in breeding season	Miller and others 2001
Vesper sparrow in US	10-15m to dog in breeding season	Miller and others 2001

2.5.2 Effects versus impacts

Finally, it is important to distinguish between an effect and an impact, as Robinson and Pollitt (2002) point out. An effect is an observed response, ie an acute behavioural or distributional response by an animal to a given disturbance. Thus an animal may move, feed elsewhere, or generally avoid the sources of disturbance, but without any apparent long-term effect on the population of its species. An impact, on the other hand, implies a significant reduction in the ability to survive due to reduced body condition, productivity and, ultimately, survival. Such negative impacts at the population level would

be of primary nature conservation concern, either at the site level, or of greater importance, at the wider regional or national scale.

As Frid and Dill (2002) point out, there are very few studies that model or predict the impact of disturbance on population levels of the species affected. However, this background context is very relevant to the following discussion of the impacts of dogs on various species of wildlife.

Behavioural responses are effects, whereas impacts induce a long term population change which could be significant.

2.6 Effect of management measures

Dowling and Weston (1999) found that fencing round an area of foredune and fencing off a primary dune to protect breeding hooded plovers in Mornington Peninsula National Park, Victoria, Australia, were not successful because the birds did not breed in the protected areas. Fencing off tracks and closing unofficial paths (so that people entered the beaches in prescribed locations) was more successful as it reduced overall disturbance and concentrated it in smaller areas.

A combination of measures was successful at one site and involved reducing overall disturbance by restricting people to prescribed areas, signs giving advice about appropriate behaviour and wardening. People complying with the guidance were thanked.

This was combined with signs asking people to keep out because of ground nesting birds. Another successful approach was to erect signs stating:

‘Temporary beach closure due to hooded plover nesting in this area: human disturbance on the beach or the dunes will cause breeding failure’.

This was backed up with signs asking people to move quickly along the beach edge, not to sit in the area, and that dogs and horses were strictly prohibited. This was supplemented by a ranger presence, and visitors were thanked for their co-operation. Compliance with this set of measures was described as good but not universal.

Dowling and Weston (1999) also describe a plover watch scheme which involved volunteers asking people not to approach a breeding site and to control their dogs, and providing some interpretation information. This was a labour intensive programme, with 12 hour shifts for 28 days. Unfortunately resources were not sufficient to maintain a high enough level of vigilance.

Lafferty’s (2001) experience of ensuring compliance with regulations was similar to those of Dowling and Weston. There was already a regulation to keep dogs on leads on the beaches where he studied disturbance on snowy plovers, but this was not enforced and rarely observed by the visitors. Lafferty noted that with signposting about 21% of dogs were leashed (as opposed to 7% without), but that on another site, this rose to 30% with moderate enforcement – a presence on site for 15% of daylight hours. 100% of dogs on leads was only achieved with full-time enforcement by rangers etc. However, many of the dog walkers also moved to adjacent beaches to let their dogs off.

At a number of beach sites, signs asking for dogs to be kept on a lead increased compliance by three fold compared to no signs, and by four fold with moderate enforcement. Total compliance was achieved only with full time enforcement by rangers.

On Dawlish Warren NNR, a dog ban was implemented in April 2002 in the more remote parts of the reserve to coincide with a large high tide roost site and breeding wader habitat. The ban, together with two successful prosecutions, has successfully reduced disturbance. The dog walkers have moved their activities to other areas, and total visitor use has also been reduced (Philip Chambers pers. comm.).

3 Dogs and birds

3.1 Key points

3.1.1 Effects on breeding birds

- **The research suggests fewer pairs of breeding birds settle in areas with high disturbance levels where dogs are present in the disturbance zone.**
- **All the breeding birds affected are ground nesting.**
- **There were significant increases in breeding success of a beach environment when dogs (but not other recreational activity) were managed showing that dogs can have a significant effect.**
- **Lekking bird species could be significantly affected by dogs and human visitors but no relevant research has been found for British species.**
- **Dogs, especially those off a lead, stimulate a greater behavioural response than walkers, and for some species, also than joggers. Only Eurasian dotterel shows no effects.**
- **The increased levels of opportunistic predation associated with corvids in particular would appear to be the greatest risk resulting from disturbance.**
- **Dogs consistently flushed ground-nesting birds off their nests earlier and for longer than recreational disturbance. Eggs are more readily taken from waders and nightjar, but woodlarks suffered greater predation of chicks than eggs.**
- **Most diurnal predators are aerial and nocturnal ones are terrestrial. Dogs are mostly daytime visitors. Thus the reaction to an intruding dog exposes the bird to aerial predators.**
- **Some non wading bird species have not been shown to be sensitive to disturbance by dogs; these include the American blackbird (a shrub-nesting species), a lark and a sparrow species (both ground nesting) in forest and meadows respectively in the United States. However, European blackbirds were affected by disturbance in Spain, and dog walking was part of the activities. However, in none of these studies was breeding success studied.**
- **Marsh harriers affected by disturbance by walkers and dogs produced less fit young, although there were no detectable behavioural responses. This effect needs to be researched for other species.**
- **More species need to be investigated, especially ground nesting ones like skylark.**
- **It is possible that the disturbance effect will increase in proportion to the number of visitors plus their dogs, and proximity to the bird or its nest. This has been found for walkers for two coastal nesting birds, but not tested directly for dog activity.**

3.1.2 Wintering birds

- **Dogs can have a greater effect on wintering birds, than walkers or, for some species, joggers.**
- **Different species seem to be more tolerant of approach than others, with distances at which a disturbance reaction occurs differing widely.**
- **For one species this response distance is half that of the birds in the breeding season.**

- **The research has focused on waders, and some wildfowl. None addresses any effects or impacts of dogs for other birds. Since ground nesting birds have been found to be most vulnerable, these might be expected to be equally susceptible in winter.**
- **There is no clear impact identified at the population level but there are a number of suggestions that birds have vacated sites when disturbance became too great. Generally these do not separate out dogs as a factor, although they are present on many sites.**
- **Since the reaction to dogs by wading birds has shown more flushing, longer absences from the nest, and greater reductions in feeding time, then it follows that if birds have abandoned sites, this could be attributed more to dogs than other activities if both are present, and in significant numbers.**
- **A reaction to dogs has an energy cost, which is particularly important in winter if resource acquisition is limited, or if winter conditions are particularly severe. Compensatory feeding is found in some species, for example, at night.**
- **Whether dogs impact on species or not will depend on the habitat involved (because of their effect on patterns of human behaviour), the numbers of dogs, frequency of disturbance, the sensitivity of the species and bird condition.**

3.2 Introduction

There has been very little experimental research into the effects of dogs compared with other forms of disturbance on wildlife in general or birds in particular. Only two studies have been found that use dogs as the experimental treatment and compare this with other disturbance activities (Miller and others 2001, Lord and others 2001), but there are others that have measured the levels of use on sites where dogs, or walkers with dogs, have been counted, and the impacts have been described and evaluated. Some of these also differentiate between whether dogs are on or off a lead.

Most of these studies relate to the effects of dogs, compared with other user groups, on birds, both on breeding and wintering species, and the work is concentrated in, but not exclusive to, North America.

The range of research on dogs and disturbance is limited.

One aspect that these studies do not cover is the potential for a disturbance effect or impact on birds to be related not just to an individual dog and walker and their distance from the species or its nest, but to a variation in numbers. Beale and Monaghan (2004) for example, although not mentioning dogs, tested the hypothesis that human disturbance effects would be increased with increasing numbers of visitors, and decrease with distance from a nest.

They found this to be true for breeding colonies of kittiwakes² and guillemots having taken other factors affecting breeding success into consideration. Both suffered decreased breeding success with higher numbers of visitors that also came closest to the nests. Importantly, this study did not show any behavioural responses that were recorded in relation to the levels of disturbance.

It is important to consider disturbance levels and proximity to birds as interrelated variables.

This combination of numbers and distance needs to be separated out from issues related to sites that are regularly or infrequently disturbed, which sometimes show the opposite effect. For example, grey herons at a fish farm reacted more strongly to infrequent severe disturbances than to where disturbance was less severe but more regular (Draulans and van Vessem 1985).

² Scientific names of species mentioned in the text are provided in Appendix 1

There is the potential for dogs to affect birds in a number of ways. Effects in the breeding season need to be separated from those in the non-breeding period. It is also important to identify when in the breeding season any effects are recorded. These could relate to:

- the territory, nest site selection, or nest building period;
- egg laying/incubation period;
- the nestling phase; and
- when fledglings are present.

Breeding birds could be affected at all or any of these stages in the breeding cycle, but impacts could differ between them since, for example, it has been shown that the further the birds are into the breeding season, the less likely they are to desert their eggs or young (Myrberget 1983).

The further birds are into the breeding season, the less likely they are to desert their eggs or young.

In addition, different bird species could be differentially susceptible to effects of dogs. It is well known for example, that the breeding Eurasian curlew is one of the most sensitive species to disturbance, flying up at distances of up to a kilometre from the intruder (van der Zande and others 1984). On the other hand birds such as grouse and dotterel sit tight on eggs until the last moment. What is not clear, however, is whether this difference in behaviour results in different degrees of impacts of disturbance based on the theoretical exposition outlined above, whether a dog is present or not.

However, the research available does not cover all species equally, nor all the stages in the reproduction cycle identified above. Inferences will need to be made from one to another as a result.

Birds could be affected at any stage of the breeding cycle.

The concern for non-breeding birds, especially those that migrate, relate to the energetic cost of disturbance (Woodfield and Langston 2004). Increased flight or alarming, reduced foraging time, or movements to other sites caused by disturbance by people with or without dogs could all incur an energetic cost. In some cases, such losses could be compensated by alternative strategies such as feeding at night time, or moving to undisturbed sites, provided the feeding resource was sufficiently rich. There could also be an issue of increased predation, as described here for many breeding birds.

If the birds could not replace the extra energy used reacting to disturbance, then their chances of survival may be reduced, or sites traditionally used by the birds could be abandoned (Woodfield and Langston 2004).

Energetic costs of disturbance are the key concern for wintering birds.

Another difficulty with the literature is the measurement of disturbance. This differs between studies and makes comparisons between studies, and inferences from them to others and to practical site management issues difficult as well. Furthermore, it is important to distinguish the significance of the effects recorded.

In many studies general disturbance is identified as having an effect on the birds in question. Only in a very few is the significance of this modelled or assessed at the population level either for the site in question, or for a region of the country.

Disturbance is measured variably making it is difficult to compare across studies. Effects at population level have been studied in very few species.

However, Sime (1999) states that despite this, *“even at the individual scale, impacts should not be summarily dismissed as insignificant, particularly in the light of the limited information available at*

present”. One reason given by Sime for this is that the visitor often places great value on the individual rather than the population, whereas the manager may be more concerned about the longer term population of a species. Both levels of analysis, she submits, are warranted. This is also important when the nature conservation value of individual sites is considered. Sites of Special Scientific Interest (SSSIs) or other nature conservation sites are selected for their specific habitats and species, and if they lose any, or their populations are significantly reduced through disturbance, then the value of sites would also be reduced. This would be contrary to the nature conservation objectives, to government commitments in terms of attaining Biodiversity Action Plan targets, and in achieving favourable condition for SSSIs.

Moreover, as many visitors also wish to see the habitats and species of nature conservation value as part of their recreational experience, the reduction of any at the site level would also affect the value of this.

Even if disturbance does not affect species at the population level, numbers on designated sites are important for conservation and for people to enjoy.

With this background in mind, the following account separates out the effects found in the literature as far as possible between breeding and non-breeding birds.

3.3 Breeding birds

3.3.1 Waders

Golden plover

There are a number of studies where dogs have been highlighted as having a greater effect on breeding birds than walkers without dogs. Yalden and Yalden (1990) studied disturbance effects on breeding golden plover on the Snake Pass moors astride the Pennine Way in the Peak District, Derbyshire. They found that the birds flushed more readily in the pre-incubation period, and when people were within 200m of them. However, this flush distance was consistently greater when a dog was with the walker, as shown in **Table 3.1** below (adapted from Yalden and Yalden 1990).

Table 3.1: Flushing distance of golden plover by dogs or walkers

Dogs present or not	Golden plover flushed 0-9.9m	Golden plover flushes >10m	Total events
Dogs present	37%	63%	27
Dogs not present	68%	32%	69
$\chi^2 = 7.77, p = 0.006:$	Fisher's Exact $p =$	0.01	

Once incubating, golden plovers remained on the nest 96% of the time in which they were disturbed (as detected using temperature probes in the nests), but would have incubated for 98% of the time if undisturbed.

During this phase, they were flushed more readily from the nest by dogs (8 out of 13 disturbances for 6 nests) than by people without dogs, and took longer to resume incubation if people or dogs were present, compared with returning to incubate after, for example, feeding.

Flushing distance when birds re-settle is greater when a visitor has a dog, than for an unaccompanied walker.

Very young chicks are very vulnerable to death through a number of causes, according to Yalden and Yalden (1990), but older ones are more robust. However, the authors recorded three older chicks as having probably been killed (but not eaten) by dogs.

Yalden and Yalden (1990) conclude that golden plover are most sensitive in the pre-incubation period resulting in avoidance of highly disturbed areas.

Dogs flush incubating birds more than walkers without dogs, and dogs can kill well grown chicks.

This was also found for dunlin by Finney and others (2004) in the same area when they compared the number of dunlin nests before and after the Pennine Way that traversed the study area had been surfaced, and its trampling width reduced from up to 100m to a flagged path.

Breeding pairs increased by 50% after the resurfacing works, and the reduction of the width of the band of disturbance. This disturbance would have been by people and dogs.

Golden plover and dunlin avoid heavily disturbed areas.

Yalden and Yalden (1990) found for golden plover that sitting birds are generally less sensitive or reactive to disturbance. There was also very little evidence in this study of nest predation. However, golden plover's greater sensitivity to dogs than people is a cause of concern. The study area is well-used by visitors (the Pennine Way passes through it), and disturbance occurs throughout the day from 09.30 to 18.30, with about 300 dogs, (60% off leads), using the area during the breeding season. The low hatching success in 1988 (when half the eggs in active nests failed to hatch) could be attributed to these levels of disturbance.

Yalden and Yalden (1990) calculate that the energy cost for the adults of the alarming response to disturbance post hatching might make chick guarding some 15% more expensive than where there is no disturbance (walkers with or without dogs).

In addition, birds breeding close to disturbance moved their broods to quieter areas, but then interacted strongly with the resident pairs there, which would have used up more energy. There are also likely to be costs to the chicks that are in cover rather than feeding during such disturbance, but these could not be calculated.

There were energetic costs of being disturbed, and of moving young away from disturbed areas.

Pearce-Higgins (*in litt.*), using data presented in Pearce-Higgins and Yalden (2003), has updated Yalden and Yalden's studies on the Snake Pass after the Pennine Way had been restored to a flagged path. Of the 22 chicks radio-tagged from 12 broods, two appeared to have been killed by dogs, suffering bruising and bite marks but not being consumed. From these data, a very tentative estimate of the daily survival rate of dog predation has been calculated by dividing the number of chick-days survived, by the number of chick-days observed (excluding instances when chicks died from other causes). The resulting survival rate of 0.9930 suggests that there is a 23% probability of a chick that would otherwise survive to fledging being killed by a dog.

This calculation is based on only a small sample of the dog predation at Snake Summit, which has high use by dog walkers. Although owners are meant to keep their dogs on the lead, 58% do not and 14% were running wild during the breeding season in the study years of 1994-6 (Pearce-Higgins and Yalden 1997). Were dog predation eliminated, the proportion of chicks surviving to fledging of 20.8% at Snake Summit (Pearce-Higgins and Yalden 2003) could increase to 26.7%. This change would increase the modelled population growth rate of 1.02 (Pearce-Higgins and Yalden 2003) to 1.07. This gives a rough indication of the maximum magnitude of any change in breeding success and population trend that may occur as a result of opening up a currently unused site to large numbers of dog walkers.

The loss of potentially 1 in 4 or 1 in 5 chicks to dogs, on top of 'natural' predation levels is very high, but needs more quantitative work to confirm the scale.

Without disturbance golden plover population growth rate would be 1.07, instead of 1.02.

Other plovers

The enhanced effect of dogs compared with humans with no dogs is also noted by Hoopes (1993) (quoted in Sime 1999). In a study of piping plover in the USA in their beach breeding habitat, adults and chicks responded to disturbances for 8% and 15% of their time respectively, but dogs within 50m stopped them feeding for 52% of the time compare with only 31% for humans. Staine and Burger (1994) found a similar decline of 36% of time devoted to feeding and 27% decline in peck rate as a result of human disturbance on piping plover on east coast American beaches, but did not distinguish between the effects of dogs and people.

Hoopes (1993) also found that the response distance was greater for dogs (46m) compared with humans (23m). Hoopes documented a 33% mortality for chicks, but neither the percentage of chicks fledged nor the mean number of chicks per pair were significantly correlated with disturbance rates. Nevertheless, management was recommended that restricted dogs (and off-road vehicles), and provided refuge areas for chicks.

Disturbance of piping plover was greater by dogs than humans, with greater disturbance distances, and resulting in reduced feeding.

Pienkowski (1984) also found that dogs contributed to clutch losses for ringed plovers at Lindisfarne and St Cyrus NNR. A dog was considered to have taken an adult bird, and dogs were deemed to be responsible for the loss of five clutches, and possibly another three (about 5%) out of a total of 172 clutches over two years on three areas. Crows were the major predator, taking 34% of clutches. Pienkowski suggests that the disturbance effect of humans potentially gives a considerable advantage to diurnal predators such as crows or gulls, and that scent trails by humans or dogs to birds or nests can assist nocturnal predators such as foxes, stoats or weasels. Dogs are not singled out, or separated from counts of human disturbance, but Pienkowski found that survival of ringed plovers at Lindisfarne to hatching was highly correlated with the levels of human disturbance (see **Table 3.2** below).

Table 3.2: Nest survival of ringed plover on Lindisfarne in relation to disturbance

Site	Nest survival % 1976	Nest survival % 1977	Distance from car park	Number of human visitors/day
Old Law	43	58	3-4.5km	c.5
Ross Back Sands	21	33	1-2.5	<50
Snook	1.4	2	0-0.7	>100

Adapted from Pienkowski 1984

Pienkowski considered that unintentional disturbance of visitors plus their dogs was more serious than direct loss of eggs. Incubating birds normally left their nest when humans or dogs approached, and the more often this happened, the more opportunities crows had to predate the eggs. Carrion crows were seen using vantage points to watch for movements of disturbed birds. Ringed plovers normally crouch under cover and rely on camouflage when faced with an aerial predator, but are flushed by ground disturbance caused by humans and dogs.

Additionally, ground predators are usually nocturnal on Lindisfarne. This means that the crows are provided with an advantage they would not find in undisturbed colonies.

Corvids and gulls are the main opportunistic predators and some can learn to associate recreational activity with feeding opportunities.

An equivalent interaction between visitors and predation has been recorded for black oystercatchers and egg predation by gulls in South Africa, and for dunlin and gulls in Scotland (Summers and Cooper 1977, and Hobson 1972, quoted in Pienkowski 1984), for great crested grebe in the Wadden Sea in Germany by Schulz and Stock (1993) and for great crested grebe in Switzerland (Keller 1989).

A number of other studies have also questioned whether crows or other similar types of diurnal predators are increasing the predation levels. Pearce-Higgins and Yalden (2003) tested this by examining golden plover productivity on a managed grouse moor where crow control is conducted as part of normal moorland management. They found that there was a low level of nest predation by crows and other predators at the Snake Summit in the Peak District, despite its regular use by large numbers of visitors (Pearce-Higgins and Yalden 1997), although survival was compromised by exposure in poor weather and starvation rather than predation. However, those nests that were predated were still largely taken by crows (seven out of eight where eggs were lost).

Predation resulting from disturbance is less where predators are controlled.

A more recent study by Liley (1999) is one of the few that has attempted to model the impact of disturbance on a population, in this case, of ringed plover breeding on the Norfolk coast. Liley counted the number and type of activities along nine kilometres of a beach divided into 120m-long sections from February to August 1996. He found significantly more people, dogs and specified activities (for example sunbathing, picnicking etc.) associated with access points, and thus could describe the beach where the ringed plover colony was nesting as busy, moderately busy or quieter.

Nesting ringed plover avoided sections of the beach where the mean number of walkers (the main user of the beaches in the breeding season) at each counted exceeded 20, and dog presence was more than about two. However, by ringing birds, Liley (1999) found that older birds avoided the more heavily used sections more than younger birds, which he interpreted as a possible learned response. Conversely older birds might be more successful at holding the most suitable (undisturbed) sites, although Liley did not suggest this. Territories were also smaller where there was less disturbance, but territorial behaviour was not affected.

Of all nests, 8.5% were lost to human activity (whilst 33% were lost overall), but dogs were only mentioned as eating one chick. Nest loss was highest on the sections of greatest disturbance from walkers and dogs. Compared with nest loss, chick hatching, survival and chick growth were not affected by visitor use, or by dogs. Disturbance by dogs and people resulted in the parents invoking broken wing displays, whilst aerial predators were mobbed in the air.

Liley (1999) predicted from his model that if the direct loss of nests from human activity were removed, population size would increase by 8%, whilst if all human-related disturbance were removed, the population could increase by 85%, demonstrating that disturbance is constraining the ringed plover numbers. However, the role of dogs in this model was not separated from other disturbance activities.

Disturbance, of which dogs were part, had a major impact on a ringed plover breeding population in one study.

Lafferty (2001a) reports that the western snowy plover in America has been lost from 52 of its former 80 western US coastal nesting sites, and quotes a number of studies suggesting that this is largely due to disturbance by a wide variety of activities including dog walking. He was studying wintering snowy plovers, but noted that they were only half as sensitive to disturbance as breeding ones at Vandenberg Air Force base, where they were disturbed more readily and at double the distance (80m compared with the average of 40m for wintering birds).

Western snowy plovers have vacated a number of breeding sites possibly due to disturbance. Breeding birds shown to be twice as sensitive as wintering ones.

He also notes that breeding snowy plovers deserted a particular beach when it was opened to the public, but continued to winter there for 30 years before abandoning it permanently, coincident with increasing levels of disturbance. Dogs are not mentioned specifically here, but Lafferty studied their effects in more detail on wintering snowy plovers (see below).

The hooded plover has been the subject of disturbance studies in Victoria, Australia by Dowling and Weston (1999). An estimated 2.5 million visitors use the Mornington Peninsula National Park and its 28km of coastline. Dowling and Weston (1999) instigated five different management strategies – no dogs from 09.00 to 17.00 during the breeding season, no dogs at any time, a programme of controlling and educating visitors, no dogs or people, and dogs permitted at all times. Over 7 years, territories and breeding success were checked for 171 nests. 60.2% failed to produce chicks, with 51.2% of nests trampled on beaches where human activity was concentrated. The trial management was found to result in significant differences.

Monitoring the 128 chicks that were found showed that only 27.3% fledged, with the failure believed to be related to the presence of dogs on a site. When dog management was put in place, the chick hatching and pre-fledging survival rates were significantly higher (see **Table 3.3** below). These were the main stages of failure for the hooded plovers where dogs were not managed.

Managing dogs had a very significant effect on breeding success of hooded plover in Australia on a beach habitat.

Table 3.3: Survival Rates under different management regimes

Management	Numbers of clutches monitored	% successful clutches	Mean numbers, fledglings/clutch
No dogs 9.00 to 17.00	82	12.2	0.2
No dogs	5	40.0	0.6
Plover watch (asking people not to use the area)	13	30.8	0.3
No dogs or people	22	36.4	0.7
No restrictions	49	0.0	0.0
Total	171	35	0.2

Source – adapted from Dowling and Weston 1999

Dotterels

Lord and others (2001) studied the impact of human disturbance on nesting northern New Zealand dotterel, which is an endangered shorebird in the country. This study used walking, running (to mimic joggers) or leading a dog as experimental treatments from 200m away to 5m from a nest, and then measured flush distance, length of time parents were off the nest, and distraction display intensity. Efforts were made to minimise the effect of the experiment since the birds are rare, for example, by not applying treatments in wet or windy conditions, and allowing a 2-hour gap between approaches of the test treatment. Nests were tested during early or late incubation. These treatments were tested on beaches in North Island New Zealand with low (0-3 visitors/hour), and high (7-20 visitors/hour) use. Leading a dog proved to cause the greatest disruption of breeding (even though it was muzzled and on a lead):

- the birds were flushed at significantly longer flush distances (mean 93.7m,) when approached by the dog + walker, than the walker or runner (mean distance 64m, $\chi^2 = 7.6$, $p < 0.006$);
- incubation was disrupted for longer (mean 4.8 mins) by dogs + walker, than by the walker or runner (mean 3.4 mins, $\chi^2 = 14.6$, $p < 0.001$);
- incubation was disrupted for longer periods with the dog on beaches that had low visitor numbers.

The study did not measure breeding success but alluded to other studies such as that of Pienkowski (1984), which had suggested increased thermal stress and predation rates resulting from the disturbance found.

New Zealand dotterel more sensitive to dog + walker than walker alone or runner.

It is possible that dogs are seen by waders as predators more than humans, as dogs can catch and kill them. Dogs can find nests through their keen sense of smell, even though the dotterel eggs are very well camouflaged. Lord and others (2001) suggest that free roaming dogs could behave in a much more exploratory manner than a muzzled and leashed one, and therefore engender a much more pronounced response from the birds. As flocks of New Zealand dotterel did not react more strongly to larger groups of people, it is suggested that it is the presence of the dog that has increased the disturbance effect.

Waders may react to dogs as a more threatening potential predator than humans.

Lord and others (2001) did note that birds nesting on busier beaches seem to habituate to disturbance more than those on low use beaches.

Evidence for habituation by birds to disturbance is mixed. Some species do exhibit habituation to high levels of disturbance whilst others show an increased sensitivity to disturbance when at high levels.

This result is not shared by Lafferty (2001a) who found an increased sensitivity with repeated disturbance of snowy plover in California. There could be a difference between breeding birds and migrating species that has not yet been tested.

Watson (1988) studied Eurasian dotterels, in relation to disturbance, on the Cairngorm Plateau. He counted people plus dogs in sectors of the Cairn Gorm as well as dotterel spring densities and breeding success.

Dotterel densities were not correlated with people or dog density, nor with year (the surveys covered the period 1971-80 when visitor use was increasing). Numbers of people varied between 0.1 and 6.8/km²/count. The number with dogs is not separated in the figures given. Watson attributes the lack of relationship to the fact that dotterel remain on the nest and do not react to disturbance until the last moment when approached (exhibiting a comparable behaviour as grouse). However, Watson did note that crows, which had rarely been seen in the arctic-alpine zone before the 1950s, had increased significantly after 1953 when the first ski facilities were provided. The crows followed the visitors, feeding on picnic scraps, and had been seen to rob a number of nests.

Whitfield and others (in press, quoted in Woodfield and Langston 2004) have corroborated Watson's earlier work on dotterel and found no relationship between nest location, hatching success or post fledging survival and footpath proximity or numbers of people and dogs. They did suspect a dog of taking one clutch, but blamed mammals and birds for the main cause of nest failure, followed by desertion due to snow.

Not all ground nesting waders are equally affected by disturbance. For example, there are no observed effects of disturbance on Eurasian dotterels.

Anecdotal comments

The only other comments found about breeding waders and the impact of dogs are summarised below in **Table 3.4**. These anecdotal reports cannot attribute the lack of dogs specifically to the increases in bird numbers witnessed, but the patterns found are in line with the research findings presented above.

Table 3.4: Anecdotal comments on breeding wader numbers and disturbance with or without dogs

Species	Comment	Source
Breeding waders	3 pairs successful on Dawlish Warren NNR after banned dogs in more remote parts of sand spit. None had bred before	P Chambers pers. comm.
Curlew, dunlin, golden plover	Increased numbers 2001, foot and mouth, Snake Summit, Peak District, birds settling on territories while moor closed. Highest counts of dunlin and curlew since 1972	Questionnaire survey, PAA 2003
Lapwing	Howden Moors, Peak District, declined in 2002, higher 2001 no access	As above
Lapwing	Returned to breed in Ashdown Forest, Sussex, due probably to reduced dog use inside grazed fenced areas, the grazing itself and increased food supply related to grazing.	Marrable 2003

3.3.2 Non-waders

There are few papers where non-wader bird species have been subjected to experimental disturbance involving dogs. However, the effects of dogs are mentioned regularly in the literature, as summarised in **Table 3.5** below.

Table 3.5: Summary of the effects of dog disturbance on other breeding birds

Species	Location	Comment	Source
Blackbird	Spain urban parks	Flushed more by pedestrians and magpies than by dogs, activity levels (eg feeding) of blackbirds decreased, density decreased with higher levels of human use.	Fernández-Juricic and Tellería 2000
Capercaillie	Scotland	Area of woodland avoided by capercaillies ranged from 1 ha per 46 m of track to 1 ha per 82 m of track. Dogs part of visitor use measured.	Summers and others 2004
Dartford Warbler	Dorset	Possible negative relationship of breeding density with proximity of urban areas	Van den Berg and others 2001
Eider duck	Scotland	People and dogs caused most disturbance, dogs believed to be responsible for the difference between this and people only. Predator encounters increased x 5.	Keller 1991
Marsh harrier	Spain	Reduced physical condition of fledglings, caused by disturbance, including dogs	Fernández and Azkona 1993

Species	Location	Comment	Source
Nightjar	Dorset heaths Cannock Chase	Anecdotal evidence dogs take nightjar chicks, will flush adults and approach eggs and chicks, but not necessarily harm them. Nest on Cannock where dogs and people cannot reach them easily amongst the brash of clear-fell compartments.	Liley and Clarke 2003 F. Gribble, West Midlands Bird Club, pers comm.
Nightjar	Dorset heaths	Birds nesting close to paths flush more readily with dogs, dogs eat chicks occasionally.	Murison 2003
Nightjar	4 Dorset heaths	Strong negative relationship between successful breeding and location of paths, Nest cameras on 12 nests, 1 robbed by crow, 1 disturbed by dog. 12.2% chance of being flushed. Most failures are during incubation.	Woodfield and Langston 2004
Red Grouse	Peak District	No difference between grouse productivity on access and non-access moors.	Picozzi 1971
Red Grouse	North of England	A dog off a lead, running around, can disturb 7 times more grouse than a dog under control.	Hudson 1982
Sharp-tailed grouse	Manitoba	Experimentally disturbed, various factors, including unleashed dogs. Males intolerant of humans and dogs, left lek, but returned in 5 minutes after disturbance ceased. Females more sensitive, did not attend lek during any of disturbances tested.	Baydack 1986, quoted by Sime 1999
Stone Curlew	England	Nesting stone curlew very sensitive to people on foot, exclusion of dogs needed	Woodfield and Langston 2004, Brown and Langston 2001
Vesper sparrow, western meadowlark, American Robin	Colorado, US	No impact of dogs on paths, significant increase in response if any disturbance off the trails.	Miller and others 2001
Woodlark	16 Dorset heaths	Breeding density negatively correlated with disturbance by dogs or people.	Mallord 2005
Woodlark	South Dorset	42% predation on real nests, 69% on artificial nests. Crows are the main predator. Predation risk increases with increasing visitor use, and corvids increase similarly.	Taylor 2002

Experimental effects of dogs on breeding non-wader birds

The only paper found that experimentally compares the effects of dogs with or without a pedestrian on non-wading breeding birds is by Miller and others (2001) in a well used (2 million visits/year) open space in Colorado City. The authors used pine forests and prairie grassland, and conducted treatments on and off (>400m from) trails. The treatments were a lone pedestrian, one with a dog on a lead, a dog alone in the prairie only (a dog walking 20m in front of the pedestrian), and all on or off trails. The treatments were repeated between 88 and 463 times on vesper sparrow, western meadowlarks (in the grasslands) and American robin (a *Turdus* species, like the British blackbird) in the forest. The authors identified the zone of influence for each species in which they were flushed. In general, there was no difference between the treatments on the trails for the birds between a person with or without a dog, and dog alone reactions were less than either of these. However, there were greater and significant differences between the treatments on and off the trails, with much larger zones of influence, flush distances and distance moved when off trails compared with on the trails.

No differences were found for several American ground or forest birds exposed to dogs with or without walkers on trails. Off trail use had greater impacts than on trail disturbance.

Work by Fernández-Juricic and Tellería (2000) on blackbirds in three urban parks in Spain showed that dogs disturbed them less than did pedestrians and magpies. The blackbirds were less likely to flush, less vigilant, and less likely to stop feeding when disturbed by dogs compared with pedestrian and magpies in all three parks. This is a similar effect to that found by Miller and others (2001) for the related American robin. The American robin and the European blackbird are shrub nesting rather than ground nesting birds, and dogs might be expected not to be interpreted as a predation threat. However, the blackbirds in Spain were still affected by dogs, although not as strongly as by people.

Although Fernández-Juricic and Tellería found that blackbirds altered their feeding strategies by moving away from the disturbance (but mostly remaining in the park), and that breeding densities were less in the more disturbed areas, the contribution to this by dogs was not explored.

Although these experiments were conducted during the breeding season, any effects on the breeding success of the species involved was not tested.

European blackbirds were also affected more by pedestrians than dogs in a Spanish park.

Miller and others (2001) interpret the results in relation to the ecology of the species observed. The dog is seen as equivalent to a coyote or fox, and these do not predate the bird species investigated. Dogs are therefore not seen as a significant predator and the sparrow, lark and American robin do not react significantly to it. The pedestrian, therefore, has a greater effect on these species. Of the species Miller and others (2001) studied, the blackbird is a shrub nesting species, whilst the sparrow and lark both nest on the ground. However, the experiments were only observing non-breeding behaviour in relation to disturbance, and did not examine any aspects of breeding success.

The authors considered that these birds seemed to have become habituated to the use of the trails, where recreational use was frequent and spatially predictable. However, off-trail use was infrequent and spatially unpredictable; the animals were not accustomed to it, and so reacted more severely.

These birds probably do not regard dogs as potential predators. But unpredictable off-trail use is more disturbing.

Heathland species

These findings are not generally shared by those investigating disturbance effects on some non-wader British species. Research into nesting nightjar and woodlark suggest that recreational disturbance could be having a significant effect, and that dogs could be implicated. Nightjar nesting densities seem to be negatively correlated with the amount and proximity of urban activities (Liley and Clarke 2003), with a potential for a 20% increase in the breeding population (assuming that habitat quality is

good) without urban influences. The factors that could be affecting numbers were cited as visitor disturbance, predation by crows, cats, foxes and the problem of summer fires.

Murison (2003) mapped nightjar territories in 2003 on ten Dorset heaths, and monitored visitor pressure. Out of 47 nests found, 60% failed, 93% of these due to predation, of which 63% were believed to be by corvids. Sites with no public access showed significantly better breeding success than those with open access, and it was also higher the further the nest was from paths and the more concealing vegetation there was around it. These results also suggest that predation and access could be linked, as for the breeding waders described above. Murison added that anecdotal evidence suggested that dogs off leads might be a particular cause of flushing, but she does not report on the numbers of dogs involved, apart from pointing out that the majority of the visitors to her heaths were dog walkers.

This research was extended by Woodfield and Langston (2004) who attempted to investigate the link between access and nest failure, by studying four heathland sites with high recreational use.

Nightjar and woodlark do show impacts of disturbance, and dogs are implicated.

In the 2003 breeding season they monitored all nest sites found, including using video cameras on eight. Ten out of 29 nests found failed, all at the egg stage. Strong negative (but not significant due to the small numbers involved) relationships were again found between location in relation to the path, and vegetation cover. The cameras recorded 12 flushing events during the day (which is significant bearing in mind that nightjar are crepuscular, and would normally not leave the nest at all during the day), one of which led to predation by a carrion crow and two adults that were flushed by a dog (one from eggs and one from chicks). Birds were calculated as being exposed to a 12.2% chance of being flushed per day. Since nightjar's eggs are white, they show up clearly when the bird is flushed, and may then be more vulnerable to predation by diurnal aerial predators such as corvids, particularly as nightjars demonstrate strongly when disturbed, which could attract the attention of predators. The adult and chicks have very cryptic colouration and are less conspicuous and, once the chicks had hatched, visitor use did not subsequently affect breeding success. However, dogs were noted as taking nightjar chicks, and flushing adults, although not always damaging or eating the eggs or chicks.

This series of research investigations suggest that dogs off leads and running around off paths are implicated in affecting the success of nightjar nests at the egg stage. The increased predation levels by corvids as a result of visitor and dog combined disturbance fits with findings for a number of waders, as described above, and for woodlark presented below.

The work on woodlark has reached similar conclusions to those for nightjar. Mallord (2005) studied woodlark on 16 Dorset heaths, and found that although woodlark density was lower where visitor use was high, the breeding success rate was higher due to density-dependent effects. The visitor counts recorded people and their activities separately, and therefore included dog walkers. Mallord found that the majority of the visitors were dog walkers (52%, but ranging from 33% to 90% on different sites), with little difference between weekends and weekdays. Most dogs were off a lead (90%). The relationship between woodlark density and visitor numbers was found for three measures of disturbance: people, dogs and disturbance events per survey, and these were also highly correlated suggesting each represented the other equally. Subsequent measures used for all the modelling work Mallord undertook therefore used the combined number of disturbance events divided by the area of the site.

Dogs not under close control can flush nightjar, and expose eggs to predation by crows.

He found that the probability of a suitable habitat being colonised was reduced to less than 50% at around only eight disturbance events per hour within sites with visitor use. Mallord gave no further information about the character of these disturbance events or the nature of the sites. Mallord calculated that there was a reduction of 34% in overall productivity because of lack of birds compared

with sites with no disturbance. The failure rate was high, at 53.3% with 78.6% of these predated, although the level of loss was not correlated with disturbance.

The egg stage had a significantly higher daily survival rate than the nestling stage. However, Mallord did not investigate the types of predators, nor seek to identify whether predation levels were higher on areas of highest visitor disturbance.

Woodlarks react equally to dogs, people and other disturbance events. Nestlings were more vulnerable to predation than egg stage.

Mallord (2005) also developed a model that predicted the impact on the woodlark population of disturbance. He found that the numbers of woodlark on a site depended on both the numbers of people and their spatial distribution. If the visitor numbers doubled but disturbance was evenly spread throughout the site then this would have a major negative effect on the population, but if disturbance remained patchy and path-based with the same pattern as that measured during his study, doubling of visitor numbers had little effect as the existing disturbance was already affecting territory distribution.

If human-based disturbance were removed altogether, Mallord (2005) predicted that there could be a 13% to 48% increase in woodlark population size depending on the density of territories. However, Taylor (2002) did investigate the role of predators in disturbance effects using artificial and real woodlark nests on 12 Dorset sites. Disturbance was measured in terms of numbers and location of people and dogs, and any corvids were also counted. Of the 1755 artificial nests used, 69% were predated, and of these 53% were by corvids, and 26% by foxes. Taylor found that the predation risk increased as the visitor use increased, as also did the correlation between predation levels and corvid but not fox abundance.

