The Economic and Environmental Impact of Sporting Shooting

A report prepared by

PACEC

on behalf of

BASC, CA, and CLA and in association with GCT

PACEC

Public and Corporate
Economic Consultants
www.pacec.co.uk

49-53 Regent Street
Cambridge CB2 1AB
Tel: 01223 311649
Fax: 01223 362913

233 Linen Hall
162-168 Regent Street
London W1R 5TB
Tel: 020 7734 6699
Fax: 020 7434 0357

e-mail: admin@pacec.co.uk

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1 Introduction

1.1 Aims and objectives

Overall aims

"to assess the economic and environmental contribution of sporting shooting to the UK"

In view of the perceived economic and environmental importance of sporting shooting, the British Association for Shooting and Conservation, the Countryside Alliance and the Country Land and Business Association, in consultation with the Game Conservancy Trust, joined together to commission Public and Corporate Economic Consultants (PACEC) to provide an independent assessment of the economic and environmental contribution of shooting to the UK.

The main objectives of this study are to:

- define the key components of shooting and their associated interests
- assess the economic contribution of the sector to the UK economy
- identify the conservation and habitat management activities arising from live quarry shooting
- evaluate the environmental benefits and costs associated with shooting

1.2 Research programme

The approach

A staged research programme was carried out, beginning in September 2004. It included a review of the literature, primary and secondary data collection, database assembly and economic modelling. Surveys were carried out of providers of shooting opportunities, those who participate in the sport and suppliers to providers and participants alike. This information provided not only new evidence on the structure and activities of sporting shooting but was also critical in calibrating the economic model for estimating the overall economic impact of the sport.

To estimate the user and non-user environmental benefits which accrue from the management of land for shooting purposes, a contingent valuation was carried out using a released game shooting estate as a case study.

The main focus of the study is on live quarry sporting shooting, although the research programme also included some analysis of clay pigeon shooting. All definitions given in this report are given in the context of sporting shooting and as such may differ from definitions in common usage.

Research methodology

Research programme

	Objective	Method	Output
Stage 1	Identification of key economic / environmental impact issues.	Stakeholder interviews and case studies	Issues and perceptions of impacts. Hypotheses
Stage 2	Design of conceptual framework for economic & environmental impact	Literature review and economic impact model development	Conceptual framework and impact model
Stage 3	Data base assembly Primary data Secondary data	Survey research Official sources	Quantitative and qualitative data bases
Stage 4	Economic and environmental impact assessment	Input/output analysis Statistical analysis	Jobs supported / value added Environmental impact
Stage 5	Report		Draft and final report

Survey research and data collection

Primary research

Target	Respondents	Method
Stakeholder	40	Face to face and telephone
Case studies	16	Face to face and telephone
Participants	1,128	Postal survey
Providers	968	Postal survey
Suppliers	169	Postal and telephone survey
Public	623	Face to face

Source: PACEC

The scale of the survey was determined by the need to ensure statistically robust estimates of activities and impacts across different geographical areas and quarry types.

Questionnaire design

Questionnaires for providers and participants were developed (from our case study and stakeholder research), each with a 'quick' section covering the key details of both participation and provision.

In a pilot it was found that the 'quick' section increased the response rate amongst participants and providers - some respondents were not willing to fill in a full questionnaire, but were willing to fill in the quick section.

Sample selection

Over 10,000 questionnaires were mailed using stratified random samples from sampling frames provided by 20 different groups. Over 2,000 completed questionnaires were returned

Survey of participants and providers

Source of contact details	Sent	Responses
Shotgun Certificate Holders (via the Association of Chief Police Officers)	800	101
Association of Deer Management Groups	400	76
British Association for Shooting & Conservation	1,801	426
British Deer Society	50	14
Countryside Alliance	2,102	452
Country Land and Business Association	1,020	146
Greater Exmoor Shoots Association[1]	565	345
Shooting lease holders on Forestry Commission Scotland land	46	10
Game Conservancy Trust	800	197
Good Shoot Guide (An Annual Publication of shoots)	50	8
Game Trust (Northern Ireland)	30	11
National Gamekeepers Organisation	1,050	135
Scottish Gamekeepers Association	200	23
Scottish Rural Property and Business Association	225	76
Union of Country Sports Workers	200	40
Ulster Farmers	100	6
Shooters Rights Association	150	0
Other (Pilot, case study, self selection)	30	30
Total	*10,069*	*2,096*

Source: PACEC

The study has benefited greatly from the co-operation of all of the above organisations.

[1] The weighting system described in Appendix A ensures that the grossed-up results are not biased by this group.

1.3 Data presentation and analysis

In this report data collected from the survey are analysed and presented in two main forms. Firstly the report includes "unadjusted" data derived directly from questionnaire responses (shown in lighter/blue shading). Secondly the report includes data based on the survey research but "grossed up" to reflect the total population of providers, participants and suppliers (shown in darker/orange shading).

Grossing up of survey results

The grossing up of survey based evidence was challenging because the total population of providers and participants is unknown, and estimating the size of each of these inter-connected populations was a major part of the study.

Estimates of key statistics for the total population of providers and participants were produced using the known total population of each contact list, taking the following into account:

- The higher non-response rate of those not involved, and of those with smaller involvement
- Joint membership of different contact lists
- Multiple people involved in one provider organisation

The grossed up results[2] also utilised information from fully completed questionnaires to infer missing data on a case by case basis in partially completed questionnaires (particularly where only the 'quick' section had been filled in).

Due to the complex nature of the grossing up technique it has not been possible to give margins of error of these grossed up estimates, but they are likely to be at least 10%. All estimates, therefore, are rounded to two significant figures – for example the number of providers is given as 61,000 rather than 60,511, and is likely to be between 55,000 and 67,000).

[2] Grossed up statistics are shown in orange (darker shaded) tables in the report, whereas the unadjusted results from the survey are shown in blue (lighter shaded) tables. When reading unadjusted results from the provider survey it should be noted that they are biased towards larger and driven game providers.

Since the vast majority of both participants and providers are involved in multiple types of sporting shooting it was not possible to assess the economic and environmental impacts by type of quarry.

It should also be noted that the text in the report not only reflects the findings from the survey research, but also includes information taken from case study and stakeholder research.

Further details of the complex methodology used are given in Appendix A.

1.4 Report structure

The report breaks down into five chapters. Following this introductory chapter, Chapter 2 analyses the nature of sporting shooting and looks specifically at the trends of providers and participants. Chapter 3 analyses the economic impact of shooting in terms of the number of direct and indirect jobs generated by shooting activities in the UK. Chapter 4 is an account of the land management and environmental activities associated with shooting and Chapter 5 presents the contingent valuation analysis of the environmental benefits. Key statistics are presented by UK country and region at the end of chapters 2, 3 and 4. For the project methodology and glossary of terms, please see Appendices A and B respectively.

Detailed methodologies for all stages of the research and full tables of results can be found in a series of working papers, which were handed to the contractors. The working papers cover the following topics:

- Literature Review (including bibliography)
- Case Studies
- Contingent Valuation
- Surveys of Providers, Participants and Suppliers
- Regional Results

2 The nature of sporting shooting

2.1 Introduction to sporting shooting

The purpose of this chapter is to look at the nature of sporting shooting in the UK in 2004. The chapter is broken down into three main sections:

- The provision of shooting opportunities
- Participation in shooting
- The numbers and usage of gamebirds, wildfowl, deer, pests (e.g. pigeons, rabbits) and predator species (e.g. foxes) shot for sport

The focus of this study is on all **live quarry sporting shooting**[3]. These different forms of shooting have a long history in European and Western culture.

Although the focus is on live quarry sporting shooting, one cannot exclude completely clay pigeon shooting, target shooting and shooting schools which generally support and train people for live quarry shooting.

Live quarry sporting shooting is not limited to gamebirds and wildfowl. It also includes the shooting of pest species, such as pigeon and rabbit where these are shot for sport.

The shooting opportunities currently available are wide-ranging, covering a number of **quarry species**[4], styles of shooting and areas of the UK. In order to present a representative picture of shooting in the UK, data were collected from a full range of **shooting providers**[5], incorporating all organisational types, from the small syndicate-run to the large commercially-orientated.

[3] **Live quarry sporting shooting:** *The shooting of birds and mammals for recreation.*

[4] **Quarry species**: *A legally shootable bird/animal which has an open season and which includes bird species which are commonly regarded as pests, e.g. pigeon (as covered by general licences).*

[5] **Shooting providers**: *An organisation/business (with employees and/or members) or individual who performs services (either paid or voluntary) which give rise to opportunities for sporting shooting.*

While the use of shooting-related membership organisations provided access to a large number of shooting providers and participants, it is important to recognise that shooting provision can also take place through informal arrangements, such as on a farmer's small-holding. A sample of shotgun certificate holders was identified to capture the shooting activities of those who do not belong to shooting organisations.

2.2 Provision of sporting shooting opportunities

This section, which looks at shooting providers, seeks to answer the following questions:

- What types of shooting are provided in the UK?
- Who is responsible for providing these opportunities? (including the total number of shooting providers in the UK)
- On what basis do organisations or individuals provide shooting?
- On what scale do organisations or individuals provide shooting? (including the total number of **Gun**[6] **days**[7] provided in the UK)

It should be noted that all responses are based on respondents' perceptions.

What types of sporting shooting are provided in the UK?

Most providers of sporting shooting provide more than one type, with **driven game**[8] being the most frequent. Informal types of shooting, such as **walked up game**[9] and **pest control**[10], are often provided alongside more formal types of shooting (e.g. driven game, grouse). Very few providers offer solely pest control shooting.

[6] **Gun**: A *shooter of any type of quarry (not just game - a wider definition than in colloquial use)*

[7] **Gun days**: *Shooting days multiplied by the average number of Guns per day.*

[8] **Driven Game**: *Form of shooting in which lowland gamebirds are flushed over the standing Guns.*

[9] **Walked Up Game**: *Form of shooting in which the shooter flushes lowland game as he/she walks over the shooting ground.*

[10] **Pest control**: *The control of pest species using a gun in the context of sporting shooting activities, including pigeon shooting.*

The low number of coastal wildfowling providers reflects the nature of wildfowling provision. **Coastal wildfowling**[11] is typically carried out through clubs, which may cover large areas of land. The shooting provider in these cases is taken to be the club manager or secretary.

81%[12]. of shooting providers surveyed provide opportunities for shooting driven lowland game

Only a small proportion of providers offer grouse shooting or coastal wildfowling.

Type of sporting shooting available through providers (% of providers)

	Country				
	UK	Eng	Wales	Scot	NI
Driven lowland game (e.g. pheasant, partridge, duck)	81	**86**	77	**64**	72
Walked up lowland game	59	**55**	70	**67**	**79**
Grouse (driven & walked up)	12	**5**	5	**40**	**0**
Deer Stalking[13]	34	**27**	**2**	**73**	**7**
Coastal Wildfowling	8	**7**	**23**	9	7
Inland wildfowling[14]	32	30	30	33	48
Avian pest control (eg pigeon)	59	**62**	53	**48**	59
Mammalian pest control (eg rabbit)	53	52	53	56	45
Number of Respondents	*1,094*	*758*	*43*	*217*	*29*

See Appendix B1 for notes on bold figures, multiple rows and rounding
Source: PACEC Survey of Providers 2005

[11] **Coastal Wildfowling:** *The shooting of ducks, geese and waders on coastal land affected by tides.*

[12] The grossed up estimate for the UK is 43%, which takes account of the bias in survey responses from larger driven game providers.

[13] **Deer Stalking:** *Shooting deer for deer management and/or crop protection in the context of sport.*

[14] **Inland Wildfowling**: *The shooting of ducks, geese and waders on inland sites.*

On average, four-fifths (83%) of all shooting providers rely on **released**[15] pheasants or partridges. This was especially true in England. Only 9% of providers said they did not release birds, most commonly in Scotland.

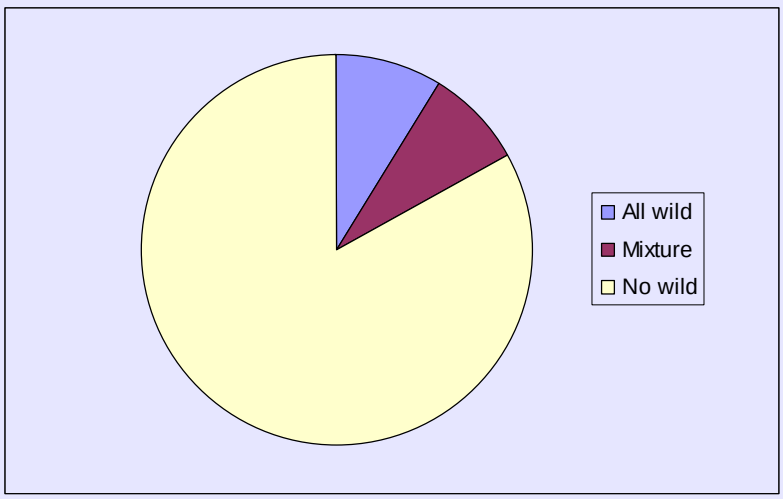
Four-fifths (83%) of all shooting providers rely on released pheasants or partridges.

Proportion of pheasant / partridge reared[16] / released (%)

	Country				
	UK	Eng	Wales	Scot	NI
All wild	9	**5**	0	**23**	9
Mixture	8	10	7	2	0
No wild	83	85	93	75	91
Number of Respondents	*372*	*273*	*14*	*53*	*11*

See Appendix B1 for notes on bold figures and rounding
Source: PACEC Survey of Providers 2005

UK proportion of pheasant or partridge shooting providers depending on released birds



Source: PACEC Survey of Providers 2005

Who is responsible for providing sporting shooting opportunities?

It is estimated that there are a total of 61,000 providers of sporting shooting opportunities in the UK. Providers of game shooting (driven and walked up) and pest control are the most numerous. There are understandably fewer grouse providers, given the habitat and wildlife management requirements of such provision.

[15] **Released birds**: *Birds bred by the shoot provider or bought in from a game farm and released into the wild for shooting.*

[16] **Reared birds**: *Gamebirds bred by the shoot provider specifically for sporting shooting and released into the wild.*

It is estimated that there are a total of 61,000 providers of sporting shooting in the UK.

Estimated number of sporting shooting providers in the UK

	Total
Driven lowland game (e.g. pheasant, partridge, duck)	26,000
Walked up lowland game	25,000
Grouse (driven & walked up)	1,600
Deer Stalking	17,000
Coastal wildfowling	3,800
Inland wildfowling	16,000
Avian Pest Control (e.g. pigeon)	48,000
Mammalian Pest Control (e.g. rabbit)	39,000
Total Providers	61,000

Source: PACEC (See Appendix B1 for notes on rounding, multiple rows)

The sporting shooting sector involves shooting operations of all ages. The presence of shooting providers with operations under 5 years old as well as a number of older, established operations suggests that the sport supports new businesses, as well as retaining those which are mature.

The sport supports businesses of all ages.

How long has the organisation been in operation? (%)

	Total
<5 years	12
5-19 years	31
20-49 years	31
50+ years	26
Number of respondents	*324*

Source: PACEC Survey of Providers 2005

The survey asked respondents to detail their provision of shooting. Shooting can be provided through one or more types of structure[17]. A third (32%) of providers operate through a **syndicate**[18] and two thirds (67%) as part of an **estate**[19]. Provision through **clubs**[20], **shooting tenancies**[21] and tenant farmers was less common.

[17] Please note that the shooting structures which respondents were asked to choose from were not defined. The definitions offered here are only suggestions of each term's commonly perceived meaning.

[18] **Syndicate**: *Typically a group of up to about 10 people shooting game over fixed or varying pieces of land.*

[19] **Estate**: *Land which is not a tenant farm (rather wider definition than in colloquial use)*

Case study evidence suggested that the syndicate is a popular way to provide shooting, as there are advantages from cost-sharing. Some syndicate shooting occurs on estates (particularly in Scotland) but 50% of estate shooting is provided directly by the landowner.

In Scotland, shooting is most likely be provided by an estate. In England and Wales shooting syndicates were more prevalent. Landowners can rent their land to syndicates without having to take responsibility for the running of the shooting opportunity and the necessary land management.

Two thirds (67%) of providers organise shooting as part of an estate. A third (32%) of providers operate through a syndicate.

Type of organisation providing sporting shooting (%)

	Country				
	UK	Eng	Wales	Scot	NI
Part of estate	67	**62**	**41**	**87**	66
Part of tenant farm	7	8	2	5	0
Shooting tenant	14	14	7	13	10
Club	8	8	**37**	**2**	14
Syndicate	32	**37**	44	**13**	21
Number of Respondents	*1,045*	*718*	*41*	*216*	*29*

See Appendix B1 for notes on bold figures, multiple rows and rounding.
Source: PACEC Survey of Providers 2005

[20] **Club:** *Typically a group of more than 10 people shooting a variety of quarry over fixed pieces of land. The distinction between Club and Syndicate in this study rests with the perception of the providers and participants who filled in questionnaires.*

[21] **Shooting tenant**: *Individual who rents the shooting rights for an area of land from the landowner.*

While estates can provide most types of shooting, syndicates were found to be statistically more likely to provide driven game shooting and opportunities to shoot avian and mammalian pest species.

Type of sporting shooting available by shooting organisation (%)

	Organisational structure					
	All providers	Synd-icate	Club	Shoot Ten.	Ten. Farm	Estate
Driven lowland game (eg pheasant, partridge, duck)	81	**91**	**52**	83	79	78
Walked up lowland game	59	62	50	64	51	58
Grouse (driven & walked up)	12	**7**	**3**	15	8	**17**
Deer Stalking	34	**27**	**12**	33	36	**46**
Coastal Wildfowling	8	7	**42**	3	3	**6**
Inland wildfowling	32	31	37	41	28	33
Avian pest control (eg pigeon)	59	**67**	55	53	62	**55**
Mammalian pest control (eg rabbit)	53	**59**	43	48	59	52
Number of Respondents	*1,094*	*319*	*60*	*86*	*39*	*505*

See Appendix B1 for notes on bold figures, multiple rows and rounding.
Source: PACEC Survey of Providers 2005

On what basis do organisations or individuals provide shooting?

Providers were asked whether their sporting shooting provision was undertaken primarily as a business or for recreational purposes. It should be noted that the results reflect the perceptions of the providers about their motivation for the provision they make – there is no objective demarcation between recreation and commerce.

The minority (22%) said that they provided shooting opportunities primarily as a business.

Is sporting shooting primarily a business or primarily recreational? (%)

	Total
Primarily a business	22
Primarily recreational	73
Other: mixture	4
Number of respondents	*326*

See Appendix B1 for notes on rounding.
Source: PACEC Survey of Providers 2005

Only a fifth (18%) of providers organised shooting to make a profit.

Is sporting shooting organised to make a profit or break even? (%)

	Total
To break even	61
To make a profit	18
Other	21
Number of respondents	*319*

Source: PACEC Survey of Providers 2005

Just under three quarters (71%) of providers saw themselves to be in competition with other providers.

Do you see yourself to be in competition with other providers? (%)

	Total
No	29
Yes	71
Number of respondents	*324*

Source: PACEC Survey of Providers 2005

On what scale do organisations or individuals provide shooting opportunities?

The number of **shooting days**[22] provided by shooting providers per annum is used to assess the scale of their operations. The following table details the number of days reported by shooting providers.

On average each shooting provider provided 16 days of shooting opportunities in 2004, resulting in 970,000 Shooting days.

Estimated number of sporting shooting days in the UK

	Providers	Average days per provider	Shooting Days
Driven lowland game (eg pheasant, partridge, duck)	26,000	6	150,000
Walked up lowland game	25,000	5	110,000
Grouse (driven & walked up)	1,600	4	5,700
Deer Stalking	17,000	8	150,000
Coastal wildfowling	3,800	5	19,000
Inland wildfowling	16,000	2	39,000
Avian Pest Control (eg pigeon)	48,000	7	340,000
Mammalian Pest Control (eg rabbit)	39,000	4	150,000
Total Providers	61,000	16	970,000

Source: PACEC (See Appendix B1 for notes on rounding, multiple rows)

[22] **Shooting day**: *Time spent by Guns on and around the shoot site. Some or all of am or pm is half a day.*

The number of Gun days provided by shooting providers per annum can also be used to assess the scale of their operations. The following table details the number of Gun days reported by shooting providers.

On average each 4 Guns took part on each shooting day, resulting in an estimated 3,600,000 Gun days.

Number of Gun days provided in the UK

	Shooting days	Average number of Guns per shooting day	Gun days
Driven lowland game (eg pheasant, partridge, duck)	150,000	10	1,500,000
Walked up lowland game	110,000	7	820,000
Grouse (driven & walked up)	5,700	10	59,000
Deer Stalking	150,000	1.4	200,000
Coastal wildfowling	19,000	3	49,000
Inland wildfowling	39,000	4	160,000
Avian Pest Control (eg pigeon)	340,000	2	570,000
Mammalian Pest Control (eg rabbit)	150,000	2	250,000
Total Providers	970,000	4	3,600,000

Source: PACEC (See Appendix B1 for notes on rounding, multiple rows)

In addition to the Guns who shoot, an average of 2 non-Guns also attend. These are people accompanying others and are additional to the **beaters**[23] and **pickers up**[24] organised by the gamekeeper.

[23] **Beater**: *Person who flushes wild game.*

[24] **Picker Up:** *Person who retrieves dead and wounded game with the aid of gundogs.*

Gamekeepers[25] manage the land and the game for shooting, so generally the number of gamekeepers employed is an indicator of the scale of operations.

Over half of the estate providers of shooting employed one or more full time **stalkers**[26] / gamekeepers.

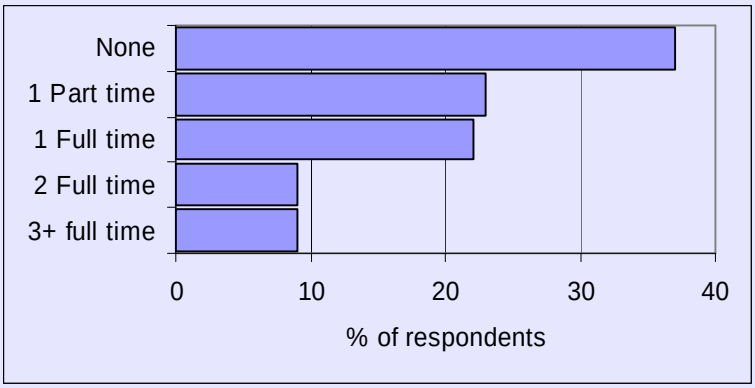
Just over one third (37%) of shooting providers did not employ a paid stalker / gamekeeper.

Number of paid stalkers / gamekeepers per organisation (%)

	Organisational structure					
	All providers	Synd-icate	Club	Shoot Ten.	Ten. Farm	Estate
None	37	**48**	**71**	**24**	**55**	**23**
1 Part time	23	**27**	17	27	21	21
1 Full time	22	**17**	**7**	19	11	**30**
2 Full time	9	**5**	3	**17**	8	**12**
3+ full time	9	**3**	**2**	13	5	**14**
Number of respondents	*1,079*	*320*	*58*	*84*	*38*	*497*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Survey of Providers 2005

Number of paid stalkers / gamekeepers per organisation



Source: PACEC Survey of Providers 2005

71% of shooting clubs surveyed did not employ a gamekeeper, where, by contrast, 56% of estates that provide shooting employed one or more full time gamekeepers.

