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Public Attitude Toward Mammal Reintroductions:

A Highland Case Study

By

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the MSc and/or the DIC

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DECLARATION OF OWN WORK

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Abstract

A survey of attitudes toward mammal reintroductions (using wolves and beavers as the two main examples) was carried out in and around an area of the Scottish Highlands earmarked for ecological restoration. Adapting methodologies used in previous studies of attitudes toward wolf restoration, a questionnaire was designed to give a numerical score to people's attitudes, as well as investigating what factors affected these attitudes. Rural residents were surveyed at their homes using a random stratified spatial sampling method and drop off and collect means of delivery. In order to test for rural-urban contrasts, Edinburgh and Inverness residents were also surveyed, using a face to face introduction. Key stakeholder interviews and a media analysis were also carried out to further inform the investigation.

The results showed that a majority of respondents had positive attitudes toward mammal reintroductions, in both rural and urban samples, so the recommendation is made that advocates should be less hesitant in making proposals. Membership of environmental organisations, urban residence, young age and a short period of time living in the area were associated with positive attitudes, whereas farming was associated with negative attitudes. Attitudes were found to be correlated with knowledge about wildlife, but not with formal education. Concerns about reintroducing beavers were centred on environmental issues, whereas concerns about wolves were more frequently humanistic. The types of risks and benefits stated by respondents were closely related to those portrayed in the media, suggesting that the media can play an important role in shaping people attitudes.

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TABLE OF CONTENTS

1. Introduction	1
1.1 <i>A Highlands Case Study</i>	2
1.2 <i>Aims and objectives</i>	3
1.3 <i>Ecological restoration</i>	5
1.4 <i>Ecological restoration in Scotland – Trees for Life</i>	6
1.5 <i>Mammal Reintroductions</i>	9
1.5.1 <i>Wolves</i>	10
1.5.2 <i>Beavers</i>	11
1.5.3 <i>Previous attitude studies</i>	12
1.6 <i>Mammal reintroductions in the USA</i>	13
1.7 <i>European legislation regarding mammal reintroductions</i>	15
1.7.1 <i>The Habitats Directive</i>	15
1.7.2 <i>The Bern Convention</i>	15
1.7.3 <i>Reintroductions in Europe</i>	16
1.8 <i>Mammal reintroductions in the UK</i>	17
1.8.1 <i>Beavers in the UK</i>	17
1.8.2 <i>Wild boar in the UK</i>	20
1.8.3 <i>Lynx in the UK</i>	21
1.8.4 <i>Wolves in the UK</i>	22
1.8.5 <i>‘Eco-park’ proposals</i>	24
2. Methodology	26
2.1 <i>Defining ‘Attitude’</i>	26
2.2 <i>‘Wolf methodologies’</i>	27
2.3 <i>Choice of survey instrument</i>	28
2.4 <i>The questionnaire</i>	29
2.4.1 <i>Covering letter</i>	30
2.4.2 <i>Definitions</i>	30
2.4.3 <i>Demographic details</i>	30
2.4.4 <i>Awareness of the issue</i>	31
2.4.5 <i>Advantages and disadvantages of reintroductions</i>	32
2.4.6 <i>Attitudes</i>	32
2.4.7 <i>Scenarios</i>	35
2.4.8 <i>Further comments</i>	36
2.4.9 <i>Knowledge Section</i>	36
2.5 <i>Sampling regime</i>	36
2.5.1 <i>Spatial method</i>	37
2.5.2 <i>Questionnaire delivery</i>	38
2.5.3 <i>Urban sampling</i>	39
2.6 <i>Stakeholder interviews</i>	40
2.6.1 <i>Key stakeholders</i>	40
2.6.2 <i>What questions were asked</i>	43
2.7 <i>Media analysis</i>	44
2.8 <i>Statistical analysis</i>	45
3. Results	47
3.1 <i>Response rates and sample descriptions</i>	47

3.1.1 Pilot Study	47
3.1.2 Rural sample	48
3.1.3 Inverness sample	49
3.1.4 Edinburgh Sample	49
3.1.5 SCA sample	50
3.1.6 Sample Descriptions	51
3.2 <i>Attitudes</i>	53
3.2.1 Producing a reliable attitude scale	53
3.2.2 Urban versus rural	54
3.2.3 Gender	56
3.2.4 Age	56
3.2.5 Duration of residence	57
3.2.6 Recreational use of countryside	58
3.2.7 Hunting	58
3.2.8 Environmental organisation	58
3.2.9 Education	59
3.2.10 Income	59
3.2.11 Farmers and landowners	59
3.2.12 Table showing which factors affect attitude score	60
3.2.13 Multiple regression	61
3.3 <i>Attitude typologies</i>	62
3.4 <i>Knowledge</i>	63
3.4.1 Quiz scores	63
3.4.2 Knowledge correlates	64
3.4.3 Wildlife awareness	64
3.4.4 Wild boar	65
3.5 <i>Awareness</i>	65
3.5.1 Trees for Life	65
3.5.2 Trial beaver reintroduction	66
3.5.3 How people have heard of TfL and the beaver trial	68
3.6 <i>Perceived advantages & disadvantages</i>	69
3.6.1 Advantages	69
3.6.2 Disadvantages	70
3.6.3 Beaver advantages	71
3.6.4 Beaver disadvantages	72
3.6.5 Wolf advantages	72
3.6.6 Wolf disadvantages	73
3.6.7 Rural-urban and beaver-wolf contrasts	74
3.7 <i>Linking sections of the questionnaire together</i>	75
3.7.1 Linking attitude to stated advantages and disadvantages	76
3.7.2 Linking attitudes to support for TfL and the beaver trial	77
3.8 <i>Media analysis results</i>	77
3.8.1 Advantages and disadvantages portrayed by the media	77
3.8.2 Positive and negative articles	78
3.9 <i>Scenarios</i>	79
3.10 <i>Scottish Countryside Alliance (SCA) sample</i>	80
3.10.1 Attitude score	80
3.10.2 Knowledge	82
3.10.3 Awareness and support	82
3.10.4 SCA sample summary	82
3.11 <i>Stakeholder viewpoints</i>	83
4. Discussion	86
4.1 <i>Majority Support for Reintroductions</i>	86

<i>4.2 Attitude Correlates</i>	88
<i>4.3 Attitude Typologies</i>	90
<i>4.4 Attitudes and Farming</i>	92
<i>4.5 Attitudes and Hunting</i>	94
<i>4.6 Role of the Media</i>	96
<i>4.7 Limitations and means of improvement</i>	96
5. Conclusions and Recommendations	97
6. References	100
7. Appendices	115
<i>Appendix 1: Survey used for rural and Inverness sampling</i>	115
<i>Appendix 2: Survey used for Edinburgh sampling</i>	120
<i>Appendix 3: Grid references used in rural sampling</i>	122
<i>Appendix 4: Piece written for SCA 'Heather Routes'</i>	123
<i>Appendix 5: Details of articles used in media analysis</i>	124

LIST OF FIGURES AND TABLES

Figure 1.1 – Photograph of part of the TfL area in Glen Affric, showing native pinewood remnants, forest regeneration area, and ‘natural features’	8
Figure 1.2 – Map showing the area that TfL have identified as ideal for ecological restoration.	8
Table 2.1 – Attitude statements and the attitude typologies they were based on.	34
Table 3.1 – Summary descriptions of the samples.	51
Figure 3.1 – Showing the mean attitude score of the 9 sub-samples.	55
Figure 3.2 – Showing the relationship between year of birth and mean attitude score.	57
Figure 3.3 – Showing the relationship between duration lived in area and attitude score.	58
Figure 3.4 – Showing mean attitude score of the farmer sub-sample and the rest of rural sample.	60
Table 3.2 – Showing demographic characteristics significant relationships with attitude score.	61
Figure 3.5 – Showing the frequency distribution of total attitude score for the rural sample.	55
Figure 3.6 – Showing the frequency distribution of total attitude score for the urban sample.	56
Table 3.3 – Showing the attitude typologies found in the urban, rural and farmer samples.	63
Figure 3.7 – Showing the percentage of respondents that have heard of TfL and the proposed trial beaver reintroduction.	66
Figure 3.8 – Showing the percentage of respondents who feel well informed about the work that TfL do and about the proposed beaver trial reintroduction.	67
Figure 3.9 – Showing the percentage of respondents who claimed to support TfL and the proposed trial beaver reintroduction.	67
Figure 3.10 – Pie charts showing how respondents had heard of TfL and the beaver trial.	68
Table 3.4 – Describing categories of respondents perceived advantages of reintroductions.	69
Table 3.5 – Describing categories of respondents perceived disadvantages of reintroductions.	70
Figure 3.11 – Showing the advantages perceived to come with reintroducing the beaver.	71
Figure 3.12 – Showing the disadvantages perceived to come with reintroducing the beaver.	72
Figure 3.13 – Showing the advantages perceived to come with reintroducing the wolf.	73
Figure 3.14 – Showing the disadvantages perceived to come with reintroducing the wolf.	74
Figure 3.15 – Showing the perceived humanistic and environmental advantages and disadvantages that would come with reintroducing beavers and wolves.	75
Figure 3.16 – Scatter-plot showing the relationship between attitude score and ‘advantages score’.	76
Figure 3.17 – Showing the proportions of newspaper articles which were positive, negative or ambivalent towards beavers and wolves.	78
Figure 3.18 – Pie charts showing scenario preferences for Edinburgh, Inverness and rural samples.	79
Figure 3.19 – Showing the mean attitude score of the urban, rural and SCA samples.	81
Table 3.6 – Results of the key stakeholder meetings.	85
Figure 3.20 – Showing the attitude score of the key stakeholder organisations and the mean scores for the questionnaire samples.	83

1. Introduction

In recent years, a new wildlife management paradigm has been growing in popularity (Graham *et al* 2005); the ecosystem management concept. Although rife with practical and ideological difficulties, this concept is based on the realisation that changes in species populations most frequently occur in response to changes in their habitats, and that the number of species is far too great in relation to the available time and resources to concentrate on conserving each of them individually (Estes 1996). The species composition of many of the Earth's ecosystems is badly depleted; the current rate of extinctions is between a hundred and a thousand times greater than that expected from the fossil record (Begon *et al* 1996). In these depleted ecosystems, it may be that nutrients and energy do not flow as they should; ecological linkages between the physical and biological systems that define a dynamic natural environment may be missing (Jarman 1995), and so begins an argument for ecological and habitat restoration. In the UK, Scotland is the main focus for the ecological restoration debate, and a number of fairly controversial initiatives have been proposed, including the re-wilding of some of the recently designated Cairngorms National Park (Holden and Clunas 2004), the Trees for Life project (Featherstone 2004), the Carrifran wildwood project (Ashmole and Chalmers 2004), and several others (Taylor 2004a).

An element of ecological restoration which is very effective at capturing public and media interest is that of mammal reintroductions. The issues surrounding reintroductions are myriad and complex, touching on ecology, biology, sociology, economics, philosophy and ethics (Nie 2003). This study will be investigating one particular aspect of reintroductions, one that has been shown to be very important with regard to their success or failure; public attitude (Fritts and Carbyn 1995). The

justification for this study is neatly encapsulated in the quote from Nie's book which calls for 'the future of the wolf to be as vigorously debated in an arena as inclusive, representative and democratic as possible'. Although this refers to wolves specifically, the principle is clearly applicable to similar wildlife management issues. The EC habitats directive also states that any reintroduction must be preceded by a proper public consultation. Although there are no concrete plans for many of the species discussed in this study, it is a prudent move to determine attitudes as far ahead as possible to inform future policies. The increasing importance placed on the stakeholder in natural resource management means that more than ever, understanding the attitudes of the public is critical to the decision-making process (Nie 2003).

1.1 A Highlands Case Study

Mammal reintroductions are a hot topic in Scotland at the moment, there are a number of exciting proposals and ideas being put forward, some close to being realised, and some further off (Wilson 2004, SNH 2005, Featherstone 2004). A reintroduction of the European beaver is the most advanced of these projects, and a large consultation has been carried out to investigate the public's attitude toward it (Scott Porter Research and Marketing Ltd. 1998). This survey is not intending to duplicate any of that work, or any of the other work that has looked at people's attitudes towards specific reintroduction projects. Instead it will be focusing on attitudes toward the overall concept of reintroductions, using beavers and wolves as the two primary examples.

As an MSc dissertation, this project does not have the resources or time to look at the attitudes of an entire country, so a case study will be used. This involves assessing the attitudes of the rural population of an area that has been identified as suitable for re-wilding by an organisation called Trees for Life (TfL), as this area is arguably the most likely to see a future un-fenced reintroduction of some of Scotland's

extirpated mammals. Rural attitudes have been focused on for this study as the rural populace close to a reintroduction site have the most to lose and therefore are expected to have the most negative attitudes (Wilson 2004). Rural residents are in the best position to most significantly affect the success of any future reintroduction programs (Tucker and Pletscher 1989), so if attitudes in the rural population are very negative, the resultant behaviour may have a great impact. This negative behaviour could take a number of forms, ranging from simple declared opposition to shooting of reintroduced animals in order to purposefully sabotage projects, as has been seen elsewhere in Europe (Wilson 2004).

1.2 Aims and objectives

The research for this study will have three interlinking strands which will aim to inform the debate around the issue of mammal reintroductions in Scotland and provide recommendations to inform future policies:

The first research strand will aim to gain an understanding of the attitudes of the rural residents living in and around the TfL area and to see what factors and characteristics are linked to specific attitudes. An urban survey will also be carried out to assess whether urban-rural differences exist. Attitudes toward the idea of reintroductions will give an insight into likely levels of support for reintroduction projects. Answers to the following research questions will be sought:

1. What are the attitudes of the rural residents living in and near to the TfL area?
Do these attitudes differ from urban residents?
2. What risks and benefits do the public expect to come with reintroductions, i.e., what are the justifications for having a positive or negative attitude?
3. What factors (e.g. demographic variables) influence attitude?

The second strand will aim to understand the attitudes of key stakeholder organisations. This will be a predominantly heuristic exercise and will provide a fuller understanding of the relevant issues and provide answers to the following research questions:

1. What is the official line or attitude of the key stakeholder organisations toward mammal reintroductions? Would they be likely to support or oppose reintroduction projects, and on what grounds?
2. Is public attitude important in the key stakeholder organisations decision making process?

The third and final research strand will investigate how the media portrays the animals that might be reintroduced, as this has been found to be a significant factor in forming people's attitudes (e.g. Enck and Brown 2002). This is of particular interest with regard to a subject which is as current and controversial as this one. Research questions as follows:

1. Does the media cast the animals that might be reintroduced in a positive or negative light?
2. Are the potential risks and benefits of species reintroductions portrayed in the media related to those expected by the sample respondents (as found in strand one)?

This introductory literature review section will explain the reasons behind choosing these particular research strands. It will start by looking at the subject of ecological restoration, and then focus on mammal reintroductions both in Scotland and overseas. Finally, previous studies that have looked at attitudes towards mammal reintroductions will be considered to get an understanding of the important questions and issues that is required to investigate attitudes towards reintroductions in Scotland.

1.3 Ecological restoration

Attempting to recreate an ecosystem as it was before mankind's intervention is no small task, and clearly comes with a wide range of practical and ideological problems (Taylor 1995). Which period of history should be recreated for example, and is there sufficient evidence to prove that the proposed species or habitat existed at the location in the first place (Jarman 1995)? But there are potentially enormous benefits that could result from ecological restoration; fully functioning ecosystems in which species populations are regulated through natural predator-prey interactions, competition and natural processes like fires and floods, no longer requiring intensive intervention by man (Dennis 1995). Examples of ecological restoration are growing in number, and vary enormously in size and scope; from single species reintroductions such as the Red Kite in the UK to restoration of mangrove forests destroyed by the Vietnam War (Featherstone 1997).

In addition to the potential ecological benefits, there is a second, more ideological argument for ecological restoration. Aldo Leopold, in the opening line of the forward to *A Sand County Almanac* (1949) claimed that 'there are some who can live with wild things, and some who can not'. Later in the book goes on to make the assertion that science and the spiritual considerations of nature are heavily disconnected. Edward O Wilson's *Biophilia* (1984) contains a number of similar observations. Wilson defines his 'Biophilia' as mankind's innate tendency to focus on life and lifelike processes, and suggests that the living world is an essential part of the human spirit. He claims that the relationship between man and the natural world will remain problematic until the divide between science and the humanities is bridged. Certain advocates of ecological restoration are attempting to reconnect these two seemingly disparate ideologies, drawing on both ecological and spiritual arguments to justify their ideas (Taylor 1995, Featherstone 1997).

The moral justification for ecosystem restoration should not be underplayed simply because it is ‘unscientific’. In Nie’s inclusive, representative and democratic arena, it may well be that a large proportion of people can identify much more closely with the spiritual or moral justifications for ecological restoration than they can with the ecological ones, so all should be considered as important, and the attitudes and behaviours that stem from them should be understood.

1.4 Ecological restoration in Scotland – Trees for Life

Scotland is an example of just such a depleted ecosystem that some consider as ripe for ecological restoration (Featherstone 1997). Since the last Ice Age, the predominant terrestrial ecosystem in Scotland was forest but extensive deforestation has removed 99% of it, leaving small, highly fragmented patches (Dennis 1995). Along with the loss of their habitat, and under sustained human persecution, many animal species have also been lost; bear, beaver, lynx, aurochs, wild boar, reindeer and wolf are some of the more conspicuous (by their absence) mammal species that have been extirpated from Scotland in the last one thousand years or so (Yalden, 1999).

Because much of the deforestation took place several hundred years ago, the plight of the Caledonian forests was little known until the publication of Steven and Carlisle’s, *The Native Pinewoods of Scotland* (1959), which did much to raise awareness. Further research has continued to describe the loss of the pinewoods, and experimental work has shown that in the right circumstances, if deer fences are erected for example, that forest regeneration will occur naturally (Forestry Commission 2003). As a result, the cause of native forest regeneration has been taken up by a number of organisations and landowners, and public awareness is now quite widespread. The lottery-funded Millennium Forest for Scotland project marked a significant step

forward. Put together by a group of conservation organisations, it has provided a national framework for native forest restoration (Taylor 1995, Featherstone 1997).

The problems associated with habitat fragmentation are well understood (Begon *et al* 1996), and there is a growing call for habitat restoration to take a holistic approach, focusing at the landscape scale rather than on individual fragments or reserves (Jarman 1995, Taylor 2004*a*). One organisation which is a firm believer in this principle is the Findhorn based ‘Trees for Life’ (TfL). Since the mid 1980’s TfL have been working towards returning a large area of the Highlands to natural forest. The driving force behind this work is a vision of total ecological restoration; bringing back not only the forests but also the full complement of animal species to recreate a complete, fully self-regulating ecosystem. The time frame in which they are working, based on the length of time it takes for a Scots Pine to come to full maturity, is 250 years. Almost twenty years into this plan, TfL have garnered support from a wide range of landowners and organisations (Scottish Natural Heritage, the Forestry Commission and the National Trust for Scotland amongst others) and have to date protected more than 150,000 naturally occurring seedlings and planted over half a million native trees (Featherstone 2004). The majority of the planting work is carried out by paying volunteers.

TfL’s work is concentrated in an area of 238,000 ha (see figures 1.1 and 1.2) that they believe is ideal for their purpose for several reasons (from Featherstone 1997):

- It contains several of the best of the remnants of the native pinewoods.
- The area is remote, with low human population and road density.
- It contains all the necessary physical components for a wild natural landscape, namely mountains, lochs, rivers and a variety of other habitats such as peat bogs.
- The area has little economic activity other than deer stalking, sheep farming and some commercial forestry.

- It is thought to be large enough to contain populations of mammals which were part of the forest ecosystem.



Figure 1.1 – Photograph of part of the TFL area in Glen Affric, showing native pinewood remnants, forest regeneration area, and ‘natural features’ (mountains and loch).

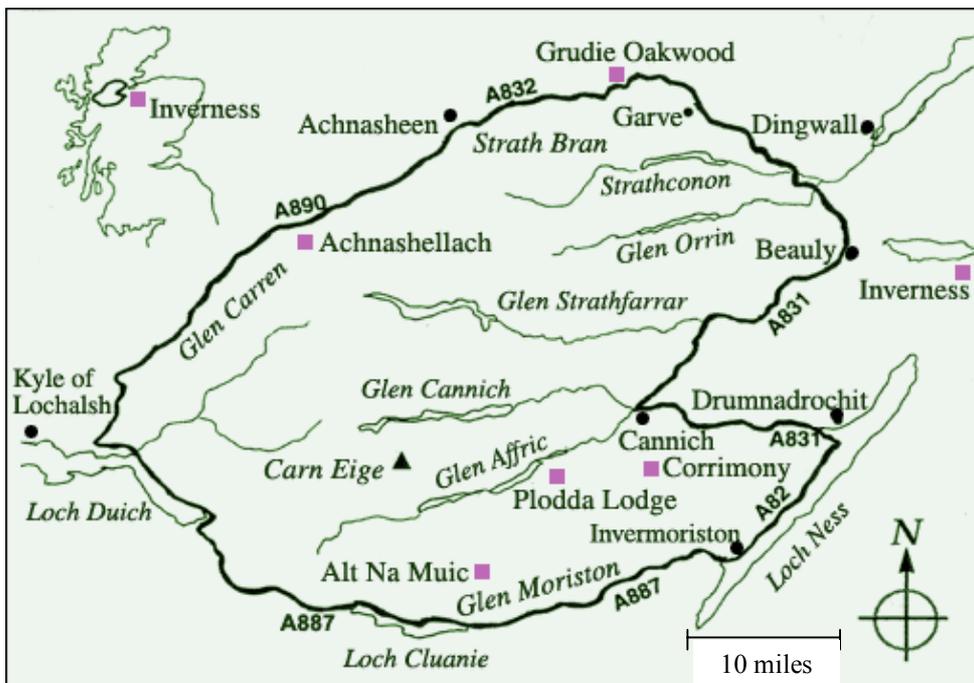


Figure 1.2 – Map showing the area that TFL have identified as ideal for ecological restoration. From: www.treesforlife.org.uk. Scale based on the 23 mile length of Loch Ness.

Within this area, they envisage a core wilderness of 600-700 square miles, restored for the ecosystem's sake, not for human exploitation. TfL are very much of the 'wilding mentality' described above, believing that there are spiritual as well as ecological precedents to carrying out their work.

In addition to these factors which are particular to the TfL area, the regime of land ownership in the Highlands (with large tracts regularly changing ownership) also favours ecological restoration (Taylor 1995). Strategic purchase of the West Affric Estate, which borders Forest Enterprise land, by the National Trust for Scotland is one such example of where like-minded organisations can have a greater impact collaboratively than individually. TfL do not own any land themselves, so all work that they do is achieved through planting agreements with landowners (Featherstone 1997).

Although TfL at the moment are almost entirely involved with the planting of trees, they are very open about their advocacy of mammal reintroductions. This part of their vision is not something that they hide behind the tree-planting; it appears on the first page of their website, and in much of their promotional material. The fact that they have gained so much support suggests that the TfL area may be a likely candidate area in which future mammal reintroductions might occur

1.5 Mammal Reintroductions

Although plants and trees may be just as critical to the functioning of the ecosystem, it is animals, particularly mammals and birds, which gain most people's interest and attention. When the animal in question is large and carnivorous, such as the wolf, the attention of the public and the media can be extreme.

1.5.1 Wolves

A large part of this report will be drawing on examples from the literature regarding wolf reintroductions, for two reasons. Firstly, the wolf is one of the most controversial species that could be reintroduced; the debate surrounding the issue in Minnesota lasted for decades and involved countless conflicts and confrontations, both legal and otherwise (Kellert 1986). The range of impacts wolves can have, whether they be positive or negative, is enormously wide; wolves could quite conceivably impact the tourist industry, the agriculture industry and the hunting industry (Nie 2003, Wilson 2004), they could bring about dramatic ecological changes (Ripple and Beschta 2003) and there's always the chance that they could cause loss of human life (Roskaft *et al* 2003). Attitudes toward wolves and their reintroduction will be influenced by all of these factors, but also by mythology and folklore (Berg 2001). The wolf, perhaps more so than any other species, has suffered a bad press in the western world, lasting several hundred years (Nie 2003). For this reason, reactions to the idea of reintroducing wolves are likely to be more extreme than reactions to any other species, so if people have no objections to wolves, they are unlikely to object to anything else.

The second reason for wolves being something of a focus for this project, and this is probably as a direct result of the first, is that there is a huge amount of literature regarding wolf reintroductions. Wolf reintroductions generate more than enough material for ecologists (Ripple and Beschta 2003), economists (Power 1991), sociologists (Skogen and Krangle 2003) and philosophers (Taylor 1995) all to have their share of related publications, and so wolves are now amongst the most well studied of mammal species (Panaman 2002). Most studies looking at attitudes towards wolves and their reintroduction have taken place overseas. Due to their absence, attitudes

towards wolves in Scotland are not nearly so well studied, so this report will contribute to filling a hole in the ‘wolf literature’.

Nie (2003) described the wolf debate as a microcosm of the larger scale natural resource management process. On this premise, many lessons that have been learned through the wolf debate can be applied to other similar issues, in particular other mammal reintroductions. One of the important lessons that has been learned through the wolf experience is that reintroductions are as much a socio-political issue as an ecological one (e.g. Lohr *et al* 1996). Nie even goes as far to claim that the most important determinant of the success or failure of a wolf restoration project is how humans choose to live with them. Wolf restorations (whether by natural recolonisation or reintroduction) that have already occurred overseas have been well documented and many of them accompanied by rigorous attitude surveys (Williams *et al* 2002). Any reintroduction that might occur in the UK would therefore have many guiding examples providing excellent advice regarding what, and what not to do.

1.5.2 Beavers

The second species that will be a focus of this study, one which represents the other end of the controversy spectrum, is the beaver, *Castor fiber*. Smaller and herbivorous, beavers are associated with a very different range of potential impacts. Beavers were last recorded in Scotland in the 16th Century; they were eradicated due to hunting for their pelt, meat and castoreum (Kitchener and Conroy 1997). Plans are currently underway to reintroduce the beaver back to Scotland, with a carefully controlled trial seeking a licence from the Scottish Executive (SNH 2005). The beaver has been reintroduced to many parts of Europe and some parts of the USA (a different species; *Castor canadensis*). Beavers are thought to bring about many ecological benefits,

playing a pivotal role in regulating and maintaining aquatic ecosystems (Macdonald *et al* 1995).