Woodlarks avoided highly disturbed areas. Increases in disturbance on the existing paths would add no further effect, but removing all disturbance was predicted to increase population by 13-48%.

Corvids were the main predator of woodlark nests, and predation increased with disturbance.

The situation with Dartford warbler, the third enigmatic heathland breeding species, is less clear. Liley and Clarke (2003) did not find any correlation between the breeding population and urban influences on Dorset heaths, but van den Berg (2001) did note a possible negative relationship with proximity to urban areas, and attributed this tentatively to disturbance. However, dogs were not separated out in either study.

No evidence of significant disturbance effects for Dartford warbler.

A local British Trust for Ornithology (BTO) recorder, responding to PAA's (2003) questionnaire on the effects on wildlife of the access closures associated with foot and mouth disease, commented that walkers and dogs, especially those that chase sticks, were seen as the main factors limiting habitat choice for nesting Dartford warblers, woodlark and nightjar.

Grouse species

In the uplands, breeding red grouse do not react to disturbance until the last moment (Hudson 1982), but Hudson, in a simple, but not replicated experiment, suggested that a dog off a leash and running around can disturb up to seven times more grouse in the breeding season than a dog on a lead. Neither Hudson nor Picozzi (1971) found any evidence of effects of recreational disturbance on grouse breeding success. Picozzi counted visitor numbers and dogs on access and non-access moors for comparison.

Red grouse breeding success not affected by disturbance, although more birds flushed from nest if dog running around out of close control.

The impacts on other grouse species could differ, however. Baydack (quoted in Sime 1999), experimentally disturbed sage grouse, sharp-tailed grouse and prairie chickens using a variety of stimuli (visual ones such as a snow fence and noise related stimuli which are not to relevant to this

report), including leashed dogs and visitor presence. These grouse all use leks, and mating takes place within a very short (2-3 week) timescale. Baydack found that human presence and dogs on leashes had the most effect on all three species. Male sharp-tails flushed from the lek, but remained within 400m of it, returning when the disturbance was removed within about 5 minutes. Females were displaced from the lek through all the disturbance activities. Male sage grouse were also flushed by human presence and returned, but 20-30 minutes later, or the next day.

Baydack, and other authors quoted by Sime (1999) suggest that disturbance at the lek could have significant implications for population productivity, long-term viability and the perpetuation of the viability of the leks. Because females only attend a lek for a very short time, disturbance could potentially influence nesting chronology and fecundity for a local bird population.

Lekking grouse species in America impacted by disturbance, especially by dogs.

There have been no equivalent investigations into the effects of disturbance on black grouse or capercaillie leks in Britain. However, Summers and others (2004) calculated that capercaillies avoided areas close to tracks in two forests in Scotland, thus rendering significant parts of the habitat unavailable to them where track density was high. Dogs were counted in this study (see Table 2.3), but no effects were separated out since numbers of visitors and of dogs were low. More anecdotal are the comments in the questionnaire survey of land owners/occupiers views on the effect of foot and mouth disease access closures on wildlife (PAA 2003). Respondents highlighted how very sensitive black grouse are to disturbance by dogs, from which they will “fly for miles”.

No research on lekking grouse in Britain is available, but black grouse and capercaillie known to be sensitive to disturbance.

Other bird species

Other bird species have received little attention in relation to effects of disturbance, and only a few additional comments are possible on this subject. As far as water birds are concerned, the only species of duck that has been investigated is the eider. For eider duck crèches, Keller (1991) found on the Ythan Estuary in Scotland, that shore-based activity, which included fishermen, walkers and dogs, had a greater effect than water-based disturbance, and it was believed that dogs were responsible for this difference. The disturbance led to an increase in energy-demanding activities such as swimming, and a reduction in roosting, whilst feeding time was also reduced, with limited opportunities for compensatory measures due to the tidal cycle. This disturbance was found to increase predator encounters fivefold as a result of ducklings losing contact with their crèches. Predation levels were also higher on water than on land. Although, Keller did not feel that the population of eiders would be impacted by these levels of disturbance, Woodfield and Langston (2004) point out that the potential condition of the fledglings and subsequent breeding productivity are unknown.

Other work on common eiders has been undertaken in Canada (Bolduc and Guillemette 2003) and in Finland by Laurilla (1989) (both quoted by Woodfield and Langston 2004). Bolduc and Guillemette used experimental disturbance, but only from humans, to study effects on nesting eiders. They found that the greatest effect of just approaching by the researcher was early in the incubation period, and that more time spent off the nest increased the risk of predation. Laurilla compared breeding success in different zones of visitor use, and found greater levels of predation in those that were more heavily visited. This ties in with other studies on disturbance and predation, even though it was only by people, and not by dogs as well.

Eider ducklings predated five times more when disturbed, including by dogs. Population impact not known.

Of other bird species, preliminary research has been undertaken into the effects of disturbance on stone curlew. Woodfield and Langston (2004) and Brown and Langston (2001) considered that stone curlew avoid all disturbance activities by humans and dogs.

Stone curlew are believed to be very sensitive to disturbance.

Research into the breeding success of marsh harriers in relation to disturbance has been conducted by Fernández and Azkona (1993). Although the breeding success in terms of fledged birds was not affected by disturbance (which included fishermen, hikers, dogs and vehicles), the authors noted that the young were in poorer physical condition PA to check as less food had been provided. The nutritional condition of the chicks was measured via blood urea levels, a method that the authors say is more accurate than body mass or other indicators of malnutrition in birds of prey. Blood urea levels return to normal when the young are fed after a period of lack of food. Samples were taken from chicks at 38-40 days just before fledging. From the results obtained, the authors felt this could reduce lifetime reproductive success and the long-term survival of nestlings and adults.

Marsh harrier fledglings less fit due to disturbance, including dogs. Possibly avoid disturbed areas for nesting.

PAA (2003) reported questionnaire respondents who noted that marsh harrier had bred for the first time on a reserve on the Humber Estuary, and the same species had nested much closer to paths than usual in other reserves in Suffolk, Norfolk, the Humber Estuary and Kent, during the closure of access at the time of the foot and mouth outbreak in 2001. All these changes in marsh harrier nesting patterns were attributed to the lack of people and dogs.

As well as the research described above, there are some anecdotal comments that tend to corroborate or add to the types of impacts noted above. These principally are derived from Small and others 2002 and PAA 2003, both of whom conducted questionnaire surveys of site managers to find out if there were any observed effects of removing access during the foot and mouth closures in 2001. The bird species that were mentioned in the responses, where dogs were thought to be involved as a factor, are listed below:

- More skylarks where none nested before due to dog walking on three sites (Small and others 2002).
- More woodcock, nightjar and lapwing where no dogs were being exercised (Small and others 2002).
- Mallard, coot, moorhen (two sites) and Canada goose able to breed successfully, they usually fail due to dogs (Small and others 2002), also for little grebes on another site (PAA 2003).
- More buzzards (three sites), mainly due to dogs on leads or their absence (Small and others 2002 and PAA 2003).
- More ground-nesting birds in general – several sites (Small and others 2002).
- Greater spotted woodpecker breeding for first time on a site (PAA 2003).

3.4 Non-breeding birds

3.4.1 Waders

Lafferty (2001) recorded all shore birds over a year in 1999-2000 on a beach near Santa Barbara in California in relation to human-induced disturbance. The area is a prime shorebird feeding site, with a rich high-intertidal invertebrate assemblage which attracts a diverse and abundant shorebird community. 13,881 birds of 57 species were counted over 48 surveys, of which half were feeding. The birds used preferred sectors in which to feed, especially where there was exposed rock. The relative abundance of birds was not negatively correlated with the amount of human activity in a sector. The average number of people was 31.8 walkers or joggers, 18.9 people sitting, 4.8 dogs and 0.2 horses per sector, per survey. Other disturbance factors were also recorded, the highest of which were 7.6 crows on average per sector. There were 11 dogs per 100 people, giving an average of 2 dogs per kilometre, but this doubled at weekends.

Lafferty (2001) found that ten percent of all visitors were observed to disturb birds, and this involved on average 10 birds per person, 7 of which flew. 39% of all dogs were observed to disturb birds, involving an average 22 birds each, 16 of which flew. Where dogs were on leads (only 7% of the sample) this reduced the probability of disturbing birds and the number of birds per disturbance. About 9% of all dogs actually chased birds during the brief observation periods (2-10 minutes). The disturbance overall caused by dogs is shown in **Table 3.6**.

Table 3.6: Levels of disturbance to shorebirds by dogs

	Leashed dogs	Unleashed dogs	Unleashed and chasing	Total
Activity total	18	221	25	264
% of Birds Disturbed	11	34	100	39
No of events, no of disturbers	2, 2	61, 75	25, 25	88, 102
No of disturbed birds	11	1329	727	2229
Birds/disturbance (SD)	5.5 (6.3)	225 (40.9)	29.1 (28.8)	24.2 (39.2)
Birds/disturber	5.5	18.3	29.1	21.9
% Disturbed birds that flew	100	76	81	72

Source: Lafferty 2001 (Explanation for Table 3.6: Disturbed birds are those that move or fly, activity is the total counted, % that were disturbed was based on the 2-10min observation periods only, a disturbance event could be caused by more than one disturber.)

Lafferty found a substantial variation between species in the proportion that were disturbed. Neither the size of the bird, its guild, frequency of occurrence or density were related to the numbers that were disturbed of any species. In general a smaller proportion of land species were disturbed than other species, and a higher proportion of aquatic species that frequented the water's edge were affected, although the sample size was not large enough for this to be significant.

The average distance at which birds reacted to humans increased with the proportion of birds that were disturbed on a particular day, suggesting that the disturbance was hyper-sensitising birds. This contrasts with the breeding dotterel in New Zealand that did seem to become partly habituated (Lord and others 2001). However, the reaction to dogs that Lafferty (2001) found was independent of the level of disturbance, possibly suggesting that being chased was always seen as threatening. Each bird was being disturbed dozens of times each day at the expense of feeding and resting time. For some of the species, this coincided with energetically demanding times associated with migration. Burger and Gochfield (1991) found that human activity altered the foraging rates of sanderlings, suggesting that species-specific reactions may be significant in some cases.

Studies on some American beaches show no significant impact of disturbance by dogs on a wide range of waders, although dogs disturbed birds more than human-based activities. Birds did not show habituation to disturbance.

Burger (1993) (quoted by Thomas and others 2003) noted that the shorebirds she studied devoted some 70% of their time to feeding and 30% in avoiding disturbance or predators. When the human use increased, foraging time was reduced to 40% of their time. Thomas and others (2003) also noted this for sanderlings on the Californian coast, showing that number of people, type of activity, free-running dogs and proximity of people can all significantly reduce the time the sanderlings spend foraging, but the authors give no details on the activities and disturbance effects of dogs separately from the other activities tested.

Birds were seen to overcome this shortfall in a number of ways. Burger and Gochfield (1991) found sanderlings and Staine and Burger (1994) noted breeding piping plovers feeding on the East coast of America at night-times as compensation for daytime disturbance, while piping plovers also concentrated their diurnal activities in areas within busy beaches that were less disturbed.

Birds losing feeding time due to disturbance seem to feed at night or other times in compensation.

Lafferty (2001) commented that the disturbed birds mostly re-alighted within the section in which they were counted, and were not lost from the beach. However, he quotes two other authors who noted the same result until they examined bird numbers and disturbance at a larger scale.

Both then found that there were negative associations, suggesting that birds are lost from sites due to disturbance (Burger 1986). However, this can not be attributed just to the presence of dogs.

Birds vacate certain sites, possibly due to high general disturbance levels, not specifically to dogs.

Lafferty (2001a) also conducted detailed research on a rare and declining American wader, the western snowy plover. Using the same Santa Barbara beach in California and methods as described above, he evaluated the disturbance effects of dogs versus walkers or joggers on snowy plovers, and attempted to model the effect of removing dogs and people separately. He found:

- on weekdays, 12.7% of people and 23% of dogs disturbed the plovers at a rate of 20% of the roost per disturbing person and 26% of the roost per disturbing dog; each plover was disturbed on average 1.4 times/hour; 27% of plovers flew when disturbed;
- at weekends, 12% of people and 28% of dogs disturbed the plovers at a rate of 20% of the roost per person and 73%/dog; each bird was disturbed 2.2 times/hour, 17% flew on being disturbed;
- seven crows disturbed plovers at a rate of 29% of the roost per crow.

Only 21% of dogs were on leads despite there being a law requiring this. However, Lafferty (2001a) found that both leashed and unleashed dogs disturbed snowy plovers. Unfortunately there were not enough of each to test the difference between them. However, snowy plovers were noted as less easily disturbed than some other species, with a peak disturbance distance of 30m. Piping plovers, for example, are disturbed at twice the distance (US Fish and Wildlife Service 1996, quoted by Lafferty 2001a). Lafferty also found that the number of people and dogs did not significantly alter the probability of disturbance, but that at any particular distance dogs had a higher probability of disturbing plovers than humans. Unlike the aggregate species observation described above, Lafferty (2001a) found that snowy plovers did not become hyper-sensitised to disturbance as the levels increased during a day. However, feeding activity did decline with the abundance of beach users, and then increased again after dark.

Combining all the sources of human and non-human disturbances, Lafferty (2001a) calculated that plovers flew (the total number of plovers divided by the number that flew in relation to the disturber):

- 21% in response to other birds apart from crows;
- 28% in response to humans;
- 36% as a reaction to dogs;
- 40% in response to horses;
- 61% in response to crows.

Bearing in mind that the number of crows, horses and other birds were less than the numbers of humans and dogs, the results show the relative strength of effects.

The effects of dogs on snowy plover in America was greater than that of humans, but less than that of crows.

A study by Fitzpatrick and Bouchez (1998) in Northern Ireland (Belfast Lough) explored the effects of human disturbance on feeding oystercatchers, curlew and redshank on a 1km stretch of the Lough shore as the tide receded and turned. They categorised the human activity as sitting (there were a number of seats along this popular shore-line front), walking (ie slow moving), or more active (cycling, running etc), and whether dogs were present with people in each of these activity classes divided between the grassy upper zone to the exposed mussel beds at low tide. Most of the human activity took place on the grass strip and upper beach area, with little on the low tide area. In contrast with the studies described above, the authors found no significant effect of the zone in which dogs occurred and the vigilance, feeding or food capture rates for any of the species. Surprise was expressed at this result since dogs were seen chasing waders, and were exercised on the beach, but there was no quantifiably measurable effect.

Gill and others (2001a) also found no disturbance effects on black-tailed godwits feeding on estuarine mud along the East Anglian coast. The measures included people using the shore-based footpaths, plus dogs. There was no relationship between this and other disturbance activities on the number of godwits, (either at the local or aggregated scale), or the amount of their principal food left at the end of the winter season (a measure that could also identify any reduced use of a prime resource, and unused carrying capacity between sites).

Comparison between the studies is difficult since disturbance has often been measured in different ways, there is not enough information given on the numbers or behaviour of the dogs or humans (eg Fitzpatrick and Bouchez 1998), and there is insufficient study into the other factors that determine whether the site is ideal or sub-optimum for the birds. For example, in Fitzpatrick and Bouchez' study, the total number of people on the site and in different zones is not given, except to remark that there were usually more than five at a time. Around five would be a low level of use. Other sites studied could be more heavily used than this, although the figures are not always given. Dog numbers and variation with time are also not always provided. Some studies also do not mention the distance from the sources of disturbance and the birds being studied, nor describe the character of the activity such as whether people are walking randomly all over the site, or mostly along paths. Such lack of information makes it impossible to present a full comparison across habitat types, dog use and birds studied.

There is the additional issue over the detailed patterns of use in relation to the habitat involved in the different studies. For example, several of the studies (eg Lafferty 2001, 2001a) describe the use of the whole beach by visitors, whilst Gill and others (2001a) describe the feeding on mud flats (not a sandy beach) and these are less attractive to human visitors and dogs compared with walking on firm sand. Lafferty (2001a) gives disturbance distances of 20m for snowy plovers, whilst Gill (pers. comm.) confirms that the pedestrian use is confined to the shoreline, although distance to the godwits would have been variable. Differences in findings could therefore be related to habitat differences, and their relative attractiveness and use by people.

Finally, Robinson and Pollitt (2002) analysed the results of the WeBS³ counts from 1995/6 to 1998/9 in relation to disturbance. Recorders noted the number of activities on their count sites. Only a small proportion (26%) of the recorders identified human disturbance. Walkers and dogs were the most frequently recorded forms of this at inland and coastal sites.

³ WeBS is the Wetland Bird Survey, a joint scheme run by BTO, RSPB, Wildfowl and Wetlands Trust (WWT) and Joint Nature Conservancy Committee (JNCC).

The analysis showed that human forms of disturbance were not increasing between the years studied, but that there were strong seasonal differences, with more activities in the summer. Disturbance sufficient to force birds to move to another site were rare, but there were many local movements within sites as a response to disturbance. The authors suggest that infrequently recorded activities can disturb waterbirds much more than regularly experienced ones, suggesting a degree of habituation.

Other studies show no impacts of disturbance on wintering waders. Care is needed in interpreting these in terms of the levels of activity, the habitat, and the behaviour of the species.

3.4.2 Other birds

Very little relevant research on wintering geese or other wildfowl has been found, although there are several studies on human disturbance, dogs are rarely mentioned and their numbers of effects even less often quantified. For example, Riddington and others (1996) calculated the energy budgets for disturbed brent geese on the Norfolk coast, counting pedestrians with or without dogs, plus other forms of disturbance, but then amalgamated the pedestrian/dog data. They did find that pedestrians (with or without dogs included in the data) had the greatest effect on the birds, resulting in a 10.8% increase on average in their energy requirements. This covered the greater vigilance, and more flight and less feeding for disturbed birds compared with undisturbed ones. Unless able to feed for an extra hour at night, disturbance could be affecting brent geese distribution in the area, the authors conjectured. The birds mostly returned to the area where they had been disturbed but, if levels of disturbance were too high, flew to another nearby feeding area. They showed no habituation to the disturbance.

It could be inferred from the wader studies, and from the human disturbance work, that geese would be as or more sensitive to dogs than to humans. The latter work suggests that disturbance can result in reduced fitness, and then reduced breeding success in the following year, especially if the energetic costs of replacing that lost reacting to disturbance is difficult to achieve (Woodfield and Langston 2004).

3.5 Synthesis

The overview of disturbance in general presented above reflects what has been investigated by researchers and others into the potential effects of dogs as part of their activities on various parts of the wildlife spectrum. There is a wide variety of activities, recreational densities, species and habitats that have not been researched, although there is also a wide literature on the effects of other activities that can be drawn on where inferences and extrapolations may be useful or possible. It is worthwhile, therefore, attempting to synthesise the information into a more succinct framework to understand better what it all means, and what the implications might be for managing recreational activity involving dogs on high value wildlife sites.

As Woodfield and Langston (2004) point out, the bird species studied show differing levels of disturbance. The extent and methods of study differ, and the tolerance levels of disturbance are based on different counting methods making generalisations difficult. In the shoreline environment where there are no paths, dogs running freely are of particular concern.

3.5.1 Pre-incubation birds

The research presented suggests that there may be fewer pairs of breeding birds where disturbance levels are high (Yalden and Yalden 1990, Liley 1999, Woodfield and Langston 2004 and Mallord 2005), and that dogs are implicated in the disturbance zone in which birds do not settle. All the species affected are ground nesting birds. This effect has also been found for other types of recreational activity, for example fishing round flooded gravel pits (Tydeman 1977), and for walking and cycling within woodland (van der Zande and others 1984), so it might be predicted for recreational use that includes dogs. That Dowling and Weston (1999) found such significant

increases in breeding success when dogs (but not other types of recreational activity) were managed shows that dogs can have a significant effect, at least in this type of coastal habitat.

There is the possibility that birds that lek could be significantly affected by dogs and human visitors (Baydack in Sime 1999) during the lekking period, but no work on this has been found for British species.

However, apart from Dowling and Weston's management trials in Australia on a coastal wading bird, there have been no other studies that have quantified the effects of dogs on breeding success in other habitats. Given the greater behavioural reaction to dogs in terms of the longer distance that a bird is flushed, and a longer period spent away from a nest, it might be expected that ground nesting birds are more sensitive to dogs than people in the territory establishment phase as well, but this has not been confirmed or refuted in experimental studies.

3.5.2 Breeding phases

It is clear from the information collated that dogs, especially those off a lead, stimulate a greater behavioural response than walkers, and for some species, also than joggers. Only Eurasian dotterel did not show any behavioural response to any kind of recreational disturbance. Direct loss of nest or eggs to dogs, although occurring, does not seem to be significant from the studies described (although the 5% recorded by Pienkowski, 1984 could be important if the colony were under pressure from other factors as well). The increased levels of predation would appear to be the greatest risk. This is associated with corvids or gulls in particular, but there are other opportunistic predators in different habitats such as the jaegers in the tundra in Canada (Strang 1980). Corvids at least have been shown to be associated with human activity, and have colonised habitats along with the recreational visitors (Watson 1988, Murison 2003, Lafferty 2001). Picozzi (1975) has shown how crows can learn to associate a marker with a nearby nest, and Pienkowski (1984) noted them watching from vantage points as visitors and dogs disturbed the ringed plovers he was researching. Observations made during a number of the studies have identified the role that these opportunistic scavengers and predators can have on clutches. They are the prime egg predators where the predator has been identified in the studies.

Where experimental doses of dog activity or measures of dogs and other recreationists were undertaken, these showed that dogs consistently flushed ground-nesting birds (except Eurasian dotterel) off their nests earlier and for longer than other recreationists. This exposes the eggs and nests, especially where either are conspicuous (eg white eggs of nightjar) or uncovered, or where the parent displays conspicuously to the disturbing dog, to the attention of the opportunistic predator, resulting in significant levels of predation.

This pattern of events Pienkowski (1984) suggests is related to the fact that, at least in Britain, most diurnal predators are aerial (birds of prey), and the terrestrial ones tend to be nocturnal (especially in much disturbed sites). Yet dogs are mostly daytime visitors, and thus the reaction to an intruding terrestrial potential predator in the form of the dog exposes the bird to the aerial ones.

It is of note that on well managed grouse moors, where predator control includes that of crows, that there is less evidence of crow predation on exposed and disturbed nests, either of grouse or golden plovers (Pearce-Higgins and Yalden 2003).

The recent research into the effects of disturbance on heathland birds is less clear-cut in the overall findings than for various waders. However, the indications are that the effects are similar for nightjar and woodlark – both ground nesting species. Again predation is the key factor affecting breeding success, especially by corvids, and these are observed as being more closely associated with well-visited sites. However, predation was more of nestlings than eggs for woodlark, but of eggs for nightjar that have well camouflaged young.

People mostly keep to paths where the vegetation and topography make this the easiest route, especially where there is long old heather alongside (Picozzi 1971), and thus might be expected to flush birds less often than would dogs that stray off paths more. In addition, the natural tracking and exploratory behaviour of dogs would come into play whenever they are off the lead, and not under close (ie to heel) control.

Thus, although the research does not always directly identify dogs as having a greater impact on the birds in question than dog-less visitors or to the dogs' human companions, Current data suggests that this is likely. The high level of use of some of the heathlands close to residential areas, the very high proportion of visitors who are dog walkers, and the large numbers of dogs off leads all point towards this conclusion.

However, there is a suggestion from limited studies that other species such as blackbird species (the American blackbird, a shrub nesting species), and a sparrow and a lark from America (both ground nesting species), that dogs are seen as less threatening than humans for these species. However, the experiments were only observing non-breeding behaviour in relation to disturbance, and did not examine any aspects of breeding success. The question could be asked that as woodlark seems to be affected, whether skylarks in Britain might be as well since both are ground nesting. Walker (pers. comm.) has witnessed the loss of breeding skylarks at Saltfleetby and Theddlethorpe Dunes NNR at the same time as magpies and dog walkers have increased. Only further research on skylark, a priority Biodiversity Action Plan species, can confirm whether they are impacted or not.

There seems to be little evidence that dogs affect the fledging success rates of many of the species studied. Once eggs have hatched for some plovers (ringed plover, black oystercatcher), the numbers reaching independence are not seen to be affected by dogs, or walkers. However, there is the warning produced by Fernández and Azkona (1993) that marsh harriers affected by disturbance by walkers and dogs produced less fit young, although there were no detectable behavioural responses. This possibility is quoted by a number of authors, particularly since it is known that stress can result in reduced breeding fitness, and needs to be investigated in relation to disturbance by dogs for many other key conservation bird species.

There is also the possibility that the disturbance effect will be greater with more visitors plus their dogs, and interact with distance from the bird or its nest. Beale and Monaghan (2004) found this for walkers, but it has not been tested directly for dog activity. The modelling results presented by Mallord (2005) come close in his predictions of the effects of increasing visitor numbers in relation to their distribution patterns, but this does not take into consideration the proximity of the nests to these increased numbers of people and dogs.

In summary, therefore, dogs are implicated on certain sites where there has been a reduction in the numbers of many ground nesting bird species in what is otherwise suitable habitat, and for an increase in levels of predation on these species through flushing the birds from nests and allowing crows or other opportunistic predators to remove eggs or young. No other impacts have been described that are attributable to dog visitors to sites, but there are other possible implications on fitness that could affect population dynamics.

Dogs are implicated where there have been reductions in ground nesting birds from an otherwise suitable habitat. Opportunistic predation has been implicated as the main cause of this reduction.

3.5.3 Wintering birds

The studies seem to demonstrate that dogs do have a greater effect on wintering birds, than do walkers or, for some species, joggers. Different species seem to be more tolerant of approach than others, with disturbance distances that cause a reaction differing widely. There is also a suggestion for one species at least that this response distance is half that of the birds in the breeding season.

However, the research has focused nearly entirely on waders, with a little also on wildfowl. No research has been located that addresses any effects or impacts of dogs on a site for other birds. Since ground nesting birds have been found to be the most vulnerable, it might be expected that ground dwelling ones would be equally susceptible in winter. Species such as hen harrier that have collective roosts on the moorlands, and terrestrially feeding ducks and geese could be candidates for attention.

For the waders examined, there is no clear impact identified in any of the studies, in other words, effects that have significance at the population levels. However, there are a number of suggestions that birds have vacated sites when disturbance became too great, but none of these have quantified the reasons and separated out dogs from other sources of recreational disturbance. However, since the reaction to dogs by wading birds has shown greater flight, and greater reductions in feeding time, then it follows that if birds have abandoned sites for wintering or migration staging posts, then this could be attributed more to dogs than other recreational activities if both are present, and in significant numbers.

The reaction to dogs by those species affected has an energy cost, which is particularly important in winter if resource acquisition is limited. It may also be important if the winter is particularly severe, although this has not been mentioned in the research reports. In a number of case studies, the authors have found that compensatory feeding at night, or by other means seems to be replacing the energy lost to reactive behaviour caused by disturbance by dogs and other recreational use. However, it is reasonable to suppose that, in some cases, this displacement activity may place pressure on other birds of the same or other species (the former being more likely).

Whether dogs impact on species or not will also depend on the habitat involved, (for example the recreational use by walkers and their dogs on mud flats would be much less than a firm, sandy beach), the numbers of dogs involved, and the sensitivity of the species. Less sensitive ones may tolerate disturbance along a path or shoreline at 50m away from prime feeding areas, than more sensitive ones.

Dogs have a greater effect on wintering birds than people alone, but no impacts at the population level have been recorded.

4 Dogs and other nature conservation interests (excluding birds)

4.1 Key points

- **There is very little relevant research that has focused on the effects of dogs on animal groups other than birds.**

4.1.1 Mammals

- **Although mammals may be disturbed by dogs, there is no evidence that these are affected at population levels.**
- **Behavioural effects on a number of species of deer are documented.**
- **Badgers can be sensitive to disturbance although overall populations are expanding.**
- **Otter populations are increasing, although disturbance may determine where they breed.**

4.1.2 Carriers of disease

- **Dogs can spread diseases that affect wildlife but no evidence was found of this occurring, from which it is inferred that this is not a significant factor at present.**

4.1.3 Carriers of alien plants

- **Dogs, as well as other animals and humans, could carry various undesirable plant species between sites or habitats.**

4.2 Introduction

Compared with the research into the effects of disturbance by dogs on birds, there is far less that is relevant to other animal groups, and none of it is experimental. The following section presents a review of what is known, and its relevance to the animals in question. Mammals are presented first, with only some anecdotal comments on other animals, including reptiles and amphibians.

4.3 Impact on animals other than birds

4.3.1 Mammals

Deer

Studies into the behaviour of red and fallow deer in Bushy and Richmond Parks in London show measurable changes to disturbance of all the types measured (Langbein and Putman 1992). These were:

- people present within 50m;
- the same distance but with a leashed dog;
- the same but with the dog off the lead;
- people crowding the deer to photograph etc; and

- actual chases by dogs of the deer group or an individual from it.

The general level of disturbance is described as ‘chronic’ ie low level and long-term. The deer reacted by increasing the time spent being vigilant, particularly in the case of the females. The probability of a response to dogs off the lead was higher than to humans within 50m for fallow and red females but the males of both species did not differentiate in their responses to same levels of activity.

However, these effects did not seem to impact the deer in terms of use of the habitat available, daily time budgets, body weights or overwinter mortality. Thus, whilst there might be welfare issues, the overall effects of disturbance were described as being of minor importance with regard to their long-term performance (Langbein and Putman 1992).

This result conflicts with that found by Humphries and others (1989) (quoted in Langbein and Putman 1992) studying the fallow deer, also in Richmond Park and a nearby less disturbed site, who suggest that chronic disturbance may be expected to have long term effects on the population performance. Langbein and Putman (1992) investigate this further and point out that their longer cumulative period of observations lead them to conclude that the disruption to behaviour patterns is more transitory than Humphries and others (1989) believed, with deer returning to their pre-disturbance activity within 2-3 minutes, and even after only 10 minutes after being chased by a dog. In addition, Humphries and others defined vigilance differently from Langbein and Putman (1992).

These authors indicated that their results concurred with others found in deer parks in Nottingham (Wollaton) and Leicester (Bradgate), although the levels of disturbance in the latter in terms of encounters per hour was considerably higher at 20-30. The time budgets were similar to those presented for Bushy and Richmond for these two parks (Bullock and others 1990 quoted in Langbein and Putman 1992).

In the study by Langbein and Putman described above, the number of dogs actually chasing deer was small, and the chances of disturbance by walkers with a dog off a lead was greater than by one with a leashed pet. However, it was noted that the number of ‘fence-deaths’ due to accidents when animals run into fences, dog chase deaths and road accidents are greater in parks with a high level of public use. Thus there is an increased level of public-induced mortality, but this was not enough to change natural mortality rates. Moreover, Langbein and Putman (1992) noted a significantly lower reproductive rate in heavily used deer parks which they attribute to females being disturbed after parturition before they have the time to bond properly with their new fawn. However, reproduction rates were generally more dependent on body weight in autumn and winter, which was related to winter feeding and forage quality, not to disturbance.

Langbein and Putman (1992) point out that deer managers in some of the deer parks have been concerned about the effects of disturbance for some time, especially in particular years when there is significant unexplained mortality of the deer (eg recorded at Dunham Massey and Richmond in the 1980s). They conclude that their results show that although they believe that the response to disturbance in their studies is slight, this does not suggest that it does not matter since close approach to deer, and with dogs does distress them to a degree. This, however, was seen more as a welfare than an ecological issue, and should be seen within the context of the five freedoms⁴ for grazing animals (usually applied to stock, but deer are in a similar position in a deer park) advocated by the Grazing Animal Project (2001).

No impacts at the population level have been found for red or fallow deer subjected to high levels of disturbance, including by dogs. There may be welfare issues where deer die due to disturbance.

⁴ The five freedoms recognised by RSPCA are freedom: from hunger and thirst; from discomfort; from pain, injury or disease; to express natural behaviour; and from fear and distress.

Bull (1998) suggested that there could be secondary conservation benefits from dogs disturbing muntjac, and keeping them away from a site (if dogs can achieve this) could be of benefit to the flora (for example in an ancient woodland).

Research in America has reached similar conclusions to those of Langbein and Putman (1992) for other deer species. Miller and others (2001) applied experimental treatments using a walker, one with a leashed dog, and a dog walking 20m in advance of the handler (see section 3.3.2 above for more detail on the experiment). For mule deer the presence of a dog resulted in a much greater area of influence, greater alert and flush distances and greater distances moved than with a pedestrian alone.

In contrast to the birds tested (see above), the reaction of the mule deer was greatest when the dog was present. Because dogs are known to kill deer, the authors assumed that the deer regard the dog as a potential predator. The authors suggest that their experimental results show that human activities may displace wildlife and reduce fitness of the local populations, and that this is greater for smaller scale off-trail use, than for on trail use. The work does not, however, produce any data on the impact of such displacement on population levels and nature conservation value.

Mule deer in America showed greater disturbance behaviour to dogs than humans, but no population impacts were measured. Off trail use had a greater effect on mule deer than on trail use, whatever the nature of disturbance.

Sime (1999) quotes a number of studies, such as Perry (1970) who concluded that deer mortality in the Southeast of America by dogs was neither large nor significant at the population level. Gavitt (1973) noted that hounds were more effective and persistent trailers of deer in America, than were non-hounds, but the latter were faster. (He tested this experimentally). Again, Gavitt did not feel that dogs were limiting the deer herd's reproduction or home ranges.

Sime also quotes other examples of studies of the impact of dogs on deer. Several studies show the effect of dogs in terms of killing deer to be in the order of 2-3% of annual mortality, and all conclude that this would not be significant at the population level. However, it was not always clear whether these affects were by companion dogs or feral/stray animals. Sime also quotes from a study she and a colleague undertook using remote camera systems, which showed domestic dogs harassing, injuring and killing white-tailed deer in their winter range. No comment is made on the significance of these observations.

There is no evidence of a population effect on other deer species due to disturbance.

These research results are also reflected in the questionnaire responses received by PAA (2003) and Small and others (2002) when a number of respondents described observed changes witnessed in behaviour of roe, red, muntjac and fallow deer during the foot and mouth epidemic when there was no access for a period in 2001. The general view was that deer were much more visible in daytime and in areas which they usually avoided when frequented by visitors and their dogs. On some sites deer bred where this had previously been very unusual or absent.

Deer are more visible and easily seen when there is no disturbance.

The observations on behavioural changes match research findings by Jeppesen (1984) who noted that roe deer sought cover in their home range, or deserted it, when disturbed, and considered that repeated disturbance might force them to shift or expand their home range. He discussed the additional energy expenditure needed for this but drew no conclusions on impacts at the population level.

Sheep

The effect of various forms of experimental disturbance on bighorn sheep has been studied by MacArthur and others (1982). They approached partially habituated sheep from a road, from a ridge away from the road and with a person with or without a dog on a lead. The strongest negative

Big horn sheep showed greater metabolic effects of disturbance by dogs + walker than humans alone. Dogs are probably seen as a predator.

reaction from the sheep was from the dog plus person. Heart rate response increased successively in the leashed-dog trial, but did not for passing vehicles or aircraft passing at over 400m overhead. The authors concluded that the dog was identified by the sheep as a potential predator (like coyotes, which engender a similar response). Alert or withdrawal behaviours may or may not be seen in addition to the physiological response to the dogs.

It is probable that some domestic sheep in Britain still retain a fear of dogs as potential predators, and that the findings for bighorn sheep are a factor in stock and dog interactions.

Otters

Otters are very sensitive to disturbance, and by dogs in particular. They are less vulnerable than, for example, birds as they can avoid a range of disturbing activities by operating nocturnally instead of diurnally. There is strong evidence to suggest that otters are particularly sensitive to disturbance from dogs, perhaps viewing them as a greater threat than people. In Green and others' (1984) radio-tracking studies, otters reacted adversely to dogs, in one case abandoning a holt for approximately three weeks. As Jefferies (1987) notes, these studies based on radio-tracking and spraint data are largely gained from male otters, and although data on females are more limited, it appears that, especially during breeding and raising cubs, females are likely to be far more sensitive to disturbance. This is illustrated by the fact that holts known to be used by breeding females tend to be the most secluded and secure (Strachan and Jefferies 1996).

Otters are considered to be very sensitive to dogs. Their nocturnal activity avoids some disturbance.

Badgers

Badgers react to disturbance by emerging later than normal (1-1.5 hours in setts studied by Neal (1977), or later if activities near the sett continue until dusk). Badger behaviour changes as well, disturbed animals hurry off to forage almost at once, whilst undisturbed animals play and socialise for up to an hour around the sett before foraging. There is no evidence that badger populations are, or are not, affected by any kind of disturbance in general, although Aaris-Sørensen (1987) attributed the loss of some third of the badgers around Copenhagen from 1973 to 1985 to the increasing numbers of people, especially when accompanied by dogs off the lead. However, as badgers are increasing in many parts of Britain, recreational disturbance is not having any significant effect at the population level.

Badgers' behaviour changed by disturbance, but no effect at the population level in Britain.

Other mammals

Research into disturbance effects on a variety of smaller mammals in the United States show that many exhibit symptoms of stress from the presence of humans and dogs. Waller and others (1999) quote Smith and Woodruff's 1980 study of woodchucks that retreated to their burrows when disturbed by a human or dog, and showed an active defence response which included an increased heart rate. Once inside the burrows, however, they adopted the passive response behaviour which includes a reduced heart rate (which slowed in proportion to the stimulus), and reduced respiration rate. If the human or dog approached the burrow or started digging, the heart rate declined even further.

Similar results were found for the eastern chipmunk, fox squirrels, grey squirrels and rabbits and in the Swiss Alps for marmots by Mainini and others (1993). All these species first retreat to cover, and then adopt the passive defence response. Squirrels' heart beats, for example, dropped by 60%, but increase from 200 to more than 450 beats/min if they had to flee from a dog or person. There is some evidence (Waller and others 1999 quote Gabrielsen and Smith 1995) that this passive defence response is present in many animal groups – invertebrates, fish, amphibians, reptiles, birds and mammals when subjected to strong pain, fear, shock or where there are few options for escape.

However, the research described does not examine the effects of this behavioural response on population demography and long-term survival.

The same foot and mouth disease access studies (PAA 2003 and Small and others 2002) as described above reveal increased sightings being reported of rabbits, foxes, badgers, hares, (at 2 to 10 sites by Small and others 2002), and at one site each for stoat, weasel, rat and water vole with no recreational activity on their sites. These observations are not scientifically derived but are indicative of changes in behaviour without disturbance.

Research suggests a metabolic and behavioural response by several mammals to disturbance by humans and dogs. There is no research of the impact at a population level.

Other animals

No research has been found that describes the effects or impacts of dogs on animals other than birds and mammals that is relevant to the British Isles. However, there are a few other pertinent comments. Bull (1998) in a report for the National Trust suggests that adders and other reptiles may be affected by disturbance. At Headley Heath, Surrey, adders were once frequent but have not been seen for many years, and the absence has been attributed to disturbance by dogs. However, there is no research to support or refute this statement.

Bull (1998) identifies the effects dogs can have in small water bodies by swimming in them regularly. This has also been witnessed for a great crested newt replacement pond in a suburban park by the authors. If the ponds are clay-lined, regular use can disturb the sediments, increase the turbidity, and potentially restrict photosynthesis for the submerged plants (in the same way as regular use by boats can in canals – Murphy and Eaton 1983).