[25] **Gamekeeper**: *Person who manages game habitat. They may rear birds for release into the wild.*

[26] **Stalker**: *Gun who shoots deer, for deer management and/or crop protection in the context of sport.*

2.3 Participation in sporting shooting

Key issues and questions

This section looks specifically at **shooting participants**[27] and addresses the following key questions:

- Who participates in sporting shooting in the UK? (including the total number)
- What types of shooting were they involved in during 2004?
- Where are people shooting?
- How are people accessing shooting opportunities?
- On what scale do people participate in shooting? (including the total number of Gun days spent shooting in the UK in 2004)

Who participates in sporting shooting in the UK?

It should be noted that, when considering the following data, people may shoot more than one quarry in more than one area. *It should also be noted that participants' selection of the types of shooting they undertake was based on their own perceptions of the categories.* Although the options for driven and walked up game stated on the questionnaire that they included duck shooting, the relatively high numbers of wildfowlers suggests that respondents who shoot only a small number of wildfowl regard themselves as wildfowlers.

There are an estimated 480,000 sporting shooting participants in the UK.

Estimates of the number of participants by type of shooting

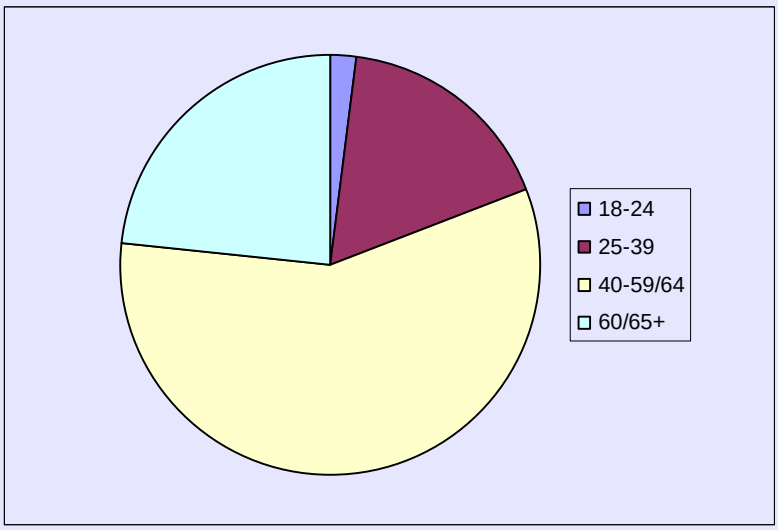
	Total UK
Driven lowland game	330,000
Walked up lowland game	270,000
Grouse (driven & walked up)	47,000
Deer Stalking	86,000
Coastal wildfowling	71,000
Inland wildfowling	94,000
Pest Control (e.g. pigeon, rabbit)	330,000
Total Participants	*480,000*

Source: PACEC (See Appendix B1 for notes on rounding, multiple rows)

[27] **Shooting participants**: *Those who take part in sporting shooting (of live quarry), and either pay to do so, or do so for nothing. Many providers are also participants.*

The majority of participants are male (93%) and over the age of 40 (80%).

Age of participant respondents



Source: PACEC Survey of Participants 2005

What types of sporting shooting were they involved in during 2004?

Over two thirds of participants (69%) each spent more than 10 days shooting in 2004.

Number of Gun days in 2004 (%)

	Total
None	4
1-4	10
5-9	17
10-19	30
20 or more	39
Number of respondents	*1,818*

Source: PACEC Survey of Participants 2005

Participants are typically involved in more than one type of shooting. Participants were likely to spend a greater number of days shooting game (driven or walked up) or avian/mammalian pests than any other form of shooting in 2004.

The most widespread was driven game shooting, cited by 86% of all participants.

Type of shooting undertaken by number of participant Gun days in 2004 (%)

	Number of Gun days in 2004					
	All participants	None	1-4	5-9	10-19	20+
Driven lowland game (e.g. pheasant, partridge, duck)	86	**58**	**78**	87	**91**	**89**
Walked up lowland game	60	**36**	**52**	58	61	**67**
Grouse (driven & walked up)	25	**8**	**9**	**14**	25	**37**
Deer Stalking	30	32	26	**23**	**26**	**38**
Coastal Wildfowling	11	8	8	**3**	11	**16**
Inland wildfowling	23	18	**16**	**14**	21	**32**
Avian pest control (e.g. pigeon)	57	63	**46**	**50**	**53**	**66**
Mammalian pest control (e.g. rabbit)	46	**66**	41	**38**	**40**	**53**
Number of Respondents	*1,878*	*73*	*179*	*312*	*550*	*704*

See Appendix B1 for notes on bold figures, multiple rows and rounding.
Source: PACEC Survey of Participants 2005

Where are people shooting?

The following table shows the regions in which participants were shooting in 2004 by participants' country of residence and country in which they shot. The most popular area for shooting in 2004 was South West England and Scotland (37% each). Although respondents who shot in Scotland were more likely to be living in the country, there was also significant travel from other parts of the UK.

For the most part, people tend to shoot in the area in which they live, with the exception of those shooting in the West Midlands, who are most likely to come from Wales. Few respondents travelled to Northern Ireland from other parts of the UK to shoot. Guns may be put off by the gun licensing laws in Northern Ireland which make it difficult for visitors to obtain a licence (stakeholders mentioned that the licensing laws acted in this way). Those coming from abroad were statistically more likely to shoot in the South West and North East regions of England.

There is a strong tendency for people to shoot in the area in which they live. For example, 89% of those who live in Wales shot in Wales in 2004.

Shooting participants may shoot in more than one region of the UK. For example, in 2004, 48% of those who had shot in Wales had also shot in South West England.

In which areas (if any) did you shoot in 2004? (%)

		Live Country					Shooting Country			
	Shoot UK	Live Eng	Live Wales	Live Scot	Live NI	Live Abroad	Shoot Eng	Shoot Wales	Shoot Scot	Shoot NI
South East	25	**30**	**5**	**8**	**7**	19	**30**	**32**	24	14
East	23	**27**	**6**	**11**	12	**3**	**27**	27	24	21
Greater London	1	1	0	0	0	0	1	2	1	2
South West	37	**43**	**14**	**13**	**12**	**100**	**44**	**48**	**33**	32
West Midlands	17	**18**	25	**9**	**2**	13	**20**	**42**	18	11
East Midlands	15	**18**	**2**	**2**	9	3	**17**	**26**	**17**	14
Yorkshire / Humberside	14	**16**	**2**	**5**	14	19	**16**	**23**	**18**	21
North West	13	**15**	12	**5**	7	10	**16**	**25**	**17**	16
North East	12	13	5	**7**	9	**29**	**14**	**19**	**18**	14
Wales	13	**12**	**89**	**6**	5	16	13	**100**	**16**	14
Scotland	37	**25**	**20**	**98**	42	**19**	**29**	**46**	**100**	47
Northern Ireland	3	**1**	0	**1**	**93**	6	**2**	3	4	**100**
Number of respondents	*1,753*	*1,319*	*65*	*281*	*43*	*31*	*1,481*	*235*	*652*	*57*

See Appendix B1 for notes on bold figures, multiple rows and rounding.
Source: PACEC Survey of Participants 2005

Although for the most part people tend to shoot in the area in which they live, there is evidence to suggest that Guns are also travelling to other countries. For example, a quarter of those living in England travelled to Scotland to shoot in 2004.

The movement of participants from one area to another necessitates expenditure on fuel, food and accommodation, all of which contribute to the economic impact of sporting shooting.

How are people accessing sporting shooting opportunities?

Participants were asked in what capacity they shot in 2004. The table below shows that there are significant differences in the way in which participants accessed sporting shooting opportunities depending on the type of quarry they shot in 2004. For example, those who went coastal wildfowling were more likely to have shot over land by informal arrangement or as a member of a club but less likely to own the land over which they shot.

Most participants (73%) shot as guests in 2004. Just under half (48%) shot as a member of a syndicate.

Participants' access to sporting shooting (%)

	Type of Quarry								
	Total	Driven	Walked Up	Grouse	Deer	Coast Wild fowl	Inland wild fowl	Avian pest	Mammal pest
I shot as a guest	73	**80**	**79**	**90**	**82**	76	**84**	75	75
I shot as a member of a syndicate	48	**53**	**53**	48	**40**	53	**54**	49	**45**
I purchased shooting by the day	42	**46**	**44**	**56**	45	47	**48**	41	40
I shot over land I owned	39	39	**42**	**51**	**48**	**30**	37	**42**	**43**
I shot over land by informal arrangement	28	**27**	**35**	**23**	**32**	**48**	**42**	**38**	**39**
I shot over land of which I was the tenant	18	19	**21**	**22**	**21**	19	**28**	**22**	**22**
I shot as a member of a club	11	**10**	**13**	**7**	10	**42**	**22**	**15**	**14**
I was not a Gun	4	**3**	**2**	**1**	4	3	3	4	**6**
Number of respondents	*1,824*	*1,574*	*1,117*	*461*	*547*	*199*	*425*	*1,055*	*841*

See Appendix B1 for notes on bold figures, multiple rows and rounding.
Source: PACEC Survey of Participants 2005

On what scale do people participate in shooting?

To estimate the total number of Gun days spent, account is taken of information provided by both providers and participants. For the more informal types of shooting, such as walked up game and pigeon or rabbit shooting, numbers from the participants' survey have been used, on the belief that providers tended not to include the full extent of smaller scale activities, thus leading to their figure being an underestimate of total provision.

However, in the case of the more formal driven game and grouse shooting, there is reason to believe that participants included all days that they went shooting, whether as a Gun or a beater/picker-up, and thus their figure is an overestimate of the number of days they spent shooting. Therefore, in these cases, the provider figure is the one used for the purposes of grossing up.

An estimated 10 million Gun days took place in the UK in 2004.

Number of Gun days in the UK as reported by providers and participants

	Gun days reported by Providers	Gun days reported by Participants	Final estimate of Gun Days*
Driven lowland game	1,500,000	(2,300,000)	1,500,000
Walked up lowland game	(820,000)	1,800,000	1,800,000
Grouse (driven & walked up)	59,000	(100,000)	59,000
Deer Stalking	(200,000)	680,000	680,000
Coastal wildfowling	(49,000)	370,000	370,000
Inland wildfowling	(160,000)	400,000	400,000
Pest Control	(820,000)	5,400,000	5,400,000
Total	3,600,000	11,000,000	10,000,000

*See previous paragraphs for explanation of choice of estimates
Source: PACEC (See Appendix B1 for notes on rounding)

2.4 Numbers and usage of quarry shot for sport

Key issues and questions

This section looks specifically at the gamebirds, wildfowl, deer, pests (e.g. pigeons, rabbits) and predator species (e.g. foxes) which are shot. The following aspects are addressed in this section:

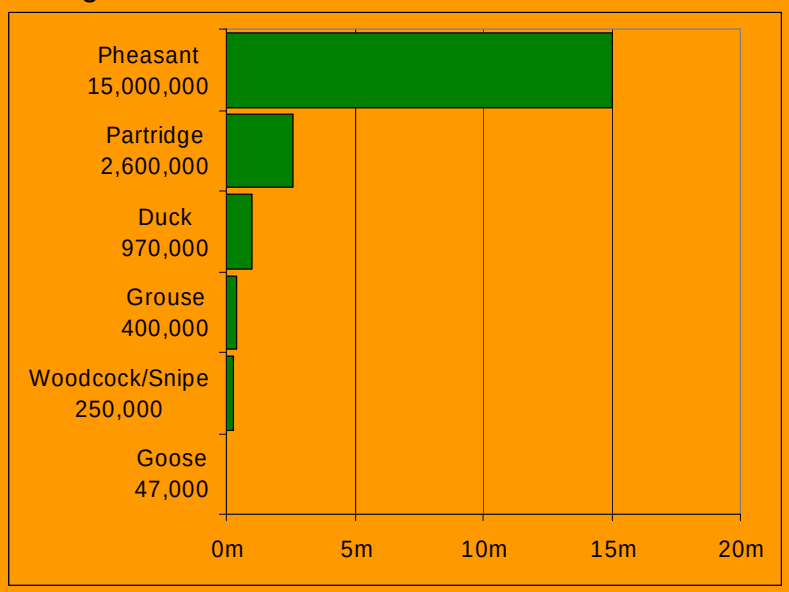
- What was the total number of gamebirds and wildfowl shot in 2004?
- What percentage of gamebirds and wildfowl shot in 2004 was destined for the food chain?
- What was the total number of deer, pests (e.g. pigeons, rabbits) and predator (e.g. foxes) shot not as part of a job in 2004?
- What percentage of deer, pests (e.g. pigeons, rabbits) and predator (e.g. foxes) shot in 2004 was sold to a dealer?
- How do providers of sporting shooting opportunities view the impacts of the new regulations surrounding the preparation and sale of dead game/birds?

What was the total number of gamebirds and wildfowl shot in 2004?

The total number of gamebirds and wildfowl shot for sport across the UK in 2004 was just under 19 million, of which 99% were intended for the food chain.

Almost four fifths (79%) of all gamebirds and wildfowl shot in 2004 were pheasant.

Total gamebirds and wildfowl shot in the UK in 2004



Note: 35m pheasants and 6½m partridges were reared and released for shooting
Source: PACEC (See Appendix B1 for notes on rounding,)

What percentage of gamebirds and wildfowl shot in 2004 was destined for the food chain?

Providers said that 99% of gamebirds and wildfowl shot in 2004 were consumed by the shooting provider or taken home by participants for themselves or their friends. It should be noted that some birds may not pass as fit for human consumption under EU Food Hygiene regulations.

44% of gamebirds and wildfowl shot in 2004 were sold to dealers (either processed or unprocessed). The remainder were consumed by the shooting provider or taken away by Guns to eat.

Average gamebirds / wildfowl sold to a dealer for food (processed by provider or dealer) (% per provider)

	Total
Grouse	29
Pheasant	46
Partridge	37
Woodcock/Snipe	8
Duck	21
Goose[28]	5
Total game and wildfowl	44
Number of respondents	*55*

Source: PACEC Survey of Providers 2005

[28] It should be noted that it is not legal to sell geese to a dealer in the UK

What was the total number of deer, pests (e.g. pigeons, rabbits) and predator (e.g. foxes) shot not as part of a job in 2004?

120,000 deer were shot, not as part of a job, in the UK in 2004.

Estimated total number of deer, pests (e.g. pigeons, rabbits) and predator species (e.g. foxes) shot not as part of a job in the UK in 2004

	Total
Deer	120,000
Pigeon	3,600,000
Hare	47,000
Rabbit	590,000
Corvid	380,000
Mink	1,000
Fox	120,000
Stoat/ Weasel	9,000
Squirrel	170,000
Feral Cat	9,000
Rat	38,000
Other	8,000

Source: PACEC (See Appendix B1 for notes on rounding)

Both case study and stakeholder research concluded that deer may be shot for environmental or ecological reasons (deer management) or solely for sport, generating income for the stalking provider. Similarly, pest control, as well as being a sport in its own right, may be undertaken for the protection of gamebirds on sporting shooting land, or the protection of crops and livestock on farmers' land. The cost implications of such control for the landowner/farmer are detailed in chapter 4.

Data were also collected and assembled on an average shooting provider basis. The following table shows the number of deer, pests (e.g. pigeons, rabbits) and predator (e.g. foxes) shot by unpaid Guns and as part of a job[29].

An average of 15 deer and 136 pigeon are shot by unpaid Guns over the land of each shooting provider. Over three times as many pest species were killed as part of employees' jobs than for sport. Around half of those species killed as part of a job were rabbits (48%).

Average number of deer, pests (e.g. pigeons, rabbits) and predator (e.g. foxes) shot by unpaid Guns and as part of a job per shooting provider.

	Total – unpaid Guns	Total – as part of job
Deer	15	25
Pigeon	136	121
Hare	10	36
Rabbit	40	360
Corvid	11	83
Mink	0	1
Fox	3	28
Stoat/weasel	2	19
Squirrel	5	38
Feral cat	0	2
Rat	2	37
Other pest	0	2
Number of respondents	*427*	*427*

Source: PACEC Survey of Providers 2005

What percentage of deer, pests (e.g. pigeons, rabbits) and predator (e.g. foxes) shot in 2004 was sold to a dealer?

61% of deer shot are sold to dealers (either processed or unprocessed), and a further 36% are consumed by shooting participants.

Average pest / predator species sold to a dealer for food (processed by provider or dealer) (% per provider)

	Sold to a dealer	Used as food but not sold to a dealer	Total used as food
Deer	61	36	97
Pigeon	39	51	90
Hare	49	45	94
Rabbit	34	29	63
Corvid[30]	7	1	8
Number of respondents	*187*	*187*	*187*

Source: PACEC Survey of Providers 2005

[29] Please note that grossed up data is not provided for the number of deer, pests (e.g. pigeons, rabbits) and predator (e.g. foxes) shot as part of a job in the UK.

[30] It should be noted that it is not legal to sell corvids to dealers in the UK.

How do providers of sporting shooting opportunities view the impacts of the new regulations surrounding the preparation and sale of dead game/birds?

From January 1st 2006, new rules must be observed by shooting providers and individuals who sell game and venison. The rules are required to meet a European directive on food safety and will be supervised by the Food Standards Agency (FSA). The new regulations require that all game placed on the market to approved Wildgame Handling establishments will need to have been inspected by a competent person. This may have cost implications, given that all affected shooting providers may need to pay to train a competent person, or themselves, in order to comply.

Of those providers who answered the question (265), a quarter (26%) believed they would be affected by the new regulations surrounding the hanging of game.

When asked to give details, over half of those giving details envisaged additional costs. A third were keen to stress the need for investment in new game larders and other equipment.

Will the regulations surrounding the preparation (ie hanging of birds) and sale of dead game/birds affect sales of game/birds shot on your land? (%)

	Total
Yes	26
No	74
Number of Respondents	*265*

Source: PACEC Survey of Providers 2005

How will the regulations surrounding the preparation (ie hanging of birds) and sale of dead game/birds affect sales of game/birds shot on your land? (%)

	Total
Additional costs / barriers to selling	51
New game larder / freezer / equipment necessary	32
More bureaucratic	15
Need training	12
Too elaborate to name	5
Improve quality control/provide benefits	3
Number of Respondents	*59*

See Appendix B1 for notes on multiple rows and rounding.
Source: PACEC Survey of Providers 2005

2.5 The nature of sporting shooting by region

Nearly half (29,000) of the 61,000 UK providers and found in the South West and East of England and Scotland.

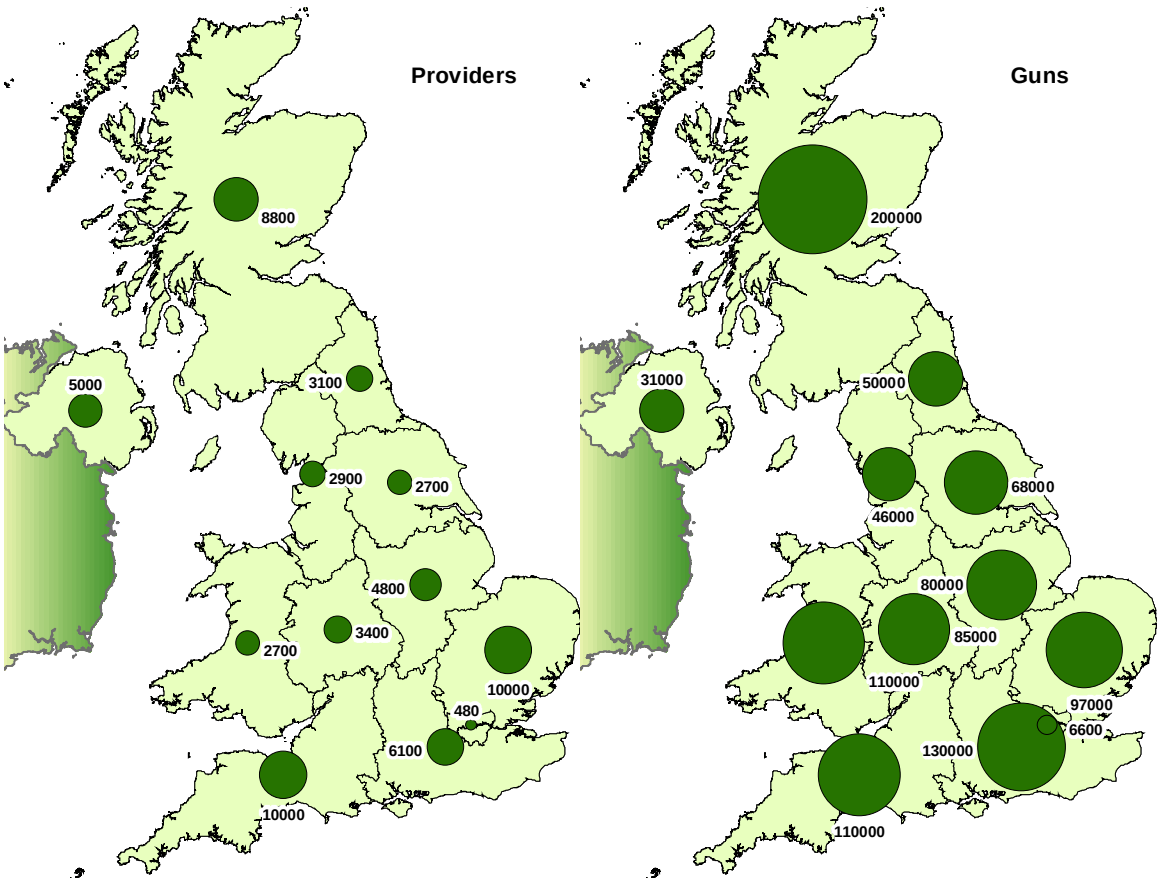
Over half (6m) of the 10m Gun days provided are in the South East and East of England, the West Midlands and Scotland.

Nearly half (200,000) of all 480,000 Guns do some shooting in Scotland

The nature of sporting shooting by UK country and region

Country/Region of England	Gun days provided (m)	Providers	Guns (by region of participation)
South East	1.4	6,100	130,000
East	1.7	10,000	97,000
Gr. London	0.0	480	6,600
South West	0.9	10,000	110,000
West Midlands	1.4	3,400	85,000
East Midlands	0.8	4,800	80,000
York/Humber	0.5	2,700	68,000
North West	0.7	2,900	46,000
North East	0.4	3,100	50,000
England	7.8	44,000	370,000
Wales	0.6	2,700	110,000
Scotland	1.5	8,800	200,000
Northern Ireland	0.3	5,000	31,000
UK	10.0	61,000	480,000

Source: PACEC (See Appendix B1 for notes on rounding, multiple rows)



2.6 Summary of the nature of sporting shooting

What types of sporting shooting are provided in the UK?

Most providers of sporting shooting offer more than one type, with the shooting of avian and mammalian pests being the most widespread and grouse and coastal wildfowling less frequent.

On average, **four fifths** (83%) of all shooting providers rely on released pheasants and partridges.

Who is responsible for providing these sporting shooting opportunities?

There are an estimated **61,000** providers of shooting in the UK.

Shooting is organised in several ways. A third (32%) of providers operate through a syndicate and two thirds (67%) as part of an estate. Provision through clubs, shooting tenancies and tenant farmers was less common.

The minority of shooting providers (22%) said that they provided shooting opportunities as a business.

Where are the shooting opportunities provided?

