The Lynx Effect

Investigating public attitudes towards the reintroduction of Eurasian Lynx *Lynx lynx* to the United Kingdom

Jamie Wyver

Supervised by: Murray Collins, Paul De Ornellas and Marcus Rowcliffe

September 2014

A thesis submitted in partial fulfilment of the requirements for the degree of Master of Science and the Diploma of Imperial College London

Submitted for the MSc in Conservation Science
Declaration of own work

This thesis, “The Lynx Effect: Investigating public attitudes towards the reintroduction of Eurasian Lynx Lynx lynx to the United Kingdom” is the result of my own independent work/investigation except where otherwise stated. Other sources are acknowledged in the body of the text, and a references section is appended. The work that I have submitted has not been previously accepted in substance for any other award.

Eurasian Lynx image by User:Colin used under creative commons.
Contents

List of figures i
List of tables iv
List of acronyms v
Abstract vi
Acknowledgements viii
1. Introduction 1
  1.1 Problem statement 1
  1.2 Project aim 2
  1.3 Objectives 2

2. Background 4
  2.1 The effect of the absence of top predators in the UK 4
  2.2 Reintroductions 5
    2.2.1 An introduction to Reintroduction 5
    2.2.2 Legislation 6
    2.2.3 Rewilding with large carnivores 7
  2.3 Eurasian Lynx 9
    2.3.1 Introducing the Lynx 9
    2.3.2 Lynx reintroductions and public attitudes in Europe 10
    2.3.3 Lynx in the United Kingdom 12

3. Methods 13
  3.1 Choice of tools 13
  3.2 Agricultural shows 14
  3.3 Online survey 15
  3.4 Statistical analysis 16
  3.5 Stakeholder interviews 17

4. Results 18
  4.1 Survey results 18
    4.1.1 Attitudes 18
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1.2 Knowledge</td>
<td>20</td>
</tr>
<tr>
<td>4.1.3 Farming and gamekeeping</td>
<td>21</td>
</tr>
<tr>
<td>4.1.4 Attitudes and background</td>
<td>22</td>
</tr>
<tr>
<td>4.1.5 Attitudes and location</td>
<td>22</td>
</tr>
<tr>
<td>4.1.6 Attitudes and age</td>
<td>22</td>
</tr>
<tr>
<td>4.1.7 Attitudes and gender</td>
<td>22</td>
</tr>
<tr>
<td>4.2 Statistical tests</td>
<td>23</td>
</tr>
<tr>
<td>4.2.1 Age and attitude</td>
<td>25</td>
</tr>
<tr>
<td>4.2.2 Farming and attitude</td>
<td>25</td>
</tr>
<tr>
<td>4.2.3 Interaction between knowledge and farming</td>
<td>26</td>
</tr>
<tr>
<td>4.2.4 Interaction between age and gamekeeping</td>
<td>27</td>
</tr>
<tr>
<td>4.3 Stakeholder interviews</td>
<td>27</td>
</tr>
<tr>
<td>4.3.1 Licensing authorities</td>
<td>27</td>
</tr>
<tr>
<td>4.3.2 Stakeholder organisations</td>
<td>29</td>
</tr>
<tr>
<td>4.4 Themes emerging from survey results and interviews</td>
<td>29</td>
</tr>
<tr>
<td>4.4.1 Effect of previous reintroductions</td>
<td>29</td>
</tr>
<tr>
<td>4.4.2 Costs and benefits of reintroductions</td>
<td>29</td>
</tr>
<tr>
<td>4.4.3 Concern for threatened species already existent in the UK</td>
<td>31</td>
</tr>
<tr>
<td>4.4.4 Knowledge and attitude</td>
<td>31</td>
</tr>
<tr>
<td>4.4.5 Addressing the perceived divide between land managers and others</td>
<td>32</td>
</tr>
<tr>
<td>4.4.6 Habitat suitability</td>
<td>33</td>
</tr>
<tr>
<td>5. Discussion</td>
<td>34</td>
</tr>
<tr>
<td>5.1 Emergent themes</td>
<td>35</td>
</tr>
<tr>
<td>5.1.1 Effect of previous reintroductions</td>
<td>35</td>
</tr>
<tr>
<td>5.1.2 Costs and benefits of reintroductions</td>
<td>35</td>
</tr>
<tr>
<td>5.1.3 Concern for threatened species already existent in the UK</td>
<td>37</td>
</tr>
<tr>
<td>5.1.4 Knowledge and attitude</td>
<td>39</td>
</tr>
<tr>
<td>5.1.5 Addressing the perceived divide between land managers and others</td>
<td>40</td>
</tr>
<tr>
<td>5.1.6 Habitat suitability</td>
<td>42</td>
</tr>
</tbody>
</table>
5.2 Study limitations and recommendations for future research 42
   5.2.1 Selection bias 42
   5.2.2 Factor scores 43
   5.2.3 Future research 44

References 45

Appendix I: Survey 56
Appendix II: Participating organisations 58
Appendix III: Stakeholder organisation interview responses 59
List of figures

Figure 1: Attitude score and knowledge level 20
Figure 2: The interaction between knowledge and farming status 26
Figure 3: The interaction between age and gamekeeping status 27
List of tables

Table 1: Sample description 18
Table 2: Responses to attitude statements ordered by percentage of respondents in agreement 19
Table 3: Overall knowledge levels 20
Table 4: Knowledge and attitudes 21
Table 5: Knowledge and farming 21
Table 6: Farming, gamekeeping and attitudes 21
Table 7: Ten linear models with the lowest AIC values 24
Table 8: Licensing authority responses 28
Table 9: Stakeholder organisation interview responses 59
List of Acronyms

Defra – Department for Environment, Food and Rural Affairs
FCS – Forestry Commission Scotland
FODR – Forest of Dean Ramblers
GWCT – Game and Wildlife Conservation Trust
LSE – London School of Economics and Political Science
NE – Natural England
NFU – National Farmers Union
NFUS – National Farmers Union Scotland
NGO – National Gamekeepers’ Organisation
NSRF – National Species Reintroduction Forum (Scotland)
RS – Ramblers Scotland
RSPB – Royal Society for the Protection of Birds
SLE – Scottish Land and Estates
SNH – Scottish Natural Heritage
SWT – Scottish Wildlife Trust
ZSL – Zoological Society of London
Abstract

The topic of rewilding, particularly with reference to reintroducing species previously extirpated from the United Kingdom, has been widely discussed in the conservation sector. For wildlife reintroductions to succeed and indeed to even gain approval from licensing authorities, public consultations must take place with those who would potentially be directly impacted by the return of the species in question. There have to date been no public surveys to test opinions on reintroducing the Eurasian Lynx *Lynx lynx*, a medium sized carnivore last believed to have been resident in Britain in Medieval times.

This study examines the attitudes of farmers and other land managers, along with the general public in two theoretical Lynx release areas, the Forest of Dean and the Scottish Highlands. There are indications of a correlation between attitudes towards the return of Lynx and the level of basic knowledge each participant has about the animal.

There are no observable distinctions between the views of people at the two separate locations. The study does however confirm that there are differences between the views of people whose livelihoods could be impacted, versus those who are less likely to experience any direct effects, with farmers more likely to hold negative views.

Word count: 14,535.
Acknowledgements

I am very grateful for all the time and patience devoted to this project by my three knowledgeable supervisors, Murray Collins, Paul De Ornellas, and Marcus Rowcliffe. I would also like to thank Amelia Sharman at LSE and Sarah Thomas at ZSL for their guidance on the survey which was key to this study. I’d like to thank everyone who helped increase the numbers of surveys completed for this study including Gail Wilson from Imperial College’s Communications and Public Affairs team for her assistance with gaining media coverage, Tim Reid who enlisted his Edinburgh climbing club, the organisers of the Essex Young Farmers Show and The Fife Show who were so accommodating, and James Borrell for publicising the survey in his newsletter. The enthusiasm with which Chris Baxter and Vernon Harwood at BBC Radio Gloucestershire and the teams at Heart Gloucestershire and the Gloucester Citizen embraced the project also helped generate a number of responses and was much appreciated.

I was very fortunate to make contact with a number of organisational representatives who either agreed to circulate my survey among their members or gave up their time to take part in telephone interviews. Their assistance and wealth of knowledge has greatly enriched this study. So, a big thank you to: Andrew Bauer (NFUS), June Burden (FODR), Mike Daniels (John Muir Trust), Martin Gaywood (SNH), Anne Gray (SLE), Simon Jones (SWT), Keith Morton (RSPB), Julian Murray-Evans (NGO), Gordon Patterson (FCS), Claire Robinson (NFU), Helen Todd (RS), Adam Smith (GWCT), Charlie Wilson (NE), and Ian Wilson (NFUS). Thanks also to farmer Michael Doherty and former farmer Aeneas McKay for sharing their views and filling in further gaps in my knowledge. I’d like to thank everyone who spared 10 minutes to complete the survey and helped to build a picture of public attitude towards Lynx reintroduction across the UK.

Finally a massive thank you to my husband Paul Brown for supporting me throughout my MSc Conservation Science adventure.
1. Introduction

“I believe Britain is a zoophobic nation. While other European countries rewild to great success, we are shamefully disconnected from our wild past of wolves and bison. And our timid, visionless conservation movement is complicit.” (Monbiot, 2013a)

1.1 Problem statement

In his Guardian column in November 2013, environment writer and champion of “rewilding” George Monbiot challenged British conservation groups to be more radical in their ambitions, stating that the United Kingdom is the largest country in Europe no longer to contain large, wild carnivores such as the Brown Bear (Ursus arctos) Grey Wolf (Canis lupus) or Eurasian Lynx (Lynx lynx) (Monbiot, 2013a). In fact, the UK is obliged to consider reintroduction of these animals under two international treaties to which it is a signatory. However much of the landscape has changed since these species were last present: 70% of UK land is now used for agriculture (Defra, 2013) and the human population has increased considerably. The return of these animals, which in other parts of Europe are known to predate livestock, could potentially bring them into conflict with people.

Therefore if a British conservation organisation were to plan a large carnivore reintroduction project, it would need the support of the public. Guidelines on conservation translocations produced by the International Union for Conservation of Nature (IUCN) (2013) state the importance of community support around release areas. Also, two of the public bodies responsible for licensing the release of animals into the wild, Natural England (NE) and Scottish Natural Heritage (SNH), require those proposing such a project to carry out a public consultation.