It is possible that aquatic invertebrates and amphibian breeding could also be affected by the increased turbidity, but there are no scientific experiments on the subject. However, fences have been placed round ponds at Ainsdale and Birkdale Hills LNR to keep dogs out of natterjack breeding ponds because dogs in the water had previously caused significant sediment disturbance and the tadpoles failed due to a fungal growth.

Dogs can increase turbidity of some ponds thus affecting plants and possibly the invertebrates that depend on these plants or which require clear water.

Bull (1998) also quotes an occasion where foxhounds treated with synthetic pyrethroids for ectoparasite control damaged a native crayfish population when they paddled through a river. These pyrethroid chemicals are known to be highly toxic to freshwater life as evidenced by the strict controls on the disposal of sheep dip chemicals which use products from the same family instead of organo-phosphorus compounds (under the Groundwater Regulations, 1998).

There is no research on the impacts on other species. Some species may be affected in particular circumstances.

4.3.2 Synthesis of results

Although there are effects of dogs on a wide range of mammals, there is no evidence that populations are affected. Behavioural effects on a number of species of deer are documented, but no effects on populations have been detected due to dogs. Indeed, most species of deer in England have increased, despite disturbance of a variety of kinds (including farmers discouraging them from cereal fields), (Defra and Forestry Commission 2004). Similarly, badgers have expanded their range since full protection was given under the Badger Act 1992, and despite disturbance and road deaths (the largest cause of badger losses in Britain), numbers have increased nationally. Otters too have made a comeback after population losses due to habitat loss and pesticide poisoning. Although disturbance may determine where they breed, there is no research that shows that dogs have had a population effect on the national scale.

4.4 Dogs, diseases and alien plants

4.4.1 Diseases and parasites

Dogs can suffer from a wide range of diseases but those of interest here are the ones that may affect wildlife. Diseases of dogs that can affect humans (zoonoses) are described in Section 7, and cross references are given to avoid repetition.

Domestic dogs can potentially introduce various diseases and transport parasites into wildlife habitats. Furthermore, dogs can transmit diseases and parasites to wild animals directly and *vice versa*. Information presented in this section is taken from Thorne and others (1982), unless otherwise cited. The list is not exhaustive and publications such as *Blacks Veterinary Dictionary* (Boden 2001) contains more information about diseases and parasites that affect dogs.

- **Canine distemper** occurs throughout the world. All canids as well as other carnivores and mustelids are susceptible to infection. Transmission occurs via direct contact between susceptible individuals shedding the virus or by aerosol. Canine distemper could be a significant limiting factor for carnivore populations and is generally fatal in ferrets. Sime (1999) gives mortality rates from 20-100%, depending on the species. The disease could be transmitted among species, but not to humans. In Britain, dogs are routinely immunised against this disease.
- **Rabies** is an acute viral disease that can infect all warm-blooded animals, including humans, and it is generally fatal (see Section 7.7.3 for more details). Though often thought of in the context of bats, skunks and raccoons, rabies has also been documented in foxes, other canids, moose and deer. If rabies was to reach this country, domestic dogs could introduce it to wild animals before clinical symptoms appear in the carrier (symptoms take 10 to 21 days to be manifest) and *vice versa* (ie dogs could be infected by wild animals). Sime (1999) states that there are regular outbreaks of rabies in the United States that this results in extensive loss of wild animal populations throughout broad geographical areas.
- **Parvovirus** was first documented in the United States in the early 1970s. It is now considered ubiquitous in the environment, though it currently exists in variant forms other than the original strain. All canines are susceptible and it now occurs in a variety of strains, and can affect dogs, foxes, wolves and coyotes. Transmission occurs through contact with the faeces. In dogs, puppies and young animals are at most risk, and if untreated the animal can die. In Britain dogs are routinely immunised against this disease.
- **Plague** is an acute, infectious disease associated with rodents, rabbits and associated carnivore and scavenger species. It is also transmittable to humans.
- Dog faeces have been implicated in the transmission of **muscle cysts** (*Sarcocystis* species), which can infect a variety of ungulate species including elk, mule deer and white-tailed deer.
- **Leptospirosis** is a bacterial disease that affects the kidneys and urinary tract. In 1977, the Center for Disease Control in the USA considered domestic pets as a possible source for human infections (see Section 7.7.3 for more information). Many species of wildlife are affected, including small mammals, muskrats, white-tailed deer, antelope, moose, bobcats, foxes, beaver, raccoons, and skunks. In Britain dogs are routinely immunised against this disease.
- Finally, Thorne and others (1982) describe various other **ecto-** and **endoparasites** that can be transported by domestic dogs. They include ticks, keds, tapeworms and fleas. These parasites are usually species specific.

Bull (1998) describes the possibility of dogs causing **Hydatidosis** – cysts caused by the immature forms of tapeworm - in ruminants and pigs by excreting the eggs in the faeces from infected animals.

If sheep graze on contaminated pastures, they can ingest the eggs and become infected. Dogs are infected by eating meat containing viable cysts. Any problems are likely to be localised.

Another disease which could, theoretically, be inadvertently spread by dogs is crayfish plague. There is no evidence to support this theory, however.

No evidence was found to suggest that any of these diseases are significant at present, although rabies would be a major concern (because of its implications for human health) if it occurred in Britain.

4.4.2 Dogs as vectors of alien plants

As far as plants are concerned, there is the possibility of the transfer of alien aquatic plants on paws or fur from pond to pond eg New Zealand pigmyweed, Parrot's-feather or floating pennywort. There is no scientific evidence that this occurs, but birds can certainly move species like Canadian pondweed. However, there will also be many other carriers as well such as deer, foxes or stock using a pond or stream to drink, as well as human boots.

Dogs may be more regularly implicated in carrying alien plants that have exceptionally sticky or spiny seed cases such as pirri-pirri-burs. However, again, these would also stick to trousers and to other animals. Their spread is undesirable, whatever their carrier.

Dogs, as well as other animals and humans, could carry various undesirable plant species between sites or habitats.

5 Enrichment of habitats by dog fouling

5.1 Key points

5.1.1 Dog faeces and urination

- **1,000 tonnes of dog faeces is estimated to be deposited in the UK every day.**
- **Faeces can take up to 2 months to break down, it has the potential to accumulate on a site in certain conditions.**
- **Defecation largely occurs in the first 10 minutes of a walk.**
- **Most faeces are deposited within 1m of a path.**
- **Nutrient enrichment can be wider than the trampled zone where dogs run around more off paths, or peak in the same 1m zone if dogs keep to paths more.**
- **Soil phosphorus levels correlate with faeces density.**
- **The half life of the phosphorous was calculated to be more than three years, but is probably much longer.**
- **The levels of soil phosphorus found associated with faeces deposition zones exceed those of highly productive farmland.**
- **There is very little information on the levels of nutrient in dog faeces.**
- **Urination takes place near the site access or car park.**
- **There is little information on dog urine effects.**
- **It has been calculated that 30,000 litres of dog urine is deposited on Burnham Beeches NNR each year. For every tonne of faeces, it is calculated that there are 500 litres of urine also deposited.**

5.1.2 Managing dog fouling

- **Providing bins and entreaties to use them works on a local basis. Bins must be easy to empty, and not harm the landscape character of a site.**
- **Raising awareness of the issues re. time to breakdown, accumulation on the site etc. is needed.**
- **Provision of doggy bags is not environmentally sustainable. There is a considerable cost as well.**
- **Dog fouling is a major public concern on sites used by large numbers of visitors.**

5.2 Introduction

This section considers the environmental impacts of dog fouling and attempts that have been made to control it. Public attitudes towards dog fouling are discussed further in Section 7.

5.3 Environmental impact

It has been estimated (Encams 2004) that dogs in the UK produce approximately 1,000 tonnes of faeces each day. Dog fouling on low fertility soils where levels of deposition are high and concentrated presents a risk of habitat change through eutrophication. It has long been recognized that in nutrient poor habitats, such as heathland, chalk grassland and dunes the inputs of nitrogen,

phosphates and potassium from dog faeces can exert a significant fertilising effect. However, there are few studies which attempt to quantify or measure this. Studies are complicated further by the problems in separating the effect of fouling from the effect of trampling (trampling can cause mineralisation of organic matter and enhanced nutrient levels).

Deposition of dog faeces is known to have a significant fertilising effect, especially in low nutrient habitats.

The distribution of faeces and urine on a site is important, as explained in the next sub-sections.

5.3.1 Faeces

Deposition patterns

Defecation will normally take place within about 10 minutes of the walk starting (which could be from the car park, or from the home if walking to a site). In addition, most faeces will be deposited close to the path (Shaw and others 1995 found it to peak at about 1m from the path), unless the dog is running around. Frank Mawby (pers. comm, ex NNR manager) suggests that most deposition takes place within about 400m of the site entrance. Bull (1998) reports that dogs obey the 'two minute' rule: dogs tend to defecate in the first two minutes of arrival by car to a site (Forest Enterprise undated).

Faeces are deposited within about 400m of access point or 2 minutes of being released from car/lead, most within 1m of path, but wider effect if dogs not in close control.

Bull (1998) also cites Serpell (1997) reporting:

“that domestic dogs tend to defecate more when not on a lead and if the owner is not present, however this may be an effect by the owner”.

There is no information on how long dog faeces last in the environment after deposition. Personal observations by the authors for this study suggest that in winter a large deposit (as produced by an adult golden retriever) lasted two months in winter conditions at an altitude of about 300m in woodland. This is likely to be a maximum for winter conditions. Deposits are likely to rot down in summer more quickly, but when the weather is very dry or very icy, they could last longer. The accumulative effect of faeces is therefore important on a local and seasonal basis.

Dog faeces may take up to 2 months to decay.

Effects of faeces

Streeter (1971) studied the effect of visitor numbers on the vegetation and nutrient status of the soil adjacent to a footpath on chalk grassland on Box Hill, Surrey. The extent of replacement of the chalk grassland flora sward by crested dog's-tail and perennial rye-grass was about 50m from the path, even though soil compaction was pronounced only in the first 20-30m. Moreover, the peak in rye-grass content was correlated with peaks in available phosphorus which was apparent not in the bare path, but in the 10 to 65m zone from it. Streeter did not offer an explanation for this phosphorus enrichment, and the changes in soil nitrogen were less pronounced, but it is likely to be a product of dog faeces and waste food on this well walked site. It was also noted that there was enhanced total nitrogen and phosphorus levels in heavily trampled areas compared with areas of lower use, but very low levels in the bare paths where erosion was occurring.

A study at Headley Heath SSSI in Surrey (Shaw and others 1995) found that soil compaction and dog fouling declined with distance from paths and that the effects were greatest on a major path. At the study site 70% of footpath usage was by dog-walkers, and the main path carried up to 600 dogs per day. The authors also discovered that the distribution of soil phosphate and to a lesser extent ammonium nitrogen followed the same pattern as canine faeces, and all peaked at 1m from the path.

In areas where extensive dog walking was allowed, the input of nitrogen, phosphate and potassium from canine faeces and urine was shown to have the potential to exert a significant fertilising effect. Dog fouling (and trampling by humans) was associated with a shift away from heather towards wavy hair-grass.

A study in public recreation grounds found that there was a strong linear relationship between defecation density from dogs and soil phosphorus (Bonner and Agnew 1983). The relationship between the number of faeces in any area and the phosphorus levels were highly significant. There was a dependence of soil phosphorus on canine defecation input. The relationship was such that the phosphorous content can be used to monitor contamination of soils in the absence of contemporary dog use. The half life of the phosphorous was calculated to be more than three years, and would probably be higher since Gough and Marrs (1990) calculated that phosphorus derived from agricultural fertilising could persist for 30 or more years in heavy clays, and 12-15 years in sandier soils. The phosphorus levels recorded by Bonner and Agnew (1983) varied from 15-35mg/kg where there were no faecal deposits within the 5x5m² to levels around 80mg/kg where 14 faecal deposits were recorded within the 5x5m² around the sample point. This is a very high level, far in excess of that found on most intensively managed productive farmland.

Soils in semi-natural grassland generally have available levels of phosphorus below 8mg/kg (Gilbert 2000). The work by Bonner and Agnew (1983) showed that the areas with high dog usage had a phosphorus level almost 10 times higher than this (although they do not specify whether they are dealing with total or available phosphorus levels). The areas with low dog usage had a higher phosphorus level (15-35mg/kg) and the sites were improved grassland but did not have additional fertiliser applied.

A visitor survey of the sand dunes in Jersey by Milwain (1984) showed that where dogs frequently accompany visitors, nutrient levels can be much elevated beside paths. She found that species like wild thyme benefited from the enrichment, producing more luxuriant forms and flowering more profusely. However, there is a zone of rye-grass along many of the paths now that would correlate with both the effects of trampling and the zone of dog faeces deposition (pers. obs). Milwain (1984) showed a correlation between enrichment and dog faeces on fixed sand dune grasslands.

Various studies show correlation between soil phosphorus and faeces deposition; levels can far exceed those of fertile farmland.

A reference to dog eutrophication and experiments to ascertain the link between the nutrient input and loss of species diversity was located in the *Torbay Calcareous Grassland Local Biodiversity Action Plan* (Torbay Council 1997). However, the work undertaken so far has been a pilot scheme to look at popular routes and see which had most dog faeces and to assess the scale of the problem. Two routes were selected and the deposits marked along each route, this was repeated a couple of times through the year. The number of deposits on the routes at any one time could be calculated and the amount added in a given number of days anticipated, although this data will be site specific. It was of interest that the route favoured by regular visitors was more heavily soiled than the route used by more casual visitors.

In Bull (1998), there is a table that shows the approximate nutrient contents (dry matter basis) of dog faeces, of two diets (data courtesy of E.N. Davidson, Pedigree Pet Foods), this is reproduced here (as **Table 5.1**).

Table 5.1: Nutrient content of dog faeces

Nutrient	% by Diet	
	Wet	Dry
Protein	5.0	3.7
Nitrogen free extract or carbohydrates	29.5	48.3
Fat	5.6	4.6
Ash	33.4	24.7
Moisture	70.52	68.81

Some dog foods provide excess nutrients to improve flavour and this excess is then excreted. The deposition quantities of phosphorus, nitrogen and potassium will vary with the size of the dog, the dog's appetite, its diet and its state of health. However there does not appear to be even rough guidance on how much the amount of these nutrients in dog faeces varies. Nevertheless, if there is a link between reports of increasing obesity in dogs (eg Wilson 2005) and levels of nutrients in dog faeces, then this suggests that average levels of nutrient content in faeces is likely to be growing.

Only one source of information on faeces nutrient composition was found.

5.3.2 Urine

Most dogs will urinate when they are released from a car, and this is partly related to scent marking, as well as bodily functions. The effect of dog urine has been rarely studied but will be a significant nutrient input. From work at Burnham Beeches NNR (Barnard 2003) estimates of amounts of faeces and urine suggest that 60 tonnes is 'deposited' on the NNR each year and that of this between 33 and 48 tonnes of faeces is left *in situ*. They have also calculated that 30,000 litres of dog urine is deposited on the NNR each year. This relationship suggests that for every tonne of faeces there are 500 litres of urine also deposited.

500 litres urine per tonne of faeces calculated from one site.

The role of dog urine in eutrophication and its exact chemical composition has been poorly researched. Nitrogen in the form of ammonia is obviously an important nutrient that can directly damage vegetation and alter the nutrient status of the soil. This is more usually associated with bitches rather than dogs, and is reputed to result from a protein-rich diet that increases the acidity of the urine (pers. comm. Jonathan Wray, Animal Health Trust). Work on dog urine damage to lawns shows that the site of urination is obvious as a brown, circular patch a few inches in diameter. These patches may be surrounded in a few days by a ring of darker green, more vigorous grass, resulting from the nitrogen in the urine. Thus the effects are direct (burning the vegetation) and indirect (nitrogen enrichment to adjacent plants). Urine does more damage on dry soils, where the salts cannot be easily dispersed (Washington State University web site).

Nitrogen is expected to be the main nutrient from urine.

As there is little experimental evidence on the composition and nutrient inputs from dog urine and faeces, and their effects on sensitive vegetation, it is appropriate to infer from evidence from the use of fertilizers to show that the addition of these nutrients will alter floristic diversity and vegetation types. Depending on the rate and periodicity of fertiliser application, it results in either a reduction in or a loss of nature conservation value (see Crofts and Jefferson (1999) for a summary and a list of references). Nutrient application stimulates the growth of competitive species (mostly grasses) at the expense of other plants, notably broad-leaved herbs. All these effects were reported as being observed by site managers in the national survey.

Adding nitrogen results in loss or reduction in botanical diversity.

5.3.3 Effects on habitats

The critical thresholds of deposition of nitrogen from the atmospheric sources over which vegetation changes may be expected in semi-natural grasslands range from 15 to 30 kg N ha⁻¹ year⁻¹. Thus the levels of nutrients required to effect vegetation change are low. Given this, dog fouling clearly has the potential to cause vegetation change but whether this occurs will depend on the spatial distribution, timing and intensity of deposition.

Even low levels of additional nitrogen can have ecological effects. Urine levels add to this.

Work using empirical evidence of an increase in available soil nutrients (nitrogen and phosphorus) associated with urination and deposition from dog faeces in semi-natural habitats does not appear to have been undertaken. Chemical analysis of dogs' faeces and urine also needs to be readily available to enable an understanding of the amounts of nutrients deposited on the site. If more dogs are to be on leads in sensitive sites, or in sensitive seasons (eg to comply with the CRoW Act) this could lead to an increase in nutrient enrichment along the edges of paths and trackways, as well as at access points and around facilities such as car parks, unless the dog owners are better educated and more willing to remove the faeces at least.

5.4 Management of dog fouling

The management of dog faeces is a subject that provokes huge debate. The ideal would be that all faeces were collected by the owners and deposited in the doggy bins provided round a site or off-site if no facilities exist on site. Not only does the type of habitat and 'ruralness' of the situation seem to influence the level of removal of deposits by dog walkers, but the siting of bins also affects the amount of uncollected faeces. However, there are issues with the siting of the bins themselves. Firstly, the presence of bins may be appropriate in a town centre park or heavily used country park, but their presence may have an unwelcome visual impact on the character of a rural or remote site. The main points are that they need to be accessible to empty by vehicle or wheelbarrow on a regular basis and that they must not spoil the landscape and view for other users.

Provision of bins and entreaties to use them helps locally, but must be easy to empty, and avoid spoiling the character of a site.

At Headley Heath, which is a National Trust property, there was an experiment to install dog bins and monitor the effect on the number of depositions. The work is reported in Bull (1998). In brief dog bins were installed in the main car park and dog deposits monitored on 4 paths before, immediately after and well after dog bin installation. The results were statistically significant on all four paths showing a decline in visible deposits along the first 100 to 200m from the car park after bin installation. There was no statistical decline in the recorded dog deposits on paths from the lower car park where bins were not installed, the effect of the bins was therefore localised. However it was felt that although the desired effect had been promoted the bins did not contain the amount of deposits to account for the decline in faecal deposits on the path.

Teignbridge Council (pers. comm. Audrey Compton) has been tackling the issue of dog faeces for a considerable length of time. In an effort to highlight the number of deposits and the length of time that they remained on the site they used a variety of different colours of spray paint to mark the deposits. The work was undertaken to show the regular users of the site that the deposits lasted for a considerable time (depending on the weather, they stayed longer in dry weather, ie for several weeks), that the local authority was taking the matter seriously and they identified the areas the Local Authority wished to avoid having concentrations of faeces. The work was not reported in any way but served its purpose and there is only a small proportion of the number of dog deposits now on the site than there were 12 years ago.

The provision of doggy bags and dispensers is another issue, together with their costs to the providers of these facilities. For example, for several years the provision of plastic bags for the disposal of dog

faeces was a major item of expenditure in the Countryside Management Department of Teignbridge Council (pers. comm. Audrey Compton). The disposal of the waste also costs money. In the situation in 2005, the Countryside Management Department has to pay another council department approximately 50p for each bin emptied. This was substantially less than 2-3 years previously when dog waste was considered clinical waste and had to be disposed of at special dump sites, whilst now it can be deposited in normal landfill sites.

The cost of the doggy bag service is significant.

By pursuing an active wardening role, supplying facilities to deposit dog faeces, ie bags and bins, the problem can be reduced considerably. There is a circular walk around Decoy Country Park, in Devon, which is approximately three quarters of a mile long and which receives around 100,000 walkers a year. Counts here have shown that the dog faeces encountered on the ground have decreased to between 1-2% of what it was 10-11 years ago when 90-100 defecations would be noted on the circular route. By 2005, only 1-2 would normally be seen (pers. comm. Audrey Compton). The results of other experiments reported in Bull (1998) and personal communications show that dog bins can help with the problem but they are not an overnight answer and that raising public awareness is vitally important.

Raising public awareness on the issues is important, wardening increases compliance.

In addition, as raised by one of the questionnaire respondents at Burnham Beeches (England Marketing 2003), the use of plastic bags on such a scale itself is not environmentally sustainable. It would be better for dog walkers to be encouraged to re-use the many bags that are used to wrap food or unwanted mail for example, than for new bags to be provided.

The manufacture and distribution of plastic doggy bags carries an environmental cost which needs consideration.

Encams – formerly the Tidy Britain Group - (undated) has conducted research that shows that about 226,000 people complain about dog fouling each year to their local council. In 2003/04 Encams undertook a campaign to change behaviour of irresponsible dog owners, and to reduce dog fouling by 20%. After producing advertisements, leaflets and notices, they measured their success within four parks just after the campaign had started and two weeks later. In all areas except one the fouling had reduced by, on average, 40%.

Dog fouling is a major public concern on sites.

5.5 Synthesis of eutrophication effects

Concentrations of dog faeces and urine can clearly increase nutrient levels of soils. This is important on soils where nutrient levels, especially of phosphorus and nitrogen, are low and where this is critical for the survival of the vegetation. Heathlands, nutrient-poor grasslands and sand dunes will be the most sensitive to such enrichment. However, the extent and significance will depend on the numbers of dogs, where faeces are concentrated, the proportion of the site that is affected, and the presence of particularly important populations of species in the faeces deposition zone. For example, on the St Ouens dunes in Jersey, this deposition zone coincides with the main habitat for autumn lady's-tresses, childing pink and sand catchfly, all of which are key species on these dunes. The effects of urination along paths or in the wider area are unknown, but likely to be negative, if on a relatively restricted scale.

6 Dogs and land management

6.1 Key points

6.1.1 Dogs and livestock management

- **There are an estimated 20,000 sheep worried, and 5-10,000 killed, lambs especially, are killed by dogs each year.**
- **Farmers can abandon grazing if dog issues make land unviable, especially in marginal conditions.**
- **Ponies or cattle could be used to replace sheep where dogs are a problem, although the sheep may be better for the vegetation.**
- **If farmers will not graze a site, conservation managers may have to simulate grazing or use their own animals, with all the attendant problems this entails of stock management.**
- **Regular wardening and other means of persuasion can ensure nearly all dogs are kept on leads, and thus reduce stock incidents.**
- **Guard animals such as donkeys and llamas may be useful to protect vulnerable stock.**
- **Dogs could affect the way stock graze a site.**

6.1.2 The impact of livestock on dogs

- **Human fear of farm livestock is greater than the incident figures suggest.**
- **Once introduced, most people like to see grazing animals and regular walkers may help keep an eye on livestock**
- **Stock resilient to dogs are available, but are mostly cattle and ponies.**
- **Stock - dog incidents can be minimised by following a series of simple guidelines.**
- **In one review of conservation site grazing, there were few dog-induced incidents with stock.**
- **Few visitors in one survey knew the sites were SSSIs, and the implications of this in terms of the need for livestock grazing and concomitant dog management.**

6.2 Introduction

This chapter addresses the issues related to the effects dogs can have on land management in terms of the potential constraints they can place on grazing and choice of stock. There are likely to be a number of issues of concern that may arise in association with visitors with dogs, or dogs that are allowed to wander unaccompanied. These revolve around disturbance and damage to livestock farming, and to the constraints the presence of large numbers of visitors with dogs can place on effective habitat management using stock grazing.

Concerns that may arise in association with dogs and access are:

- **disturbance to or killing of livestock caused by dogs (thousands of incidents - some resulting in the death of the livestock - are reported each year (Bull, 1998));**
- **opposition to the introduction of a grazing scheme by dog walkers.**

6.3 Effects related to agriculture and conservation grazing

The key issue from the agriculturist's viewpoint is the number of grazing animals that are killed or maimed by dogs each year. A figure of 5,000 to 10,000 lambs killed per year, which does not include hurt and threatened animals, nor the level of abortion in disturbed ewes, is quoted in Bull (1998). Taylor and others (1999) quote figures of 30,000 sheep per annum being victims of dog attacks in the UK (at a cost of £1.7m). These are on all sites, not just those of nature conservation importance and the authors suggest that many of these can be attributed to 'latch-key' dogs (dogs that are let loose and allowed to roam at will, unaccompanied by their owners). In addition the National Trust has lost a few ponies that have been frightened by dogs off the sea cliffs in the South West. These were replaced by older animals that were more resilient to dog chasing (Bull 1998). On some National Trust coastal sites, animals have been removed to quieter sites in the main holiday season to avoid disturbance.

Large numbers of sheep and lambs especially are killed by dogs each year. Other stock can also be vulnerable.

There are farmers who abandon grazing because of the pressure of dog activity. This is most likely to occur on the urban fringe or on marginal land where grazing is barely viable. This problem may also coincide with the opening up of land for new public access. If these areas correspond to high value wildlife habitats, then maintaining and securing improvements could then be a problem if grazing were the best form of conservation management. For example, an area of chalk grassland in the South Downs Area of Outstanding Natural Beauty (AONB) is being grazed by cattle when sheep, or a mixture of the two, would be better because the farmer was concerned about the numbers of dogs and their effects on sheep (S. McHugh pers. comm.). S. Cooch (English Nature Dorset team, pers. comm.) also reports the situation of a farmer on Purbeck who had lost several sheep to dogs, and was threatening to remove the stock in the summer, with attendant effects on the limestone flora and butterflies. He would also be liable to lose agri-environment payments. Since the law prohibits loose dogs close to livestock, this sequence of events is of particular concern and highlights the difficulty of enforcing adherence to legal restrictions.

Farmers may abandon grazing because of the pressure of dog activity. This can adversely affect the nature conservation interest and condition of a site.

Bull (1998) gives the example of the National Trust's Ashdown House in Oxfordshire, where grazing that was needed to prevent shading of lichens and bryophytes on sarsen stones could not be introduced because of the threat of dog worrying.

High numbers of dogs on a site could affect the farmer more, possibly, than the conservation grazing manager. The farmer needs a financial return, and has invested in a particular agricultural management system, such as sheep or cattle. If sheep grazing becomes uneconomic or untenable because of harassment by dogs, livestock grazing may be abandoned. In addition, it may be very difficult to persuade a farmer to graze his stock on a conservation site if he perceives there to be a dog issue. This would only be resolved if the conservation site manager introduces the grazing scheme himself.

If a farmer will not graze, the conservation site manager has to use his or her own animals.

If sheep - or goats which may also be used for conservation grazing (Oates and Bullock 1997) - cannot be used on a site because of the presence and numbers of dogs, then the vegetation could suffer. Ponies or cattle may be appropriate in certain circumstances, although these can produce a vegetation structure and height not suited to particular species (plants or invertebrates in particular). In addition, cattle cannot usually be used on steep slopes, although ponies may be, as on the steep coastal cliffs in the South West (Oates 1998).

Ponies or cattle may replace sheep, although these may be less suited to vegetation management.

At Old Winchester Hill NNR (Hampshire), cattle were first introduced to the site in about 1976, although sheep were the preferred stock type, and were introduced subsequently when the site was well used by dog walkers, most of whom were allowed to roam freely. Sympathetic grazing is crucial to the ecology of the chalk grassland. Once stock were introduced, visitors were requested to keep dogs on a lead at all times except in the picnic area. To enforce this, there was a ranger present at the weekend and at some point each day as well. At least one dog was detected off the lead on most days still, but others were leashed as requested. To begin with there was much resistance to the restrictions, but this calmed down subsequently. However, there were ongoing problems with some people deliberately ignoring the requests to leash dogs. The stock were Herdwicks and Beulahs and Easycare crosses. None were killed between 1990 and 2005 (Barry Proctor, pers. comm.).

Wardening and other means can ensure nearly all dogs are kept on leads.

In more urban fringe areas, there can be greater problems. The GAP internet discussion group discussed the issue of a goat nearly being killed by a dog that its owner refused to leash on one site and others killed by unaccompanied dogs on another, both in Surrey. The concern was more related to the headline grabbing issues. If more stock were put on a site, the media could interpret this as sending more to their deaths - not a useful way of dealing with the issues involved, but a highly emotive one (GAP 'nibblers' internet discussion group November 2004).

Bull (1998) raises the possibility of using guard animals to protect vulnerable stock. Conventionally in some European countries guard animals have included Pyrenean Mountain dogs, and other breeds specially trained for the job, but there is some discussion of employing llamas or donkeys for the task. Research at the University of Iowa (Franklin and Powell 2003) has shown that llamas can be used as guard animals and have been marketed in the UK as being able to protect sheep against foxes, feral and aggressive domestic dogs (Rose undated). The llama responds to a threat by sounding an alarm call, chasing off the intruder and, if all else fails, kicking it.

Guard animals (such as llamas or donkeys) may be a useful means of protecting vulnerable livestock against dogs.

There is also the potential for visitors to alter the grazing pattern of livestock at a particular site. Although there appears to have been no research undertaken on this topic, it does seem possible that the presence of people has the potential to change the pattern of grazing of livestock such that they will graze preferentially in areas near to or distant from visitors. The behavioural response will depend on stock type, breed and the animals' previous experience of contact with people. Bull (1998) for example, quotes the example of Arnside Knott in Cumbria where Hebridean sheep seemed to be deterred from grazing close to the car park where there was no steep refuge ground from dogs. It is possible that dogs may influence the re-hefting of sheep when an area is being re-stocked (such as occurred post-foot and mouth disease in Cumbria). Hart (2004), in his very practically-oriented book on hefting, makes no mention of public access or dogs as being a specific problem when re-introducing stock to hefts.

Dogs could affect the way stock graze a site, ie some areas are avoided.

6.4 The impact of livestock on dogs

The second issue is where grazing is required for conservation reasons but the site has such a high level of dog walking that this jeopardises the scheme. There are many reasons why site users may object to grazing, including the need to fence an unfenced site, and the fear of stock. A varying proportion of those with concerns will also be dog walkers.

The main concerns expressed relate to aspects of health and safety. These can be translated as:

- fear of larger animals when with dogs (this is discussed further under Section 7);
- any dangers associated with stock and dogs;
- worries about any diseases that could be caught by the dogs from stock or their faeces.

Many people have a real fear of animals, especially large ones, despite the fact that actual incidents are rare. The level of anxiety is not really justified by the available statistics on incidents. Nicol, Jones and Lomax (2000) analysed Health and Safety Executive (HSE) data for life-threatening injuries sustained by the public in fields (as opposed to large open spaces) involving stock for a grazing feasibility study for Chasewater Heaths and Gentleshaw Common. They found that there were 13 cases nationally over 10 years; three involved bulls and the rest were from cows with calves at foot.

The perception of fear of stock is greater than the incident figures suggest.

The perception of threat seems to be far greater than the actual risk (especially in the open setting of many conservation sites compared with enclosed small fields), and there are a number of cases where grazing has been introduced, and the public's response after the event has been very positive (for example in the Malverns where special trips took place to see the animals – PAA 2005). In addition, conservation grazing on low productivity sites is increasingly turning to traditional and hardy breeds that tend to be smaller and more placid than dairy cows and other modern breeds.

Once introduced, most people like to see grazing animals.

However, the choice of stock for grazing could be compromised by the number of dogs using a site. National Trust (pers. comm. Matthew Oates) is strongly of the opinion that sheep are not suitable for sites with large numbers of visitors with dogs, and Bull (1998) mentions two properties where sheep were replaced by cattle as being more 'dog-proof'. On some sites, for example on Ashdown Forest, sheep are grazed by commoners in quite high numbers, in a site which is well-used by people and their dogs. Although dog attacks on sheep do occur on sites used by visitors, and animals can die, this is not a common occurrence on sites of nature conservation importance and on larger, more open sites. A number of every kind of grazing stock die each year anyway for a variety of reasons, and dog worrying has to be put into perspective on sites of nature conservation interests.

The *Breeds Profile Handbook* (Grazing Animals Project 2001) gives the resilience to dogs of a wide variety of sheep, cattle, pony and other animals. Except Beulahs (that can stand up to dogs) and Hebridean (that tend to keep out of the way), all sheep and goat breeds are susceptible to being harassed by dogs. However, there is a wide choice of ponies and cattle that are much more tolerant, and ignore dogs. Stock resilient to dogs are available.

As well as choice of stock, there are a number of sensible precautions that can be taken when introducing grazing onto a nature conservation site that would minimize the effects of dogs, and the concerns of the public. These might include the following:

- to avoid using very large stock, as these appear more threatening;
- to avoid using animals with horns which could be potentially threatening; although in Hampshire, the County Council experience (via the GAP internet discussion group) is that grazing with Highland cattle, which have long horns, prevents vandalism and juveniles with sticks etc, since the animals look able to defend themselves, even though they are very docile. Nevertheless, they have been known to inflict fatal injuries, as occurred in Scotland in 2003;
- to avoid animals that are too inquisitive. Animals that do not approach and ignore visitors, and are not too tame and looking for tit-bits, would be better;

- cattle might be more useful than sheep or goats since the former are generally relatively indifferent to people and dogs, and compatible with publicly accessed sites (Hampshire County Council, GAP internet discussion group 06.08.04);
- older, less skittish animals might be more useful. In addition, these can cope with poorer herbage on many nature conservation sites at this stage of their life cycle, which would be an added benefit;
- animals which are attractive to the public would engage the visitor better, since many people enjoy seeing stock (although maybe at a distance);
- stock that are used to public contact are less likely to react to people and dogs;
- water troughs and feeding points should not be located close to car parks or public access points to avoid concentration of dung where there are high concentrations of people, and where there is more bare ground which is already under considerable pressure;
- on the whole it is best to avoid breeding on site, at least until the visitors and their dogs are used to the animals, so that there is less conflict with calves or lambs when mothers are at their most protective and aggressive towards dogs;
- the full use of signage informing visitors that stock are present, and could be met on a site is important, so that visitors are not surprised by finding grazing animals;
- education of visitors not to approach, or feed stock, and to keep their dogs under close control and away from the grazing animals;
- a full programme of education, information and interpretation should be available for all visitors, including a targeting of regular dog walkers with events such as ‘adopt an animal, ‘come to meet the animals’, to increase public understanding and remove any fears;
- volunteers, preferably those who walk dogs regularly, should be encouraged to watch out for the stock. Some could be trained as ‘lookers’, as GAP calls them.

Cattle can be rather curious if they come into close contact with dogs, but groups of younger bullocks, for example, are more likely to chase a dog than older animals. Experience (reported on the GAP internet discussion group) on Avon Heath Country Park and in the New Forest by Richard Collingridge, and by English Nature in Dorset show that there are a number of examples of stock on publicly accessed sites with large numbers of dog walkers. Another GAP internet discussion group respondent recommends having dogs under close control, and instructing visitors to let the animal go if being chased, rather than trying to protect it. The Pembrokeshire Coast NPA, quoting advice from the Ramblers’ Association, say the same on their website. The new Countryside Code repeats this advice. This avoids any collateral damage to the dog owner, which is the reason for most injuries (HSE 2001).

There are a number of ways of reducing stock–dog incidents, such as choosing animals that appear not to pose a threat to humans (eg ones that are docile, small, not inquisitive, habituated to public presence); ensuring stock-related activities occur in less visited areas (eg locate water and feed troughs away from gates and paths); providing information to visitors about the stock; recruiting, training and deploying volunteers as ‘lookers’.

In a wide ranging investigation of how site managers deal with (*inter alia*) the issues of dogs and stock management for a grazing feasibility study for Cannock Chase (PAA 2005, unpublished), the authors found that across 12 consultees there had been few issues related to the public and negative impacts by stock of any kind reported, and only a small handful of incidents of a few dogs being kicked, or people intimidated. The level of incident was very low considering that many of the sites involved were regularly visited by many dog walkers. Several consultees had experience of more incidents in the first year of grazing being introduced, and once the visitors

Stock-dog incidents were rare on conservation sites in one review.

had learnt about the stock and its needs and behaviour, and the stock had become accustomed to the site, then the number of such occurrences declined.

The key to introducing conservation grazing onto sites where there has been none for some time is thorough consultation, and efforts to ensure that all stakeholders understand fully the issues involved from all points of view. If the results from visitor surveys undertaken at Cannock Chase, Sutton Park and Gentleshaw Common by Craig (2002) are representative of other sites, it would appear that the majority of site visitors do not know that sites might be SSSIs, or why they are of high wildlife value. Craig, for example, found that 80% of Sutton Park's visitors were ignorant of its designation, whilst a much lower percentage did not know that Gentleshaw Common (46%) and Cannock Chase (65%) were SSSIs. Part of the consultation needed on possibly many sites will therefore involve ensuring that there is a greater understanding of the importance of sites for nature conservation, and the British and European obligations that this brings.

Few visitors may know about the conservation value of a site.

6.5 Synthesis of key points

It is clear from the research that the presence of dogs affects land management decisions in two key respects. Firstly, because of the threat dogs pose to livestock (particularly sheep); where substantial numbers of dogs are likely to be present, land managers are unlikely to want to use the land for sheep production, and it is more likely that the land would be used for cattle and/or ponies.

The national statistics available suggest that the concern over sheep is justified with reports of up to 30,000 dog attack victims each year in the UK (although few of these are likely to occur on nature reserves and a significant proportion may be caused by 'latch-key' dogs). Where sheep are necessary for maintaining habitat quality, and dogs would pose a threat to them, various measures can be considered (eg wardening, use of guard animals, education and awareness-raising campaigns) although there will always be doubts as to whether any measure or combination of measures can be totally effective. Animal welfare will thus remain a concern.

Secondly, there have been a number of initiatives in recent years to re-introduce grazing to some areas to improve the nature conservation value of degraded habitats. Where the land is open for public access, the grazing management plans have to recognise the presence of people (and their dogs) and the concerns that people may have over the introduction of large grazing animals. This can be a constraint to maximising the nature conservation benefits of grazing.

In practice, the concerns that people have appear to be inflated when viewed against the available statistics. They have been shown, at sites where cattle grazing have been re-introduced, to have been rapidly resolved. Nevertheless, it is sensible to take this concern into account if grazing is to be introduced to a site and measures can be taken to ensure that fears are not realised. There are a number of ways of reducing stock-dog incidents. These can be summarised as:

- choosing animals that appear not to pose a threat to humans (eg ones that are docile, small, not inquisitive, habituated to public presence);
- ensuring stock-related activities occur in less visited areas (eg locate water and feed troughs away from gates and paths);
- providing information to visitors about the stock;
- recruiting, training and deploying volunteers as 'lookers'.