According to shooting providers and participants, the greatest numbers of Gun days are provided in the East of England and in Scotland (1.7 and 1.5 million respectively in 2004).

For the most part, participants tend to shoot in the region in which they live, although it is common for shooters to travel for particular types of shooting (e.g. grouse).

On what scale do organisations or individuals provide shooting opportunities?

Returns from providers and participants suggest an estimated total of **10 million** Gun days in the UK in 2004.

Who is participating in sporting shooting in the UK?

There are an estimated **480,000** people in the UK who shoot live quarry[31]. The majority were male and over the age of 40.

[31] This figure includes the use of shot guns, rifles and air rifles. For reasons why this figure may be an under-estimate, please see the methodology in Appendix A.

What types of sporting shooting activity were they involved in during 2004?

Most participants took part in more than one type of shooting in 2004. Participants were most likely to be shooting gamebirds or pest species but least likely to be shooting grouse or wildfowl.

How are people accessing sporting shooting opportunities?

Most participants pay for their shooting, either by the day or by annual subscription. 73% of Guns had shot as a guest in 2004.

3 The economic impact of sporting shooting

3.1 Introduction to economic impacts

Whether shooting is done through an informal arrangement or provided commercially, it generates economic activity. Such activity and its magnitude are discussed in this chapter.

Conceptual Framework

The chapter focuses on employment as the main indicator of economic impact, although estimates of **Gross Value Added**[32] are also presented. To estimate the total number of **jobs**[33] supported by sporting shooting in the UK, it is necessary to establish both direct and indirect jobs associated with sporting shooting. Direct jobs are those arising from the provision of sporting shooting opportunities. Indirect jobs are also generated and, indeed, no economic analysis of the sector would be complete without taking into account all wider effects (so called 'ripple' effects) of the transactions associated with the sport. These wider effects are derived from the type and extent of expenditure reported by both providers and participants.

Beginning with the participants, individuals make purchases from both shooting providers (in the form of day fees for example) and from other **suppliers**[34] (such as guns, ammunition and membership of shooting organizations).

[32] **Gross Value Added (GVA):** *The standard monetary measure of the value of economic activity. Usually estimated as the sum of employment costs plus profits, but since many providers run at a loss, profits of shooting providers have been excluded in this study*

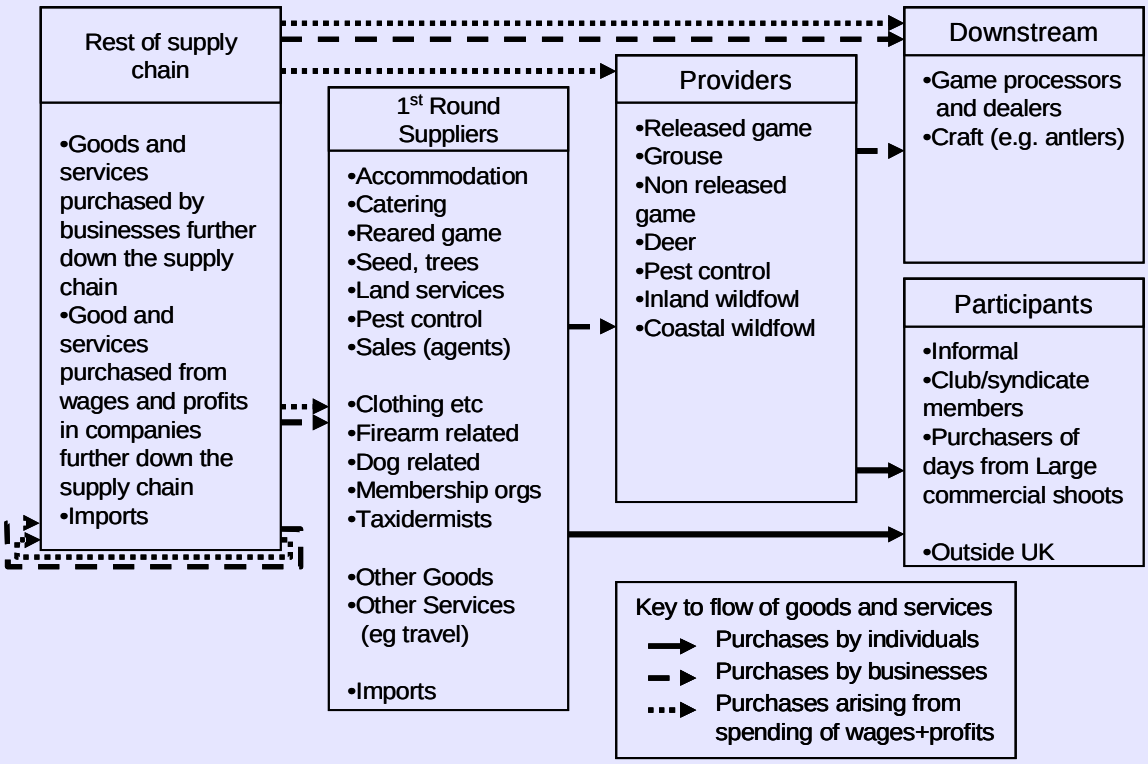
[33] **Jobs:** *include both employees and self employed (including working directors/owners)*

[34] **Suppliers:** *A range of firms/individuals which supply shoot providers and participants with related goods and services. Potential suppliers include: shooting agencies (sales), accommodation, shooting training, land management services, reared game (for release).*

Providers also make purchases, including expenditure on the preparation of shooting land, such as the purchase of land management services, fencing and game cover crop seed. Some providers employ one or more gamekeepers to manage the land and look after the game. Larger shooting operations may also employ ancillary staff to undertake administration, catering or accommodation functions.

In addition to supplying participants with shooting opportunities, providers also supply downstream industries with goods and services. For example, the sale of shot game to game processors and dealers.

Economic Framework



Source: PACEC

Every transaction which takes place among providers and participants incurs further economic effects. Linkages take place as firms buy from other firms, referred to as 'supply chain effects'. Furthermore, additional purchases arise from first and subsequent round suppliers spending their wages and profits which have been generated by the shooting activity. These are referred to as 'expenditure multiplier effects' and the multipliers applied to generate these figures are taken

from the Office of National Statistics Input-Output tables. These two types of effects have been amalgamated and are presented under the heading 'rest of supply chain'.

The chapter follows these monetary flows from their source to their effect on UK employment and GVA, addressing the following questions on route:

Key issues and questions

What are the **direct** economic effects of sporting shooting?

- What are shooting providers spending on average per annum in order to provide sporting shooting opportunities?
- What is the total number of direct jobs generated by shooting?

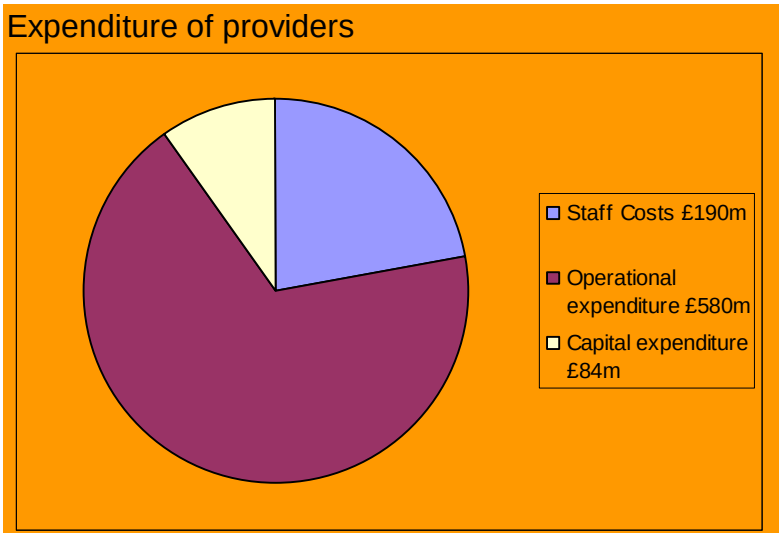
What are the **indirect** economic effects of sporting shooting?

- What are providers and participants spending on supplier industries (e.g. ammunition, game farms)?
- How many first round supplier jobs come from shooting?
- What are the downstream jobs resulting from the sport?
- How many jobs are supported through the supply chain beyond the first round impacts?
- What is the total number of jobs supported by shooting?
- What amount of Gross Value Added (GVA) is attributable to sporting shooting in the UK?

3.2 Direct economic effects of providers of sporting shooting

What are shooting providers spending per annum on sporting shooting opportunities?

In 2004, shooting providers in the UK spent an estimated £850 million providing sporting shooting opportunities. Staff costs account for just under a quarter (22%) of providers' total annual expenditure.



Source: PACEC (See Appendix B1 for notes on rounding)

Employment costs[35] are the largest single outgoing for shooting providers, accounting for just under a quarter (22%) of their total spend. Over half of providers' annual expenditure goes on operational spend (68%) and just 10% is spent per year on capital items.

[35] **Employment costs:** *include wages and employers' National Insurance and pension contributions and the costs of any other benefits (e.g. health care)*

The majority of providers each spent over £1,000 per annum and close to one quarter spent over £50,000 in 2004.

Syndicates were less likely to spend over £50k than were estates. Their annual outgoings were however substantial, with 88% spending between £1-49k per year.

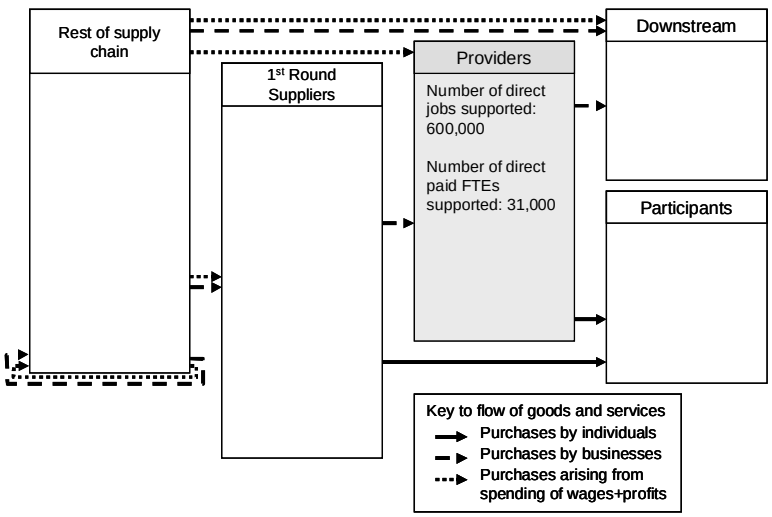
Total sporting shooting expenditure by type of provider (%)

	Organisational structure					
	All providers	Synd-icate	Club	Shoot Ten.	Ten. Farm	Estate
£0-99	3	**1**	0	2	**10**	4
£100-999	9	**5**	**24**	4	**21**	9
£1k-9k	36	**47**	**56**	31	38	**25**
£10k-49k	30	**35**	**14**	35	18	29
£50k or more	23	**12**	**7**	29	13	**33**
Number of respondents	*1,053*	*314*	*59*	*84*	*39*	*487*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Survey of Providers 2005 (Q17)

It is estimated that the number of cottages provided for shooting provider workers in the UK is 3,200. With average rent forgone of £4,300 per year per cottage this amounts to a total of £14million in loss of potential income.

What is the total number of direct jobs generated by sporting shooting provision?



We estimate that 600,000 people are involved in the provision of sporting shooting in the UK, undertaking work equivalent to 49,000 **full time equivalents (FTEs)[36].** 390,000 receive payment, equivalent to 31,000 FTE paid jobs.

Estimated work (including beating and loading) done to provide sporting shooting opportunities in the UK ('000)

Category	Beaters and Loaders	Shoot managers, Gamekeepers etc	All Involved in provision
Workers	410	190	600
FTE work done	19	30	49
Paid workers	340	53	390
FTE paid jobs	15	16	31

Source: PACEC (See Appendix B1 for notes on rounding)

The number of direct jobs relative to the number of direct full time equivalents (FTE) indicates that many of the direct jobs required to provide sporting shooting opportunities are **seasonal[37]/part time[38]**. Most, but not all, beaters are paid (91%). Those who are not paid may be wives/children of Guns.

[36] **Full Time Equivalents (FTE):** *The number of full-time employees that could have been employed if the reported number of hours worked by part-time employees was worked by full-time employees. This statistic is calculated by dividing the "part-time hours paid" by the standard number of hours for full-time employees then adding the resulting quotient to the number of full-time employees.* **Full time jobs***: assumed to be 37 hours a week for 232 days per year.*

[37] **Seasonal Jobs**: *assumed to be for 20 weeks of the year*

[38] **Part Time Jobs:** *assumed to be 20 hours a week*

The survey estimated that ten providers would use the services of 190 paid workers doing the work of 32 Full Time Equivalents. Beaters and pickers up account for 138 workers and 13 FTEs.

Average number of paid workers and FTE jobs in every ten provider organisations*

	Paid workers	Paid FTE jobs
Shoot manager	2	1
Administrator	2	1
Estate / farm worker	4	2
Gamekeeper	12	11
Stalker	4	2
Beater / Picker-up	138	13
Loader	17	1
Catering manager	3	1
Catering assistants	4	1
Game processor	1	<½
Accommodation manager	1	<½
General	<½	<½
Clay pigeon shooting	2	<½
All job descriptions	190	32

See Appendix B1 for notes on rounding.
*2 Administrators would arise where 2 providers had 1 administrator and 8 had none; or where 1 provider had 2 administrators and 9 had none.
Source: PACEC Survey of Providers 2005

While some shooting providers will employ a range of ancillary staff to manage all aspects of the business, including catering and accommodation (more typically estate providers), other providers do not employ such staff. No syndicate for example employed a paid shoot manager, given that such a position is likely to be held voluntarily by a member of the syndicate. Although the numbers were greatest on shooting tenants' land, the employment of beaters and pickers-up was common to all shooting providers. Not only are they vital to the shooting operation, they are also relatively inexpensive, as they are employed only on shooting days.

It should be noted that even though average staff numbers appear high compared to FTEs, not all staff are full time or in salaried positions. As a result, 190 paid staff employed equates to just 32 FTEs.

Most beaters/pickers up will be paid per shooting day. Thus, the number of FTE jobs for beaters/pickers for an average ten providers in our survey is just 13. Typically there would be 11 FTE gamekeeper employed per ten shooting providers per annum. The relatively high FTE measurement for gamekeepers suggests that they are more likely to be held in a **permanent**[39] salaried position than other members of staff, which may operate for the shooting season only. This is understandable, given that gamekeepers are responsible for the management of the land all year round.

63% of shooting providers in the survey employ a gamekeeper (which may be part time or full time, paid or unpaid).

Number of paid stalkers / gamekeepers by provider / organisation type (%)

		Organisational structure				
	All providers	Synd-icate	Club	Shoot Ten.	Ten. Farm	Estate
None	37	**48**	**71**	**24**	**55**	**23**
1 Part time	23	**27**	17	27	21	21
1 Full time	22	**17**	**7**	19	11	**30**
2 Full time	9	**5**	3	**17**	8	**12**
3+ full time	9	**3**	**2**	13	5	**14**
Number of respondents	*1,079*	*320*	*58*	*84*	*38*	*497*

See Appendix B1 for notes on bold figures, multiple rows and rounding.
Source: PACEC Survey of Providers 2005

[39] **Permanent Jobs:** *assumed to be for 52 weeks of the year*

In addition, an average group of ten shooting providers also employ the services of 31 unpaid staff. On average, 13 unpaid beaters/pickers up carry out work for ten shooting providers.

Ten shooting providers also, on average use the services of 31 unpaid staff.

Number of unpaid workers per ten provider organisations

	Unpaid workers	Unpaid FTE work
Shoot manager	5	1
Administrator	2	<½
Estate / farm worker	1	<½
Gamekeeper	3	1
Stalker	1	<½
Beater / Picker-up	13	1
Loader	2	<½
Catering manager	1	<½
Catering assistants	<½	<½
Game processor	<½	<½
Accommodation manager	<½	<½
General	<½	<½
Clay pigeon shooting	3	<½
All job descriptions	31	4

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Survey of Providers 2005

The unpaid staff may, for example, be wives or children of the Guns or members of a club/syndicate carrying out the work for colleagues. Although they are not paid directly by the shooting providers, this does not mean that they have no economic impact. Indeed, such workers will still spend in the local area on travel, food and drink and may be paid 'in kind' by the shooting provider (e.g. an annual meal prepared to thank those working for the provider). It is worth noting that some positions are always paid jobs, e.g. game processors and accommodation managers.

It has already been suggested that the work of beating and picking up on a shooting provider's land may be carried out by non-Guns or by Guns for their colleagues. The survey asked shooting participants if they carried out any such work. Over a third (36%) of participants said that they did, the most prevalent jobs being beating (27%) and picking up (17%). The work which participants carry out has implications for shooting provision. While their work may substitute for paid or unpaid employment, their attendance is not free from impacting on the local area, through spend on travel, food and drink, and those carrying out such work are also more likely to own a gundog, which supports breeders and trainers across the country.

Understandably, those shooting informally were statistically more likely to perform work related to the provision of sporting shooting. The role of gamekeeper was only undertaken by 9% of participants and there was a greater tendency for tenants and those shooting informally to undertake this work. Indeed, we have already seen that shooting estates, where one might expect participants to buy days or shoot as the landowner, are more likely to employ a gamekeeper.

Over a third (36%) of participants said that they carried out work related to the provision of sporting shooting in 2004. The most prevalent jobs being beating (27%) and picking up (17%).

Participants working as a beater, picker up, loader or gamekeeper (%)

	Participants' Access								
	All types	Landown	Tenant	Buy days	Club	Syndicate	Informal	Guest	Non-Gun
None	64	**69**	60	**68**	58	**59**	**51**	62	55
Beater	27	**22**	27	24	35	**31**	**38**	28	18
Picker up	17	15	20	17	20	19	**23**	**20**	36
Loader	5	3	8	6	**0**	5	**8**	6	0
Gamekeeper	9	10	**18**	7	8	9	**14**	10	9
Number of respondents	*814*	*272*	*101*	*380*	*88*	*428*	*263*	*578*	*11*

See Appendix B1 for notes on bold figures, multiple rows and rounding.
Source: PACEC Survey of Participants 2005

3.3 Indirect economic effects of sporting shooting

What are providers and participants spending on supplier industries (e.g. ammunition, game farms)?

Participants' total spend is shown below, broken down according to their on-site, off-site and **capital**[40] expenditure.

Participant spend

Sporting shooting participants in the UK spent a total of £2.0 billion on goods and services for sporting shooting.

Estimated total spend by sporting shooting participants (£m)

	Total
On-site operational expenditure	750
Purchase of game	32
Off-site operational expenditure	500
Total operational expenditure	1,300
Capital expenditure	760
Total participant spend	2,000

Source: PACEC (See Appendix B1 for notes on rounding)

The typical (median[41]) spend of participants is estimated to be £1,000 per year, but one in twenty participants spend £10,000 or more each year, bringing the average (mean[42]) spend to be £4,200 per year.

Sporting shooting participants in the UK paid a total of £750 million to providers.

Estimated breakdown of on site expenditure by sporting shooting participants (£m)

	Total
Annual shoot subscriptions	360
Per day shooting fees	250
Tips	63
On site food	34
On site accommodation	36
Total on-site spend (to Providers)	*750*

Source: PACEC (See Appendix B1 for notes on rounding)

[40] **Capital good:** *The cost of a capital good refers to its replacement cost, or its value in today's money, rather than the price originally paid for it.*

[41] **Median:** *The middle value in the distribution, above and below which lie an equal number of values.*

[42] **Mean:** *The average value – all of the values added together divided by the number of values.*

Total off-site operational expenditure by sporting shooting participants was £500 million.

Estimated breakdown of off site operational expenditure by sporting shooting participants (£m)

	Total UK
Firearms certificate/game licence	10
Membership of organisations	29
Shooting/Country Magazine	16
Training/Shooting School	29
Shooting Insurance	4
Travel to Shoots	130
Off-site Food	58
Off-site Accommodation	60
Dogs – training	11
Dogs – feed	50
Dogs – vet	31
Dogs – kennelling	6
Ammunition	20
*Other	43
Total off-site spend (to Suppliers)	*500*

*The Other category was used by respondents who were either not willing or not able to split some or all of their expenditure into the other categories

Source: PACEC (See Appendix B1 for notes on rounding)

Participants were asked to state their capital expenditure on sporting shooting. Where something (e.g. building, vehicle) has a shared use and would be required even if shooting were not to take place, respondents were requested not to include it. In addition, each capital cost is the replacement costs divided by the life expectancy (in years) multiplied by an appropriate "shared use" percentage. For example, a £1,000 firearm, lasting 20 years used 50% for sporting shooting would yield a cost of 1,000/20*50% =£25.

The largest component of participants' capital expenditure is on vehicles, with participants in the UK spending £570m per annum on vehicles for shooting. While the choice of 4 by 4 vehicles may be linked to sporting shooting, to include the entire expense of such vehicles in the jobs supported calculation is more questionable. In this study we have therefore excluded this expense from the supply chain calculation.

Breakdown of capital expenditure on sporting shooting participation (£m)

	Total UK
Vehicles	570
Firearms	77
Dogs	21
Accessories	22
Clothing	51
*Other	19
Total capital spend (to Suppliers)	*760*

*The Other category was used by respondents who were either not willing or not able to split some or all of their expenditure into the other categories
Source: PACEC (See Appendix B1 for notes on rounding)

We see from the results given immediately above that participants in the UK spend a total of £21 million per year on the purchase of **gundogs**[43]**,** and, from the previous results, a further £98 million on training, feeding, veterinary and kennelling (£11, £50, £31 and £6 million respectively)

Gundog ownership (%)

	Participants' Spend on Sporting Shooting					
	All participants	£0-99	£100-999	£1k-9k	£10k-49k	£50k+
No gun dog	33	31	**50**	32	**25**	33
Gun dog (Keep if not sporting shooting)	47	69	**34**	48	**54**	39
Gun dog (only for sporting shooting)	20	**0**	16	20	21	27
Number of respondents	*739*	*16*	*119*	*378*	*171*	*51*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Survey of Participants 2005

[43] **Gundog:** *dog specially bred and trained for locating, flushing and retrieving game*

Provider spend

Providers' total spend is shown below, broken down into their operational and capital expenditure.

Providers of sporting shooting opportunities in the UK spent a total of £660 million on operating and capital expenditure in 2004.