Beavers and wolves also represent the two extremes of likelihood with regard to reintroductions; the beaver is very close to being reintroduced in Scotland. Feasibility studies have been carried out and an application for a licence to carry out a trial reintroduction from the Scottish Executive has been made by Scottish Natural Heritage (SNH). SNH are not interested in considering the feasibility of reintroducing wolves at this time (Panaman 2002), and the prospect of a wolf comeback is much more distant, in spite of the many groups who advocate it. By concentrating on these two very different species, the full range of responses to the idea of reintroductions will hopefully be elicited.

1.5.3 Previous attitude studies

Williams *et al* (2002) gives a useful summary of studies of attitudes towards wolves and their reintroduction between 1972 and 2000. It showed that a majority of surveys found that more people had positive attitudes towards wolves than negative and that most supported wolf restoration. Older respondents, rural residents and farmers were found to have attitudes more negative than average, whilst members of environmental groups were found to be more positive than most. Williams *et al* (2002) also found that attitudes were generally more positive in the USA than in Europe, where a majority were not supportive of wolves. They found that attitudes were not becoming positive over time and that attitudes have the potential to change rapidly if linked to more important attitudes or new experiences (if a person were injured or killed by a reintroduced animal for example).

In the UK there have been only a small number of attitude studies of this kind. Bath and Farmer's (2000) survey of young people's attitudes toward carnivores found

that knowledge of carnivores is poor among UK students, and claimed that better knowledge of these species would improve attitudes. A survey of Scottish attitudes found that only 36% of the general public supported reintroducing the wolf, while 66% were in favour of bringing back the beaver (Macmillan 1996 in Featherstone 1997). More recently, a study using the Contingent Valuation Market Stall methodology found over two thirds of respondents would favour the reintroduction of a once extinct native species to Scotland (Philip and Macmillan 2003).

National (Scott Porter Research and Marketing Ltd. 1998) and local (SNH 2005) surveys have been carried out assessing people's attitudes toward the proposed trial reintroduction of the beaver to Scotland. The national consultation indicated that 86% of respondents supported the idea of the reintroducing the beaver, but certain concerns were raised (Scott Porter Research and Marketing Ltd. 1998), so a trial was considered the best way to test potential impacts. The local consultation was carried out in 2001, this time surveying only in the local area surrounding the trial site. This survey also indicated a high level of support for the idea, but also highlighted a great deal of ambivalence about the issue (SNH 2005).

Other than these, no other studies could be found that investigated attitudes towards mammal reintroductions in Scotland (although anecdotal reports from respondents suggested that other student theses had focused on similar issues).

1.6 Mammal reintroductions in the USA

There have been many mammal species reintroduced in the USA, but the one that has been the most written about and the one which has caused the greatest controversy is that of the grey wolf (*Canis lupus*). Reintroductions of smaller species such as the beaver, *Castor canadensis* (McKinstry and Anderson 1999), the fisher, *Martes pennanti* (Berg 1982) and the black-footed ferret, *Mustela nigripes* (Reading and Kellert 1993)

have not produced such intense interest or levels of conflict due to their smaller size and the fact that they do not consume livestock (Nie 2003). Bears (*Ursus sp.*) are associated with many of the same problems as wolves (human safety, livestock concerns etc) but bear reintroductions have been carried out much less frequently than wolves (Predator Conservation Alliance 2002). The reintroduction debate therefore is very much centred on wolves, and the literature reflects this.

The complete eradication of wolves never occurred in the USA, but successful programs to remove them resulted in their extirpation from the southern part of their range (Lohr *et al* 1996). Some of these federal and state eradication programs continued well into the 20th century, until wolf populations had dropped so low that they were listed as endangered or threatened in the lower 48 states (Pate *et al* 1996). Positive media attention and an increase in public sympathy did a great deal to change people's perceptions of wolves (Kellert 1986), and the last three decades since they were listed endangered has seen the development of many wolf recovery plans and the implementation of a number of successful restoration programs (Pate *et al* 1996).

Arguably the most famous of these wolf reintroductions was carried out in Yellowstone National Park. Because Yellowstone draws such a large number of visitors, it is here that the shift that has occurred in people's perceptions of wolves is perhaps the most clear. Just forty years ago, residents of Minnesota were receiving bounty payments to destroy wolves. Now, they and huge numbers of their countrymen form 'wolf jams' just to catch a glimpse of these carnivores (Mech 1996). The American experience demonstrates just how rapidly and drastically people's attitudes towards wolves can change. Whether such an attitudinal shift will be required in Scotland is a question that this study will aim to go some way toward answering.

1.7 European legislation regarding mammal reintroductions

There are two important pieces of European legislation which relate to mammal reintroductions; the habitats directive and the Bern convention.

1.7.1 The Habitats Directive

Article 22 of the habitats directive, (or more correctly; council directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) obligates member states to study the desirability of reintroducing species in appendix four that are native to their territory. Appendix four lists ‘animal and plant species of community interest that are in need of strict protection’. Article 22 goes on to state that proper public consultation must take place prior to a reintroduction. Appendices one and two are also of interest within the context of this study; appendix one lists ‘habitat types of community interest whose conservation requires the designation of special areas of conservation’, and this list includes Caledonian forest as a priority habitat type; appendix two lists ‘species of plants and animals of community interest whose conservation requires the designation of special areas of conservation’.

1.7.2 The Bern Convention

Council decision 82/72/EEC concerning the conclusion of the convention on the conservation of European wildlife and natural habitats (the Bern convention) aims to ‘promote co-operation between the signatories in order to conserve wild flora and fauna and their natural habitats’. Article 11 states that contracting parties must encourage the reintroduction of native species, provided that a study is made in the light of the experiences of other contracting parties. Appendix 2 lists strictly protected fauna species, and appendix 3 lists protected fauna species. One of the important elements of the Bern convention is the focus it puts on the conservation of migratory species, and

promotes co-operation between states to achieve this end. The UK is a signatory to the Bern convention, but as an island, its potential contribution to conserving migratory species is restricted to birds and aquatic animals. Therefore, with regard to terrestrial species, the UK has less of an obligation to co-operate with other nations.

1.7.3 Reintroductions in Europe

Both of these articles that refer to reintroductions state that they must only be considered where it would contribute to the conservation of an endangered species. What is not made clear however, is the scale at which the conservation status of the species should be considered; a species may be critically endangered at the European scale, whilst simultaneously being abundant in one particular country or area. Although the habitats directive and the Bern convention clearly bear good intentions, this ambiguity about scale, and weak wording such as ‘study the desirability of’, and ‘encourage the reintroduction of’, mean that there is ample opportunity for member states to avoid commitment to reintroductions.

There have however, been many reintroductions of several species to Europe. The beaver perhaps represents the biggest reintroduction success story, with a Eurasian population which numbered only around 1,200 animals at the end of the 19th century now grown to almost 600,000 (Halley and Rosell 2002). Reintroductions are a big part of this increase, with around a hundred reintroductions having taken place in nearly thirty Eurasian countries, leaving the UK to be one of very few nations without an established beaver population (Nolet and Rosell 1998, Macdonald *et al* 2000, Halley and Rosell 2002).

Wolves in Europe do not tell the same success story, and although their numbers have been increasing, continuing habitat loss and persecution mean that many populations’ futures are uncertain (Hinrichsen 2000). Different nations seem to have

different attitudes toward the wolf, and so in some places, cross-border populations can prove hard to manage. This is perhaps most clearly seen in the case of Sweden and Norway. Attitude studies in Sweden have shown that wolves are ‘winning the public relations battle’; with most Swedish residents claiming to be happy to live with a wolf population twice its current size (Hinrichsen 2000). In Norway however, attitudes are quite different, with only 7% of residents wanting the wolf population increased (Bjerke *et al* 1998), and earlier this year a cull of wolves was carried out bringing the population to dangerously low levels, to the dismay of many of those involved in wolf conservation (Kirby 2005). Wolves have a different status country to country with regard to hunting. In some countries, Spain and Slovakia for example, the wolf is a game animal, whereas in others such as Sweden, Poland and Italy they have strict protection (Hinrichsen 2000).

1.8 Mammal reintroductions in the UK

The concept of mammal reintroductions in the UK is commonly discussed at the moment because there are a number of different ideas and projects underway, and a range of species being considered. The current UK status and the advantages and disadvantages expected to come with reintroducing the four most commonly discussed candidate species are described in the following sections.

1.8.1 Beavers in the UK

The Eurasian beaver (*Castor fiber*) is listed as ‘near threatened’ (NT) on the IUCN redlist (2002), included on appendices 2 and 4 of the habitats directive and appendix 2 of the Bern convention and is at the centre of the UK reintroduction debate at the moment. A joint venture by Scottish Natural Heritage (SNH), the Scottish Wildlife Trust (SWT), Mammals Trust UK (MTUK) and the Forest Enterprise (FE) is proposing

a seven year trial, with an initial population of three to four families of beavers (around twenty individuals) from Norway being reintroduced into a carefully controlled and monitored site at Knapdale, Argyll (Karthaus 2003). The idea of a trial as opposed to a full reintroduction came in response to the results of the national consultation that SNH had carried out in 1998 (see section 1.5.3).

A decision from the Scottish Executive as to whether to grant the licence for the trial has been longer in coming than expected (Taylor 2002*a*), in part due to the objection of the local National Farmers Union for Scotland (Karthaus 2003), who felt that the potential flooding of farmland would be unacceptable (C Campbell pers comm.). The initial application for the trial was made in early 2002 but the executive asked for more information before a decision could be made. This additional information, taking three years to collect, has been submitted, and makes clear the fact that the Scottish proposal is taking a much more precautionary approach than any of the European reintroductions, many of which had little or no public consultation and did not bother with a trial (SNH 2005). It details beaver reintroductions in other parts of Europe and looks in depth at the risks and benefits that have been seen.

Beavers are commonly referred to as management tools or habitat managers (Taylor 2002*a*, Karthaus 2003, SNH 2005). The primary reason for reintroducing beavers therefore, is not for some heritage/moral reason (though that is still important) but for the benefits to biodiversity that they bring (Karthaus 2003). The interest in 'using' beavers as management tools has grown substantially, and this is reflected in the very large number of reintroductions that have occurred in Europe, with at least fifty river basins seeing them reinstated (Yalden 1999). The Kent Wildlife Trust provides the first UK example of using beavers as management tools. In a fenced off enclosure, they, and other herbivores are being used to re-wild certain near-natural areas (Taylor

2002a, Kent Wildlife Trust 2005). The fences involved in this scheme clearly differentiate the project from the Scottish proposal, but it may prove instructive as to the impacts that beavers may have in the UK.

Reintroductions overseas have shown the types of benefits that come with reintroducing beavers, and these form the bases of the argument for bringing them back. Beavers have been seen to have positive effects on habitats, populations of aquatic and dead wood invertebrates, amphibians and breeding birds. A reduction in willow scrub and therefore shading has been observed, and beaver ponds are thought to aid survival of fish when rivers are low. An increase in the numbers of visitors to the areas that have seen reintroductions is another common observation. The risks of negative impacts on agriculture and forestry, such as those caused by localised flooding, are slight and established mitigation methods can be applied. Perhaps the largest concern associated with beavers in Scotland, is the impacts that their dams may have on spawning fish; the fishing industry in Scotland is a multi-million dollar industry (BFRS, 2002), so there are good grounds for concern. The European experience has been inconclusive as to these effects, but it has shown that maintenance of dams and the formation of bypasses is a dynamic process, so the barrier effects will constantly change. The risk of disease, such as the fish scale parasite *Gyrodactylus*, and the human intestinal parasite, *Giardia* is another concern, but one that should be dealt with by six months quarantine of the founder animals (SNH 2005). Beavers have been shown to have very varied reproduction and dispersal rates, to a large extent determined by the topography of the landscape, so rampant spread throughout hilly Scotland is unlikely (Halley and Rosell 2002).

1.8.2 Wild boar in the UK

Of the four species discussed here, wild boar (*Sus scrofa*) is perhaps the lowest conservation priority; the only one that is not listed in either the IUCN red list or appendices of either the habitats directive or Bern conventions. So perhaps it is fitting that they have taken matters regarding their reintroduction into their own hands. Wild boar have been extinct in the UK since the 13th Century (Yalden 1999), but their status as a game species, and later a commercially farmed species has meant that their presence in the UK has never disappeared altogether. Escapees from farms over time have resulted in the establishment of at least two free-living populations in southern England (Goulding *et al* 2003, Wilson 2003). Whether these animals are pure bred European wild boar or hybrids of feral domestic swine is not known. This has consequences for their conservation value and hence on how they should be managed; DEFRA have officially acknowledged the boars' presence, but are as yet undecided as to what to do about them (Goulding 2004). If they are pure-bred, as a former native species (particularly one which is being considered for reintroduction anyway) there is a strong argument for allowing them to remain (Gow 2002).

Feasibility studies have been carried out to investigate the potential for a somewhat more controlled reintroduction of wild boar to Scotland. Leaper *et al* (1999), using GIS and PVA techniques, concluded that biologically, reintroducing wild boar was possible, but emphasised that environmental and socio-economic research would need to be carried out before a reintroduction would be seriously considered. However, Howells and Edwards-Jones (1997), again using PVA, concluded that establishing a self-sustaining population was *not* feasible in Scotland due to the lack of suitable habitat. The presence of the free-living populations in the UK may help to inform this

issue further by allowing direct observation of how these populations fare, to a certain extent removing the need for modelling and feasibility studies.

Wild boar are considered to be a keystone woodland species, although the specific effects that they have on woodland ecology is not fully understood (Leaper *et al* 1999). They can act as a means of seed dispersal, their rooting behaviour is thought to accelerate decomposition of organic matter and be beneficial with regard to reducing bramble and bracken dominance, and an increased floral diversity has been observed in areas where boar are present. This same rooting behaviour however can have detrimental effects on bluebells, a species which is of particular importance in the UK (Gow 2002). Wild boar can cause significant agricultural damage and can act as reservoirs for disease; hence they are considered a pest in some countries (Leaper *et al* 1999). They can cause road accidents and have been known to chase dogs, causing a potential risk to human safety if the dog's owner attempts to intervene (Goulding 2004).

This range of conflicting factors associated with wild boar has been not been accurately represented by the media; it has tended to focus on the negative aspects, most frequently reporting that boar would constitute a risk to human safety, be agricultural pests and act as a reservoir for disease (Goulding and Roper 2002). This predominantly one-sided representation of the boar will complicate further an already complex management problem.

1.8.3 Lynx in the UK

The Eurasian lynx (*Lynx lynx*) is included in appendix 2 and 4 of the habitats directive, appendix 2 of the Bern convention, and is listed as 'near threatened' (NT) on the 2002 IUCN red list. Of the four species discussed here, the Eurasian lynx is the most endangered; the only one to be showing a decreasing population trend (IUCN 2002).

Lynx were until recently (when radiocarbon dating showed otherwise) thought to have been extinct from the UK since Mesolithic times, but it is now known that they persisted until about 1700 years ago (Yalden 1999). There have been many anecdotal reports of lynx and/or other large pantherine cats living wild in the British countryside (Taylor 2002*b*, Taylor 2004*a*, Moiser *et al* 2002), but according to Wilson (2004), reports of them surviving for long periods of time in the wild and reproducing do not stand up to scientific scrutiny.

Lynx have a much lower profile, both in the media and in folklore and mythology, than the wolf. For this reason, and because lynx pose a far smaller risk to human safety and livestock than wolves (or bears), Wilson (2004) suggests that the lynx merits serious consideration for reintroduction. Yalden (1999) suggests that there is an adequate food supply, in the form of roe deer and brown hares, as well as sufficient suitable habitat in the UK to support a reintroduction, and notes the success of lynx reintroductions that have occurred in Europe. He suggests that lynx could beneficially reduce the very large numbers of deer in Scotland. Lynx would probably have some detrimental effects on agriculture however, as they do in Europe, where compensation schemes are in place to placate those affected (Yalden 1999). A small human safety consideration also applies, as exemplified by the recent mountain lion (not a hugely dissimilar animal to the Eurasian lynx) caused human fatality in Colorado (Taylor 2004*b*). A feasibility study for a Scottish lynx reintroduction is currently underway (A W Featherstone pers comm.).

1.8.4 Wolves in the UK

The grey wolf (*Canis lupus*) is not listed in the IUCN red list, but is the only one of the four species discussed here that feature in appendix 2 of the Bern convention (strictly protected fauna species). The wolf is also listed in appendix 4 and as a priority species

in appendix 2 of the habitats directive. The wolf is the most recent of the large mammal fauna to have become extinct from Scotland, their extinction in the 1600s thought to be hastened by the loss of forest habitat (Yalden 1999). Reintroducing wolves to Scotland has been discussed for many years, some suggesting that the Isle of Rhum (which is a nature reserve owned by SNH) might be a suitable place for a trial (Yalden 1999). There are a number of organisations that advocate their return, Trees for Life, the Wolf Society and the Wolf Trust being notable examples. They support the return of the wolf on moral grounds as well as on ecological grounds.

One attraction of bringing back wolves is the idea that they could control the numbers of deer in Scotland. Estimates by the Deer Commission for Scotland (DCS) suggest that there could be as many as 600,000 deer in Scotland. Deer have no natural predators in the UK, so it is hardly surprising that their numbers have risen so high. The Scottish hunting industry is worth £500 million per annum, with about half of that coming from fishing, and the other half from shooting sports (R Montague pers comm.), so there are certain parties are quite happy with a superabundance of deer, but they cause a number of problems, both to people and the environment. Deer density has an effect on the potential for forest re-growth, the current level being far higher than that needed to allow natural regeneration (Jorristma *et al* 1999). In areas where forest regeneration work is carried out, deer fences are erected at great expense (A W Featherstone pers comm.). Deer also cause around 400,000 traffic accidents a year in the UK, between 2 and 5% of which would result in human injury or death (White *et al* 2000, Staines *et al* 2001). With deer populations so high, it is unlikely that wolves would have any significant effect in regulating them, but if a large deer cull was carried out, wolves may contribute to keeping the deer population at a less ecologically damaging level. In Yellowstone national park, wolves were effective in controlling elk

numbers, and had a number of other beneficial ecological effects (Ripple and Beschta 2003), but ecological effects of this type are inherently complex and unpredictable (Graham *et al* 2005) and so extreme caution must be used when extrapolating from one ecosystem to another. Although these ecological benefits are attractive, there is not a great deal of theoretical support. Until context specific models are developed, the debate over the effects that wolves would have on deer on Scotland will continue (Panaman 2002).

In addition to the legislative obligations, reasons for bringing back wolves include the boost they could bring to tourism, and moral arguments, based around atonement for the fact that humans eradicated them in the first place. The arguments against reintroducing wolves are perhaps easier to list and include concerns for human safety, the damage they would cause to agriculture by killing livestock, the harm they could cause to tourism in Scotland by scaring off walkers and reducing ungulate hunting quarry. Whether these concerns are real or imagined is largely academic; people's attitudes can be just as easily shaped by both.

1.8.5 'Eco-park' proposals

Paul Lister and Paul Van Vlissingen, two wealthy Scottish landowners, are making quite a different type of reintroduction proposal. They are suggesting using their land to create large self-sustaining 'eco-parks' which would fence in the full complement of extinct mammals. Van Vlissingen's estate, in Sutherland, is 81,000 acres, and Lister's Alladale estate in Wester Ross is 23,000 acres (though he hopes to double this before bringing back the mammal species). Whether these areas are large enough to support the animals that are being considered without supplementary feeding is a question for the population modellers, but in terms of public acceptance, this idea may be much more attractive to many residents. Fears about livestock and human safety would be

removed, as would concerns about the reintroduced animals' impact on the ecosystem, as there would be no direct dispersal route between the interior and exterior of the fence. The establishment and maintenance of Lister's 'eco-park', which would involve the planting of 2-300,000 trees and the erection of over 50 miles of electrified fence, he claims would create around a hundred jobs, a social contribution which may act as an important bargaining chip in his favour.

The biggest problem with the eco-park idea is that of public access. The "rights to roam" act (part of the Land Reform (Scotland) Act 2003) that came into effect earlier this year gives the public free access to almost the whole of the Scottish countryside (Ramblers Association 2004). A recent episode of the TV programme *Countryfile* featured Paul Lister explaining his proposal and included a spokesman for the ramblers association, David Mossis. Mr Mossis stated that as an organisation, the ramblers association is keen on habitat restoration and reintroductions, but felt that the fences would be a retrogressive move in light of the recent land reform legislation. He acknowledged that reintroductions overseas have not required fences, and could not see any reason why the UK should be an exception. He also claimed that fencing off estates would set a precedent to other landowners, who could create their own fenced 'private kingdoms' if they agreed to keep a few wolves.

The decision as to whether the fences can go up or not rests with the Scottish Executive, but Paul Lister is hoping that within 18 months or so he can have a trial area established; an fenced area of 750 to 1000 acres with bison, wild boar and beaver. He believes that starting small and showing the public that it can work and then allowing the project to progress is the best way forward.

This eco-park idea, though intriguing, will not be the main focus of this study, as in the strictest sense, what these proposals suggest is not 'reintroduction', as the animals

would remain behind fences. The media attention that Lister and Van Vlissingen's ideas have been attracting however will have an effect on the reintroductions issue, as mentions of the species that might be reintroduced have the potential to affect peoples attitudes towards that species, and hence how they feel about it being reintroduced.

2. Methodology

2.1 Defining 'Attitude'

As seen above, there have been many studies carried out which have measured attitudes toward mammal reintroductions, particularly those of wolves (William *et al* 2002 summarises many of them). Before attitudes can be measured, a robust working definition of attitude must be given. Bath and Buchanan (1989) state that attitude is 'a predisposition to act in a favourable or unfavourable fashion toward some object', and goes on to say that attitudes are generally considered a predictor of willingness to accept (wolf) restoration. The 'object' in this study is the area of countryside which would be inhabited by reintroduced mammals. Social scientists use the term 'opinions' to denote the least enduring and most superficial attitudes. (Oppenheim 1992).

Attitudes are only really interesting if they actually translate into behaviour. According to the theory of reasoned action (Fishbein and Ajzen 1975), which has informed several of the surveys of attitudes towards wolves in the USA and Scandinavia (Pate *et al* 1996, Enck and Brown 2002, Ericsson and Heberlein 2003), the intention that corresponds to a certain behaviour is the best predictor of that particular behaviour. In this case, the behaviour of interest is whether people will support or oppose mammal reintroduction programmes. Attitudes to a certain extent determine behavioural intention (Pate *et al* 1996), so by measuring attitudes an insight into how people will behave is achieved.

2.2 'Wolf methodologies'

Because of the large number of attitude studies regarding wolves the methodologies used have evolved over time, constant refinement producing a few robust and well used methodologies. Many of them have used Likert type responses to assess levels of agreement or disagreement with a number of attitude statements. Kellert's work, which many subsequent studies based their methodologies on, defined a number of attitude typologies which describe societal attitudes toward nature (Kellert 1980, Kellert 1985). Likert responses to an often large number of statements gave respondents a score for each of the typologies, which corresponded to support or opposition to wolf restoration. Most of these studies were carried out using telephone interviews lasting up to an hour, as each of the attitude scales required responses to many statements.

Scaling responses to a number of attitude statements is a well-established technique, based on the observation that attitudes are not fixed, and therefore not easily elucidated by single questions (Salant and Dillman 1994). An attitude scale's main function is to divide people into broad groups and to see how attitude is related to other variables of interest. Attitude scales are not appropriate for measuring subtle insights into individual cases. The Likert scale is a very popular and reliable scaling procedure as it is less laborious than alternatives like Thurstone scales and provides a precise measure of the respondents' level of agreement or disagreement (Oppenheim 1992). The main problem associated with Likert scales is that the same overall score can be achieved in a number of ways; two or more identical scores can have totally different meanings (Oppenheim 1992). Bearing this in mind whilst designing the attitude statements is the best way to overcome this problem.

Other studies which did not use Kellert's typologies have also used attitude scales comprised of Likert responses, but the statements were specific to the animal or

reintroduction project being researched. For example, Ericsson and Heberlein (2003), who used a postal survey to assess attitudes of the Swedish public toward wolves, included statements about fear of wolves, existence value of wolves, the desired size of the wolf population in Sweden and various other factors. The attitude score has been found to be a useful methodology as it not only indicates whether a respondent has a positive or negative attitude, but also gives a measure of how strong that attitude is.

Because this study does not have the time or resources available to use the full Kellert methodology, a combination of the two methodologies described above will be used whereby statements used to construct an attitude scale will be specific to the context of the study but will be based on Kellert's attitude typologies (see section 2.4.6 for a fuller explanation).

2.3 Choice of survey instrument

A questionnaire was chosen for the main survey instrument for a number of reasons. As opposed to verbal interviewing, a questionnaire standardises the questions asked, so a uniformity of response is achieved, allowing statistics to be carried out (McDaniel and Gates 1995). Questionnaires have been widely used to describe attitudes, opinions and awareness, with regard to this subject and many others, so the potential for using previous studies to provide design guidelines is great.

Questionnaires also have distinct financial and practical advantages. Telephone interviews require a great deal of time and are associated with high cost, and the potential for interviewer bias (Fink and Kosecoff 1985); some respondents may wish to report fear (of wolves perhaps) and may be unwilling or embarrassed to do so verbally. Verbal methods are also harder to standardise, with slight changes in word order or even inflection having the potential to alter the meaning of a question (Salant and Dillman 1994). Allowing respondents to answer questions in their own time is another

advantage over verbal methods. This means that answers will be more considered so a more accurate description of respondents' attitudes will be gained (Fink and Kosecoff 1985). The risk with this method however, is that respondents may get help completing the questionnaire from other members of the household, potentially distorting responses.

Delivering the questionnaire by post was not considered a good idea due to the low response rate that is commonly achieved, the difficulty of getting addresses and the high financial cost (Salant and Dillman 1994). Because the area to be surveyed had a clearly defined boundary, it was decided that a door to door method of delivery was the most suitable for the rural sampling. For the urban sampling, respondents were engaged face to face, but left to complete the survey in their own time. This had the advantage that multiple surveys could be completed at any one time, and removed the problems associated with interviewer bias.

2.4 The questionnaire

Appendix 1 shows a copy of the questionnaire used. Oppenheim (1992) states that the detailed specific aims and measurements must be precisely and logically related to the aims of the overall research plan. There are no hard and fast established methodologies to help design questionnaires, the researcher must exercise their own best judgement (Oppenheim 1992). Guidelines do exist however, and careful consideration was given to these with regard to style and language, question and word order and question type. These considerations mean that the potential for offending or boring the respondent with sensitive questions or an overly-long questionnaire is minimised. The following sections will describe the questionnaire and the justifications behind each of the questions. Italicised text refers to sections or questions in the questionnaire.