Thorough consultation with local people and stakeholders is likely to be the best way of overcoming concerns and designing a workable grazing management plan.

7 Dogs and society

7.1 Key points

7.1.1 General points

- **Dogs exist with people throughout the world, but are regarded differently in different countries.**
- **National Parks in other countries have regulations to control where dogs are allowed, sometimes using permit schemes, and when dogs must be kept on a leash.**

7.1.2 Patterns of behaviour of dog owners

- **Some dog owners behave irresponsibly failing to clear up after their dogs, and allowing them to chase wild animals and livestock. 72% of respondents in a survey agreed strongly or slightly with the statement that “dog fouling in the countryside is a big problem”.**
- **Many dog owners are not aware, or are not willing to accept, that their dog may be damaging wildlife.**
- **Contact between conservationists and dog owners to share information about reducing the impact of dogs appears to be beneficial.**
- **Dog walkers will tend to take a regular route during the week, usually close to their home whereas routes used at weekend are often further away from home.**
- **Families with children are more likely to own a dog than those without.**

7.1.3 Benefits of dogs

- **As dogs need daily walking, their owners gain benefits from regular exercise and access to the countryside.**
- **Dog ownership results in important health, psychological and social benefits for all family members.**
- **Studies have shown that dog ownership produces beneficial physiological effects in people such as favourable changes in blood lipids, glucose, blood pressure, immune levels and pain relief.**
- **Pets in schools promote emotional maturity amongst children by fostering a sense caring and responsibility, stimulating a desire for learning and engendering a calming effect that makes for an environment more conducive to learning.**
- **In Western society, dogs have assisted humans as working dogs but their potential as assistance dogs is only recently being extended – dogs have now been trained to alert epileptic owners to imminent seizures.**
- **Sales of dog food were nearly £1bn in 2003.**

7.1.4 Risks associated with dogs

- **Suckler cows with calves pose a risk to dog walkers when crossing fields.**
- **One of most significant risks arises from people trying to rescue dogs from waterbodies.**
- **Dog-borne zoonoses are not a significant threat to human health.**

7.2 Introduction

Dogs have played a significant role in British society since at least medieval times. There are benefits that continue to derive from dog ownership, both at an individual and society-wide level.

7.3 Perception of dogs in the countryside

A number of recreation surveys and some discussion groups have explored issues of public perception of dog walkers and non-dog walkers, in relation to their knowledge and views of different sites.

7.3.1 General public

The relevant findings are summarised here (in **Table 7.1**).

Table 7.1: Summary of public perceptions of dogs in the countryside

Site	Habitat	Comment	Source
Burnham Beeches	NNR, cSAC, ancient woodland, wetland, heathland, grassland, secondary woodland	1 in 5 visitors felt dogs were hindering their enjoyment of their walk	Barnard 2003, England Marketing 2003
		86% felt leaving dog faeces on site was unacceptable	
		95% of dog walkers claimed to clear up after their dogs	
		67% felt that most dogs were under effective control	
		Creation of dog-free zone welcomed by 56% of visitors	
		76% felt that dogs chasing wildlife was unacceptable.	
Cannock Chase, Sutton Park, Gentleshaw Common	Heathland, secondary woodland, scrub, bracken	70% of visitors would support or strongly support keeping dogs on leads to minimise disturbance to wildlife, but 53% thought it was not important	Craig 2002
Chichester Harbour	Land-based visitors round harbour	19% were walking a dog 13% complained of dog mess, and 5% wanted more dog bins	Wilton 2003
		2% complained of loose dogs	
Scotland	Public attitudes to access in general	55% of respondents who walked daily in the countryside had dogs, but were less likely to take part in open-air recreation for a day out or to entertain children	NFO System Three (2001)
Sherwood Forest, Rufford Country Park	Forest and heath	More dog bins and a few wanted dogs to be on leads	ACK Tourism in association with RJS Associates Ltd 2004

Site	Habitat	Comment	Source
Cannock Chase	Conifer Forest, heath, scrub, grassland	81% of dog walkers visit once or twice per week in summer, and 75% in winter visit with this frequency, dog walkers tended to be more local than other visitors, most from 0 to 5mls radius, daily use by visitors c.12% (national average 4%)	Ball and others 2000
		22% of total visitors, 27% of walkers were dog walking out of 1.27 million visitors/yr	
		9.9% found dog walkers detracted from their site enjoyment, concerns about fouling (4.6% of a user group), wanted more dog bins	
Loch Leven	Lake and surrounds NNR	Dog fouling in public areas, need for more dog bins, concern about dogs affecting wildlife all drawn out of discussion groups	Report of public meeting SNH 2004

One topic that is raised consistently is that of the extent of dog faeces, and the extent to which this distracts from the quality of the recreational experience. Research by highway authorities (in preparing their Rights of Way Improvement Plans) found that the presence of dog mess is a deterrent to other users (eg Land Use Consultants 2004, ADAS Consulting 2004). In Cheshire, 7% of respondents said that provision of bins and/or removal of dog mess would improve their enjoyment of use of rights of way (Cheshire County Council 2004). In Bedfordshire, 72% of respondents agreed strongly or agreed slightly with the statement that “*dog fouling in the countryside is a big problem*” (ADAS Consulting 2004).

72% of respondents agreed strongly or slightly with the statement that “dog fouling in the countryside is a big problem”.

The two key detracting factors inhibiting visitor enjoyment of Burnham Beeches were the number of dogs walked there, especially the faeces left, and issues related to traffic. Out of control dogs were also highlighted, and there was considerable support for a dog-free zone. The types of comments received included the following:

- “Dog mess, especially in areas where children play”
- “Being terrified of dogs, and very few being kept on leads, problem of owners just opening car doors and letting the dogs run by themselves”
- “Too many dogs out of control”
- “Too many dogs loose on the common, charging around out of control and even knocking down children”
- “Irresponsible dog owners, especially re. Horses”

When asked specifically about certain behaviour, the majority of respondents found the following unacceptable:

- A dog worrying stock (90%).
- Dog walkers not cleaning up after their dogs (86%).
- A dog fighting with other dogs (79%).

- A dog that is chasing/disturbing wildlife (78%) (the author points out that this implies that 135,000 visits each year are made by people who are not sure if it is acceptable for their dog to chase wildlife, and another 11,000 may think that is acceptable for their dogs to do this—Barnard 2003).
- Being approached by a dog you don't know (28% overall, but 80% of non-dog walkers).

Although the majority (67%) of the respondents felt that the dogs on site were under effective control, 21% felt that only a few dog walkers had effective control over their dogs.

The total use of Burnham Beeches by visitors is in the order of 550,000 per year, with over 300,000 dogs, which equates to 1,000 dogs visiting per day, or 100 present per hour. Although much mess is cleared up, some 200,000 deposits are not.

Although issues of dog mess and dogs detracting from the recreational experience were reported at Cannock Chase (Ball and others 2000), the scale of the concern is less than at Burnham Beeches. Key issues there are the conflict with cyclists and other users with whom everyone shares the tracks, although Craig (2002) (from a much smaller sample) found strong support for dogs being kept on leads. The scale of a site (Cannock is very large – 850ha or so of heathland plus extensive forest), the numbers of dog walkers, and the concentration of dogs in certain areas will all be relevant in an assessment of the relative significance of any issue.

7.3.2 Dog walkers' perceptions

From the dog walkers' point of view, walking a dog off a lead provides a better recreational experience, and exercises the dog better. The Kennel Club Press release 09.07.2001 related to the New Forest dog owners group's consideration of issues related to dogs on leads and the CRoW Act, noted that a local veterinary surgeon felt that she and her colleagues had recently started witnessing behavioural problems with dogs brought to their practices due to lack of exercise and being kept on the lead. It was felt that dogs get far more exercise off the lead and this form of exercise gives the greatest pleasure to both dogs and their owners.

Dog walking is an important social activity, with many participants meeting and chatting on a regular basis to people they may not otherwise know. For people who are isolated in the community, this could be very important interactive time.

The Burnham Beeches survey (England Marketing 2003) provides some interesting insights into the issue of clearing up dog mess. A higher percentage of the dog owners left faeces on the Main Common (33%) than the Paddock and Heathland (12%), and the comments in the questionnaires suggested that some walkers did not think it mattered if their dogs fouled away from the Main Common, and even trained their pets to foul in these other areas (which are more sensitive to eutrophication). Observations of visitors in the Burnham Beeches survey showed that although some 95% of visitors claimed to clear up after their dogs, many did not, and some were seen to appear to clear up mess, but then left it when they thought they were not observed. The observational research identified that less than half of the dog walkers cleaned up after their dog had fouled, and that they were more likely to clean up on the Main Common than in the Paddock and Heathland areas. Some failure to clear up dog mess was genuinely due to missing the activity when animals were hidden in undergrowth. Female dog walkers are more likely to clean up after their dog has fouled than male dog walkers.

Some walkers did not feel that it is necessary to clean up after their dogs in areas away from the Main Common, especially when there were other animals such as cows and sheep living in these areas with faeces left on the ground. Although many visitors (81%) were aware of the value of Burnham Beeches for nature conservation, it was clear that the dog owners were not aware of how the abandoned faeces might affect the ecological nature of the site. Comments were received such as:

- *“My dogs only foul in the woods and I don’t consider it necessary to clean up there”*
- *“Plastic bags cause more environmental pollution than quickly decaying dog faeces”*
- *“I have trained my dogs to use the woods not the paths or main common areas. Therefore I consider their excrement to provide natural nutrient for the soil”*
- *“My dogs don’t mess on the paths, just in the undergrowth”*

The dog walkers are generally aware and make use of the dog bins and dog bag dispensers around the site, although many bring their own bags. Most (95%) were aware of the bins provided, although 7% did not use them. It is important that such bins are regularly serviced, and this was raised as an issue in the Burnham Beeches survey.

The surveys suggest that dog walkers on the whole are not aware of the potential for dogs to impact on ground nesting birds and for eutrophication of soils to be an issue on sensitive sites, and on some sites (eg Cannock Chase, Craig 2002) are not aware that there is a high nature conservation value such as an SSSI designation. Although the majority agreed that chasing wildlife was not acceptable behaviour at Burnham Beeches, there can be very strong resistance to being asked to leash dogs in such sites (eg the public outcry which arose in the New Forest in relation to anxieties about the CRoW Act). Much of the disturbance that dogs might cause may not be visibly witnessed as chasing.

Many dog owners are not aware, or are not willing to accept, that their dog may be damaging wildlife.

Flushed birds may not be seen. In addition, dog faeces represent an importation of nutrients onto a site (given that the dog’s food is grown elsewhere) whereas the extensive grazing of livestock implies a net export of nutrients (the nutrient value in their faeces is derived from nutrients grown on the site and nutrients are removed in the form of meat). These messages need to be shared with dog walkers.

7.3.3 Management of dog walkers

Forest Enterprise estimates that there are over 50 million visits made to their woods every year and that about 14% of these visitors are accompanied by dogs. Harrop (1999) reported that there were a number of incidents reported to Forest Enterprise each year which included dogs. These were:

- Concerning deer 297
- Concerning other wildlife 186
- Concerning general nuisances 169
- Concerning people 36

At that time, the following solutions with pros and cons for each were suggested as shown in **Table 7.2**.

Table 7.2: Methods of preventing problems from people with dogs on forest enterprise property.

Solution	Pros	Cons	Effectiveness
Byelaws	Legal back up	Difficult to enforce	Low
Dog loops	Segregates dogs and people	Problem moved not solved	High (in right location)
Dog free/ no fouling areas/ zones	Segregates dogs and people	Problem moved	High (dogs go somewhere else)
Education	Treats problem	Difficult to target dog owners	Moderate
Know your visitor	Helps planning use of wood	Problem still exists	Moderate
Rangers	Directs people and dogs and educates	Can't be there all the time	Moderate

(Source: Harrop 1999)

In 2003, Forest Enterprise carried out an internal survey of the issues relating specifically to dog walkers (Harrop 2004). Most of the views given by their managers related to managing the problems rather than banning dogs.

Issue related ideas

- sacrificial area adjacent to car park or paths of short grass to encourage dogs to use this area, combined with a variable mowing regime to allow faeces to decompose;
- zoning areas through fencing and scrub/long grass to keep dogs away from picnic area or play area;
- education programme (eg better understanding of Toxocara, posters);
- dog walking zones in car park and short dog walking paths at the start of walks;
- codes of conduct;
- dog free/ dog use zones;
- dog faeces clear ups (one location reports 30lb (15.4kg) collected over February half term);
- dog taxes;
- dog on lead areas
- biodegradable poo bags;
- poop scoop bins - there is general concern about the poop scoop approach, the environmental problems associated with them and possible alternatives.

Dog positive ideas

- dog parking areas (around visitor centres);
- dog taps and dog drinks;
- involving dog walkers in consultative forums;
- talking to owners on site;
- partnership with dog training company;
- on site dog grooming;
- dog wash;

- partnership with dog rescue centre to "walk a dog and get healthy".

However, research suggests that some of these measures may not be welcomed by dog owners. For example, at Burnham Beeches (England Marketing 2003), the dog owners found areas where dogs had to be on a lead, the lack of areas where they could train their dogs, and of separate areas especially for dogs detracted from their experience. 65% of dog walkers disagreed with the idea of a code for dog walkers, compared with an overall 69% of all respondents who strongly agreed or agreed to the need for one. Similarly, 76% of the dog walkers strongly disagreed with the need for a separate area for dogs compared with 49% of all respondents who did.

There is clearly a need for much better sharing of conservation and recreational messages between nature conservationists managing high value sites and recreational users.

Steps have been taken along these lines by a number of organisations such as the National Trust, and some Local Authorities. Extracts of Guiding Principles and Good Practice from several different organisations are included in **Appendix 2**. Also, the Countryside Agency, the Kennel Club and English Nature have produced a leaflet *You and your dog in the countryside* (Countryside Agency and others 2005).

Contact between conservationists and dog owners to share information about reducing the impact of dogs appears to be beneficial.

As part of this research, a member of the consultancy team attended a briefing session provided by one of the major dog re-homing organisations. The purpose of the briefing was to educate prospective new dog owners on how best to look after their dogs. The briefing did not include any information about good citizenship, such as the need to clear up dog mess, about dogs worrying livestock, nor about environmental implications. However, this material may have been provided at other times or in other forms (eg leaflets).

7.3.4 Dog management in National parks in other countries

Information was sought via the internet of approaches to managing dogs in sensitive areas in other countries. National park status was taken as an indicator of high value sensitive areas. As text strings used for searching were in English, the information obtained is skewed towards English speaking countries. However, as highlighted below, these will tend to be countries in which dogs enjoy a similar status to that in England. It is important to note with respect to National Parks in many other countries that:

National Parks in other countries have regulations to control where dogs are allowed, sometimes using permit schemes, and when dogs must be kept on a leash.

- much of the land is state owned;
- there is seldom a network of rights of way as there is in England and Wales;
- most are prime nature conservation sites;
- human impacts are also heavily regulated (eg limits to the numbers of visitors in parks).

United States of America

In United States National Parks, dogs are recognised as being predators and therefore disruptive to wildlife. The Department for the Interior regulations (revised 2004) lay down regulations for dogs in all the National Parks in the USA which include:

- the superintendent in each park may designate areas that dogs cannot enter at all;
- dogs must be on a leash, no longer than six feet, at all times, or they must be caged or crated;

- leaving dogs unattended and tied to an object is prohibited;
- pets running at large may be impounded (dogs may become prey for bear, coyote or other predators. They may also become feral and/or turn to preying on the wildlife);
- if pets running at large are seen killing or molesting any animal, they may be destroyed;
- all dog faeces must be removed.

Some dog walkers infer from this and their own experience that the majority of national parks in the USA do not welcome pets (Kain 2002). The general policy is that dogs must be kept on a short (6 ft) leash, and are only allowed in parking areas, within 15m to 30m of the road, or within developed areas such as campsites. The majority of parks do not allow dogs on hiking trails, beaches or inside buildings. Some exclude dogs altogether (eg Isle Royale – see <http://www.isle.royale.national-park.com/visit.htm>).

Recent negotiations with dog walking groups over the management of dogs at Golden Gate National Recreation Area (Golden Gate National Park Service 2003) reveals much the same concerns about dogs and their environmental impact, and similar solutions (summarised in visitor leaflets – see: <http://www.nps.gov/goga/pets/pdf/pets.pdf>).

The introduction to the Redwood National Park pet information recognises that Americans enjoy dogs' companionship and affection as well as appreciating their practical skills. (Redwood National Park Visitors Guide on www.redwood.national-park.com/visit.htm)

New Zealand

The situation is similar in New Zealand. The New Zealand Department of Conservation starts its pet information web page (www.doc.govt.nz/Conservation/002~Animal-Pests/Pets.asp) by saying that people generally like pets for company and affection or as partner in leisure activities such as hunting and fitness. However, they have called this sheet *Your Pet is a Predator*, which unequivocally states how they regard pets, including dogs. Predators introduced by man are a significant concern to New Zealand conservationists as many rare ground nesting and/or flightless bird species have evolved in the absence of dogs or dog-like predators and so are particularly vulnerable.

The government does recognise that although dogs are not a primary cause for the decline of many species, they are a contributing factor (NZ Department of Conservation 2003). Conversely, the Department also uses dogs positively in its work, by using them to locate other predators such as stoats. They are also part of pig, goat and gamebird hunting and control in these areas. Lastly, but not least, they are used to help find rare bird species – but are always muzzled.

The Department of Conservation has three classifications of dog areas:

- Controlled Dog Area (No access) – where there is rare or vulnerable wildlife;
- Controlled Dog Area (Access by Permit Only) – which states the activity and purpose for the dog to be in the area;
- Open Dog Area – Where dogs may be taken without a permit, but should be under control at all times, faeces must be removed from all amenity and access areas, and the maximum number of dogs allowed with one person is three.

The New Zealand Dog Control Act 1996 (s10) requires local authorities to have a dog management policy in place. Examples found include those for Thames-Coromandel Peninsula (Thames-Coromandel District Council 2000) and City of Auckland (undated).

Australia

In Australia, the Dog Control Act 2000 is now the principal means of controlling dogs, and requires councils to develop a dog management policy. Broadly there are five main policy responses to the issue of dogs:

- provision of free-running areas (ie unleashed access providing dogs remain under 'effective control');
- banning;
- different zones in one park;
- time-share arrangements;
- seasonal variations have also been used although mainly on beaches, eg dogs banned from November to April in the bird breeding season.

An example of a proposed management strategy for a National Park (in Victoria State) is provide as an example (see **Box 7.1** below).

Box 7.1: Proposed management strategies for bunurong marine national park

“Permit dogs restrained on leads on walking tracks, visitor sites and certain specified beach areas of the planning area:

Between November 1st to March 31st [note: the Antipodean summer] (...) allow access to the above areas between the hours of 6 pm and 9 am only.

Permit dogs in the Bunurong Marine NP where confined to a vessel and under control at all times.

Require dog owners to dispose of their dog excrement so as not to cause a nuisance to other visitors or wildlife

Ensure adequate park information is provided to visitors through park notes, information signs and ranger patrols describing dog restrictions and the importance of the planning area for hooded plover conservation.

Monitor the impact of dogs in the planning area on wildlife and other visitors.

Take appropriate management action to control any impacts.”

Source: Parks Victoria (undated)

A dog management policy for a more urbanised area has been developed by Kingborough Council (in Tasmania). (see <http://www.kingborough.tas.gov.au/webdata/resources/files/dogpolicy1.pdf>).

South Africa

The South African National Park service is responsible for managing Cape Peninsula National Park, an area of undeveloped, publicly owned land surrounding Cape Town and its suburbs. The National Park is used by approximately 78,000 regular dog walkers. Together with the local dog walking group (Friends of the Dog Walkers), it has formed an environmental management programme for walkers accompanied by dogs in the Park (CPNP and FDW 2002). Key points in the programme are:

- a baseline assessment was conducted to identify areas from which dogs were excluded;
- identification and quantification of impacts of dogs;
- development of a code of conduct;
- issuing of a green card (needed by Park users and only granted to dog owners assessed as being responsible users);

- prohibition of dogs from certain areas.

European countries

Websites were found that provided information on dog management policies in National Parks of three European countries:

Country	Park	Policy
Sweden	Swedish Environmental Protection Agency ⁵	“In several parks you are not allowed to light fires, to camp or to bring a dog which is not on a leash.”
Latvia	Kemeru National Park ⁶	“Dogs: dogs on a leash are allowed within the park.”
Poland	Białowieża National Park ⁷	“... it is forbidden to: ... bring in dogs without leads or muzzles”. In special areas, no dogs allowed.

7.4 Cultural status of dog ownership

7.4.1 International context

Brickner (2003) suggests that the dog population worldwide is around 500 million, with their abundance locally influenced by factors such as geography, climate, availability of food and shelter. Their presence and distribution depends largely on the attitudes of humans in the country. These in turn are deemed (Veitch 2002 quoted in Brickner 2003) to be related to perceptions about care for the natural environment, care for a harvestable resource, the level of disease carried by dogs and the value of dogs as pets.

Bartlett (2001) presented a summary of cultural attitudes to the dog, from an animal welfare and rights perspective. His analysis is summarised in **Table 7.3**.

Table 7.3: Summary of cultural attitudes to the dog

Country/Region	Aspects of cultural attitudes
North America, Europe, Australia	Dogs kept as pets Stray dogs not tolerated on welfare grounds
Eastern Europe, Central Asia	Dogs commonly kept as pets Homeless dogs sometimes tolerated but, in some countries (eg Romania), rounded up and killed Dog fur farming in some areas
East and South East Asia	Dogs eaten as food in some countries (Korea, southern China, Vietnam, Cambodia, Myanmar, Thailand, Malaysia). Pets were regarded as decadent by Chinese authorities
India (Hinduism, Jainism and Buddhism)	Compassionate attitude towards all animals Killing of dogs ruled as illegal by the courts
Middle East and Islamic World	In the past, dogs held in high regard (eg ancient Egyptians had a dog god – Anubis) Dogs now treated harshly (probably a legacy of fear of rabies)

Source: Bartlett 2001

Adamczyk (2004) provides a personal socio-political perspective of dog ownership in the former Soviet bloc. He reports dog ownership patterns and purposes as being similar to those of western Europe – with dogs as pets/companions in urban areas and as working dogs in rural areas – and that dog ownership was (and is) common and widespread.

⁵ <http://www.internat.naturvardsverket.se/index.php3?main=/documents/nature/engpark/enpstart.htm>

⁶ <http://www.coastalguide.to/kemeru/main.html>

⁷ <http://www.bpn.com.pl/eng/touristsregulations1.htm>

A high rate of companion animal ownership and the regarding of pets as family members may be primarily a phenomenon in Europeans and persons in countries in which the majority of citizens are of European descent (Al-Fayez and others 2003). Although dogs are very much a part of family life in Western countries, in the Muslim world, non-human animals generally are thought of as having more economic than emotional value. The dog is generally regarded as 'dirty' in the Islamic religion (Al-Fayez and others 2003) although dog ownership for hunting and for the guarding of fields and herds is permitted. The inquest into the death of a Muslim teenager between Lizard Point and Kynance Cove in Cornwall was told that he believed dogs to be unclean and was afraid of being bitten by one. The appearance of a dog on the coastal path provoked him to run off; he appeared to lose his balance and fell over the cliff edge (BBC News 2005a). Even so, companion animals do not appear to be specifically forbidden in Islam and some suggest (Society for the Protection of Animal Rights in Egypt 2002) that the Holy Koran carries no references to dogs being unclean or do not conform with the spirit of Islam. The respondents to the National Survey reported a high rate of non-Europeans taking action to avoid encountering dogs at sites (see Table 9.11).

Dogs exist with people throughout the world, but are regarded differently in different countries.

In countries like Great Britain, Germany, Australia and New Zealand, where the laws concerning keeping domestic dogs are strict, and stray dogs can be impounded or put down, then free-ranging dogs are relatively rare. This contrasts with other countries where feral dogs are much more common, such as Romania, Italy and Hong Kong. In many other countries, where dogs are seen more as guard animals and less as pets, the attitudes are quite different, for example, from those in Britain and North America (Brickner 2003). For example, in Zimbabwe, there are an estimated 1.36 million dogs in communal lands, and most will be finding their own food. The impact of these dogs on wildlife will differ markedly from that of dogs in countries like Britain and America where dogs are traditionally walked, well fed, treated as pets and part of the family, being inside the house rather than ranging uncontrolled outside.

In the United States, dogs are regarded in a similar way to the way they are seen in the UK. This is reflected in the similarity of the most popular breeds, being:

- Labrador
- Golden Retriever
- German Shepherd Dog
- Beagle
- Dachshund
- Yorkshire Terrier.

In addition, a high proportion of dogs are crossbreeds, especially with collie and terrier blood. (See the website of Enchanted Learning at:

www.enchantedlearning.com/subjects/mammals/dog/popular.shtml).

Cain (1985) surveyed 896 military families with pets throughout the United States. 68% of the families viewed their pets as full family members, and 62% reported that their pets usually-to-always had 'people status'. Dogs were not singled out for special mention.

Headley and others (2004) conducted three studies from April 2002 to February 2004 and used China as one of their countries for research because, before 1995, owning a pet was regulated. Pet ownership has increased rapidly since regulations against keeping pets were abolished in 1995. The total number of dogs registered by the authorities in Beijing was 139,631 between January and November 2002. The authors suggest that this number will gradually increase on the basis of the

current trend. This suggests a strong preference within some sectors of society towards keeping dogs as pets.

7.4.2 Patterns of dog walking

Various recreation surveys have revealed patterns of dog walking, although how far these can be taken as generalisations will differ between sites. Distinction should be made between local, daily dog walking sites and those that are visited more as a weekend day out. Thus the urban fringe sites and those set within residential areas will be more heavily used for daily dog walking compared with the National Park moorlands for example (as illustrated in Table 2.3). Thus, for example, visitors to Burnham Beeches (located close to Burnham, Beaconsfield and Maidenhead), came primarily to walk or walk their dogs (England Marketing 2003). The dog walkers (42% of the site's visitors from the survey, but believed to be nearer to 35% by the site managers) came to the site three or more times a week on average, usually with one dog each, although the mean number of dogs per walker was between 1.4 and 1.5.

In the Burnham Beeches survey (England Marketing 2003), the number of dog walkers was highest at the weekend rather than during the week. The numbers on the Saturday were much the same as on Sunday, but tended to peak in the mornings on Sunday, but in the afternoon on Saturday. However, more families walked the dog at the weekend, with more lone walkers in the week. The peak weekday dog walking times for the Paddock and Heathland were 1pm to 4pm, and 5pm to 6pm, with a lower peak between 9am and 10am. The weekend pattern was similar. The pattern on the Main Common was similar, but with more dog walking between 11am and 12am in the week.

Mawby (pers. comm. ex NNR manager) suggests that at Finglandrigg Woods NNR, dog walkers tended to use the site before and after working hours, even in the semi-dark at times. On the dunes in Jersey, dog walkers tend to arrive after dropping children off at school, and again before or after school collection times in the afternoon (pers. obs.).

Arkenford (unpubl, 2003) suggest that numbers visiting countryside sites are increasing. This is at odds with data from the GB Leisure Visits Survey (TNS Travel & Tourism 2004) which recorded an 11% decline in day visits to the countryside by English residents between 1998 and 2002/03, although trips to the coast/seaside did increase by a similar percentage. Walker (pers. comm.) has witnessed an increase in use of sand dunes at a NNR in Lincolnshire by dog walkers over the last 25 years, and attributes this to increased availability of cars (the site is 8 miles from the nearest main residential areas), and the increase in dog wardens and fouling restrictions in towns. Where there are few alternatives, key sites may attract more dog walkers over time where they think they can let the dog off freely and not feel obliged to clear up the dog mess.

In Tyne and Wear, researchers (AJT Environmental Consultants 2004) found that 22% of households contained a member who had been dog walking in the last 12 months. Participation would increase to 25% if constraints on access were removed. In Cheshire, 15% of respondents said that walking the dog was the reason why they visited the Cheshire countryside. In Bedfordshire, 18% of countryside visitors are accompanied by a dog (although 25% of respondents owned a dog) and this is more likely amongst rural residents (22%) than urban ones (15%).

As dogs need daily walking, their owners gain benefits from regular exercise and access to the countryside.

7.4.3 Needs and demands of dog walkers

It is a legal requirement (under CRow Act s60 and s61) for every highway authority in England and Wales to prepare a Rights of Way Improvement Plan, and in doing so, they have to assess the current and future needs and demands of the potential visitors to the countryside. In response, authorities have been doing a considerable amount of research into the needs and demands of visitors to the countryside. Leading the way in this research is a series of studies part-funded by the Countryside

Agency through its Exemplar Project. This is being conducted in at least one authority in each of the Agency's eight regions. Most of the research classes dog walkers with other types of walkers but, in some cases, specific reference is made to dog walkers.

ADAS Consulting did research amongst residents of areas within Bedfordshire (ADAS Consulting 2004). They found from a focus group session that:

- the dog provided the key motivation for a walk, particularly during the week;
- the walk was also recognized by owners as a valuable opportunity for them to socialize and there was seen to be 'safety in numbers';
- during the week, local, well-known and convenient routes were used but at weekends, trips further afield were made to country parks etc.;
- choice of weekend route varied;
- length of walk during the week seemed to vary between ½hr to 1½hrs depending on the walker's available time, with 1 to 3 walks taken each day;
- owners appeared to stick to the same routes.

The needs of dog walkers were identified as being:

- sufficient dog bins, regularly emptied;
- enforcement of dog fouling laws;
- room for the dog to run off lead in safety (ie absence of roads, livestock and other walkers);
- vegetation not too overgrown;
- clear and sufficient signage;
- clear route across fields;
- through /circular routes (they dislike having to turn back);
- opportunities for the dog to drink.

7.4.4 Preferences for different habitats

There is no research available on this subject readily available. However, it is widely recognised from observational studies (eg as summarised in Taylor and Thurston 2002) that access users will tend to avoid tall vegetation. This means that there is a tendency for them to stick to paths when passing through areas where vegetation is tall (eg heather moorland, Picozzi 1971) and be more inclined to wander at will where vegetation is short (eg grazed chalk downland).

7.5 Professional dog caring

In recent years, there has been significant growth in the number of businesses engaged in providing professional care for dogs. A number of different types of service can be identified. These are described in **Table 7.4**, based on information provided (pers. obs).

Table 7.4: Types of dog care services

Type of Service	Description
Kennels	Enclosed, individual housing where dogs are confined within their pen. Exercise is usually on the lead by a member of kennel staff or in a paddock owned by the kennels. There is usually little relationship between the kennel staff and dog but the dog remains in a secure environment. A well-established and mature service. Kennels must be licensed and, in order to obtain a licence, must comply with the Animal Boarding Establishment Act 1963.
House Sitters	The sitters live in the house when the owner is away. They fulfil a dual role of security and carer for any pets of whatever species which are resident there. House sitters may be friends/family or a professional. A well established service, but increasingly popular with professionals who live in the countryside. There is a national representative body – the National Association of Registered Petsitters (NARP) (see website: http://www.dogsit.com/pages/869224/index.htm).
Dog Carers	The dog goes to stay in the house of a carer who aims to look after the dogs in the same way that it is cared for at home. This service has traditionally been carried out by friends and family, but professional services are now available. This business is growing fast from a low base. NARP also aims to represent dog caring companies. In good operations, only dogs from the one household are looked after at any one time, and any security issues concerning the dog are highlighted to the carer (as is required by NARP).
Dog Walkers	The dog is walked on a regular basis from the owner's house. Traditionally carried out by friends and family and when the owner is at work, professional services are now available. This business is growing fast from a low base. In good operations, any security issues concerning the dog should be highlighted to the walker. Although there have been reports of up to 20 dogs being walked at a time, this is likely to be the exception, and 4 dogs is usually the practical maximum to be walked at one time.

7.6 Contributions of dogs to society

7.6.1 Social and health benefits

Although dog ownership is more likely to be amongst C2DE⁸ socio-economic groups, the most important factor influencing ownership of dogs is the presence of children in the household. This is underlined by the fact that there is a strong dog-owning bias in the ABC1 groups towards those with families; with 27% of ABC1 households with a family owning a dog, compared with 19% of ABC1 households with no family (Mintel 2004).

Research done by Cain (1985) on 896 US military families revealed that 68% viewed their pets as full family members, and that 70% said that having a pet increased their happiness. In addition, the majority of the families believed that having a pet was important when they are sad, lonely or depressed, although no specific mention was made of dogs.

⁸ The letters refer to classification of people by their occupation:

A Professional

B Managerial and technical

C Skilled: C1- non-manual; C2 - manual

D Partly-skilled

E Unskilled

(Rose 1995)

Dogs require regular (at least once a day) outdoor exercise, and the first of Help the Aged's *Top Ten Tips for Healthy Ageing* is to take more exercise. The fifth tip is to get outdoors as often as possible. The many benefits of regular outdoor exercise noted by respondents include:

- “we feel fitter and more alert”;
- “it helps prevent disabling conditions such as osteoporosis”;
- “exposure to light is vital for our body clocks and Vitamin D levels”.

Help The Aged's website also specifically cites walking the dog as one of its top ten ways to get more exercise and that the special benefit of having a dog at your side is that it:

-
- boosts confidence by providing a feeling of security;
- is a great source of entertainment;
- results in other people being more likely to stop and speak to you, thus reducing risk of withdrawal from society.

(See the website of Help the Aged:

http://www.helptheaged.org.uk/HealthAgeing/Exercise/_different_types_exercise.htm))

At the 10th International Conference on Human-Animal Interactions, McNicholas and others (2004) from the University of Warwick, in presenting their primary research said that three months after a bereavement pet owners reported fewer problems associated with adjustment as measured by physical and psychological symptoms of stress/distress than bereaved non-pet owners (dogs were not singled out for consideration). In addition, previous studies have shown that pets are regarded as ‘generalist’ providers of social support. The child-pet relationship is characterised by high emotional support and low in conflict. It would seem that the relationship between children and their pets is important to feelings of psychological well-being. Evidence also strongly suggests that exposure to pet allergens may help physical health, and this was demonstrated in their work on school attendance rates of children who own pets against those who do not.

Headley and others (2004) confirmed this, also at the conference presentation, when reporting on the three studies in Germany, China and Australia that show that pet owners go to the doctor 15-20% less often than non-owners. The difference remains statistically significant after controlling for gender, age, income and other key variables that also affect health. They tried to put a value on pet ownership by working out the national health budget savings due to pets. What would be the extra cost to the health budget if pets were banned and ex-owners used the health system as much as non-owners now do? Their preliminary calculations: in Germany the extra cost was € 5.59 billion; while in Australia the extra cost was \$3.86 billion.

Dog ownership results in important health, psychological and social benefits for all family members.

Further, Professor Sam Ahmedzai (professor of Palliative Medicine at Sheffield University) told a Society for Companion Animal Studies conference (SCAS 2004) that small-scale studies have shown that dog ownership:

- impacts favourably on levels of blood lipids, glucose and thrombotic factors such as blood pressure;
- it helps the body produce substances that boost immune levels; and
- can help to relieve pain by generating a feeling of well-being.

Studies have shown that dog ownership produces beneficial physiological effects in people such as favourable changes in blood lipids, glucose, blood pressure, immune levels and pain relief.

The organisation Pets As Therapy (PAT) was set up to enable dogs to be taken to hospitals, hospices and other health institutions for patients to stroke and pat, thus improving their feeling of well-being; the benefits of this was supported by McNicholas and others (1993) who found that if older people are made to give up a pet when they move into residential care, they can suffer psychological and physical problems.

The Kennel Club undertook a survey of dog owners through questionnaires distributed at Crufts and available through the internet and through its partner PRODOgs. The results for each question are listed in order of ‘strongly agree’ response in **Table 7.5** below, which in each case was the most frequent response. Given the nature of the audience, a high level of agreement would be expected and this is borne out by the results. Key findings were:

- For all the seven statement, 90% or more of respondents ‘agree’ or ‘strongly agree’ that dogs make a positive contribution to their lives.
- Due to the majority of respondents being female, the results suggest that women feel safer and have more mobility with dogs; the low number of men responding precluded analysis of this by gender, though in every case men ‘agree’ or ‘strongly agree’ with the statements.
- Three-quarters of all respondents said having a dog makes them go out walking more, and do so at levels that ‘can help to reduce the risk of cardiovascular diseases, some cancers strokes and obesity’.
- The highest degree of support came from people living in cities; in every case they agreed dogs enhanced their lives and made them feel safer.
- No significant correlations with respondent age were found.

Table 7.5: Level of agreement with statements by dog owners

Statement	Strongly agree	Agree	Disagree	Strongly disagree
I would not go out walking as much if I didn't have a dog	83%	13%	0%	4%
Owning a dog makes me have a healthier lifestyle	75%	25%	0%	0%
I feel safer when out for a walk when I have a dog with me	83%	8%	8%	0%
I walk with my dog(s) for at least 30 minutes, 5 or more times per week	75%	17%	8%	0%
It's easier to make new friends and socialise when you have a dog	78%	17%	4%	0%
I wouldn't go out at night as much if I didn't take a dog with me	57%	30%	13%	0%
I feel more secure in my home when I have a dog with me	77%	18%	5%	0%

Source: Kennel Club 2003

A director of a pet care firm, which uses family-based carers to look after dogs while their owners are away has been told by individuals that:

- carers enjoy having dogs, simply because it gives them a reason to go outdoors and take exercise;
- having dogs is felt to be good for their children, instilling a sense of responsibility in them and habituating them to animals;

- some female carers feel more secure, and therefore more willing to go out and take exercise;
- some male carers feel less self-conscious about going for a walk alone with a dog where they may encounter female walkers, as the dog legitimises their presence and reduces the risk that the females may feel threatened.

National Pet Week is a charity that aims to promote responsible pet ownership. It supports pets in schools and, on its website, says that school pets have been found to:

- motivate pupils to think and to learn, as children have a high level of natural interest in, enthusiasm for, and enjoyment of animals, and thus improve academic achievements;
- encourage pupils to have a respect and reverence for life and thereby improve their relationships with other pupils, parents and teachers;
- foster a sense of responsibility and nurturing in children;
- lead to the development of hobbies / careers in animal care.

Pets in schools promote emotional maturity amongst children by fostering a sense caring and responsibility, stimulating a desire for learning and engendering a calming effect that makes for an environment more conducive to learning.

Teachers have also found therapeutic benefits for children with special needs. For example:

- a calming effect on pupils, particularly those with behavioural or learning difficulties; improving behaviour and concentration, reducing stress and improving self-esteem;
- encouraging expression and participation in more withdrawn children;
- animals can help when working with the most vulnerable children;
- educational improvements with low achievers.

Pets in schools also have social benefits for the school community:

- enhancing the learning environment, creating a sense of security and family warmth for the pupils;
- encouraging the involvement of parents and the wider community in school activity;
- helping to promote the school as an important nurturing influence in the community;
- reducing the incidence of truancy, vandalism and conflict through fostering a greater sense of community.