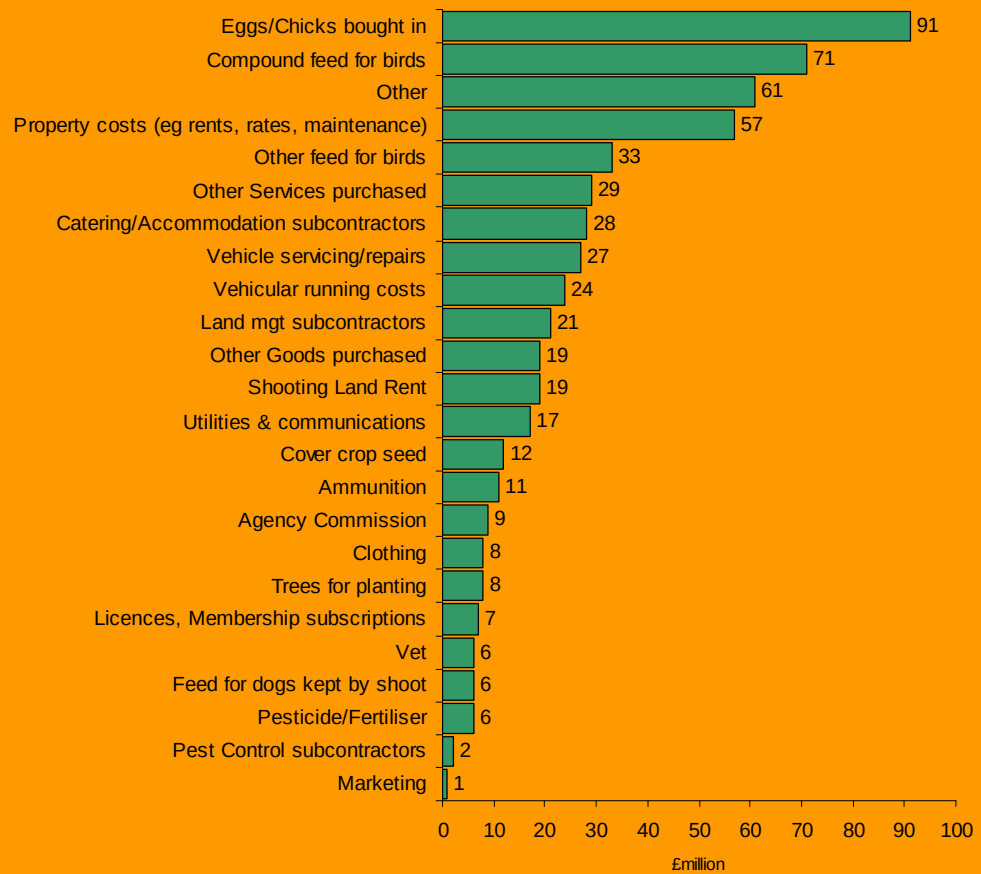
Estimated total spend by sporting shooting providers (£m)

	Total
Total operational expenditure	580
Total capital expenditure	84
Total provider spend	660

Source: PACEC (See Appendix B1 for notes on rounding)

The largest items of operational expenditure across all regions are the costs of buying gamebird stock and the feed put down for them. £91m was spent by providers on the purchase of eggs and reared chicks.

Estimated breakdown of operational expenditure on sporting shooting provision



Note: The Other category was used by respondents who were either not willing or not able to split some or all of their expenditure into the other categories

Source: PACEC (See Appendix B1 for notes on rounding)

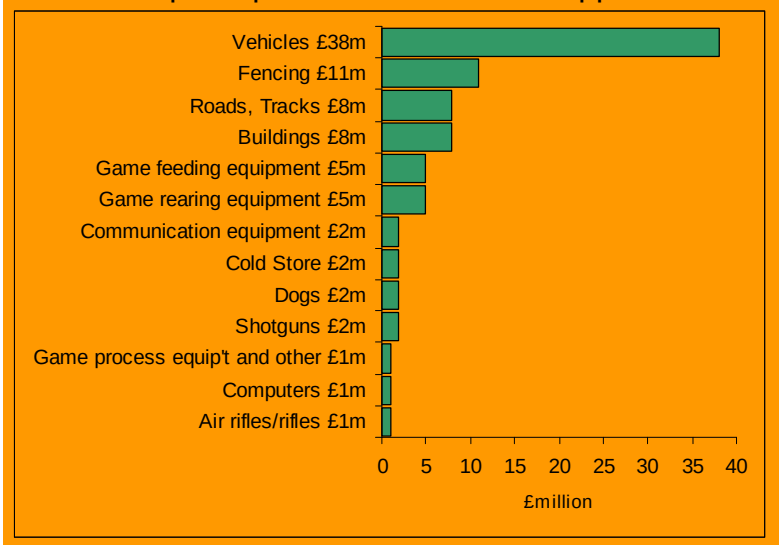
Also of significance in terms of providers' operational expenditure are the costs associated with land management. These will be discussed in chapter 4.

In addition to the £570 million operational expenditure, shooting providers in the UK made **charitable donations**[44] to the sum of £7 million over the course of 2004.

The cost of vehicles represented the largest proportion of capital expenditure for shooting providers. While shooting providers did spend money on game rearing equipment (£5m in total in 2004), they did not as a rule purchase equipment to process shot game.

Shooting providers in the UK spent £38m on vehicles for shooting purposes in 2004.

Provider capital spend breakdown for suppliers



Source: PACEC (See Appendix B1 for notes on rounding)

Businesses in the supply chain of providers are typically very dependent on their customers. Providers of shooting suggested that some four fifths of such businesses were particularly dependent on the sport.

81% of providers answering the question said that they used suppliers which were particularly dependent on the sport.

Considering your expenditure, are there suppliers you use who are particularly dependent on sporting shooting? (%)

	Total UK
Yes	81
No	19
Number of respondents	*286*

Source: PACEC Survey of Providers 2005

[44] **Charitable donations**: *These exclude those specific to sporting shooting.*

How many first round supplier jobs result from sporting shooting?

16,000 first round supplier paid FTE jobs are supported in the UK as a result of shooting. The greatest proportion of jobs is in the food and accommodation sector (5,700 jobs supported in the UK).

Estimated number of first round supplier jobs in the UK supported by sporting shooting

	Total UK FTE paid
Fees/rent/tips	(included in direct)
Land mgt services	150
Pest control services	25
Shooting school	460
Sales/marketing	180
Accommodation/food	5,700
Membership/ insurance	310
Game farm	300
Magazines	130
Feed/fert/trees/seeds/fencing	760
Firearms & ammunition	590
Dogs (incl. training & kennelling)	1,700
Vet	560
Travel	1,300
Vehicles (providers only)	110
Vehicle running	690
Utilities/communications	56
Building: road/track/ property	860
General goods	1,100
General services	510
Craft	5
Art	180
Taxidermy	14
Total 1st round supplier employment	16,000

Source: PACEC (See Appendix B1 for notes on rounding)

The number of visitor nights generated by sporting shooting has important consequences for participants' spend in the areas surrounding land used for shooting. The average (mean) number of visitor nights generated by shooting per shooting provider in 2004 was 202, which includes nights spent away from home by Guns and **non-Guns**[45] for the purposes of shooting.

Per average shooting provider in 2004, 103 visitor nights were generated in the local area as a result of shooting.

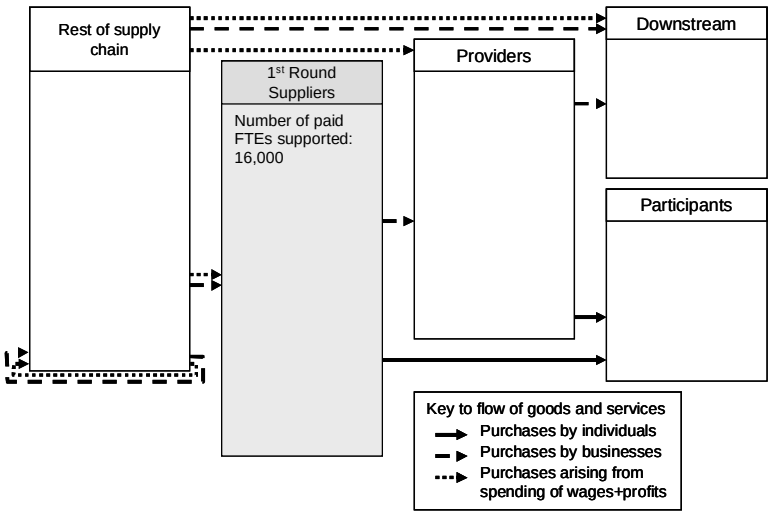
Total number of visitor nights generated by sporting shooting per shooting provider in 2004

	Total
Onsite Visitor nights	89
Local Visitor nights	103
Region Visitor nights	5
Rest of UK Visitor nights	4
Total UK	*202*

See Appendix B1 for notes on rounding.
Source: PACEC Survey of Providers 2005

Of these, half (51%) were generated in the local area, 2% in the rest of the region and 2% in the rest of the UK. 44% of all visitor nights are provided on site.

In addition, 140 jobs are estimated to be generated across the UK as a result of the charitable donations made by shooting providers and participants.



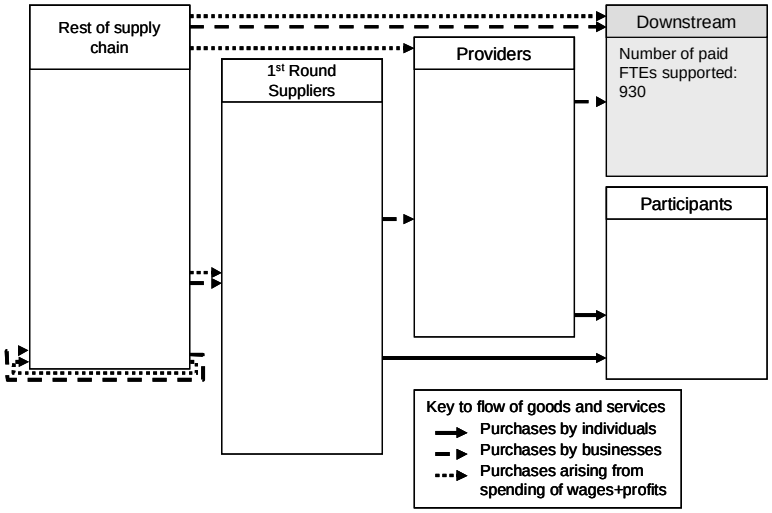
[45] **Non-Gun:** *Term used in this report to describe people accompanying others who are additional to the beaters and pickers up organised by the gamekeeper*

What are the downstream jobs resulting directly from the sport?

In total, spend by participants and providers on downstream industries came to £59m in 2004. A total of 930 downstream paid FTE jobs were supported by providers and participants in the UK in 2004.

Downstream industries affected by participants and providers	
	Total
Expenditure by participants and providers	£59 million
Number of paid FTE jobs supported	930 jobs

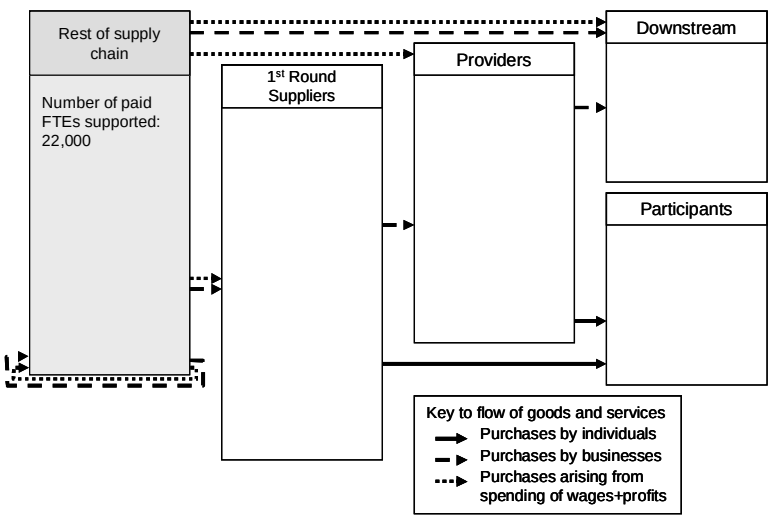
Source: PACEC (See Appendix B1 for notes on rounding)



How many jobs in rest of the supply chain are supported through the supply chain and expenditure multiplier effects?

We estimate 22,000 paid FTE jobs are supported across the UK by sporting shooting in the rest of the supply chain.

The number of supply chain jobs quoted below represents the amalgamation of all jobs resulting from firms buying from other firms (supply chain effects) and all jobs generated by firms and individuals' spending of wages and profits (expenditure multiplier effects).



What is the total number of jobs supported by sporting shooting in the UK?

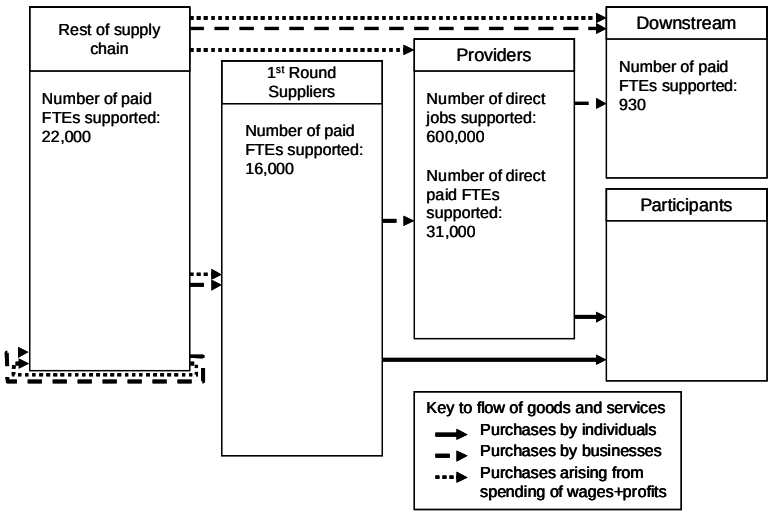
The estimated number of jobs supported by sporting shooting has been calculated by adding together all direct and indirect (first round supplier, downstream and supply chain) jobs.

Sporting shooting in the UK supports an estimated 70,000 jobs.

Breakdown of paid jobs supported by sporting shooting

	Total UK FTE paid
Beaters and loaders	15,000
Shoot managers, Gamekeepers[46], others	16,000
Total number of direct jobs	31,000
Number of supplier jobs supported	16,000
Number of jobs supported in downstream industries	930
Number of supply chain jobs supported (includes expenditure multiplier effects)	22,000
Total number of indirect jobs supported	39,000
Total number of jobs supported	*70,000*

Source: PACEC (See Appendix B1 for notes on rounding)



[46] **Gamekeeper**: *Person who manages game habitat. They may rear birds for release into the wild.*

What amount of Gross Value Added (GVA) is attributable to sporting shooting in the UK?

The total direct Gross Value Added for the UK as a whole resulting from the provision of sporting shooting is estimated to be £1.6 billion.

Estimated GVA supported by sporting shooting (£m)

	Total UK
Provider staff costs	190
Participant tips	63
Direct GVA	250
Downstream	31
First round suppliers	570
Rest of supply chain	790
Indirect total	1,400
Total	1,600

Source: PACEC (See Appendix B1 for notes on rounding)

3.4 The economic effects of shooting by region

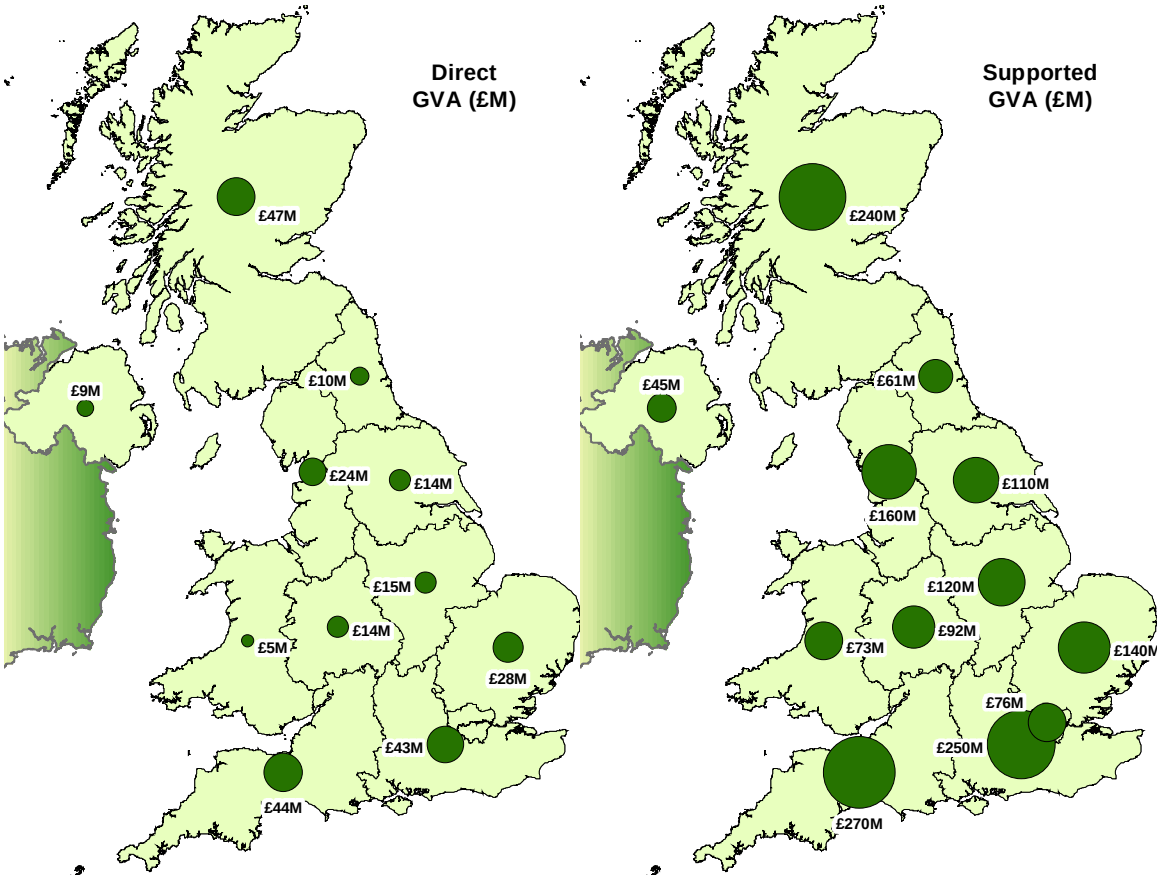
The largest economic effects are found in the South West and South East of England, and Scotland.

Typically, the total GVA supported is proportionate to direct GVA, with the exception of Gr. London where the low number of providers relative to shooting suppliers results in a proportionately higher amount of GVA supported.

The economic effects of sporting shooting by UK country and region (£m)

Country/Region of England	First round supplier spend by providers and participants	Direct GVA	Total GVA supported
South East	220	43	250
East	110	28	140
Gr. London	25	0.4	76
South West	280	44	270
West Midlands	66	14	92
East Midlands	110	15	120
York/Humber	94	14	110
North West	140	24	160
North East	53	10	61
England	1,100	190	1,300
Wales	73	5.3	73
Scotland	230	47	240
Northern Ireland	37	8.7	45
UK	1,400	250	1,600

Source: PACEC (See Appendix B1 for notes on rounding)

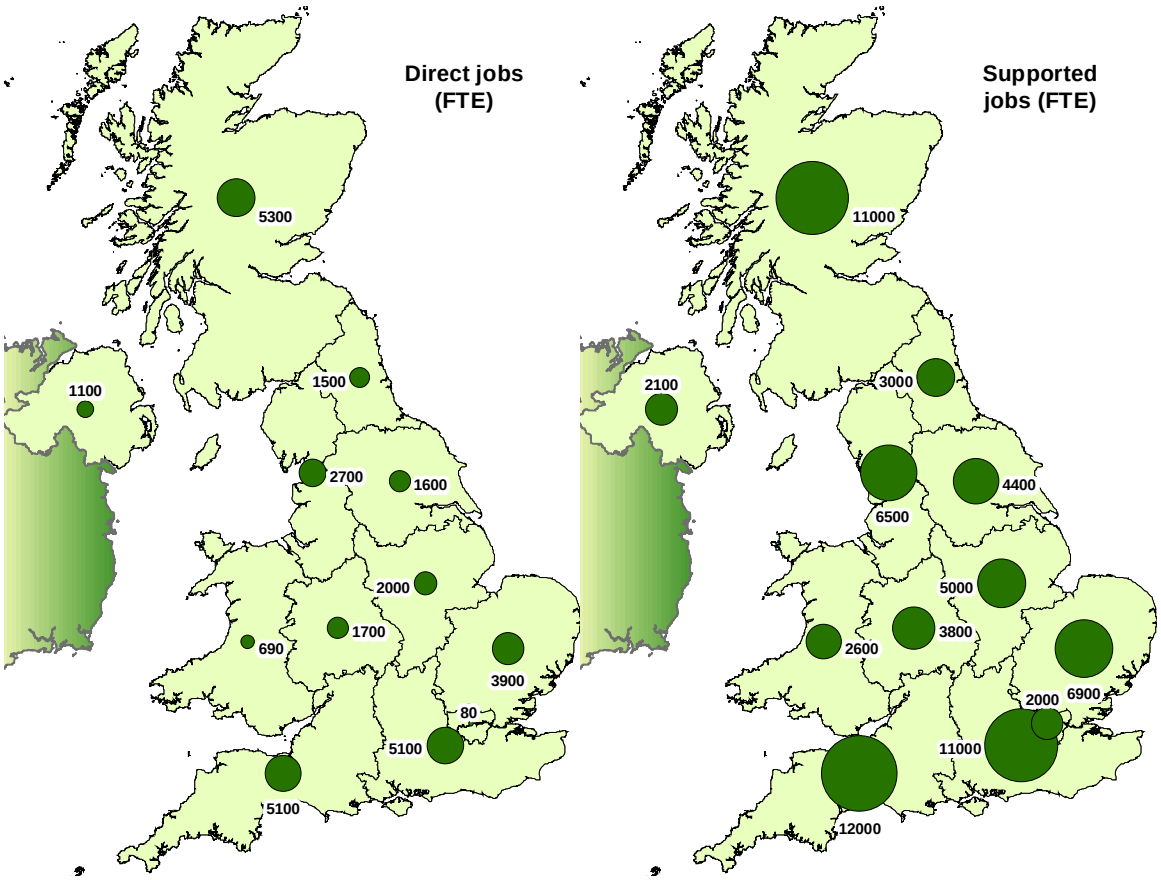


The largest numbers of workers supported by shooting are in the South West, East and South East of England and Scotland

The economic effects of sporting shooting by UK country and region

Country/Region of England	Total workers supported	Total paid workers	Total direct FTE paid jobs	Total FTE paid jobs supported
South East	72,000	49,000	5,100	11,000
East	100,000	62,000	3,900	6,900
Gr. London	3,900	2,000	80	2,000
South West	100,000	64,000	5,100	12,000
West Midlands	35,000	24,000	1,700	3,800
East Midlands	45,000	28,000	2,000	5,000
York/Humber	29,000	21,000	1,600	4,400
North West	35,000	26,000	2,700	6,500
North East	30,000	19,000	1,500	3,000
England	450,000	300,000	24,000	54,000
Wales	22,000	12,000	690	2,600
Scotland	88,000	58,000	5,300	11,000
Northern Ireland	41,000	22,000	1,100	2,100
UK	600,000	390,000	31,000	70,000

Source: PACEC (See Appendix B1 for notes on rounding)



3.5 Summary of the economic impact

What is the total number of jobs supported by sporting shooting activities in the UK?

Sporting shooting supports an estimated total of just under **70,000** paid FTE jobs in the UK. Of these 44% are supported directly and the remainder indirectly, through purchases to suppliers by both individuals and firms, and as a result of spending profits and wages.

What is the breakdown of jobs supported by sporting shooting in the UK?

The breakdown of paid FTE jobs is:

31,000 direct jobs
39,000 indirect jobs

The breakdown of direct jobs is:

15,000 Beaters and Loaders
16,000 Shoot managers, gamekeepers & others

The breakdown of the 39,000 indirect jobs:

16,000 supplier jobs
930 downstream jobs
22,000 “rest of supply chain” jobs

In addition to the paid jobs, informal work is also carried out both by shooting participants and others.

What are providers typically spending in order to provide sporting shooting opportunities?