2.4.1 Covering letter

Following guidelines in Fink and Kosecoff (1985) the questionnaire was accompanied by a short covering letter (also shown in Appendix 1) which introduced the subject and explained the purpose of the study. The letter needed to be concise, yet informative. A personal style was used in an attempt to increase the response rate; it was thought that people would be more co-operative if they thought they were helping an individual with research as opposed to a larger organisation. A covering letter was not appropriate for face to face surveying, so a verbal equivalent (as standardised as possible) was used instead.

2.4.2 Definitions

In order to remove any uncertainty about any of the terms used in the questionnaire, a short definitions section was included; the term '*area*' was used to mean within a 30 mile radius of the respondents home; '*ancient ecosystem*' was used to refer to the landscape, plants and animals present in Scotland 1500 years ago and '*lost mammals*' refers to the animals which were present at that time, but that are now extinct in Scotland. 1500 years ago was chosen as a cut-off date, as this is the period which saw the extinctions of the species which are most commonly considered for reintroductions, namely beaver, wild boar, wolf and lynx (Yalden 1999).

2.4.3 Demographic details

In order to identify which personal characteristics affected attitudes towards reintroductions, questions asking about demographic details were included in the questionnaire. The information obtained by these questions could help to identify groups which are typified by particular attitudes. This can be used to help target

sensitive groups with information or be used to predict where high levels of support or opposition towards individual projects can be expected.

These demographic questions were split into two sections; one requesting less sensitive information at the beginning (*section 1*), and another requesting more sensitive information (income and education for example) towards the end (*section 6*). The details requested were; how long the respondent had lived in the area, gender, occupation, year of birth, frequency of recreational use of the countryside, whether the respondent was a hunter, whether the respondent was a member of an environmental organisation, highest level of education and income of the highest earner in the household. These particular questions were chosen as they were considered to be the most likely to be related to attitudes, and because most of them had been used in previous studies, allowing qualitative comparisons to be made. All of the questions were multiple-choice, with the exception of occupation and education, which were open-ended.

2.4.4 Awareness of the issue

In order to assess how aware respondents were of the issue, a section which aimed to find out how much people knew about TfL and the beaver trial was included (*section 2*). Questions covered whether respondents had heard of TfL and the beaver trial, how they had heard, whether they felt well informed, and whether they were supportive. This section was also included to give indications of which are the most important methods of finding out about these kinds of projects. It has been noted how great an effect the media can have in influencing public opinion about reintroduction issues (Yalden 1999, Goulding and Roper 2002, Skogen and Krangle 2003), so whether people have heard about TfL and the beaver trial through this medium will be of interest, particularly in relation to the results of the media analysis (see 2.4). A large public consultation

regarding the beaver trial was carried out (Scott Porter Research and Marketing Ltd. 1998), so how well people feel informed about it compared to about TfL, a local organisation who have not invested nearly so much in publicity (A W Featherstone pers comm), will give an indication of how effective this consultation was.

2.4.5 Advantages and disadvantages of reintroductions

Section 3 aimed to investigate what advantages and disadvantages respondents expected would come with mammal reintroductions. Respondents were asked to list up to three advantages and three disadvantages that they thought would come with reintroducing beavers, and three advantages and disadvantages they thought would come with reintroducing wolves.

This section was open-ended, so responses required categorisation prior to analysis to allow any meaningful quantitative analysis. The categories used are based on the responses given and needed to be broad enough to encompass the full range, while remaining focused enough to provide indications of the frequency of perceptions. The existing literature was used to help to construct the categories (Goulding and Roper 2002 for example).

2.4.6 Attitudes

Using a methodology similar to that in Lohr *et al* (1996) and following guidelines in Oppenheim (1992), attitudes were measured by using a Likert type response to 10 statements relating to reintroductions. The respondents had the choice to tick boxes corresponding to strong agreement, agreement, neutrality, disagreement or strong disagreement with the statements. If respondents did not know how they felt about the statement, they were asked to leave all five boxes blank.

Prior to analysis, the responses were given numeric values of strongly disagree = -2, disagree = -1, neutral = 0, agree = +1, strongly agree = +2. The resulting values could then be summed to give an overall attitude score ranging between -20 and +20, a high score indicating a positive attitude toward reintroduction.

Since the questionnaire had to be kept fairly short to maximise participation, it was considered an ideal situation if the ten attitude statements could also be indicative of individual behavioural attributes. This would mean that the attitude section would yield not only an overall measurement of how positive or negative respondents' attitudes were, but also provide an insight into how people view wildlife and reintroductions. To this end, the ten statements were based mainly on the attitude typologies used in Kellert (1985), as well as one which aimed to assess how common the NIMBY (Not In My Back Yard) attitude was, and one which asked for an overall level of support. The attitude statements that were used and the attitude typologies on which they were based are displayed in table 2.1.

Previous studies that have used these typologies (e.g. Kellert 1985, Kellert 1986, Bjerke *et al* 1996, Bjerke *et al* 1998) used multiple questions to build up an attitude scale for each typology. This obviously necessitates a longer survey than would fit within the requirements of this study. Using single questions can give an indication of the typologies that are prevalent within the sample, but it is acknowledged that multiple questions would have given a greater level of confidence in the results. For this reason, the analyses used to gauge the presence or absence of certain typologies in the sample will be simple, and really only offer a qualitative result.

The ten statements were written as if from the viewpoint of a person characterised by each of the attitude typologies. This was clearly a subjective exercise involving a certain amount of imagination, but using the literature for guidance and

carrying out several pilot studies amongst colleagues refined the process until a satisfactory scale was achieved.

Attitude question	Typology	Description (Kellert, 1985)
4.1 I feel that wolves symbolize the greatness and beauty of nature.	<i>Naturalistic</i>	Interest and affection for wildlife and the outdoors.
4.2 I feel that reintroducing Scotland's lost mammals is important in order to restore the natural balance of the environment.	<i>Ecologistic</i>	Concern for the environment as a system, for interrelationships between wildlife species and natural habitats
4.3 I wouldn't want large carnivores reintroduced for fear that they might hurt pets and other smaller animals.	<i>Humanistic</i>	Interest and strong affection for individual animals, principally pets.
4.4 I like the idea of reintroducing Scotland's lost mammals, but I wouldn't want them in my area.	<i>NIMBY</i>	Interest in nature, but not prepared to deal with direct consequences.
4.5 If Scotland's lost mammals were reintroduced, I would not venture into the countryside.	<i>Negativistic</i>	Avoidance of animals and nature due to either dislike or fear.
4.6 I find nature to be a strong source of inspiration so would love to see it returned to its ancient state.	<i>Aesthetic</i>	Interest in the artistic and symbolic characteristics of animals or their habitats.
4.7 I feel that reintroducing Scotland's lost mammals would bring more money through tourism to the area.	<i>Utilitarian</i>	Concern for the material and practical value of animals.
4.8 I would find it a stimulating and exciting experience to hunt and kill a wild boar.	<i>Dominionistic</i>	Interest in mastery and control over animals, typically in sporting situations.
4.9 I have little interest in nature and feel that the money spent on a reintroduction program would be better spent elsewhere.	<i>Neutralistic</i>	Avoidance of animals and nature due to indifference.
4.10 Overall I would say that I would support a project which aimed to reintroduce Scotland's lost mammals and completely restore its ancient ecosystem.	<i>n/a</i>	<i>n/a</i>

Table 2.1 – Attitude statements and the attitude typologies they were based on.

It was considered important to ensure that the overall attitude section was kept balanced so that people didn't feel that they were being influenced by what were purposefully provocative statements. Because some of the typologies are considered positive and some negative (Bjerke *et al* 1998), this was easy to achieve, so the resulting section had five positive statements (4.1, 4.2, 4.6, 4.7 & 4.10) and five negative statements (4.3, 4.4, 4.5, 4.8 & 4.9). This ensured that no clue was given as to the attitude of the researcher and that all statements required individual consideration, so not allowing simple ticking down one side of the page.

2.4.7 Scenarios

As described in the introduction, there are two landowners in Scotland who are considering 'reintroducing' many of the extinct species in question into large fenced reserves on privately owned land. Although this particular idea is not the main focus of this study, it is clearly closely linked, so a section was included which allowed respondents to indicate their favourite reintroduction scenario. Five possible scenarios were offered, using beaver, wild boar, lynx and wolf as candidate species (named above the five options);

- a) No reintroduction of any species
- b) Reintroduction of above species into a fenced 'eco-park'
- c) Reintroduction of above species into the wild with management and monitoring
- d) Reintroduction of above species into the wild with no management or monitoring
- e) Reintroduction of selected species into the wild (with associated tick list of candidate species and space for 'other')

Respondents were asked to rank the five scenarios in order of preference, using '1' to denote favourite, and '5' to denote least favourite.

2.4.8 Further comments

A space was included for respondents to leave any further comments they wished to make towards the end of the questionnaire. This provided a means to gain a deeper insight into specific issues, and allowed the respondent to state their opinions in an open and unconstrained manner.

2.4.9 Knowledge Section

A ten question 'quiz' section was included at the end of the questionnaire to give a measure of the level of knowledge respondents had about the subject of reintroductions and wildlife in general. The questions all had multiple-choice answers, spanned a range of difficulty levels and were all related to the subject of Scottish wildlife, both past and present. One point would be given for a correct answer, none for an incorrect answer or 'don't know'. This knowledge score ranging from zero to ten can then be tested for correlations with other variables, such as attitude score.

Due to the sensitivity associated with testing people, this section was labelled as 'optional, and for your amusement only'. To encourage completion, entrance into a prize draw was offered to those getting 80% or more correct answers (as suggested in Fink and Kosecoff 1985).

This section was included as many previous studies have reported a connection between positive attitudes and knowledge level (Williams *et al* 2002). This connection is important as it may reveal the potential benefits of education programs.

2.5 Sampling regime

In order for a sample to be representative of a population, and to reduce the potential for bias, sampling units must be drawn randomly (Fowler *et al* 1998). However, truly random samples can be hard to acquire, particularly in rural areas where lists of

addresses or phone numbers are not freely available. Stratifying the sampling method so that units are selected randomly within predefined strata is one way to reduce the difficulty of obtaining a truly random sample. Since the study area (the TfL area) was well defined, it was decided that a stratified random spatial sampling method would be the most appropriate.

Using tables designed to help decide the most appropriate sample size (such as that found in Salant and Dillman 1994), taking into account practical considerations and accepting that a high level of precision was not essential to this study, a total rural sample size of 120, and an urban sample of 100 was considered appropriate.

2.5.1 Spatial method

Ordnance Survey Landranger maps (nos. 19, 20, 25, 26 and 34) covered the entire area. At 1:50,000 scale, Landranger maps are very detailed, showing all buildings, and are frequently revised (Ordnance Survey, no date). The maps purchased for this exercise were updated in 2002, so one limitation (and a potential source of bias) of this method is that any houses built since 2002 would not be included.

The Landranger sheets were cut and joined to create one large map of the entire TfL area, using the boundary roads as described in the introduction for the periphery. Using a compass, three miles outside of the TfL area was marked on to include people living close to the area, not just within it. The whole area was then sectioned into four quadrants to stratify the sampling. This would ensure that the whole area is fairly represented and allow for any differences between sub-sections to be tested.

Grid squares which contained buildings were visually identified and entered into an excel database starting with the most north-western and ending with the most south-eastern. Using the random number generation function within Excel, sixty (twice the number of desired responses per quadrant, to ensure satisfactory sample size) random

numbers between zero and the total number of squares with buildings in for each quadrant were produced. For example, 157 grid squares were identified as having buildings in the south-east quadrant, so sixty random numbers were generated between 1 and 157.

2.5.2 Questionnaire delivery

Selected grid references were marked on the maps and routes of delivery were planned. The most central house in the selected grid square was surveyed in each case. Grid squares which were selected more than once (due to multiple occurrence of the same random number) which had more than one house were sampled twice, the second house being the one nearest to the top left corner of the grid square, the third being the one nearest to the bottom right. Grid squares selected more than once which had only one house, meant that the closest house in an adjacent grid square was used.

Due to the way that houses were arranged, widely dispersed and often quite isolated, the most efficient way to distribute and collect the questionnaires was to identify a 'there and back again' type route, dropping off surveys on the way and collecting them later the same evening on the way back. The respondent at the last house on the route was requested to complete the questionnaire straightaway so that it could be collected immediately.

Surveying was carried out between about five and nine in the evening on weekdays and between eleven and seven at weekends when it was thought that most people would be at home. Respondents who were in at the time of calling were given a short introduction and asked to leave the completed questionnaire in a place where it could be collected without having to disturb them again. For houses where no-one was in at the time of calling, a hand written post-it note was left with the questionnaire requesting that it be left outside for collection later. On the way back past, if it was

clear that there was still no-one at home (if the questionnaire was still in the letter box), then a stamped addressed envelope and a different post-it note requesting that respondents completed the questionnaire and forwarded it was left. Hand written post-it notes were used to try to give a personal feel which it was thought might encourage completion.

2.5.3 Urban sampling

Sampling in urban areas was far less problematic and less systematic. Selecting multiple busy locations within the cities meant that the respondents came to the questionnaire, the opposite of the rural situation. Places like shopping centres, parks and sports centres were visited to get an idea of busy periods, and the most suitable locations and times were selected. Decisions of where and when to sample were partly determined by the amount of available time in the survey area, but each location was sampled at both a weekday and a weekend and at multiple times throughout the day in order to try not exclude any sub-samples.

In order to remove the risk of group bias, the every n th person passing method was used (Fink and Kosecoff 1985). In areas where people were passing frequently, such as in shopping centres, every 10th person passing was asked. At less busy localities, where people were static, such as in sports centre viewing galleries, every 5th person sat down was sampled. Using a stratified as opposed to random sampling method means that there is less confidence that the urban sample is representative of the population, but due to the constraints of time, and because rural attitudes are the main focus of the study, it was considered to be the most appropriate.

As the questionnaire was designed to be completed unassisted, areas near to seating were selected so that the respondent could be left to work at their own speed. Several questionnaires could therefore be in the process of being completed at any one

time, which increased the speed at which the target number of responses could be obtained. This method also had the advantage of removing any risk of interviewer bias.

As a covering letter was not considered suitable for this type of surveying (people were often in too much of a hurry), a short and set introduction was given instead. This introduction contained the same information as the covering letter. The content of the rest of the questionnaire was the same as that used in the rural sampling.

2.6 Stakeholder interviews

In order to further investigate the issue, and to understand the attitudes of key stakeholder organisations, a number of semi-structured interviews were carried out. The following section gives brief descriptions of the organisations that were represented and explains why they are considered important in relation to this study.

2.6.1 Key stakeholders

The Tfl idea clearly would clearly have a wide range of impacts, affecting a diverse group of stakeholders. This section will briefly describe the stakeholder organisations that were considered the most relevant to this study and hence the ones which were interviewed.

Trees for Life (Tfl), the organisation which proposed the idea which this study is surveying attitudes towards, is clearly very involved. Tfl work with a number other organisations (Forestry Commission for example) and have been quite content to be carrying on with their forest regeneration work without a particularly obvious public face. However, particularly with regard to reintroductions, Tfl recognise that public attitude is important and that education is necessary, and to this end they have recently appointed a marketing assistant in an attempt to increase public support (A W

Featherstone pers comm.). An interview with Alan Watson Featherstone, TfL's executive director was carried out on 16th May.

The National Trust for Scotland (NTS) is the third largest landowner in Scotland, caring for over 76,000 hectares of Scottish countryside, including several sites in the TfL area (NTS publicity 2005). The NTS has around 250,000 members, who are typically older people. Whether NTS support or oppose a reintroduction program could have major consequences on how successful that program would be. An interview with James Fenton, head ecologist of NTS was carried out on 26th May at the NTS northern regions office. NTS is a completely separate organisation from the National Trust in England and Wales.

The National Farmers Union, Scotland (NFUS) has about 10,000 members, which represents about 80% of all Scottish farmers. Mammal reintroductions, particularly of carnivores such as the wolf, would clearly have serious implications for farming. NFUS were the most vocal in their opposition of the beaver trial (Karthaus 2003), so any other mammal reintroductions are likely to be met with similar, if not more fierce opposition. An interview with Craig Campbell, SNFU policy manager was carried out 3rd June.

The Forestry Commission (and the Forest Enterprise, which is its implementing arm) is a governmental body, implementing policies from the Scottish Executive. A major focus of their work at the moment is native woodland regeneration, and they manage a large part of the TfL area, so a lot of work is done in partnership with TfL. The beaver trial site at Knapdale is Forestry Commission land. An interview with Russell Cooper, wildlife officer and head Forestry Commission stalker was carried out on 19th May.

The Scottish Countryside Alliance (SCA) is a devolved wing of the Countryside Alliance with about 9000 members. Around half of their members are farmers or landowners, the rest are recreational fishermen, hunters or stalkers. Mammal reintroductions would be likely to affect a large proportion of this membership. Since the hunting issue is largely dead, SCA are diversifying, supporting a range of countryside livelihood issues such as branding of wild shot Scottish game and protection of shooting rights (R Montague pers comm.). An interview with Ross Montague, campaigns manager was carried out on 1st June.

The Scottish Wildlife Trust (SWT) has around 25,000 members and is generally seen as the voice of moderation amongst the conservation organisations (S Milne, pers comm.). They own or manage more than a hundred reserves throughout Scotland, covering an area of about 20,000 hectares, though none of this is in the TfL area (SWT publicity 2004). They often work to raise awareness of conservation issues, and this is the main role they are playing with regard to the beaver trial. An interview with Simon Milne, chief executive, was carried out on 6th June.

Mammals Trust, UK (MTUK) is not a membership organisation as such, but have about 15,000 supporters with whom they are in regular contact with and who make donations on a regular basis. MTUK is the UK campaigning arm of the Peoples Trust for Endangered Species (PTES), an international organisation. They are solely concerned with raising and distributing funding for mammal related projects and are providing a share of the funding for the beaver trial. An interview with Jill Nelson, chief executive, was carried out on the 20th June.

Scottish Natural Heritage (SNH), the Scottish Executives statutory advisor on natural heritage and conservation matters, are largely behind the beaver trial. An

interview could not be organised with a representative from SNH, but there has been a lot written about their stance towards reintroduction, so secondary sources were used.

There are obviously other stakeholder organisations that could have been interviewed; WWF, the Mammal Society, the Deer Commission for Scotland (who declined an interview) the RSPB, the Scottish Crofters Association, People Too (an anti-conservation NGO) and the Wolf Society of Great Britain to name a few. Due to the restrictions of time it would clearly not have been possible to interview all of them, but it is thought that those described above are broadly representative of the whole.

2.6.2 What questions were asked

The interviews sought answers to two main questions: Firstly, what was the stakeholder organisation's stance regarding reintroductions? Some organisations had an official line, while others could only give general indications of how they would be likely to respond to potential projects. The factors which affected the particular organisation's stance on reintroductions were also discussed, including the potential risks and benefits that might come with reintroductions. In an attempt to summarise heavily wordy information which would result from these interviews, the interviewee was asked to complete the attitude section of the questionnaire on behalf of their organisation.

Secondly, how important is public attitude in policy making? Does the stakeholder organisation consult widely and do they feel that a positive public attitude is required for successful reintroduction program? Understanding public attitude is all well and good, but if the organisations that might be involved or affected by mammal reintroductions do not need public approval, or are not interested in what the public think, then the importance of this study is diminished.

The stakeholder meetings were also used as sources of primary information for investigating the issue in general. The interviewees were very well informed individuals and provided many suggestions that facilitated the research in various ways.

2.7 Media analysis

Section 2 of the questionnaire included questions about how respondents had heard of TfL and the beaver trial. One of the options in response was ‘local or national media’. It has been noted many times that the media can be a very powerful force in shaping people’s attitudes towards wildlife issues, particularly regarding large mammals (Goulding and Roper 2002). To see how the British media is handling the issue of reintroductions and to see if this has any relation to people’s attitudes and awareness, a media review, using a sample of national and local newspapers, was carried out.

Since it was not considered likely that there would be many articles about the concept of reintroductions in general, two species were focused on for the media review, and how the media portrayed them was analysed. Beavers and wolves were chosen because, as mentioned above, they are thought to represent the two extremes of the issue. This would also allow the media-portrayed advantages and disadvantages to be compared with those perceived by respondents.

The sample newspaper articles were found using the Factiva search engine on the 23rd June, 2005. The search of UK newspapers excluded republished news, recurring pricing and market data, obituaries, and sports news. The time period selected was the last two years, as it was thought articles older than this would no longer be affecting people’s attitudes. Two searches were carried out; one which searched for ‘beaver or beavers’ (Boolean ‘or’), and another which searched for ‘wolf or wolves’. Both searched for the terms as free text in the headline and lead paragraph. References to certain sports teams, and common phrases such ‘the wolf at the door’, ‘cry wolf’ and

'a wolf in sheep's clothing' meant that particularly for the wolf search, many more articles were returned than those that were actually relevant (over 2000 for the wolf search). The articles therefore had to be individually screened to pick out articles which referred to actual wolves or beavers.

Following the methodology suggested in Goulding and Roper (2002), advantages and disadvantages that would come with reintroducing beavers and wolves that were portrayed in the articles were recorded using the same categories as those made for classifying the responses to *section 3* of the questionnaire. In addition, the articles were read, and using best judgement were rated as either positive, negative or ambivalent in the way in which they portrayed the species.

2.8 Statistical analysis

The majority of the statistics used in this report are non-parametric, as most of the data are on an ordinal or nominal scales (attitude score and several of the demographic categories for example). Non-parametric tests are also appropriate here as they are suitable for analysing derived data such as proportions (Fowler *et al* 1998).

The Likert responses to the 10 statements in section 4 (attitudes) of the questionnaire gives rise to the attitude scale. The responses obtained must be transformed so that they all indicate a consistent direction of support or opposition for reintroductions. This was achieved by taking all the responses to negatively directed statements (such as 'If Scotland's lost mammals were reintroduced, I would not venture into the countryside') and dividing them by -1, so reversing the sign. The responses can then be summed to give an overall attitude score, which will fall between -20 and +20. The whole range of responses, between -20 and +20, represents the attitude scale. This attitude scale is ordinal; as the numbers indicate rank order so do not represent absolute

quantities, and the intervals between adjacent numbers are not necessarily equal (Fowler *et al* 1998).

Reliability analysis, using Cronbachs alpha (as in Bath and Buchanan 1989 and Pate *et al* 1996) was carried out to provide a measure of reliability of this ordinal scale. Cronbach's alpha is a model of internal consistency and gives an estimate of reliability based on the degree to which responses to the statements are related to each other (SPSS Inc. 2001). The closer the value of alpha is to 1, the more reliable the scale. Transformed Likert values as described above were used for this test.

To test whether attitude score is related to binomial demographic variables such as gender, urban or rural residence, whether the respondent was a hunter or not and whether the respondent was a member of an environmental organisation or not, the Mann-Whitney *U*-test was used to compare the median attitude score between groups. Values are converted to ranks for this test, so it is applicable to ordinal variables such as the attitude score (Fowler *et al* 1998).

For quiz scores and demographic variables which were measured across a range, such as year of birth, income, education, duration lived in area and frequency of recreational use of the countryside, the Spearman rank correlation coefficient was calculated. This test is also applicable to ordinal data (Fowler *et al* 1998) and gives a measure of the strength of relationship between attitude score and the variables mentioned above.

In order to analyse differences in attitude score between the different sampling areas, the Kruskal-Wallis test was used. The Kruskal-Wallis test is a non-parametric test which is used to compare the medians of three or more samples and is suitable for ordinal data (Fowler *et al* 1998). This test was used to compare attitude scores between sampling areas to assess whether sub-samples can be confidently grouped together to

form larger urban or rural samples. Significant differences between sub-samples will indicate a poor sampling regime and may require exclusion of certain sub-samples from the dataset.

Binomial tests and chi-square tests were used to see if the observed frequencies of variables deviate significantly from those expected under some null hypothesis (SPSS Inc. 2001).

The only parametric test that was used is multiple regression using a univariate general linear model to assess which of the demographic variables explains the most variation in attitude score. The test requires that the dependent variable (attitude score) be normally distributed, so prior to this analysis, a one-sample Kolmogorov-Smirnov test was used to see whether this was the case or not.

All statistical analyses were calculated using SPSS version 11.0, and $p \leq 0.05$ was required for significance for all statistical tests.

3. Results

Questionnaire-based research such as this can generate huge amounts of information, so it is important to remain focused on results which have some relevance. For this reason, not all possible results will be reported.

3.1 Response rates and sample descriptions

3.1.1 Pilot Study

A pilot study was carried out on 12th May 2005. 12 Inverness shopkeepers were given the survey and asked to complete it and record the amount of time it took them. The pilot sample included both males and females, and covered all the age categories. A

few minor changes in word order were made, and two spelling corrections, but in general the survey was well understood and took between 7 and 11 minutes to complete.

3.1.2 Rural sample

The rural sampling was carried out between 17th May and 2nd June. Of the 240 grid references selected for questionnaire distribution in the rural area, 45 were undeliverable for various reasons, the main one being that Ordnance Survey maps do not differentiate between inhabited houses and derelict buildings, barns and other non-dwellings. In instances where there was more than one building in the grid square and the selected one turned out to be uninhabited, the closest inhabited building was used instead. Other reasons for not being able to distribute the questionnaires were locked gates or un-drivable tracks so that the selected house or houses could not be reached, or that the house selected was a holiday let, so having no permanent residents.

Of the 195 questionnaires distributed, 60.5% ($n=118$) were distributed using the drop-off and collect method. This allowed face to face interaction with householders, so a verbal explanation of the study could be given, and arrangements for when the survey was to be collected could be made. This method yielded a high response rate (83.9%) with only 19 instances of people declining the survey, or not leaving it at the agreed collection point. The remaining 77 questionnaires were left with stamped addressed envelopes at houses which were obviously inhabited, but where no-one was in at the time of calling. As is commonly reported with postal surveys (Moser 1985) this method yielded a much lower response rate (35.1%), with only 27 useable responses returned. So in total, a response rate of 64.6% was achieved and a rural sample of $n=126$. This sample comprises 4 sub-samples corresponding to the four quadrants used to ensure that the whole of the area was represented; the north-east

quadrant (RNE, $n=34$); the north-west quadrant (RNW, $n=33$); the south-east quadrant (RSE, $n=31$) and the south-west quadrant (RSW, $n=28$).

Due to the nature of the sampling method, it was not possible to record any characteristics of non-respondents (age, gender etc) so no inferences can be made about reasons for non-response, so the results can not be weighted accordingly.