(See the website of National Pet Week: www.nationalpetweek.org.uk/teac_pack.htm#3).

7.6.2 Working dogs

Dogs have been living with humans for about 15,000 years (Hamer 2001) sharing their food and shelter, but also working for man's benefit. In Homer's *Odyssey*, written in the 8th century BC, dogs appear as hunters and guards.

Dogs of a variety of breeds and crossbreeds have been used extensively in livestock farming for a variety of purposes:

- rounding up stock;
- guarding stock against predators;

- vermin control;
- guarding people and property.

Dogs have been given crucial military roles throughout history:

- Mastiffs helped defend Britain against Julius Caesar;
- North American Indians used dogs as sentries;
- dogs were used in the Spanish-Moroccan War of 1919-26 to draw enemy fire and expose their positions.

There are countless stories of dogs' loyalty to man, bravery and courage and at each stage, man's understanding of what dogs can do and how to train them has developed (Hamer 2001).

Today, there are still many working roles in the services for dogs that include:

- protection dogs trained to provide controlled aggression in the apprehension of intruders at restricted military installations;
- arms-and-explosives search dogs – for the detection of caches of weapons and bomb-making items;
- tracker dogs - trained to follow a suspected terrorist after an incident or by back-tracking from an incident in order to gain information on a suspected terrorist's movements before an incident;
- drug detection dogs – trained to detect the illegal passage of prohibited substances into the UK.

(See the website of the Royal Army Veterinary Corp's Animal Defence Centre: <http://community-2.webtv.net/Hahn-50thAP-K9/K9History26/>).

Dogs are frequently used at disaster scenes to find people buried in rubble. An estimated 350 specially-trained dogs were used at the World Trade Centre in September 2001 to detect people either alive or dead. After the initial rescue period, these 'cadaver' dogs played a critical role in locating the bodies along with wallets and purses that have led to the identification of the deceased. (See the website of the UK Fire Services Search and Rescue Team: www.ukfssart.org.uk/us%20search%20dogs.htm).

In 2003, Buster, a six year old springer spaniel, was awarded the Dickens Medal for his efforts in Iraq. Buster is considered to be responsible for saving the lives of countless civilians and troops following the discovery of a hidden cache of weapons explosives. (See the website of the Pet Food Manufacturers' Association: www.pfma.com/public/benefits1.htm).

In snowy climates, dogs are still used as draft animals either to pull sledges (called pouks) or carrying small packs. They have played a key role in polar exploration and were central to the debate of the relative success/lack of success of Amundsen and Scott in their efforts to reach the South Pole (eg Fiennes 2003).

7.6.3 Assistance dogs

Increasingly, dogs are being trained to a variety of roles in which they assist disabled people lead fuller and more independent lives. In the UK, these dogs are usually supplied and trained by one of the following charities under the umbrella organisation, Assistance Dogs (UK):

- Support Dogs - offers a variety of types of assistance dogs: Seizure Alert® (for people with epilepsy), disability assistance, medical assistance, seizure response dogs for children, hypoglycaemia alert dogs for people with diabetes, dogs for people with emotional conditions;
- The Guide Dogs For The Blind Association – for people with sight problems;
- Hearing Dogs For Deaf People – for people with hearing problems;
- Dogs For The Disabled;
- Canine Partners – for people with mobility disabilities.

In Western society, dogs have assisted humans as working dogs but their potential as assistance dogs is only recently being extended – dogs have now been trained to alert epileptic owners to imminent seizures.

Information can be obtained from the website: www.support-dogs.org.uk/content.php?categoryId=30. A support dog can be trained to do many simple tasks that may assist their owner, some of which are:

- opening and closing doors;
- picking up objects;
- assisting with dressing and undressing;
- assisting with going to the shops;
- acting as a physical support;
- raising the alarm;
- operating control buttons;
- switching lights on and off;
- carrying items;
- loading and unloading the washing machine;
- fetching the telephone and other items.

A medical assistance dog provides support and assistance for people with specific medical conditions such as hypoglycaemia and other similar disorders.

The organisation ‘Support Dogs’ train Seizure Alert Dogs® to respond and alert their owners to an imminent epileptic seizure by giving their owners a significant signal many minutes prior to a seizure. Sufferers from the condition report that the feelings of security and independence clients have gained through having a Seizure Alert Dog® is tremendous, not only because they have a warning prior to a seizure but because they are able to take their dog with them everywhere. (See the website of the charity, Support Dogs UK www.support-dogs.org.uk/content.php).

7.6.4 Economic benefits

Data on market sizes are typically acquired by market research companies; and acquiring these data can be costly. Therefore, the data acquired for this study are limited to an estimate of the value of dog food sales – of £839m in 2003 (Mintel 2004). In addition, businesses

Sales of dog food were nearly £1bn in 2003.

involved in providing veterinary services, pet accessories, grooming, care, breeding and behaviour industries all benefit from dog ownership. Since the number of dogs kept as pets is high, these related economic activities must make a useful contribution to the economy.

7.7 Health and safety issues

There is a range of issues concerning the safety aspects of dogs in the countryside in general, which are also relevant to conservation areas. Safety concerns can be split into three main areas:

- the risks of injury to people from dogs, including the trauma associated with fear of dogs, especially amongst children following an unhappy encounter and in certain ethnic groupings that perceive dogs as unclean;
- the risk of injury to people with dogs;
- risks to people from zoonoses carried by dogs.

7.7.1 The fear and risks of injury to people from dogs

Research has found that a significant number of people fear dogs or feel uncomfortable if approached by a dog they do not know. At Burnham Beaches (England Marketing 2003), out of control dogs were a major cause of concern to visitors, including reports of people saying they were “.. terrified of dogs..”. Being approached by a dog they didn’t know was deemed to be unacceptable by 80% of non-dog owners. This fear of dogs may take on a different form if they are considered to be unclean out of religious conviction and appears to have been the cause of a Muslim teenager’s death (BBC News 2005a). Respondents to the national survey (discussed in Section 9) reported observations of people taking evasive action when approaching a dog although it is not possible to deduce from these observations what motivated the evasive action.

The Department of Trade and Industry’s (DTi) Leisure Accident Surveillance System (DTi 2003) estimated that there were over 64,000 leisure-related accidents involving dogs in 2002. A similar number of accidents with dogs were reported as occurring in the home, as reported in the Home Accident Surveillance System (DTi 2003). These include all accidents irrespective of the location in which they occurred.

Practical Advice for Clinical Guidance (PRODIGY) quotes Brogan and others (1995) in saying that where children are bitten by a dog, it is usually their own household pet. The mean age of the dog-bite victims is 13 years old. To reinforce this, a contributor to www.auspet.com wrote that in the USA the most common attack is usually by the family dog; more often than not, when it is leashed, fenced, chained or indoors. In addition, they assert that nearly half of all attacks occur on the street, pavement, or area adjacent to the owner’s property.

Taylor and others (2002) infer that the lack of specific data on accidents or injuries to people in the countryside (of which injuries caused by dogs would be a subset) means that it is not a serious or significant problem at a national level. Experience of a professional dog carer is that a pet dog is most unpredictable when it is cornered and feels vulnerable to a perceived aggressor. When outside this is most likely to arise when the dog is on the lead and comes into close proximity to other dogs, such as down a narrow path.

7.7.2 The risks of injury to people with dogs

Data from the Health and Safety Executive (HSE 2001) show that there were 27 accidents involving people and livestock between 1991 and 2000 in England, Scotland and Wales. All were recorded as having involved people on rights of way and in ‘fields’ (rather than open country). A dog was present with the walker in 20 of these incidents, and the injuries were inflicted by cows which had calves. It

is concluded that there is a risk to people in the countryside when they are walking a dog through a field of cows with calves, although the risk is relatively small when viewed against the large number of countryside visits that are undertaken (Taylor and others 2002)

Suckler cows with calves pose a risk to dog walkers when crossing fields.

Although risks from suckler cows are believed to be greater to an individual when accompanied by a dog, absence of a dog is no guarantee of safety. In 2003, a walker in Scotland was attacked and subsequently died from injuries inflicted by a suckler cow (with calf at foot) and no dog was present to provoke the cow (HSE 2004).

Data from the DTi's Leisure Accident Surveillance System (DTi 2003) show that an estimated 82 people were involved in accidents with a cow, bull or calf in 2002. However these data do not show whether a dog was involved or not.

There are also incidences of people putting themselves at risk by trying to save dogs that have got into difficulty in water (RoSPA 1999). One situation is where dogs have broken through ice on frozen ponds or lakes. An example was the deaths of two teenage boys who drowned in the sea off Blackpool on 28th May 2005 while trying to rescue their friend's border collie (which also drowned) (BBC News 2005b). According to Lifeguard magazine (1998) dogs are more able to withstand the cold water than people and usually save themselves. RoSPA (1999) advise that it is best to stay on the bank, or better still, keep the dog on the lead.

One of most significant risks arises from people trying to rescue dogs from waterbodies.

7.7.3 Risks to people from zoonoses transmitted by dogs

Some commentators believe that dogs in developed countries are becoming, in general, less healthy than in the past and attribute this to poor breeding practices (Holster 2001). As a result, different breeds are pre-disposed to certain diseases and conditions (see: <http://www.petstation.com/drbob-dog-breed-diseases.html>). No data were found regarding trends in treatment of dogs for disease, although the Kennel Club and BSAVA have jointly undertaken a national survey of dog health and results should become available in late 2005/early 2006. However, the area of concern for human health is zoonoses.

Zoonoses are diseases that are passed from animals to humans, and are also called zoonotic illnesses. On occasion it is possible for dogs to carry germs and parasites that can make people ill; however, good hygiene, veterinary care and regular prophylactics can reduce these zoonoses or eliminate them from the dog population.

The most significant zoonoses relevant to England and Wales are:

- Roundworm (*Toxocara canis*);
- Ringworm – a fungal infection;
- Mange - Sarcoptic mites;
- Lyme disease - Spirochaete bacterium;
- Campylobacteriosis;
- Rabies;
- Leptospirosis.

Each is described briefly below. None of the zoonoses are particularly prevalent in England and no data were found on the frequency of occurrence, other than for roundworm.

Dog-borne zoonoses are not a significant threat to human health.

Roundworm

Toxocara canis is an infestation of roundworm (in its adult stage) that lives on the small intestine of dogs and foxes. Dogs will usually not show any clinical signs although affected animals may have a dull coat and swelling of the stomach, and experience weight loss and diarrhoea.

Eggs produced by the adult roundworm in the small intestine of the dog or fox are excreted. When defecated, eggs are not infectious. Under optimal conditions, which in this country is during the summer months only, eggs take 2-3 weeks from the time they reach the open environment to the time they become infective. The eggs are particularly resistant to environmental factors and can remain viable in the soil for several years (National Trust 1998, Bayer undated). The eggs can be transmitted rapidly by dogs, birds, small mammals, earthworms, beetles and flies. Rain splash and mowing operations may also disperse eggs.

Toxocara eggs are sticky and will adhere to anything with which they come into contact, including humans. People risk becoming infected if they ingest the eggs. However, children are most at risk because they are most likely to be playing in the soil and to fail to wash their hands. In humans, the larvae can only develop to larval stages, but they are able to migrate through the body and cause an inflammatory response. In severe infestations, an inflammatory response in the eye can lead to partial or full blindness. The majority of symptoms do improve with time and rarely require intervention with medicine.

The British Small Animal Veterinary Association (BSAVA 1994) data conclude that cases of infection are greatly exaggerated as only two percent of adults show antibodies to *Toxocara canis*; in spite of ENCAMS' (undated) research that found that 54% of dog owners had not given their dogs worming tablets and that a high percentage of public parks were found to have eggs present. Boden (2001) reports a study in which the results of blood tests on dog breeders and non-dog breeders. Antibodies to *Toxocara canis* were found in 15% of dog-breeders but only in 2.6% of the non-dog breeders.

Cases requiring treatment stand at approximately two per million of the population, or about 100 cases per year, with 20-30 of these resulting in manifestations in the eye.

Prophylactics to keep dogs clear of infestation are effective, and this is a cheap and simple procedure.

Ringworm

This fungal infection, caused by *Microsporum* or *Trichophyton*, is highly infectious as the spores may be windborne or found in the soil. Symptoms are that the dog may spend time scratching or rubbing itself against solid objects, and there will be (usually) round areas of hair loss (McKay 2002). If transmitted to humans (effected by the passing of spores through direct contact), itching symptoms are similar. Treatment is with a fungicidal wash or iodine tincture.

Season does have influence on the spread of ringworm, as it spreads more readily in damp conditions; it is rarely troublesome during the summer. In addition, it prefers overcrowded, badly-ventilated buildings and is most likely to take hold on an animal that is generally unhealthy (Miller and West 1970). It is therefore unlikely to be a problem for humans in open countryside areas.

Mange

Sarcoptic, demodectic and otodectic mange in the dog are caused by the Sarcoptinae mites. Sarcoptic mange mites burrow into the skin and can be transmitted to humans, where they are commonly believed to cause scabies. However, the National Fox Welfare Society, on its website, maintain that this is not correct and that any symptoms may be an allergic reaction at worst (See: www.nfws.org.uk/pro/problems.htm).

Symptoms are persistent scratching, but it is difficult to diagnose, so many vets will treat scratching dogs for sarcoptic mange as a routine, rather than try to get a positive identification (personal experience by one author) as it is cheaply and easily treated. Infection is through direct contact with other infected animals or by being on infected ground and is commonly called fox mange due to its prevalence in foxes – particularly ‘urban’ foxes (which are a source of infection for dogs). Once again, it is most likely to take hold on an animal that is unhealthy. The products used to treat mange are similar to prophylactics used to keep dogs free of other ectoparasites, such as fleas and ticks.

The transmission of mange or scabies to people as a result of being in the countryside is unlikely to take place, as the mites do not live long once off the host (Hines 2004).

Lyme disease

Caused by the bacteria *Borrelia burgdorferi*, Lyme Disease was first recognised in the USA in 1975; the source of the infection being ticks on deer (Boden 2001). Symptoms include swollen joints, rashes and enlarged lymph nodes.

Both dogs and humans can pick up ticks as they brush against vegetation that is infested with them; however, dogs are not a primary source, this usually being deer ticks or sheep ticks. Veterinary advice is to apply regular preventative medicine to kill fleas and ticks on dogs.

Campylobacteriosis

Campylobacter are spore-forming bacteria and are micro-aerophilic (they require very little oxygen to survive). They can cause various diseases from dysentery to abortion. Species of Campylobacter have been found in dogs suffering from dysentery and diarrhoea and, in some instances, people in contact with those dogs were also ill with acute enteritis. The link between the two has not been confirmed, however, but there is suspicion that canine campylobacter is a zoonoses (Boden 2001).

Rabies

Rabies is an acute viral disease that can infect all warm-blooded animals, including humans, and is generally fatal (Sime 1999). Present in continental Europe, there are strict controls and measures to prevent it reaching Britain.

A fatality in Britain occurred as a result of infection by European Bat Lyssavirus (EBL) from a Daubenton's bat (carrier of north European rabies), this being only the third instance of infection recorded in the British bat population since the first in 1996. In contrast, 630 EBL cases were recorded in northern Europe (mostly Germany, Holland and Denmark) between 1977 and 2000, of which three were fatal.

(see website: <http://www.simplyworkwear.co.uk/newspro/arc10-2002.html>).

Leptospirosis

Leptospirosis transmission is typically associated with rats' urine. However, the *Leptospira* bacteria have been found in cattle, pigs, horses, dogs, rodents, and wild animals. Humans become infected

through contact with water, food, or soil containing urine from these infected animals, and illness usually begins abruptly with fever and other symptoms. Leptospirosis may occur in two phases: firstly, fever, chills, headache, muscle aches, vomiting, or diarrhoea. In the second phase, the patient may recover for a time but become ill again. If a second phase occurs, it is more severe and the person may have kidney or liver failure or meningitis. This phase is also called Weil's disease. Leptospirosis is treated with antibiotics. (See the website of the Centers for Disease Control and Prevention, Department of Health and Human Services. www.cdc.gov/ncidod/dbmd/diseaseinfo/leptospirosis_g.htm)

7.8 Synthesis

The presence of dogs in areas of countryside with public access can detract from people's enjoyment. A variety of reasons (including their tendency to disturb wildlife) are reported but dog mess is the most frequently cited. Its presence is an all-too-evident indicator of an irresponsible approach to dog ownership, and many dog owners are in denial of any responsibility. First-time dog owners do not appear to receive education about the potential effects of dogs on wildlife and social pressure does not seem to be effective. It seems from the national survey that many visitors to nature conservation sites will take action to avoid encountering dogs.

A similar attitude towards dogs is evident in other 'western' countries. However, Islamic countries have a more ambivalent attitude towards dogs and appear, on balance, to be more comfortable without the presence of dogs in domestic and recreational settings. Different attitudes are found in other Asian cultures.

Dog owners, however, derive a large number of benefits from dogs. Not all dogs are pets and there are many ways in which dogs contribute positively to society (eg assistance dogs for blind and deaf people, search and rescue dogs, guard dogs, sheep dogs and so on). Where dogs are kept as pets, their owners benefit mentally and physically in various ways; dogs in a household have been shown to enhance the emotional development of children with whom they co-habit, for example.

Rights of Way Improvement Plans have to take account of the current and future needs of users of local rights of way and, as regular users, dog owners are likely to have a significant influence on the content of plans. Many of their needs, however, are not dissimilar to some other groups of walkers (eg a preference for a short, circular walk, close to home, that is easy to follow) but with the additional preference for an area in which their dog can safely be let off the leash, where dog bins are provided and there is an appropriate legal framework (eg byelaws or dog control orders where needed).

Dogs also pose certain risks to people, either from disease or injury (direct or indirect). A number of zoonoses have been identified but risks to human health appear to be low relative to other risks in the countryside (eg risks from E. Coli 0157). As well as the risk of being bitten by a dog (rare), there is a very small risk of injury (and even death) of dog walkers from suckler cows.

8 Dogs and the law

8.1 Key points

8.1.1 Practices and byelaws

- **Dogs are considered to be a usual accompaniment and so allowed on rights of way.**
- **Dogs are allowed on CRoW access land, subject to certain restrictions.**
- **Many public access areas are subject to local byelaws that include rules affecting dogs.**

8.1.2 Statutory enactments

- **There is a variety of primary and secondary legislation that affect dog owners. These span over 50 years, and are likely to continue to change.**
- **The most relevant Acts affecting dogs in the countryside are:**
 - **Dogs (Protection of Livestock) Act 1953.**
 - **Wildlife and Countryside Act 1981 (as amended).**
 - **Dogs (Fouling of Land) Act 1996 and Clean Neighbourhood and Environment Act 2005.**
 - **Countryside and Rights of Way Act 2000.**

Other regulatory issues

- **Where access is permissive, the grantor of permission may wish to impose restrictions that affect dogs.**
- **Farmers may be concerned that the presence of dogs on their land that may not have been treated against endo- or ecto-parasites may prejudice their quality assured status.**

8.2 Introduction

There are a number of pieces of legislation that affect the handling of dogs in the countryside. These laws provide a legal basis for how dog owners must behave and what legal mechanisms may be available to site managers to help them control dogs. These are reviewed below, together with a number of other, non-statutory, mechanisms. The Kennel Club has produced guidance on laws affecting dogs (Information Sheet 9 – Kennel Club 2005).

8.3 Laws (updated to mid-2005)

8.3.1 Accepted practice and local byelaws

Dogs and rights of way: There is no law that states that dogs can be taken on public rights of way. However, case law has established that the interpretation of common law is that the public can use rights of way and have with them anything that can be considered as a ‘usual accompaniment’. It has been generally accepted that a dog or dogs can be regarded as a ‘usual accompaniment’ (Riddall and Trevelyan, 2001). Dogs must be kept under ‘close control’ on rights of way, although close control has not been defined in law.

Trespass: Because a dog is regarded as a usual accompaniment, trespass is not committed against a landowner by someone taking a dog along a right of way but only provided that the dog does not stray from the line of the right of way. The situation is different on CRow access land (see below). A dog owner would be committing an offence if his/her dog is allowed or sent onto land in search of game, whether or not accompanied by the owner, although the offence may be under the Game Acts.

Local byelaws: There are many pieces of legislation that allow local authorities and others (eg Forestry Commission, Ministry of Defence, National Trust) to introduce byelaws that affect specific areas of land. The legislation that provides the power to introduce byelaws will typically set limits on the purposes to which these byelaws can be used. Byelaws can be made to regulate behaviour associated with dogs in four ways:

- keeping dogs on leads;
- keeping dogs on leads where disturbance is likely;
- banning dogs (although these cannot be used on rights of way);
- requirement to prevent dog fouling.

Riddall and Trevelyan (2001) suggest that, as Traffic Regulation Orders can be sought to prohibit use of a right of way by specified categories of user, it is theoretically possible to seek an order prohibiting use of a way by anyone accompanied by a dog.

8.3.2 Statutory enactments

Laws are listed in chronological order, starting with the earliest legislation.

Dog (Protection of Livestock) Act 1953: It is an offence under the Dogs (Protection of Livestock) Act 1953 to allow a dog to worry or attack livestock on agricultural land. It is also an offence for a dog (other than guide dogs or dogs owned by the land manager) to be allowed to be “at large (that is to say not on a lead or otherwise under close control) in a field or enclosure in which there are sheep” (Section 2(c)). The land manager could shoot a dog if he/she believed that there was no other way of stopping it worrying animals. Such action must be reported to the local police within 48 hours.

In the context of this Act, ‘agricultural land’ is defined as land used as arable, meadow or grazing land, or for the purpose of poultry farming, pig farming, market gardens, nursery ground or orchards. However, Section 1(5) allows the Secretary of State to instruct that this definition does not apply to an area that appears to him/her to consist wholly or predominantly of mountain, moor, heath or down land, where he/she believes it is expedient to do so.

Animals Act 1971: A dog owner could be liable to pay compensation for losses caused by his/her dog where he/she has been negligent and someone has suffered damages as a result.

Highway Act 1980, Section 137: Case law has established that dogs that act in a manner that deters people from using a right of way is an obstruction for the purposes of Highways Act 1980, S137, provided that the action of the dog’s owner can be shown to be wilful. It could also constitute a public nuisance at common law.

There are several other laws relating to the threat posed by dogs to users:

- Town and Police Clauses Act 1847
- Dogs Act 1871
- Guard Dogs Act 1975
- Dangerous Dogs Acts 1989 and 1991

However, these are unlikely to be relevant to dog walking in the countryside.

Wildlife and Countryside Act 1981, Section 28: (as amended by the Countryside and Rights of Way Act 2000). Where land has been notified by English Nature as a SSSI under Section 28 of the Wildlife and Countryside Act 1981, trespass may constitute a criminal offence under Section 28P if a person, without reasonable excuse, intentionally or recklessly destroys or damages any of the flora or fauna or geological or physiographical features by reason of which the land is of special interest, or intentionally or recklessly disturbs fauna, and the person knew what he had destroyed, damaged or disturbed was within an SSSI. It is possible that if a person was the keeper of a dog that was being encouraged to destroy or damage such features, the person could be held liable.

Road Traffic Act 1988 Section 27: provides that a highway authority can make an order requiring dogs to be kept on leads on specific rights of way. If an order is made the landowner can put up notices saying ‘Dogs must be kept on a lead at all times on this path’. The **Control of Dogs on Roads (Procedures) (England and Wales) Regulations 1995** sets out the way that such orders are to be made.

The **Litter (Animal Droppings) Order 1991** made under Section 86 of the **Environmental Protection Act 1990**: places a duty on local authorities to keep the following areas clear of dog faeces:

- any public walk or pleasure ground;
- any land ... laid out ... or used for the purpose of recreation;
- any part of the seashore which is frequently used by large numbers of people, and managed by the person having direct control of it as a tourist resort or recreational facility;
- any land forming part of a public highway [public rights of way are highways] which is open to the air, which the public are permitted to use on foot only, and which provides access to retail premises;
- a picnic site provided by a local authority under Section 10(2) of the Countryside Act 1968.

The requirement does not apply to woodland, heath or land used for the grazing of animals.

Control of Dogs Order 1992: requires that every dog, whilst on a highway (note that public rights of way are highways) or in a public place, must be wearing a collar with the name and address of its owner on the collar itself or on a plate, disc or some other device attached to it. There are exceptions to the general rule for working or assistance dogs. Anyone failing to comply is guilty of an offence under the **Animal Health Act 1981**.

Dogs (Fouling of Land) Act 1996 and Dogs (Fouling of Land) Regulations 1996: The Dogs (Fouling of Land) Act 1996 allows local authorities to designate areas where the regulations will apply. In designated areas, dog owners are required to clear up after their dogs; failing to do so could result in a large fine. If an authorised officer of the authority finds someone committing an offence, he may give them notice offering them the opportunity to discharge their liability to conviction by payment of a fixed penalty. If the alleged offender refuses this opportunity, goes to court and is convicted, then they could face a maximum fine of £1,000.

The regulations can be used over any land that is:

- in the open air (including covered land which is open to the air on at least one side);
- land to which the public are entitled or permitted to have access.

There are exceptions to this general applicability:

- land in/adjacent to a highway with a speed limit of more than 40 mph;
- land used for agriculture;
- woodlands;
- rural common land;
- land which is predominantly marshland, moor or heath;
- land which has been exempted from the Act by written notice to the Local Authority.
-

Providing bins for dog waste is not a requirement of the Regulations, but is seen by many land managers as desirable. This Act will cease to have effect when the Clean Neighbourhoods and Environment Act 2005 takes effect (see below).

Countryside and Rights of Way Act 2000 (CRoW): CRoW introduced a right of access on foot, for open-air recreation, to land mapped as ‘CRoW access land’. Anyone exercising their rights can be accompanied by a dog (but not any other pet) but subject to the requirement that dogs must be kept on a short lead (of 2m or less) between 1 March and 31 July and when in the vicinity of livestock. In addition, under Section 23, a land manager can impose a ban on dogs:

- for a single period of up to six weeks in any calendar year over enclosures (of no more than 15ha) that are used for lambing (power available to owner-occupier or tenant);
- for a period of five years over land used for the breeding and rearing of grouse (power available to landowner only).

The Section 23 restrictions do not apply to trained guide dogs being used by a blind person, or a trained hearing dog with a deaf person.

Land managers can also apply for a direction to impose restrictions on access land for reasons of land management (Section 24), health and safety and fire risk reduction (Section 25). Restrictions could include banning of dogs or a requirement that dogs be kept on a lead.

Section 26 allows restrictions to be directed by the relevant authority where they believe they are necessary for nature conservation or heritage preservation. In the case of the former, the direction can be made where necessary for ‘the purpose of conserving flora, fauna or geological or physiographical features of the land in question’. In deciding whether a restriction is needed for nature conservation reasons, the relevant authority shall have regard to advice from the relevant advisory body (ie English Nature). Restrictions could be introduced that affect dogs.

It should be noted that these restrictions can be applied only on access land. This means that they cannot be used where access is available through other legal mechanisms (such as Access Agreements, urban commons and land accessible through specific Acts of Parliament). However, these alternative mechanisms may also contain regulations affecting dogs. The power to use these regulations will typically be vested in the managing body (eg on Dartmoor – the Dartmoor Commoners Council; on the Malvern Hills - the Conservators).

The **Hunting Act 2004** has relevance to dogs. A person commits an offence if he/she hunts a wild mammal with a dog. There are exemptions (listed in Schedule 1 to the Act). Stalking and flushing can be undertaken provided that five conditions are satisfied. The first is that it is done:

- to prevent or reduce serious damage that might otherwise occur to livestock, game/wild birds, food for livestock, crops, growing timber, fisheries, other property or to biological diversity; or
- to obtain meat for human or animal consumption; or
- participation in a ‘field trial’ (excludes hare coursing).

The second is that stalking/flushing takes place with permission of the occupier or owner, or by the landowner. Thirdly, no more than two dogs can be used. Dogs should not be used below ground (with one exception – see below), and fifthly, stalked/flushed animals should be shot as soon as possible after being disturbed and dogs should be controlled so that speedy shooting of the animal is not hindered.

Dogs can be used below ground to stalk and flush an animal where:

- it is undertaken to prevent or reduce serious damage to game or wild birds which are being kept or preserved for shooting; and
- the person involved has written evidence to show that it is his land or has permission to use dogs underground; and
- only one dog can be used underground at any one time; and
- steps are required to conform with animal welfare requirements.

Using dogs to hunt rats and rabbits, to retrieve shot hares and to flush animal for falconry are not offences provided the person has permission from the landowner or occupier. Provisions are made with respect to use of dogs to recapture or rescue wild mammals and to undertake research and observation.

The Hunting Act 2004 also bans hare coursing and anyone taking part in hare coursing, in any way (eg by entering a dog, by permitting it on his land, attends the event) commits an offence.

Sections 55 to 68 inclusive of the **Clean Neighbourhoods and Environment Act 2005** will, when introduced, make some significant changes to the law relating to the control of dogs. It will empower local authorities (county, district and parish level) to issue dog control orders relating to one of the following:

- fouling of land by dogs and removal of dog faeces;
- the keeping of dogs on leads;
- the exclusion of dogs from land;
- the number of dogs which a person may take onto land.

Dog control orders can be applied to any land “*which is open to the air and to which the public are entitled or permitted to have access (with or without payment)*”. “*Open to the air*” will include any land that is open on at least one side. Regulations will set out the procedure for consultation to be followed prior to introducing a dog control order and how it is to be publicised. Sanctions to be available to authorities will be via the imposition of a fixed penalty notice (action in the courts appears to be limited to that required to secure payment of the fixed penalty) which can be determined by the authority; if no limit is set, the amount will be £75. Authorised officers (including community support officers) will be able to require anyone who is to be subject to a fixed penalty notice to supply his/her name and address and it will be an offence for them to refuse or give false information.

In order to avoid duplication, it will not be possible to introduce byelaws over land subject to a dog control order (and it is implicit that dog control orders will not be needed where byelaws currently apply) and the Dogs (Fouling of Land) Act 1996 will no longer have effect.

Section 68 of the Act will bring to an end the duty imposed on the police by the Dogs Act 1906 (Section 3) to seize stray dogs, but not in respect of Section 2(2) of the Dogs (Protection of Livestock) Act 1953, which will continue to apply.

8.4 Other regulatory issues

Permissive Agreements: Where access is provided with the landowner's permission, rather than as of right, there may be an agreement in place, formal or informal, with a local authority. The landowner may have asked for conditions to be applied to his granting of permission. An example of such conditions could be a ban on dogs, or that dogs must be kept on a lead.

Quality Assurance Schemes: Farmers are increasingly seeking 'assured' status for their produce through membership of an assurance scheme. Although not a legal requirement, once in place, a farmer will be obliged to meet the scheme's requirements in order to qualify for any benefits that the scheme offers. The scheme protocols usually require that farm dogs be treated against parasites and diseases. However, a farmer cannot be responsible for dogs owned by the public on his land and will need to check to ensure that this is not within the scheme's requirements.

9 National survey

9.1 Key points

9.1.1 Sample characteristics

- **In 2004/05 a survey that elicited responses from 77 site managers was undertaken to collate views and experience of dogs.**
- **Respondents were responsible for managing over 150 sites of high nature conservation importance across England and Scotland.**
- **Around 30% of visitors to sites have dogs with them. The majority are local people, and relatively few are ‘professional’ dog walkers.**

9.1.2 Dog control policies

- **Rural and remote sites appear to experience the greatest level of restrictions, whereas urban and urban fringe sites experience less restriction.**
- **There was a 50% chance of problems affecting birds occurring irrespective of the management regime.**
- **Dog management policies vary in effectiveness but wardens/guided walks, steering and regulation appear to work best.**
- **Multi-faceted policies are more effective than one or no policies.**
- **Working with dog walkers can assist in meeting objectives. Out of 11 respondents who tried to establish relationships with dog owners, 8 said that this had been successful.**

9.1.3 Observed effects

- **All observed effects are consistent with the effects reported in research literature.**
- **Nutrient enrichment is evident around car parks and site entrances.**
- **Concern over the effect of dogs on grazing livestock was reported to have exerted an effect on management by 40 out of 77 respondents.**
- **The limitation on grazing imposed by concern over the effect of dogs on livestock has the potential to seriously constrain effective management.**
- **Non-dog owning visitors appeared to be more than twice as likely to try to avoid contact with dogs as welcomed them. Taking evasive action was most commonly observed in people of non-European origin, people with children, horse riders and cyclists.**
- **Health and safety incidents occur very infrequently.**

9.2 Introduction

The National Survey collected information on:

- the different management techniques employed by countryside managers to manage dogs on sites important for nature conservation;
- the relative success, in terms of effectiveness, of these different management techniques;
- the observed interactions between dogs and wildlife on these same sites;
- the effects of dogs on land management practices carried out for nature conservation.

In order to avoid the collection of irrelevant or inappropriate information, questions were asked specifically for sightings and experience of disturbance to species of ground nesting birds. In the survey, managers were given a list of species of particular interest, but were asked not to limit their observations to these alone. They were also given the opportunity to record observations concerning the impact of dogs on other wildlife.

It is important to recognise that this approach to the survey has certain limitations:

- There was no control over who received the questionnaire, and so it is not possible to measure the response rate or the representativeness of the sample (either in terms of numbers of respondents or proportion of the total area of relevant sites covered by respondents). As a consequence, it is not feasible to measure the statistical significance of the responses received.
- There was limited control over when the cascaders distributed the questionnaire. The original deadline of 15 December 2004 was extended to 24 January 2005 due to one key cascader not sending the questionnaire out until close to Christmas.
- Respondents are self-selecting, and so a bias may be introduced. For example, responses may be greater amongst those site managers who believe dogs on nature conservation sites are a serious concern. Alternatively, a greater percentage of responses may be received from those who have no problem with dogs and so found the questionnaire easy to complete.
- Where cross-tabulations have been done to explore different possible effects, numbers within sub-sets are often quite small. This means that the certainty of the observations made is reduced. Some of the conclusions drawn should be seen as being speculative.

There may be alternative explanations for the results that are not apparent from the responses given.

9.3 Nature of the responses

Throughout this section, results are provided by respondent (of which there were 77) or by site. As many respondents were responsible for more than one site, and the 77 respondents manage at least 153 sites, where relevant in the following analysis, the number of respondents or the number of sites is stated. A further complication is that respondents were able to provide data about effects on any number of species. In total, 35 respondents provided 68 species-related responses; these are discussed more fully in Section 9.4.3).

9.3.1 Number and types of respondent

The number of respondents by broad category (note that respondents used their own descriptions) is shown in **Table 9.1**. It is clear that the large majority have direct experience of site management.

Table 9.1: Numbers of respondents by type

Description	Number of respondents
Site or reserve manager/assistant manager	42
Ranger or warden	14
Local authority officer	5
Nature conservation officer	5
Project-related officer	3
Other	8
Total	77

Respondents were typically employed by public sector bodies and voluntary organisations.

Of the responses, 69 (89.6%) were from managers of sites in England, and 8 (10.4%) came from site managers in Scotland. There were no responses from anyone based in Wales. Within England, there was a skew towards sites from the south east and east of England:

Region in which respondents works:	Number
South East and London	28
East of England	17
South West	12
Scotland	8
North West	5
Yorks/Humbs	3
East Mids	2
West Mids	1
North East	1

Some of the respondents covered more than one site in their reply, and because some managers were not specific in itemising all the sites, it is possible only to say that survey respondents are responsible for managing more than 153 separate sites. Where several sites are covered in one response, the data are analysed as one response.

9.3.2 Indicators of value of sites for nature conservation purposes

The respondents were asked to note whether the site(s) they manage are covered by designations; responses are shown in **Figure 9.1** (note that some managers are responsible for more than one site or have more than one designation applying to their site). Of the NNRs, 12 were Spotlight NNRs.

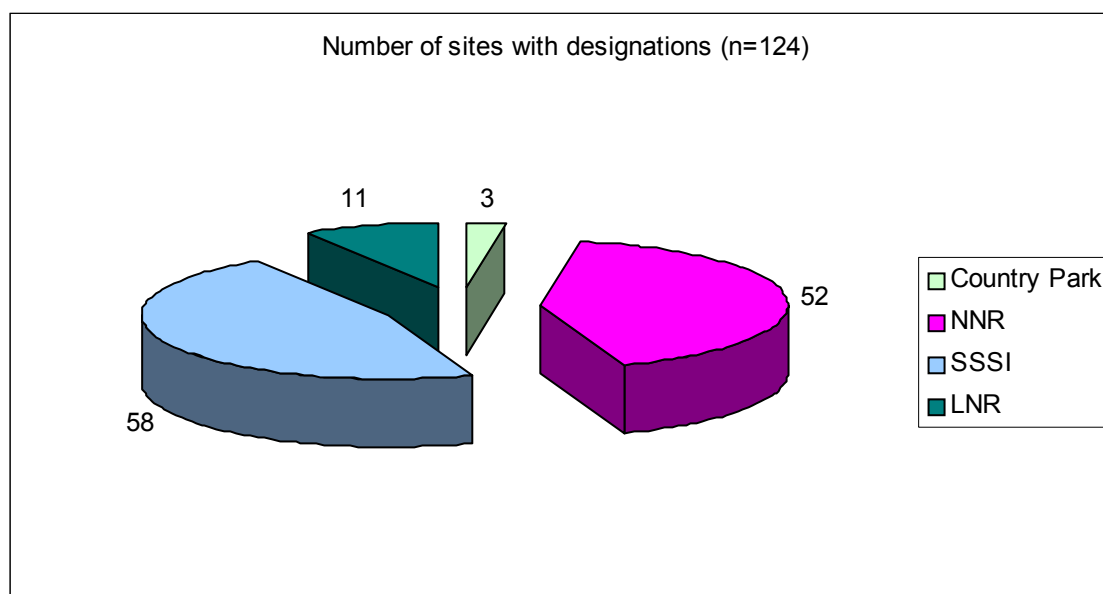


Figure 9.1 Categorisation of sites

Respondents were also asked to state what other designations applied to the sites they manage. Responses are given in **Table 9.2**. This shows that the majority of the sites covered by the survey are of high nature conservation importance, as the vast majority are known to have a statutory designation for nature conservation reasons (or possibly for reasons of their geological interest in the case of some SSSIs), and many are of importance for their landscapes.

Table 9.2: Other designations applying to sites managed by survey respondents

Other designation at the site(s)	Number of sites
Landscape Designation (eg National Park, Area Of Outstanding Natural Beauty, Area of Special Landscape Value)	5
International Conservation designation (Candidate Special Area of Conservation (cSAC), Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar)	31
Other type of reserve (Site of Nature Conservation Importance, RSPB Reserve)	9
Open countryside/open space/forest park/parkland	4
Woodland/forest park	2
Total other designations	51

(Note: Some respondents gave more than one reply)

9.3.3 Characteristics of sites managed by respondents

The distribution of sites by size is shown in **Figure 9.2**. The majority of sites (for those in which respondents stated an area) are less than 500 ha in extent (68%, n=77).