In 2004, shooting providers in the UK spent a total of **£850 million** in order to provide shooting. Just under a quarter (22%) of this was spent on staff. Providers also bore an additional cost of **£14 million** in rent foregone on 3,200 cottages (typically for gamekeepers).

What are participants typically spending on their sport per annum?

Shooting participants in the UK spent a total of **£2.0 billion** on goods and services in 2004, of which **£750 million** was spent directly on shooting providers’ land. The largest annual expenditure for participants was shoot subscriptions, totalling £360 million in 2004.

Shooting generated an average of 200 visitor nights per shooting provider in 2004, which includes nights spent away from home by both Guns and others for the purposes of shooting.

What amount of GVA is attributable to sporting shooting in the UK?

The total GVA for the UK as a whole resulting from sporting shooting is an estimated **£1.6 billion**.

4 The environmental effects of sporting shooting

4.1 Introduction to environmental effects

While the previous chapter has concentrated on placing a value on the contribution which sporting shooting makes to the UK economy, one cannot conclude that the value of the sector is in jobs and monetary contribution alone. Indeed, this study has set out to examine both the economic and the environmental impacts of the sport.

This is not the first time that a study has looked at the effects which sporting shooting has on the environment. A number of previous reports highlight the important role which habitat and wildlife management for shooting plays in preserving landscapes, habitats and biodiversity in the UK. The environmental component of our own study is designed to provide up-to-date information on the habitat and wildlife management carried out by shooting providers, and to add value to previous studies by including a review of public perceptions of the effects which management for shooting has on the UK environment (see chapter 5).

Shooting providers influence the management of two thirds of the area of rural land in the UK.

Habitat and wildlife management is crucial to provide the conditions necessary for sustaining gamebird/other populations. Shooting providers become, in effect, countryside stewards for a sizable proportion of land in the UK. Indeed, whether they manage the land solely for the purposes of shooting or more commonly, for a combination of reasons including shooting, they influence the management of 15 million hectares of land, two thirds of the area of **rural land**[47] in the UK.

[47] **Rural land** is defined by the ODPM as all land in the UK which is not defined as urban, i.e. not in a settlement of 10,000 or more people.

What is more, shooting providers undertake work which complements other management carried out by conservation organisations providing public environmental services at their own expense, or funded through countryside grants. Where the shooting provider is not the landowner (such as a syndicate shoot captain), the shooting provider often carries out land management that is additional to that undertaken by the landowner. This can increase the land value.

Shooting providers take their countryside stewardship responsibility seriously with half of providers being members of conservation organisations; and just under a quarter (22%) having participated in an environmental survey or project. Of those who liaise with conservationist groups, 91% report that they established good or okay relations.

63% of providers employ a gamekeeper (who may be part time or full time, paid or unpaid) whose duties include habitat and wildlife management. This can have significant effects on the countryside and biodiversity.

To assess the environmental effects of shooting, data were collected from three sources:

1. A questionnaire which asked providers about the habitat and wildlife management which they undertook for shooting.
2. A questionnaire which asked participants about their experience of a range of environmental aspects on sites[48] where they had shot.
3. The views of the public, assembled from a separate survey which asked for people's own assessment of the environmental aspects of shooting. This survey did not ask respondents about the *extent* of management for shooting.

This chapter falls into two parts. The first looks at the activities associated with sporting shooting in the UK. The second considers the inputs required for these activities.

[48] **Shooting Site**: *The land over which sporting shooting takes place*

4.2 Environmental activities associated with sporting shooting

Key issues and questions

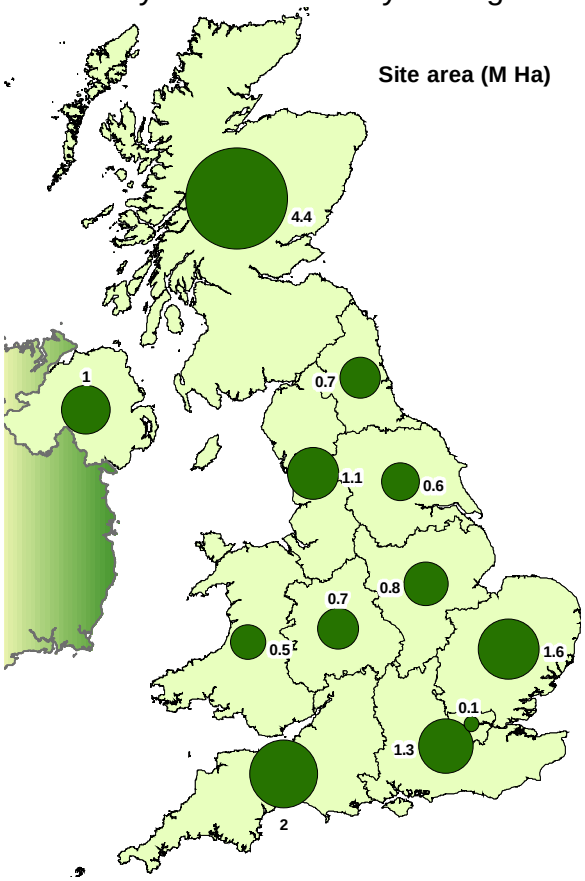
This section aims to answer the following questions:

- What is the scale and type of habitat and wildlife management carried out for shooting?
- Who carries out this habitat and wildlife management?
- How would habitat and wildlife management change if sporting shooting stopped?

What is the scale and type of habitat and wildlife management carried out for shooting?

In the UK as a whole shooting providers were found to be responsible for a total of 15 million hectares of land. Although shooting does not take place over the entirety of this area, the figure does illustrate the area of land which may be influenced by management for shooting.

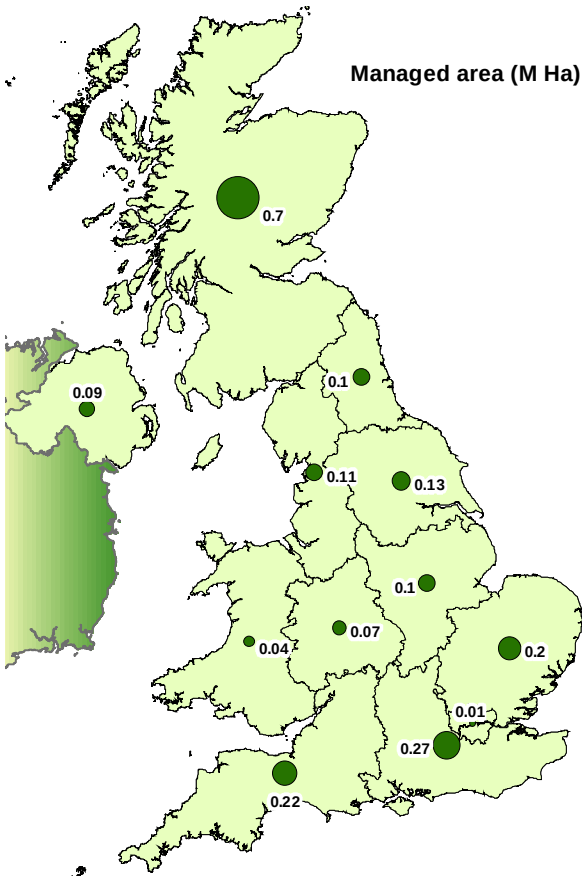
Shooting influences the management of large areas of land throughout the UK with over 4 million hectares in Scotland.



Source: PACEC

When shooting providers were asked to give details of the extent of various types of habitat and wildlife management carried out on their land, the area of land over which these specific types of management took place was grossed up for the UK. 2 million ha of land is managed in this way in the UK. This represents 8% of the total land area of the UK, 13% of rural land in the UK and an area the size of Wales. The following map shows grossed up results for each region.

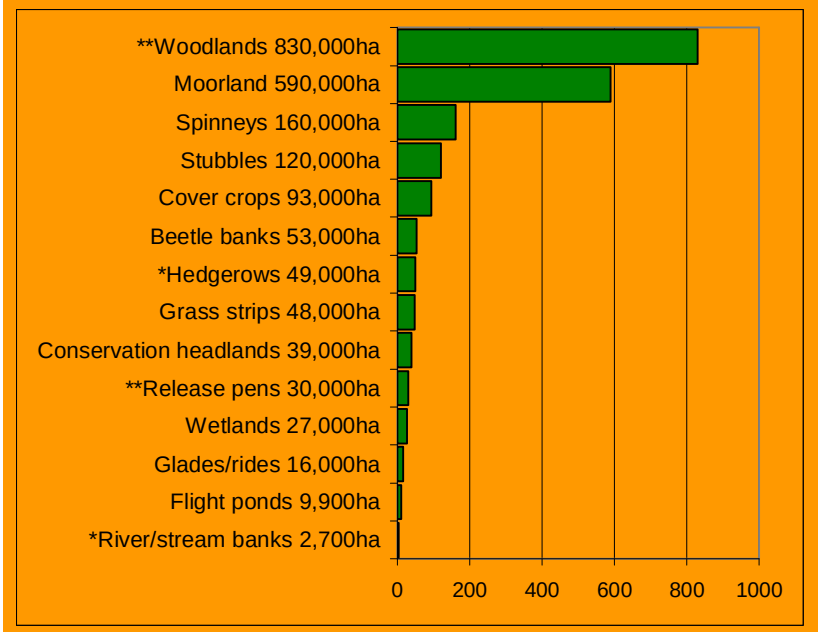
The map of the extent of habitat and wildlife management carried out for sporting shooting reflects the very high shooting interest in Scotland, as well as high shooting interest generally in the arable districts to the South, South West and East of England.



Source: PACEC

The management of moorland and woodland dominate habitat and wildlife management.

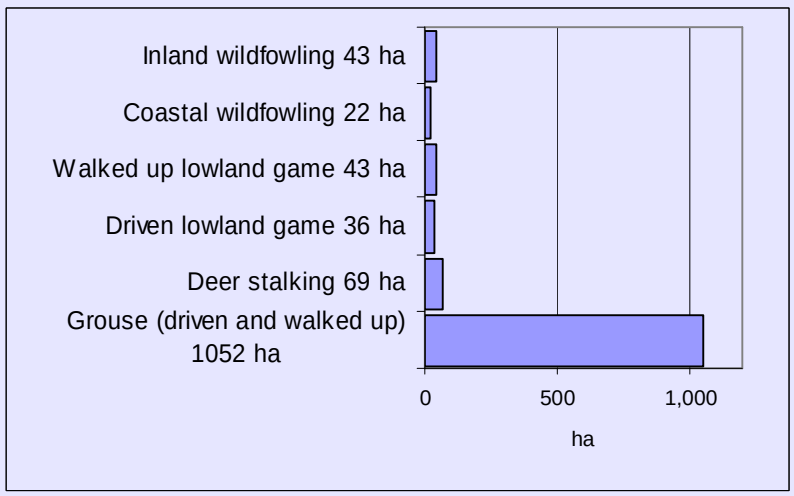
Estimated extent of habitat and wildlife management undertaken on land used for sporting shooting in the UK



*Hedgerows and river/stream banks are assumed to be 4m wide
**Management of woodlands includes work on release pens
Source: PACEC (See Appendix B1 for notes on rounding)

Some types of shooting, notably grouse shooting, demand more habitat and wildlife management than others.

Typical (median) area of habitat and wildlife management carried out by providers



Source: PACEC Survey of Providers 2005

Gamebird shoots (excluding grouse) maintain on average 8.9 ha of **cover crops**[49]. These provide food and shelter for game as well as other wildlife including many songbirds. An average lowland shoot for pheasants maintained 61 ha of woodland for pheasants. Woodland for shooting is managed differently than if it were managed solely as forestry. 'Spinneys' are small strips of trees and shrubs planted, usually in areas with little or no existing woodland. These contribute to landscape directly and offer additional wildlife habitat.

Participants were asked to comment to the best of their knowledge on the occurrence of habitat and wildlife management on the sites which they shot over.

A majority of shooting providers are actively carrying out such activities, particularly with respect to pest control, wildlife support and the creation and maintenance of cover crops, woodlands, hedgerows and field margins.

Occurrences of habitat and wildlife management practices carried out by shooting providers (%)

	Some Occurrence	Large Occurrence
Control of pests	70	47
Planting of cover crops for game	63	40
Creation / maintenance of woodlands	63	36
Small scale tree planting	59	22
Creation / maintenance of wide hedgerows	58	27
Creation / maintenance of wide field margins	55	29
Creation / maintenance of flight ponds	51	18
Creation / maintenance of conservation headlands	48	22
Creation / maintenance of wetlands	38	12
Creation / maintenance of beetle banks	22	4
Management of heather moorland	19	14
Number of respondents	*785*	*785*

Source: PACEC Survey of Participants 2005

A wide variety of habitat and wildlife management practices are associated with sporting shooting, designed to control pests, increase wildlife and provide habitats favourable for sustaining conditions suitable for quarry.

[49] **Cover Crops:** *crops (such as kale and millet) planted on game shoots to provide birds with food and shelter.*

Who carries out this habitat and wildlife management?

The amount of habitat and wildlife management undertaken depends very much on how the provision of shooting is organised. Thus shooting estates are much more likely to undertake greater areas of habitat and wildlife management than other organisational structures and this in part reflects the average area of the shooting site involved.

Average area of habitat and wildlife management undertaken for shooting (ha)

	Organisational Structure					
	All providers	Synd-icate	Club	Shoot Ten.	Ten. Farm	Estate
Mean	756	272	77	233	140	1,124
Number of respondents	*345*	*107*	*14*	*29*	*15*	*166*

See Appendix B1 for notes on rounding.
Source: PACEC Survey of Providers 2005

Clubs are more likely to share land (with other clubs) than other providers, so habitat and wildlife management of this land for shooting can be shared.

Do any other organisations provide sporting shooting on this site? (%)

	Organisational Structure					
	All providers	Synd-icate	Club	Shoot Ten.	Ten. Farm	Estate
Yes	7	5	**22**	0	5	8
No	93	95	**78**	100	95	92
Number of respondents	*443*	*120*	*23*	*34*	*21*	*212*

See Appendix B1 for notes on bold figures, multiple rows and rounding.
Source: PACEC Survey of Providers 2005

How would habitat and wildlife management change if sporting shooting were stopped?

If shooting were stopped:

- 21% of providers would manage their land in the same way
- 59% would manage habitats differently
- 20% would stop all habitat and wildlife management

Of the organisations likely to continue managing the land if shooting were stopped, estates were more likely to anticipate a change in habitat and wildlife management.

Only 21% of shooting providers would manage their land in the same way if sporting shooting stopped.

If sporting shooting were stopped, how would your land be managed? (%)

	Organisational Structure		
	All providers	Ten. Farm	Estate
Differently	37	31	40
Very differently	22	19	**28**
The same	21	19	**11**
Not managed	20	31	21
Number of respondents	*285*	*16*	*145*

See Appendix B1 for notes on bold figures, multiple rows and rounding.
Source: PACEC Survey of Providers 2005

4.3 Costs of environmental activities associated with sporting shooting

Key issues and questions

The following section looks at the financial costs of habitat and wildlife management carried out by shooting providers and it seeks to answer the following questions:

- What expenditure is required to carry out habitat and wildlife management for shooting purposes?
- What labour is required to carry this out?
- How is the management funded?
- What would be the costs of pest control in the absence of shooting?

What expenditure is required to carry out habitat and wildlife management for shooting purposes?

Shooting providers in the UK spend an estimated £250 million per year on habitat and wildlife management for sporting shooting (related labour, operational and capital spend, which are detailed below). Expenditure on habitat and wildlife management therefore represents over a quarter (29%) of all costs borne by shooting providers.

Expenditure on habitat and wildlife management represents over a quarter (29%) of all costs borne by shooting providers.

Breakdown of costs of habitat and wildlife management for sporting shooting (£m)

	Habitat & wildlife management costs	Sporting shooting costs
Staff Costs	140	190
Operation costs	49	580
Capital costs	57	84
Total costs	*250*	*850*
Share of sporting shooting	*29%*	*100%*

Source: PACEC (See Appendix B1 for notes on rounding)

Below are illustrations of operational and capital expenditure on habitat and wildlife management. Respondents were asked only to detail the expenditures attributable to sporting shooting, although some items may not be exclusively for habitat and wildlife management work (e.g. an estate vehicle used by the gamekeeper used for beaters on shooting days).

An estimated total of £21m was spent on habitat and wildlife management subcontractors. Expenditure on pest control subcontractors was considerably less (£2m), indicating that most pest control is carried out by shooting providers' employees or volunteers.

Breakdown of selected* operational expenditure on habitat and wildlife management for sporting shooting (£m)

	Total UK
Land mgt subcontractors	21
Trees for planting	8
Cover crop seed	12
Pesticide/Fertiliser	6
Pest Control subcontractors	2
Total operational land mgt spend	*49*

*Note that expenditure on elements of management, such as the felling, thinning, re-planting and new planting of woodland are not included.
Source: PACEC (See Appendix B1 for notes on rounding)

Shooting providers spend £11m per annum on fencing, which arguably may be specifically for sporting shooting purposes (such as in the case of **release pens**[50]), or indirectly for management (when fences are put up to manage deer).

The £7.9m invested in roads and tracks each year for shooting purposes may have knock on benefits for other users of the land such as walkers or farm workers.

Breakdown of selected capital expenditure on habitat and wildlife management for sporting shooting (£m)

	Total UK
Fencing*	11
Roads, Tracks	8
Vehicles	38
Total capital spend	*57*

*Excludes expenditure on fencing erected for other purposes (e.g. for livestock).
Source: PACEC (See Appendix B1 for notes on rounding)

[50] **Release Pens:** *on the majority of land where released pheasant shooting takes place release pens are erected for the protection of young birds.*

How much labour is required to carry out these activities?

An estimated 2.6 million work days are undertaken each year on habitat and wildlife management for shooting in the UK. This is the equivalent to 12,000 FTEs. Total estimated labour costs associated with this are £140 million[51]

The most labour intensive management is pest control, taking an estimated 3,100 FTE per year across the UK.

Breakdown of labour undertaken for habitat and wildlife management practices for sporting shooting (FTEs)

	Labour
Create or maintain conservation headlands	210
Create or maintain grass strips around fields	210
Create or maintain hedgerows	1,600
Create or maintain 'spinneys'	800
Retain overwinter stubbles	59
Plant cover crops	330
Create or maintain beetle banks	1,700
Maintain banks of streams and rivers	110
Maintain woodlands (coppicing, thinning)	2,400
Create or preserve wetlands	38
Create or maintain release pens	710
Remove trees to create glades / rides	300
Manage heather moorland	120
Create or maintain flight ponds	94
Pest control (to protect game and habitats)	3,100
Total	12,000

Source: PACEC (See Appendix B1 for notes on rounding)

Grouse shooting providers required the greatest labour input for habitat and wildlife management, with an average (mean) number of 558 days per shooting provider per annum.

On average, each shooting provider undertook 155 days work per year on habitat and wildlife management for sporting shooting. This is equivalent to 0.67 FTEs per annum.

Amount of labour required for habitat and wildlife management & conservation (days)

	Providers' Type of Quarry								
	Total	Driven	Walked Up	Grouse	Deer	Coastal wild fowl	Inland wildfowl	Avian pest	Mammalian pest
Mean	155	172	185	558	298	44	184	196	216
Number of respondents	*285*	*235*	*171*	*40*	*102*	*23*	*139*	*146*	*131*

See Appendix B1 for notes on bold figures, multiple rows and rounding.
Source: PACEC Survey of Providers 2005

[51] Labour costs estimated by multiplying FTEs by the survey average annual salary; £12,000.

How is habitat and wildlife management funded?

Most providers rely on a range of sources to fund habitat and wildlife management activities.

At present, a proportion of the costs of habitat and wildlife management are borne by the shooting provider. A quarter of shooting providers said that conservation paid for itself (23%). Most cited other sources of funds used to pay for the habitat and wildlife management activities outlined above. With 19% of respondents saying that funding came specifically from their own revenue and private funds, one must not disregard the private resources being invested.

The financing of habitat and wildlife management by shooting providers (%)

	Organisational Structure					
	All prov-iders	Synd-icate	Club	Shoot Ten.	Ten. Farm	Estate
Funding has to come from other sources (including public funds)	52	46	**20**	42	69	**58**
Conservation reaps its own rewards (e.g. shooting/woodland revenues)	23	**33**	27	29	23	**17**
Revenue and private funding	19	14	27	29	0	20
Private finance/grants	5	6	13	0	8	4
Volunteerism	1	0	13	0	0	0
Other / mixture	1	0	0	0	0	1
Number of respondents	*288*	*69*	*15*	*24*	*13*	*158*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Survey of Providers 2005

What would be the costs of controlling pest species in the absence of sporting shooting?

The anticipated costs of pest control without sporting shooting on the land were found to be on average £9,800 per year per provider. It should also be noted that in the absence of shooting, some pest control may no longer be necessary.

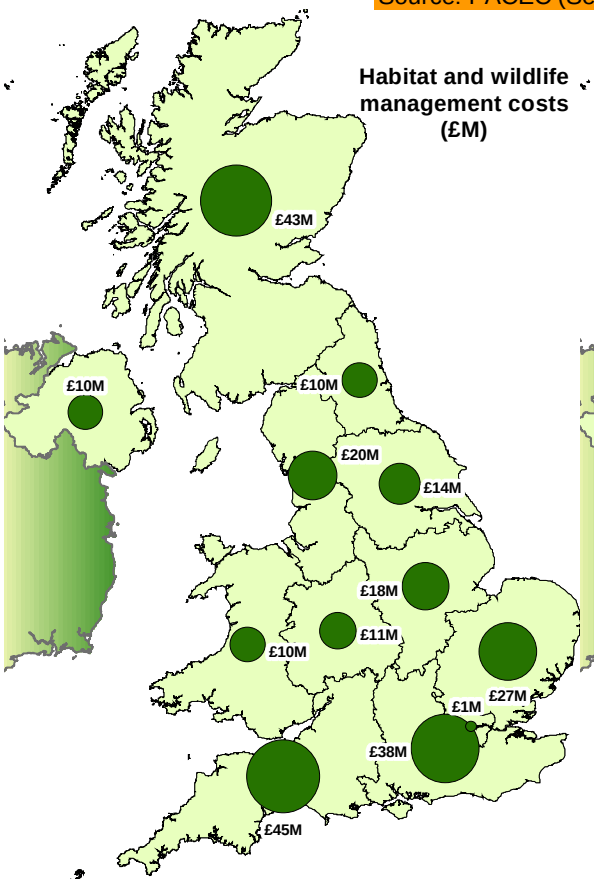
4.4 The environmental effects of shooting by region

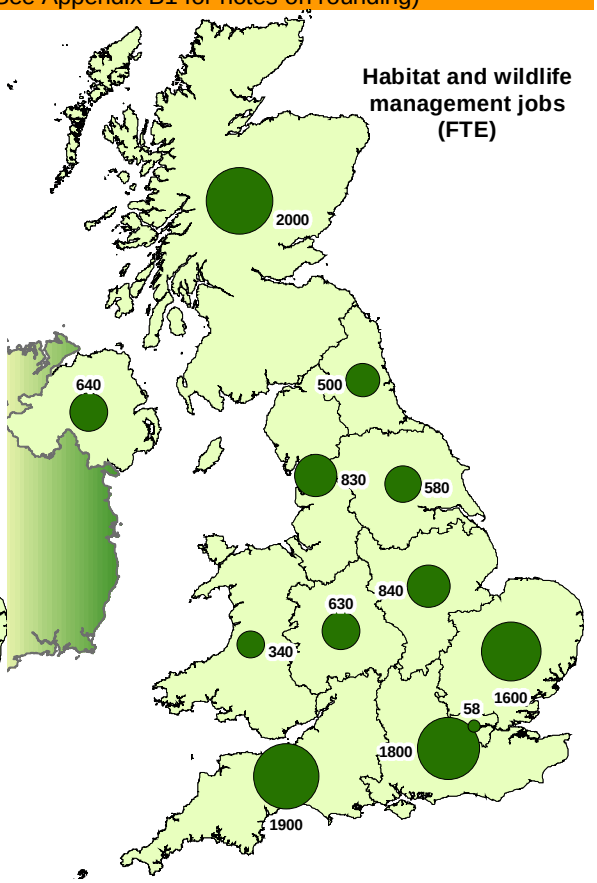
Higher regional labour inputs for environmental management usually correspond with greater areas of land managed.