The largest consultation of this kind to have been carried out on an animal reintroduction in recent years was a study for SNH looking at attitudes towards the return of the Eurasian Beaver (Castor fiber) to Scotland. Over 4,000 people took part, with 86% in favour of Beaver reintroduction (SNH, 1998).
There has to date not been a survey of public attitudes towards reintroduction of the Eurasian Lynx, the smallest of the three carnivores referenced by Monbiot. An examination of views towards Lynx could provide an insight into whether reintroduction of this animal in the UK would succeed, and may also reflect public views towards wildlife reintroductions, and living with wildlife in general.

1.2 Project aim
This project sets out to test the prevailing public mood towards reintroducing the European Lynx to the United Kingdom. Since it was clear from surveys regarding Wolf reintroduction (Nilsen, 2007) that views differed between the general public and those who might be more directly affected by a returning predator, such as farmers, the aim here is to focus on those groups whose livelihoods or pastimes might be impacted and discover whether that difference remains when Lynx are considered. Further, no direct comparison has previously been made between the views of those living in what has been considered to be a more suitable habitat in the Scottish Highlands (Wilson, 2004 and Hetherington, 2008), and people in a more inhabited area such as Southern England. It was therefore decided that this project would compare the attitudes of people living or working in, or visiting, the sparsely populated Scottish Highlands, and the Forest of Dean in Gloucestershire, a forested area surrounded by human habitation and roads.

1.3 Objectives
1.3.1 To determine whether knowledge plays a part in shaping attitudes towards living alongside Lynx.
Hypothesis: The level of a person’s basic knowledge about Lynx affects their attitude towards the reintroduction of the animal to their local area.

1.3.2 To examine the difference of views on Lynx reintroduction between those who make a living directly from the land and those who do not.
Hypothesis: There is a difference in attitude towards Lynx reintroduction between farmers and non-farmers.
1.3.3 To discover whether there is a difference in attitudes towards Lynx reintroduction between people living or working in, or visiting the Scottish Highlands and those living or working in, or visiting the Forest of Dean. Hypothesis: There is a difference in attitudes towards Lynx reintroduction between people in the Scottish Highlands and those in the Forest of Dean.
2. Background

“You really can’t be serious?”
Survey participant.

2.1 The effect of the absence of top predators in the UK
Extirpated as a result of human activity, Grey Wolf, Brown Bear and Eurasian Lynx have been absent from British landscapes for centuries. The loss of these large carnivores has triggered a trophic cascade with profound implications for woodland habitats. With the threat of predation removed deer can remain in areas favourable for browsing, and grow their populations. Native deer Red (Cervus elaphus) and Roe (Capreolus capreolus) have been joined by four anthropogenically introduced species, Chinese Water (Hydropotes inermis); Fallow (Dama dama); Reeves’s Muntjac (Muntiacus reevesi); and Sika (Cervus nippon).

Wäber et al (2013) estimated that an annual cull of 60% of Roe and 53% of Muntjac was needed to bring those species down to sustainable levels. The report detailing this was accompanied by a press release stating that “there are more deer in the UK than at any time since the ice age”. The source of this claim is unclear: it isn’t mentioned in Wäber’s study, but a number of other studies concur that the unmanaged deer populations are becoming a serious issue (Fuller and Gill, 2001, Fuller et al, 2007, and Newson et al, 2011). Gill (2000) outlines the effect of their expanding populations on British woodland, where deer systematically strip out all vegetation within reach, depleting habitats preferred by bird, invertebrate and small mammal species. Tanentzap and Coomes (2012) add that the removal of vegetation reduces a woodland’s ability to provide ecosystem services such as carbon sequestration.

High numbers of deer may also have a negative impact on people through economic costs to forestry. A report commissioned by Scottish Natural Heritage revealed £10.5m was spent on protecting forests, chiefly from deer browsing, in 2009/10, on land managed by Forestry Commission Scotland alone (Putman, 2012).
In addition, an increasing number of road traffic accidents on British roads involve deer: one recent estimate suggested there could be over 42,500 vehicle collisions with deer each year with considerable economic impacts, and injuries to people and the animals involved (Langbein, 2007).

2.2 Reintroductions

2.2.1 An introduction to reintroduction

The reintroduction of species, involving the translocation of wildlife from one area to another, is now a familiar conservation tool. Seddon (2014) describes five principle motivations for these translocations.

Three of these are carried out for *Species conservation*.

- For *Reinforcement*, individuals can be introduced to an area within their indigenous range where there are already existing populations of the same taxon.
- If there are no existing populations in this range, this is a *Reintroduction*.
- If the release is outside the species’ indigenous range, this is an *Assisted colonisation*.

The final two motivations are categorised as translocation for *Rewilding*, with the aim of restoring natural ecosystem functions or processes.

- *Reintroduction for rewilding* aims to restore a population of a species which plays a key role in an ecosystem.
- Finally, *Ecological replacement* brings a new species to an area to take on a function once performed by an extirpated species (Seddon, 2014).
2.2.2 Legislation

The Bern Convention (1979) and the EC Habitats Directive (1992) oblige the UK to consider reintroductions of former native species.

The Habitats Directive states that when implementing the Directive, Member States shall:

“study the desirability of re-introducing species in Annex IV that are native to their territory where this might contribute to their conservation, provided that an investigation, also taking into account experience in other Member States or elsewhere, has established that such re-introduction contributes effectively to re-establishing these species at a favourable conservation status and that it takes place only after proper consultation of the public concerned;”

(European Union, 1992)

Species listed in Annex IV for consideration for reintroduction include Eurasian Lynx, and other species formerly native to the UK such as Eurasian Beaver, Grey Wolf and Brown Bear.

Permission to reintroduce nationally extinct species in the UK must be granted by the statutory body for each country. Natural England grant licenses for England, and Scottish Natural Heritage are their counterparts in Scotland. Both agencies require those applying for licences to carry out meaningful, scientific public attitude surveys with a particular emphasis on groups of people most likely to be affected by the reintroduction.
In Scotland, the National Species Reintroduction Forum (NSRF) comprises 27 organisations. Its role is to “contribute to broad scale, strategic issues relating to species reintroductions and other types of conservation translocations in Scotland” (Scottish Natural Heritage, 2014). In July 2014 the Forum produced the Scottish Code for Conservation Translocations, which sets out guidance on translocations. This includes a section on maximising the benefits to society while minimising conflict with other land users, with an emphasis on the need for consultation:

“Consult with other land-users and stakeholders to fully understand the potential socioeconomic consequences of conservation translocations as part of the process of deciding whether it is acceptable to proceed, noting that the benefits and costs of a conservation translocation may be unequally distributed among different stakeholders/land-users” (NSRF, 2014)

However, the Infrastructure Bill proposed in the UK recategorises previously resident species as non-native and therefore subject to eradication or control. This would include the animals listed in the EU Habitats Directive for the UK to consider reintroducing, but also species listed in Schedule 9 of the Wildlife and Countryside Act 1981. The latter list includes wildlife that has already been re-established, such as the Common Crane (*Grus grus*) and Wild boar (*Sus scrofa*), and species that have always been resident and are subject to current conservation programmes, such as the Corncrake (*Crex crex*) (Monbiot, 2014). Conservation organisations including the Zoological Society of London (ZSL) fear this will have serious implications for current and future reintroduction programmes (Durant, 2014).

### 2.2.3 Rewilding with large carnivores

The recent debate around rewilding challenges the current use of land by people. Monbiot (2013b) calls for the removal of sheep from British uplands where, he says, they have reduced habitats to “bowling greens with contours”. He describes sheep farming as a heavily subsidised, unproductive industry which results in the removal of hillside vegetation leading to biodiversity loss, erosion and flooding. To redress the ecological balance he suggests the removal of sheep and the reintroduction of large carnivores to control deer populations (Monbiot, 2013c).
Monbiot is not alone in recommending the reintroduction of large carnivores to Britain. Manning (2009) believes wolves in the Scottish Highlands could control the numbers and modify the behaviour of deer with positive results for ecosystems, and recommends a large controlled experiment to prove the theory. Nilsen (2007) identifies potential cost savings for deer estates who would need to cull fewer hinds, in addition to conservation benefits.

The deliberate reintroduction of Grey Wolves to the USA’s Yellowstone Park and their effect on the ecosystem has been well documented. Initially they reduced numbers, and changed the behaviour of, their prey species Elk (*Cervus elaphus*) and Coyote (*Canis latrans*). Indirect effects were then observed in Pronghorn (*Antilocapra americana*), whose fawn survival rates improved as numbers of their main predator, Coyote, decreased. Woody plants on which Elk graze increased in number, providing food and habitats for other wildlife in the park. The regrowth of plants around water, and the population of Beavers these plants could now support, led to reduction in bank erosion and creation of new wetland habitats (Ripple, 2014).

Where they are returning to parts of Europe, Bears, Wolves and Lynx are coming into conflict with livestock farmers and others who rely on the countryside for their income. In Europe, the European Commission funded several carnivore conservation projects through its LIFE programme, some of which featured reintroductions. Three Brown Bears were introduced to the Central Pyrenees through LIFE in 1995/6, and five more animals 10 years later by the Office National de la Chasse et de la Faune Sauvage (ONCFS). The decade-long gap was partly due to fierce local opposition from sheep farming communities, which prevented a further LIFE release and continues to this day. With no further animals likely to be introduced there is a danger of in-breeding among the small population, which is believed to be around 22-27 bears (Silva, 2013).

Several wildlife reintroductions have been attempted in the UK in recent decades. White-tailed Eagles (*Haliaeetus albicilla*) have been brought back to different areas of Scotland in successive waves (Scottish Natural Heritage). The return of the eagles has been hailed a conservation success by many, and conservationists are also keen to point out the economic benefits the birds have brought to the region.
The RSPB calculate that the eagles on the Isle of Mull bring the island £5 million from tourists each year, and that 110 jobs on the island are supported by visitors drawn to watch the birds (Molloy, 2011). However the return of Britain’s largest bird of prey has proved unpopular with some farming communities where it is blamed for loss of lambs. A recent application to reintroduce White-tailed Eagles to Suffolk was abandoned by the proposer following the withdrawal of Natural England funding (Natural England, 2010). While the majority of people polled on the proposal were supportive, there had been several objections from farmers concerned about predation of livestock (Wilson, 2014).