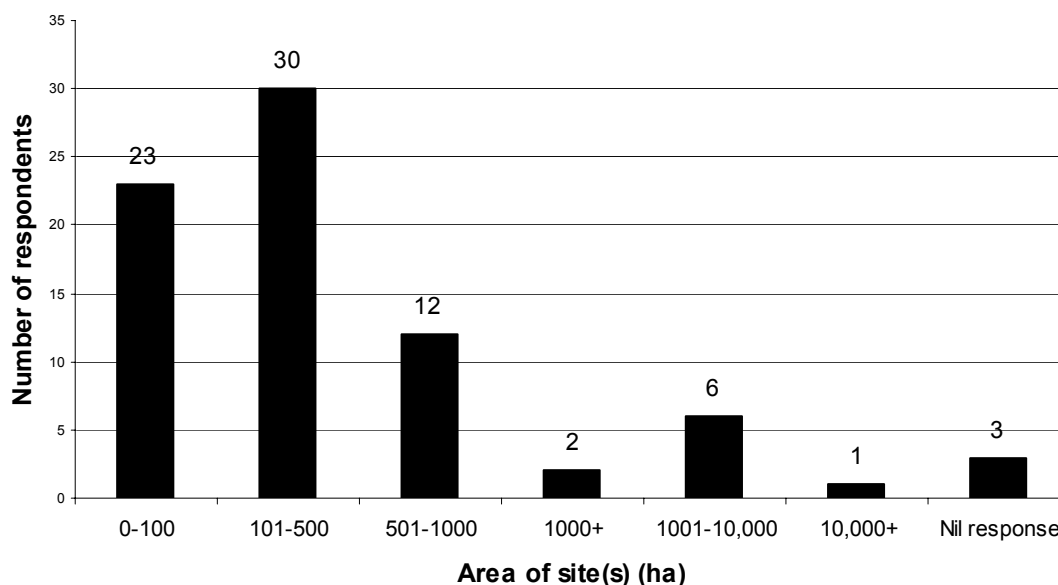


Figure 9.2 Distribution of sites by size

The respondents were asked to describe the sort of setting in which their site is located, and were provided with the choice between ‘Remote’, ‘Rural’, ‘Urban Fringe’ and ‘Urban’. Respondents were also asked to give an indication of the number of visitors they believe that their sites receive each year. Respondents were able to choose from different ranges. Their combined responses to these two questions are shown in **Figure 9.3**.

This shows that rural sites dominate the sample, and experience visitor numbers from under 1,000 up to more than 1m. More sites (31) fell within the 10,000 to 50,000 visitors per year category than any

other category, and nearly half of these were classed as rural by the respondents, while 5 and 4 sites were urban fringe and urban respectively.

Looking at the responses for numbers of visitors, if the mid-point of each range is multiplied by the number of sites with visitor numbers falling within that range (and those with 'Over 1m' assumed to receive 1 million), and the total summed, it can be estimated that the land managed by respondents receive on average some 76,000 visitors per year. Arkenford (2003) estimated the number of visits, based on a survey of 492 site owners, at between 356m and 392m per annum for all SSSIs (between 86,500 and 95,000 visits per site on average). They did, however, identify a heavy skew towards 'honeypot sites'.

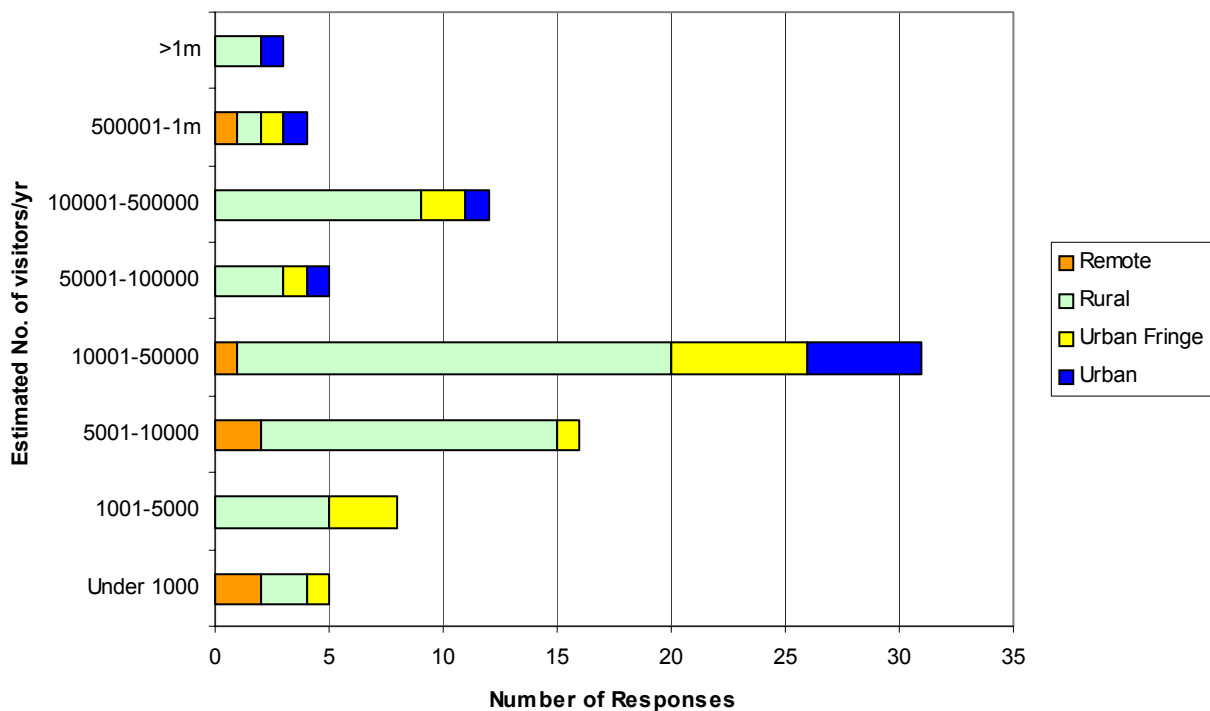


Figure 9.3 Annual number of visitors by type of site location

When asked what percentage of these visitors has a dog with them, the average over the 73 who replied to this question was that 28% of visitors have a dog. However, 7 respondents (9.5%) said that they have none or almost no visitors who are accompanied by dogs. When these are taken out, about 30% of visitors have dogs with them. If this percentage is applied to the crude estimate of total visitor numbers, then around 22,800 visitor days involve dogs at each site per year with about 1.7m visits overall. Arkenford (2003) estimated that 56% of visitors to SSSIs are 'Casual Walkers/Dog Walkers'. However, the figures for the two different groups are not disaggregated. Nevertheless, it would seem reasonable to suppose that the figure of 30% dog walkers as a proportion of the total is not atypical.

Respondents were asked to give a breakdown of the type of dog owners who visit their sites. This will have an element of subjectivity, as it may not always be possible for a site manager to assess accurately the type of dog owner within the categories suggested. Given this caveat, it appears that around two thirds of the visitors with dogs are local people, and a small proportion (2%) are professional dog walkers, although the professionals may have more dogs with them (per person) than other local dog walkers.

Around 30% of visitors to sites have dogs with them. The majority are local people, and relatively few are 'professional' dog walkers.

When asked if respondents ever observe dogs coming on to their site which are not accompanied by people:

- 4% said that they often have this happening;
- 45% said occasionally; and
- 51% said this never happens.

9.3.4 Conclusion

Taking the various indicators determined above, it is concluded that the sample of respondents is reasonably representative of sites that are managed primarily for nature conservation and to which the public has access.

The 77 responses, from managers responsible for over 153 sites, has provided:

- a relatively small sample from which to draw conclusions;
- a sample focused on sites of high nature conservation value;
- a good spread of site sizes;
- a range of sites with visitor characteristics that appear to be typical of sites of high nature conservation value generally.

The relatively small sample size suggests that the results need to be treated with some caution.

9.4 Analysis of results

9.4.1 Dog management policies and techniques

Respondents were asked about their policy towards dogs. In practice, this was a difficult question for respondents to answer because:

- policies may provide for variation during the course of the year;
- different policies may apply to different sub-areas (and, for those whose response covers several sites, different sites);
- policies may be applied to an area of land, but public rights of way cross the area and their policies could not be imposed on people exercising these rights.

Because of these difficulties, it is not easy to categorise responses. Even so, it was found that there were:

- 19 respondents whose sites have a complete ban on dogs (for most of the area, most of the time);
- 58 respondents whose sites have with some restrictions (for some of the area and some of the time), of which 13 had areas with no restrictions.

It might be expected that the setting of the site has some influence on the nature of restrictions applied. This is explored in **Table 9.3**. Note that, because of insufficient detail in some responses, the data in this table exclude some responses.

Table 9.3: Numbers of sites by type of restriction and site setting

Type of Site	Proportion of all Respondents	Sites with Complete Ban	Sites with Some Restrictions	No Restrictions
n=88	% of sites within category			
Remote Site (Virtually no resident population close to site)	7.0	10.5	4.1	10.0
Rural (In the countryside, with villages/small towns nearby)	61.0	78.9	67.3	60.0
Urban Fringe (Adjacent to centres of population)	19.0	5.3	14.3	20.0
Urban (Within urban areas)	13.0	5.3	14.3	10.0

Rural and remote sites appear to experience the greatest levels of restriction, whereas urban and urban fringe sites experience less restriction.

Rural and remote sites appear to experience the greatest level of restrictions, whereas urban and urban fringe sites experience less restriction.

There are several means by which dog owners may be asked or required to restrict their dog’s activities. The different types of restrictions and the frequency with which they are used are shown in **Table 9.4**, below. Some sites have different types of restriction used either at different times or over different sub-areas. In some cases, the response did not allow proper disaggregation of data.

Table 9.4: Range of restrictions used on sites

Management policies towards people with dogs	Number of sites where policy practiced
No restrictions	13
Dogs on leads around livestock	20
Dogs on leads in sensitive nature conservation areas	10
Dogs on leads at certain times of year	8
Dogs on leads all year round	16
Dogs excluded from areas with livestock	6
Dogs excluded from sensitive nature conservation areas	13
Seasonal dog exclusions	5
Permanent dog exclusions	19
Other	17
Total	127

9.4.2 Success of dog management policies and techniques

Proportion of sites with observed problems

Out of 19 who said that they have a complete ban in place (for most of the area, most of the time), nine (47%) said that they have no problems with dogs, whereas of the other ten:

- eight said they have observed effects on wildlife caused by dogs even though they have dog bans in place, but no elaboration was given (it may be that serious adverse effects had been observed and these prompted the introduction of a ban);
- the manager was currently fencing off sensitive areas at one site;
- one had got public footpaths across the site and so is unable to keep dogs off completely.

Of the 58 managers whose dog policy is less restrictive, 31 (53%) reported having not observed any problems with dogs.

Figure 9.4 shows, for each type of site, the percentage of sites within that category where effects of dogs on birds had been observed.

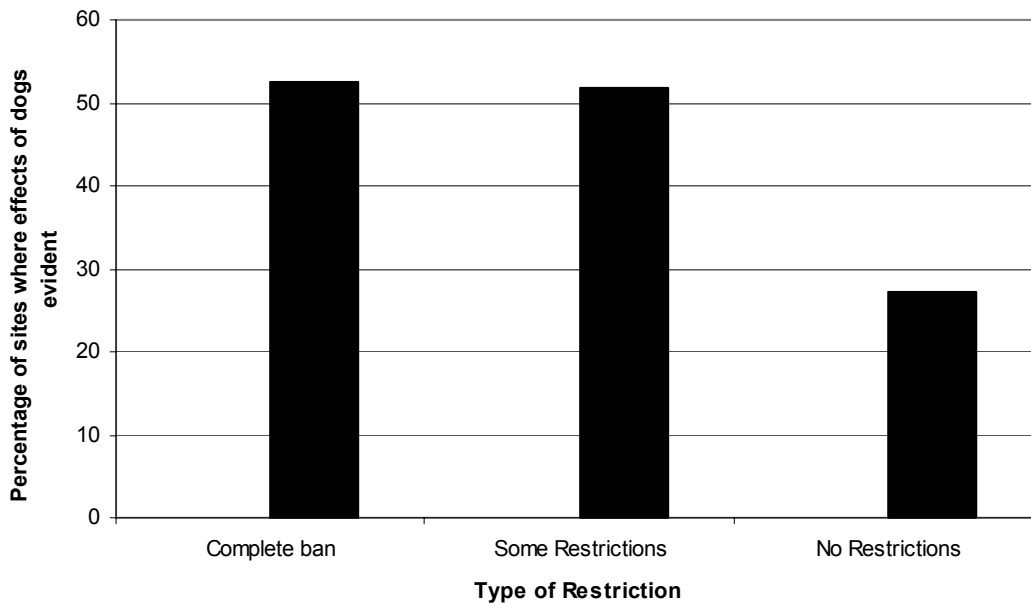


Figure 9.4 Percentage of sites on which effects of dogs on birds has been observed (by type of restriction policy)

This suggests that banning dogs will not necessarily lead to effects of dogs on birds being stopped. It seems that there is around a 50% chance of problems occurring on some occasion at a publicly accessible site, irrespective of the dog management policy applied. However, the absence of effects may not be a good indicator of a successful dog management policy, as it may reflect a lower conservation value and absence of wildlife to be affected. This is discussed again in Section 9.4.7 below).

There is a 50% chance of dogs adversely affecting birds at some stage, irrespective of dog management policy applied.

Measures for ensuring policy effectiveness

Having set a policy, it has to be implemented. A variety of measures are available for this. The ones used by respondents are listed in **Figure 9.5**, together with the respondents' assessment of the measure's effectiveness. Effectiveness is measured on a scale of 1 to 5, with 5 meant to mean 'very effective' and 1 meaning 'it does not work'. Respondents were allowed to use their own interpretation of effectiveness but it is reasonable to suppose that they gauged this against the effects they intended to achieve as a result of using the management measure. However, information on what they expected to achieve was not sought.

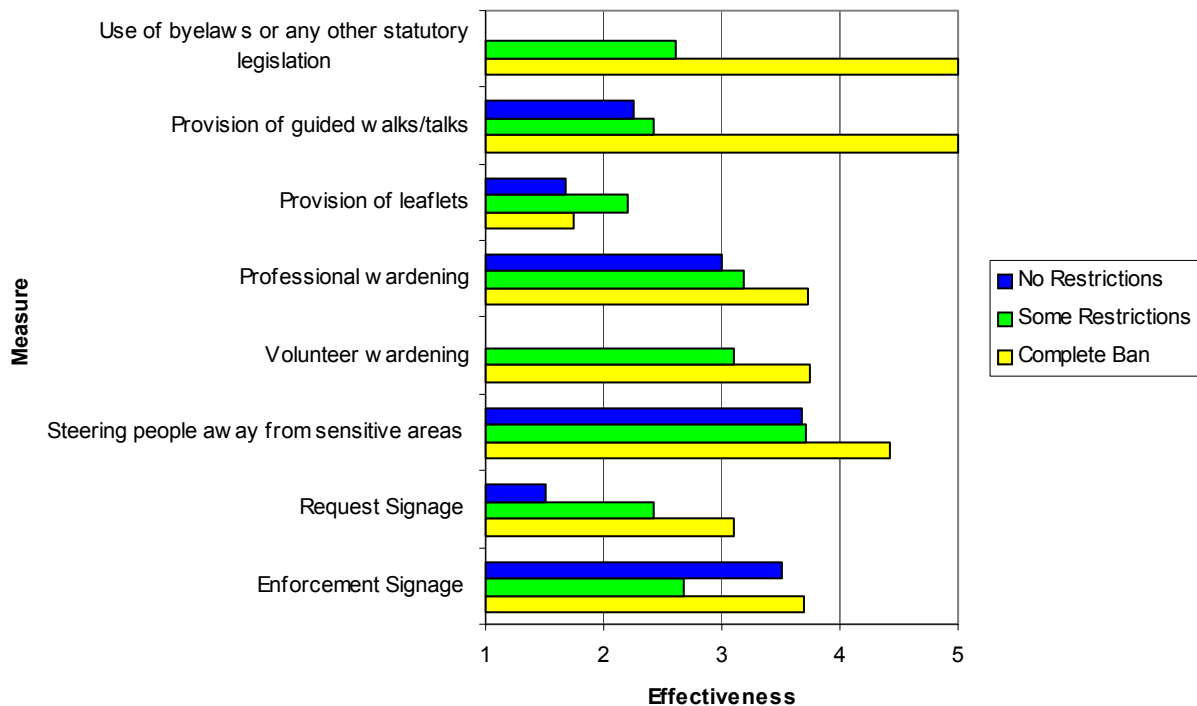


Figure 9.5 Measures used and their effectiveness by respondent

Steering people away from sensitive sites seems to offer the most effective mechanism across all types of restriction regime, with wardening (either employed or volunteers) closely following. The responses suggest that leaflets are the least effective method, whereas legal mechanisms and guided walks are very effective when dogs are banned (in fact this may be the mechanism used to effect the ban). Signage, whether making a request for, or demanding, compliance are regarded as having only moderate levels of effectiveness. This is reasonably consistent with research by Lafferty (2001), as reported in Section 2.6.

Effectiveness varies with measures used. Regulation allows complete ban and are very effective where they can be used but elsewhere, wardening and steering are best.

It is possible that those respondents with no reported problems have a particularly effective way of implementing their chosen dog management policy that is not used by managers of sites at which problems are reported. A comparison was made between these two subsets but it is difficult to draw clear conclusions from this as the sample is small and the basis used for the categorisation (of either with problems or without problems) cannot be checked. In any event, most measures were rated similarly by both the respondents with problems and without problems, apart from a lower level of effectiveness for all measures reported by the

Guided walks, regulation and steering combine to provide the greatest level of compliance with management measures.

former. Also, some of the respondents with problems reported ‘Other’ techniques as being effective. The ‘Other’ techniques mentioned are:

“Use of permit system to allow access to sensitive areas, allowing direct contact with dog walkers requesting that dogs are kept on leads in sensitive areas.”

“Patrolling also helps to enforce these policies.”

“The NNR visitor centre has an interpretation display on the effects dogs have on the reserve.”

Further, unlike the respondents with no reported problems, the respondents who do experience problems see the regulatory approach as least effective.

Relationships with dog owners

Respondents were asked whether they had attempted to establish any relationship with dog owners. In total, eleven said that they had and that in the majority of cases (8 of the 11), it had been successful. For example:

- several (3) said that informal arrangements were in place;
- some did obedience training campaigns;
- one had a dog walkers’ discovery day;
- one held meetings with “friends of ..” groups (many of whom are dog owners); and
- one deliberately sought out views of dog walkers over management issues.

Out of 11 managers who tried to establish relationships with dog owners, 8 said that this had been successful.

9.4.3 Impacts on birds

There were 68 responses from 35 respondents that related to specific observations of bird species being affected by dogs. As all of the responses were free format, respondents were able to name the species as they felt most appropriate. In several cases, rather than name a single species, respondents referred to a group of species (eg waders) or species that followed a similar pattern of behaviour (eg ground nesting birds). Responses are reported as given. The list of bird species and the number of responses for each question relating to disturbance are summarised in **Table 9.5**.

Table 9.5: Summary of observed effects of dogs on species of birds and groups of bird species

Species/Species Group	Number of Responses	Flushing	Injury or death (A=Adult, Y=Young)	Interference with nesting	Abandonment of eggs leading to chilling	Abandonment of young leading to chilling or starvation	Dispersal of young
Aggregations of wildfowl and waders	15	11	2(A)	2			2
Lapwing	7	6		2			1
Nightjar	7	5	1(Y)	2			2
Skylark	4	4		1			
Curlew	3	1	1(A)	1		1	
Snipe	3	2					
Dartford warbler	2	1	1(A)				

Species/Species Group	Number of Responses	Flushing	Injury or death (A=Adult, Y=Young)	Interference with nesting	Abandonment of eggs leading to chilling	Abandonment of young leading to chilling or starvation	Dispersal of young
Grey partridge	2	2					
Red grouse	2	1					
Redshank	2	2					
Reed bunting	2			1			
Shelduck	2	1		2			
Stonechat	2	1		1			
Woodcock	2	2					
Canada goose	1						
Dipper	1	1		1	1	1	
Eider	1			1			
Golden Plover	1						
Ground nesting birds	1	1					
Gull, black headed	1			1		1	
Little tern	1						1
Mallard	1						
Meadow pipit	1	1					
Oystercatcher	1						
Ringed Plover	1	1			1		
Stone curlew	1	1					
Woodlark	1	1					
Total	68	45	5	15	2	3	6

The results are reported as given, which means that effects on ‘aggregates or wildfowl/waders’ are reported as well as reports on individual waders and wildfowl. The most commonly affected species or species groups were wildfowl/waders with 15 responses (22% of all responses), 7 (10%) were lapwing and 7 (10%) were nightjar.

Flushing

Two thirds of the respondents had seen, or had reported to them, occurrences of flushing of birds from their nest by dogs. A question was also asked about the frequency of birds being flushed from the nest by dogs. The responses are shown in **Figure 9.6**. There was no prompting of frequency, and so the results use a mix of categories.

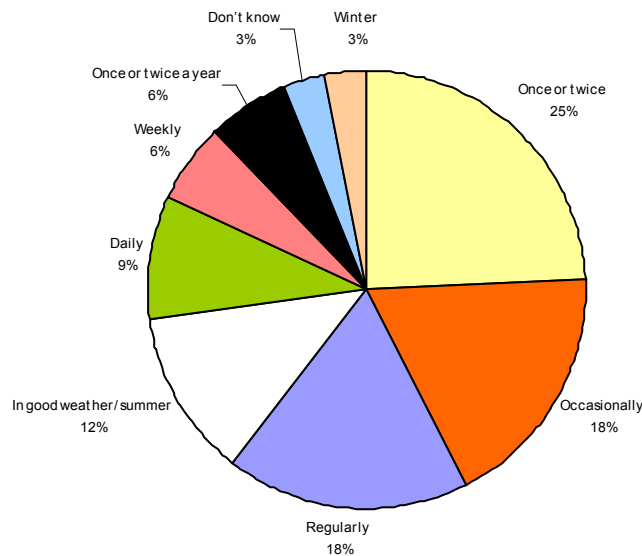


Figure 9.6 Reported frequency and timing of flushing

When commenting as to whether the dogs responsible for the flushing were on or off the lead, 31 responses were provided; 29 (94%) said that the dogs were off the lead, and 2 (6%) said that dogs were both off and on the lead.

Direct injury or death

One of those reporting an incident of injury or death with wildfowl/waders commented “*it is possible throughout the year*”, rather than that he had seen it happening. The second response for this species group was that a red setter caught and killed a Canada goose on one occasion. Once again, dogs were said to be off-lead when these incidences occurred. Although there were three responses about consumption of eggs or chicks, only one respondent said that he had actual evidence on one occasion of nest predation carried out by a dog (a spaniel). One other respondent commented that he had seen predated eggs (nightjar) but that there was no evidence of whether it was done by a dog or not.

Interference with breeding

A question was asked about evidence of prevention of, or interference with, breeding activity (including prospecting for sites, courtship, nesting and rearing behaviour). The results are presented in **Table 9.5** above, by species affected. Perhaps not surprisingly, wildfowl/waders and ground nesting birds feature most prominently in the responses.

Those who had observed interference were asked to state with what frequency the disturbance occurred. The results are shown in **Figure 9.7**, again without any strict banding of responses.

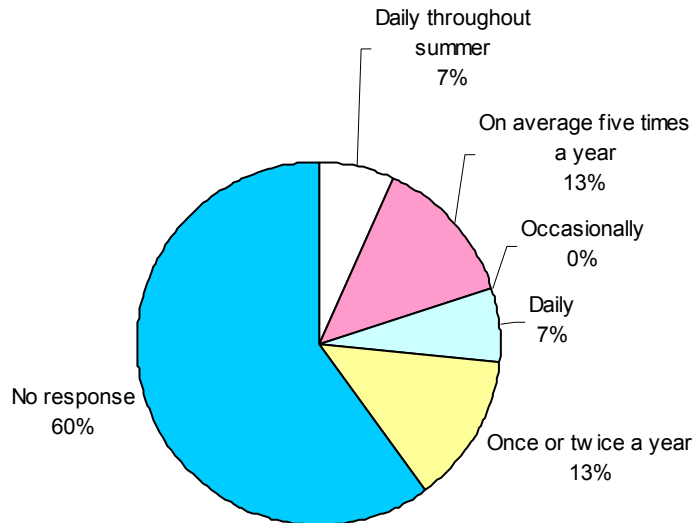


Figure 9.7 Frequency and timing of interference with breeding

Abandonment and subsequent effects

Another potential effect is that of abandonment of eggs leading to chilling and loss of egg viability. A question on this elicited two responses (see Table 9.5). Neither respondent gave any precise description of these occurrences or supported their comment with evidence to substantiate the claimed link with dogs. One of the respondents said: “*agitated adults prevented from incubating and brooding young chicks, for example*”. A related question sought evidence about abandonment of young leading to chilling or starvation and elicited three responses. All of these three respondents simply responded “yes”, and there was no comment as to frequency or any description of the circumstances.

Six respondents reported abandonment or flushing leading to predation of eggs or young by crows, gulls or other birds. All said that this was a possible or probable occurrence, and two added that they had received reports of corvids taking chicks. One other mentioned that although there was no direct evidence, the constant presence of crows did make it likely that young would be more vulnerable if the adults are flushed from the nest. These observations are consistent with effects observed by some researchers (see Section 2.5).

There were no responses to a question about abandonment or flushing leading to predation by foxes or other mammals.

Dispersal of young

There were four responses to a question about dispersal of young in which the young were re-located by their parents. The responses are given below.

Species Name/Type	Comment
Aggregate of wildfowl and waders	<i>“Possible throughout the year by dogs off lead”</i>
Little tern	<i>“Yes – dog running through colony dispersing young”</i>
Nightjar	<i>“Regular – by dogs off leads”</i>
Nightjar	<i>“Young dispersed on two occasions but not checked to see if parent returned”</i>

Two site managers had observed young being dispersed and not re-located by their parents. There comments were:

Species Name/Type	Comment
Aggregate of wildfowl and waders	<i>“Possible throughout the year by dogs off lead”</i>
Lapwing	<i>“No direct evidence of this, but I suspect that it does happen as a result of dog disturbance”</i>

Other comments

One respondent, in response to a question about scent trails being laid to sites by dogs that are then followed by other predators, agreed that this was a possibility throughout the year, by dogs off-lead, and could affect aggregates of wildfowl and waders.

Summary and conclusion

Figure 9.8 provides details of the number of respondents who have reported problems with birds (or have reported no problems with dogs), broken down by type of management policy. This provides an interesting perspective on the perceived effectiveness, as measured by number of observed effects. However, care is needed in placing too much weight on these results as the numbers involved are small. Nevertheless, it is interesting to observe that, for example, fewer respondents had noted problems where there were no dog restrictions than those who reported problems (6 versus 2), although this may have arisen because susceptible wild animals are no longer present (or are rare) as a result of the presence of dogs, or that they have become habituated to dogs' presence. At the obverse, of the 12 respondents with permanent dog restrictions, three reported having observed problems.

Taken in isolation, the reported responses do not constitute scientifically or statistically robust findings. However, the results are entirely consistent with what might be expected both empirically, whether from personal observations or scientific investigation.

Results found in the survey are consistent with research findings.

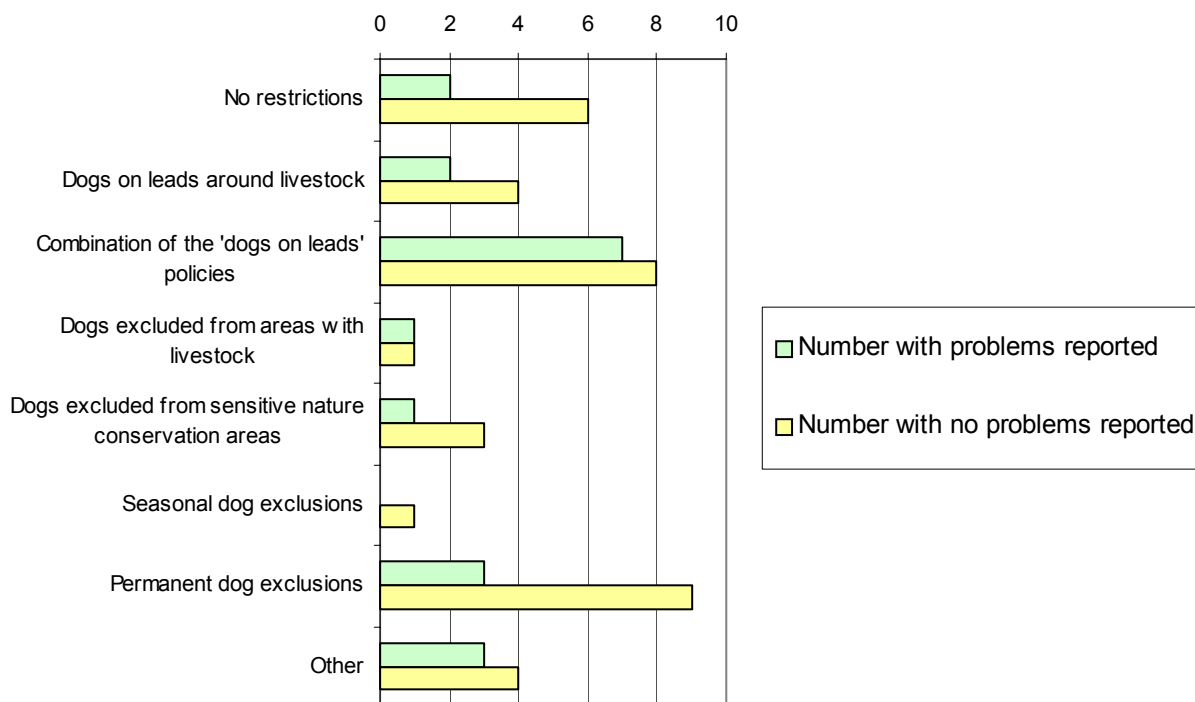


Figure 9.8 Frequency and timing of interference with breeding

9.4.4 Effects of dogs on species other than birds

Respondents were able to report impacts on animals other than birds (a separate spreadsheet was available for this purpose). Of the 77 respondents, just over half (n=42, 53%) reported effects. A number of different species were affected, as reported in **Table 9.6**.

Rabbits are the species most affected, followed by deer of various species. It would appear that some cases of disturbance are not accidental based on comments received. Information on the impacts found by researchers is given in Section 4.

Table 9.6: Non-bird animal species respondents say have been affected by dogs

Species	Number of Responses
Rabbit	14
Deer	9
Fox	6
Squirrel	5
Hare	4
Water vole	3
Fallow deer	2
Muntjac	2
Sheep	2
Cattle	1
Field vole	1
Otter	1
Seal	1
Total	51

Note: (Some respondents gave more than one response)

9.4.5 Other effects

A number of questions were asked to explore other potential effects.

Dogs attracting predators

Two respondents commented that predators (one referred to “*corvids and gulls*”) frequently appear when dogs appear; six said that predators occasionally appear (similar to an effect recorded by Strang (1980) and MacInnes (1980) in which predators appeared to follow researchers in their fieldwork – see Section 2.5.1). A total of 62 said that this effect had never been observed.

Signs of habituation

It has been suggested that some species of wild animals become habituated to the presence of dogs. Ten respondents said that they believed that they had observed such signs. Examples of information proffered are:

“only where dogs and people are very close and on regularly used defined route (track, bank) breeding waders display reduced reaction compared with walking through fields at similar range.”

“From the evidence of the location of the nest site beside tracks and paths frequently used by dog walkers.”

“Possibly...observed Woodcock apparently unconcerned by presence of Husky which runs loose every day in wood near its home.”

Nutrient enrichment

Nutrient enrichment was noted by 19 respondents. Typical effects reported were:

- enrichment occurs close to car parks and entrances to sites (11 mentions);
- reduction of species diversity (5 mentions) and increasing dominance of nutrient loving species such as nettles, thistles, clover, docks, grass species at the expense of others (11 mentions);
- vividness of green vegetation (3 mentions);
- faeces apparent on ground (3 mentions).

Several of the respondents who said there was no evidence of nutrient enrichment explained why:

- “*too widespread*” (it was not clear whether this was referring the site, or the distribution of dog faeces);
- “*too few dogs to monitor*”;
- “*no but very concerned*”.

The observations noted above suggest that nutrient enrichment can be a major influence in those parts of sites that are within a short radius (50m to 200m) of car parks and entrances. The enrichment will be evidenced by

reducing species diversity, greening of the vegetation and invasion by ‘weed’ species. Two further respondents suggested that more research was needed to ascertain what were the effects of dog faeces, and their significance, in terms of nutrient enrichment. Information about research into eutrophication

Symptoms of nutrient enrichment are most evident close to car parks and entry points.

by dog fouling is reported in Section 5. In response to a question about management of dog fouling, answers were given as shown in **Table 9.7**.

Table 9.7: Management measures used to control dog fouling

Management measure	Number practicing the measure
Provision of dog bins	29
Special measures used to meet Health and Safety requirements (eg clothing, reciprocating mowers)	22
Signage	15
Use of Byelaws and the Dog Fouling Regulations	9
Talk to dog owners	5
Poo bags to hand out	3
Occasional Initiatives	2
Use of ordinary waste bins	1
Ban dogs	1
Flick poo into bushes	1
Specific fouling sacrifice area	0
Total	88

Note: Some respondents use more than one measure

Provision of bins and measures to protect staff are the most commonly used measures. Signage is also a common response. Management measures explored by researchers and site managers are discussed further in Section 5.

9.4.6 Impacts of dogs on land management practices

A number of questions were asked about the effects of dogs on other land management practices. These have been considered under two separate headings – grazing of livestock and health and safety.

Grazing of livestock

Many livestock farmers are concerned about dogs worrying their stock, especially sheep. Yet, grazing by livestock can be an essential component in the management regime of many sites of nature conservation importance. Respondents were asked whether the presence of dogs at their site had exerted an influence on grazing management. Responses were that:

- in nine instances, a land management activity had been **discontinued**;
- in ten cases, the presence of dogs at a site had **prevented** a land management activity from being introduced;
- in 21 cases, the presence of dogs had caused the site manager to effect a **change** in a land management activity.

Concern over the effect of dogs on grazing livestock was reported to have exerted an effect on management by 40 out of 77 respondents.

Respondents were not asked for details and none were volunteered (more discussion on this subject is contained in Section 6). Nevertheless, it would appear from this that the presence of dogs exerts a significant influence on decisions made concerning grazing management at a large proportion of sites. This has the potential to significantly affect the nature conservation interest of a site because grazing management is often necessary for maintenance or restoration of a site's condition.

The limitation on grazing imposed by concern over the effect of dogs on livestock has the potential to seriously constrain effective management.

Health and safety

Concerns have been expressed about public safety aspects of dogs. This has been considered in the literature review (see Section 7.7 above). The questionnaire provided an opportunity to ask whether there had been health and safety incidents on sites in which dogs were a key component. Responses are summarised in **Table 9.8**.

Threats by livestock occur at a relatively small number of sites, and attacks at a very small number of sites. Suckler cows are most likely to be the threatening animal. A majority of those people threatened by an animal was accompanied by a dog, although only one of the two people actually attacked was accompanied by a dog. Of all cases reported, in just over half the cases, the threatening or attacking animal was either pregnant or had young. These results tend to be consistent with information provided elsewhere (and reported in the literature review) although the numbers involved are (fortunately) very small.

Attacks on people were reported at a very small number of sites, and these tend to involve suckler cows and pregnant or with young.

Table 9.8: Data relating to health and safety

Details	Threatened	Attacked
Number of sites with occurrences:	11	2
Frequency in last 5 years (by site with any occurrences)		
1 – 3 times	9	2
4 – 10 times	1	-
More than 10 times	1	-
Occasions when person was accompanied by a dog	6	1
Of these, dog known to be on a lead	3	0
About the livestock – number of occurrences when the animal was a:		
Bull	2	0
Dairy Cow	2	0
Suckler Cow	7	1
Ram	1	1
Ewe	1	0
Deer	0	0
Horse or Pony	2	0
Other	1	0
Proportion of cases when animal was pregnant or had young	64%	50%

Relationships with other users

Respondents were asked to state what was the reaction of other users to the presence of people with dogs. Although respondents were prompted with the types of ‘other users’, no guidance was given to how they might respond. A wide range of different responses was received. In order to simplify the analysis, responses have been grouped. It is inevitable that the observations will contain a degree of subjectivity as it is unlikely that people were asked to explain their attitudes towards people with dogs, but that their attitude has been inferred from the observed behaviour. The results are summarised in **Table 9.9** below.

Table 9.9: Reported effects on other users of people with dogs

User Type	Generally OK/positive	Disapprove/complain	Deviate to avoid contact	Neutral/ignore	Other response
People without dogs	15	12	4	3	15
People with children	9	6	23	5	8
Horse riders	2	6	11	3	2
Cyclists	2	4	9	5	4
Non-European	0	1	11	0	1
Disabled	4	3	2	2	1
Total	32	32	60	18	31

It is evident from this that the most commonly observed response of users without dogs is to take action to avoid contact with an approaching dog. This reaction was most pronounced in people of non-European origin, people with children, horse riders and cyclists. About an equal number (but half the number who took evasive action) are perceived as approving as are disapproving. However, care is needed in drawing conclusions from these observations as it is not possible for site managers to know why people acted the way they did.

Non-dog owning visitors appeared to be more than twice as likely to try to avoid contact with dogs as welcomed them. Taking evasive action was most commonly observed in people of non-European origin, people with children, horse riders and cyclists.

9.4.7 Linking impacts to management policies

This sub-section examines the links between dog management policy and the reported effects on wildlife species. Various cross-tabulations have been attempted in order to try to identify the most effective means of managing dogs. In these cross-tabulations, effectiveness is measured in terms of the frequency with which adverse effects have been observed and reported by respondents. The frequency was as follows:

- no species affected (n=16, or 20% of responses);
- effects on both birds and other animals (n=31, or 40% of responses);
- effects on either birds or other animals (n=30, or 40% of responses).

The differences in settings of the sites managed by respondents with respect to the presence or absence of effects on birds and other species was explored but, apart from sites in remote settings, sites in other settings experience broadly the same level of effects (26-29% of sites experience no effects). Rural sites appear to have the most significant level of effects on birds and other wildlife combined (nearly half the sites reported to have problems), but with little difference between urban and urban fringe. Other species are most commonly affected on urban fringe sites.

The effects on sites of different nature conservation value were also examined. In order to do this, the responses were divided between those obtained from managers of:

- SACs, cSACs and SPAs (high value);
- SSSIs but not SACs, cSACs or SPAs (medium value);
- Others (low value).