3.1.3 Inverness sample

The sampling in Inverness was carried out in two locations; the Eastgate shopping centre (INSC) on the 13th of May, and the Inverness leisure centre (INLC) on the 14th and 16th of May. 69 useable responses were obtained from the sports centre, and 56 from the shopping centre, giving a total Inverness sample size of 125. All respondents were given a short verbal introduction to the subject containing the same information so as not to bias the study. The same survey was used for the Inverness sample as for the rural sample and so, as it was designed to be completed without assistance, after the initial introduction, the respondent was left to complete the survey at their own speed. In the sports centre, the majority of the respondents were sat viewing their children's swimming lessons, and as such had little to do, so the response rate was very high; only 3 of the 72 people asked declining to complete the survey. This potential bias in this sample was acknowledged, and comparisons of attitude were made between this, and the other samples (see figure 3.1).

3.1.4 Edinburgh Sample

Inverness is a small city with a very large catchment area, so it was thought that attitudes may not differ greatly from those of the surrounding rural area. For this reason, and because the rural and Inverness sampling took slightly less time than anticipated, three days sampling in Edinburgh were carried out on the 4th, 5th and 6th of

June. Due to the faster pace of life which is generally observed in larger cities, and because the respondents would be likely to feel less strongly about what is predominantly a rural issue, a shorter version of the questionnaire was used. This version (see Appendix 2) was largely the same as the one used for the rural and Inverness sample, but did not have the knowledge (quiz) section, or space for further comments. The personal details section and the knowledge of the issue section were also slightly reduced so that the resulting questionnaire fit onto 2 sides of A4 paper as opposed to 4, and took between 3 and 4 minutes to complete.

Three areas were sampled in Edinburgh; the Princes Mall (EDSC), a centrally located shopping centre; the Gracemount leisure centre (EDLC), located on the outskirts, and Princes Street Gardens (EDPG), a centrally located recreational open space. The Princes Mall sample yielded 23 useable responses, the Gracemount leisure centre 47 and the Princes Street Gardens 31, giving of a total Edinburgh sample of $n=101$.

3.1.5 SCA sample

A meeting with Ross Montague at the Scottish Countryside Alliance (SCA) resulted in an additional sample being obtained. A recent SCA conference (12th April), entitled 'Getting the Balance Right' featured a talk by Lithuanian wolf ecologist, Zanete Andersone-Lilley, so they clearly see the need for debate on this issue. However, as an organisation, the SCA do not have an official line toward the subject of reintroductions, despite the obvious impacts that any projects could have on a large proportion of their membership. For this reason, Ross Montague was very interested this study, and offered to advertise the research via the SCA weekly online newsletter, 'Heather Roots', which is sent out to around 3000 people, mainly SCA members. In order to maximise this opportunity, a website was set up where the questionnaire (the full length version)

could be downloaded. A piece was written explaining the purpose of the research and giving details of how the questionnaire could be completed and returned (see Appendix 4), and this was included in the 22nd June edition of ‘Heather Roots’.

This sampling method resulted in a very low response rate, with 19 useable responses received via email and 4 through the post. Since this sample was obtained after most of the analysis for the other samples had been completed, was not obtained through the same routes as the others, and was very much self-selected, it will be dealt with separately, in section 3.10.

3.1.6 Sample Descriptions

Table 3.1 describes the samples. The variation between samples will not be controlled for in the analyses, as they are typical differences found between urban and rural inhabitants so can be considered to be representative of the areas studied.

Demographic variable	Rural sample	Inverness sample	Edinburgh sample	SCA sample
Sex ratio (approx)	1:1	2:3 (M:F)	1:1	3:1 (M:F)
Median year of birth category	1951-1960	1961-1970	1961-1970	1941-1950
Median income category	£15,000-£19,999	£25,000-£29,999	£25,000-£29,999	£30,000+
Median education category*	Vocational	Vocational	College	Degree
Median duration lived in area category	20 years +	6-20 years	6-20 years	20 years +
Percentage hunters	42%	18%	Question not asked	78%
Percentage members of environmental organisation	31%	12%	Question not asked	35%
Sample Size	126	125	101	23

Table 3.1 – Summary descriptions of the samples.

* Ranked (low to high): None, some schooling, secondary, vocational, college, degree, higher degree

The rural sample had a sex ratio not significantly different from 1:1 (binomial test, $p > 0.05$). It had significantly higher proportions of both hunters ($\chi^2 = 17.873$, $df = 1$, $p = 0.001$), and members of environmental organisations ($\chi^2 = 10.593$, $df = 1$, $p = 0.000$) than the Inverness sample. The rural sample were significantly older ($U = 5440.0$, $Z = -9.900$, $p = 0.000$), had significantly lower incomes ($U = 4170.5$, $Z = -4.004$, $p = 0.000$) and had lived in their area for significantly longer than the urban sample ($U = 12349.0$, $Z = -2.193$, $p = 0.028$). No significant difference in level of education was found between the rural and urban sample.

The Inverness sample had a sex ratio that was significantly different from 1:1 (binomial test, $p = 0.020$), with a preponderance of females. It had significantly smaller proportions of both hunters ($\chi^2 = 17.873$, $df = 1$, $p = 0.001$), and members of environmental organisations ($\chi^2 = 10.593$, $df = 1$, $p = 0.000$) than the rural sample. The Inverness sample were significantly older ($U = 4514.0$, $Z = -3.873$, $p = 0.000$), had a significantly lower level of education ($U = 3343.0$, $Z = -2.651$, $p = 0.008$) and had lived in their area for significantly longer than the Edinburgh sample ($U = 4365.5$, $Z = -4.204$, $p = 0.000$). No significant difference in income was found between the Inverness and Edinburgh samples.

The Edinburgh sample had a sex ratio not significantly different from 1:1 (binomial test, $p > 0.05$). Edinburgh respondents were typically younger, and had lived in the area for less time than the other samples.

The SCA sample had a sex ratio not significantly different from 3:1 (binomial test, $p > 0.05$), with a preponderance of men. The SCA sample had a significantly higher proportion of hunters than both the rural ($\chi^2 = 8.903$, $df = 1$, $p = 0.003$) and urban ($\chi^2 = 32.570$, $df = 1$, $p = 0.000$) samples, and a greater proportion of members of environmental organisations than both the rural ($\chi^2 = 16.187$, $df = 1$, $p = 0.000$) and

urban ($\chi^2 = 45.087$, $df = 1$, $p = 0.000$) samples. SCA respondents were significantly more educated than both rural ($U = 404.5$, $Z = -4.019$, $p = 0.000$) and urban ($U = 896.0$, $Z = -4.196$, $p = 0.000$) samples. SCA respondents were significantly older ($U = 1239.5$, $Z = -4.315$, $p = 0.000$) and had lived in their area for significantly longer ($U = 1766.5$, $Z = -2.681$, $p = 0.007$) than urban respondents, but did not have significantly different incomes. SCA respondents were not significantly older and had not lived in their area for longer than rural respondents, but did earn significantly higher incomes ($U = 351.5$, $Z = -3.100$, $p = 0.002$).

3.2 Attitudes

This main finding of the questionnaire, which will be used as the primary indicator of the level of support or opposition to reintroductions, is the attitude score. The attitude score is calculated from the responses to section 4 of the questionnaire. The range of scores makes up the ordinal attitude scale.

3.2.1 Producing a reliable attitude scale

Using the entire sample (Edinburgh, Inverness and rural), and all 10 statements in the attitude section, a Cronbachs alpha reliability estimate of $\alpha=0.8304$ was produced. Running the test but with certain responses to statements removed, returned different values of Cronbach's alpha. Statement 4.9 ('I have little interest in nature and feel that the money spent on a reintroduction program would be better spent elsewhere'), was considered to be potentially distorting due to its internally conflicting nature; several respondents commented that they *did* feel that the money spent on a reintroduction program would be better spent elsewhere, but that they *did* have a strong interest in nature. However, removing this from the calculation resulted in a lower reliability estimate, so the attitude scale will continue to include responses to this statement.

Removing statement 4.8 ('I would find it a stimulating and exciting experience to hunt and kill a wild boar') resulted in a higher reliability estimate for the scale, with a Cronbach's alpha value of $\alpha=0.8559$. Although this value is not significantly higher, removing this statement can be further justified by the knowledge that hunting can be perceived as either an activity at odds with wildlife management or one which can provide important economic support for it (Gow 2002, Goulding *et al* 2003 and Yalden 1999), resulting in a complex relationship between hunting and reintroductions. As a result, responses to this statement are not included in the attitude score calculation, resulting in the overall attitude scale ranging from -18 to +18; the higher the number the more supportive of mammal reintroductions.

The following sections describe which factors are related to attitude score, and how attitude score differs between samples. As the main focus of this study is rural attitudes, results will be given separately for the rural sample and the urban sample, except in the case of the media analysis in which the whole sample was used.

3.2.2 Urban versus rural

Figure 3.1 shows the difference in mean attitude score between the 9 sub-samples. No significant differences in attitude scores were found between the Edinburgh and Inverness sub-samples (using a Kruskal-Wallis test), so the two can be grouped together and treated as one large urban sample ($n=226$). No significant differences were found between the four rural sub-samples (χ^2 test and pair-wise Mann-Whitney U tests), so these can also be grouped together as a single sample ($n=126$). The (non-significant) differences seen between the four rural samples can possibly be explained by their proximity to the nearest urban centre (Inverness). Inverness is to the east of the rural area in question, and both the eastern rural sub-samples have the most positive attitudes.

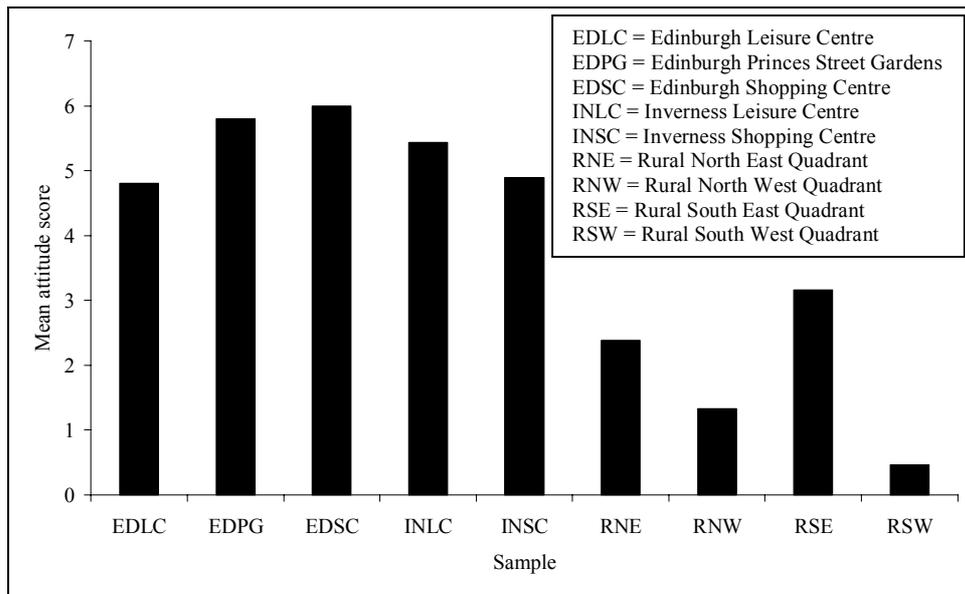


Figure 3.1 – Showing the mean attitude score of the 9 sub-samples

A very highly significant difference in attitude score was found between the rural sample and urban sample using the Mann Whitney *U* test ($U = 10151.5, Z = -4.471, p = 0.000$). Rural residents have a significantly lower attitude score than urban residents.

Figure 3.5 shows the frequency distribution of total attitude score for the rural sample. It shows that a majority (55%) of respondents had positive attitudes, 37% had negative attitudes, and 8% were neutral.

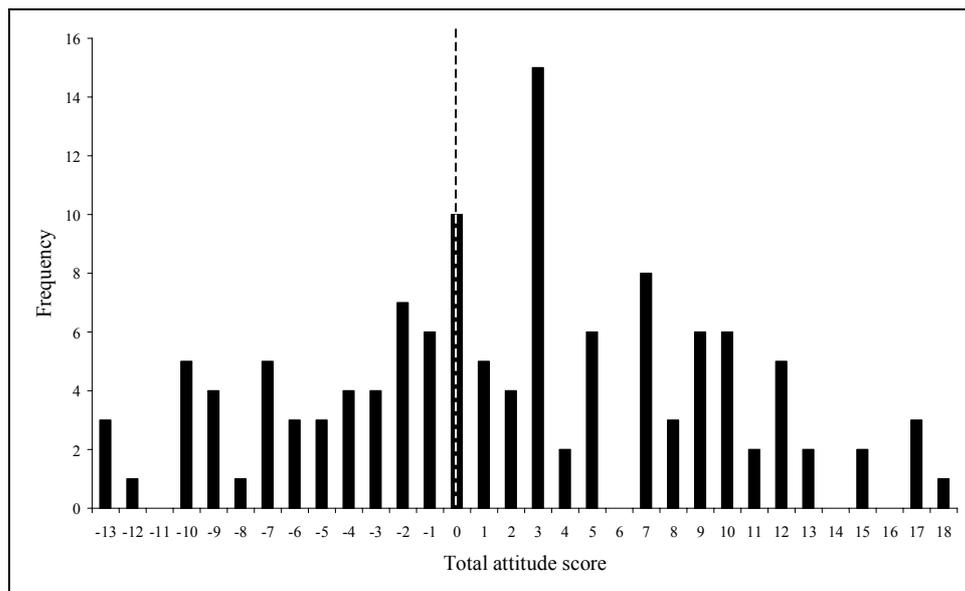


Figure 3.5 – Showing the frequency distribution of total attitude score for the rural sample.

Figure 3.6 shows the frequency distribution of total attitude score for the urban sample.

Note that lowest attitude score (-9) is higher than that of the rural sample (-13).

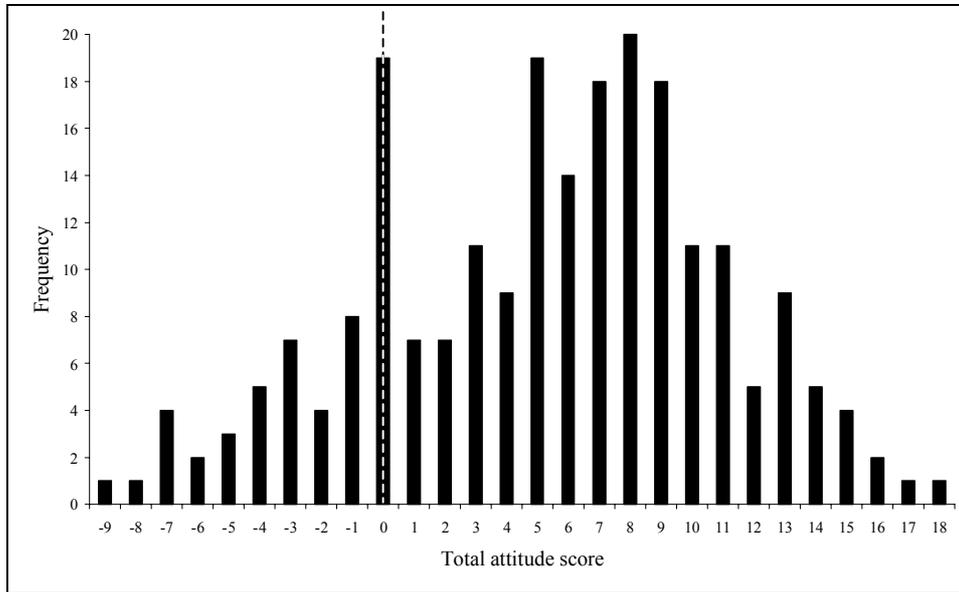


Figure 3.6 – Showing the frequency distribution of total attitude score for the urban sample.

A much greater majority of the urban sample (76%) had positive attitudes, 15% had negative attitudes. The prominent spike at zero seen in figure 3.6 but not figure 3.5 highlights the greater level of ambivalence within the urban sample.

3.2.3 Gender

No significant difference in attitude score was found between genders in the rural sample ($p = 0.838$), but a highly significant difference was found when looking at the urban sample ($U = 4802.5$, $Z = -3.152$, $p = 0.002$), males having significantly more positive attitudes than females.

3.2.4 Age

Year of birth is highly significantly correlated with attitude score for the rural sample ($r_s = 0.236$, $n = 126$, $p = 0.008$). No such correlation is seen when looking at the urban sample. Figure 3.2 shows the relationship between year of birth and attitude score.

Only the oldest and youngest rural age categories have mean scores lower than zero. In the rural sample, the second youngest age category (born between 1971 and 1980) has the most positive attitudes.

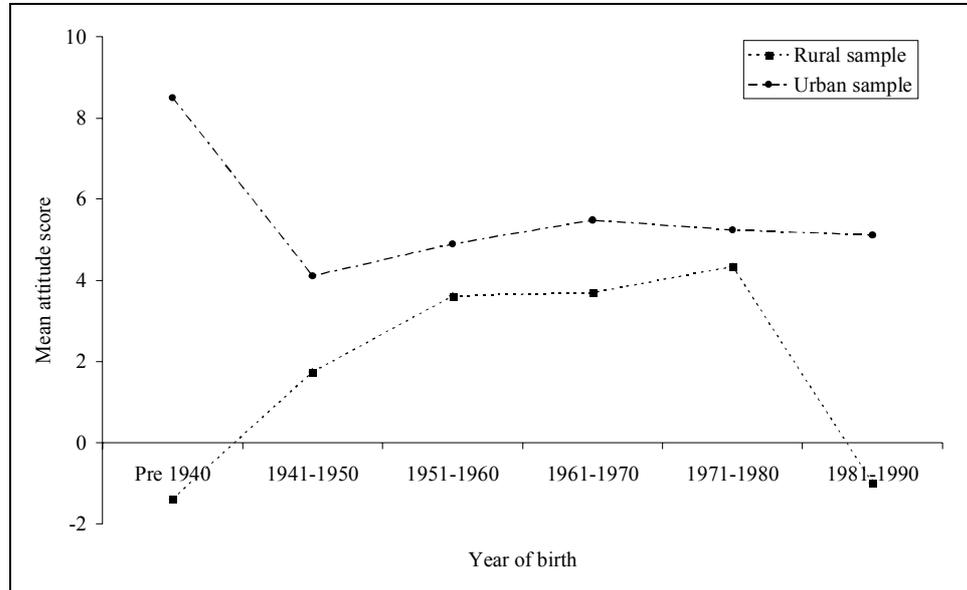


Figure 3.2 – Showing the relationship between year of birth and mean attitude score.

3.2.5 Duration of residence

The length of time the respondent had lived in their area is significantly negatively correlated with attitude score in both the rural sample ($r_s = -0.194$, $n = 126$, $p = 0.030$) and the urban sample ($r_s = -0.182$, $n = 226$, $p = 0.006$). Figure 3.3 shows the relationship between the length time resided in the respondent's area and mean attitude score.

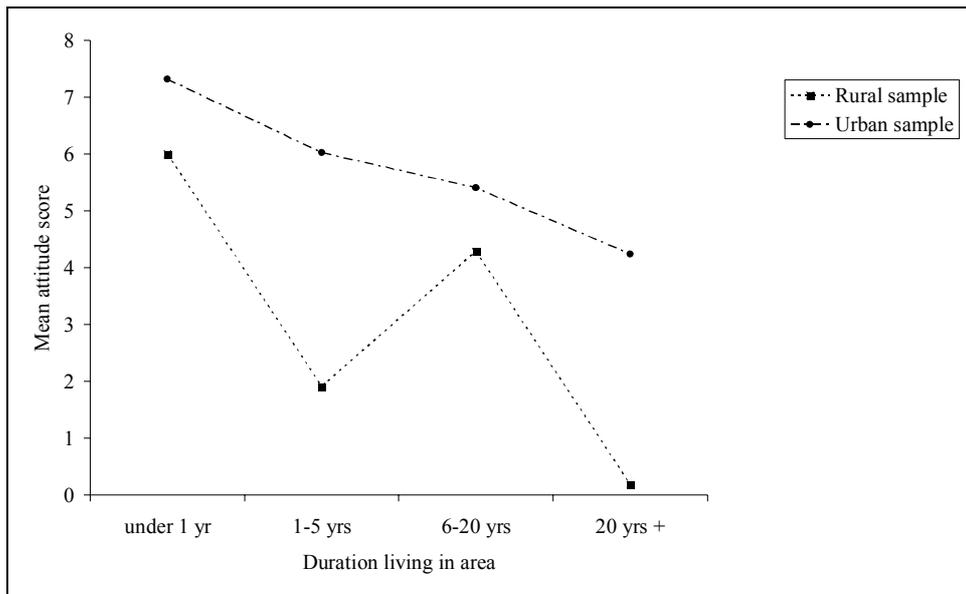


Figure 3.3 – Showing the relationship between duration lived in area and attitude score

3.2.6 Recreational use of countryside

No significant correlation was found between attitude score and the frequency with which the respondent used the countryside for recreational purposes, for either the rural sample ($p = 0.461$) or the urban sample ($p = 0.886$).

3.2.7 Hunting

No significant difference in attitude score was found between hunters and non-hunters, in either the rural sample ($p = 0.076$) or the urban sample ($p = 0.117$). This provides further justification for removing the hunting statement (4.8) from the attitude scale calculation, suggesting that hunting and support for reintroductions are not mutually exclusive.

3.2.8 Environmental organisation

Members of environmental organisations had a significantly higher attitude score than non-members in the rural sample ($U = 1004.0$, $Z = -3.279$, $p = 0.001$). The urban sample did not show this difference ($p = 0.413$), but the number of members of

environmental organisations in this sample was particularly low ($n = 14$). Over 50% of respondents who stated that they were members of an environmental group ($n = 60$) were RSPB members. Most other organisations were only mentioned once each and included WWF, Friend of the Earth, Reforesting Scotland, the Game Conservancy Trust, the Scottish Wildlife Trust, and a number of others

It should be noted that both the hunting question and the environmental organisation question were omitted from the Edinburgh questionnaire, so references to ‘urban sample’ in these instances means just the Inverness sample.

3.2.9 Education

No significant correlation was found between education and attitude score for either the rural sample ($p = 0.618$) or the urban sample ($p = 0.086$).

3.2.10 Income

No significant correlation was found between income and attitude score for either the rural sample ($p = 0.877$) or the urban sample ($p = 0.689$).

Education and income are themselves very significantly correlated for the rural sample ($r_s = 0.457$, $n = 57$, $p = 0.000$) and the urban sample ($r_s = 0.219$, $n = 148$, $p = 0.008$). The values for n in the analyses of education and income are lower due to the sensitive nature of the questions being asked.

3.2.11 Farmers and landowners

There are many different ways that occupation can be classified (Moser 1985), but as occupation is likely to be another correlate of income and education, this classification and analysis will not be carried out here. Responses to the occupation question will be not be wasted however; respondents who were farmers, gamekeepers, estate owners or managers were identified and grouped into a small sub-sample ($n = 17$) termed ‘farmer’.

This sub-sample represents the part of the population which will perhaps most keenly feel the impacts of mammal reintroductions. All 17 respondents of the ‘farmer’ sub-sample were part of the rural sample, so figure 3.4 shows how their mean attitude score differs from the rest of the rural sample. The difference in mean attitude score was found to be very highly significantly lower for the farmer sample than for the rest of the rural sample ($U = 380.5, Z = -3.906, p = 0.000$).

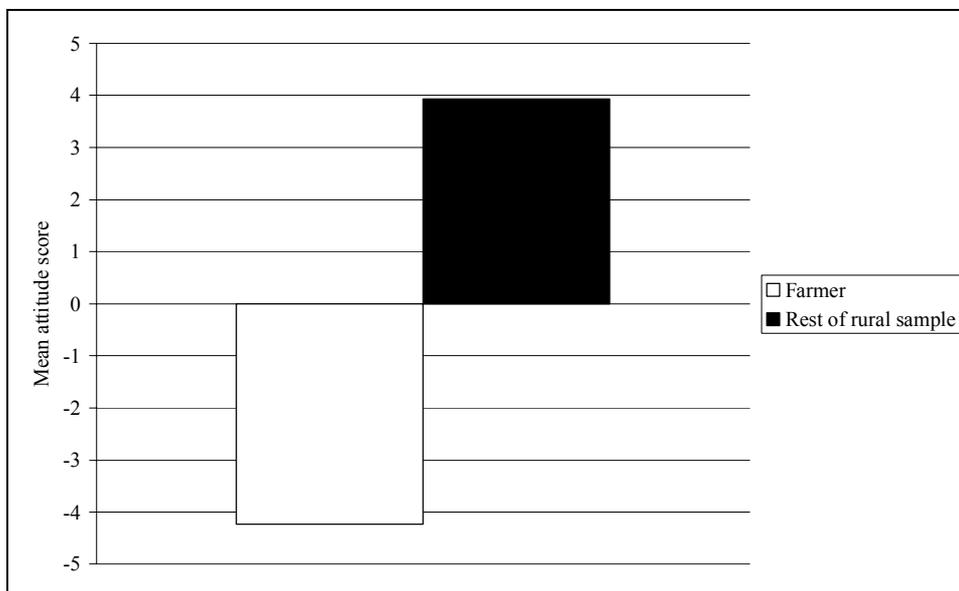


Figure 3.4 – Showing the mean attitude score of the farmer sub-sample and the rest of the rural sample.

3.2.12 Table showing which factors affect attitude score

Table 3.2 summarises which of the demographic variables are significantly related to attitude score. Most of the results given are for the rural sample, as attitudes of rural residents are the main focus of this study.

Demographic characteristic	Significant?	Description
Rural/urban residence	Yes ($p = 0.000$)	Rural residents have significantly lower attitude scores than urban residents.
Gender	No ($p = 0.838$)	No significant difference between men and women's attitude score.
Year of birth	Yes ($p = 0.008$)	The younger the respondent the higher the attitude score.
Duration of residence in area	Yes ($p = 0.030$)	The longer the period lived in the respondents area, the lower the attitude score.
Recreation use of countryside	No ($p = 0.461$)	No correlation between frequency of use of the countryside for recreation and attitude score.
Hunter/non-hunter	No ($p = 0.076$)	No significant difference between hunters and non-hunters attitude score.
Environmental organisation	Yes ($p = 0.001$)	Members of environmental organisations had significantly higher scores than non-members.
Education	No ($p = 0.618$)	No significant correlation between level of education and attitude score.
Income	No ($p = 0.877$)	No significant correlation between income and attitude score.
Farming/landowning occupation	Yes ($p = 0.000$)	Farmers and landowners have a significantly lower attitude score than the rest of the rural sample.

Table 3.2 – Showing demographic characteristics significant relationships with attitude score. *P* values given relate to rural sample tests.