Following the public consultation on Beaver reintroduction in Scotland, the Scottish Beaver trial at Knapdale has now reached the end of a seven year experiment to monitor the impact of returning the animals to the landscape. Research from the trial is currently being analysed, and in 2015 the Scottish Government will decide whether the animals can remain. Two further, unofficial, Beaver releases have taken place in the UK, with around 150 now living on the Tay Estuary in Scotland, and a small group on the River Otter in Devon. A Minister in the Department for Environment, Food and Rural Affairs (Defra) announced the Government’s intention to recapture the latter group (HC Deb, 2014) leading to widespread condemnation among the public, with a number of online petitions calling for the animals to remain.

2.3 Eurasian Lynx

2.3.1 Introducing the Lynx
The Eurasian Lynx (referred to here as Lynx) is a medium sized nocturnal cat, with a body length of up to 130cm and a height of 70cm, and distinctive ear tufts. It is a largely nocturnal woodland species whose range once covered most of Europe, but by 1800 Lynx remained only in large mountain ranges and forested areas (Breitenmoser, 2000). Lynx are now returning to many of their former habitats across Europe, with populations more than quadrupling over the past 50 years (Deinet, 2013). Half of the Lynx populations result from reintroductions during the 1970s and 1980s, but legal protection and natural recolonisation also contribute to the return of these animals.
Analysis of prey remains in the Swiss Jura mountains by Jobin et al (2000) found that roe deer and chamois were the preferred staples of the Lynx diet, comprising 69.3% of prey items studied. Jobin found that Red Fox (Vulpes vulpes) also featured as prey for Lynx, making up 6% of the recorded diet. A top predator may also outcompete mesopredators such as foxes and mustelids for food, or kill these animals without consuming them. Johnson (2010) discusses a ‘three-level community’ of species in Finland: the relationship between Lynx, Red Fox and Mountain Hare (Lepus timidus). An increase in Lynx has suppressed fox populations and therefore the impact of fox predation on the hares. Helldin (2006) finds that hares and grouse in Sweden, previously declining through predation by a growing Red Fox population, begin to recover with the return of Lynx and subsequent decline of fox numbers.

In Southern Norway, Gervasi et al (2013) found a relationship between the abundance of Roe Deer and prey selection by Lynx. When Roe deer populations are low but domestic sheep are abundant, the numbers of Roe deer predated fall and sheep become the main prey; when Roe deer are abundant, Lynx kill fewer sheep and more deer.

A second European lynx species, the Iberian Lynx (Lynx pardinus) is Critically Endangered (Von Arx, 2008). This felid, considered the most threatened cat in the world, is restricted to two regions of southern Spain. Legal protection and land management changes are thought to have led to moderate improvements in the animals’ status in recent decades (Deinet, 2013).

### 2.3.2 Lynx reintroductions and public attitudes in Europe

Four Lynx were released into the Swiss Jura Mountains through an authorised reintroduction project in the 1970s. In subsequent years further unofficial releases occurred in the region resulting in a population of 8-10 animals. As the population increased, Lynx spread into the French part of the mountain range. A recent study found long-term stability in the social and spacial structure of the population, although a lack of adult males was noted (Breitenmoser-Würsten C., 2007).
Linnell et al (2009), while recognising that reintroduction schemes have played a role in re-establishing Lynx in Western Europe, note that many of these projects were badly planned. Projects have released animals which have spent long periods in captivity, ignored genetic origins of individuals, failed to evaluate release sites or attempt any pre-release public relations, failed to coordinate releases and only releasing very small numbers of individuals (Linnell et al, 2009).

Kvaalen (1998) investigated primarily negative attitudes towards Lynx among Swiss and Norwegian sheep farmers. She discovered that along with the main cause of conflict, the predation of livestock, several underlying beliefs. These include the views that Lynx kill for the sake of killing rather than to feed; and that no-one gets any pleasure from Lynx in the environment as unlike deer they are rarely seen and therefore cannot be appreciated aesthetically. There was also a sense among both groups of farmers that Lynx were imposed on them by people who lived in cities, with the whims of urbanites creating extra work for the sheep farmers. Kvaalen suggests that a lack of knowledge on the ecological value of Lynx needs to be addressed.

Public opinion polls show a majority in favour of Lynx presence in Switzerland, but less acceptance in rural areas, and a majority against Lynx in the Simmental, a region where the animals had come into conflict with farmers (Breitenmoser-Würsten U., 2007). In 2007, a study found generally positive views towards Lynx in Finland where the animal has experienced recent population growth, although hunters managing deer and hare populations held negative views as Lynx were seen as a threat to game populations (Liukkonen et al, 2009).

A study in Poland (Bath, 2008) on knowledge of, and attitudes towards Lynx among hunters, foresters, farmers and teenagers found a generally positive outlook. The strongest predictor of attitude was fear, particularly among female farmers in areas where Lynx were present. Knowledge scores were low among all groups, but the study concludes that knowledge was important in predicting attitude towards Lynx.
2.3.3 Lynx in the United Kingdom

Lynx are now believed to have been absent from the UK since early Medieval times (Hetherington et al, 2005) and it appears that they have largely fallen out of the public psyche. In a study of ‘forgotten’ British animals, Raye (2014) targeted educated but non-expert British people to ascertain which animals they believed were native species. The majority were unaware that Lynx ever lived in the British Isles, with only 22% identifying this as a native species (Raye, 2014).

Nilsen et al (2007) reported that wildlife reintroductions are generally welcomed by the Scottish public, who are willing to accept wolves back into the countryside. The attitudes of farmers towards wolves are negative, but notably not as negative as those of the organisations which represent their interests. The majority of the public appear to be positive about the recovery of smaller carnivores: for example, the gradual return of Polecats (*Mustela putorius*) and reintroductions of Pine Martens (*Martes martes*) (Wilson, 2004).

There have been no large scale studies on attitudes to Lynx reintroduction among the British general public, although an online survey by BBC Wildlife Magazine in July 2014 sought to discover the most popular candidate for reintroduction among their readership. At the time of writing, Lynx remains in the top place with 30% of the 923 votes, ahead of, in descending order in terms of vote share, Wolf, Beaver, Elk (*Alces alces*), Wild Boar and Bear. As previously noted, a reintroduction of Lynx as described by the Habitats Directive would require a “proper consultation of the public concerned”; that is, those who would be affected by such a project (European Union, 1992).
3. Methods

“This would be a wonderful thing putting the balance back into nature”
Survey participant

3.1 Choice of tools

As some of the target groups such as farmers and gamekeepers live and work across large, sometimes remote, areas, it was decided that approaches would be made to them through representative groups such as the National Farmers Union Scotland (NFUS), directing members to complete an online survey, and directly, for face to face interviews at agricultural shows. To gather views of a broader group of people who might use the Forest of Dean or Scottish Highlands for other types of work or leisure the online survey was promoted through Twitter (3.3).

A survey was drawn up in three sections. The first section tested basic knowledge of Eurasian Lynx, beginning with a series of four photos of animals from which participants needed to identify the animal in question. Several multiple choice questions on the habits, habitat and diet of the Lynx followed.

The second section focussed on attitudes with a series of statements. Half of these expressed positive views regarding Lynx reintroduction, for example “I believe that bringing back the Lynx to the Forest of Dean will attract tourists and boost the rural economy, creating jobs in the countryside”. The others took a negative view “A reintroduction like this would be an expensive waste of money”. For each statement a Likert scale offered the options of “Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree” with an additional option of “Don’t know”. The final part of the survey gathered personal details such as age and occupation. A copy of the questionnaire used in face to face interviews, which contained the same questions as the online survey, is in Appendix I.
3.2 Agricultural shows

The survey was piloted at Essex Young Farmers Show on 18 May 2014. This event was chosen for its audience: farmers and others who work in or visit rural Essex, and the timing of the event which occurred at an early stage of the project. Visitors to the show were approached and asked if they would be willing to take part in a survey about wildlife. If a family group was approached, children were invited to colour in a selection of wildlife pictures to keep them occupied whilst an adult from the group was interviewed. Following the knowledge section of the survey, a life-size dibond cutout silhouette shape of a Lynx was revealed to the participant before they moved on to the attitude statements. Ten surveys were completed.

A further survey was carried out at the Fife Show in Cupar, Scotland on 24 May 2014. It was decided at this point to focus the survey on discovering public attitudes and correlating those with existing knowledge levels, rather than providing information on Lynx ecology after the seven knowledge questions. This time the survey was carried out without the Lynx cutout as a visual aid, and participants moved directly from the knowledge section of the survey to the attitude statements.

Following the pilot, the phrase “I believe that…” was added to precede attitude statements to emphasise to respondents that their own views were being sought rather than suggesting that they state a fact, about which they may feel less confident. Visitors and participants were approached as before, with a particular focus on sheep farmers who had gathered to show their livestock. 24 further surveys were completed.
Organisers of three further agricultural shows taking place within the project timeline were approached. Organisers of the Royal Highland Show in Scotland were not keen for a survey to take place during their event, and no response was received from the Royal Three Counties Show in Gloucestershire. The Drymen Show in Scotland organisers were willing to allow access but it was decided that this smaller show would not generate enough survey responses to make the journey worthwhile.

3.3 Online survey
An online version of the survey was developed. To the personal information section, an additional question was added where participants could submit an email address if they were prepared to be contacted for further interviews. The survey also included free text boxes for comments and for participants to add their occupations. Several interest groups were approached by email, including farmers, gamekeepers, landowners and walkers. A full list of groups approached can be found in Appendix II. Group organisers willing to take part emailed a link to an online survey to their members.

To increase survey response in the Forest of Dean and Gloucestershire area, where response was initially limited, local Twitter accounts with high numbers of followers, including local newspapers and radio stations, were directly targeted with tweets asking them to Retweet the survey link. This gained local media interest and the project was featured on BBC Radio Gloucestershire, Heart Gloucestershire Radio, and in the Gloucester Citizen online where a link to the survey was featured. Paid for advertising on Twitter targeted at followers of media channels in Gloucestershire and farming, walking, gamekeeping and landowner organisations also generated several completed surveys. The study was also covered in stories on the websites of The Great Outdoors magazine, Scotland Outdoors, and Farming Monthly, where links to the online survey were given.