The environmental effects of sporting shooting by UK country and region

Country/Region of England	Area influenced by shooting (000ha)	Area over which mgt for shooting takes place (000ha)	Costs of habitat & wildlife mgt for shooting (£m)	Labour for habitat & wildlife mgt for shooting (FTE)
South East	1,300	270	38.0	1,800
East	1,600	200	27.0	1,600
Gr. London	87	7	0.7	58
South West	2,000	220	45.0	1,900
West Midlands	650	73	11.0	630
East Midlands	780	96	18.0	840
York/Humber	560	130	14.0	580
North West	1,100	110	20.0	830
North East	650	98	9.6	500
England	8,600	1,200	180.0	8,800
Wales	500	42	9.6	340
Scotland	4,400	700	43.0	2,000
Northern Ireland	990	86	10.0	640
UK	15,000	2,000	250.0	12,000

Source: PACEC (See Appendix B1 for notes on rounding)





4.5 Summary of the environmental effects

What area of the UK is managed for sporting shooting?

Indeed, whether they manage the land solely for the purposes of shooting or more commonly, for a combination of reasons including shooting, shooting providers influence the management of **15 million ha** of land, **two thirds** of the area of rural land in the UK.

Specific habitat and wildlife management for shooting is carried out on **2 million ha** of land in the UK. This represents **8%** of the total land area of the UK, **13%** of rural land in the UK and an area the size of Wales. Around **40%** of this area is woodland.

What types of habitat and wildlife management are carried out?

Management activities range from the creation and maintenance of woodlands, hedgerows and banks, to the control of pests. The burning of moorland heather ('muirburn') is a practice specific to grouse moors.

The evidence suggests that habitat and wildlife management practices carried out for shooting are, in the majority of cases, dependent on the existence of shooting, whether this be because shooting provides the motivation, or the necessary funding.

What is the cost of such habitat and wildlife management practices?

Shooting providers in the UK spend an estimated **£250 million** per year on habitat and wildlife management practices specifically for sporting shooting (related labour, operational and capital spend). This is a significant cost, which represents 29% of providers' total expenditure. The cost may be funded all or in part by government grants or the provider themselves.

56% (£140 million) of this expenditure is on labour. A total of **2.7 million work days (12,000 FTEs)** are required each year to undertake all habitat and wildlife management on sporting shooting sites in the UK. In addition to work carried out by paid employees and subcontractors, shooting participants and other volunteers are also involved in such management.

5 Public perceptions of the environmental effects associated with sporting shooting

Recognising that shooting activities can have both negative and positive environmental effects, this chapter analyses perceptions of these impacts from an extensive survey of shooting providers, shooting participants and non-shooters. The inclusion of non-shooters is designed to avoid bias which could result from interviews with members of the shooting community alone. The analysis also provides the first attempt to place a monetary value on these environmental impacts.

5.1 Perceived effects of activities associated with sporting shooting

Key issues and questions

This first section aims to answer the following questions:

- What do shooting providers and participants believe are the positive and negative effects of habitat and wildlife management carried out for sporting shooting?
- What are the public's views of the effects of sporting shooting on the environment?
- What conclusions can be drawn from the views of shooters and non-shooters on the effects of sporting shooting on the environment?

What do shooting providers and participants believe are the positive and negative effects of habitat and wildlife management carried out for shooting?

The majority (82%) of providers cited no negative effects of shooting on flora and fauna.

Providers were asked to answer open ended questions regarding their perceived effects of habitat and wildlife management for sporting shooting. The majority (82%) of providers cited no negative effects of shooting on flora and fauna. Over half of these providers (55%) identified a positive effect of sporting shooting on songbirds. Other positive effects of habitat and wildlife management for shooting were the effects on flora (23%) and on birds of prey (15%) and insects (14%).

Amongst the negative effects cited were the reductions in numbers of corvid and pigeon on shooting land (9%) and other predator species, which may harm young gamebirds, such as foxes (7%).

Participants were asked which different types of habitat and wildlife management typically carried out for sporting shooting they believed to have a positive effect and the extent of such effects. A wide variety of habitat and wildlife management practices were identified as having some or large positive environmental impacts. Control of pests, increase in the amount of wildlife, creation or maintenance of woodlands, planting of cover crops, tending / planting of trees and hedgerows were the most frequently identified activities said to have significant positive effects.

A wide variety of positive environmental effects were identified by participants.

Aspects of habitat and wildlife management perceived by participants to have a positive effect on the environment (%)

	Some Positive Effect	Large Positive Effect
Control of pests	78	53
An overall increase in amount of wildlife	78	55
Creation / maintenance of woodlands	76	54
Planting of cover crops for game	75	48
Small scale tree planting	70	34
Creation / maintenance of wide hedgerows	69	43
Creation / maintenance of wide field margins	66	42
Creation / maintenance of flight ponds	62	32
Creation / maintenance of conservation headlands	57	35
Creation / maintenance of wetlands	45	24
Creation / maintenance of beetle banks	26	10
Management of heather moorland	24	19
Number of respondents	*589*	*589*

See Appendix B1 for notes on multiple rows and rounding.
Source: PACEC Survey of Participants 2005

Participants were asked to identify occurrences of a wide range of negative environmental effects associated with sporting shooting and whether such occurrences were typically large. In all sixteen potentially negative impacts were specified. The most frequently reported negative occurrence (76% of participants) was the failure to retrieve wounded birds. Proximity of shooting to buildings / people, deposition of lead shot, spent cartridges / clays and noise pollution were identified as negative occurrences by 50% or more of participants.

Some occurrences of environmental effects were identified by a significant proportion of participants. However, the proportion of participants identifying a large occurrence was very small.

Proportion of participants reporting the occurrence of various environmental aspects attributable to sporting shooting (%)

	Some Occurrence	Large Occurrence
Wounded birds not retrieved	76	1
Proximity of shooting to people / buildings	58	1
Deposition of lead shot	53	5
Spent cartridges / clays	51	3
Noise pollution	50	1
Released game or deer damaging habitat	49	4
Dead game on roads	47	2
Spread of disease among reared / captive birds	40	1
Dogs on private property flushing / retrieving game	37	1
Released game in people's gardens	35	0
Widespread use of electric fences	32	2
Spread of disease from reared to wild birds	21	0
Removal of trees for rearing of game	21	1
Wastage of bird / game carcasses on site	20	0
Vehicles blocking roads	18	0
Creation of car parks for shooters	17	2
Number of respondents	*785*	*785*

See Appendix B1 for notes on multiple rows and rounding.
Source: PACEC Survey of Participants 2005

The extent to which these occurrences were reported to have some negative effects on the environment was also explored.

For participants the activity of shooting itself was most closely associated with negative effects. Activities linked to provision of shooting opportunities were less frequently seen to give rise to negative environmental impacts.

Aspects perceived by participants to have some negative effect on the environment (%)

	Total
Deposition of lead shot	37
Noise pollution	36
Wounded birds not retrieved	36
Proximity of shooting to people / buildings	32
Spent cartridges / clays	31
Released game or deer damaging habitat	26
Dead game on roads	26
Spread of disease among reared / captive birds	22
Spread of disease from reared to wild birds	15
Released game in people's gardens	15
Dogs on private property flushing / retrieving game	15
Widespread use of electric fences	14
Wastage of bird / game carcasses on site	10
Vehicles blocking roads	8
Creation of car parks for shooters	7
Removal of trees for rearing of game	6
Number of respondents	*589*

See Appendix B1 for notes on multiple rows and rounding.
Source: PACEC Survey of Participants 2005

Participants were most aware about the negative effects of lead shot deposition (37%), noise pollution (36%), and wounded birds not being retrieved (36%), although few said these were large effects.

What are the public's views of the effects of sporting shooting on the environment?

The views of the public were sought as part of the survey for a contingent valuation study. This study was designed to assess the value of shooting to the environment using people's willingness to pay to retain the benefits associated with habitat and wildlife management practices for sporting shooting and their willingness to pay to avoid the aspects of the sport which they believe to have negative effects[52].

Of a total 625 people interviewed, 8% were shooters and the remainder non-shooters.

The sample was stratified by age, gender and area of residence and, of a total 625 people interviewed, 8% were shooters and the remainder non-shooters. The results are weighted to give estimates for the UK population. This weighting process gives rise to Effective Sample Sizes of 441 for which the associated margin of error is + or – 5 percentage points.

The contingent valuation questionnaire did not label the environmental effects of sporting shooting as either negative or positive. Instead, it asked respondents to identify which they regarded as negative and which they regarded as positive and to rate these on a scale.

When respondents were asked about their views on selected aspects of sporting shooting, a third (32%) remained neutral and a quarter (23%) allocated a mixture of positive and negatives.

[52] The study is an environmental study, and not a moral study, so only one question was asked in the survey about moral objections to sporting shooting - which were held by 34% of the population.

There were no significant differences between the views of respondents living in rural and urban areas.

Views about nuisance, waste, cover crops, release pens, pest control, woodlands and spinneys (%)

	Where Respondent Lives					
	Total	Rural village[53]	Small rural town[54]	Larger market town[55]	Regional city[56]	Urban / Suburban[57]
Neutral	32	12	35	37	36	32
Only positives	31	56	43	26	25	23
Mixture of positives and negatives	23	29	16	21	24	24
Only negatives	14	2	6	16	15	21
Effective Sample Size of respondents	*441*	*129*	*132*	*119*	*94*	*109*

See Appendix B1 for notes on rounding.
Source: PACEC Contingent Valuation Survey 2005

These results are also shown below by respondents' activities in the countryside. Users are classified as shooters, walkers, nature observers or workers in the countryside.

Discounting shooters, countryside users saw much more positive value in shooting compared to non countryside users.

Views about nuisance, waste, cover crops, release pens, pest control, woodlands and spinneys (%)

	Activities in the Countryside					
	Total	Shoot[58]	Other users			Non-Users[62]
			Walk[59]	Nature[60]	Work[61]	
Neutral	32	**1**	**19**	**6**	**0**	**58**
Only positives	31	**76**	**38**	**46**	**67**	**14**
Mixture of positives and negatives	23	**23**	**30**	**36**	31	**11**
Only negatives	14	0	13	12	3	17
Effective Sample Size of respondents	*441*	*51*	*282*	*120*	*33*	*128*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

[53] **Rural Village:** *A village with a population of 2,000 near the case study shooting site*

[54] **Small Rural Town:** *A town with a population of 11,000 near the case study shooting site*

[55] **Larger Market Town:** *Grantham (population 31,000)*

[56] **Regional City:** P*eterborough*

[57] **Urban/Suburban:** *Greenwich, London*

[58] **Shooter:** *Those typically visiting landscapes, with similar characteristics as that illustrated on the contingent valuation information sheet, as a shooter.*

[59] **Walker:** *Those typically visiting shooting landscapes as a walker.*

[60] **Nature Observer:** *Those typically visiting shooting landscapes as a nature observer.*

[61] **Worker:** *Those typically visiting shooting landscapes as part of their work on a farm or estate.*

The majority (63%) of respondents identified no negative issues.

The majority (63%) of respondents identified no negative issues. 11% did not specify their most important negative issue. Of those who did identify their most important negative, release pens were the most frequently cited (19% of all respondents).

Although the majority of countryside users listed no specific negatives of shooting, the most frequently cited was the presence of release pens.

Most important negative issue cited (%)

	Activities in Countryside					
	Total	Shoot	Other users			Non-Users
			Walk	Nature	Work	
No negatives	63	**77**	**57**	**52**	67	**73**
Release pens	19	**2**	**22**	24	**3**	**13**
Most important not specified	11	19	12	13	22	11
Pest control	3	0	3	4	0	2
Nuisance[63]	2	0	3	**5**	3	1
Waste[64]	1	2	1	1	6	1
Cover crops	1	0	2	0	0	0
Woodlands	0	0	0	0	0	0
Effective Sample Size of respondents	*441*	*51*	*282*	*120*	*33*	*128*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

[62] **Non Countryside Users:** *Those who have never visited landscapes with similar characteristics as that illustrated on the contingent valuation information sheet.*

[63] **Nuisance:** *refers to the noise of guns; the possibility of dogs straying onto neighbouring areas; and the regular movement of vehicles leading to mud and congestion on lanes and tracks.*

[64] **Waste:** *can include any un-retrieved cartridges, deposition of lead shot on the site or neighbouring properties, or dead birds found on neighbouring roads or properties.*

On average, across non-shooting countryside users, over 57%[65] citied woodlands as being the most positive benefit of shooting. Non countryside users only cited woodland in less than 20% of cases.

Overall 46% of respondents identified no positive environmental effects associated with shooting.

Most important positive issue cited (%)

	Activities in Countryside					
	Total	Shoot	Other Users			Non-Users
			Walk	Nature	Work	
No positives	46	**1**	**32**	**18**	**0**	**75**
Woodlands	38	**52**	**47**	**64**	**62**	**19**
Most important not specified	6	4	7	4	**15**	4
Pest control	4	**15**	**5**	5	7	**1**
Spinneys	4	**11**	5	6	**12**	2
Cover crops	2	**9**	3	3	0	0
Release pens	1	8	1	0	3	0
Effective Sample Size of respondents	*441*	*51*	*282*	*120*	*33*	*128*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

Over three quarters (80%) of respondents regarded nuisance as a neutral issue.

View of nuisance e.g. gun noise[66] (%)

	Activities in Countryside					
	Total	Shoot	Other Users			Non-Users
			Walk	Nature	Work	
Major negative	5	0	6	7	0	4
Minor negative	10	11	12	**18**	20	7
Neutral	80	**65**	**76**	**67**	**52**	**89**
Minor positive	2	**9**	3	**5**	8	**0**
Major positive	2	**14**	3	3	19	**0**
Effective Sample Size of respondents	*441*	*51*	*282*	*120*	*33*	*128*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

[65] Average of non-shooting countryside users citing woodlands as a positive (i.e. (47+64+62)/3)

[66] It may be surprising to find that some respondents regarded nuisance as a positive feature. Respondents who gave this answer typically viewed all aspects of sporting shooting as positive.

A similar proportion remained neutral on their view of waste (83%).

View of waste e.g. un-retrieved cartridges[67] (%)

	Activities in Countryside					
	Total	Shoot	Other Users			Non-Users
			Walk	Nature	Work	
Major negative	4	0	4	6	0	5
Minor negative	8	12	10	13	**18**	5
Neutral	83	**63**	**79**	**74**	**57**	**90**
Minor positive	2	**10**	3	4	8	**0**
Major positive	2	**15**	4	3	17	**0**
Effective Sample Size of respondents	*441*	*51*	*282*	*120*	*33*	*128*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

Excluding shooters, countryside users appreciated the value of game crops significantly more than non-users.

View of cover crops (%)

	Activities in Countryside					
	Total	Shoot	Other Users			Non-Users
			Walk	Nature	Work	
Major negative	4	0	4	5	0	4
Minor negative	5	0	6	4	3	4
Neutral	65	**13**	**56**	**48**	**17**	**83**
Minor positive	18	**39**	**22**	**29**	**43**	**9**
Major positive	8	**48**	**11**	**13**	**37**	**0**
Effective Sample Size of respondents	*438*	*51*	*283*	*118*	*34*	*127*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

Most countryside users were neutral about release pens although walkers and nature watchers were more likely to view them negatively than countryside workers.

View of release pens (%)

	Activities in Countryside					
	Total	Shoot	Other Users			Non-Users
			Walk	Nature	Work	
Major negative	15	**0**	18	17	**0**	11
Minor negative	17	**6**	19	21	10	14
Neutral	55	**34**	**48**	**43**	**35**	**72**
Minor positive	8	**30**	9	12	**26**	**3**
Major positive	4	**30**	**7**	8	**29**	**0**
Effective Sample Size of respondents	*440*	*51*	*281*	*117*	*34*	*128*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

[67] It may be surprising to find that some respondents regarded waste as a positive feature. Respondents who gave this answer typically viewed all aspects of sporting shooting as positive.

The views on pest control show a clear split across the user groups. While shooters and other countryside users were likely to cite pest control as a positive, non-users were more likely to label it as a negative, although the majority (72%) were neutral.

View of pest control (%)

	Activities in Countryside					
	Total	Shoot	Other Users			Non-Users
			Walk	Nature	Work	
Major negative	8	**0**	8	11	0	9
Minor negative	10	**0**	10	10	5	12
Neutral	53	**11**	**43**	**37**	**5**	**72**
Minor positive	20	**41**	**27**	**30**	**51**	**6**
Major positive	9	**48**	**12**	12	**39**	**1**
Effective Sample Size of respondents	*440*	*51*	*281*	*118*	*34*	*128*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

All groups regarded the effect of shooting on woodland as neutral/positive.

View of woodlands (%)

	Activities in Countryside					
	Total	Shoot	Other Users			Non-Users
			Walk	Nature	Work	
Major negative	3	0	3	**6**	0	3
Minor negative	1	0	0	0	0	2
Neutral	43	**1**	**29**	**13**	**3**	**71**
Minor positive	28	24	**33**	**37**	33	**17**
Major positive	26	**75**	**34**	**44**	**65**	**8**
Effective Sample Size of respondents	*441*	*51*	*282*	*120*	*33*	*128*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

Again, spinneys received more positive answers than negative and the results fall in a similar pattern to those of woodlands.

View of spinneys (%)

	Activities in Countryside					
	Total	Shoot	Other Users			Non-Users
			Walk	Nature	Work	
Major negative	3	0	3	**6**	0	3
Minor negative	1	0	0	0	0	2
Neutral	49	**2**	**38**	**20**	**3**	**76**
Minor positive	29	30	**35**	**45**	**45**	**17**
Major positive	18	**68**	**24**	**29**	**52**	**3**
Effective Sample Size of respondents	*441*	*51*	*282*	*120*	*33*	*128*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

What conclusions can be drawn from the views of shooters and non-shooters on the effects of sporting shooting on the environment?

It is evident, when compared to those of non-shooters that there is bias among shooters with regard to the effects of sporting shooting. However, there are a number of views which are common amongst both shooters and non-shooters and may be accurate impressions of the effects of the sport. There was a notable difference in opinions between those who regularly use the countryside and those who do not. Discounting shooters, countryside users saw much more positive value in shooting compared to non countryside users.

5.2 Monetary valuation of these effects, both benefits and dis-benefits

Unlike most goods and services where benefits are measured by market prices which reflect what people are willing to pay, in the case of benefits derived from environmental improvements (or damage), no such market exists. A particularly novel feature of this study is to place a monetary value of these benefits using a contingent valuation approach.

Expressions of willingness to pay were used as an estimation of the valuation of the environmental effects attributable to sporting shooting.

The contingent valuation method assesses people's willingness to pay to retain the benefits associated with habitat and wildlife management for sporting shooting and their willingness to pay to avoid the aspects of the sport which they believe to have negative effects.

These expressions of willingness to pay were used to estimate the value of the environmental effects attributable to sporting shooting, and are detailed in this section. The valuations are broken down as follows:

Key issues and questions

- How do shooters and non-shooters value the negative effects of sporting shooting on the environment?
- How do shooters and non-shooters value the positive effects of sporting shooting on the environment?

How do shooters and non-shooters value the negative effects of sporting shooting on the environment?

Two thirds (64%) of respondents said there were no negatives associated with sporting shooting. Overall, 85% saw no need to contribute to a fund to reduce negative effects.

15% of respondents were willing to contribute to a fund which would control the negative effects of shooting, including a significantly higher proportion of those living in urban areas (26%).

Willingness to contribute to the funding of control of negatives of sporting shooting (%)

	Where Respondent Lives					
	Total	Rural village	Small rural town	Larger market town	Regional city	Urban / Suburban
There are no negatives	64	69	**78**	63	62	57
Not willing to fund negatives	21	15	**11**	23	**31**	17
Willing to fund negatives	15	16	11	13	**7**	**26**
Effective Sample Size of respondents	*436*	*129*	*132*	*119*	*91*	*107*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

A statistically higher proportion of those walking or observing nature on shooting land said that they would contribute to such a fund, which is understandable given the implications for their occupations.

Willingness to contribute to the funding of control of negatives of sporting shooting (%)

	Activities in Countryside					
	Total	Shoot	Other Users			Non-Users
			Walk	Nature	Work	
There are no negatives	64	**77**	**58**	**53**	67	**74**
Not willing to fund negatives	21	15	23	23	18	**15**
Willing to fund negatives	15	8	**19**	**24**	16	11
Effective Sample Size of respondents	*436*	*51*	*278*	*118*	*33*	*126*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

Predictably (given that 77% did not identify any negatives) of those using the land, shooters were least likely to want to contribute to a fund controlling the negative aspects of their sport.

The average (mean) contribution cited was £4.20.

Of the 15% of respondents willing to pay to control the negative effects of the sport, the average (mean) contribution cited was £4.20 and the maximum contribution cited was £700.

The average (mean) contributions varied across user and non-user groups, from as little as £1.90 for non-users to as much as £16.10 for workers.

Amount which respondents were willing to contribute each year to the control of negatives of sporting shooting (£)

	Activities in Countryside					
	Total	Shoot	Other Users			None
			Walk	Nature	Work	
Maximum	700.0	400.0	700.0	400.0	400.0	100.0
Average (Mean)	4.2	**8.2**	**5.9**	**5.6**	**16.1**	**1.9**
Typical (Median)	0.0	0.0	0.0	0.0	0.0	0.0
Minimum	0.0	0.0	0.0	0.0	0.0	0.0
Number of Respondents	*459*	*37*	*272*	*109*	*14*	*156*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

The variation in average (mean) contribution across residence areas was not as marked, ranging from £0.20 for those living in regional cities to £10 for urban/suburban dwellers.

Amount which respondents were willing to contribute each year to the control of negatives of sporting shooting (£)

	Where Respondent Lives					
	Total	Rural village	Small rural town	Larger market town	Regional city	Urban / Suburban
Maximum	700.0	400.0	40.0	20.0	4.0	700.0
Average (Mean)	4.2	**5.7**	**1.2**	**0.9**	**0.2**	**10.0**
Typical (Median)	0.0	0.0	0.0	0.0	0.0	0.0
Minimum	0.0	0.0	0.0	0.0	0.0	0.0
Number of Respondents	*459*	*62*	*67*	*49*	*138*	*143*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

How do shooters and non-shooters value the positives of sporting shooting on the environment?

53% of respondents identified positive issues. Perhaps understandably, given their lack of direct personal benefits, non-users of the land were not so willing to fund the positive aspects (9%). This was also largely because 77% of this group identified no positive aspects of sporting shooting.