3.2.13 Multiple regression

Using a one sample Kolmogorov-Smirnov test, attitude score for the rural sample was found to be not significantly different from a normal distribution ($Z = 0.73$, $df = 126$, $p = 0.93$). Attitude score for the urban sample and the whole sample did not approximate a normal distribution. The fact that rural attitude score is approximately normally distributed allowed a multiple regression analysis using a univariate linear model to be carried out. Only the variables which were found to be significantly related to attitude score (see table 3.2) were used to construct the model. These analyses will provide an insight into which of the significant demographic variables explain the most of the

variation in attitude score and therefore enable identification of the most sensitive groups.

Using year of birth, duration of residence, environmental organisation membership and farming occupation, the whole model explained a significant, but relatively small proportion of the variation in attitude score ($p = 0.000$, partial eta squared = 0.253). No interactions between any of the factors or covariates were significant at the $p \leq 0.05$ level, so were removed from the model. Farming occupation explained the largest and most significant part of the variation ($p = 0.004$, partial eta squared = 0.071) followed by age ($p = 0.006$, partial eta squared = 0.064). Environmental group membership explained the next largest amount of variation, while duration lived in area explained the smallest.

3.3 Attitude typologies

The median Likert score (between -2 and +2) for each question of the attitude statements will be used as the main indicator for presence or absence of the associated attitude typology. A positive median score indicates a majority of respondents who fit into that particular typology. A median of less than 0 indicates that the majority of the sample does not exemplify that particular typology. The medians of rural (excluding farmers), urban and the farmer samples were compared using Mann-Whitney *U*-tests. The results for these analyses are shown in table 3.3.

The table shows that the only typology that is common to the majority of the rural sample is the utilitarian typology. The urban sample took a different view of the benefits of reintroductions, and in addition to the utilitarian typology showed the presence of the naturalistic, ecologicistic, and aesthetic typologies. The farmer sample showed only the presence of the humanistic typology, describing concern for reintroduced animals harming other smaller animals.

Typology	Urban median score in response to corresponding attitude statement.	Significant difference between urban and rural sample? (* = $p \leq 0.05$, ** = $p \leq 0.01$, *** = $p \leq 0.001$).	Rural median score in response to corresponding attitude statement.	Significant difference between rural and farmer sample? (* = $p \leq 0.05$, ** = $p \leq 0.01$, *** = $p \leq 0.001$).	Farmer median score in response to corresponding attitude statement.
Naturalistic	0.5	Yes ***	0	Yes **	-1
Ecologistic	1	Yes ***	0	Yes ***	-1
Humanistic	0	Yes ***	0	Yes *	1
NIMBY	-1	No	-1	No	0
Negativistic	-1	No	-1	Yes **	0
Aesthetic	1	Yes ***	0	Yes **	-1
Utilitarian	1	Yes ***	1	Yes *	-1
Dominionistic	-2	Yes *	-2	Yes **	0
Neutralistic	-1	No	-1	Yes *	0

Table 3.3 – Showing the attitude typologies found in the urban, rural (excluding farmers) and farmer samples.

3.4 Knowledge

Knowledge of reintroductions and wildlife was assessed using a 10 question multiple-choice quiz. 1 point was given to a correct answer, 0 points to an incorrect answer or a ‘don’t know’, giving a maximum possible of 10.

3.4.1 Quiz scores

Quiz scores were found to be significantly positively correlated with attitude score for the rural sample ($r_s = 0.215$, $n = 95$, $p = 0.036$), and the urban sample ($r_s = 0.362$, $n = 94$, $p = 0.000$). Rural quiz scores were significantly higher than those of the urban sample ($U = 2327.0$, $Z = -5.734$, $p = 0.000$). These results must be treated with some caution due to the fact that a prize was offered for high quiz scores, and that for the rural sample, the questionnaire was completed behind closed doors, there was ample incentive and opportunity to consult secondary material for assistance with answers.

However, since the correlation is significant and similar trends have been observed in previous studies (Williams *et al* 2002) the result can be accepted with some confidence.

The quiz section was designed to contain questions with a range of difficulty levels. This is reflected in the percentage of correct answers returned. Of the 193 respondents who attempted section 8 (this section was not included in the Edinburgh survey), 88% got question 8.1 (asking what type of animal the Eurasian lynx was) correct. Only 32% of respondents who attempted the quiz section correctly answered question 8.10 (asking which animals from a list are found in the UK).

3.4.2 Knowledge correlates

In the rural sample, no significant relationship was found between quiz score and age, gender, income, hunting, farming/landowner occupation education, duration lived in area or frequency of recreational use of the countryside. The only significant relationship found was that members of environmental groups had significantly higher quiz scores than non-members ($U=642.0$, $Z = -2.531$, $p = 0.011$).

In the urban sample, quiz score was positively correlated with income ($r_s = 0.270$, $n = 74$, $p = 0.020$), negatively correlated with year of birth ($r_s = -0.206$, $n = 96$, $p = 0.044$), and men had a significantly higher quiz score than women ($U = 776.0$, $Z = -2.591$, $p = 0.010$). No relationship was found between quiz score and education, environmental group membership, duration lived in area or frequency of recreational use of the countryside.

3.4.3 Wildlife awareness

The fact that so few people got question 8.10 correct is mainly due to the inability to correctly select the muntjac from the list of wild animals living in the UK. The muntjac is a non-native, but very common species in many parts of England, but no sightings

have been officially recognised in Scotland (Deer Commission for Scotland 2000). This suggests that people's perception of wildlife is mainly focused at the regional level, and that wildlife knowledge is obtained through direct observation of animals, as opposed to from other sources such as books or the media.

3.4.4 Wild boar

One of the animals on the selection list in question 8.10 was the wild boar (*Sus scrofa*). Wild boar escapees have established breeding populations in several southern English counties, which DEFRA have officially acknowledged (Goulding 2004). Of the 32% ($n = 48$) of respondents who checked all the other correct boxes for question 8.10, only 39% ($n = 19$) selected the one for wild boar. This supports the idea that reintroductions are a fairly local issue, and stresses the importance of understanding the attitudes of people who live near to any potential reintroduction programs.

3.5 Awareness

Section 2 of the questionnaire investigated whether respondents had heard of Trees for Life and the proposed beaver trial reintroduction. They were also asked to comment on how well informed they felt and whether they supported them or not.

3.5.1 Trees for Life

The proportion of the rural sample that had heard of Trees for Life was significantly higher than that of the urban sample ($\chi^2 = 25.246$, $df = 1$, $p = 0.000$), as seen in figure 3.7. There was no significant difference found between the rural and urban sample (see figure 3.8) with regard to the proportion of respondents who claimed to feel well informed as to the work that TfL do. Figure 3.9 shows that the proportions of rural respondents who claimed to support TfL, not support TfL, or were undecided as to

whether they supported Tfl or not were significantly different to those of the urban population ($\chi^2 = 7.833$, $df = 2$, $p = 0.020$). A majority of respondents claimed to support Tfl in both samples, but a greater proportion of the rural sample were undecided.

3.5.2 Trial beaver reintroduction

Figure 3.7 shows that the proportion of the rural sample that had heard of the proposed trial beaver reintroduction was also significantly higher than that of the urban sample ($\chi^2 = 34.633$, $df = 1$, $p = 0.000$). There was no significant difference found between the rural and urban sample with regard to the proportion of respondents who claimed to know enough about the proposed trial beaver reintroduction (see figure 3.8). Figure 3.9 shows that the proportions of rural respondents who claimed to support, or not support the beaver trial, or were undecided as to whether they supported it or not were significantly different to that of the urban population ($\chi^2 = 23.228$, $df = 2$, $p = 0.00$). A majority of respondents claimed to support the beaver trial in both samples, but a greater proportion of the rural sample were undecided.

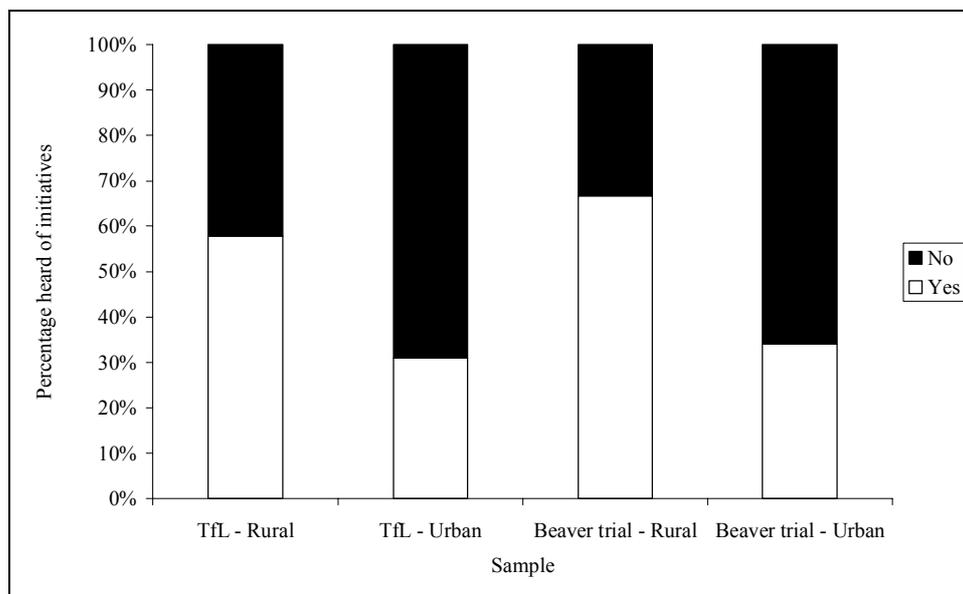


Figure 3.7 – Showing the percentage of respondents that have heard of Tfl and the proposed trial beaver reintroduction. The differences in responses from the urban and rural samples for both the Tfl and beaver trial questions were found to be significant at the $p < 0.001$ level.

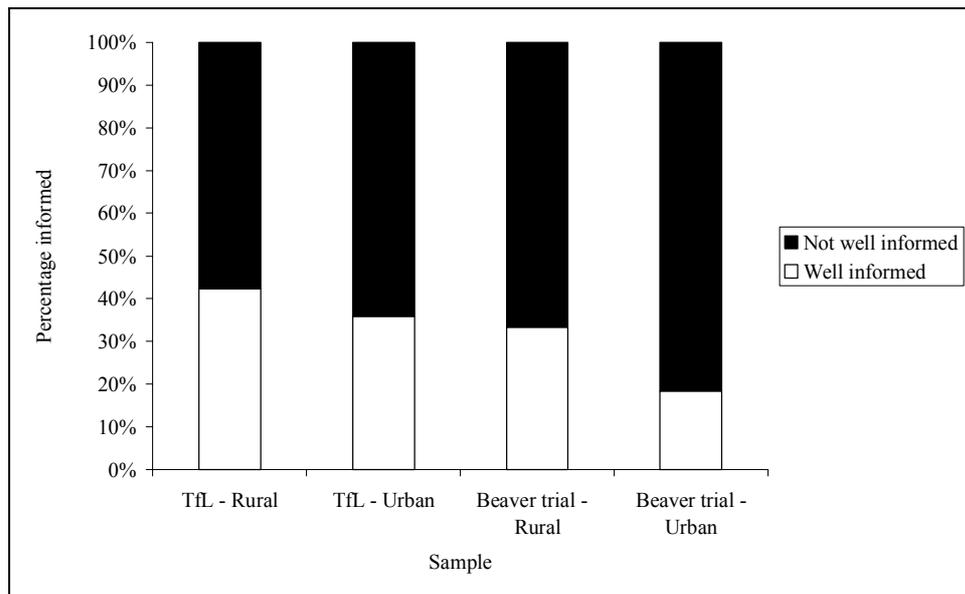


Figure 3.8 – Showing the percentage of respondents who feel well informed about the work that TfL do and about the proposed beaver trial reintroduction. The differences in the rural and urban responses were not found to be significant for either the TfL question or the beaver trial question ($p > 0.05$).

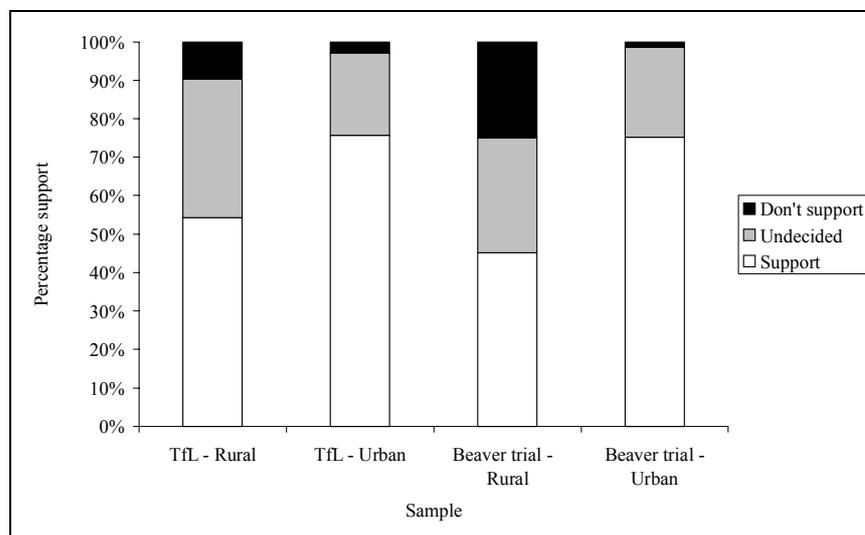


Figure 3.9 – Showing the percentage of respondents who claimed to support TfL and the proposed trial beaver reintroduction. Urban and rural responses were found to be significantly different for both the TfL question ($p < 0.05$) and the beaver trial question ($p < 0.001$).

3.5.3 How people have heard of TfL and the beaver trial

Questions 2.2 and 2.5 of the questionnaire asked respondents to state how they had heard of TfL and the beaver trial. Four options were offered; ‘friends and family’, ‘TfL/SNH publicity’, ‘other groups’ publicity’ and ‘local or national media’.

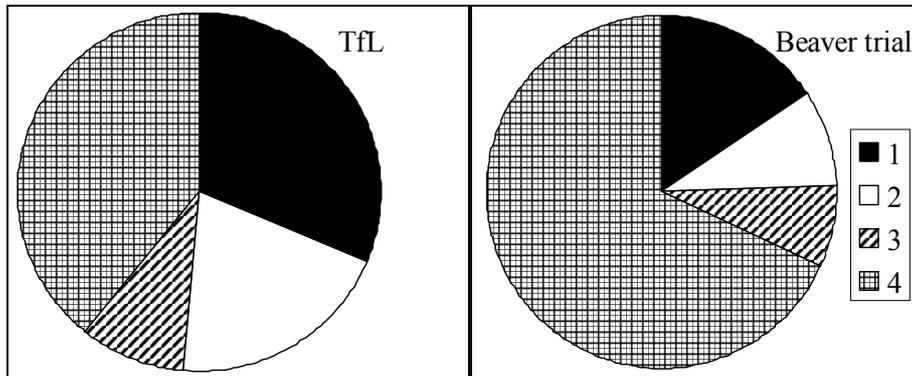


Figure 3.10 – Pie charts showing how respondents had heard of TfL and the beaver trial. 1 = friends and family, 2 = organisation’s/project’s own publicity, 3 = other groups’ publicity, 4 = local or national media.

No significant difference was found in how urban and rural residents had heard of TfL and the beaver trial, so the two samples are grouped together. A significant difference did exist between how people had heard of TfL and how they had heard of the beaver trial ($\chi^2 = 24.532$, $df = 3$, $p = 0.000$), figure 3.10 highlights these difference.

Local and national media was the most frequent way that respondents had heard of both TfL (40%) and the beaver trial (68%), though this proportion was significantly greater for the beaver trial ($\chi^2 = 8.908$, $df = 1$, $p = 0.003$). Friends and family was a significantly more frequent means of finding out about TfL than the beaver trial ($\chi^2 = 24.532$, $df = 3$, $p = 0.000$), as was through the organisations/projects own publicity ($\chi^2 = 6.278$, $df = 1$, $p = 0.012$). This initially seems surprising considering the large amount of money and effort which went into the beaver trial consultation (Scott Porter Research and Marketing Ltd. 1998). This question was not included in the Edinburgh survey, so responses all come from close to the area where TfL operate, so the higher proportion of self-publicity is perhaps to be expected.

3.6 Perceived advantages & disadvantages

Section 3 of the questionnaire asked respondents to name advantages and disadvantages that they thought might come with reintroducing beavers and wolves. These two species perhaps represent the two extremes of controversy for potential reintroductions, so responses to this section give an insight into how people may react to specific projects. This section of the questionnaire was open ended, so responses were put into two levels of categories to allow graphical representation and analysis. Tables 3.4 and 3.5 give descriptions of the categories used and provide a key to the shorthand codes used in the rest of figures.

3.6.1 Advantages

Advantages: Category (Shorthand)	General Description	Humanistic (H) / Environmental (E)
Biodiversity (B)	Reintroduction would enhance Scottish biodiversity.	E
Biological control (BC)	Beavers may control populations of other pest species.	E
Biological control deer (BCD)	Wolves may control populations of deer.	E
Biological control other (BCO)	Wolves may control populations of species other than deer.	E
Conservation (C)	Reintroduction would help the conservation of the species.	E
Education (Ed)	Reintroduction may provide educational value to the public.	H
Employment (Em)	Managing reintroduced species could provide employment.	H
Forest regeneration (FR)	Wolves may control herbivores benefiting forest re-growth.	E
Habitat (H)	Beavers may enhance habitat for other species.	E
Heritage/Moral (HM)	Fulfilment of moral obligation to reintroduce a former native species. Leaving richer natural heritage.	H
Hunting quarry (HQ)	Reintroduced species could act as a sporting quarry, so bringing financial benefits.	H
Restore balance (RB)	Reintroduced species may help restore damaged ecosystem.	E
Tourism (T)	Reintroduced species could be a tourist attraction.	H
Wildlife viewing (WV)	Reintroduced species may provide entertainment to people.	H

Table 3.4 – Describing categories of respondents perceived advantages of reintroductions.

These categories were constructed after the questionnaires were received, so some categories pertain to only the beaver or the wolf due to the responses given. The second level categorisation classifies the existing categories as either humanistic or environmental.

3.6.2 Disadvantages

Disadvantages: Category (Shorthand)	General Description	Humanistic (H) / Environmental(E)
Beaver welfare (BW)	Concerns for how the reintroduced beavers may be treated.	E
Cost (C)	Reintroduction may cost too much money.	H
Disease (D)	Reintroduced species may spread disease (e.g. rabies).	H
Disturb balance (DB)	Reintroduced species may disturb current ecosystem balance.	E
Harm fish (HF)	Beavers may negatively affect fish populations.	E
Harm humans (HH)	Reintroduced species may cause physical harm to humans.	H
Harm pets (HP)	Reintroduced species may physically harm pets.	H
Harm trees (HT)	Beavers may negatively affect trees.	E
Harm wildlife (HW)	Reintroduced species may negatively impact wild animal welfare.	E
Human fear (F)	People may be afraid of reintroduced species.	H
Hunting quarry (HQ)	Reintroduced species may support a hunting industry to which some people are opposed.	H
Livestock (L)	Wolves may kill livestock and so negatively affect agriculture.	H
Neg habitat (NH)	Beavers may degrade the habitat for other species.	E
Neg Tourism (NT)	Wolves may cause a decline in tourism.	H
Nuisance (N)	Wolves may enter towns causing nuisance similar to urban foxes.	H
Poor management (PM)	Management of reintroduced species may be done poorly so animals breed out of control.	E
Prevent access (PA)	Reintroduction may restrict public access to the countryside.	H
Public opposition (PO)	Sections of the public who do not approve will cause furor.	H
Road accidents (RA)	Reintroduced species may cause road accidents.	H
Too many tourists (TT)	Reintroduced species may attract more tourists than infrastructure and countryside can handle.	H
Watercourse (W)	Beavers may negatively affect watercourses.	E
Wolf welfare (WW)	Concerns over how reintroduced wolves will be treated.	E

Table 3.5 – Describing categories of respondents perceived disadvantages of reintroductions.

More disadvantages were perceived than advantages, so there are a greater number of categories. Animal welfare concerns are grouped together with environmental ones for the second level categorisation, unless the animals concerned (pets and livestock for example) have a very direct impact on human economic or emotional welfare.

3.6.3 Beaver advantages

Figure 3.11 shows the range of advantages respondents believed would come with reintroducing beavers and the frequency with which they were stated. Values are weighted for sample size (rural; $n = 126$, urban; $n = 226$) so that relative frequencies can be visually compared. A tourism boost (T) is the most frequently stated advantage for both samples. In order to determine if any of the categories contained significant differences in responses between urban and rural samples, chi-square analysis was carried out (with Yates' correction for continuity). Significant differences were found in the conservation (C) category ($\chi^2 = 5.546$, $df = 1$, $p = 0.019$) and the education (Ed) category ($\chi^2 = 7.741$, $df = 1$, $p = 0.005$).

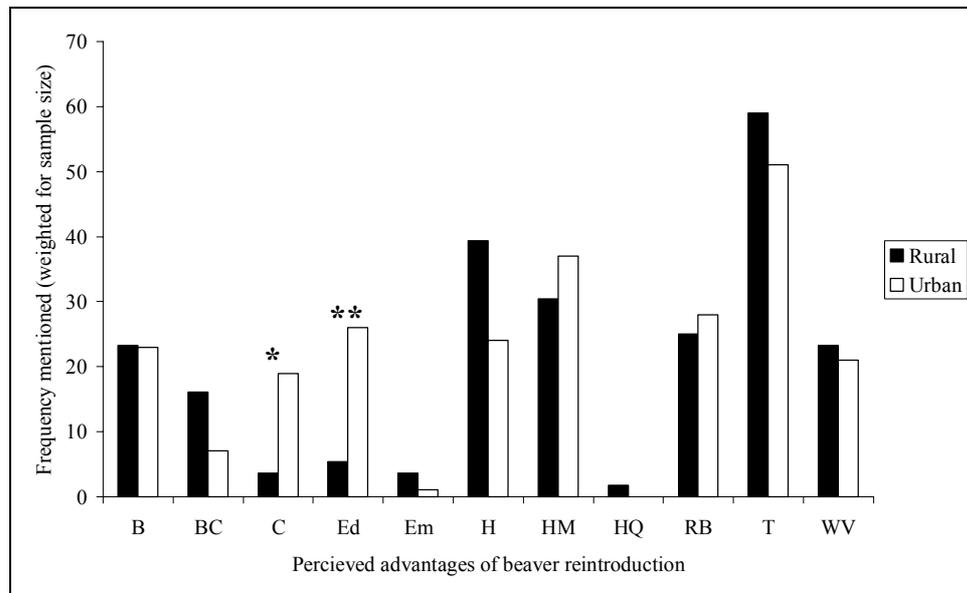


Figure 3.11 – Showing the advantages perceived to come with reintroducing the beaver. Significant differences between rural and urban samples found with chi-square tests indicated by * ($p \leq 0.05$) & ** ($p \leq 0.01$).

3.6.4 Beaver disadvantages

Figure 3.12 shows the range of disadvantages respondents believed would come with reintroducing beavers and the frequency with which they were stated. The most frequently stated concern in the rural sample is that beavers would interfere with watercourses (W). The most frequently stated concern in the urban sample is that beavers would disturb the current ecological balance (DB).

Significant differences in the responses from urban and rural samples were found in two categories; a significantly larger proportion of urban respondents stated concerns about beavers harming fish ($\chi^2 = 9.862$, $df = 1$, $p = 0.002$) and negatively affecting watercourses ($\chi^2 = 6.605$, $df = 1$, $p = 0.010$).

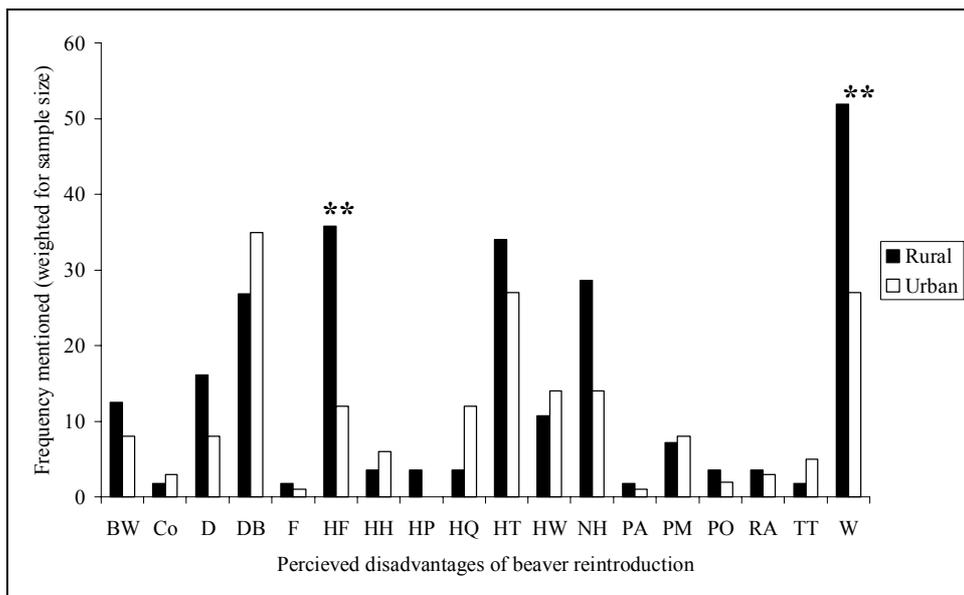


Figure 3.12 – Showing the disadvantages perceived to come with reintroducing the beaver. Significant differences between rural and urban samples found with chi-square tests indicated by ** ($p \leq 0.01$).

3.6.5 Wolf advantages

Figure 3.13 shows the range of advantages respondents believed would come with reintroducing wolves and the frequency with which they were stated. As with beavers, a boost to tourism, (T) is the most frequently stated advantage for the urban sample.

However, in the rural sample, biological control of deer, (BCD) was the most frequently stated.

Significantly more rural than urban respondents thought that biological control of deer (BCD) would be an advantage of reintroducing wolves ($\chi^2 = 12.392, df = 1, p = 0.000$). Significantly more urban than rural respondents thought that biological control of species other than deer, (BCO) ($\chi^2 = 4.656, df = 1, p = 0.031$) and educational benefits (Ed) ($\chi^2 = 5.091, df = 1, p = 0.024$) would come with reintroducing wolves.