3.4 Statistical analysis

The resulting data were downloaded from the Surveymonkey website and prepared in Excel for analysis. Knowledge scores (ranging between 0 and 7, reflecting the number of correctly answered questions) were calculated for each participant. They were then grouped into three levels of scores, Low (0-2 correct answers), Medium (3-5) and High (6-7). Attitude scores based on responses to the fifteen attitude statements were also calculated. Answers were scored as follows: Strongly Agree: 2, Agree: 1, Neutral: 0, Disagree: -1 and Strongly Disagree: -2. No numerical score was recorded for “Don’t Know” responses.

Data were then examined and analysed using R version 3.0.2. First, a Cronbach’s Alpha test was used to verify consistency between survey responses. From the attitude scores, factor scores were generated using factor analysis via the fa.poly function. Linear models were then developed to detect correlation between factors such as knowledge score and attitude factor score. Model selection was made on the basis of Akaike information criterion (AIC) (Burnham and Anderson, 2002).

Models with low AIC values and of particular interest were then tested for outliers. As outliers can increase error rates this test is run so that errors can be identified in the raw data. Outliers do not necessarily need to be removed, but it is valuable to be aware of them and the influence they may have on analysis (Osborne and Overbay, 2004). A test was run on the selected models to check for multicollinearity: where two or more factors are highly correlated and therefore likely to affect the results of analysis.

Models were then tested to determine whether error variance changes with the level of response. This shows whether the model has homoscedasticity or a consistent error variance, or heteroscedasticity, where error variance is not consistent throughout the data. The latter can affect the outcome of statistical tests which assume a finite variance in errors. If this occurred, heteroscedasticity robust standard errors were applied. Finally, coefficients and their p-values for each selected model were examined to identify correlations.
3.5 Stakeholder interviews

A series of telephone interviews were held with representatives from organisations with an interest or connection with wildlife reintroductions. The organisations taking part were: Forestry Commission Scotland (FCS), Game and Wildlife Conservation Trust (GWCT), National Farmers Union (NFU), National Farmers Union Scotland (NFUS), Natural England (NE), Ramblers Scotland (RS), Royal Society for the Protection of Birds (RSPB), Scottish Natural Heritage (SNH), Scottish Land and Estates (SLE), and the Scottish Wildlife Trust (SWT). Participants were asked about the groups they represent, their policies on wildlife reintroductions, and how policy decisions are made within their organisations. Two broader interviews were held with Scottish farmers who described their work and views on the impact wildlife introductions can have on livelihoods.

Following each interview, a full transcript was provided to interviewees to confirm their acceptance of the inclusion of quotes in this thesis. Transcripts were interpreted following the method suggested by Löfgren (2013). This method involved highlighting (or coding) phrases or statements which: occurred frequently, appeared particularly novel, were emphasised as important by the interviewee or related to issues previously discussed here. These codes were then grouped into themes.
4. Results

“Why can't we spend money on looking after what we still have, instead of on loony romantic ideas about 'rewilding' a space-strapped countryside into a past golden age that never was?” Survey participant.

4.1 Survey results

A total of 611 online surveys were fully completed. Table 1 describes the samples, where data from the Fife Show surveys has been combined with online surveys completed on the Scottish Highlands.

Table 1: Sample description

<table>
<thead>
<tr>
<th>Demographic variable</th>
<th>Forest of Dean</th>
<th>Scottish Highlands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender ratio (approx)</td>
<td>1.6:1 (M:F)</td>
<td>1.7:1 (M:F)</td>
</tr>
<tr>
<td>Largest age group</td>
<td>21-40 (46%)</td>
<td>21-40 (43%)</td>
</tr>
<tr>
<td>Percentage farmers</td>
<td>5%</td>
<td>22%</td>
</tr>
<tr>
<td>Percentage gamekeepers</td>
<td>2%</td>
<td>9%</td>
</tr>
<tr>
<td>Percentage foresters</td>
<td>5%</td>
<td>12%</td>
</tr>
<tr>
<td>Sample size</td>
<td>272</td>
<td>363</td>
</tr>
</tbody>
</table>

4.1.1 Attitudes

Support for Lynx reintroduction in general was high, with 65% of those completing the survey in favour, either selecting Agree or Strongly Agree as a response to the attitude statement specifically referring to reintroduction. The majority of respondents agreed with positive statements, with a minority agreeing with negative statements. Table 2 lists the attitude statements in order of percentage of respondents who either agreed/strongly agreed or disagreed/strongly disagreed with them.
Table 2: Responses to attitude statements ordered by percentage of respondents in agreement, where % agree shows those who agree or strongly agree, and % disagree shows those who disagree or strongly disagree.

<table>
<thead>
<tr>
<th>Attitude statement</th>
<th>% agree</th>
<th>% disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I believe that bringing Lynx back to the Forest of Dean/Scottish Highlands will…”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attract tourists and boost the rural economy, creating jobs in the countryside.</td>
<td>69%</td>
<td>18%</td>
</tr>
<tr>
<td>Help restore our woodlands to a more natural state.</td>
<td>64%</td>
<td>17%</td>
</tr>
<tr>
<td>Benefit forestry by reducing damage caused by deer.</td>
<td>64%</td>
<td>14%</td>
</tr>
<tr>
<td>Reduce the number of smaller predators, assisting gamekeepers and farmers.</td>
<td>55%</td>
<td>17%</td>
</tr>
<tr>
<td>Benefit small mammals by managing the numbers of predators.</td>
<td>46%</td>
<td>18%</td>
</tr>
<tr>
<td>Cause problems for gamekeepers, as Lynx will feed on pheasants and grouse.</td>
<td>41%</td>
<td>27%</td>
</tr>
<tr>
<td>Have a negative impact on the work of livestock farmers by posing a threat to sheep and cattle</td>
<td>28%</td>
<td>54%</td>
</tr>
<tr>
<td>Be dangerous for pets.</td>
<td>25%</td>
<td>47%</td>
</tr>
<tr>
<td>Have a negative impact on wildlife.</td>
<td>14%</td>
<td>64%</td>
</tr>
<tr>
<td>Be dangerous for people.</td>
<td>8%</td>
<td>76%</td>
</tr>
<tr>
<td><strong>General attitude statements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would like Lynx to be re-introduced to the Forest of Dean/Scottish Highlands.</td>
<td>65%</td>
<td>23%</td>
</tr>
<tr>
<td>Reintroducing animals benefits people by creating a more natural environment.</td>
<td>63%</td>
<td>21%</td>
</tr>
<tr>
<td>We have a moral duty to re-introduce animals that have previously been driven extinct by people.</td>
<td>51%</td>
<td>31%</td>
</tr>
<tr>
<td>We have already made many changes to the British countryside, and it would not be sensible to add a large predator now.</td>
<td>27%</td>
<td>59%</td>
</tr>
<tr>
<td>A reintroduction like this would be an expensive waste of money.</td>
<td>24%</td>
<td>62%</td>
</tr>
</tbody>
</table>
4.1.2 Knowledge
Knowledge levels were based on the number of correctly answered questions and grouped into levels of scores, Low (0-2 correct answers), Medium (3-5) and High (6-7). The majority of respondents had a high level of knowledge about Lynx (Table 3).

Table 3: Overall knowledge levels

<table>
<thead>
<tr>
<th>Knowledge level</th>
<th>Percentage of total respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>3%</td>
</tr>
<tr>
<td>Medium</td>
<td>36%</td>
</tr>
<tr>
<td>High</td>
<td>61%</td>
</tr>
</tbody>
</table>

A pattern emerged when attitude factor scores were compared against knowledge levels (Figure 1). It appeared that the higher the knowledge level, the more positive a respondent was likely to be towards Lynx reintroduction. This correlation also appeared when knowledge levels were contrasted with responses to the statement “I would like to see Lynx reintroduced to the Forest of Dean/Scottish Highlands” (Table 4).

Figure 1: Attitude score and knowledge level
Table 4: Knowledge and attitudes

<table>
<thead>
<tr>
<th>Knowledge level</th>
<th>Median attitude score in response to statement “I would like to see Lynx reintroduced to the Forest of Dean/Scottish Highlands”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>-1</td>
</tr>
<tr>
<td>Medium</td>
<td>1</td>
</tr>
<tr>
<td>High</td>
<td>2</td>
</tr>
</tbody>
</table>

4.1.3 Farming and gamekeeping

Farmers generally had a slightly lower level of knowledge about Lynx than non-farmers. Table 5 shows the knowledge level results for these two groups. Farmers were more likely to have a negative attitude towards Lynx than non-farmers (Table 6).

A minority of farmers (24%) agreed or strongly agreed that Lynx should be reintroduced. Generally the gamekeepers who took part held a negative view of Lynx reintroduction, but were less negative than the farmers.

Table 5: Knowledge and farming

<table>
<thead>
<tr>
<th>Knowledge level</th>
<th>% of farmers</th>
<th>% of non-farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Medium</td>
<td>38%</td>
<td>35%</td>
</tr>
<tr>
<td>High</td>
<td>58%</td>
<td>62%</td>
</tr>
</tbody>
</table>

Table 6: Farming, Gamekeeping and attitudes

<table>
<thead>
<tr>
<th></th>
<th>Median attitude score in response to statement “I would like to see Lynx reintroduced to the Forest of Dean/Scottish Highlands”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers</td>
<td>-1.5</td>
</tr>
<tr>
<td>Gamekeepers</td>
<td>-1</td>
</tr>
</tbody>
</table>
4.1.4 Attitudes and background
Of those who said that they either had a ‘countryside’ or ‘both countryside and town’ background, implying that they had at least spent some time living in a rural area, 65% either agreed or strongly agreed with the statement “I would like to see Lynx reintroduced to the Forest of Dean/Scottish Highlands”. The median attitude score for this statement across the ‘countryside’/‘both’ background groups was 1. Of those claiming a ‘town’ background, 52% agreed with the statement above. The median attitude score for this statement for the ‘town’ group was 2.

4.1.5 Attitudes and location
There was little difference in attitude between those living or working in the Forest of Dean and those in the Scottish Highlands. The median attitude score in response to the statement “I would like to see Lynx reintroduced to the Forest of Dean/Scottish Highlands” was 1 for both locations.

4.1.6 Attitudes and age
There appeared to be a tendency for acceptance of Lynx to decrease slightly as age increased. This might make sense in the context of farming, where farmers, whose views were more negative, tended to be older: for example, 60% of farmers were aged 40 and above, whereas only 49% of non-farmers were over 40.