Countryside users who did not shoot recognised positive aspects and a willingness to pay for them.

Willingness to contribute to fund the positive effects of sporting shooting (%)

	Activities in Countryside					
	Total	Shoot	Other Users			None
			Walk	Nature	Work	
Willing to fund positives	30	**65**	**41**	**48**	**61**	**9**
Not willing to fund positives	23	35	**27**	**34**	36	**14**
There are no positives	46	**1**	**32**	**19**	**3**	**77**
Effective Sample Size of respondents	*439*	*51*	*280*	*118*	*33*	*126*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

The average (mean) response was the same as for controlling the negative aspects; £4.20 pa.

Of those who were willing to contribute to ensure the continuing existence of the positive aspects of sporting shooting (131), the average (mean) response was the same as for controlling the negative aspects; £4.20 per annum.

Of those using the land, those working or shooting on the land gave the greatest average (mean) contributions of £53.60 and £29.10 respectively. Non-users' willingness to pay for the positive aspects was typically lower, with an average (mean) of just £0.40 per annum.

Amount which respondents were willing to contribute each year to fund the positives of sporting shooting (£)

	Activities in Countryside					
	Total	Shoot	Other Users			None
			Walk	Nature	Work	
Maximum	700.0	700.0	400.0	400.0	700.0	20.0
Average (Mean)	4.2	**29.1**	**5.3**	**9.1**	**53.6**	**0.4**
Typical (Median)	0.0	7.0	0.0	0.0	4.0	0.0
Minimum	0.0	0.0	0.0	0.0	0.0	0.0
Number of Respondents	*459*	*37*	*273*	*109*	*14*	*154*

See Appendix B1 for notes on rounding.
Source: PACEC Contingent Valuation Survey 2005

Amount which respondents were willing to contribute each year to fund the positives of sporting shooting (%)

	Activities in Countryside					
	Total	Shoot	Other Users			None
			Walk	Nature	Work	
Not willing to pay	70	**35**	**59**	**52**	**39**	**91**
10p	2	0	3	2	3	1
20p	2	0	**3**	1	0	**0**
40p	2	1	2	1	0	1
70p	0	0	0	0	0	0
£1	5	2	6	**9**	0	3
£2	4	6	5	4	8	**0**
£4	4	4	5	6	3	3
£7	1	10	2	**3**	0	0
£10	3	4	5	**8**	10	**0**
£20	4	**20**	**6**	**8**	**18**	**1**
£40	2	**9**	**3**	**5**	5	0
£70	0	4	1	2	3	0
£100	0	1	0	0	2	0
£400	0	2	0	1	6	0
£700	0	1	0	0	3	0
Effective Sample Size of respondents	*438*	*51*	*279*	*118*	*33*	*126*

See Appendix B1 for notes on bold figures and rounding.
Source: PACEC Contingent Valuation Survey 2005

Conclusions

The average (mean) contributions for both the existence of positive and control of negative aspects were identical (£4.20). Although the number willing to contribute to a positive fund was greater, the level of their contributions was generally lower, perhaps because they are used to these aspects being supplied currently without the need for public funding. However, the small percentage (of largely urban dwellers) who felt strongly enough about the negatives to volunteer to fund their control were more likely to contribute greater sums, illustrating their resistance to such aspects.

The net position of those interviewed was neutral.

Thus, the balance between the average (mean) willingness to pay to retain the benefits associated with habitat and wildlife management practices for sporting shooting and the average (mean) willingness to pay to avoid the aspects of the sport which they believe to have negative effects suggests that the net position of those interviewed was neutral. Indeed, this result

corresponds to the large number of respondents who chose to remain neutral on a number of issues.

Comparing non-users' willingness to pay to retain the positive effects and their willingness to pay to avoid the negative effects, it is clear that those who are not in contact with the countryside are more willing to pay to control the negatives (a mean of £1.90) than to ensure the continuation of the positives (a mean of £0.40). In contrast, for those working in the countryside their willingness to pay to preserve the positives (a mean of £53.60) far outweighed their willingness to pay to control the negatives (a mean of £16.10).

5.3 Summary of public perceptions

What are shooters and non-shooters views of the effects of sporting shooting on the environment?

The effects of sporting shooting cited by respondents included positive effects, such as increases in wildlife and the creation and maintenance of woodland, and negatives, such as the deposition of lead shot and dead birds found on roads and neighbouring land. Although shooters' responses were more biased towards the positive aspects, non-shooters were also found to identify more positive than negative effects resulting from the sport.

How do shooters and non-shooters value the effects of sporting shooting on the UK environment?

The average (mean) contribution cited by shooters and non-shooters for the continued existence of positive effects associated with sporting shooting was the same as the average (mean) value placed on the control of the negative aspects resulting from the sport; **£4.20** per annum. This balance suggests that the net position of those interviewed is neutral.

Non-users of the countryside were willing to pay more to control the negatives (a mean of £1.90) than to ensure the continuation of the positives (a mean of £0.40). Conversely, countryside users were more willing to pay more to preserve the positives rather than to control the negatives.

Appendix A Survey methodology

A1 Introduction

A1.1 The purpose of the surveys of participants and providers was to look at the employment and monetary flows of those responsible for providing shooting opportunities and those participating in the sport, so as to assess the direct, indirect and induced impacts of the sport on the UK economy. In other words, this information was gathered to inform the modelling of the impacts of the sector and to calculate the total number of jobs and revenue generated by the sector across all associated activities.

A1.2 In addition to the economic impact of sporting shooting, the surveys were also used to assess the environmental impacts of sporting shooting by asking providers and participants a series of questions relating to the land management practices attributable to the shooting taking place. As well as giving results which could then be aggregated for the benefit of the study, these questions also informed the construction of the contingent valuation questionnaire.

A1.3 The facility to shoot and stalk is provided by owners of land and sporting rights, who may grant access to shoot over their land. In many cases, the land is subject to special management for this purpose. However, the 'providers' are not necessarily owners; they may be lessees, with a specific interest in the sporting rights. For the purposes of this study, providers were taken to include landowners, shoot managers, gamekeepers and farmers based on the shoot site, or the club captain/secretary of a shooting club. Where there was more than one person involved in the provision of shooting activities, it was suggested that those in key roles worked together to fill in the questionnaire, especially as the financial and land management aspects of the questionnaire may best be filled in by two different people.

A1.4 For the purposes of this study, participants were taken to be Guns who shoot any type of quarry across the UK.

A1.5 The purpose of the 'supplier' survey was to look at the employment and monetary flows of businesses associated with the sporting shooting sector, to inform the modelling of the indirect, induced and other knock-on impacts of sporting shooting activities. In other words, this information was gathered in order to calculate the total number of jobs and revenue generated by the sector across all associated activities. With this in mind, the businesses we interviewed encompassed suppliers to providers and participants alike at both ends of the supply chain. For example, game farms supplying providers with reared game through to game dealers purchasing shot game from providers for processing and onwards sale.

Questionnaire design

A1.6 The design of the provider, participant and supplier questionnaires drew on information gathered from stakeholder interviews, literature reviews and other desk top research. These draft questionnaires were then piloted informally during the first phase of the case study research.

Quick sections

A1.7 Following the informal pilot of the provider and participant questionnaires, a 'quick' section was incorporated in each questionnaire in order to cover the key elements of both the participants and providers surveys (which were used for grossing up). This element was designed with the following in mind:

- Non response of long detailed questionnaires can cause problems with our estimate of the grossed up size of sporting shooting. Very large organisations may be unwilling to give **detailed** information. Larger organisations may be particularly suffering from survey **fatigue**. Very small organisations may be unwilling to spend a long **time** giving information. Each of them may be willing to fill in the shorter less intrusive questionnaire.
- The vast majority of providers are themselves participants, so including a small number of participant questions to providers is useful. A small number of participants may be providers, so asking a small number of provider questions to participants is useful, particularly in identifying the smaller and/or more informal providers.
- The quick section enabled respondents to request an alternative questionnaire if they were sent the wrong version in cases when the status of the sample was unknown.
- It was possible for self selected groups to fill in full questionnaires. These were not be used for grossing up purposes (for which the five minute version responses from our stratified samples were used), but to refine our estimates of the more detailed variables in the full questionnaire.

A1.8 The 'quick' section of the provider and participant questionnaires contained the following features:

- Questions regarding the respondent's membership of the organisations which are providing the data. This allowed for estimates of double counting to take place.
- Providers were asked how many key people were involved in running the provider organisation. These key people are: Shoot manager, Shoot Secretary/captain, Landowner, Tenant and Stalker/gamekeeper. This was required, given that we could potentially have contacted a provider organisation via a number of sources (e.g. gamekeeper and landowner) and we needed to be aware of this when grossing up.

A1.9 In the same way that the provider and participant questionnaires were given a 'quick' section, a 'quick' option was also given in the supplier questionnaire. Suppliers were given the option of completing just the first two sections, estimated to take only ten minutes. The first two sections covered all key data for grossing up purposes. The remaining three sections asked for detailed information concerning jobs, operational and capital expenditure.

Snowball sampling strategy

A1.10 At an early stage it was understood that a key problem with this study would be estimating the number of providers and participants who were not members of any of the organisations which would allow us to undertake field research. In order to deal with this issue a "snowball" sampling strategy was devised as follows:

- Providers were asked for an estimate of the % of participants who would not be a member of any of the databases used in our study. Providers were then asked for a representative sample of such participants. These Participants would then be sent questionnaires.
- Participants were asked whether they estimate that some of their sporting shooting was provided by an organisation not covered by any of the databases used in our study. Participants were then asked for the names and contact details of such providers. These Providers would then be sent questionnaires.
- In both cases the estimates made by the original providers and participants (as to membership of databases of participants and providers) would be checked against the information given by the "snowball" participants and providers.

A1.11 Unfortunately only one provider and one participant were willing to give names and contact details of participants and providers, so this strategy failed. However, the problem of estimating "non member" provider and participants was dealt with through being able to send questionnaires to shotgun certificate holders via the Association of Chief Police Officers (ACPO).

A2 Sampling strategy

Providers and participants

A2.1 Providers and participants were accessed primarily through a number of membership databases which were made available to us, either directly or indirectly. We sent questionnaires to random stratified samples from each database and then grossed up, taking account of the overlap of the databases.

A2.2 The extraction of contact details and surveying of providers and participants was approached as follows:

- All samples were selected as random stratified samples using any proxy for amount of sporting shooting (if available), followed by location.
- The information sent to PACEC was either the **full** database, (which allowed PACEC to select the sample using all available information), or the **sample** (which allowed PACEC to de-duplicate the surveys), or **none** (which some database holders have preferred to do for operational or confidentiality reasons).
- In cases where recipients were almost certain to be providers, they were sent the providers questionnaire. In cases where recipients are very unlikely to be providers they were sent the participants questionnaire and in cases where there is a fair chance that they might be providers (e.g. CLA, SRPBA, BDS) they were randomly sent either Provider or Participant questionnaires.

- In cases where PACEC was sending out the questionnaires or organisations were willing, samples were sent out in two halves. Depending on the returns from the first half of the survey, the balance in the second half between different databases was changed, as was the balance between different surveys (Provider or Participant). There was also the option to reduce the sample if the response rates were particularly high or the targets of 1,000 replies to each survey were being met.
- Each questionnaire sent out had an identification code on it to show which database the contact was drawn from, to allow for grossing up.
- Respondents were encouraged to complete the questionnaires in full by entering all such respondents into a prize draw to win a box of wine. This was designed to boost response rates, especially given the large size of the full questionnaires.

A2.3 All provider and participant questionnaires were distributed by post. The organisations which have helped us to access potential questionnaire respondents are as follows:

Association of Deer Management Groups (ADMG)

British Association for Shooting & Conservation (BASC)

British Deer Society (BDS)

Countryside Alliance

Country Land and Business Association (CLA)

Greater Exmoor Shoots Association (GESA)

Forestry Commission Scotland

Game Conservancy Trust (GCT)

Good Shoot Guide

Game Trust, Northern Ireland

National Gamekeepers Organisation (NGO)

Scottish Gamekeepers Association (SGA)

Scottish Rural Property and Business Association (SRPBA)

Union of Country Sports Workers (UCSW)

Ulster Farmers

Shooters Rights Association

A2.4 In addition, participant questionnaires were sent out to shotgun certificate holders (via the Association of Chief Police Officers – ACPO), which makes this study unique. The ability to use contact information from an organisation which is not a sporting shooting organisation makes the study both more comprehensive and more objective. The following constabularies sent questionnaires out on our behalf:

- Essex
- Norfolk
- Surrey
- Tayside
- Greater Manchester
- Fife

- North Wales
- Staffordshire

A2.5 Unsuccessful attempts were made to send questionnaires to members of other organisations (most notably the National Farmers Union, Shotgun certificate holders in other ACPO regions, and Firearms certificate holders – covering the use of air rifles).

A2.6 In the case of membership lists where it was not clear whether members would be providers or participants (such as the CLA, SRPBA) a mixture of provider and participant questionnaires were sent to the contact lists, in a ratio which seemed appropriate to the members' known characteristics. For example, in the case of the CLA, where member samples were grouped according to the size of holding, it was believed that owners of larger holdings, if they were shooters, were more likely to be providers. The proportion of provider questionnaires sent to CLA members was therefore greater for owners of larger holdings than for smaller holdings, who received a greater proportion of participant questionnaires. Within these groupings, the distribution of provider and participant questionnaires was random.

A2.7 The response rates to the first sets of mailings were analysed in order to ascertain whether the response rate from a given contact list's first mailing was significant and included a relatively high percentage of shooters and, where applicable, whether the proportions ascribed to provider and participant questionnaires were correct. On the basis of this information, some membership organisations were then asked to send out the second half of their selected sample of contacts and the proportion of provider and participant questionnaires was varied according to responses from the previous mailing. Generally, the proportions used originally were a close match with the population represented in the completed questionnaires.

A2.8 It was not possible to conduct telephone prompts to increase the response rates because in most cases for reasons of confidentiality we did not have the contact lists (the organisations themselves sent out the questionnaires).

A2.9 Respondents who received a provider questionnaire were also given the opportunity to request a copy of the participant questionnaire. 62 respondents took up this option. Furthermore, an article in Smiths Gore's newsletter; 'Landscope' encouraged a small number of people to contact us for a copy of the participant questionnaire.

A2.10 Members[68] of the Association of Deer Management Groups (ADMG) were sent a copy of the provider questionnaire as well as a supplementary questionnaire on deer management in Scotland. Despite being sent two questionnaires, members of the Association who responded tended to answer both questionnaires in full and a number also requested a participant questionnaire. The ADMG's increased sample size did not negatively impinge on our grossing up strategy but had the effect of

[68] Members of the Association of Deer Management Groups are deer management groups rather than individuals.

reducing the margins of error in the estimates of Scottish Deer Stalking. Similarly the research undertaken in the Exmoor National Park by the Greater Exmoor Shoots Association reduced the margins of error in the estimates of Pheasant Shooting in the South West.

Suppliers

A2.11 A database of suppliers was complied from numerous sources (including online databases, game fair programmes, shooting magazines and the survey of participants and providers). The database was designed to cover all categories of supplier that might be involved with the sporting shooting sector (as identified by the survey of participants and providers).

A3 Fieldwork

Pilot – providers and participants

A3.1 The provider and participant questionnaires were piloted using copies of the questionnaires with and without the 'quick' section, in order to compare response rates from each type of questionnaire. The pilot was designed to assess whether the inclusion of a 'quick' section boosted responses rates and/or reduced the number of questionnaires completed in full.

A3.2 The data sets used for the pilot were the Countryside Alliance data sets, given that PACEC had access to the data and could control the number and timing of questionnaires sent out. Members of the Scottish Gamekeepers Association were also recipients of the pilot questionnaire, given that the Association was due to send out a mailing in mid May. The results are given in the following table.

Table A3.1 Quick section pilot test

	Quick section	No Quick section
Questionnaires sent out	226	226
Total replies	58	31
Quick replies	19	3
Full replies	37	28
Total replies / number sent out	25%	14%
Full replies /number sent out	16%	12%

Source: PACEC

A3.3 We decided on the universal usage of the 'quick' version of the questionnaire and the cessation of testing of the 'non-quick' version, on the basis of the following results:

- We are 99% sure that we get a better response rate with the 'quick' version of the questionnaires
- There is no evidence that the number of fully filled in questionnaires decreases with the 'quick' versions of either questionnaire.

Pilot – suppliers

A3.4 The supplier questionnaire was piloted by telephone using 20 contacts taken from across all categories of associated suppliers. The pilot was designed to assess whether the questionnaire worked in its current form. Of the 20 contacted, 7 questionnaires were completed. However, respondents experienced difficulties filling in the final two questions on expenditure and these were often left blank.

A3.5 Following the pilot, it was decided that the supplier questionnaire should be a postal survey, given that suppliers will find it useful to have their management accounts in front of them in order to complete the questionnaire. Some changes were also made to the content of the questionnaire.

Main survey

A3.6 A total of 10,045 providers and participants questionnaires were sent out via 20 organisations as shown in the following table.

Table A3.2 Questionnaires sent out: providers and participants

Source of Contact details	Pop-ulation	Particip't Quest're sent	Provider Quest're sent	Total Quest're sent	Quest're sent /Pop'n
Association of Chief Police Officers	654,061	800	0	800	0.1%
Association of Deer Management Groups	400	0	400	400	100.0%
British Association for Shooting & Conservation	111,838	1,171	630	1,801	1.6%
British Deer Society	6,000	25	25	50	0.8%
Countryside Alliance – Members	102,405	452	25	477	0.5%
Countryside Alliance – Supporters	100,000	125	0	125	0.1%
Campaign For Shooting (Countryside Alliance)	26,000	500	1,000	1,500	5.8%
Country Land and Business Association	38,065	603	417	1,020	2.7%
Greater Exmoor Shoots Association	1,500	500	65	565	37.7%
Shooting lease holders on Forestry Commission Scotland land	46	40	6	46	100.0%
Game Conservancy Trust	20,500	400	400	800	3.9%
Good Shoot Guide	159	0	50	50	31.4%
Game Trust	Figures cannot be disclosed				
National Gamekeepers Organisation	9,800	50	1,000	1,050	10.7%
Scottish Gamekeepers Association	3,100	0	200	200	6.5%
Scottish Rural Property and Business Association	3,000	25	200	225	7.5%
Union of Country Sports Workers	5,000	100	100	200	4.0%
Ulster Farmers	12,700	50	50	100	0.8%
Shooters Rights Association	4,000	150	0	150	3.8%
Other (Pilot, case study, self selection)	Figures cannot be disclosed				
Total		*5,011*	*5,058*	*10,069*	

Source: PACEC

A3.7 A total of 2,096 providers and participants questionnaires were filled in – an overall response rate of 21% as shown in the following table.

Table A3.3 Response rates: providers and participants

Source of Contact details	Total sent	Partici't received	Provider received	Total received	Received /Sent
Association of Chief Police Officers	800	101	0	101	13%
Association of Deer Management Groups	400	1	75	76	19%
British Association for Shooting & Conservation	1,801	246	180	426	24%
British Deer Society	50	14	0	14	28%
Countryside Alliance – Members	477	92	6	98	21%
Countryside Alliance – Supporters	125	21	1	22	18%
Campaign For Shooting (Countryside Alliance)	1,500	100	232	332	22%
Country Land and Business Association	1,020	82	64	146	14%
Greater Exmoor Shoots Association	565	281	64	345	61%
Shooting lease holders on Forestry Commission Scotland land	46	10	0	10	22%
Game Conservancy Trust	800	114	83	197	25%
Good Shoot Guide	50	0	8	8	16%
Game Trust	Figures cannot be disclosed				
National Gamekeepers Organisation	1,050	7	128	135	13%
Scottish Gamekeepers Association	200	0	23	23	12%
Scottish Rural Property and Business Association	225	7	69	76	34%
Union of Country Sports Workers	200	28	12	40	20%
Ulster Farmers	100	4	2	6	6%
Shooters Rights Association	150	0	0	0	0%
Other (Pilot, case study, self selection)	Figures cannot be disclosed				
Total	*10,069*	*1,128*	*968*	*2,096*	*21%*

Source: PACEC

A3.8 A total of 1,323 supplier questionnaires were sent out, of which 175 were filled in – an overall response rate of 13% as shown in the following table.

Table A3.4 Supplier Strategy – use of PACEC database

	Contacts in sample	Questionnaires received
Game	35	9
Land Management services	107	28
Pest control services	95	13
Shooting school	34	4
Sales/Marketing	118	7
Accommodation /Food	42	3
Membership/insurance	53	4
Game Farm	115	20
Magazines	20	1
Feed/Fert/Trees/Seed/Fence	89	15
Firearms + Ammunition	183	0
Dogs (incl. train and kennel)	37	10
Vet	37	11
General Goods	327	36
Craft	3	1
Art	11	11
Taxidermy	17	2
Total	1,323	175

Source: PACEC

A4 Non response bias

A4.1 In order to address the issue of non-response bias on estimates of involvement in sporting shooting, we carried out a set of follow-up interviews.

A4.2 The target sample was taken from the contact data supplied by the Countryside Alliance:

- 20 Countryside Alliance Member (no sporting shooting flag) and 20 Countryside Alliance Supporters. These groups have relatively low rates of involvement in Sporting Shooting (48% in the main survey)
- 20 Countryside Alliance Members (sporting shooting flag) and 40 Campaign for Shooting (provider flag). These have very high rates of involvement in Sporting Shooting (94% in the main survey)

A4.3 Non-respondents were asked the following questions:

In the summer you sere sent a questionnaire about Sporting Shooting in the UK as part of a study commissioned by the British Association for Shooting and Conservation, the Countryside Alliance and the Country Land and Business Association.

a Did you fill in the questionnaire (Yes/No)

b As part of the data checking would you be willing to answer 4 very short questions - which should take no longer than 1 minute? (Yes/No) If No, is this because you are not involved in sporting shooting? (Yes/No)

If 'Yes':

1 **What types of sporting shooting were you involved with in 2004?** (Tick as many as apply)
Grouse; Driven Game; Walked up Game; Coastal WF; inland WF, Deer stalking; avian pest; Mammal pest, **None**

2 Were you involved in the provision of sporting shooting 2004 (Tick as many as apply)
Grouse; Driven Game; Walked up Game; Coastal WF; inland WF, Deer stalking; avian pest; Mammal pest, None

3 If you were involved in provision, how many key people were involved in the provision
Landowner, Farmer, Estate manager, Gamekeeper, Stalker, Shoot Manager, Secretary, Captain

4 If you were involved, how many paid gamekeeper/stalkers were employed?

A4.4 The key finding was that the involvement rates were lower for those who did not reply to the postal survey, than those who did reply to the postal survey for both groups (48% fell to 26%, and 94% fell to 90%).

A4.5 An involvement deflator was calculated using the following

- Involvement rate of survey respondents = 48%
- Involvement rate of non survey respondents = 26%
- Survey response rate = 20%
- Involvement rate of population =
  20% * 48% + (1-20%) * 26% = 30%
- Actual involvement rate changes from 48% to 30%
- Involvement deflator necessary = 30/48 = 63%

A4.6 This deflator changes depending on the involvement rate. We assume that the deflator is 100% when involvement rate = 100% and it changes linearly to 63% when the (survey based) involvement rate is 48%. This correctly predicts a deflator of 96% when the involvement rate is 94%. The results are shown in the next table.