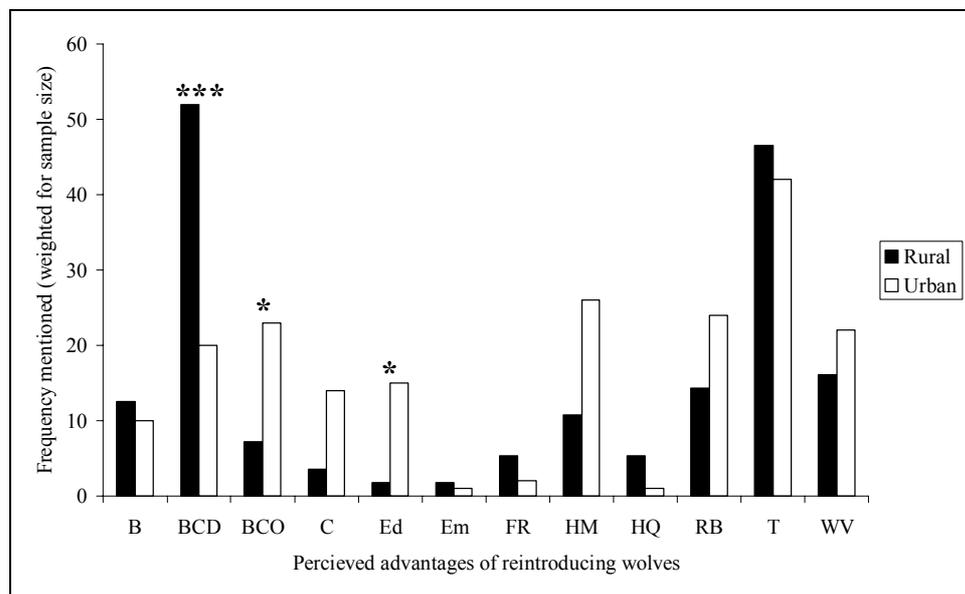


Figure 3.13 - Showing the advantages perceived to come with reintroducing the wolf. Significant differences between rural and urban samples found with chi-square tests indicated by * ($p \leq 0.05$) & * ($p \leq 0.001$).**

3.6.6 Wolf disadvantages

Figure 3.14 shows the range of disadvantages respondents believed would come with reintroducing wolves and the frequency with which they were stated. Respondents from the rural sample most frequently stated concerns about wolves killing livestock (L). Urban respondents stated concerns about wolves harming humans (HH) the most frequently.

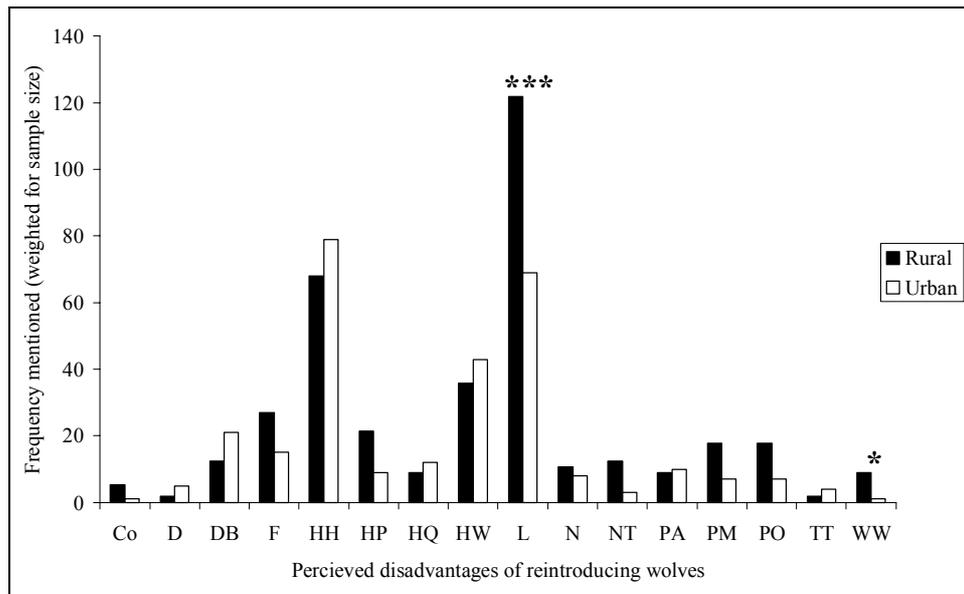


Figure 3.14 – Showing the disadvantages perceived to come with reintroducing the wolf. Significant differences between rural and urban samples found with the chi-square test indicated by * ($p \leq 0.05$) & * ($p \leq 0.001$).**

A significant difference in the responses from the urban and rural samples was found in two categories; significantly more rural than urban respondents stated concerns about loss of livestock (L) ($\chi^2 = 17.720$, $df = 1$, $p = 0.000$) and about the welfare of the wolves once reintroduced (WW) ($\chi^2 = 4.082$, $df = 1$, $p = 0.043$).

3.6.7 Rural-urban and beaver-wolf contrasts

As described in tables 3.4 and 3.5, the advantages and disadvantages were categorised further and placed into humanistic and environmental categories. When categorised in this way, no significant differences were found between rural and urban samples (chi-square tests, $p > 0.05$), so the two samples were grouped together. Figure 3.15 shows these whole sample contrasts.

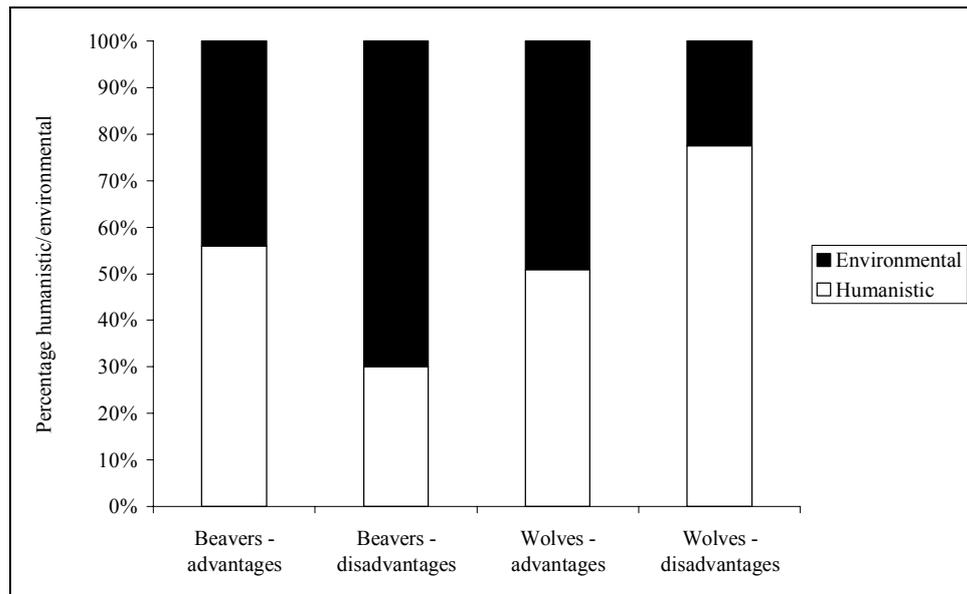


Figure 3.15 – Showing the perceived humanistic and environmental advantages and disadvantages that would come with reintroducing beavers and wolves.

Chi-square tests showed significant differences in the ratio of environmental to humanistic responses between advantages and disadvantages of reintroducing beavers ($\chi^2 = 40.105$, $df = 1$, $p = 0.000$) as well as between advantages and disadvantages of reintroducing wolves ($\chi^2 = 59.734$, $df = 1$, $p = 0.000$). Respondents stated a similar proportion of environmental and humanistic advantages for both wolves and beavers (not significantly different from 1:1, binomial test, $p > 0.05$). Perceived disadvantages of beavers were significantly more frequently environmental (binomial test, $p = 0.000$) whereas concerns about wolves were significantly more frequently humanistic (binomial test, $p = 0.000$).

3.7 Linking sections of the questionnaire together

In order to check for internal consistency and to provide extra confidence in the results, analyses were carried out which essentially linked sections of the questionnaire together.

3.7.1 Linking attitude to stated advantages and disadvantages

Firstly, to test whether the advantages and disadvantages respondents stated were related to the attitude score, an ‘advantages score’ was calculated. This was calculated by scoring each stated advantage as +1, and each stated disadvantage as -1, so the overall score had a maximum possible score of +6 and a minimum of -6. The attitude score and the ‘advantages score’, were found to be very highly positively correlated for both the rural sample ($r_s = 0.570$, $n = 126$, $p = 0.000$) and the urban sample ($r_s = 0.407$, $n = 226$, $p = 0.000$); respondents with high attitude scores stated more advantages than disadvantages, and those with low attitude scores stated more disadvantages than advantages. This ‘advantage score’ gives a measure of how interested in the subject the respondent is, as those with high scores were prepared to spend the time writing down more advantages/disadvantages than those who were less interested. As stated above, this result is really only a means of checking for internal consistency, and not really providing any new information. Figure 3.16 shows the relationship between attitude score and ‘advantages score’.

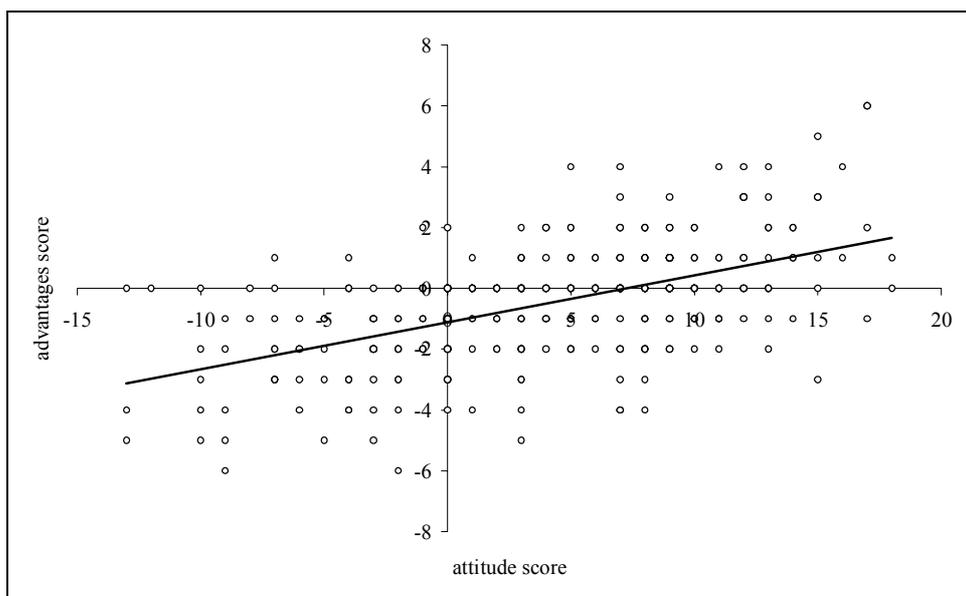


Figure 3.16 – Scatter-plot showing the relationship between attitude score and ‘advantages score’.

3.7.2 Linking attitudes to support for TfL and the beaver trial

Mann-Whitney *U*-tests found no significant difference in attitude score between the respondents who had heard of, or felt well informed about, TfL or the beaver trial, and those who hadn't or didn't feel well informed. This suggests that those people with positive attitudes do not go out 'looking for' such organisations/projects, or information about them, but that the relevant publicity reaches a broad spectrum of people. It may also suggest that people don't need to be informed in order to have opinions about a particular project.

As expected, respondents who claimed to support TfL and the beaver trial had significantly higher attitude scores than those who did not support them or were undecided (TfL; $U = 173.0$, $Z = -2.879$, $p = 0.004$. Beaver trial; $U = 160.5$, $Z = -6.195$, $p = 0.000$).

3.8 Media analysis results

In order to see if the media influences people's attitudes, a sample of newspaper articles was analysed to see how potential species for reintroduction were being portrayed. Again, because they represent two extremes, beavers and wolves were used as the two main examples.

3.8.1 Advantages and disadvantages portrayed by the media

The beaver search returned 35 relevant articles, and the wolf search returned 117. This in itself gives some insight into how the media handles wildlife issues; the bigger and more controversial the animal, the more it gets written about. Appendix 5 gives full details of the articles used. Articles were read, and using best judgement, a tally was made of the number of times a positive or negative attribute fell into the same

categories of advantages and disadvantages which were used to categorise the questionnaire responses (described in tables 3.4 and 3.5).

The occurrence of the categorised advantages and disadvantages in the media articles is significantly correlated with those stated in the questionnaires for both beavers ($r_s = 0.796, n = 29, p = 0.000$) and wolves ($r_s = 0.559, n = 28, p = 0.002$). As the media search was carried out for UK (some local and some national, see appendix 5) papers, the rural and urban samples were combined for these analyses.

3.8.2 Positive and negative articles

In addition to the advantages and disadvantages analysis, the articles were categorised according to whether they cast the species in question in a positive, negative or ambivalent light. Figure 3.17 shows that in general the media is more positive in its portrayal of wolves than beavers and that there is more ambivalence towards beavers. The proportions of positive, negative and ambivalent articles about beavers was significantly different to those about wolves ($\chi^2 = 7.147, df = 2, p = 0.028$).

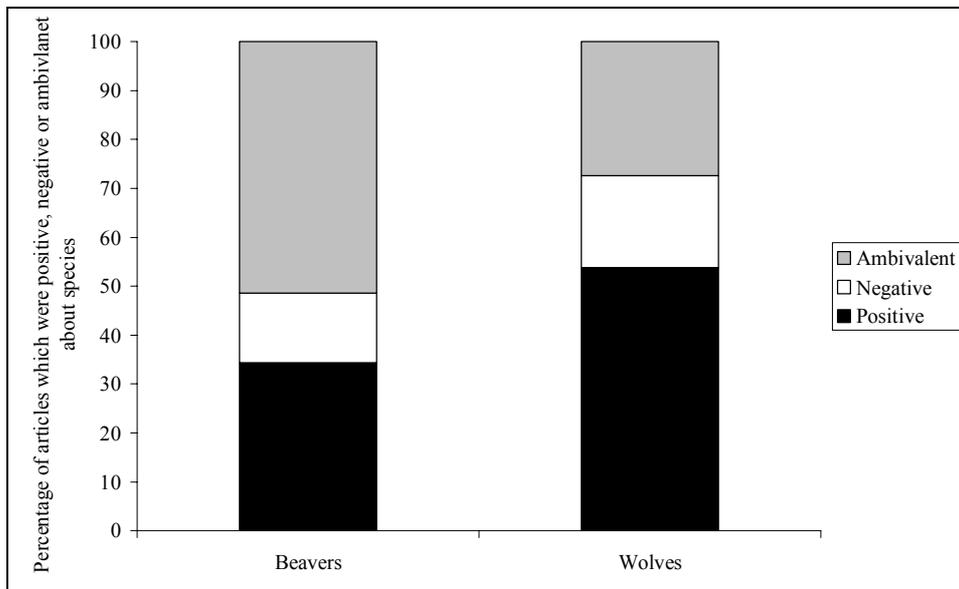


Figure 3.17 – Showing the proportions of newspaper articles which were positive, negative or ambivalent towards beavers and wolves.

3.9 Scenarios

Section 5 of the questionnaire asked respondents to rank several reintroduction scenarios in order of their preference. Although the pilot study revealed no problems with this section, it seemed to cause some confusion with respondents from the main samples. For this reason, only the top-ranked scenarios will be considered. The four (modified) scenarios are as follows:

1. No reintroduction of any species
2. Reintroduction of named species into a fenced 'eco-park'.
3. Reintroduction of named species excluding the wolf into the wild.
4. Full reintroduction of named species into the wild.

The named species are beaver, wild boar, lynx and wolf. Scenario 3 is constructed from responses to the 'reintroduction of selected species into the wild' option (5e). Because of the confusion caused by this section, the Edinburgh questionnaire (which was designed later) included only scenarios 1, 2 and 4 and only asked for the first favourite option so these results will be treated separately. Figure 3.18 shows the scenario preferences for the Edinburgh, Inverness and rural samples.

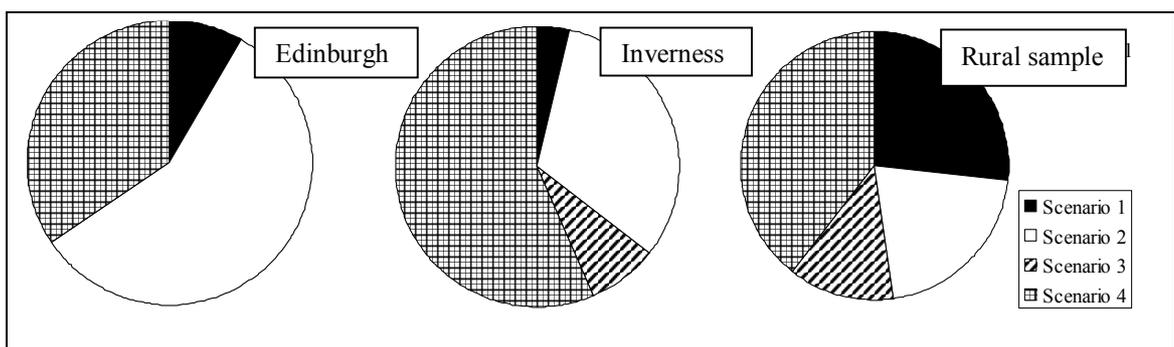


Figure 3.18 – Pie charts showing the scenario preferences for Edinburgh, Inverness and rural samples.

Comparisons of the frequencies each of the scenarios were stated as first favourite were made using chi-squared tests. Edinburgh-rural, and Edinburgh-Inverness comparisons

were made by removing scenario three responses so that relative frequencies of responses between samples remained valid.

The rural sample stated scenario 1 as favourite (no reintroductions) significantly more frequently than the Inverness sample ($\chi^2 = 20.811$, $df = 1$, $p = 0.000$) and the Edinburgh sample ($\chi^2 = 13.670$, $df = 1$, $p = 0.000$), though the most frequently stated favourite (39%) in the rural sample was scenario 4 (reintroduction of all species into the wild). The Inverness sample stated scenario 4 as favourite (reintroduction of all species into the wild) most frequently, significantly more frequently than both Edinburgh ($\chi^2 = 4.557$, $df = 1$, $p = 0.033$) and rural samples ($\chi^2 = 5.554$, $df = 1$, $p = 0.018$). The 'eco-park' option was the most frequently stated favourite (58%) of the Edinburgh sample, significantly more frequently stated than both the Inverness ($\chi^2 = 12.865$, $df = 1$, $p = 0.000$) and the rural samples ($\chi^2 = 30.990$, $df = 1$, $p = 0.000$). All other pair-wise comparisons were not found to be statistically significant at $p \leq 0.05$.

3.10 Scottish Countryside Alliance (SCA) sample

3.10.1 Attitude score

It was not possible to determine whether the SCA respondents were of rural or urban residence, but considering the organisation of which they were members, it is assumed that they were predominantly rural residents. This assumption is given credence by the fact that the SCA sample attitude score was found to be significantly lower than the urban sample ($U = 1822.0$, $Z = -2.365$, $p = 0.018$), but not significantly different from that of the rural sample. Figure 3.19 shows the mean attitude score for the urban, rural and SCA sample.

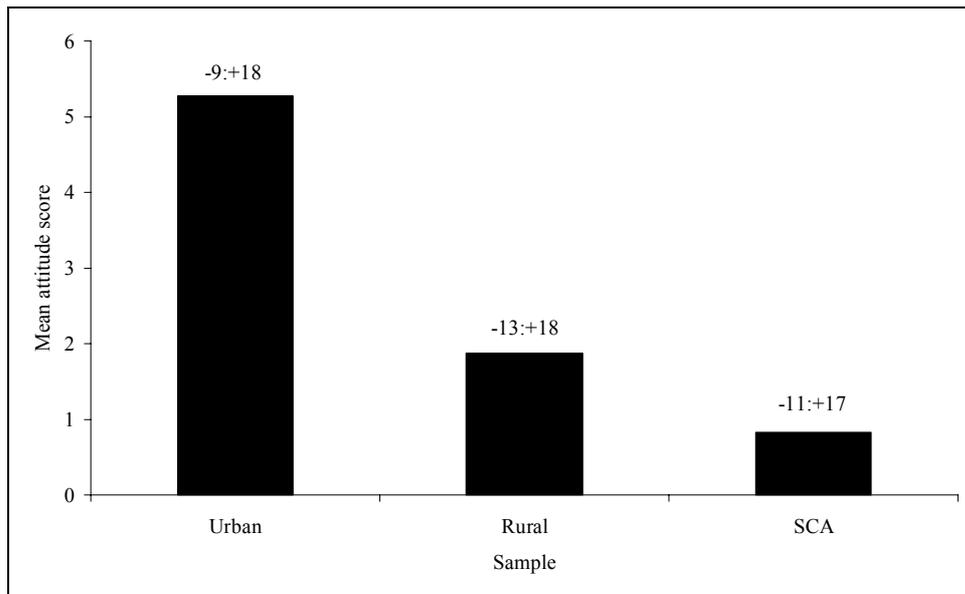


Figure 3.19 – Showing the mean attitude score of the urban, rural and SCA samples. Values denote the range of attitude scores for each sample (min:max).

Within the SCA sample, attitude score was found to be positively correlated with year of birth ($r_s = 0.542$, $n = 23$, $p = 0.008$), but not correlated with duration lived in area, education or income. SCA members who hunted had significantly lower attitude scores than those who did not hunt ($U = 17.5$, $Z = -2.053$, $p = 0.040$). No significant difference was found between men and women, members and non-members of environmental groups or those who were farmers/landowners or not.

Despite the lower mean attitude score, the SCA was far from a homogenous group; the individual attitude scores ranged from -11 to +17, a wider range than the urban sample. Some of the comments that came with surveys were amongst the most positive and radical received; one notable example suggesting that mammal reintroductions need not stop at ones which were once native to Scotland, but could include species which are globally endangered, such as the Siberian Tiger. The small sample size may well not be representative of the whole, but it is clear a wide range of attitudes exist amongst SCA members.

3.10.2 Knowledge

The SCA sample had a significantly higher average quiz score than the urban sample ($U = 288.0$, $Z = -5.308$, $p = 0.000$), and a slightly (not significantly) higher quiz score than the rural sample. Within this sample, attitude score and quiz score were not significantly correlated.

3.10.3 Awareness and support

Only 6 of the 23 SCA respondents had heard of TfL, a significantly smaller proportion than the rural sample ($\chi^2 = 6.694$, $df = 1$, $p = 0.010$), but not different to the proportion of the urban sample. Of those 4 felt informed as to the work that they did, and 4 claimed to support it. These proportions were not different to those feeling informed, or supporting TfL in either rural or urban samples.

22 of the 23 SCA respondents had heard of the beaver trial, a significantly larger proportion than either rural ($\chi^2 = 6.610$, $df = 1$, $p = 0.000$) or urban sample ($\chi^2 = 30.532$, $df = 1$, $p = 0.000$). Of those, 12 felt well informed about it, 8 supported it, and 11 did not, the remaining 3 being undecided. The proportion feeling informed and the proportion supporting the beaver trial was not significantly different from the rural sample, but SCA respondents were significantly more well informed ($\chi^2 = 4.386$, $df = 1$, $p = 0.036$), and less supportive ($\chi^2 = 30.686$, $df = 1$, $p = 0.000$) than the urban sample.

3.10.4 SCA sample summary

Further analysis of the SCA sample will not be carried out, as although some differences do exist, it is really just a sub-sample of the rural dataset. The one main finding of interest however is that the SCA attitude score is not significantly different from the rural sample, yet the proportion of hunters is far higher. This adds further support to the decision to have removed the hunting question from the attitude scale,

and confirms the complexity of the relationship between hunting and attitudes towards reintroductions. Unfortunately, the SCA sample's small size and self-selected nature mean that any further information that this sample may provide about the connection between attitudes towards reintroductions and hunting would be inconclusive.

3.11 Stakeholder viewpoints

Figure 3.20 summarises the key stakeholder organisations' attitudes toward mammal reintroductions as a result of completing the attitude section of the questionnaire.

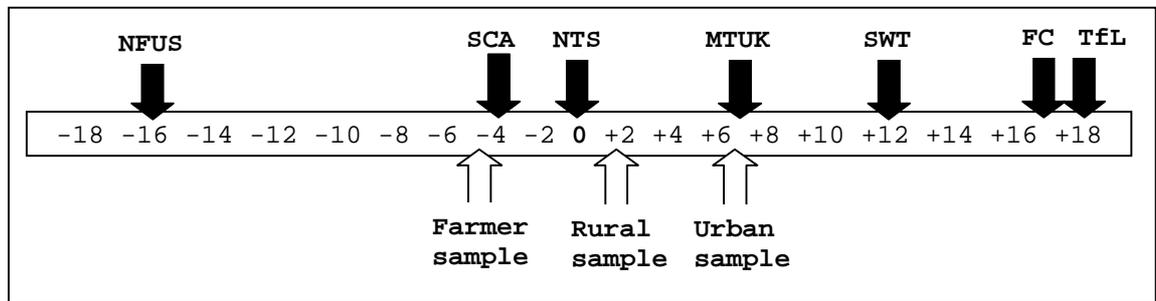


Figure 3.20 – Showing the attitude score (numbers) of the key stakeholder organisations and the mean scores for the questionnaire samples. NFUS = National Farmers Union for Scotland, SCA = Scottish Countryside Alliance, NTS = National Trust for Scotland, MTUK = Mammals Trust UK, SWT = Scottish Wildlife Trust, FC = Forestry Commission, TfL = Trees for Life.

Table 3.6 focuses on the two main questions asked in the stakeholder interviews, namely what is the organisations stance towards reintroductions, and how important are public attitudes to the organisations. It should be noted that most of the organisations did not have an official line when it came to reintroductions, so any on the information gained from the stakeholder interviews must be regarded as unofficial. More information than that recorded below was obtained though the stakeholder interviews, so references to additional information gained may be made later in the text.