4.1.7 Attitudes and gender
A greater number of women are neutral on Lynx reintroduction, based on responses to the “I would like to see Lynx reintroduced” statement: 13% as opposed to just 8% of men. Overall women gave roughly similar numbers of neutral responses (18%) to men (16%). There was no significant difference in attitude between male and female farmers.
4.2 Statistical tests

A Cronbach's Alpha test on the dataset showed internally consistent responses, therefore factor scores were chosen as an appropriate method for summarising the attitudes of participants. Linear models tested six predictor variables on attitude: knowledge level, farming status (whether someone is a farmer), gamekeeping status (whether they’re a gamekeeper), forestry status (whether they use their local forest for forestry), age and gender. Those models with the lowest AIC values (Table 7) were selected for further investigation.
### Table 7: Ten linear models with the lowest AIC values

<table>
<thead>
<tr>
<th>Model</th>
<th>Variables</th>
<th>AICc</th>
<th>dAICc</th>
<th>AICw</th>
</tr>
</thead>
<tbody>
<tr>
<td>136</td>
<td>Age + Farming + Gamekeeping + KnowledgeLevel + Farming:KnowledgeLevel +</td>
<td>1269.52</td>
<td>0</td>
<td>3.32E-01</td>
</tr>
<tr>
<td></td>
<td>Age:Gamekeeping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>140</td>
<td>Age + Farming + Gamekeeping + KnowledgeLevel + Farming:KnowledgeLevel</td>
<td>1270.296</td>
<td>0.7754417</td>
<td>2.25E-01</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>131</td>
<td>Age + Farming + Gamekeeping + KnowledgeLevel + Farming:KnowledgeLevel +</td>
<td>1271.549</td>
<td>2.0287807</td>
<td>1.20E-01</td>
</tr>
<tr>
<td></td>
<td>Gamekeeping:KnowledgeLevel + Age:Gamekeeping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>132</td>
<td>Age + Farming + Gamekeeping + KnowledgeLevel + Farming:KnowledgeLevel +</td>
<td>1272.357</td>
<td>2.8363557</td>
<td>8.04E-02</td>
</tr>
<tr>
<td></td>
<td>Age:Gamekeeping + Age:Gamekeeping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>134</td>
<td>Age + Farming + Gamekeeping + KnowledgeLevel + Farming:KnowledgeLevel +</td>
<td>1272.392</td>
<td>2.8713102</td>
<td>7.90E-02</td>
</tr>
<tr>
<td></td>
<td>Gamekeeping:KnowledgeLevel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>135</td>
<td>Age + Farming + Gamekeeping + KnowledgeLevel + Farming:KnowledgeLevel +</td>
<td>1273.572</td>
<td>4.0513764</td>
<td>4.38E-02</td>
</tr>
<tr>
<td></td>
<td>Age:Farming</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>129</td>
<td>Age + Farming + Gamekeeping + KnowledgeLevel + Farming:KnowledgeLevel +</td>
<td>1274.372</td>
<td>4.851608</td>
<td>2.94E-02</td>
</tr>
<tr>
<td></td>
<td>Gamekeeping:KnowledgeLevel + Age:Farming + Age:Gamekeeping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>143</td>
<td>Age + Farming + Gamekeeping + KnowledgeLevel + Age:Gamekeeping</td>
<td>1275.623</td>
<td>6.1027424</td>
<td>1.57E-02</td>
</tr>
<tr>
<td>130</td>
<td>Age + Farming + Gamekeeping + KnowledgeLevel + Farming:KnowledgeLevel +</td>
<td>1275.693</td>
<td>6.1726458</td>
<td>1.52E-02</td>
</tr>
<tr>
<td></td>
<td>Gamekeeping:KnowledgeLevel + Age:Farming</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>138</td>
<td>Age + Farming + Gamekeeping + KnowledgeLevel +</td>
<td>1276.804</td>
<td>7.283574</td>
<td>8.70E-03</td>
</tr>
<tr>
<td></td>
<td>Gamekeeping:KnowledgeLevel + Age:Gamekeeping</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The model with the lowest AIC factor score compared attitude with age, farming, gamekeeping, and knowledge level; the interaction between farming and knowledge level; and the interaction between age and gamekeeping: (fascores~Age+Farming+Gamekeeping+KnowledgeLevel+Farming:KnowledgeLevel +Age:Gamekeeping). The Adjusted R-squared value suggested that this model represented 28% of variance in the attitude score. This limits the possibility for model prediction, but it does allow tests of effects of individual variables.

4.2.1 Age and attitude
Those non-farmers aged between 41 and 60 can be expected to have an attitude score 0.24 (-0.4 - -0.08) points lower than those aged between 21 and 40, holding all other predictor variables constant, and this is significant at the 1% level (p=0.004). Those non-farmers aged between 61 and 80 can be expected to have an attitude score 0.34 (-0.57 - -0.11) points lower than those aged between 21 and 40, holding all other predictor variables constant, and this is significant at the 1% level (p=0.004).

4.2.2 Farming and attitude
Farmers can be expected to have an attitude score 1.22 (-1.49 - -0.95) points lower than non-farmers, holding all other predictor variables constant, and this is significant at the 0.1% level (p=<2e-16). Gamekeepers can be expected to have an attitude score 0.62 (-1.02 - -0.22) points lower than non-gamekeepers, holding all other predictor variables constant, and this is significant at the 1% level (p=0.003).
4.2.3 Interaction between knowledge and farming

Those non-farmers with a low knowledge level can be expected to have an attitude score 1.20 (-2.01 - -0.39) points lower than those non-farmers with a high knowledge level, holding all other predictor variables constant, and this is significant at the 1% level (p=0.004). Those non-farmers with a medium knowledge level can be expected to have an attitude score 0.58 (-0.74 - -0.42) points lower than those non-farmers with a high knowledge level, holding all other predictor variables constant, and this is significant at the 0.1% level (p=1.04e-11).

Those farmers with a medium knowledge level can be expected to have an attitude score 0.66 (0.24 – 1.08) points higher than those farmers with a high knowledge score, holding all other predictor variables constant, and this is significant at the 1% level (p=0.002). The interactions between knowledge level and farming status are shown in Figure 2.
4.2.4 Interaction between age and gamekeeping

Those gamekeepers aged under 20 can be expected to have an attitude score 0.96 (-0.07 - 1.99) points higher than those gamekeepers aged 21-40, holding all other predictor variables constant, and this is significant at the 10% level (p=0.07). This interaction is illustrated in Figure 3.

4.3 Stakeholder interviews

4.3.1 Licensing authorities

Representatives of two Government agencies, Natural England (NE) and Scottish Natural Heritage (SNH) explained the legislation and process around reintroduction of wildlife, and their position on the importance of public consultations (Table 8). Both agencies encourage anyone proposing a reintroduction project to follow guidance provided by the IUCN (2013).
Table 8: Licensing authority responses

<table>
<thead>
<tr>
<th>Organisation and representative</th>
<th>Reintroduction process</th>
<th>Legislation and Licences</th>
<th>Public consultation</th>
<th>Who has the final say?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Natural England</strong></td>
<td>The proposer would need to meet the requirements of the IUCN guidance.</td>
<td>“The Key Act is the Wildlife and Countryside Act, Section 14 – which prohibits the release of any animal that’s not ordinarily resident or a regular visitor in a wild state, or is listed on Schedule 9. Lynx isn’t listed on Schedule 9 at the moment but isn’t ordinarily resident so it would be covered by that.”</td>
<td>An application for reintroduction would have to include evidence of a statistically valid public opinion survey to demonstrate local support.</td>
<td>The Secretary of State and Defra who have the power to license animals covered by Section 14.</td>
</tr>
<tr>
<td>Charlie Wilson, Wildlife Management Senior Specialist</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SNH</strong></td>
<td>The proposer would use the new Scottish code, which is structured around the IUCN guidance.</td>
<td>As Lynx has been declared extinct in Scotland it is defined as non-native, so a non-native species licence would be required, along with a licence for moving a wild born animal from another EU country.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.3.2 Stakeholder organisations
Eight organisations outlined their views on the involvement of stakeholders and influence of public opinion on policy decisions regarding issues such as wildlife reintroductions, and their organisation’s view on bringing back the Lynx (Appendix III, Table 9). Many separated the views of the general public and those of groups of people who were better informed on the issues a Lynx reintroduction would generate. Although many organisations did not have an official standpoint, those representing the interests of farmers and landowners were broadly against reintroduction. Reasons given for these views are outlined in 4.4.

4.4 Themes emerging from survey results and interviews

4.4.1 Effect of previous reintroductions
In the free text comments section of the survey, four farmers and one estate worker expressed negative views on the reintroduced White-tailed eagle. A typical statement was “Sheep farming has already been badly affected by the introduction of the sea eagle”. There was a broad awareness among stakeholder interviewees regarding the reintroduction of White-tailed eagles to parts of Scotland. NFUS referred to “existing issues with sea eagles”. GWCT, commenting on raptor reintroduction in general, noted that this had historically been done without much consultation and in disagreement with land users who would “ultimately have to deal with the consequences”. NFUS echoed this view but added that this had changed and the government and others were now willing to consult land managers. The RSPB also agreed times had changed and a reintroduction of White-tailed eagles now would not be run in the same way as one in the 1970s.

4.4.2 Costs and benefits of reintroductions
Conservation organisations interviewed (the RSPB and the SWT) suggested that issues raised regarding the reintroduction of White-tailed eagles were perhaps indicative of wider problems in land management. One of these issues could be the allocation of public funding. The NFU would not have welcomed eagle reintroduction “because of where public money was being spent”.

29
Some of those opposing Lynx reintroduction alluded to this issue, with GWCT referring to “cash strapped times”, NFUS “an era where the public purse in under strain” and the NFU suggesting that conserving threatened species already in the country would be a better “investment in public expenditure”. GWCT stated that “reintroductions historically tend to cost more to society than they generate”.

SWT also referred to the cost to individuals, saying that farmers would be frustrated that they would have to “swallow the cost and the impact” of a species they could not control while others are able to enjoy watching eagles or being aware of Lynx presence. Both the NFU and the NFUS stated that a compensation scheme for farmers to reimburse them for animals taken by Lynx would be difficult to administer.