Table A4.1 Involvement in sporting shooting

Source of Contact details	Survey Total	Survey Involved	Survey Involved/total	Deflator	Best estimate Involved
Association of Chief Police Officers	101	87	86%	90%	78%
Association of Deer Management Groups	76	75	99%	99%	98%
British Association for Shooting & Conservation	426	406	95%	97%	92%
British Deer Society	14	14	100%	100%	100%
Countryside Alliance – Members	98	73	74%	82%	61%
Countryside Alliance – Supporters	22	16	73%	81%	59%
Campaign For Shooting (Countryside Alliance)	332	309	93%	95%	88%
Country Land and Business Association	146	121	83%	88%	73%
Greater Exmoor Shoots Association	345	343	99%	100%	99%
Shooting lease holders on Forestry Commission Scotland land	10	9	90%	93%	84%
Game Conservancy Trust	197	181	92%	94%	87%
Good Shoot Guide	8	8	100%	100%	100%
Game Trust	Figures cannot be disclosed				
National Gamekeepers Organisation	135	132	98%	98%	96%
Scottish Gamekeepers Association	23	23	100%	100%	100%
Scottish Rural Property and Business Association	76	72	95%	96%	91%
Union of Country Sports Workers	40	37	93%	95%	88%
Ulster Farmers	6	3	50%	64%	32%
Shooters Rights Association	0	0	100%	100%	100%
Other (Pilot, case study, self selection)	30	30	100%	100%	100%
Total	*2,096*	*1,949*	*93%*	*95%*	*88%*

Source: PACEC

A4.7 The small sample which was used in this study needs to be understood in the context of most studies which don't do any primary research into non response bias at all. Furthermore the model developed here (in which the non response bias changes depending on the level of shooting) is quite sophisticated.

A5 Grossing up

A5.1 There are certain key statistics which we wish to estimate for the whole of the UK sporting shooting:

- From the Participant survey
  - Number of Guns (by quarry, by country/region)

  - Number of Gun Days (by quarry, by country / region)
  - Expenditure by participants by category of expenditure
- From the Provider survey
  - Number of Providers (by quarry, by country/region)
  - Number of days provided (by quarry, by country / region)
  - Number of Gun Days provided (by quarry, by country / region)
  - Total Bag (by quarry, by country / region)
  - Land management (area and labour by activity by country / region)
  - Jobs (by type by country / region)
  - Expenditure (by category by country / region)

A5.2 In order to estimate these key statistics a method was devised consisting of the following four steps (each of which are described in greater detail below):

- Weighting of data (to take into account response rates with known populations, also taking into account non response rates)
- Adjusted weights (to allow for joint membership)
- Inference of missing data (on a case by case basis)
- Adjustment of Association of Chief Police Officers data (to compensate for lack of complete coverage over all UK regions)
- Adjustment of weights (to allow for increased response rate for those which higher levels of activity)

Weights

A5.3 In the first place questionnaires are given a weighting (e.g. 98 for the Game Conservancy Trust) which is calculated as the total number of persons in the group (e.g. 20,500 GCT members) divided by the number of responses from persons the group (e.g. 197 GCT responses), multiplied by the non involvement deflator (94%). In the case of ACPO this was done on the basis of an estimate of 654,000 certificate holders across the UK with 101 responses.

Table A5.1 Weights

	Population	Received	Deflator	Weight
Association of Chief Police Officers	654,061	101	90%	5,837
Association of Deer Management Groups	400	76	99%	5
British Association for Shooting & Conservation	111,838	426	97%	254
British Deer Society	6,000	14	100%	429
Countryside Alliance – Members	102,405	98	82%	855
Countryside Alliance – Supporters	100,000	22	81%	3,663
Campaign For Shooting (Countryside Alliance)	26,000	332	95%	74
Country Land and Business Association	38,065	146	88%	229
Greater Exmoor Shoots Association*	1,500	345	100%	4*
Shooting lease holders on Forestry Commission Scotland land	46	10	93%	4
Game Conservancy Trust	20,500	197	94%	98
Good Shoot Guide	159	8	100%	20
Game Trust	Figures cannot to be disclosed			
National Gamekeepers Organisation	9,800	135	98%	71
Scottish Gamekeepers Association	3,100	23	100%	135
Scottish Rural Property and Business Association	3,000	76	96%	38
Union of Country Sports Workers	5,000	40	95%	118
Ulster Farmers	12,700	6	64%	1,364
Shooters Rights Association	4,000	0	100%	1
Other (Pilot, case study, self selection)	0	30	100%	1
Total	1,098,604	2096		

Note: The Providers in Exmoor (with a 100% return rate) have a weight of 1; the participants had a 20% response rate with a weight of 5. The 4 quoted here is the average of these weights.
Source: PACEC

A5.4 Where possible the initial weighting process is done for (mutually exclusive) groups within an organisation. For example:

- The CLA members were split by area of land which they owned (Small, Medium and Large)
- BASC membership lists were de-duplicated and split into 20 groups including Full members, Wildfowl club, gamekeepers.

A5.5 A further adjustment was necessary for providers, to allow for double counting arising from there being more than one person in a key position within the shooting

organisation. The weighting (for the respondent as a participant) was divided by the number of people in key positions (i.e. the number in Question 10 plus one).

Adjusted weights (to allow for joint membership)

A5.6 These initial weights will overestimate the scale of activity due to dual membership. In order to account for this joint membership we start with the largest membership organisation (BASC) and then add one membership organisation at a time, adjusting the weighting at each stage to allow for double counting.

A5.7 As an example we add CLA members to BASC members

Table A5.2 Adding CLA members to BASC members

	Responses	Initial weighted responses	Final weighted responses
BASC members who are not members of CLA	387	101,876	101,876
CLA members who are not members of BASC	107	27,439	27,439
BASC members: who are members of CLA	39	10,963	5,553
CLA members who are members of BASC	39	10,268	5,410
Joint members	78	21,231	10,963
Total	*572*	*150,545*	*140,278*

Source: PACEC

A5.8 At the second (and subsequent) stages, the double counting involves

- checking whether those which have already been added (e.g. BASC and CLA) have membership of the new group (e.g. GCT)
- checking whether the new group (e.g. GCT) are members of any of the previously added organisations (e.g. BASC or CLA)

Inference of missing data

A5.9 There are two reasons why data is missing from the surveys:

- Respondents only filled in the 'quick' section
- Respondents filled in only part of the full questionnaire.

A5.10 In both cases it is possible to make an estimate of the missing data based on what information has been completed for the survey together with an analysis of other respondents who did answer the missing questions. Mathematically we *constrain* the estimates based on other respondents to be consistent with actual information given on the survey.

Table A5.3 Inference of missing data for participants

Item	Estimation method
Number of Guns	No inference required
Total number of Gun days	Median of those answering (Q28) who gave the same banded number of days (Q6)
Gun Days by region by quarry	Take the total number of days shot by region and quarry (Q28) for those who live in the same area (Q3), remove those days in those regions (Q3) and those quarries (Q4) where this respondent does not shoot. Constrain these numbers to sum to the total number of Gun days (above), with the added constraint that there must be at least one gun day in each quarry and region specified in Q4 and Q3.
Total UK expenditure	If Q5 is blank, use median total expenditure (Q24+25+26) of those with the same banded number of gun days (Q6). If Q5 is not blank, use median total expenditure (Q24+25+26) of those with the same banded expenditure (Q5). Divide capital expenditure by number of years to give annual expenditure. Exclude imports to give annual UK expenditure
Breakdown of expenditure	Use the average breakdown of expenditure of those who did give details (Q24+25+26) constrained to equal the total expenditure (above)

Source: PACEC

Table A5.4 Inference of missing data for providers

Item	Estimation method
Number of providers	No inference required
Days provided by quarry	Take the median number of days shot by quarry (Q31) by level of expenditure (Q17) for those quarries (Q13) where this provider is involved. Constrain these numbers to sum to the total number of days (Q14). Split Avian and Mammalian pest control using Q29 and Q13. Split Coast and Inland wildfowling using Q13. Split Grouse and driven using Q13 and Q28.
Gun Days provided	Take the median of Q31 by quarry, but constrain this to come within the range specified in Q15.
Bag	Take the median bag per Gun day in Q31/Q28/Q29
Area	Take the median of those answering Q24 by level of expenditure (Q17)
Land management	Take the median ratio of area managed (q34) to total area (above) of those activities which are relevant to the quarry shot. Use the median labour per hectare / metre.
Jobs	Median of those answering Q37 who have the same banded number of paid stalkers / gamekeepers (Q16) including beaters and loaders (if grouse/driven game is provided)
Annual UK Expenditure	Median of those answering Q45 and Q46 who have the same banded expenditure (Q17). Use the average breakdown by category from Q45&46. Divide capital expenditure by number of years to produce annual expenditure estimates. Exclude expenditure outside the UK to produce annual UK expenditure.

Note: Allocation of all of the items in this table by region/country was on the basis of the region of residence given in Q3.
Source: PACEC

Adjustment of Association of Chief Police Officers data

A5.11 Because we were not able to get ACPO data across each region of the country, unadjusted ACPO data would bias our estimates to those regions where the respondents lived. Therefore in our model all ACPO data was allocated to an "Unknown" region, together with all cases where a respondent did not fill in Q3 (area of living) on the 'quick' section. All of the "Unknown" region data was then allocated to all of the other regions pro-rata, but constrained to ensure that the area of land affected by sporting shooting in a region did not exceed the rural land in that region.

A5.12 This process was not done for those participating in sporting shooting with air rifles, because no contact data source was available, and the overlap between the population of air rifle users and shotgun users was not known. This means that our estimates may be an underestimate of the amount of sporting shooting in the UK.

Higher activity levels have higher responses rates

A5.13 The results based on the steps outlined above gave rise to over-estimates of certain variables whose values were known from other sources. The main such variables were the area of land shot over in the UK (which is generally reckoned[69] to be 75% of rural land – or 16 million hectares) and the numbers of total numbers of each quarry shot (for which broad estimates were available from BASC and GCT). Those responses with large activity rates were linked with responses with smaller activity rates (from the same source)

A5.14 The re-weighting processes ensured that the overall weights for each contact list group remained the same (since we had no evidence that the overall estimate for the number of providers or participants were not correct).

[69] Piddington, Dept of Land Economy at Cambridge University, 1980

A6 Supply chain jobs

A6.1 The number of responses in each category was so low that giving detailed sets of results for the survey would be disclosive. Instead the estimates based on the contact lists and the survey of turnover and employment attributed to sporting shooting are given in the table below.

Table A6.1 Analysis of suppliers

	Estimates of UK totals based on contact lists and survey results			
	Contacts	S/S contacts*	Turnover (£m)	Jobs (000s)
Game	35	16	59	0.9
Land Management services	107	38	19	0.1
Pest control services	95	24	20	0.3
Shooting school	34	25	14	0.2
Sales/Marketing	118	102	59	0.2
Accommodation /Food	42	26	39	0.1
Membership/insurance	53	53	64	0.2
Game Farm	115	91	143	0.6
Magazines	20	20	30	0.1
Feed/Fert/Trees/Seed/Fence	89	51	197	0.8
Firearms + Ammunition	183	137	206	0.7
Dogs (incl. train and kennel)	37	24	1	0.0
Vet	37	9	2	0.0
General Goods	327	244	533	2.6
Craft	3	3	1	0.0
Art	11	7	25	0.2
Taxidermy	17	14	1	0.0

* This takes into account the proportion of business which the respondents assessed was due to sporting shooting.
Source: PACEC

A6.2 Because in many cases data from the suppliers should match the data from the providers and participants, decisions had to be taken as to which was the more reliable estimate. These decisions are summarised in the table below.

Table A6.2 Choice of UK data for the model

	Supplier estimate	Provider/ participant estimate	
Game	**59**	32	Because non guns purchase game, the Supplier estimate is preferred
Land Management	19	**21**	Because the supplier contact list was not comprehensive the provider estimate is preferred
Pest control services	20	**2**	Because the suppliers may have included the purchases made by those doing pest control as part of their job, the provider estimate is preferred
Shooting school	14	**29**	Because the supplier contact list was not comprehensive the participant estimate is preferred
Sales/Marketing	**58**	10	Because the supplier list was comprehensive and because money may pass directly to the agent from the participant, the supplier estimate is preferred to the provider estimate.
Accommodation /Food	5	**216**	Because the supplier contact list was not comprehensive the provider and participant estimate is preferred
Membership/insurance	25	**37**	Although the supplier contact list was comprehensive, more data financial data was obtained from the participants, so the participant estimate is preferred.
Game Farm	143	**68**	The larger supplier estimate is based on the mean turnover of companies from which we obtained data. If something closer to the median is used to estimate the non respondents the provider based estimate is obtained
Magazines	14	**16**	More data was obtained from the providers than from suppliers, so the provider estimate is preferred.
Feed/Fert/Trees/ Seed/Fence	197	**179**	The amount of data obtained from the providers was greater than the amount of data obtained from the suppliers, so the provider estimate is preferred.
Firearms + Ammunition	103	**89**	More data was obtained from the providers and participants than from suppliers, so the provider and participant estimate is preferred.
Dogs (incl. train and kennel)	1	**37**	Because the supplier contact list was not comprehensive the provider and participant estimate is preferred
Vet	2	**36**	Because the supplier contact list was not comprehensive the provider and participant estimate is preferred
General Goods	533	**227**	More data was obtained from the providers and participants than from suppliers, so the provider and participant estimate is preferred.
Craft	0		The supplier survey was the only source of data
Art	25		The supplier survey was the only source of data
Taxidermy	1		The supplier survey was the only source of data

Source: PACEC

A6.3 Because participants are active in more than one region it was difficult to allocate their expenditure by region, so participants' expenditure was allocated to each region pro rata to the provider expenditure.

A6.4 The allocation of first round supplier expenditure (and jobs) around the UK was based on the percentages of expenditure remaining in the local area and the UK, found in the surveys of participants and providers as shown in the following table.

Table A6.3 Retention of expenditure in local area and UK

	Expenditure within the Local region	Expenditure within the UK
Game	100%	100%
Land Management	97%	100%
Pest control services	93%	100%
Shooting school	100%	100%
Sales/Marketing	97%	100%
Accommodation /Food	61%	100%
Membership/insurance	33%	94%
Game Farm	35%	74%
Magazines	0%	100%
Feed/Fert/Trees/Seed/Fence	59%	91%
Firearms + Ammunition	56%	73%
Dogs (incl. train and kennel)	67%	94%
Vet	61%	99%
General Goods	65%	95%
Craft	100%	100%
Art	100%	100%
Taxidermy	100%	100%
Travel	100%	100%
Vehicles	26%	58%
Vehicle running	87%	98%
Utilities/communications	96%	100%
Building: Road/Track/Property	89%	100%
General Services	57%	89%

Source: PACEC (Surveys of Providers and Participants)

A6.5 Expenditure falling outside the local area, but within the UK was allocated to all the other 11 regions in the UK in proportion to the size of their economy, as measured by jobs in 2004 in the following table.

Table A6.4 Employment and share of employment by UK area

	Jobs (m)	Share of UK
South East	4.3	14%
East	2.7	9%
Greater London	4.5	15%
South West	2.6	8%
West Midlands	2.7	9%
East Midlands	2.1	7%
Yorkshire Humberside	2.5	8%
North West	3.4	11%
North East	1.1	4%
England	25.9	85%
Wales	1.3	4%
Scotland	2.6	8%
Northern Ireland	0.8	3%
UK	30.6	100%

Source: Annual Business Inquiry, Labour Force Survey, Office for National Statistics, PACEC

A6.6 Converting turnover into employment for the first round supplier jobs was achieved either using the employment to turnover ratio from the supplier survey or those in the UK Input-Output Supply Use Tables from the Office for National Statistics. In a similar way converting turnover into Gross Value Added (GVA) for the first round supplier jobs was achieved either using the GVA to turnover ratio from the supplier survey or those in the UK Input-Output Supply Use Tables from the Office for National Statistic (where GVA was equal to compensation of employees plus gross operating surplus).

A6.7 The “rest of supply chain” jobs are calculated for the UK using a multiplier (2.4) based on data from the UK Input-Output Supply Use Tables from the Office for National Statistics). Half of these jobs were allocated to the local region and half were allocated to all the other 11 regions in the UK in proportion to the size of their economy.

Appendix B Glossary

B1 Guide to the interpretation of tables

Bold: A number is shown in bold where, taking into account the margin of error due to sampling, we are 95% certain that it is different from the number in the left hand total column (using a Chi-Squared or Mann-Whitney statistical test).

Rounding: Numbers are rounded due to margins of error present in the estimation process. As a result totals may not add up exactly (e.g. the total of 1/3+1/3+1/3 is 1, but when given as rounded percentages, 33%, 33% and 33% do not add up to 100%). Furthermore some numbers are given as <½ meaning between 0 and 0.5.

Multiple Rows: A table with "Multiple Rows" in the footnote indicates that any individual or organisation may appear in more than one row. Therefore the sum of all the numbers in any column may give rise to a total which exceeds the total at the end of the column (or 100% where the numbers are percentages). For example, 50% of people may undertake one activity, and 60% of people may undertake a second activity. These numbers add up to more than 100%, since 10% of people undertake both activities.

Multiple Columns: A table with "Multiple Columns" in the footnote indicates that any individual or organisation may appear in more than one column. Therefore the sum of all the numbers in any row (particularly the number of respondents) may give rise to a total which exceeds the total at the beginning of the row. For example, 200 out of 400 people may undertake one activity, and 240 out of 400 people may undertake a second activity. These numbers add up to more than 400, since 40 of people undertake both activities.

Respondents: Different numbers of people answered different questions in the questionnaires. In particular the numbers of respondents is much larger for questions in the quick section of the questionnaires than for other questions.

B2 Glossary of Terms

Please note that all definitions given in this report are given in the context of sporting shooting and as such may differ from definitions in common usage.

Beater: *Person who flushes wild game*

Capital good: *The cost of a capital good refers to its replacement cost, or its value in today's money, rather than the price originally paid for it*

Charitable donations: *These exclude those specific to sporting shooting*

Club: *Typically a group of more than 10 people shooting a variety of quarry over fixed pieces of land. The distinction between Club and Syndicate in this study rests with the perception of the providers and participants who filled in questionnaires.*

Coastal Wildfowling: *The shooting of ducks, geese and waders on coastal land affected by tides.*

Cover Crops: *Crops (such as kale and millet) planted on game shoots to provide birds with food and shelter*

Deer Stalking: *Shooting deer for deer management and/or crop protection in the context of sport.*

Driven Game: *Form of shooting in which lowland gamebirds are flushed over the standing Guns*

Employment costs: *Include wages and employers' National Insurance and pension contributions and the costs of any other benefits (e.g. health care)*

Full Time Equivalents (FTE): *The number of full-time employees that could have been employed if the reported number of hours worked by part-time employees was worked by full-time employees. This statistic is calculated by dividing the "part-time hours paid" by the standard number of hours for full-time employees then adding the resulting quotient to the number of full-time employees*

Full time jobs*: Assumed to be 37 hours a week for 232 days per year*

Gamekeeper: *Person who manages the game habitat. They may rear birds for release into the wild*

Gross Value Added (GVA): *The standard monetary measure of the value of economic activity. Usually estimated as the sum of employment costs plus profits, but since many providers run at a loss, profits of shooting providers have been excluded in this study*

Gun: *Shooter of any type of quarry (not just game)*

Gun days: *Shooting days multiplied by the average number of Guns per day*

Gundog: *Dog specially bred and trained for locating, flushing and retrieving game*

Inland Wildfowling: *The shooting of ducks, geese and waders on inland sites.*

Jobs: *Include both employees and self employed (including working directors/owners)*

Larger Market Town: *In the context of the contingent valuation survey, Grantham (population 31,000)*

Live quarry sporting shooting: *The shooting of birds and mammals for recreation*

Median: *The middle value in the distribution, above and below which lie an equal number of values*

Mean: *The average value*

Nature Observer: *In the context of the contingent valuation survey, those who typically visit shooting landscapes as a nature observer*

Non Countryside Users: *In the context of the contingent valuation survey, those who have never visited landscapes with similar characteristics as that illustrated on the contingent valuation information sheet*

Non-Gun: *Term used in this report to describe people accompanying others who are additional to the beaters and pickers up organised by the gamekeeper*

Nuisance: *refers to the noise of guns; the possibility of dogs straying onto neighbouring areas; and the regular movement of vehicles leading to mud and congestion on lanes and tracks.*

Part Time Jobs: *Assumed to be 20 hours a week*

Permanent Jobs: *Assumed to be for 52 weeks of the year*

Pest control: *The control of pest species using a gun in the context of sporting shooting activities, including pigeon shooting.*

Picker Up: *Person who retrieves dead and wounded game with the aid of gundogs*

Quarry species: *A legally shootable bird/animal which has an open season and which includes bird species which are commonly regarded as pests, e.g. pigeon (as covered by general licences).*

Reared birds: *Gamebirds bred by the shooting provider specifically for sporting shooting and released into the wild*

Regional City: *In the context of the contingent valuation survey, Peterborough*

Released birds*: Birds bred by the shooting provider or bought in from a game farm and released into the wild for sporting shooting*

Release Pens: *On the majority of land where released pheasant shooting takes place release pens are erected for the protection of young birds*

Rural land *All land in the UK which is not defined as urban, i.e. not in a settlement of 10,000 or more people. (ODPM definition)*

Rural Village: *In the context of the contingent valuation survey, a village with a population of 2,000 near the case study shooting site*

Seasonal Jobs: *Assumed to be for 20 weeks of the year*

Shooter: *In the context of the contingent valuation survey, those who typically visit landscapes, with similar characteristics as that illustrated on the contingent valuation information sheet, as a shooter*

Shooting day: *Time spent on and around the shooting provider's site. Some or all of am or pm is half a day*

Shooting participants: *Those who take part in sporting shooting (of live quarry), and either pay to do so, or do so for nothing. Many providers are also participants*

Shooting providers: *An organisation/business (with employees and/or members) or individual who performs services (either paid or voluntary) which give rise to opportunities for sporting shooting*

Shooting Site: *The land over which sporting shooting takes place*

Shooting tenant: *Individual who rents the shooting rights for an area of land from the landowner*

Small Rural Town: *In the context of the contingent valuation survey, a town with a population of 11,000 near the case study shooting site*

Spinneys: *Small strips of trees and shrubs planted, usually in areas with little or no existing woodland*

Stalker: *Gun who shoots deer for deer management and/or crop protection in the context of sport.*

Suppliers: *A range of firms/individuals which supply shooting providers and participants with related goods and services. Potential suppliers include: shooting agencies (sales), accommodation, shooting training, land management services, reared game (for release)*

Syndicate: *Typically a group of up to about 10 people shooting game over fixed or varying pieces of land. The distinction between Club and Syndicate in this study rests with the perception of the providers and participants who filled in questionnaires.*

Urban/Suburban: *In the context of the contingent valuation survey, Greenwich, London*

Walked Up Game: *Form of shooting in which the shooter flushes lowland game as he/she walks over the shooting ground*

Walker: *In the context of the contingent valuation survey, those who typically visit shooting landscapes as a walker*

Waste: *Can include any un-retrieved cartridges, deposition of lead shot on the site or neighbouring properties, or dead birds found on neighbouring roads or properties*

Worker: *In the context of the contingent valuation survey, those who typically visit shooting landscapes as part of their work on a farm or estate*