Organisation	Attitude toward reintroductions?	Importance placed on public attitude in policy making?
Forestry Commission (FC) Russell Cooper	Governmental body, so don't really have an 'attitude' as such; will act as told to by the Scottish Executive. Shift from commercial forestry to 'forests as an experience', so mammal reintroductions could enhance this. Beaver trial is on FC land.	Consultation is an important part of FC policy making. Design plans are made, followed by rounds of public consultation, then implementation, as expected of governmental body.
Mammals Trust UK (MTUK) Jill Nelson	Deciding factor of which projects would receive funding is conservation value of proposed species. Supporting beaver trial financially. Thinks that anything more controversial than beavers is unlikely. Thinks beavers have clear conservation value (hence providing funding), wolves perhaps not. MTUK mission statement 'to conserve all our native species' does not specify whether that includes extinct ones or not.	Consultation not particularly important, as decisions about a specific projects go-ahead are already made by time MTUK decides to support it financially or not. 15,000 supporters, who must be kept happy, follow population trends in UK, so most money comes from SE England (supporting a Scottish beaver trial!). A project with a human interaction factor (education, information provision) is more likely to get funding.
National Farmers Union Scotland (NFUS) Craig Campbell	Official line is very anti-reintroductions, particularly regarding the wolf. 'Eco-park' idea is acceptable. Thinks that compensation scheme for predated livestock would not help with regard to wolves; it's not just about money, but also animal welfare. Does not believe that beavers were ever widespread in Scotland, and that they should be kept out to remove risk of bring in gyrodactylus (salmon parasite).	SNFU represents about 80% of Scottish farmers, and consultation among them is very important. They are a very representative union and SNFU are in tune with the attitudes of their members.
National Trust for Scotland (NTS) James Fenton	Not likely to be leading the field with regard to potentially incendiary policies such as reintroductions. Access a big issue to NTS, so any conflict regarding that (such as 'eco-park' ideas perhaps) would be likely to reduce support for reintroductions. Feel that evidence to show the benefits of reintroductions must be clear and strong.	NTS tend to be reactive to their 250,000 members wishes. Typically older and fairly conservative membership. Relationship with communities (farmers and crofters etc) an important factor, so the attitudes of these groups would be reflected in NTS policies, not those of the wider public.

<p>Scottish Countryside Alliance (SCA) Ross Montague</p>	<p>Currently no official line, but see the need for debate. ‘Empowering the land manager’ is a driving paradigm, so if reintroductions would create employment, tourism etc, then SCA would be supportive. But, think that wolves in particular would decrease tourism and hunting revenue, so are generally not supportive. Feel that there are enough problems managing current wildlife (foxes for example) without reintroducing any more.</p>	<p>Public attitudes and particularly member’s attitudes are very important. SCA consults widely through their newsletter ‘Heather Roots’, which goes out to around 3000 people. However, thinks that attitudes may not be reflected in behaviour. Recognises frequency of ‘Braveheart mentality’; people hooked on the romantic idea of wild Scotland, but only the idea. Thinks that Scotland is a very polarized country.</p>
<p>Scottish Wildlife Trust (SWT) Simon Milne</p>	<p>Official line about reintroductions is that they would welcome any debate on the issue, as it brings biodiversity and other related issues to the fore. A major focus of their work is PR and advocacy. Raising awareness has been a major part of their role in the beaver trial (courting media interest etc). Any reintroduction must be preceded by thorough scientific research, and have a sound ecological justification. Thinks beaver trial will be a success.</p>	<p>Consult widely on all issues among 25,000 members, council and supporting committees as well as with other organisations. Public attitude therefore very important. SWT generally seen as the voice of moderation amongst the conservation organisations. Thinks that peoples poor understanding of how wildlife is managed in the UK is the root of many problems. People within the landscape an important focus.</p>
<p>Trees for Life (TfL) Alan Watson Featherstone</p>	<p>Fully support reintroduction of all extinct species as part of 250 year ecological restoration plan. Think that two things are required first, education of public, and removal of sheep from the hills. Thinks that current farming practices are ‘mining’ the land’s nutrients; ecological restoration (and mammal reintroductions) would get the situation back in line. Main drivers for reintroductions are ecological & moral.</p>	<p>Public attitude becoming more important to them; recent appointment of marketing assistant. Don’t feel that TfL as an organisation needs to be well known, as long as the idea that they are driving towards is. As they own no land themselves, agreements with landowners are needed for their work to progress, so the attitudes of these individuals are currently most important to them.</p>

Table 3.6 – Results of the key stakeholder meetings.

4. Discussion

4.1 Majority Support for Reintroductions

The results have shown that the attitudes of respondents are generally positive. The majority of both urban and rural sample held positive attitudes. From attitudinal studies regarding wolf reintroductions in the literature, it was found that attitudes in Western Europe and Scandinavia were more negative than those in the USA, so a high level of support for reintroductions in this study is something of a surprise. A possible explanation could be provided by the observation that people with the least experience of wolves have the most positive attitudes (Williams *et al* 2002). Wolves have been absent in the UK for far longer than they have in other European countries (Hinrichsen 2000), several hundred years longer than anyone's living memory so perhaps this longevity of absence has resulted in 'historical lack of experience', translated into wolves having a lower mythological potency in the UK than in other parts of Europe.

The scenarios section of the questionnaire gave respondents the opportunity to select species from the list (boar, beaver, lynx, wolf) for reintroduction. Only 8% of Inverness respondents and 12% of rural respondents chose to remove wolf from the list, so this suggests that people see mammal reintroductions as a whole issue, rather than several individual species-specific ones. This provides further justification for the frequent references to surveys about attitudes towards wolf reintroductions that will be used in this discussion.

The potential exists for advocates of wolf reintroductions to take advantage of positive attitudes which have resulted from a lack of experience with the candidate species. This might be something of a risky strategy however, as the recent cull of wolves in Norway shows. Just over 30 years after they were given legal protection in

Norway, and following a good population recovery (Fritts and Carbyn 1995), attitudes towards wolves are now very negative. This potential for rapid attitudinal turnaround may have already been seen in the UK; the one animal that has re-appeared in the British fauna, wild boar, is suffering from predominantly negative media coverage (Goulding and Roper 2002). If predominantly positive media coverage for species that could be reintroduced turns negative following reintroduction, the success of the project could be jeopardised. This highlights the need to educate the public both with regard to the positive aspects of reintroductions, and the negatives so that no nasty surprises can be left in store. Information about negative impacts, and the possible mitigation methods for those impacts, should be made available from the very outset so that as trusting a relationship as possible is established between the instigator of the reintroduction and the public.

Being one of the last countries to reintroduce the beaver and generally being behind in the whole issue of reintroductions may well be a fact that could work to the UK's advantage. There are numerous overseas examples of both good and bad reintroductions of all the species that are being considered. Okarma (1993), for example, describes the history of the wolf in Poland, how attitudes have changed, methods for hunting wolves, the effects of having them as game species and a great deal of other information that almost reads like a 'how-to' guide. There is little that is not well understood about wolves and their management, likely sources of conflict and many possible mitigation methods have all been well documented (e.g. Ericsson *et al* 2004). Taking advantage of others' experiences means that a UK reintroduction could potentially be a far smoother operation than those seen overseas.

4.2 Attitude Correlates

The attitudes of the urban sample were shown to be significantly more positive than that of the rural sample; a trend that has been observed in previous studies (Williams *et al* 2002). However, the rural-urban divide was far from clear cut. With improved transport links, and a greater potential for working from home via the internet, there are a growing number of urbanites choosing to live in rural areas, particularly in areas that are renowned for their beauty, such as Glen Affric. This urban-rural mix may have resulted in a higher rural attitude score than would be expected, with the recent rural dwellers having a more positive attitude than long term rural residents. This theory is backed up by the fact that people who had lived in the area for the longest tended to have the most negative attitudes. Reintroductions are commonly perceived as a symbol of urban dominance (Williams *et al* 2002), but with a mixed urban-rural population, such a complaint would be unlikely to be sustained.

Age was found to be negatively correlated with attitude score in the rural sample, another common observation in attitude studies (Williams *et al* 2002). The lack of this pattern in the urban sample is probably due to the lower level of interest in the sample as a whole. A glance at figure 3.2 will show that the youngest rural age group (born between 1981 and 1990) did not follow the expected pattern, and had a negative attitude score (which only the oldest age category also had). This finding supports one of the conclusions in Bath and Farmer (2000) that there has been a ‘loss of connection’ between UK young people and their natural heritage. Williams *et al* (2002) suggested that the relationship between age and attitudes was a cohort effect and that people do not tend to get more negative as they get older. If this is the case, then advocates of mammal reintroductions should be concerned that the present youngest age category will age whilst retaining their negative attitudes.

No explanation was suggested as to why UK young people should show this 'loss of connection', but the UK education system would be an obvious place to start looking. In the current hyper-sensitive UK society, schools are suffering perhaps more than most. A number of recent studies have shown that young people are being deprived of outdoor activities due to concerns by teachers about being sued (Shaw 2004). Bath and Farmer's (2000) report suggested that attitudes were linked to knowledge, perhaps this paucity of outdoor and wildlife education is resulting in negative attitudes.

The relationship between education and attitude is not clear cut however. Kellert (1980), and many other studies found that education often resulted in increased awareness of wildlife and the environment. This particular trend was not seen in this study (attitude score was not found to be correlated to education level) and perhaps suggests that the UK education system has been different to that found overseas for more than just the recent past. Knowledge, as measured using the quiz, was correlated with attitude score, but is not related to formal education in this sample. This finding suggests that education about the animals to be reintroduced will be harder to target. 'Education' is a common recommendation produced from attitude surveys (e.g. Enck and Brown 2002 and Lohr *et al* 1996) but what form this education will take is rarely specified. The type of education provided by visitor centres is unlikely to have any great effect on attitudes, as the people who are interested enough in the species/project to visit in the first place probably already have a positive attitude. Another related measure in this survey is whether respondents claimed to feel well informed about TfL or the beaver trial. No difference in attitude score was found between those who felt informed and those who didn't, so this initially suggests that information alone does not affect attitudes. However, the majority of media articles about beavers were

ambivalent, and since media was the most commonly cited source of information, it would be difficult to tell whether they had an effect on attitudes or not. This relationship can not be commented on for wolves, as there was no question which asked how well respondents felt informed about wolves. Further research and definition of exactly which aspect of 'education' is significant in affecting attitudes is required and recommended. This survey suggests that wildlife knowledge is more important in shaping attitudes than formal education and simple information about a particular project.

Members of environmental organisations were found to have higher attitude scores than non-members; an unsurprising, but useful finding for those wishing to garner support for reintroduction projects. Membership organisations such as the RSPB (which was the most frequently stated environmental organisation) can be influential with regard to wildlife management decisions, as they frequently have representatives on steering groups of projects, often own large tracts of land and many have a high media profile. So support for a particular reintroduction project from one of these groups can provide a major boost.

4.3 Attitude Typologies

One of the important factors that is commonly associated with attitudes toward reintroducing mammals is fear (Linnell *et al* 2002). This is a particularly important consideration with regard to wolves and other carnivores, but Bath and Farmer (2000) found that some respondents reported fear of otters, and in this study, ten respondents expressed fear of beavers, or concerns that they might harm humans. To a large extent, fear of these animals is unfounded (Wilson 2004); a lack of knowledge, and the way that the animals are portrayed in folklore and mythology is believed to be partly responsible (Nie 2003). There are no reliable records of attacks on people by lynx or

non-rabid wolves in Europe from the 20th century (Wilson 2004). This study has shown that fear is not a particularly important factor with regard to mammal reintroductions, particularly in the rural sample. A lack of the NIMBY attitude and the negativistic attitude suggest this, as well as the fact that only 7% of rural responses expressed fear of wolves in the advantages and disadvantages section. Concerns in the rural area were more commonly centred on damage to livestock; over 30% of the stated disadvantages of bringing back wolves described this concern in the rural sample. A number of anecdotal reports of large cats living in the wild in and around the TFL area were recorded from respondents, and as many of these as possible were followed up with conversation with the particular respondent. Rather than being afraid of these animals, people more commonly expressed excitement, and none stated that their presence made them afraid to walk alone in the area. The fact that the NIMBY and negativistic attitudes were also not found in the urban sample suggests that reintroductions would not negatively impact walking-based tourism in the Highlands. The 'harm humans' category was a frequently stated concern with regard to wolves however, but frequently, this concern was stated as a question, ie 'do wolves hurt people?' as opposed to actual expression of fear.

The utilitarian attitude typology was present in both the urban and rural sample, which suggests that the public would expect that reintroductions cause an increase in tourism rather than a decrease. Philip and Macmillan (2003) suggested that the tourist economy in Scotland is closely associated with wildlife and countryside, and the presence of the utilitarian typology seems to confirm this. This suggests that Scottish people would make the most of mammal reintroductions and reap rewards from them to the benefit of the economy.

4.4 Attitudes and Farming

Attitudes in the farmer sample were significantly more negative than the rest of the rural sample. So despite the overall positive attitude, wildlife managers should tread carefully, as the group with the most negative attitudes are the ones who could most easily have an effect on the success of reintroduction projects. Alan Watson Featherstone of TFL felt that removing sheep from the hills was one of the most important first steps in his re-wilding vision. The number of concerns centred on damage to livestock (over 30% of all rural responses) in the advantages and disadvantages section, confirm the potential for conflict between livestock farming and reintroductions. The recent agricultural reform and introduction of the Single Farm Payment (SFP) may bring about a shift in the style of agriculture in Scotland. The SFP is a payment to farmers, not for production, but based on the size of their farm and is dependent to some extent on the farmer maintaining his land in 'good agricultural and environmental condition' (Scottish Executive 2004). Craig Campbell of the SNFU believes that the SFP will drive rational farmers to reduce the less profitable areas of their business. He predicted that sheep farming and arable farming will decline in highland areas.

Another possible outcome of the SFP is that farmers may seek to diversify their income and a switch to eco-tourism and wildlife viewing may provide such an opportunity. The presence of the utilitarian typology in both the rural and urban samples adds weight to this possibility. Reintroductions overseas have generated large numbers of visitors. Perhaps the best example of this is the International Wolf Centre in Minnesota which provides employment and a considerable contribution to the local economy, in the region of \$3 million a year (Mech 1996). Reintroduced wildlife viewing in the UK is already big business; Ospreys, Red Kites and Sea Eagles all attract

many visitors, both to purpose-built centres and to farms made open to the public (RSPB 2005).

In the space left for further comments, and through conversation with respondents, many farmers made clear that they felt there were enough problems managing the wildlife in Scotland, without introducing any more. One farmer, who owned a 10,000 acre farm, claimed that of 300 lambs, he loses 30-40 every year to various predators. As a result, he shoots about 25 foxes and traps up to 60 hooded crows. Understandably, this gentleman was not keen on bringing back any more carnivores. Similarly, many respondents stated that the difficulty that SNH and other conservation organisations seem to have in managing populations of red squirrels, wildcats, capercaillies and other struggling species was justification for not reintroducing any extra species. These respondents felt that not until the species that already exist in Scotland were successfully managed did anyone have the right to bring in any additional ones.

It would be difficult to convince anybody that bringing back certain extinct species would get the ecosystem 'back in balance' without clear evidence, and even with evidence, trophic cascade effects are often complex and can be difficult for the layman to understand (Ripple and Beschta 2003). This rural sample may be particularly hard to convince with this type of argument as it showed a lack of the ecologicistic attitude typology.

Compensation schemes have been set up in many countries where carnivores cause livestock depredation. Organisations that are advocating mammal reintroductions commonly suggest that compensation schemes could be set up in this country, however, according to Craig Campbell, financial compensation may not be enough. He believes that financial loss is only part of the issue and that animal welfare is an important

concern of farmers that could not be bought off. The compensation scheme set up for Sea Eagles (which can take young lambs and were reintroduced to Scotland in 1975) has largely quietened the outrage of farmers, but bred an air of distrust between farmers and SNH with regard to reintroductions. Compensation schemes come with a number of problems (Naughton-Treves *et al* 2003), and farmers who have recently lost production subsidies may be tempted to supplement their income by claiming that wolves are killing more sheep than is in fact the case. This kind of abuse is thought to have been observed in France with regard to both wolf (Brown 2001) and lynx compensation schemes (Yalden 1999), and is very hard to police.

Ross Montague of the SCA (pers comm.) suggested that Scotland is a polarised country. The range of responses given to the attitude statements seem to partly confirm this suggestion (see figures 3.5 and 3.6) with the overall attitude score in the rural sample ranging from -13 to +18. But the greatest proportion of responses fell towards the middle of the distribution, indicating that a large number of people do not hold particularly strong feelings on the issue. This polarisation is likely to largely be explained by the farming contingent at one extreme and recent settlers from urban areas at the other. This highlights the importance of understanding demographic characteristics of respondents and how carefully sound-bites or blanket statements like ‘strong public backing of beaver reintroduction’ (SNH 2005) must be interpreted.

4.5 Attitudes and Hunting

No difference in attitude score was found between hunters and non-hunters, a testament to the complexity of the relationship between hunting and attitudes toward mammal reintroductions. Some previous studies have shown that hunting is related to negative attitudes (e.g. Lohr *et al* 1996) while other have shown a more complex relationship (e.g. Bjerke *et al* 1998). The attitude score of the SCA sample, of which 78% of

respondents were hunters, was still more than zero, and not significantly different to that of the rural sample which only had 42% hunters. Ross Montague of the SCA believed that the organisational attitude (see figure 3.20) was likely to be more positive than that of its members, but this appears not to be the case. This may be due the realisation by the hunters that deer are so abundant that a few predators would not affect the sport, and could even enhance it by providing new potential quarry species. Three rural respondents stated this possibility as an advantage of reintroducing wolves, and one stated it as an advantage of reintroducing beavers.

Wolves are a game animal in Spain, which has Europe's largest wolf population (Hinrichsen 2000), as well in several other European countries. Lynx are hunted for sport in Norway, and wild boar hunting in France is an important industry (Goulding and Roper 2002). Hunting to a strict quota could be a means of gaining the support of the hunting community, and as has been seen with other species, by giving species a commercial value can be an effective means of ensuring their conservation (Yalden 1999). High trophy fees may also be an effective means of raising revenue that could be used to fund a compensation fund for depredated livestock, as with wild boar in France (Goulding and Roper 2002). However, considering the attitudes towards hunting in the UK, in light of the recent ban on hunting with dogs (White *et al* 2000), and the strength of the anti-hunting lobby in the UK, it is highly unlikely that hunting wolves or boar or lynx would be accepted. It remains a possibility that may merit further research; perhaps the public would be prepared to accept a limited hunting quota if that was the only way that reintroductions could be funded. Yalden (1999) suggested that the anti-hunting lobby did not appreciate the important role that the hunting industry plays in conservation. A more open relationship between these two groups and

an acceptance of the fact that hunters are frequently wildlife enthusiasts (Kellert 1981) may help to see a more collaborative approach to wildlife management.

4.6 Role of the Media

The way that the candidate species are portrayed in the media was found to be related to the sample's perceived advantages and disadvantages of reintroducing wolves and beavers and their attitudes. For the most part, articles cast wolves and beavers in a positive light, so this may go some way to explaining the overall positive attitudes of the rural and urban sample. A large number of the articles about wolves were describing visits to schools and events by the UK wolf conservation trust, accompanied by one or more of their own wolves. These visits by the wolf trust are designed to dispel myths about the animals and often allow people close contact with them. The articles covering these events frequently portrayed the wolves favourably, using phrases like 'friendly pair' and 'beautiful animals' to describe the canine visitors. This positive media coverage is a major added bonus to the wolf trust; their message reaching far wider audiences than just those who attend the visits.

4.7 Limitations and means of improvement

This study has shown some interesting results and highlighted some potential areas for future study, but it did have problematic aspects which could be improved upon. The lack of differentiation between dwellings and non-dwellings on the Landranger maps caused time to be wasted whilst sampling; this could be overcome by employing GIS techniques to identify habitations in advance, or using a non-spatial method, such as sampling from the electoral role. Having more time to wait in the area to deliver and collect surveys would have been useful as this method reaped more responses than those which were returned in the post. Extra time to carry out more in depth interviews

with respondents would also have been helpful, perhaps allowing the full Kellert methodology to be employed giving a greater insight into specific attitudes.

5. Conclusions and Recommendations

1. An overall positive attitude towards the mammal reintroduction aspect of ecological restoration was found for both urban and rural samples. This is likely to be due to the fact that the species discussed have been absent from the Highlands for several hundred years, and positive attitudes towards certain extirpated mammals have been found to be associated with a lack of experience with them. This leads to the recommendation that organisations involved could perhaps be less hesitant in making proposals as they may get more support than expected. But they should be aware that attitudes could change following reintroduction, so should plan policies accordingly.
2. Farmers have significantly more negative attitudes. Disseminating information to farmers about potential reintroduction schemes that could generate income through tourism is recommended. Policies regarding reintroductions must be tied to agricultural policies as the farmers are both the group with the most negative attitudes and the one which has the greatest potential to affect the outcome of reintroductions.
3. The relationship between hunting and attitude towards reintroductions is complex, and more research (perhaps in conjunction with the SCA who were particularly interested in the issue) would be useful to more fully understand it.

4. The main concerns associated with bringing back beavers were environmental, whereas concerns about bringing back wolves were centred on the harm they could cause to humans (both directly and by harming livestock). These concerns and the perceived benefits were not found to be significantly different from those portrayed in the media, so the media could be partly responsible for the general positive attitudes. This finding leads to the recommendation that those interested in correcting people's misconceptions (fears about human safety for example) about a species to be reintroduced should try to use the media to disseminate accurate information as much as possible.

5. Despite lower awareness and lower wildlife quiz scores, the urban sample had more positive attitude scores. It is therefore recommended that urban centres be targeted to generate funding for reintroduction projects. The urban-rural split is not clear cut however, with the most recent rural settlers having the most positive attitudes. As a result the widest range of attitude scores was observed in rural sample, highlighting a polarity of opinion. The rural populace must therefore be dealt with carefully as the positive attitudes of the whole may be disguising the very negative attitudes of an important minority.

6. Attitudes and knowledge about wildlife and reintroductions are not linked to formal education (or it's co-correlate; income) which suggests that wildlife knowledge and attitudes are acquired later in life and by choice as opposed to compulsory learning. The finding that the youngest age category had more negative attitudes than expected strengthens this theory. The recommendation

that more wildlife education and outdoor activities are provided in schools is therefore made.

Overall, in light of the very negative views of the farmers and the polarised views of the rural community as a whole, it is not recommended that all the species discussed here are reintroduced at this time. But attitudes are more positive than might have been expected, so the organisations advocating reintroductions could perhaps be bolder in making proposals. Changes to agriculture and the dissemination of accurate information regarding the candidate species through the media may raise attitudes further, so reintroduction advocates may one day in the not too distant future see an area with a fully restored ecosystem in Scotland, complete with some of its extirpated fauna.

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7. Appendices

Appendix 1: Survey used for rural and Inverness sampling

Imperial College, University of London

Department of Environmental Science and Technology

Dear Householder,

My name is Lee Schofield and I'm a student at Imperial College London, studying for an MSc in Ecological Management. I am hoping that you'd be kind enough to fill out the attached questionnaire which forms a part of my research project.

I'm interested in your attitudes towards the concept of reintroducing mammals back into your area of the Scottish countryside. As you may or may not be aware, you live near to the 'Trees for Life' project, which is aiming to recreate Scotland's ancient ecosystem, initially through regeneration of the Caledonian Pine forests. The area that this project covers is potentially large enough to support populations of animals which were formally present in Scotland, but are now extinct (for example, beavers, wild boar and wolves).

I have selected your area due to its proximity to the above project, and your household has been randomly chosen.

Please note that, aside from the proposed trial beaver reintroduction in Knapdale, **there are currently no plans to reintroduce any animals into the Scottish countryside in the foreseeable future.** My research project is therefore more a survey of general attitudes towards the concept of reintroductions, as opposed to attitudes towards specific projects.

Please read the instructions as to how to fill out the questionnaire at the beginning of each section carefully. The final section of the questionnaire is an optional quiz. All completed questionnaires which have quiz scores of 80% correct or over will be entered into a prize draw for a bottle of champagne.

Please be assured that you as an individual will not be identifiable, as you will not be asked for your name anywhere on the questionnaire. All information you provide will be strictly confidential and not made available to any third party, though the overall findings of the study will be given to Trees for Life, Scottish Natural Heritage and the National Trust for Scotland.

Feel free to contact me if you have any questions,

Many thanks for your assistance,

Lee Schofield
lee.schofield@imperial.ac.uk
07967 155857

Attitudes toward mammal reintroductions in Scotland questionnaire

Definitions: When the word 'area' is used it means within a 30 mile radius of your home. The term 'ancient ecosystem' refers to the landscape, plants and animals present in Scotland 1500 years ago, and 'lost mammals' refers to mammals which were present at that time, but that are now extinct in Scotland.

Section 1 – Personal Details:

1.1. How long have you lived in this area?

- a) Under 1 year b) 1-5 years c) 6-20 years d) 20 years +

1.2. What is your gender? a) Male b) Female

1.3. What is your occupation?

1.4. What is the year of your birth?

- a) Pre 1940 b) 1941-1950 c) 1951-1960
d) 1961-1970 e) 1971-1980 f) 1981-1990

Section 2 – Knowledge of the issue:

2.1. Had you heard of the 'Trees for Life' project before receiving this questionnaire?

- a) Yes (go to question 2.2) b) No (go to question 2.5)

2.2. How did you hear about 'Trees for Life'?

- a) Friends & family
b) Their own publicity What type of publicity?.....
c) Other groups publications Please specify.....
d) Local or national media Please specify.....

2.3. Do you feel well informed as to the work that 'Trees for Life' do?

- a) Yes b) No

2.4. Do support the work that 'Trees for Life' do?

- a) Yes b) No c) Don't know

2.5. Had you heard of the proposed beaver trial reintroduction before receiving this questionnaire?

- a) Yes (go to question 2.6) b) No (go to question 3.1)

2.6. Where did you hear about the proposed beaver trial reintroduction?

- a) Friends & family
b) Scottish Natural Heritage publicity What type of publicity?
c) Other groups publications Please specify.....
d) Local or national media Please specify.....

2.7. Do you feel that you know enough about the proposed beaver trial reintroduction?

- a) Yes b) No

2.8. Do you support the proposed beaver trial reintroduction?

- a) Yes b) No c) Don't know

Section 3 – Advantages and Disadvantages of reintroductions:

3.1. Please list up to 3 advantages or benefits that you can think of that would come with reintroducing beavers. Please list them in order of importance.

1. _____
2. _____
3. _____

3.2. Please list up to 3 disadvantages or possible risks that you can think of that would come with reintroducing beavers. Please list them in order of importance.

1. _____
2. _____
3. _____

3.3. Please list up to 3 advantages or benefits that you can think of that would come with reintroducing wolves. Please list them in order of importance.

1. _____
2. _____
3. _____

3.4. Please list up to 3 disadvantages or possible risks that you can think of that would come with reintroducing wolves. Please list them in order of importance.