In terms of benefits a wildlife reintroduction can provide, the statement with which the largest number of survey respondents with wither agreed or strongly agreed was “I believe that bringing back Lynx to the Forest of Dean/Scottish Highlands will attract tourists and boost the rural economy, creating jobs in the countryside”. Scottish Land and Estates (SLE) recognised that eagle tourism has been a boon for Mull and Skye, and commented that if farming subsidies were removed it would be better to ‘farm’ tourists to come and watch eagles rather than “struggle on with extensive hill farming” in some areas. However SLE added that their emphasis was on supporting landowners who want to farm, and that the right for people to use their land as they wish should be an important consideration. Ramblers Scotland (RS) suggested that their members would be keen to visit areas where Lynx occurred: “the richer the wildlife, the better the walking experience” (RS, 2014).

Michael Doherty, who farms a small Highland estate, commented that although Lynx could attract large numbers of tourists, the benefit of this would not necessarily be felt by those who own, work or manage the land where the animal was present. He highlighted potential negative effects of increased tourism to remote rural areas with inadequate infrastructure to cope with an influx of visitors, including traffic jams and disturbance to wildlife (Doherty, 2014).
4.4.3 Concern for threatened species already existent in the UK

Interviewees discussed Lynx reintroduction in the wider context of wildlife conservation, particularly in Scotland where several threatened species such as Capercaillie have their last stronghold in the UK. GWCT, NFU and NFUS, all of which are broadly against Lynx reintroduction, and RS, which is open to discussion on the idea, all mentioned that the focus of conservation ought to be on such species rather than bringing in a new animal. The RSPB pointed out that a reintroduction need not reduce conservation efforts on other species, and that in fact the addition of Lynx could bring benefits to threatened wildlife and their habitats.

Some survey respondents echoed stakeholders in raising the issue of species already in decline in Scotland: Black Grouse, Capercaillie, and particularly Scottish Wildcat. Some stated that the Wildcat should be brought back from the brink before time and money were spent on reintroducing Lynx.

Conversely, eight hoped the introduction of Lynx to the Forest of Dean would help to control the numbers of another species: Wild Boar. However, 14 gave the reappearance of Wild Boar as the reason not to bring in Lynx. A typical comment was “I don't know much about the lynx but the boars are a flipping nuisance and if they are anything like them, it should be avoided as they cause a lot of damage and stress.”

4.4.4 Knowledge and attitude

RS referred to Lynx as “a bit of a cinderella”, not grabbing public attention as much as wolves and White-tailed eagles. The NFU, NFUS and RSPB suggested the public as a whole may not know enough about Lynx reintroduction to make an informed decision. However, SWT disputed this: “many people are pretty well informed and do understand the issues a great deal”. RS noted the phenomenon of public mood changes, citing the smoking ban: “the evidence was out there for years but the government did not act until they felt the public was ready for it”. SWT also reflected on changes in public appetite, adding that a public consultation could also changes the views of people on either side of the argument.
The NFU raised the issue of public mood and animal welfare with regard to domestic sheep being chased by predators: “The public love dogs. But dogs can cause problems for when they worry sheep, causing abortions of lambs”. The NFU pointed out that foxhunting has been banned because people didn’t want foxes to be chased, yet a Lynx would chase livestock, and other species: “if people say ‘yes, we want Lynx’, do they actually understand how a Lynx goes around killing livestock?” (NFU, 2014).

4.4.5 Addressing the perceived divide between land managers and others

The majority of survey respondents, 84%, identified their background as either “countryside” or “both town and countryside”. Some farmers, with countryside backgrounds, refer to a “them and us” situation, with impositions made upon them by distant city dwellers:

“As a farmer of livestock in the Highlands I am yet to be convinced that bringing back the Eurasian Lynx is nothing more than a whim of a small number of do gooding individuals. Whom supported by an urban majority will railroad this through against the will of the locals.”

“The decision should be made by the communities that will be affected not by an urban elite 100s of miles away.”

There were similar comments from people did not identify themselves as farmers but recorded their background as “countryside”:

“…If you want these changes then live here and deal with the fallout as well.”

“Anyone considering it should be sanctioned…under mental health or is probably a townie who will live far away from the problems that will be caused!”

FCS commented that the opinions of those who have a strong stake in something should be given more weight than those who do not. NE explained that when reviewing a proposal for reintroduction a public consultation is not viewed as a “vote” and that stakeholder views need to be assessed.
Their Scottish counterpart SNH commented that “…there are going to be certain groups who are going to be far more affected than others. So the views of folk living in the city aren’t necessarily going to be weighted the same as those living on the land”. Furthermore, NE noted that with a wide-ranging species such as Lynx a local and a national consultation might be necessary. RS commented that it may not always be possible to balance everyone’s interests.

Former Mull farmer Aeneas Mackay described how people visiting from organisations and authorities such as the Deer Commission were once gamekeepers or people involved directly with the land rather than academics: now this has changed and many academics are now working on natural regeneration projects. He adds “I’m not sure if it’s for the good” (Mackay, 2014).

GWCT, NFU, SLE and SWT all mentioned the need for a “back up plan” if the project causes problems for farmers. GWCT implied that the concerns of land managers would be addressed if a conservation project was prepared to remove or lethally control animals which were having a serious impact on livelihoods.

**4.4.6 Habitat suitability**

GWCT, NFU and SLE all cited unsuitability of habitat as a reason against reintroduction. They emphasised that the British landscape is now man-made and much changed since Lynx were last present. However, SWT stated that there would be sufficient habitat for Lynx.
5. Discussion

“Would be great to see this "ghost of the woods" back in the UK! I'm pretty sure it has its place in the Forest of Dean.” Survey participant.

This study found a high level of support for reintroduction of Lynx, with 65% of those surveyed agreeing or strongly agreeing that it should return. This could be the result of increased awareness of the role of a large predator in British ecosystems and the effect of its absence following recent media coverage of the subject of rewilding, particularly in newspaper articles, blog posts and a book by Monbiot (2013). The topic of Lynx reintroduction has also recently featured in BBC Wildlife Magazine (Barkham, 2014), in talks by two keynote speakers at the UK’s biggest wildlife event, the British Birdwatching Fair (King, S. and Packham, C., 2014), and in the New Statesman where Monbiot concludes “The lynx is now becoming the totemic animal of a movement that is transforming British environmentalism: rewilding” (Monbiot, 2014). It is also worth observing that although they were not specifically targeted, several respondents are likely to have a good understanding of Lynx ecology: with around 35 adding to the free text field on occupation roles such as biologist, conservationist or ecologist. Perhaps unsurprisingly 82% of biologists, conservationists and ecologists agreed or strongly agreed with Lynx reintroduction.

This study found that knowledge level can be positively correlated with attitude towards Lynx reintroduction, with those who have a high level of knowledge generally viewing the potential return of the Lynx more favourably than those with a lower knowledge level. It also confirmed that the majority of farmers, gamekeepers and other land managers, and those who represent them, have some reservations. Emergent themes from the results of the survey and stakeholder interviews can now be examined to further explain reasons behind their concerns regarding the reintroduction of Lynx.
5.1 Emergent themes

5.1.1 Effect of previous reintroductions
Some interviewees regarded the Scottish White-tailed eagle reintroductions as precedents for the effects Lynx might have on the interests of farmers. Five survey respondents cited the negative impact of eagles as a reason not to introduce the animals. These are, of course, very different species and cannot be expected to behave in the same manner: but the feelings they elicit could be similar.

Indications of how the return of the Lynx might be received can be drawn from the ongoing debate on the impact of reintroduced White-tailed eagles on Scottish sheep farming. First, there is disagreement over the severity of the impact. Scottish Natural Heritage (SNH) state on their website that the eagles generally take lambs at low levels, citing two studies using tagged lambs on Mull and Wester Ross (SNH, 2014). However, the chairman of a local branch of the Crofting Foundation disputed the results of the Wester Ross study, saying that the radio transmitter tags used on lambs in the experiment “put off” the eagles (The Scotsman, 2009). In 2008, crofters in Gairloch, Wester Ross claimed the birds had killed over 200 lambs in a year, but the RSPB pointed out that there were only three local pairs of eagles and it was unlikely that such a high number could be taken (Barclay, 2008).

The National Farmers Union Scotland (NFUS) published their own survey results this year, where 68 out of 108 farmers (66%) reported that eagles were having a negative effect on their farm business (NFUS, 2014). Proving livestock such as lambs have been taken by a predator is not straightforward and the NFUS alludes to this in the report. The disparity of the positions above could mean that eagles are being unjustly blamed for preying on sheep, or that farmers are not being believed. Either way, these tensions do not bode well for the reintroduction of another large predator.

5.1.2 Costs and benefits of reintroductions
As nearly a quarter of survey respondents believed (either agreeing or strongly agreeing) that a Lynx reintroduction would be an expensive waste of money, and GWCT, NFU and NFUS all expressed concerns over the use of public funds to support reintroduction programmes, this theme merits further consideration.
GWCT’s statement on reintroductions costing more than they give back to society is also worth examining, as costs might in fact be outweighed by benefits in the long term, and those benefits may not necessarily be financial in nature.

The argument that a reintroduction is an unnecessary cost to society ignores the benefits such a project could provide to people. There are opportunities for wildlife tourism and the creation of jobs as exemplified on Mull (Molloy, 2011), although whether this success would translate to Lynx would need further research. Given the points raised by Doherty (2014) about lack of infrastructure for tourism in remote parts of Scotland, and the elusive nature of the Lynx, it is debatable whether all crofters and farmers will see a direct economic benefit from Lynx reintroduction. However there may be opportunities for some to exploit what a report commissioned by SNH termed “a positive market outlook for farm based tourism and activities in Scotland” (PlaceFirst, 2011). If simply knowing Lynx were present was not enough of a visitor attraction, it could be argued that tourism could be generated as a result of the changes the animal can make to the ecosystem such as the recovery of populations of some charismatic bird species (Helldin, 2006). Curtin (2013) describes the growth of wildlife tourism in Britain, and in particular the potential for Scotland to capitalise on its natural resources, concluding that “…the direct and indirect benefits brought by wildlife to the British tourism product should not be underestimated…” (Curtin 2013, p.210). FCS, along with 64% of survey respondents, agreed that Lynx decreasing deer numbers could benefit forestry, by reducing damage to trees. Deer management costs to FCS are currently around £4.5 million each year (Parliamentary Office of Science and Technology, 2009).