It should be noted that the terms ‘high’, ‘medium’ and ‘low’ are used in a relative sense; as has been noted earlier, all sites are likely to be of significant value for nature conservation. The analysis (of the 75 respondents who provided sufficient information to allow their sites to be categorised) shows that respondents managing ‘low’ value sites reported fewer problems. Of the 18 respondents in this category, 8 (44%) reported no problems compared to 6 (30%) of the ‘high’ and 24% (9) of the medium value. It is possible that the lower level of problems may reflect the comparative absence of wildlife to be affected, or a lower level of management presence to observe such effects. The ‘high’ and ‘low’ value sites received a similar level of visitor numbers, which was higher than for the ‘medium’ value sites, so variation in visitor numbers does not appear to explain this variation. Nor does the setting of the sites explain the variation, as a similar proportion of the ‘high’ and ‘medium’ value sites were in urban or urban fringe locations (30% and 28% respectively) compared to the ‘low’ value sites (40%).

Looking at the different species groups, it appears that effects on other wildlife are observed marginally more frequently than effects on birds. This may be because such disturbance is easier to spot, especially when large animals such as deer are involved, and it is more apparent to the observer that the animal has been disturbed. There was also anecdotal evidence of deliberate disturbance.

The volume of visitors may be relevant, and so this is examined in **Figure 9.9**.

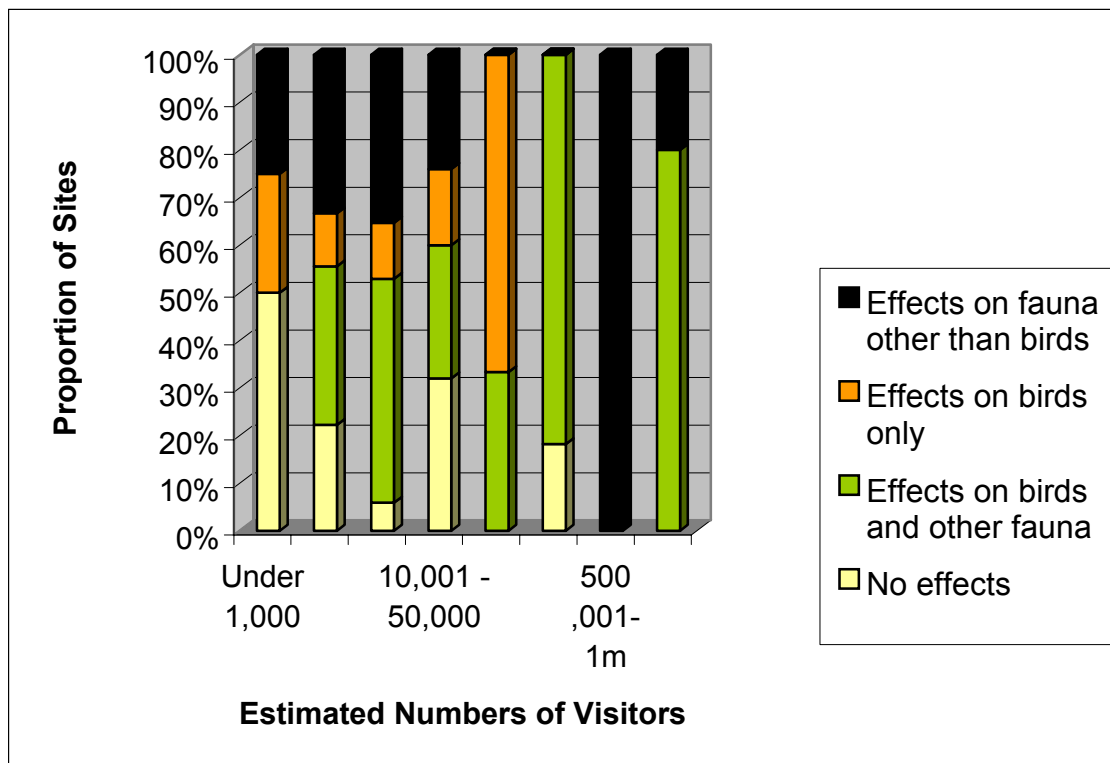


Figure 9.9 Numbers of visitors and the level of dog-related effects on wildlife

There does not appear to be any consistent pattern between the numbers of visitors and the frequency with which effects have been reported. However, sites with small numbers of visitors appear to have fewest problems (as might be expected), and on heavily visited sites, all sites in this category (few in number) had reported effects. However, the data in the figure do not take account of visitor density or distribution. It is well established by research (eg Taylor and Thurston 2002) that a significant proportion of visitors to open countryside locations travel only a small distance from the point of arrival. Further, a large number of visitors on a large site, with a multitude of undisturbed sanctuary areas, may cause less impact on wildlife than a much smaller number of visitors on a small site.

It may be that the management policies provide the explanation as to why effects are observed on some sites and not others, or that different species groups are affected. This aspect was examined but no discernible pattern to the link between management policy and frequency of effects emerged. Whilst dogs on leads and dogs excluded are the most commonly used policies, they were not clear determinants of observed effects on birds or other animals.

As has been noted earlier, most sites have more than one management policy applying. The management sophistication that this may reflect could explain the success in preventing problems. However, the number of policies may simply reflect the number of sites that the respondent has within his management. Nevertheless, **Table 9.10** includes the respondents who said that they had no problems with wildlife or who had had problems and looks at the number of policies that each manager said that they employ. Over 40% of the sites with no problems were employing more than one technique. In contrast, 57% of those who reported problems had only one or no management policy, and half of those who reported problems with both birds and other species had no specific management policy.

Table 9.10: Occurrence of effects by number of management policies

Number of management Policies Employed	Number of respondents with no reported problems	Number of respondents with problems with birds	Number of respondents with problems with other species	Number of respondents with reported problems for both birds and other species
0	0	0	0	15
1	13	6	6	8
2	7	3	3	5
3	2	1	2	1
4	0	0	0	1
5+	0	0	0	1
No response	1	0	0	0
Total	23	10	11	31

It is interesting to compare these results to those found by researchers (see Table 3.3 for example).

It could be inferred from the above that a having a management policy is of value, and (rather more tentatively) that a multi-faceted management approach is more successful than any single management policy. Further, having a policy is seen to be better than not having any policy at all.

Having a management policy is beneficial, especially if multi-faceted rather than reliant on a single one.

In Section 2, reference was made to the differences in inherent characteristics of different breeds. **Table 9.11** provides a summary of the data by breed of dog, where this was provided.

Table 9.11: Breeds of dogs which respondents say affected wildlife and birds

Breed of dog	Affecting non-bird species	Affecting birds
Various	4	-
Retriever	2	-
Lurcher/greyhound/hound	9	-
Collie	1	1
Terrier	4	1
Red setter	3	-
Labrador	2	6
Springer spaniel	1	5
German Shepherd dog (Alsatian)	1	-
Foxhound	2	-
Pointer	-	1
Total number of responses	29	14

The breeds identified as causing problems correspond closely those that would be expected to cause problems, based on their breed characteristics. The list also includes several of the most popular breeds (see Section 2.3).

9.5 Synthesis

The research amongst site managers has revealed that there are few direct observations about the effects of dogs on wildlife because it requires the coincidence of two events – that disturbance takes place and that a site manager is there to observe it. These two events do not often coincide, and so many observations are based on circumstantial evidence. Nevertheless, all of the observations are consistent the findings of research as described in earlier chapters.

The responses concerning effectiveness of, and compliance with, management measures reveals that steering visitors and wardening are effective, whilst leaflets and signage are not very effective, although the last two measures may be an essential pre-requisite to the success of the former two. Legal measures were said to be effective, and secure high levels of compliance, where and when dog bans are imposed.

Species groups of wildfowl and waders, plus a number of ground nesting/living individual species (nightjar, skylark, lapwing) were most commonly reported as being disturbed by dogs. Where reported (in relation to 31 observations), nearly all (94%) of the dogs which were observed as causing the disturbance were off-lead.

The breeds identified as causing problems conform with expectations, based on breed characteristics and popularity amongst dog owners.

Symptoms associated with nutrient enrichment – greening of grass, invasion by nutrient loving plants and reduced species diversity – were commonly reported as occurring within 200m of car parks and popular access points to reserves.

Concern over the presence of dogs has a significant influence on decisions over site management where this involved grazing livestock. Of the 77 respondents, 40 (52%) said that this had been a factor in their decisions, causing them to stop, change or not introduce grazing at a site. Where grazing is an essential component in the management regime, the limits imposed could have significant effects on the site's long-term value unless alternative regimes are available. For example, in recent work at Cannock Chase, concern over the welfare of sheep has led to proposals for the required grazing regime to be applied using cattle and ponies.

Another significant effect noted by respondents is their on-site observation that many of the people unaccompanied by dogs appeared to take action to avoid contact with dogs. Although some welcome dogs and show a positive reaction to them, a similar number complained about the presence of dogs and twice as many showed negative reaction or evasive behaviour. It is likely that many dog owners (who presumably are themselves positively predisposed towards dogs) do not appreciate the negative reactions exhibited by others when they come across dogs.

The analysis examined a range of variables against the frequency of problems being reported (affecting either birds or other animals, or both) to determine whether there are any correlations. The only clear correlation is that sites with large numbers of visitors report more problems than those with few visitors. There is some evidence that leads, tentatively, to a conclusion that a multi-faceted dog management policy is more successful at limiting effects on wildlife than a policy reliant on a single measure.

The high level of agreement between the survey and research results lends more credibility to the observations than a strict statistical analysis would allow. The survey findings, whilst providing limited quantitative data, are entirely consistent with empirical evidence.

10 Recommendations for site managers

10.1 Overview

There are a number of recommendations provided in the literature that provide measures to help reduce the effects and impacts of dogs on wildlife and nature conservation sites. Inferences can also be drawn from the findings of the national survey. These can be divided into:

- integrated strategies;
- those that address dog management and thus reduce the extent to which dogs can affect wildlife;
- those that prevent dogs and recreational access to sensitive areas;
- those that reduce anthropogenic eutrophication;
- other management measures.

10.2 Integrated strategies

Much of the effort in managing dogs appears to be on negative messages – dogs being banned, or dogs must be kept on leads. A strategy adopted in Pembrokeshire publicises the areas where dogs are welcomed (Pembrokeshire County Council 2005), with a view to displacing them away from areas where they may not be as welcome. However, the strategy is not without dissenters (NAFW 2005).

It is likely that an overall integrated strategy, rather than the adoption of any one of the ideas presented below, would be most effective. The extent to which this needs to embrace the measures outlined will depend on the level of visitor use, the numbers of dogs, the extent to which these may be causing problems (eg through dogs mostly being off leads and out of control), the size of the site, and the sensitivity of the nature conservation interests. Also, agricultural interests may coincide with wildlife interests insofar as dog control is concerned. A number of organisations, such as the National Trust, have reviewed dogs on site issues and developed an overall strategy for their sites. Their website is particularly useful for further information on their approach

(see: http://www.nationaltrust.org.uk/environment/html/peo_com/pdf/recreat01.pdf :National Trust /Recreational Activities at National Trust properties – dog walking).

When a strategy is being implemented, Dowling and Weston (1999) point out the value of using the media in helping to broadcast the message on acceptable behaviour of dog owners and their dogs at sensitive sites. Signs and displays at information centres or at site entrances are also useful as part of the package. Pamphlets or other paper-based information can form part of this approach. Part of a strategy will be to increase the awareness within the organisation and the public on the issues of disturbance and eutrophication in so far as it affects the site or sites in a region (Sime 1999). It should be noted that managers in the national survey (see Section 9) tend to feel that leaflets are not very effective.

Taking each of these in turn, the key measures are expounded below. In all cases, visitors are more likely to comply with the restrictions placed, if they understand the benefits that are likely for the wildlife (Miller and others 2001). By emphasising how human activities affect wildlife, visitors will be able to associate their actions with either beneficial or harmful behaviour. Miller and others (2001) go on to argue that this would aid people to develop a ‘conservation ethic’. They quote Klein as finding that visitors who spoke to the ranger were less likely to disturb wildlife than those who did not.

10.3 Dog management

This is essentially concerned with keeping dogs on leads or under close control. On CRoW access land, dogs must be kept on a short lead between 1 March and 31 July each year and at any time when in the vicinity of livestock. Although it is a legal requirement for a dog to be kept under close control on a public right of way, it is not a requirement for them to be kept on a lead (although they should not be allowed to be ‘at large in a field or enclosure in which there are sheep’):

- it is unlikely that many dog owners are aware of this (at best, subtle) distinction; and
- a sufficient number of dog owners may be willing to keep their dog on a lead if they were made aware of the threat it poses to wildlife.

Consequently, more effort needs to be made to encourage dog owners to keep their dog on a lead, and to reinforce this message (whilst keeping within legal requirements) as much as possible.

It is particularly important to consider having all dogs on leads, or banning dogs altogether in the most sensitive areas and at the most sensitive times, where there are important ground-nesting birds in the breeding season. This would normally extend from the end of March to the end of July. There may also be a need for restrictions in winter where there are concentrations of ground dwelling wintering birds, or where there are other particularly sensitive nature conservation interests. If it is possible for there to be ‘dogs on leads’ and ‘dogs off leads’ areas, this would be better than a single measure of dogs on leads in all locations.

Examples of attempts to implement such an approach include the National Trust’s ‘Take the Lead’ campaign in the Peak District Moors (quoted in National Trust 1998), which sought to combine the need for leashing dogs in the lambing and bird breeding season on the open moors.

There are benefits in permitting dogs to be off leads and many owners derive greater enjoyment from this. Areas can be zoned for public use without leashing dogs as possible ‘sacrificial’ land suggested below (see Section 10.5), along with other areas that may not be as sensitive to disturbance. Steering techniques (see Section 10.4) can also be used to direct dog owners to less sensitive areas, on the not unreasonable assumption that their dogs will go with them. Alternatively, a higher-level strategy for a district or region should be developed that provides positive messages to the public about where dogs off leads are and are not acceptable.

The Countryside Council for Wales (CCW) gives some guidance on dog management in its publication *Managing Public Access* (CCW 2005).

10.4 Access management

Various methods have been adopted on different sites to manage access by zoning use, fencing out areas to provide sanctuary areas for wintering or breeding birds, or other appropriate management measures. Measures that could be used to manage dog owners and thus their dogs include:

- taking a strategic view of access at a site, using the methods currently being applied by English Nature to plan for management of access at SSSIs that will experience public access for the first time as a result of the implementation of CRoW Part I;
- rationalising the number and distribution of footpaths and tracks, closing some down where these reduce the effectiveness of quiet or sanctuary areas (as suggested for capercaillie by Summers and others 2004), although no changes can be made to the alignment of public rights of way or access land where there is a right of access without following the appropriate legal procedures. Paths and tracks that take people into sensitive areas and which are not public rights of way can be allowed to grow over;

- planting of dense screens of prickly species along particular paths. Dogs do not usually like to run through low gorse swards (Western gorse) on heathland, and blackthorn, rose or hawthorn could be trained to form suitable live screens to keep dogs and people on paths, provided these do not then become management problems in their own right;
- use of inert screens such as wattle or reed fences to shield birds from visitor and dog intrusion, as is usually applied along entrances to hides;
- fencing tracks or paths alongside very sensitive areas (but beware of the common land issues re. fencing)
- not allowing dogs to swim in ponds or other water bodies that are sensitive to such disturbance (enforced using signs and wardening, as appropriate, or even fencing);
- using signage to keep people and dogs out of sensitive areas, ensuring that the signs remain clear and up to date over the years (Abraham undated) and banning dogs from sensitive areas eg lek sites (Marshall 2005);
- closing areas of the site to public access (eg tern or plover breeding colonies, or winter goose refuges, Riddington and others 1996) temporarily during the breeding or wintering season. Any such closures will need to be made without breaching public rights of access;
- providing alternative and interesting routes, such as to hides or viewing facilities, the use of which do not affect the species;
- reducing the incursion of cars into recreational sites, keep car parks to the edges (Marshall 2005).

It is important when considering any of these measures to take into consideration the effects of visitor numbers that Beale and Monaghan (2004) found, as described in Section 3 distances may be greater when visitor numbers are higher.

10.5 Reducing eutrophication

10.5.1 Good practice guidance

Realistically, it is only possible to reduce the amount of faeces that are left on a site. Urination cannot be controlled significantly, although some of the ideas below might alleviate this a little.

The issue needs a strategy which develops an acceptable code of practice for dog walkers, uses various techniques to explain to dog walkers why it is necessary to remove the faeces their dogs produce, provides receptacles for this, encourages environmentally sustainable means of achieving it, and provides some enforcement of the operation of the code.

Some examples of codes of practice, developed by the Countryside Code (Countryside Agency and Countryside Council for Wales 2004), the National Trust and Teignbridge Council (South Devon), are included in **Appendix 2**. The Teignbridge Code extends to include aspects of dog behaviour management and dog training to help reduce conflicts between visitors. Teignbridge Council has also developed an assessment methodology to highlight to visitors the visual and amenity impact of dog mess on recreational sites that would be usefully applied elsewhere.

The Woodland Trust has also used some novel techniques for controlling dog fouling, labelled as 'Flick-with-a-stick' and 'Flag-the-poo'. These are described in their urban woodland design guide leaflets (Woodland Trust 2002).

The provision of bins for dog faeces needs to be promoted along with the re-use of waste polythene bags (such as all those that cover mail) rather than new bags, which increases the overall environmental impact, or biodegradable plastic bags where this is consistent with the setting of the

site. Some way of collecting and recycling the faeces without the use of polythene bags needs to be developed to make the whole process more sustainable. Managers are advised to discuss waste management with the local waste planning authority, as dog waste on its own may be classed as controlled waste and thus require special (and more costly) disposal methods, whereas dog waste mixed with other forms of litter may not be considered to fall into the controlled waste category.

The results of the questionnaire survey suggests that leaflets and signage are not the most effective means of encouraging particular behaviour, but could be used as part of a broader strategy to enforce the message. However, the survey also shows that rangers on site talking to people is the most effective means of achieving measures to reduce leaving dog faeces on site. The ENCAMS' leaflets provide some useful practical guidance that site managers may want to adopt.

For sites where there are large numbers of dog walkers, and very sensitive vegetation, the possibility of obtaining further 'sacrificial' land should be considered. The ideal would be to move the car parks or site entrance up to a 10-minute walk away. The new land should be designed, and habitats created to maximise its attractiveness to recreationists, to provide short circuit walks, and plenty of paths. Such land could then be the first area for a walk, take the majority of the first flush of urine and faeces, and reduce the levels on the sensitive habitats.

On some sites, it may be possible to designate the area so that it is covered by a dog control order (made under the Clean Neighbourhoods and Environment Act 2005). To be effective, some of the above mentioned measures will be needed to enforce the regulations. Where wardens are available to help manage access, they can also have a role in enforcing control of dog fouling whether regulations apply or not.

10.5.2 Other management measures

Predator control

It has been shown in Section 3 that high incidence of crows or other similarly opportunistic predators such as gulls and magpies are implicated as robbers of unguarded nests. However, Pearce-Higgins and Yalden (2000) showed that predation on golden plover was less on a well-managed grouse moor (although there were other causes of chick loss) despite regular dog disturbance. It follows, therefore, that there may be opportunities for maintaining rigorous control over those species to which this can be legally applied. This could reduce predator numbers in particular where there are important ground-nesting bird species. The visiting public would need to understand the value and importance of such measures.

Agricultural management

The interests of livestock farmers and nature conservation managers coincide when control of dogs is concerned. Wherever a site has both interests, management planning should take both aspects into account. There are measures open to livestock farmers (eg in some circumstances, it is lawful for a farmer to shoot a dog that is worrying stock and the farmer believes the dog cannot be stopped in any other way) that can, in extreme circumstances, be applied and their use publicised as a deterrent to others. The *Finest Countryside* (2005) website holds reports of these extreme measures being used on grazed salt marshes that are also valuable for birds, in an Area of Outstanding Natural Beauty. Although the shootings were not actively publicised, the events have become widely known locally; even so, further sheep worrying has subsequently occurred.

Engaging with the public

Evidence from a variety of sources suggests that trying to engage with local communities over access can help pre-empt problems emerging, or escalating to serious levels. Whilst it may be difficult to justify such engagement for dogs alone, any attempt to do so over public access in general should also

include dogs. This allows the message about responsible behaviour to be disseminated and may help create social pressure against irresponsible dog owners. Of the 11 site managers in the national survey who had engaged with the public, eight believed this to have been successful.

Permit system

The aim of a dog permit system would not necessarily be to restrict usage of a site by dogs but to create a mechanism whereby the site manager has the opportunity to meet with dog owners and to use this to impress upon them the importance of responsible dog control. It also provides a mechanism for withdrawing permission where the dog owner behaves irresponsibly. The availability of such a sanction may act as a deterrent. Clearly, this system can only be used where access is by permission of the site manager (so of no real use where rights of way cross a site, or the land is CRoW access land) and there is a reasonable level of manager presence at the site to deter use by those without permits.

11 Areas for further research

11.1 Introduction

It is evident from the review of research that there are opportunities to increase knowledge of the effects of dogs on wildlife, and how dogs can be effectively managed on wildlife sites.. One of the requirements of the project is to identify areas for further possible research. These ideas are presented below.

11.2 Dogs and wildlife

A first step would be to investigate additional species that could be susceptible to disturbance, especially by dogs, but to focus the research on separating the effects of dogs on and off leads and human visitors. Obvious species that have been highlighted in the questionnaire results are skylark and lapwing, but curlew, which is known to be one of the most easily disturbed species (van der Zande 1984) could also be considered, the population of which is declining in the uplands.

The effects of dogs on beach breeding birds would be an important aspect to consider. Most of the work on this has taken place in America, Australia and New Zealand, with only Liley's (1999) work being relevant to Britain. However, Liley did not separate out the effects of dogs fully in his research into the effects of disturbance on ringed plover.

Any new research should set out to determine the impact of any effects of disturbance by dogs on and off leads, and examine these at a population level, modelling the effects of disturbance and other population controlling factors. Special attention should be paid to the potential for opportunistic predators to have a secondary and significant impact. Also, there is a need to focus research onto the long term implications of animals (especially birds) that fail to thrive even though they do not show a behavioural response.

Further studies on different species should differentiate between disturbance types where possible, in terms of activity, speed, approach direction and look for any habituation. It would be worthwhile instigating research following the type of studies undertaken in America where an experimental approach is used comparing treatments such as leashed dog, dog out of close control, and walker with no dog. There could be an ethical issue if dogs running around were used on a site of high breeding bird value, but the research does need to be conducted in different habitats, and especially, but not inclusively, where there are ground-breeding birds of value.

There would be a valuable opportunity to undertake some experimental dog control research of the type adopted by Dowling and Weston (1999) in Australia. On suitably open sites, trials excluding dogs and people, excluding only dogs, allowing leashed dogs, or with no control could be undertaken. The results would be very useful in informing people of the impacts of their activities, and in persuading them to work with site managers to reduce this.

More investigations are needed into the extent of problems related to livestock management on nature conservation sites. The constraints on stock type, grazing patterns or seasons, and the implications for the nature conservation interests need further examination in a more quantitative and definitive way.

The extent of and the long-term effects of nutrient enrichment by dog faeces and urine are needed on a range of critical habitat types. There is no information, for example, on the extent of enrichment off paths, and in habitats other than the one paper on heathland by Shaw and others (1995). The significance of dog fouling compared with other sources of enrichment such as nitrogen in air pollution needs to be assessed.

Within the monitoring of effects of CRoW access on species, dogs need to be considered as a separate category, including separating whether they are on or off a lead, and out of close control. The extent to which dogs do consume chicks and eggs when running around needs to be examined in order to provide sound statistics for use when working with dog walking groups and the public in general.

11.3 Management of dog owners

Research into the understanding of wildlife disturbance by dogs amongst dog owners, including segmentation of the population of dog owners (into cohorts such as – knowledgeable, ignorant but well-meaning, ignoring and indifferent, ignorant and irresponsible) would be valuable. Based on the insights gained, a promotional campaign of awareness raising can be pursued. Leaflets have been found to not work well and so there would be a need to encourage a strategy using all means appropriate for different sites and different categories of dog owner, especially urban fringe or where dog walking is a more important landuse.

The national survey of site managers has provided some interesting pointers towards the effectiveness of different dog management measures. There is need, however, for a closer examination – using scientifically objective observational studies – of what works and what does not work in persuading owners to better control their dogs. This should involve looking at multi-faceted versus single policy management strategies. There would be merit in developing and publicising a series of good practice examples.

Research amongst dog owners into their attitudes towards dedicated dog fouling areas would be a useful pre-cursor to the development of such areas. Assuming reaction was fairly positive, some design criteria and management techniques would need to be developed.

English Nature should commission research to monitor:

- success of the dog-friendly promotions (eg Pembroke);
- penetration of, and adherence to, the guidance contained in the new dog leaflet;
- the success of dog management policies in other English-speaking countries, where more restrictive dog management regimes are often used.

12 Summary of conclusions and recommendations

12.1 Introduction

Conclusions have been reached at various stages within the earlier sections but are brought together in the summary below. The research also enables some recommendations to be offered to consider at national level.

12.2 Summary of conclusions

Both the desk research and national survey undertaken for the report show a correlation between visitor numbers and disturbance of wildlife by dogs. More work is needed to differentiate between the effects of disturbance by humans and by humans with dogs on leads.

Some popular breeds of dogs have been developed by humans to enhance their success in hunting animals for sport or food. The dog's traits include searching out game, flushing it and retrieving game from undergrowth and water. These traits can cause a detrimental effect where wildlife is to be preserved.

The research suggests that dogs which are running out of control have a more disturbing effect on wildlife than people on their own, or people with dogs under close control (ie on a lead).

Whilst it is often difficult to differentiate between the impacts of humans and the impacts of dogs, the key findings for all bird groups or species are that:

- the presence of dogs provokes a disturbance response at greater distances and for longer periods than stimuli from recreational activities (including people without dogs) during the breeding season for most species studied, especially ground nesting ones, and for one species this disturbance distance was twice as long in the breeding opposed to the wintering season;
- breeding success of birds is reduced as a result of:
 - avoidance of nesting in highly disturbed sites
 - flushing of parent birds from nests, thus exposing eggs and chicks to cold or predation by other animals (especially corvids and gulls);
 - interference with the feeding of dependent young;
 - actual predation of eggs or chicks by dogs;
- breeding success can be improved significantly when dogs are managed, including in beach environments;
- lekking birds may be particularly vulnerable to disturbance by dogs although research in the UK is limited;
- of the wader species, only the Eurasian dotterel has been shown not to be disturbed by dogs or people;
- although some species exhibit no behavioural response to disturbance by dogs or people, they appear to produce less fit young (eg marsh harriers) and this relationship is worthy of further study;
- the response to dogs differs between species of ground feeding/roosting wintering birds but dogs generally have a greater effect than walkers and (for some species) joggers;
- reaction to dogs has an energy cost and this could be significant in winter, although compensatory feeding (eg at night) is found in some species;
- evidence concerning possible habituation is mixed.

Further work needs to be done to differentiate between the longer term impacts on bird populations of disturbance by humans and of disturbance by humans with dogs.

Although there is much evidence that dogs do chase wild mammals, the highest incidences are of chasing of rabbits, deer and (grey) squirrels and, although there may be welfare concerns in certain cases, there is no evidence of impact on overall populations.

It is clear that wildlife will be subject to lower levels of anthropogenic disturbance on sites where people and their dogs are present in low numbers (such as in remote area). In these areas it may be that dogs have few impacts on the wildlife and therefore no restrictions are necessary.

Many dog owners do not know the effects on soil nutrient status of leaving dog faeces on the ground, and neither do they know the effects that dogs swimming in water bodies can have on the environment. This suggests that education programmes could have some effect on owners and their dogs' behaviour. As perhaps one third of visits to countryside areas are by people accompanied by dogs, and a high proportion of these are locals, there could be big benefits in educational programmes aimed locally. Tentative inferences from the national survey are that the getting together with local dog owners can be successful at raising awareness. To support the hypothesis that there is a significant level of 'responsible-but-ignorant' dog owners, it has also been found that owners will keep their dogs on leads during the lambing period of April (which they are aware of), but then let dogs off the lead again during the bird nesting period of May (which they may be unaware of). In addition, programmes of 'pick-it-up' (ie dog faeces) are shown to be reasonably successful. However, the managers participating in the national survey reported that leaflets are not effective, and that other management regimes are more successful (eg wardening - both professional and volunteer - and steering people from vulnerable areas).

Steering people away from sensitive areas may be readily achievable where land conditions permit, as dog walkers have said that they prefer circular walks of ½ to 1½ hours in length which have got dog bins and a safe place for the dogs to roam off lead away from livestock. People are generally happy to take the same walk each weekday, and they will often meet and talk to other dog owners, although they like some variation at weekends. It should be possible to provide owners with information on other local walks where dogs are welcome.

In general the most defecation by dogs takes place close to the car park or place of entry to the countryside area and close to paths. Management would be most effective where directed towards making sure that car parks and paths are not close to areas vulnerable to eutrophication, with a sacrifice zone of 50m – 100m from the car park and 1m alongside popular paths. Again, research has shown that creative programmes encouraging people to 'bag-it-and-bin-it' do have an impact, and bins close to car parks (which can be easily accessed for emptying) are used. There are undoubtedly benefits in developing, promoting and identifying biodegradable poo-bags. It is also the case that re-use of plastic envelopes and bags received in the post will prove cheaper and be more sustainable than using commercially produced poo-bags.

Walking a dog is a significant reason why people do go into the countryside for a walk, and many people who do so would feel more vulnerable and isolated without their dog(s).

12.3 Recommendations

Authorities responsible for countryside management should encourage the development of dog management strategies, using a mixture of policies, management measures and messages, where dog use on nature conservation sites is a significant concern. These strategies should seek to work with visitors to manage and control impacts of dogs.

These organisations should make high level contact with re-homing organisations and dog training organisations to emphasise the need for dog owner induction and training courses including information about the impact of dogs on wildlife. The Kennel Club may be able and willing to assist with this. Similarly, promoting responsible behaviour via National Association of Registered Petsitters could also be beneficial.

Authorities should monitor the success (or otherwise) of the strategy of promoting dog friendly areas (such as in Pembrokeshire) as a means of drawing visiting dog owners away from more vulnerable areas. Monitoring could be done via Pembrokeshire Council and others who helped devise the policy. Forest Enterprise may have a role in developing suitable 'dog-friendly' alternative sites.

Countryside bodies should work with partners to develop and support a research strategy that builds on the work already undertaken, and focuses on the range of ideas presented in Section 10. The impacts of dogs will not be the only area needing more research, and this will need to be integrated into the needs for work related to other recreational activities and sensitive species.

13 References

- AARIS-SØRENSEN, J. 1987. Post and present distribution of badgers (*Meles meles*) in the Copenhagen area. *Biological Conservation*, 41, 159-65.
- ABRAHAM, K. Undated. *Interactions between dogs and wildlife in parks on the Berkeley Marina*. Available from: <http://ist-socrates.berkeley.edu/~es196/projects/2001final/Abraham.pdf>.
- ACK TOURISM in association with RJS ASSOCIATES LIMITED. 2004. *Sherwood Forest Country Park 2004 Survey of Winter Visitors*.
- ADAMCZYK, J. 2004. *Dog ownership in the Soviet Bloc: A socio-political perspective*. North West K9 website. Available from: http://www.nwk9.com/article_societ_bloc.htm
- ADAS CONSULTING LTD. 2004. *Key Issues Study. In connection with Bedfordshire outdoor access improvement plan*. Report for Bedfordshire County Council, Bedford.
- AJT ENVIRONMENTAL CONSULTANTS. 2004. *User demand research*. Executive Summary. Report for Tyne and Wear Council and partners.
- AL-FAYEZ, G., and others. 2003. Companion animal attitude and its family pattern in Kuwait. society and animals. *Journal of Human-Animal Studies*, 11, No. 1. Available from: (<http://www.psyeta.org/sa/sa11.1/alfayez.shtml>)
- ANDERSON, P. 1990. *Moorland recreation and wildlife in the Peak District*. Bakewell: Peak Park Joint Planning Board.
- ANDERSON, P. & RADFORD, E. 1992. *A review of the effects of recreation on woodland soils, vegetation and fauna*. English Nature Research Reports, No. 27.
- ANDERSON, P., & RADFORD, E. 1994. The ecological effects of woodland recreation. *Quarterly Journal of Forestry*, 88, 3.
- ARKENFORD. 2003. *Sites of Special Scientific Interest: their contribution to access, sport, recreation and tourism in England*. Draft Report to English Nature, Peterborough.
- BALACHANDRAN, V. 2002. *Northants Visitor Survey 2000*. Forestry Commission Report.
- BALL, R. BONNER, L., & WILLIAMS, S. 2000. *Cannock Chase AONB Visitor Survey 2000*. Staffordshire University.
- BARNARD, A. 2003. Getting the facts - dog walking and visitor number surveys at Burnham Beeches and their implications for the management process. *Countryside Recreation*, 11, 2.
- BARTLETT, K. 2001. *Cultural attitudes about the dog*. Address to the XII Congreso Nacional de Medicina Veterinaria de Centroamericano. Available from: <http://www.animalsrighttolifewebsite.com/The20%Dog%Mistique.htm>
- BAYDACK, R. K. 1986. *Sharp-tailed grouse response to lek disturbance in the Carberry Sand Hills of Manitoba*. Colorado: Colorado State University, Fort Collins.
- BAYER. Undated leaflet. *If they make you squirm, imagine what they do to dogs and cats. A guide to worm control*. Suffolk: Bayer plc.

- BBC NEWS. 2005a. "Dog startled cliff-fall teenager". Wednesday 26 January 2005. Available from: http://news.bbc.co.uk/2/hi/uk_news/england/cornwall/4209865.stm
- BBC NEWS. 2005b. "Dog rescue tragedy boys are named". Sunday 29 May 2005. Available from: http://newsrss.bbc.co.uk/2/hi/uk_news/england/lancashire/4591839.stm
- BEALE, C.M., & MONAGHAN, P. 2004. Human disturbance: people as predation-free predators? *Journal of Applied Ecology*, 41, 335-343.
- BODEN, E. 2001. *Black's Veterinary Dictionary*. 20th Edition. London: Adam and Charles Black.
- BOLDUC, F., & GUILLEMETTE, M. 2003. Human disturbance and nesting success of common eiders: interaction between visitors and gulls. *Biological Conservation*, 110, 77-83.
- BONNER, C., & AGNEW, A.D.Q. 1983. Soil phosphorus as an indicator of canine faecal pollution in urban recreation areas. *Environmental Pollution (Series B)* 6, 145-156.
- BRICKNER, I. 2003. *The impact of domestic dogs (Canis familiaris) on wildlife welfare and conservation: a literature review*. Thesis, Tel Aviv University.
- BRITISH SMALL ANIMAL VETERINARY ASSOCIATION [BSAVA]. 1994. *Toxocara Canis*. (Information Leaflet). Cheltenham: BSAVA sva.
- BROGAN, T.V., and others. 1995. Severe dog bites in children. *Pediatrics*, 96, 5, 947-950.
- BROWN, A., & LANGSTON, R. 2001. *Assessing the nature conservation significance of potential impacts on the wild bird populations of England and Wales of the introduction of a statutory right of access to the countryside. Guidelines for assessing the case for management measures, statutory restrictions or statutory exclusions, when considering access to habitats of importance to birds*. Report to Wildlife and Access Advisory Group. Unpublished.
- BULL, S.E. 1998. *The impact of dogs on National Trust properties*. Unpublished report. Cirencester: Estates Dept, The National Trust.
- BULLOCK, D.J., and others. 1990. *Response of fallow deer and red deer to disturbance in Bradgate Park and Wollaton Park*. 28pp. Report to Universities Federation for Animal Welfare.
- BURGER, J. 1993. Shorebird squeeze. *Natural History*, 102, 8-12.
- BURGER, J. 1986. The Effect of Human Activity on Shore Birds in Two Coastal Bays in the Northeastern United States. *Environmental Conservation*, 13, 123-130.
- BURGER, J. AND GOCHFELD, M. 1991. Human disturbance and birds: tolerance and response distance of resident and migrant species in India. *Environmental Conservation*, 18, 158-165.
- CAIN, A.O. 1985. Pets as family members. In: M. SUSSMAN (ed.), *Pets and the family*. (p5-10). New York: The Haworth Press.
- CAIRNGORMS NATIONAL PARK AUTHORITY. 2004. Cairngorms National Park Tourism Marketing Strategy. Paper 3 Annex 2 Date 02/07/04, Appendix 11 - *Lowland Market Research Interim Results 2003-2004*. Available from: www.cairngorms.co.uk/resource/docs/boardpapers/02072004/CNPA.Paper.373.Board.CNPA.Paper.3.An.pdf+cairngorms+national+park+authority+lowland+market+research+interim+results&hl=en

CHESHIRE COUNTY COUNCIL. 2004. *Cheshire Community Survey 2003*. Chester: Cheshire County Council.

CITY OF AUCKLAND. Undated. *Auckland City Council's policy on dogs*. New Zealand: City of Auckland Council. Available from:
<http://www.aucklandcity.govt.nz/council/documents/dogpolicy/policy>

COUNTRYSIDE AGENCY, & COUNTRYSIDE COUNCIL FOR WALES. 2004. *The Countryside Code*. Cheltenham: Countryside Agency. Available from:
http://www.countrysideaccess.gov.uk/countryside_code/

COUNTRYSIDE AGENCY, KENNEL CLUB, & ENGLISH NATURE. 2005. *You and your dog in the countryside: Great ways to explore, enjoy and help look after the countryside with your dog*. Draft leaflet. Cambridge: Countryside Agency.

COUNTRYSIDE COUNCIL FOR WALES. 2005. *Managing Public Access*. Bangor: Countryside Council for Wales.

CRAIG A. R. 2002. *Visitor Understanding of lowland heathland sites of Special Scientific Interest and Implications for Management.*, MSc thesis, Staffordshire University

CROFTS, A., & JEFFERSON, R.G. 1999. *The Lowland Grassland Management Handbook*. 2nd edition. Peterborough: English Nature/The Wildlife Trusts.

DEFRA & FORESTRY COMMISSION. 2004. *The sustainable management of wild deer populations in England: An Action Plan*. Defra. Available from:
[http://www.forestry.gov.uk/pdf/deerstrategyengland301204.pdf/\\$file/deerstrategyengland301204.pdf](http://www.forestry.gov.uk/pdf/deerstrategyengland301204.pdf/$file/deerstrategyengland301204.pdf)

DEPARTMENT OF THE INTERIOR, NATIONAL PARKS SERVICE. 2004. *Code of Federal Regulations. Title 36 – Parks, Forests and Public Property. Chapter 1 – National Park Service Department of the Interior. Part 2 Resource Protection, Public Use and Recreation. Section 2.15 Pets*. Available from:
http://a257.g.akamaitech.net/7/257/2422/14mar20010800/edocket.access.gpo.gov/cfr_2002/julqtr/pdf/36cfr2.15.pdf

DEPARTMENT OF TRADE AND INDUSTRY. 2003. *24th (Final) Report of the Home and Leisure Accident Surveillance System. 2000, 2001 and 2003 Data*. London: DTi.

DETR. 1999. *Appraisal of options on access to the open countryside of England and Wales*. Appendix 5 - Assessment of areas of open countryside to which access exists. London: Defra.