1. _____
2. _____
3. _____

Section 4 – Attitudes:

Please tick a box to state whether you strongly disagree, disagree, are neutral, agree, or strongly agree with regard to the following statements. If you don't know, please leave all the boxes blank:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4.1. I feel that wolves symbolize the greatness and beauty of nature.	<input type="checkbox"/>				
4.2. I feel that reintroducing Scotland's lost mammals is important in order to restore the natural balance of the environment.	<input type="checkbox"/>				
4.3. I wouldn't want large carnivores reintroduced for fear that they might hurt pets and other smaller animals.	<input type="checkbox"/>				
4.4. I like the idea of reintroducing Scotland's lost mammals, but I wouldn't want them in my area.	<input type="checkbox"/>				
4.5. If Scotland's lost mammals were reintroduced, I would not venture into the countryside.	<input type="checkbox"/>				
4.6. I find nature to be a strong source of inspiration so would love to see it returned to its ancient state.	<input type="checkbox"/>				

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4.7. I feel that reintroducing Scotland's lost mammals would bring more money through tourism to the area.	↑	↑	↑	↑	↑
4.8. I would find it a stimulating and exciting experience to hunt and kill a wild boar.	↑	↑	↑	↑	↑
4.9. I have little interest in nature and feel that the money spent on a reintroduction program would be better spent elsewhere.	↑	↑	↑	↑	↑
4.10. Overall, I would say that I would support a project which aimed to reintroduce Scotland's lost mammals and completely restore its ancient ecosystem.	↑	↑	↑	↑	↑

Section 5 – Scenarios:

Please indicate which of the following possible scenarios you would prefer. Mark your most favorite with a 1, and your second with a 2 etc.
[Potential Species for reintroduction are: Beaver, wild boar, lynx and wolf]

a) No reintroduction of any species:

b) Reintroduction of above species into a fenced 'eco-park':

c) Reintroduction of above species into the wild with management and monitoring:

d) Reintroduction of above species into the wild with no management or monitoring:

d) Reintroduction of selected (choose from list below) species into the wild:

i/ Beaver ↑ ii/ Boar ↑ iii/ Lynx ↑ iv/ Wolf ↑ vi/ Other (please specify)

Section 6 – Personal Details:

6.1. How often would you say that you use the countryside for recreational purposes (e.g. picnics, hiking, cycling, fishing etc)?

a) More than once a week ↑ b) Once a week ↑

c) More than once a month ↑ d) Once a month ↑

e) Occasionally ↑ f) Never ↑

Please state your most frequent countryside activity.....

6.2. Have you been hunting, fishing, shooting or stalking in the last 12 months?

a) Yes ↑ b) No ↑ If yes, please state which.....

6.3. Are you a member of any environmental organization (e.g. RSPB, Greenpeace, Friends of the Earth etc)?

a) Yes ↑ b) No ↑ If yes, please state which.....

6.4. What is the highest level of formal education you have received?.....

6.5. What is the annual pre-tax income of the highest earner in your household?

a) Less than £10,000 ↑ b) £10,000-£14,999 ↑ c) £15,000-£19,999 ↑

d) £20,000-£24,999 ↑ e) £25,000-£29,999 ↑ f) More than £30,000 ↑

g) Rather not say ↑

Section 7 – Further Comments:

Please use the space provided to add any further comments you may have about this issue, and/or to leave your email or postal address if you wish to find out the results of this study. Many thanks for your time.

.....

.....

.....

Section 8 – Knowledge quiz [optional]:

This section of the questionnaire is optional and for your amusement only. However, if you do complete it and get 80% or more correct, you will be entered into a prize draw, with a chance to win a bottle of Champagne.

Please select one correct answer from the choices below, without consulting any secondary material.

8.1. The Eurasian lynx is a member of:

- a) The dog Family b) The cat Family c) The deer Family d) Don't know

8.2. Wild boar eat:

- a) Small animals b) Plants c) Small animals and Plants d) Don't know

8.3. In what century are wolves generally believed to have become extinct in Scotland?

- a) 1500's b) 1700's c) 1900's d) Don't know

8.4. The European wildcat in Scotland is:

- a) Extinct b) Common c) Threatened d) Don't know

8.5. Approximately how many deer are there thought to be in Scotland at the present time?

- a) 30,000 b) 150,000 c) 600,000 d) Don't know

8.6. Is it common for bears to kill humans in Europe?

- a) Yes b) No c) Don't know

8.7. What is the average shoulder height of a wolf?

- a) 2'0"/61cm b) 2'10"/86cm c) 3'8"/112cm d) Don't know

8.8. How many species of deer live in the wild in Scotland, and how many of these are native?

- a) 4 wild, 2 native b) 2 wild, 1 native c) 6 wild, 5 native d) Don't know

8.9. What percentage of the original Caledonian pine forests of 6000 years ago are thought to be surviving in Scotland today?

- a) 30% b) 10% c) 1% d) Don't know

8.10. Please tick the boxes of animals which are currently found in the wild in the UK:

- | | | | | | |
|------------|--------------------------|--------------|--------------------------|-----------------|--------------------------|
| a) Bison | <input type="checkbox"/> | b) Coyote | <input type="checkbox"/> | c) Dormouse | <input type="checkbox"/> |
| d) Muntjac | <input type="checkbox"/> | e) Polecat | <input type="checkbox"/> | f) Red squirrel | <input type="checkbox"/> |
| g) Weasel | <input type="checkbox"/> | h) Wild boar | <input type="checkbox"/> | i) Wolverine | <input type="checkbox"/> |

In order for us to contact you should you win the prize draw, please enter your email address or telephone number:.....

Appendix 2: Survey used for Edinburgh sampling

Attitudes toward mammal reintroductions in Scotland questionnaire

Definitions: When the word ‘area’ is used it means within a 30 mile radius of your home. The term ‘ancient ecosystem’ refers to the landscape, plants and animals present in Scotland 1500 years ago, and ‘lost mammals’ refers to mammals which were present at that time, but that are now extinct in Scotland.

Section 1 – Personal Details:

- 1.1. How long have you lived in this area?**
 a) Under 1 year b) 1-5 years c) 6-20 years d) 20 years +
- 1.2. What is your occupation?**
- 1.3. What is the year of your birth?**
 a) Pre 1940 b) 1941-1950 c) 1951-1960
 d) 1961-1970 e) 1971-1980 f) 1981-1990

Section 2 – Knowledge of the issue:

- 2.1. Had you heard of ‘Trees for Life’ before receiving this questionnaire?**
 a) Yes (go to question 2.2) b) No (go to question 2.3)
- 2.2. Do support the work that ‘Trees for Life’ do?**
 a) Yes b) No c) Don’t know
- 2.3. Had you heard of the proposed beaver trial reintroduction before receiving this questionnaire?**
 a) Yes (go to question 2.4) b) No (go to question 3.1)
- 2.4. Do you support the proposed beaver trial reintroduction?**
 a) Yes b) No c) Don’t know

Section 3 – Advantages and Disadvantages of reintroductions:

- 3.1. Please list any advantages/benefits and disadvantages/possible risks that you can think of that would come with reintroducing beavers/wolves:**

Beavers: Advantages/benefits	Beavers: Disadvantages/possible risks
Wolves: Advantages/benefits	Wolves: Disadvantages/possible risks

Section 4 – Scenarios:

Please indicate which of the following possible scenarios you would prefer. Mark your most favourite with a 1, your second with a 2, and your least favourite with a 3.

Potential Species for reintroduction are: Beaver, wild boar, lynx and wolf

- a) No reintroduction of any species:
- b) Reintroduction of above species into a fenced ‘eco-park’:
- c) Reintroduction of above species into the wild:

Section 5 – Attitudes:

Please tick a box to state whether you strongly disagree, disagree, are neutral, agree, or strongly agree with regard to the following statements. If you don't know, please leave all the boxes blank:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5.1. I feel that wolves symbolize the greatness and beauty of nature.					
5.2. I feel that reintroducing Scotland's lost mammals is important in order to restore the natural balance of the environment.	<input type="checkbox"/>				
5.3. I wouldn't want large carnivores reintroduced for fear that they might hurt pets and other smaller animals.	<input type="checkbox"/>				
5.4. I like the idea of reintroducing Scotland's lost mammals, but I wouldn't want them in my area.	<input type="checkbox"/>				
5.5. If Scotland's lost mammals were reintroduced, I would not venture into the countryside.	<input type="checkbox"/>				
5.6. I find nature to be a strong source of inspiration so would love to see it returned to its ancient state.	<input type="checkbox"/>				
5.7. I feel that reintroducing Scotland's lost mammals would bring more money through tourism to Scotland.	<input type="checkbox"/>				
5.8. I would find it a stimulating and exciting experience to hunt and kill a wild boar.	<input type="checkbox"/>				
5.9. I have little interest in nature and feel that the money spent on a reintroduction program would be better spent elsewhere.	<input type="checkbox"/>				
5.10. Overall, I would say that I would support a project which aimed to reintroduce Scotland's lost mammals and completely restore its ancient ecosystem.	<input type="checkbox"/>				

Section 6 – Personal Details:

6.1. **How often would you say that you use the countryside for recreational purposes (e.g. hiking, cycling, fishing, stalking, shooting etc)?**

- | | | | |
|---------------------------|--------------------------|-----------------|--------------------------|
| a) More than once a week | <input type="checkbox"/> | b) Once a week | <input type="checkbox"/> |
| c) More than once a month | <input type="checkbox"/> | d) Once a month | <input type="checkbox"/> |
| e) Occasionally | <input type="checkbox"/> | f) Never | <input type="checkbox"/> |

Please state your most frequent countryside activity.....

6.2. **What is the highest level of formal education you have received?.....**

6.3. **What is the annual pre-tax income of the highest earner in your household?**

- | | | | | | |
|----------------------|--------------------------|--------------------|--------------------------|----------------------|--------------------------|
| a) Less than £10,000 | <input type="checkbox"/> | b) £10,000-£14,999 | <input type="checkbox"/> | c) £15,000-£19,999 | <input type="checkbox"/> |
| d) £20,000-£24,999 | <input type="checkbox"/> | e) £25,000-£29,999 | <input type="checkbox"/> | f) More than £30,000 | <input type="checkbox"/> |
| g) Rather not say | <input type="checkbox"/> | | | | |

Appendix 3: Grid references used in rural sampling

NE	SE	SW	NW
4247	2049	2989	4595
5350	2528	720	4698
3743	3450	1991	4192
5051	1648	3094	5020
5350	2751	2193	3687
5453	1741	1399	5810
5048	2349	2290	5514
5545	1230	1122	5201
5253	1431	921	4194
5040	1230	2090	4801
5257	1948	2189	5513
5531	2748	1022	4091
5641	1228	1893	5810
5950	2951	2289	5106
5252	3436	3381	4800
4043	1749	2783	3801
3949	3144	2488	5715
3743	3144	2320	4497
5529	1949	3121	4710
5454	1228	2191	4905
4053	2629	3093	6023
4839	2951	1022	5020
6539	3138	2797	4800
4354	2946	1107	5120
6231	1647	2904	3787
6539	2635	2007	4191
4252	3044	3122	5918
4248	1332	2193	3992
3936	3037	2390	3686
6333	1433	2895	5810
5753	2951	2097	4801
4152	1642	1993	3889
5043	2529	1596	4020
4751	2952	1805	3788
5248	3143	2682	3992
6425	1749	2702	4595
4855	3336	3384	3912
4047	1227	2779	5514
3936	3328	2783	3892
5535	2940	3093	4800
6027	2529	2895	4091
5430	2254	3123	5413
4356	1642	2985	4395
4752	2351	3287	5201
4552	1448	2684	4091
4451	3335	2090	5208
4557	1330	2490	3989
4346	2943	3486	5121
5545	1949	2319	4093
5638	2024	2095	5814
5255	3039	1417	3888
5228	3047	921	4497
4452	1433	2196	3687
5125	1548	3384	3892
6048	2831	1009	3892
4956	2049	1398	4291
4653	2427	1014	4194
4850	2651	2802	4192
4352	2251	2989	5918
5532	3148	2889	3686

Appendix 4: Piece written for SCA 'Heather Routes'

Attitude toward mammal reintroductions questionnaire

I'm studying toward an MSc in Ecological management at Imperial college, London, and am currently in the process of collecting data for my dissertation entitled *Public attitudes toward mammal reintroductions in the highlands*. The idea of reintroducing species such as beaver, wild boar, lynx and wolf is one that has been discussed for a long time, and there have been many attitude studies carried out in the USA and Europe prior to reintroduction programmes.

In this country, SNH have carried out a large public consultation regarding the trial beaver reintroduction, which showed a high level of public support. The beaver perhaps represents the least controversial species that could be reintroduced. But what would people think about bringing back a whole range of species, including large carnivores such as the wolf?

The vision held by an organisation called Trees for Life includes just such an ambition. They have identified an area of the highlands which they think might be suitable to act as a core wilderness area, capable of supporting populations of a range of reintroduced species. This area, which is bound by the roughly circular road which links Inverness and Kyle of Lochalsh (see www.treesforlife.org.uk), has low human population density, low road density and some of the best remaining Caledonian pine forest remnants in Scotland. Trees for Life, in partnership with the forestry commission, are currently focusing their energies on forest regeneration, using volunteers to provide the bulk of their workforce. Trees for Life do not own any land so any work that they carry out is through agreements with landowners.

The idea of creating a large wilderness area with no agriculture and a whole suite of mammal species not currently found in Britain is clearly one which will cause a range of responses in different people, and for a range of reasons. My research has used a questionnaire to explore some of these reasons. I randomly sampled houses in the Trees for Life area and also did some face-to-face surveying in Inverness and Edinburgh, to see if urban residents had different opinions.

As a reader of *Heather Roots*, you probably have a vested interest in some aspect of the countryside, so I'd be really interested to know your thoughts on the issue. By completing the questionnaire, you will be helping me enormously with my research, and also helping to inform the debate which surrounds this issue. The questionnaire can be downloaded from [here](#) and should only take about 10 minutes of your time.

Appendix 5: Details of articles used in media analysis

Author	Publication	Date	Title
Shields B	Scottish Daily Record	7/6/05	Beaver can build Eck of a lodge
Allardyce J	Sunday Times	5/6/05	Minister blocks return of wild beavers
Pauling T	Aberdeen Press and Journal	20/5/05	Why ministers aren't eager to reintroduce beavers to Scotland
McAlpine K	Sun	19/5/05	Big Eck's eager for beaver
Anonymous	Coventry Evening Telegraph	19/5/05	Beaver wins celebrity backing
Anonymous	Aberdeen Press & Journal	19/5/05	Celebrities back bid to reintroduce beaver
Anonymous	Daily Star	19/5/05	Eck's a beaver fanatic
Anonymous	Times	19/5/05	Backing beavers
Merritt M	Daily Mirror	19/5/05	I love beaver
Anonymous	Scottish Daily Record	19/5/05	Bring back the beaver
Gallagher P	Aberdeen Press & Journal	14/5/05	D-Day looms on decision to bring back beavers
Anonymous	Aberdeen Press & Journal	11/5/05	Return of a native after extinction for fur
Kerr M	Aberdeen Press & Journal	11/5/05	Beavers to leave mark on Scotland once more
Anonymous	Herald	11/5/05	Beavers may make a Scottish comeback
Scott D	Daily Express	11/5/05	Experts are eager to bring beavers back to Scotland
Anonymous	Times	11/5/05	Beaver Trial
Lister-Kaye J	Times	19/3/05	Out there; Country life
Platt S	Sun	3/3/05	Beaver crusade beats the blues; Scotcha; Opinion
Anonymous	Herald	1/3/05	SNH lodges plan to bring back beavers
Scott K	Guardian	1/3/05	Conservationists seek highlands return for beavers
Brooks C	Aberdeen Press & Journal	28/2/05	Trial project may see the beaver back in Scotland
Edwards R	Sunday Herald	27/2/05	Beaver set to return to Scotland by 2006 Landowners and farmers furious as officials back...
Watson J	Scotland on Sunday	27/2/05	Why long lost beaver will soon give a dam about the Highlands
Anonymous	Daily Post (Liverpool)	2/12/04	Extinct species talk
Anonymous	Daily Post (Liverpool)	24/7/04	wild Wales: Is this a sign that nature is fighting back
Anonymous	News of the world	4/7/04	Now beaver's behind bars
Anonymous	Sunday Times	11/4/04	Beaver danger. Points; Letter
Tait J	Daily Mirror	5/4/04	Beavers return after 400 years
Allardyce J	Sunday Times	4/4/04	Beavers make a Scottish comeback
Anonymous	Herald	1/3/04	Briefing - Over-eager beavers

Beavers (cont...):

Author	Publication	Date	Title
Reynolds J	Scotsman	20/2/2004	Back from the brink
Evans P	Guardian	3/12/2005	Reappearing act: after a quick effective crusade the great bustard is to return to Britain. But what's...
Anonymous	Aberdeen Press & Journal	31/10/2003	Backing for wild beavers
Chisholm W	Scotsman	28/8/2003	Border beavers may resurface
Anonymous	Daily Mirror	20/7/2003	Beaver in girl attack

Wolves:

Author	Publication	Date	Title
McNeish C	Sunday Herald	5/6/05	Reserve price to high to sit on the fence Munro may be remote but giant game park plan is threat...
Anonymous	Western Daily Press	4/6/05	Call yourself a wolf? You're just a big softie
Anonymous	Western Morning News	31/5/05	Dinosaurs and misunderstood wolves
Anonymous	Derby Evening Telegraph	30/5/05	Artist's wild gift
Langan F	Daily Telegraph	28/5/05	Bear kills wolf in grizzly attack
Anonymous	Western Morning News	26/5/05	Wealthy swarm in to buy up wildlife park
Anonymous	Western Gazette	26/5/05	Unusual things to see at show
Anonymous	Bristol Evening Post	23/5/05	Wolf-like dog kills two community farm lambs'
Anonymous	Western Morning News	21/5/05	Wurzels and wolf pack on standby
Anonymous	Times	21/5/05	The Stone Age child in us all;Books
Crampton R	Times	14/5/05	I didn't know how to proceed, except limp back to our car and tell my wife that, in the 30 seconds...
Webb M	Independent.co.uk	14/5/05	The travellers guide to; Wild Spain
Anonymous	Daily Express	12/5/05	Call for wolves to cull deer
Anonymous	Aberdeen Press & Journal	9/5/05	Looking to the future and a walk on Scotland's wild side
Anonymous	Guardian	5/5/05	Life: Dispatch: Research and reports from around the world: Dances with wolves and hyenas
Foster S	Northern Echo	25/4/05	I lived with wolves to escape the Nazis'
Anonymous	Leicester Mercury	18/4/05	Animal experts are taking a walk on the wild side
Matthews R	Sunday Telegraph	17/4/05	Questions & Answers: Before the domestication of dogs, mans best friend was the wolf
Wright S	Daily Express	15/4/05	Surviving with wolves
Anonymous	Leicester Mercury	13/4/05	Ancient animals which roamed free
Campbell S	Daily Telegraph	12/4/05	The company of wolves: On a visit to Colorado wildlife sanctuary, Sophie Campbell finds the...
Anonymous	Western Morning News	8/4/05	Wolves solve mystery of dog behaviour
Hurley F	Daily Mirror	4/4/2005	Dutchman with over £1billion tops our rich list
Ungoed-Thomas	Sunday Times	3/4/2005	Scotland produces its first billionaire
Anonymous	Guardian	25/3/05	Guardian Weekly: Dispatch: Prey, won't you join us for dinner

Wolves (cont...):

Author	Publication	Date	Title
Anonymous	Citizen	24/3/05	Show set for chariot thrills
Rifkind H	Times	24/3/05	Very cool for cats ...; True Fiction
Anonymous	Citizen	18/3/05	Factfile
Anonymous	Guardian	17/3/05	Life: Dispatch: Research and reports from around the world: Beef up biodiversity, import a killer
Anonymous	Herald Express	11/3/05	Doomed spirits calling
Waterhouse K	Daily Mail	3/3/05	And yet another cry of 'wolf!'
Anonymous	Coventry Evening Telegraph	2/3/05	Wolves are talking point
Anonymous	Sunday Herald	13/2/05	Company of wolves
Fraser L	Guardian	1/2/05	The book
Craig R	Western Morning News	31/1/05	Wolves have a place here
Peake K	Western Morning News	11/1/05	Returning wolf to wild is fraught with peril
Anonymous	Scottish Daily Record	7/1/05	Classes with wolves
Kelbie P	Independent.co.uk	20/12/04	Call of the wild
Anonymous	Sunday Mail	19/12/05	Wolves attack 15
Restan S	Aberdeen Press & Journal	18/12/04	Millionaire plans wolves and bears in new park
Anonymous	Coventry Evening Telegraph	17/12/04	Return of the wolf
Buncombe A	Independent on Sunday	12/12/04	Grizzly bears and wolves will get their own border crossing
Anonymous	Western Morning News	10/12/04	Wolfman Shaun is the 'leader of the pack'
Mills J	Daily Mail	9/12/04	Sleeping with wolves
Monbiot G	Guardian	7/12/04	Why I'm a wolf man
Hannan R	Western Mail	6/12/04	Wolf
Gilchrist J	Scotsman	30/11/04	Call of the wild
Anonymous	Sun	22/11/04	Bears to run wild
Hellen N	Sunday Times	21/11/04	Laird plans to unleash wolves on Highlands
Anonymous	Western Morning News	5/11/04	Slightly foxed? Enter the maned wolf
Ross J	Scotsman	2/11/04	Beauty and history win special title from UNESCO
Anonymous	Independent.co.uk	23/10/04	Wolf cull claims its first victim
Foster S	Northern Echo	19/10/04	Wolf in sheep's clothing
Hughes A	Daily Post (Liverpool)	18/10/04	Dog in wolf's clothin
Menelaws D	Citizen	24/9/04	Go to hunt and see what social inclusion means
Anonymous	Sun	23/9/04	Sun Spot
Beard M	Independent.co.uk	21/9/04	Red in tooth an clae, wildlife's top images
Walsh J	Independent.co.uk	18/9/04	An Italian original

Wolves (cont...):

Author	Publication	Date	Title
Anonymous	Herald	3/9/04	Fairytales success as author earns (pounds) 3M
Armitstead C	Guardian	3/9/04	Review: a yucky feast for many a tailless cub
Anonymous	Tamworth Herald	19/8/04	Hungry like the wolf
Anonymous	North Devon Journal	19/8/04	If you go down to the woods...
Anonymous	Coventry Evening Telegraph	14/8/04	Visitor proves a howling success
Anonymous	Coventry Evening Telegraph	7/8/204	Wolves at your door
Hitchin A	People	1/8/04	Mob kill Ben, 20
Harper J	Sunday Mirror	1/8/04	Hols riot youth knifed to death
Anonymous	Daily Post (Liverpool)	24/7/04	Wild wales: Is this a sign that nature is fighting back
Ram L	Tamworth Herald	24/6/04	Gang attack compared to a wolf pack
Anonymous	North Devon Journal	24/6/04	Meet our classroom visitor... it's a wolf
Anonymous	Western Morning News	24/6/04	Wolves aren't cruel - it's the nature of the beast
Anonymous	Standard & Guardian	24/6/04	Safari park welcomes summer arrivals
Anonymous	Evening Herald	19/6/04	TV spot for Shaun the wolf whisperer
Anonymous	Evening Herald	12/6/04	Shaun shows to shoppers that wolves don't deserve their bad press
Anonymous	Daily Mirror	12/6/04	Wolf alert
Withers H	Daily Post (Liverpool)	11/6/04	Natural born killer
Castle C	Western Morning News	9/6/04	Angora goats back in ring
Anonymous	Cornish Guardian	3/6/04	Royal Cornwall Show
Anonymous	Evening Herald	29/5/04	Meet a real wolf cub
Quetteville H	Daily Telegraph	27/5/04	Prince joins fight to save Draculas old villages
Conner S	Independent.co.uk	21/5//04	Study finds that small dogs retain DNA links to wolves
Anonymous	Western Daily Press	15/5/04	Cuddly wolf cubs
Hodgeson N	Western Morning News	14/5/04	Wolf cubs to play profile raising role
Williams B	Daily Mirror	12/5/04	Angry like the wolf
Anonymous	Evening News Scotland	8/5/04	Zoo goes for a Latin flavour
Hirst C	Western Morning News	19/4/04	Ecological issues discussed
Anonymous	Coventry Evening Telegraph	17/4/04	Chance to see a family of wolves
Anonymous	Western Morning News	6/4/04	The man who talks to the wolves
Anonymous	Guardian	6/4/04	Animals in Anglo-Saxon art, Sutton hoo Suffolk
Leake J	Sunday Times	4/4/004	Wildcats on way out because of domestic affairs
Anonymous	Evening Herald	26/4/04	Wolf expert shares knowledge
Davies D	Daily Post (Liverpool)	20/3/04	Wild wales: Caves hold secret to prehistoric wales
Reynolds J	Scotsman	20/2/04	Back form the brink

Wolves (cont...):

Author	Publication	Date	Title
Kerins S	Sunday Mirror	15/2/04	Radar - Lady Victoria Hervey
Anonymous	Leicester Mercury	3/2/04	Animal Devil
Anonymous	Evening Mail	29/1/04	Prowler invited to school
Bruce S	Aberdeen Press & Journal	15/1/04	Students wildlife park work is recognised
Anonymous	Sentinel	1/1/04	Lost species are back from the shadows
Anonymous	Express & Echo	16/12/03	Wolves have bigger prey to go after than foxes
Stewart W	Times	15/12/03	Raised by dogs;Reportage
Anonymous	Western Daily Press	28/11/03	Rabies threat to wolves
Jones E	Daily Post (Liverpool)	27/11/03	Do we really want to show our sheep to the wolves
Anonymous	Evening Mail	14/11/03	Wild about wolves!
Anonymous	Coventry Evening Telegraph	11/11/03	Walk with wolves - at Brandon
Anonymous	Coventry Evening Telegraph	8/11/03	Focus on wolves
Forgrave A	Daily Post (Liverpool)	6/11/03	At the heart of the country - Wolf bid is howling up the wrong tree
Anonymous	North Devon Journal	30/10/03	Mission to Poland for the man who talks to the wolves
Anonymous	Bath Chronicle	10/10/03	Wolf Whispers
Anonymous	North Devon Journal	11/11/03	Life on the wild side
Anonymous	Independent.co.uk	31/08/03	Former leaders tell wolf-friendly tale
Anonymous	Evening Mail	29/8/03	Wolves head for the show
Anonymous	North Devon Journal	28/8/03	Learning with the wolves... here in North Devon
Anonymous	Western Morning News	28/8/03	Family plans after wolf cub rescued
Anonymous	Standard & Guardian	28/8/03	Animals increase the risks
Anonymous	Western Morning News	26/8/03	Sheep slaughter
Anonymous	Scottish Daily Record	22/8/03	Beastly boudoir
Anonymous	Western Mail	21/8/03	Wolves snatch children
Clover C	Daily Telegraph	28/7/03	Link threatens last haunts of rare wildlife