Theoretically everyone benefits from the indirect effects of a top predator reducing herbivore numbers and therefore encouraging plant growth and ultimately carbon sequestration (Tanentzap and Coomes, 2012). In addition, there are “non-use values” associated with wildlife reintroductions. These are cited and described by Gurnell et al (2008) when discussing the potential return of the Beaver to England and adapted here for Lynx: Altruistic value, from knowing others can enjoy Lynx and the ecosystems they inhabit; Bequest value, passing on the ecosystem services provided by this keystone species to future generations; and Existence value, the sense of satisfaction in knowing Lynx exist in Britain once more.
The cost issue that the groups representing farmers and land owners are most concerned with is the immediate loss of income experienced by someone who has lost livestock to a wild predator. This is made clear in a recent call by NFUS for a moratorium on wildlife reintroductions:

“Restrictions on public finances have meant insufficient budget to properly support land managers affected by existing legal and illegal reintroductions... It is fair that appropriate and accessible funding is made available to vulnerable farms and crofts to manage the impact that species can have on their livelihoods.” (Mellor, 2012)

The issue here is that the farmer has to pay “upfront”, while the rest of society reaps the benefits in the long term.

5.1.3 Concern for threatened species already existent in the UK
While 14% of survey respondents believed Lynx would have a negative impact on wildlife, GWCT, NFU and NFUS all stated that money destined for a reintroduction project would be better spent conserving existing wildlife. The NFU recently voiced similar opinions regarding proposals to release Beavers in Devon, which it said would be a “costly luxury”, adding that “halting the decline of existing resident wildlife was of more paramount concern” (West Briton, 2009).

This recurring argument, that wildlife reintroductions should be halted in favour of conservation of existent species, fails to acknowledge scientific discourse on the positive contributions to ecosystems made by keystone species such as Beaver, Lynx, and White-tailed eagle, that those contributions could in fact benefit declining species through habitat restoration, in the way that another keystone animal, the Wolf, has facilitated the return of other species to Yellowstone Park (Ripple, 2014). Newly recolonised White-tailed eagles in Finland have been shown to affect behaviour of invasive American Mink (Neovison vison), restricting their range and potentially their population growth (Salo et al, 2008). There is potential for the same interaction to occur in the Scottish Uplands, where invasive Mink have already decimated populations of Water Vole (Arvicola terrestris) (Aars et al, 2001), a species which is often described as “Britain’s fastest declining mammal” (Strachan, 2004).
The Lynx may benefit species of current conservation concern in Britain, for example the Common Nightingale (*Luscinia megarhynchos*). Nightingales are estimated to have declined by 49% in Britain between 1995 and 2011 (RSPB, 2013), and by 63% across Europe between 1980 and 2009 (Vickery et al, 2013). While the decline of this species can be partially explained by climate change and loss of winter habitat in Africa (Ockenden et al, 2012), there is evidence that in Britain overbrowsing of woodland understorey by deer also has a negative impact on birds such as the Nightingale (Fuller and Gill, 2001, Fuller et al, 2007 and Newson et al, 2011). Lynx can limit Roe Deer population growth and reduce their numbers overall (Melis et al, 2010) and where this happens browsing pressure on plants and trees such as European Yew (*Taxus baccata*) is reduced (Mysterud and Østbye, 2004), allowing recovery of depleted woodland habitat. So by reducing deer numbers and allowing plant growth in the lower levels of woodland, it is likely that Lynx could facilitate improved conditions for Nightingales.

Both Black Grouse and Capercaillie were cited by some of those who believed conservation of existent threatened species should be prioritised over Lynx reintroduction. Lynx have been found to suppress numbers of Red Fox, allowing recovery of Black Grouse and Capercaillie populations (Helldein, 2006). It does not necessarily follow, therefore, that aiming to bring a top predator back to an ecosystem ignores or disadvantages declining existent species. Indeed, by restoring habitat the Lynx could benefit threatened wildlife.

It is possible that for some, the addition of a top predator is too big a risk to take with species already in rapid decline. However where conservation management efforts have so far failed to reverse downward population trends, such as in the case of the Capercaillie whose numbers fell by 35% between 2004 and 2010 (RSPB, 2013), new methods should be considered. As Ritchie et al suggest in their review of the role of predators, this type of failure is a “strong argument for bold and unconventional approaches to restoration” and that the effects of apex predators could be harnessed as “restoration agents” (Ritchie et al, 2012, p.268).
5.1.4 Knowledge and attitude

That 61% of participants attained a high knowledge score would seem to refute suggestions from some of the stakeholder organisations that the general public does not fully understand the issues involved in Lynx reintroduction. The finding that respondents with high knowledge scores also had high attitude scores is statistically significant, which suggests the possibility that an increased understanding of the ecology of Lynx could increase positivity of attitude. This reflects the conclusions of studies in Norway and Switzerland (Kvaalen, 1998) and Poland (Bath, 2008) where research indicated that education could improve attitudes towards acceptance of Lynx. On this theme, Bruskotter and Wilson (2014) also recommend promoting tolerance of carnivores with a focus on the benefits they bring to ecosystems rather than purely the hazards they present, citing previous studies on attitudes towards bear, tigers and wolves.

Analysis suggested that a farmer with a high knowledge score might have a slightly more negative stance on reintroduction. If this was the case the implication would be that unlike the general populace, farmers become more negative towards Lynx the more they know about them, presenting a significant challenge to anyone hoping education would play a key role in shaping views as part of a reintroduction programme. Indeed, a study by Ericsson and Herberlein (2003) on public attitudes towards wolves in Sweden found that although in most cases attitude becomes more positive as knowledge increases, local hunters in areas where the animals were present had the highest level of knowledge but the most negative attitudes. It is therefore important to recognise that if a reintroduction programme required the support of farmers, simply providing them with facts about Lynx ecology may not persuade them: possible methods of reaching agreement with farmers are referenced in 5.1.5.
Although farmers generally appeared to hold negative views towards Lynx reintroduction, a reason for this could be the effect of publicity around the study. During a heated debate on the study on The Farming Forum website over two days in June, apparently a larger number of people with strongly negative views on Lynx reintroduction were made aware of the survey and decided to make their opinions known through the online survey. On those days the average number of “strongly disagree” responses to the “I would like to see Lynx reintroduced” statement rose from 1 to 9 per day, based on averages throughout the 84 days the online survey ran.

5.1.5 Addressing the perceived divide between land managers and others

The perception of an urban/rural divide on similar issues in Europe and the USA are discussed by Ericsson and Herberlein, who cite a number of studies where the reintroduction of the wolf is seen as ‘a symbol of urban dominance over the less populated countryside’ and, according to a Swedish government report on the subject ‘the symbol for the divide between urban and rural [people]’ (2003: p.150).

However the claim by some of those whose comments on the survey describe such as “them and us” scenario is brought into question by the survey data: 65% of those who had lived in the countryside agreed or strongly agreed with Lynx reintroduction compared with 52% from towns who agreed or strongly agreed with the same statement. Closer examination of what respondents understood by the given choices of backgrounds and whether those supporting Lynx reintroduction actually inhabit areas where the animal could be released would provide a more definitive picture. However it is possible that those claiming Lynx reintroduction will be imposed on them by an “urban elite” are simply unaware of the feelings of their neighbours who would welcome the animal’s return.
Liukkonen et al (2009) found this divide was not just between the town and the countryside, but between locals and ‘others’: conservationists and national or EU authorities. Generally, according to those who live in areas where Lynx are present, “those who protect Lynx most eagerly live mainly in areas where no Lynx occur and their positive opinions about the species are based on lack of experience” (Liukkonen 2009: p.172). Another possible reason for the divide is the perception of “scientific knowledge” as being in conflict with “local knowledge”.

A European Commission report on coexistence with large carnivores describes the dichotomy between scientific knowledge based on principles and lay knowledge gained in specific locations:

“Because knowledge is a source of power, with management agencies often giving greater weight to scientific knowledge, conflicts over whose knowledge counts the most often become entangled in struggles for power” (Linnell 2013: p.13)

While organisation representatives interviewed did not specifically condemn the White-tailed eagle introduction project, there was a general feeling that future reintroductions should be carried out differently, with the implication that greater public engagement would be key to its success. Engagement could mean giving farmers a sense of empowerment in an ongoing project as well as involvement at the consultation stage. Weighting of views, as mentioned by FCS, NE and SNH, is likely to benefit land managers and farmers. If, as interviewees suggested, conservation project managers had a “back up plan” to remove animals which were causing problems, the farmers concerned might feel less frustrated and powerless. Linnell (2013) also suggests delegation of power to local levels and co-management regarding large carnivores with stakeholders involved in decision-making, although it does also note that this can be difficult to manage at the scale required for animals which range over large areas.
GWCT’s suggestion that land managers would appreciate a plan to control animals, if necessary, as part of a conservation reintroduction proposal reflects research in Finland. The Finnish study found solutions to conflict in Lynx management which were acceptable to all stakeholder, including hunters and conservationists. These were: (1) Improving the compensation system, (2) creating a flexible system where problem Lynx could be eliminated (3) improving research and monitoring and (4) increasing public awareness of Lynx with reliable information (Luikkonen, 2009).

5.1.6 Habitat suitability

27% of respondents agreed with GWCT, NFU and SLE that the significant changes people had made to the British landscape rendered it unsuitable for the return of a large predator. This is perhaps not just in reference to a lack of wild prey or habitat but reflecting concern over livestock predation: 41% of those respondents agreeing the habitat had altered too much were farmers or gamekeepers. However, SWT stated that suitable habitat was available and this is supported by Wilson (2004) and Hetherington (2008). The difference of opinion here could be ascribed to the division between local knowledge and scientific knowledge described by Linnell (2013). Farmers could be commenting on the local area with which they are familiar, whereas scientists are discussing different areas, and projects on a broader scale.