DOWLING, B., & WESTON, M.A. 1999. Managing a breeding population of the hooded plover *Thinornis Rubricollis* in a high-use recreation environment. *Bird Conservation International*, 9, 255-270.

DRAULANS, D., & VAN VESSEM, J. 1985. The effect of disturbance on nocturnal abundance and behaviour of grey herons (*Ardea cinerea*) at a fish farm in winter. *Journal of Applied Ecology*, 22, 39-51.

ENCAMS. Undated. *dog fouling and the law. a guide for the public*. ENCAMS. Available from:
www.encams.org

ENGLAND MARKETING. 2003. *Burnham Beeches Visitor Survey Report – dog walking survey*.

- ENGLISH NATURE, & THE COUNTRYSIDE COUNCIL FOR WALES. 2001. *Countryside and Rights of Way Act, 2000 Part I - Access to the Countryside. Guidance for statutory authorities involved in assessing the nature conservation implications of a statutory right of access in England and Wales under clause 26*. Unpublished.
- ENVIRONMENT AGENCY. 1998. *A strategic review of sheep dipping*. Technical Report P170.
- FAWKES, P.F. 2001. *The effects of dog disturbance on ground nesting Birds in the New Forest*. New Forest Dog Owners Group. Available from: www.newforest_online.co.uk/nfdog/paper.htm
- FERNÁNDEZ, C., & AZKONA, P. 1993. Human disturbance affects parental care of marsh harriers and nutritional status of nestlings. *Journal of Wildlife Management*, 57, 602–608.
- FERNÁNDEZ-JURICIC, E., & TELLERÍA, J.L. 2000. Effects of human disturbance on spatial and temporal feeding patterns of blackbird (*Turdus merula*) in urban parks in Madrid, Spain. *Bird Study*, 47, 13-21.
- FIENNES, R.T.W. 2003. *Captain Scott*. London: Hoddor & Stoughton Ltd.
- FINEST COUNTRYSIDE. 2005. *Definition of dogs being 'under close control'*. Entry onto discussion forum. Available from: <http://www.finest.net.countryside.gov.uk/>
- FINNEY, S., and others. 2004. The effect of recreational disturbance on two upland breeding birds, the golden plover *Pluvialis apricaria* and the dunlin *Calidris alpina*. *RSPB Research Report*, No. 7.
- FITZPATRICK, S., & BOUCHEZ, B. 1998. Effects of recreational disturbance on the foraging behaviour of waders on a rocky beach. *Bird Study*, 45, 157-171.
- FOREST ENTERPRISE ENGLAND (Undated). *Dog management in South and West England Forests*.
- FRANKLIN, W.L., & POWELL, K.J. 2003. *Guard Llamas: A part of integrated sheep protection*. Department of Animal Ecology, College of Agriculture, Iowa State University. <http://www.extension.iastate.edu/Publications/PM1527.pdf>
- FRID, A., & DILL L. M. 2002. Human caused disturbance stimuli as a form of predation risk. *Conservation Ecology* 6 (1), 11. Available from: <http://www.consecol.org/vol6/iss1/art11>
- GABRIELSEN, G. W., & SMITH, E.N. 1995. Physiological responses of wildlife to disturbance.. In: R.L. KNIGHT & K. J. GUTZWILLER, eds. *Wildlife and recreationists: coexistence through management and research*, 95-107. Washington D.C: Island Press.
- GAVITT, J.D. 1973. *Disturbance effect of free-running dogs on deer reproduction*. Thesis. Virginia: Virginia Polytechnic Institute, Blacksburg.
- GILBERT, J.C. 2000. *High soil phosphorus availability and the restoration of species rich grassland*. PhD thesis. Silsoe: Cranfield University.
- GILL, G. A., & SUTHERLAND, W.J. 2000. Predicting the consequences of human disturbance from behavioural decisions. In: L.M. Gosling & W.J. Sutherland, eds. *Behaviour Conservation*, 51.64. Cambridge: CUP.
- GILL, G.A., NORRIS, K., & SUTHERLAND, W.J. 2001. Why behavioural responses may not reflect the population consequences of human disturbance. *Biological Conservation*, 97, 265-268.

GILL, G.A., NORRIS, K., & SUTHERLAND, W.J. 2001a. The effects of disturbance on habitat use by black-tailed godwits (*Limosa limosa*). *Journal of Applied Ecology*, 38, 846-56.

GOLDEN GATE NATIONAL PARK SERVICE. 2003. *Negotiated rulemaking process for dog management at Golden Gate National Recreation Area*. San Francisco: Golden Gate National Recreation Area, Available from: <http://www.nps.gov/goga/pets/regneg/reg-neg-announce.htm>

GOUGH, M.W., & MARRS, R.H. 1990. A comparison of soil fertility between semi-natural and agricultural communities: implications for the creation of species-rich grassland on abandoned agricultural land. *Biological Conservation*, 5, 83-6.

GRAZING ANIMALS PROJECT. 2001. *Breeds Profile Handbook*.

GREEN, S., GREEN, R.C., & JEFFERIES, D.J. 1984. *A radio-tracking survey of otters Lutra lutra on a Perthshire river system*. *Lutra*, 27, 85-145.

HAMER, B. 2001. *Dogs at War. True stories of canine courage under fire*. London: Andre Deutsch.

HARPER, J., & WEST, V. 2002. *Cwmcarm Visitor Survey 2002*. Report for the Forestry Commission.

HARROP, P. 1999. Dogs and woodland. *Countryside and Recreation Network Workshop notes - 3 June 1999*. Forestry Commission. Unpublished.

HARROP, P. 2004. *Dog walking in Forestry Commission woods in England*. Quick review of issues and management ideas. Forestry Commission. Unpublished.

HART, E. 2004. *Hefting in practice. The ancient craft of grazing on the open hills*. Published by the author. Ludlow, Shropshire.

HEADLEY, B., and others. 2004. *Pets and human health in Australia, China and Germany: evidence from three Continents*. 10th International Conference on Human-Animal Interactions Conference hosted by the Society for Companion Animal Studies (SCAS) on behalf of the International Association of Human-Animal Interaction Organisations. Glasgow. Available from: www.glasgow2004ad.com.

HEALTH AND SAFETY EXECUTIVE. 2001. *HSE accident statistics*. Personal Communication from C Molde (5 November 2001).

HEALTH AND SAFETY EXECUTIVE, 2004. *Fatal Injuries in farming, forestry and horticulture 2003/2004*. Kenilworth: Field Operations Directorate. Available from: <http://www.hse.gov.uk/agriculture/pdf/fatal0304.pdf>

HINES, R. 2004. *Diseases people catch from their pets. Zoonotic illnesses of dogs cats and other pets*. Available from: www.2ndchance.info/zoonoses.htm

HOBSON, W. 1972. Breeding biology of the Knot. *Proc.West. Fdn Vert. Zool*, 2, 5-25.

HOLSTER, J.J. 2001. *Dogs in trouble*. Petstation. Available from: <http://www.petstation.com/dogs-in-trouble.html>

HOOPEES, E.M. 1993. *Relationships between human recreation and piping plover foraging ecology and chick survival*. Massachusetts: Thesis, University of Massachusetts, Amherst.

- HUDSON, P. 1982. Red grouse production and management in relation to tourism. *In: K. HEARN (ed). Moorlands: wildlife conservation, amenity and recreation*, 45-54. RERG Report No 8.
- HUMPHRIES, R.E., SMITH, R.H., & SIBLY, R.M. 1989. Effects of human disturbance on the welfare of park fallow deer. *Deer*, 7, 458-63.
- JEFFERIES, D.J. 1987. *The effects of angling interests on otters, with particular reference to disturbance*. *In: P.S. MAITLAND & A.K. TURNER (eds). Angling and wildlife in freshwaters*. ITE Symposium No. 19, 23-30. ITE.
- JEPPESEN, J.L. 1984. Human disturbance of roe deer and red deer: preliminary results. *In: O. SAASTAMOIREN, and others (eds.) Multiple-use forestry in the Scandinavian Countries. Communication Institute Foresta*. 113-18.
- KAIN, T. 2002. In search of the best national parks for dogs. DogFriendly.com – *Dog Travel Magazine*, September 2002. Available from: http://www.dogfriendly.com/server/magazine/m0902/f0902_1.shtml
- KELLER, V. 1989. Variations in the response of great crested grebes *Podiceps cristatus* to human disturbance – a sign of adaptation? *Biological Conservation*, 49, 21-45.
- KELLER, V.E. 1991. Effects of Human Disturbance on eider ducklings *Somateria mollissima* in an Estuarine Habitat in Scotland. *Biological Conservation*, 58, 213-228.
- KENNEL CLUB. 2005. *Do you know the dog law?* Information Guide 9. At 01/03/2005. London: Kennel Club.
- LAFFERTY, K.D. 2001. Birds at a Southern California beach: seasonality, habitat use and disturbance by human activity. *Biodiversity and Conservation*, 10, 1949-1962.
- LAFFERTY, K.D. 2001a. Disturbance to wintering western snowy plovers. *Biological Conservation*. 101, 315-325.
- LAND USE CONSULTANTS. 2004. *Summary report on research contributing to the pilot Rights of Way Improvement Plan for Blackmore Vale*. Prepared for the Countryside Agency and Dorset County Council.
- LANGBEIN, J. & PUTMAN, R.J. 1992. Behavioural responses of park red and fallow deer to disturbance and effects on population performance. *Animal Welfare* 1. 19-38.
- LAURILA, T. 1989. Nest site selection in the Common Eider *Somateria mollissima*: differences between archipelago zones. *Ornis Fenn*, 66, 100-111.
- LIFEGUARD MAGAZINE. 1998. *Stay Off the Ice!* Winter – Issue 28.
- LILEY, D. 1999. *Predicting the consequences of human disturbance, predation and sea-level rise for ringed plover populations*. PhD thesis. University of East Anglia.
- LILEY, D., & CLARKE, R.T. 2003. The impact of human development and human disturbance on the numbers of nightjar *Caprimulgus europaeus* on heathlands in Dorset, England. *Biological Conservation*, 114, 219-230.
- LORD, A., and others. 2001. Effects of human approaches to nests of northern New Zealand dotterels. *Biological Conservation*, 98, 233-240.

- MACARTHUR, R.A., GEIST, V., & JOHNSTON, R.H. 1982. Cardiac and behavioural responses of mountain sheep to human disturbance. *Journal of Wildlife Management*, 46, 2, 351-358.
- MACINNES C.D. 1980. Comment- observer-induced predation is real. *J. Wild Management*, 44, 222-5.
- MADSEN, J. 1995. Impacts of disturbance on migratory waterfowl. *Ibis*, 137, 567-574.
- MAININI, B., NEUHAUS, P., & INGOLD, P. 1993. Behaviour of marmots *Marmota marmota* under the influence of different hiking activities. *Biological Conservation*. 64, 2, 161–164.
- MALLORD, J.W. 2005. *Predicting the consequences of human disturbance, urbanisation and fragmentation for a woodlark Lullula arborea population*. PhD Thesis. University of East Anglia.
- MARRABLE, C. 2003. Ashdown Forest – a review of grazing. *English Nature Research Reports*, No 535.
- MARSHALL, K. 2005. *Capercaillie and recreational disturbance study*. Unpublished report for Cairngorm National Park Authority, Forestry Commission Scotland and Scottish Natural Heritage.
- McKAY, J.E. 2002. *Vet Clinic Dogs*. London: Hamlyn.
- McNICHOLAS, J., COLLIS, G., & MORLEY, I. 1993. *Pets and people in residential care: guidelines for policy and practice*. Joseph Rowntree Foundation.
- MCNICHOLAS, J., COLLIS, G.M., & SEGHAL, J. 2004. *Effects of pet support on child health*. 10th International Conference on Human-Animal Interactions Conference hosted by the Society for Companion Animal Studies (SCAS) on behalf of the International Association of Human-Animal Interaction Organisations. Glasgow. Available from: www.glasgow2004ad.com.
- MILLER, S.G., KNIGHT, R.L., & MILLER, C.K. 2001. Wildlife responses to pedestrians and dogs. *Wildlife Society Bulletin*, 29, 124-132.
- MILLER, W.C., & WEST, G.P. 1970. *Black's Veterinary Dictionary Ninth Edition*. London: Adam and Charles Black.
- MILWAIN, E. 1984. *Recreational trampling pressure and its effects on the vegetation and soils of Les Quennevais – Blanches Banques Sand Dunes, St. Ouen's Bay, Jersey*. BSc Thesis unpublished.
- MINTEL. 2004. *Cat and dog food*. Mintel.
- MURISON, G. 2003. *The impact of human disturbance on the breeding success of nightjar Caprimulgus europaeus on heathlands in south Dorset, England*. Unpublished report for the Dorset Heathland Project, RSPB.
- MURPHY, K.J., & EATON, J.W. 1983. The effects of pleasure-boat traffic on macrophyte growth in canals. *Journal of Applied Ecology*, 20, 713-729.
- MYRBERGET, S. 1983. Desertion of nests by willow grouse. *Fauna norv. Ser. C. Cinclus*, 6, 109-113.

NATIONAL ACCESS FORUM FOR WALES 2005. *Item NAF20 - New approaches to old challenges – The Kennel Club’s work for the better management of dogs in the countryside.* Confirmed Minutes Of The Twentieth Meeting Held At Newport YMCA, Gwent, On 1 March 2005. Bangor: Countryside Council for Wales.

NATIONAL TRUST. 1998. *Dog walking workshop.* Proceedings of a workshop organised by the National Trust. Cirencester: National Trust Estates Dept.

NEAL, E.G.1977. *Badgers.* Dorset: Blandford Press Ltd.

NEW ZEALAND DEPARTMENT OF CONSERVATION. 2003. *Management of dogs on land administered by the Department of Conservation.* Discussion Document. Northland Conservancy, Department of Conservation, Northland, New Zealand.

NFO SYSTEM THREE. 2001. *Survey of behaviour associated with access and informal recreation.* Scottish Natural Heritage Commissioned Report F99/ACC08 (Unpublished Report).

NICOL, JONES, & LOMAX. 2000. *Gentleshaw Common and Chasewater Heaths: grazing feasibility study.* Report to Lichfield District Council.

OATES, M., & BULLOCK, D. 1997. Browsers and grazers. *ENACT*, 5, 4.

OATES, M. 1998. *Grazing for nature conservation on National Trust land.* National Trust. unpublished.

OSBORNE, W.J.N. 7th October 2004. *Brook Meadow Visitor Survey.* 25th September 2004. Available from: <http://www.hants.org.uk/brook-meadow/index.html>

PARKS VICTORIA. Undated. *Parks Victoria Management Planning Process – discussion paper.* Bunurong Marine National Park Management Plan. Available from: http://www.parkweb.vic.gov.au/resources/08_1287.pdf

PEARCE-HIGGINS, J.W., & YALDEN, D.W. 2003. Golden plover *Pluvialis apricaria* breeding success on a moor managed for shooting red grouse *Lagopus lagopus*. *Bird Study*, 50, 170-177.

PEARCE-HIGGINS, J.W., & YALDEN, D.W. 1997. The effect of resurfacing the Pennine Way on recreational use of blanket bog in the Peak District National Park, England. *Biological Conservation*, 82, 337-343.

PEMBROKESHIRE COUNTY COUNCIL. 2005. *Pembrokeshire – a guide to holidays with your best friend.* Pembrokeshire County Council, Haverfordwest. Available from: http://www.visitpembrokeshire.com/dogs_index.asp.

PENNY ANDERSON ASSOCIATES. 2003. Access to the countryside observations on wildlife made during closures of the countryside during the 2001 foot and mouth disease epidemic. *English Nature Research Reports*, No. 486.

PENNY ANDERSON ASSOCIATES. 2005. *Cannock Chase grazing feasibility study.* Report to Staffordshire County Council.

PERRY, M.C. 1970. *Studies of deer-related dog activity in Virginia.* Thesis. Virginia: Virginia Polytechnic Institute. Blacksburg.

PICOZZI, N. 1971. Breeding performance and shooting bags of red grouse in relation to public access in the Peak District National Park, England. *Biological Conservation*, 3, 211-215.

- PICOZZI, N. 1975. Crow predation on marked nests. *Journal of Wildlife Management*, 39, 151-155.
- PIENKOWSKI, M.W. 1984. Breeding biology and population dynamics of ringed plovers *Charadrius hiaticula* in Britain and Greenland: nest-predation as a possible factor limiting distribution and timing of breeding. *J. Zool., London*, 202, 83-114.
- PRODOGS & KENNEL CLUB. 2003. *Preliminary findings of UKDOG questionnaire: Data to 17 April 2003*. Support and development of Kennel Club/PRODOGS UKDOG Project. London: Kennel Club.
- RIDDALL J, & TREVELYAN, J. 2001. *Rights of Way: A Guide to Law and Practice*. 3rd Edition. Ramblers' Association (London) and Open Spaces Society (Henley-on-Thames).
- RIDDINGTON R., HASSALL M., & LANE S.J., & TURNER P. A. 1996. The impact of disturbance on the behaviour and energy budgets of Brent geese *Branta b bernicla*. *Bird Study* 43, 269-279.
- ROBINSON, J.A., & POLLITT M.S. 2002. Sources and extent of human disturbance to water birds in the UK: an analysis of wetland birds survey data, 1995/6 to 1998/99. *Bird Study*, 49 205-211.
- ROSE, D. 1995. *Official social classifications in the UK*. Social research update. Issue 9, July 1995. Guildford: Department of Sociology, University of Surrey. Available from: www.soc.surrey.ac.uk/sru/SRU9.html
- ROSE, P. Undated. *Roseland llamas as livestock guards*. Leaflet produced by Roseland Llamas, Stockleigh Pomeroy, Devon.
- ROSE, R. J., & CLARKE, R.T. 2005. *Urban impacts on Dorset Heathlands: Analysis of the heathland visitor questionnaire survey and heathland fires incidence data sets*. Report to Dorset Environmental Records Centre.
- ROYAL SOCIETY FOR THE PREVENTION OF ACCIDENTS. 1999. *Safety at inland water sites*. London: RoSPA.
- SCHULZ, R., & STOCK, M. 1993. Kentish plovers and tourists: competitors on sandy coasts? *Wader Study Group Bulletin*, 68, 83-91.
- SCOTTISH NATURAL HERITAGE. 2004. *Loch Leven National Nature Reserve*. Report of Public Meeting 22 March 2004.
- SERPELL, J. 1997. *The domestic dog, its evolution, behaviour and interaction with people*. Cambridge: Cambridge University Press.
- SHAW, P.J.A., LANKEY, K., & HOLLINGHAM, S.A. 1995. Impacts of trampling and dog fouling on vegetation and soil conditions on Headley Heath. *The London Naturalist*, 74, 77-82.
- SIME, C.A. 1999. Domestic Dogs in Wildlife Habitats. In: G. JOSLIN & H. YOUMANS, coordinators. *Effects of recreation on Rocky Mountain wildlife: A Review for Montana*, 8.1-8.17. Committee on effects of recreation on wildlife, Montana Chapter of The Wildlife Society.
- SMALL, R.W., GILLATT, C.E., & CROSS, J. 2002. *Wildlife and people: lessons from the foot and mouth disease outbreak 2001*. Liverpool: Biological and Earth Sciences, Liverpool John Moores University.

- SMITH, E.N., & R.A. WOODRUFF. 1980. Fear bradycardia in free-ranging woodchucks (*Marmota monax*). *J. of Mammalogy*, 61, 750-753.
- SOCIETY FOR COMPANION ANIMAL STUDIES (SCAS). 2004. *People and animals: a timeless relationship*. 10th International Conference on Human-Animal Interactions Conference hosted by the Society for Companion Animal Studies (SCAS) on behalf of the International Association of Human-Animal Interaction Organisations. Glasgow. Available from: www.glasgow2004ad.com.
- SOUTH AFRICAN NATIONAL PARKS, & FRIENDS OF THE DOG WALKERS. 2002. *Environmental management programme for walkers with dogs in the Cape Peninsula National Park*. Cape Town, South Africa. See website: <http://www.cnpn.co.za/downloads/empfordogsfinal.pdf>
- STAINE, K. J., & BURGER, J. 1994. Nocturnal foraging behaviour of breeding piping plovers (*Charadrius melodius*) in New Jersey. *The Auk*, 111, 3 579-587.
- STRACHAN, R., & JEFFERIES, D.J. 1996. *Otter survey of England 1991-1994. A report on the decline and recovery of the otter in England and on its distribution, status and conservation in 1991-1994*. London: Vincent Wildlife Trust.
- STRANG, K. 1980. Incidence of avian predators near people searching for waterfowl nests. *Journal of Wildlife Management*, 44, 1, 220-2.
- STREETER, D. 1971. The effects of public pressure on the vegetation of chalk downland at Boxhill, Surrey. In: E. DUFFEY & A.S. WATT (eds). *The scientific management of animal and plant communities for conservation*, 459-68. Blackwell.
- SUMMERS, R.W., & COOPER, J. 1977. The population, ecology and conservation of the black oystercatcher *Haematopus moquini*. *Ostrich*, 48, 8-40.
- SUMMERS, R.W., McFARLANE, J., & PEARCE-HIGGINS, J.W. 2004. *Measuring avoidance of woodland close to tracks by capercaillies in Scots pine woodland*. Report to Forestry Commission Scotland, Scottish Natural Heritage and the Royal Society for the Protection of Birds.
- TAYLOR, E. 2002. *Predation risk in woodlark Lullula arborea habitat: the influence of recreational disturbance, predator abundance, nest site characteristics and temporal factors*. MSc thesis, University of East Anglia.
- TAYLOR, K., and others. 1999. *Appraisal of options on access to the open countryside in England and Wales*. London: Defra. ISBN 1 851121 58 7.
- TAYLOR, K., & THURSTON, N. 2002. *predicting patterns and levels of recreational use of open countryside*. Unpublished report for the Countryside Agency.
- TAYLOR, K., JOHNS, M., & PARDOE, D. 2002. *Advice on Managing risks to public health and safety on open country*. Unpublished report for the Countryside Agency, Countryside Council for Wales and Forestry Commission.
- THAMES-COROMANDEL DISTRICT COUNCIL. 2000. *Dog control policy*. Thames-Coromandel District Council, New Zealand. Available from: <http://www.tcdc.govt.nz/Information/Documents/PDFFiles/DogPolicy.pdf>
- THOMAS, K., KVITEK, R.G., & BRETZ, C. 2003. Effects of human activity on the foraging behaviour of sanderlings *Calidris alba*. *Biological Conservation*, 109, 67-71.

- THORNE, E. T., and others, eds. 1982. *Diseases of wildlife in Wyoming*. Second edition. Wyoming: Wyoming Game and Fish Department, Cheyenne.
- TNS TRAVEL & TOURISM. 2004. *Great Britain leisure day visits*. Report of the 2002-03 Great Britain Day Visits Survey. Edinburgh: TNS Travel & Tourism.
- TORBAY COUNCIL. 1997. *Towards a Torbay Heritage Strategy. Torbay Calcareous Grassland, Local Biodiversity Action Plan*. Available from: http://www.countryside-trust.org.uk/docs/calcareous_grassland_lbap.doc
- TREMBLAY, J., & ELLISON, L.N. 1979. Effects of human disturbance on breeding of black-crowned night herons. *The Auk*, 96, 364-369.
- TYDEMAN, C.F. 1977. The importance of the close fishing season to breeding bird communities. *J. Environmental Management*, 5, 289-296.
- UNITED STATES DEPARTMENT OF CONSERVATION. 2003. *Management of dogs on land administered by the Department of Conservation. Discussion Document*. Northland Conservancy.
- US FISH AND WILDLIFE SERVICE. 1996. *Piping plover (Charadrius melodus), Atlantic Coast population, revised recovery plan*. Hadley, MA.
- VAN DEN BERG, L.J.L., and others. Territory selection by the Dartford warbler (*Sylvia undata*) in Dorset, England: the role of the vegetation type, habitat fragmentation and population size. *Biological Conservation*, 101, 2) 2,11-216.
- VAN DER ZANDE, A.N., and others. 1984. Impact of outdoor recreation on the density of a number of breeding bird species in woods adjacent to urban residential areas. *Biological Conservation.*, 30, 1-39.
- VAN DER ZANDE, A. 1984. *Outdoor recreation and birds: conflict or symbiosis?* PhD Thesis, Leiden.
- VEITCH, C.R. 2002. *Feral dog- a situation summary*. Endangered Species Recovery Council, 48 Manse Road, Papakura, New Zealand.
- WALLER, A. J., and others. 1999. Semi-aquatic mammals. In: G. JOSLIN & H. YOUMANS, coordinators. *Effects of recreation on Rocky Mountain wildlife: A Review for Montana*, 5.1-5.25. Committee on Effects of Recreation on Wildlife, Montana Chapter of the Wildlife Society.
- WASHINGTON STATE UNIVERSITY
<http://pep.wsu.edu/hortsense/scripts/query/displayProblem.asp?problemID=654&tableName=plant>
- WATSON, A. 1988. *Dotterel Charadrius morinellus* numbers in relation to human impact in Scotland. *Biological Conservation*, 43, 245-56.
- WHITFIELD, D.P., and others (in prep). *The influence of human recreation on Eurasian dotterel Charadrius morinellus breeding in the Scottish Highlands. I. The effects of disturbance*.
- WILSON, A. 2005. "Fat Pets". Quoted in BBC News report. Available from: http://www.bbc.co.uk/insideout/eastmidlands/series7/fat_pets.shtml
- WILTON, C. 2003. *Chichester Harbour Area of Outstanding Natural Beauty. Survey of land based recreation 2002/3*. Report for Chichester Harbour Conservancy.

WOODFIELD, E., & LANGSTON, R. 2004. *Literature review on the impact on bird populations of disturbance due to human access on foot*. A report by The Royal Society for the Protection of Birds, as part of a programme of work jointly funded by English Nature and RSPB. English Nature Project Reference FST20-11-011.

WOODLAND TRUST 2002. *Urban woodland management guide: damage and misuse*. Grantham: Woodland Trust. Available from:

<http://www.woodland-trust.org.uk/publications/publicationsmore/urbanwoodlandguide1.pdf>

YALDEN, P.E., & YALDEN, D.W. 1990. Recreational disturbance of breeding golden plovers *Pluvialis apricarius*. *Biological Conservation*, 51, 243-262.

YALDEN, P.E., & YALDEN, D.W. 1988. The level of recreational pressure on blanket bog in the Peak District, England. *Biological Conservation*, 44, 213-227.

Your dog. 2005. January 2005 Edition.

Appendix 1 Scientific names of species mentioned in the text

Birds

American robin	<i>Turdus migratorius</i>
Blackbird	<i>Turdus merula</i>
Black grouse	<i>Tetrao tetrix</i>
Black headed gull	<i>Larus ridibundus</i>
Black oystercatcher	<i>Haematopus bachmani</i>
Black-tailed godwit	<i>Limosa limosa</i>
Brent geese	<i>Branta b. bernicula</i>
Buzzard	<i>Buteo buteo</i>
Canada goose	<i>Branta canadensis</i>
Capercaillie	<i>Tetrao urogallus</i>
Coot	<i>Fulica atra</i>
Crow	<i>Corvus corone</i>
Curlew/Eurasian curlew	<i>Numenius arquata</i>
Dartford warbler	<i>Sylvia undata</i>
Dipper	<i>Cinclus cinclus</i>
Dotterel/Eurasian dotterel	<i>Charadrius morinellus</i>
Dunlin	<i>Calidris alpina</i>
Eider duck	<i>Somateria millissima</i>
Eurasian curlew	<i>Numenius arquata</i>
Golden plover	<i>Pluvialis apricaria</i>
Great crested grebe	<i>Podiceps cristatus</i>
Great spotted woodpecker	<i>Dendrocopos major</i>
Grey heron	<i>Ardea cinerea</i>
Grey partridge	<i>Perdix perdix</i>
Guillemot	<i>Uria aalge</i>
Gulls	<i>Larus spp.</i>
Hooded plover	<i>Thinornis rubricollis</i>
Jaegers (Skuas)	<i>Stercorarius Spp.</i>
Lapwing	<i>Vanellus vanellus</i>
Little grebe	<i>Tachybaptus ruficollis</i>
Little tern	<i>Sterna albifrons</i>
Kittiwake	<i>Rissa tridactyla</i>
Magpies	<i>Pica pica</i>
Mallard	<i>Anas platyrhynchos</i>
Marsh harrier	<i>Circus aeruginosus</i>
Meadow pipit	<i>Anthus pratensis</i>
Moorhen	<i>Gallinula chloropus</i>
Northern New Zealand dotterel	<i>Charadrius obscurus aquilonius</i>
New Zealand dotterel	<i>Charadrius obscurus</i>
Nightjar	<i>Caprimulgus europaeus</i>
Oystercatcher	<i>Haematopus ostralegus</i>
Piping plover	<i>Chararius melodus</i>
Prairie chickens	<i>Tympanuchus sp.</i>
Red grouse	<i>Lagopus lagopus</i>
Redshank	<i>Tringa tetanus</i>
Reed bunting	<i>Emberiza schoeniclus</i>
Ringed plover	<i>Charadrius hiaticula</i>
Sage grouse	<i>Centrocercus urophasianus</i>

Sanderling	<i>Calidris alba</i>
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>
Shelduck	<i>Tadorna tadorna</i>
Skylark	<i>Alauda arvensis</i>
Snipe	<i>Gallinago gallinago</i>
Stonechat	<i>Saxicola torquata</i>
Stone curlew	<i>Burhinus oedicephalus</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
Western meadowlark	<i>Sturnella neglecta</i>
Western snowy plover	<i>Charadrius alexandrinus</i>
Woodcock	<i>Scolopax rusticola</i>
Woodlark	<i>Lullula arborea</i>

Mammals

Antelope	<i>Antilocapra sp.</i>
Badger	<i>Meles meles</i>
Bat	<i>Chiroptera sp</i>
Beaver	<i>Castor canadensis</i>
Bighorn sheep	<i>Ovis canadensis</i>
Bobcat	<i>Felis rufus</i>
Cat (domestic)	<i>Felis sp.</i>
Cattle	<i>Bos sp.</i>
Coyote	<i>Canis latrans</i>
Dog (domestic)	<i>Canis sp.</i>
Eastern chipmunk	<i>Tamias striatus</i>
Elk	<i>Cervus elaphus</i>
Fallow deer	<i>Dama dama</i>
Ferret	<i>Mustela sp</i>
Field vole	<i>Microtus agrestis</i>
Fox squirrel	<i>Sciurus niger</i>
Grey squirrel	<i>Sciurus carolinensis</i>
Hare	<i>Lepus sp</i>
Rat	<i>Rattus Rattus</i>
Red fox	<i>Vulpes vulpes</i>
Marmot	<i>Marmota sp</i>
Moose	<i>Alces alces</i>
Muntjac	<i>Muntiacus reevesi</i>
Mule deer	<i>Odocoileus hemionus</i>
Musk rat	<i>Ondatra zibethica</i>
Otter	<i>Lutra lutra</i>
Rabbit	<i>Oryctolagus cuniculus</i>
Raccoon	<i>Procyon lotor</i>
Red deer	<i>Cervus elaphus</i>
Roe deer	<i>Capreolus capreolus</i>
Sheep	<i>Ovis aries</i>
Skunk	<i>Mephitis sp</i>
Stoat	<i>Mustella erminea</i>
Water vole	<i>Arvicola terrestris</i>
Weasel	<i>Mustella nivalis</i>
White tailed deer	<i>Odocoileus virginianus</i>
Wolf	<i>Canis lupus</i>
Woodchuck	<i>Marmota monax</i>

Other animals

Adder	<i>Vipera berus</i>
Crayfish	<i>Austropotamobius pallipes</i>
Earthworm	<i>Lumbricus terrestris</i>
Great crested newt	<i>Triturus cristatus</i>

Plants

Arrowhead	<i>Sagittaria sagittifolia</i>
Autumn lady's-tresses	<i>Spiranthes spiralis</i>
Canadian pondweed	<i>Elodea canadensis</i>
Childing pink	<i>Petrorhagia nanteuilii</i>
Crested dog's-tail	<i>Cynosurus cristatus</i>
Duckweed	<i>Lemna minor</i>
Floating pennywort,	<i>Hydrocotyle ranunculoides</i>
Heather	<i>Calluna vulgaris</i>
New Zealand pigmyweed,	<i>Crassula helmsii</i>
Parrot's-feather,	<i>Myriophyllum aquaticum</i>
Perennial rye-grass	<i>Lolium perenne</i>
Pirri-pirri-burs	<i>Acaena spp</i>
Sand catchfly	<i>Silene conica</i>
Wavy hair-grass	<i>Deschampsia flexuosa</i>
Wild thyme	<i>Thymus polytrichus</i>

Appendix 2 Examples of good practice

Extract from the Countryside Code

- By law, you must control your dog so that it does not disturb or scare farm animals or wildlife. You must keep your dog on a short lead on most areas of open country and common land between 1 March and 31 July, and at all times near farm animals.
- You do not have to put your dog on a lead on public paths as long as it is under close control. But as a general rule, keep your dog on a lead if you cannot rely on its obedience. By law, farmers are entitled to destroy a dog that injures or worries their animals.
- If a farm animal chases you and your dog, it is safer to let your dog off the lead – don't risk getting hurt by trying to protect it.
- Take particular care that your dog doesn't scare sheep and lambs or wander where it might disturb birds that nest on the ground and other wildlife – eggs and young will soon die without protection from their parents.
- Everyone knows how unpleasant dog mess is and it can cause infections – so always clean up after your dog and get rid of the mess responsibly. Also make sure your dog is wormed regularly.

Source: Countryside Agency and Countryside Council for Wales (2004)

National Trust policy on dog walking and examples of good practice

Guiding principles

- 1 The National Trust welcomes responsible dog owners. It does not consider it acceptable for owners to expect others to clear up after their dogs in car parks, play areas or on paths.
- 2 The National Trust expects dog owners to keep their dogs under control, which on some sites will mean on a lead. It is not acceptable to allow dogs to jump up at or otherwise intimidate other visitors.
- 3 The National Trust will continue to try to raise awareness in a variety of ways. It will if necessary seek prosecutions through legislation and its Byelaws, or in certain circumstances may ban dogs altogether.

Examples of good practice

- Take every opportunity to raise the public's awareness about responsible dog ownership through on-site contact with owners, draw attention to excessive amounts of dog faeces, information (particularly the National Trust Guide for Dog Owners), press releases, voluntary wardens, articles in vets' surgeries and pet shops, school visits, etc.
- Maintain contact with local dog walkers. Where practicable, establish a local dog-walkers forum to agree guidelines, zoning, patrolling rotas, etc. Consider any special controls required for people exercising many dogs at once.
- Liaise with local authorities and other providers of land for dog walking to agree a common approach to management.
- Provide more dog gates adjacent to stiles to assist access and minimise damage to fencing
- Liaise closely with tenant farmers and assist them, particularly at lambing time and the busier visitor months, with wardening, temporary notices and other management, monitor incidents
- Locate car parks so that dogs do not foul picnic and sitting areas.

- Encourage dog owners to use poop scoops wherever practicable on intensively used sites.
- Bins will not always solve the problem of indiscriminate fouling.
- Use more seasonal explanatory 'dogs on leads' notices in respect of grazing livestock, deer parks, lambing, bird-nesting areas and other wildlife sanctuaries and beaches.
- Identify some areas where dogs will not be allowed without a lead or at all.
- Ensure adequate time and resources are allocated to wardening as problems and misunderstandings are most likely to arise where wardening presence is low.

Teignbridge District Council's dog walker's code

We think that Teignbridge dog walkers are amongst the most considerate around! Dogs and their owners are very welcome on our sites, (please note that [dog byelaws](#) are in place at Dawlish Warren). Please follow these simple guidelines.

- Bag and bin your dog's mess, wherever you are - there are usually bins on site.
- Please bring your own dog mess bags - bags available on site are for emergency use only
- If you can, train your dog to mess in your own garden - but always bring a bag 'in case'!
- Don't bring very nervous, exuberant or 'touchy' dogs unless you are absolutely certain that you can control them! We recommend that you
- Put a choke chain on strong, exuberant dogs
- Put a muzzle on very nervous or snappy dogs
This will help to protect others from a frightening incident and protect you from legal action.
- Dog fights can be very frightening and owners who intervene are often badly hurt. A pepper pot can help stop a dog fight!
- Keeping your dog on a lead in a 'Dogs on leads area' helps to:
- Protect wildlife - especially water birds and ground nesting birds
- Reduce dog mess - even very conscientious dog walkers may not notice that their dog has messed if it is walking behind them, or if they are talking to a friend!
- Ensure that dogs are less exuberant - and therefore less likely to knock over children or frail people.
- Don't let your dog yap/bark for long periods - it really can spoil other people's enjoyment.
- Join a dog training class if you have a young dog, a difficult dog or maybe a rescue dog. You will enjoy your dog's company more if you are confident that it is obedient.
- If you follow this Code of Practice, you will be encouraging responsible dog ownership in Teignbridge.

Good practice guidance offered by CCW

Prevention is better than cure and there are various steps that can be taken to encourage responsible behaviour – such as putting up signs (see below) or talking to dog owners about what is good practice in dog control. If problems with users' dogs arise:

- Whenever possible, approach the owner of the dog that is causing problems to ask them to bring their dog under control. If necessary, report the owner to the police and ask them to investigate with a view to prosecution. Compensation for damage to livestock may also be claimed from the dog owner.
- Ask the highway authority to make an order under Section 27 of the Road Traffic Act 1988 requiring dogs to be kept on leads on specific public rights of way, although these are difficult to enforce.
- If an order is made, put up notices insisting 'Dogs must be kept on a lead at all times on this path'. Talk to the highway authority about steps that can be taken to enforce this.
- If the authority is unwilling to make an order it is still permissible to put up notices asking owners to control their dogs, eg 'Please keep your dog on a lead near livestock' or stating 'Please keep your dog under close control'.
- Notices are more likely to be effective when they are positive, polite and offer an explanation; impacts on wildlife and livestock are not always obvious to dog owners. Signs asking for dogs to be kept on leads between certain dates or at "lambing time", or in clearly defined areas, will be more effective than signs left in place all year.

Source: Countryside Council for Wales 2005



English Nature is the Government agency that champions the conservation of wildlife and geology throughout England.

This is one of a range of publications published by:
External Relations Team
English Nature
Northminster House
Peterborough PE1 1UA

www.english-nature.org.uk

© English Nature 2002/3

Cover printed on Character Express, post consumer waste paper, ECF.

ISSN 0967-876X

Cover designed and printed by Status Design & Advertising, 2M, 5M, 5M.

You may reproduce as many copies of this report as you like, provided such copies stipulate that copyright remains with English Nature, Northminster House, Peterborough PE1 1UA

If this report contains any Ordnance Survey material, then you are responsible for ensuring you have a license from Ordnance Survey to cover such reproduction.

Front cover photographs:
Top left: Using a home-made moth trap.
Peter Wakely/English Nature 17,396
Middle left: CO₂ 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.
Paul Glendell/English Nature 24,888



Awarded for excellence