5.2 Study limitations and recommendations for future research

5.2.1 Selection bias

Online surveys have the potential to reach a wide audience at a low cost, but are subject to self selection bias (Bethlehem, 2010). Therefore the drawing of any conclusions from this survey needs to be approached cautiously. It is possible that only those who feel strongly about the subject matter have completed the online survey. Indeed, an examination of the total attitude scores for the statement “I would like to see Lynx reintroduced...” revealed that 60% of online survey respondents felt strongly (strongly agree or strongly disagree) whereas only 41% of Fife Show randomly selected interviewees felt strongly either way. However it is also worth noting that this means 40% of those filling in the survey online did not have particularly strong views regarding the reintroduction of Lynx to their local area.
Other aspects of selection bias also need to be recognised here: for example, only those with internet access could complete the online survey, and only those who were on organisation email lists or accessed websites where the survey was promoted, or who heard local radio interviews on the survey, would have been aware of it. The NFUS stated (Wilson, 2014) that they didn’t have contact email addresses for 40% of their Highlands farmer members, so it is possible that many in this target group would not have been aware of the survey.

The knowledge test section of an online survey is also open to abuse as there is no way of preventing respondents from checking facts online before submitting their answers. The survey is also potentially subject to participants deliberately giving false responses, including some dubious job titles in this instance, or to individuals or groups attempting to influence the results through multiple survey completions giving similar or identical opinions. It is also important to acknowledge that comments entered in the survey’s free text box are not necessarily representative and that again, only those with particularly strong feelings may have felt compelled to contribute.

Recognising the limitations stated above, there are, nonetheless, common themes which can be linked with the results of those approached at the Fife Show, and organisation representatives interviewed by telephone.

5.2.2 Factor scores
Factor scores generated using R are a convenient means of representing overall attitudes of individuals. However the process by which these are generated removes data from all participants who responded to one or more attitude statement with “Don’t know”, leaving only 517 records from the original total of 635. To ensure the views of those removed via this process are still recognised, the original data is examined in the Results and Discussion section aside from that used for the statistical tests.
5.2.3 Future research

This study has shown a correlation between knowledge about Lynx ecology and attitude towards the animal’s reintroduction. It has also revealed numerous cases where the arguments put forward by those opposing a reintroduction scheme do not reflect the conclusions of scientific research. For example, the view of some organisations and survey respondents that a conservation focus on reintroducing lost species is detrimental to those existent species already in decline, while evidence points to the contrary (Salo, 2008 and Ripple, 2014). A second example is the view that wildlife reintroductions are imposed on people living in the countryside by “outsiders”, when the reality suggested by this study may be that many people living in rural areas would be enthusiastic about such schemes. Finally, while evidence for suitable habitat has been described (Wilson, 2004 and Hetherington, 2008) some state that the countryside has changed too much to accommodate Lynx.

Since this study recorded views without presenting background information on Lynx reintroduction, it might be valuable to repeat the survey with door-to-door approaches in specific geographical locations such as villages in areas where Lynx reintroduction might be feasible. This could be followed with local focus groups to present evidence of the above cases, and then discuss their interpretations based on exposure to this evidence. Involving the organisations approached in this study in similar discussions would also prove useful: in Scotland the NSRF may be an appropriate place to start, and a similar group could be formed in other parts of the UK. This could determine whether the provision of detailed information and therefore increasing knowledge could really have an effect on attitudes towards bringing back one of Britain’s most charismatic animals.
References


Wilson, I., Regional Manager at NFUS (2014) Email sent to Jamie Wyver, 11 April.
Appendix I: Survey

Do you have any other comments about Lynx reintroduction?

About you

1. Which of these ways of using the forest apply to you?
   (a) Farming (b) Gamekeeping (c) Forestry (d) Walking (e) Cycling
   (f) Working or volunteering for conservation (g) Wildlife watching
   (h) Other (please specify)

2. Would you describe your background as Town/Countryside/Both?

3. Male / Female / Other (please specify)

4. Age range: Under 20 /21-40/ 41-60 /61-80 /81+

5. Do you have any children under the age of 16 Yes/No

6. Do you own a dog? Yes/No

7. First half of your postcode ________________

8. What is your occupation?
   If you’re a farmer or gamekeeper please indicate the type of farming/game you
   work with ________________

9. Are you a member of any professional bodies associated with your work
   such as farming or gamekeeping organisations, and if so which ones?

10. Are you a member of any conservation organisations?

11. Finally are you a member of another organisation which might have an
     interest in animal reintroductions?

Thank you very much for your time.

Lynx reintroduction survey

I’m collecting views on whether the Eurasian Lynx should be reintroduced to areas
such as the Scottish Highlands. Lynx were once native in the UK, but there have
been no wild breeding populations here for over 1000 years after they became
extinct as a result of human activity.

1. Which of these do you think is a picture of a Eurasian Lynx
   A B C D or don’t know?

   Do you think Lynx:
   2. are closest in size to a (a) domestic cat (b) labrador or (c) lion or
      (d) don’t know
   3. either (a) show no fear of people or (b) avoid people and are rarely seen
      – or (c) don’t know
   4. feed mainly on (a) small deer and other similar wild animals (b) livestock
      and pets (c) fruit, invertebrates and small mammals or (d) don’t know
   5. can be seen mainly (a) during the day (b) at night (c) at any time or
      (d) don’t know
   6. in the wild are (a) dangerous or (b) harmless to people, or
      (c) don’t know?
   7. mainly live in (a) woodland, (b) farmland (c) suburban areas or
      (d) don’t know
**Attitude statements**

Please read the following statements carefully. I’d like to find out how much they reflect your own views on Lynx reintroduction. After you’ve read each statement, please choose whether you Strongly Disagree, Disagree, are Neutral, Agree, Strongly Agree or Don’t Know.

I believe that bringing Lynx back to the Scottish Highlands will:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree [ ]</th>
<th>Disagree [ ]</th>
<th>Neutral [ ]</th>
<th>Agree [ ]</th>
<th>Strongly Agree [ ]</th>
<th>Don’t know [ ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. have a negative impact on the work of livestock farmers by posing a threat to sheep and cattle</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
<tr>
<td>2. attract tourists and boost the rural economy, creating jobs in the countryside</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
<tr>
<td>3. benefit forestry by reducing damage caused by deer</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
<tr>
<td>4. reduce the number of smaller predators, assisting gamekeepers and farmers.</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
<tr>
<td>5. cause problems for gamekeepers, as Lynx will feed on pheasants and grouse.</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
<tr>
<td>6. be dangerous for people.</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
<tr>
<td>7. be dangerous for our pets.</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
<tr>
<td>8. have a negative impact on wildlife.</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
<tr>
<td>9. benefit small mammals by managing the numbers of predators.</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
<tr>
<td>10. help restore our woodlands to a more natural state.</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
<tr>
<td>11. A reintroduction like this would be an expensive waste of money.</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
<tr>
<td>12. Reintroducing animals benefits people by creating a more natural environment.</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
<tr>
<td>13. We have a moral duty to re-introduce animals that have previously been driven extinct</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
<tr>
<td>14. We have already made many changes to the British countryside, and it would not be sensible to add a large predator now.</td>
<td>Strongly disagree [ ]</td>
<td>Disagree [ ]</td>
<td>Neutral [ ]</td>
<td>Agree [ ]</td>
<td>Strongly Agree [ ]</td>
<td>Don’t know [ ]</td>
</tr>
</tbody>
</table>
Appendix II: Participating organisations

The following organisations agreed to circulate a link to the online survey among their members:

Forest of Dean Ramblers
National Farmers Union Scotland
National Gamekeepers’ Organisation
Ramblers Scotland
Scottish Land and Estates
### Appendix III: Stakeholder organisation interview responses

#### Table 10: Stakeholder organisation responses

<table>
<thead>
<tr>
<th>Organisation and representative</th>
<th>Representing</th>
<th>Consulting members on policy decisions</th>
<th>Public opinion</th>
<th>Lynx reintroduction policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry Commission Scotland (FCS). Gordon Patterson, Biodiversity Policy Officer.</td>
<td>As a statutory body FCS does not represent the forestry sector but encourages and promotes forestry with best practice advice, research and incentives.</td>
<td>Stakeholders are regularly consulted. The level of consultation depends on the target audience.</td>
<td>No official policy but there’s potential for benefits to forestry if Roe Deer numbers were controlled by Lynx.</td>
<td></td>
</tr>
<tr>
<td>Game and Wildlife Conservation Trust (GWCT). Adam Smith, Director Scotland.</td>
<td>GWCT is not a representative body, rather a charity which undertakes research into land management and conservation. Members choose to support.</td>
<td>Through trustees who represent the views of members.</td>
<td>Public attitudes have to be part of a conservation policy mix. Attitudes important for success of a reintroduction project.</td>
<td>No specific line but broader view on reintroductions: there are no remaining natural habitats and man has replaced apex predators.</td>
</tr>
<tr>
<td>Organization</td>
<td>Key Figures</td>
<td>Description</td>
<td>Approach</td>
<td>Notes</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>----------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>-----------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>National Farmers Union (NFU).</td>
<td>Claire Robinson, Countryside Adviser.</td>
<td>Active farmers in the countryside, professional agents and countryside members.</td>
<td>Against</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regional advisers; regional and national farming committees; branch level groups. Consultations through groups and online.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public attitude plays a role but there needs to be informed debate too.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Farmers Union Scotland (NFUS).</td>
<td>Andrew Bauer, Deputy Director of Policy.</td>
<td>Farmers, some large estates and some crofting members.</td>
<td>Against</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Through regional boards and local branches bringing views to the head office committee.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shouldn’t be a primary consideration: a more detailed view is needed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ramblers Scotland (RS).</td>
<td>Helen Todd, Campaigns and Policy Manager.</td>
<td>The interests of walkers: RS members and others who take part in recreational walking.</td>
<td>Against</td>
<td>No official line but RS is open to discussion.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Through trustees generally represent member views.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>They wouldn’t come first but you can’t achieve anything without having public support.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Through a governing body of trustees.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public attitude must be taken account of, but policy needs to be shaped by people with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>Representative</td>
<td>Approach</td>
<td>Relevance</td>
<td>Position</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Scottish Land and Estates (SLE). Anne Gray, Policy Officer (Environment).</td>
<td>Land based businesses in Scotland, mainly the larger estates.</td>
<td>Through members policy groups.</td>
<td>It's relevant but needs to be balanced by a more detailed knowledge base.</td>
<td>No official line but likely to be against.</td>
</tr>
<tr>
<td>Scottish Wildlife Trust (SWT). Simon Jones, Head of Major Projects.</td>
<td>Represents members and their values.</td>
<td>Through committees and council who represent members.</td>
<td>Should be one of the major shaping factors.</td>
<td>In favour.</td>
</tr>
</tbody>
</table>