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How the proposed reintroduction of Eurasian lynx to Britain illustrates competing values and contrasting views associated with humans and the natural world

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Introduction

In 2015, the Lynx UK Trust declared its proposal for a UK reintroduction of the Eurasian lynx (*Lynx lynx*) – a large, forest-dwelling carnivore that would have significant interactions with human activities (Table 1). Aberdeenshire, Argyll and Bute, Cumbria, Norfolk, and Northumberland were announced as prospective areas for pilot releases (Figure 1). The Trust’s proposal document (Eagle, 2015) reported the expectation that one or two sites within these areas would be selected for a “highly controlled, time limited and regulated study.” For each site, it is proposed that this would involve the release of up to six lynx, which would be sourced from mainland Europe and transferred to acclimatization enclosures before being fitted with GPS collar and released into the wild.

Such a project is not without precedent. Starting in 1970, lynx reintroductions – both official and unsanctioned – have been conducted in at least 15 locations across eight European countries (Linnell *et al.*, 2009). The list does not include Britain, but it is only relatively recently that evidence has emerged to firmly satisfy the reintroduction precondition that “past causes would not again be threats to any prospective translocated populations” in the country (International Union for the Conservation of Nature and Natural Resources Species Survival Commission, 2013). The evidence in question comes from carbon dating of lynx remains that supports the presence of the species in Britain as recently as 1550 years ago (Hetherington *et al.*, 2006). Even without this find, it might have been reasonable to assume that the lynx did not become locally extinct through a changing climate, on account of the wide climatic range that the species exploits today. However, the evidence further shifts the probable reason for decline to anthropogenic causes, including hunting of the lynx’s prey and habitat destruction.

Modelling work published in 2007 examined the potential for a successful reintroduction of lynx to Scotland based on habitat and prey availability. The results indicated that the Highlands of Scotland could sustain a population of approximately 400 lynx, while the Southern Uplands of Scotland could support around 50 (Hetherington and Gorman, 2007). Whether these populations would remain genetically resilient in the long term is a question for further study (Linnell *et al.*, 2009), particularly given a recent meta-analysis that suggests a minimum viable population size across mammal species of around 4,000 individuals (Traill *et al.*, 2007). What seems clear is that, if genetic integrity is to be ensured, then a meta-population management approach is likely to be required (Davies-Mostert *et al.*, 2009; Lindsey *et al.*, 2011) – involving, say, the movement of one individual per generation between local populations (e.g. a Swiss population and a British population). This expands on the view of Hetherington *et al.* (2008), who argued that the creation of wildlife corridors between core areas may be essential for the long-term success of a British lynx reintroduction. The corridors need not, however, be devoid of human activity – a key point given the relatively crowded nature of Great Britain. More recent evidence, from Norway, indicates that lynx are not only willing to move through areas of relatively high human activity but also establish cores in such areas, given a sufficient abundance of deer (Basille *et al.*, 2009; Bouyer *et al.*, 2015a; Bouyer *et al.*, 2015b).

Beyond ecological suitability, there are additional facets to the evaluation of potential lynx reintroductions. Indeed, Linnell and colleagues (2009) opine that in lynx restoration projects “the human dimension is the most important.” In spite of this, previous European reintroductions have had little in the way of pre-release public relations (Linnell *et al.*, 2009) and there has been a lack of awareness of the potential for “massive opposition” from people who regard them as a significant threat (von Arx and Breitenmoser, 2004), even if this view is held by only a relatively small number of people. Overall, there have been very few studies exploring social attitudes relating to lynx reintroductions (exceptions are Bath *et al.* [2009] and Lescureux *et al.* [2011]). There also appears to be minimal examination of the ethical case for reintroducing the lynx to Britain independent of any impacts on humans, positive or negative.

This article examines the potential implications of reintroducing the lynx to Britain, thinking beyond small-scale trial releases to the possibility of populations numbering several hundred or more (in line with the modelling of Hetherington and Gorman [2007]). First, we discuss a range of anthropocentric (human-centred) considerations, as framed by different types of “value” (something underlying the judgement of what is desirable or important). From the discussion it will become clear that there is potential for conflict between different

stakeholders and we thus also examine the importance of public consultation and conflict management. After that, we turn to explore ecocentric (Earth-centred) values, which are those arising from a widening of ethical considerations beyond just our own species. Finally, we briefly introduce a means by which anthropocentric and ecocentric values can be given fair consideration within the same decision-making process.

Anthropocentric values

An anthropocentric worldview is one in which humans are given a privileged position in nature, with the “environment” (everything other than humans) being considered only as something for the benefit of our species (Park, 2007). Within this worldview, the values associated with the environment can be broadly divided into “use” and “non-use” categories (Winter and Lockwood, 2005). “Use” values include those that humans derive *directly*, through extractive activities, such as harvesting natural products, and through non-extractive activities, as exemplified by recreation. (As noted by Livingston [1981], the line between extractive and non-extractive values becomes blurred, in terms of physical impact on non-human nature, where there is a heavy burden of recreational use.) “Use” values also include those that humans derive *indirectly*, through ecosystem functioning and aesthetic appreciation. Maintaining the option for use at a future point is also considered a “use” value. The “non-use” category, in contrast, comprises existence values, which relates to satisfaction gained (e.g. spiritual) from preserving a site or resource, and bequest value, which concerns morally foregoing use of a site or resource so that it exists for future generations. The bulleted hierarchy in Box 1 summarizes these anthropocentric values.

Regarding the proposed reintroduction that forms the focus of this article, it is important to note that the lynx is primarily a forest-dwelling species, and societal views on forested land in the UK, as elsewhere in Europe, have shifted in recent decades to encompass a much wider set of demands than just timber production (Niemelä *et al.*, 2005). Accordingly, the group of stakeholders for whom one or more of these values might apply is broad, as is illustrated by the range of examples presented below (Breitenmoser, 1998; Stahl *et al.*, 2001; Schmidt-Posthaus *et al.*, 2002; von Arx and Breitenmoser, 2004; Wilson, 2004; Hetherington, 2006; Breitenmoser *et al.*, 2007; Blake, 2009; Carver, 2009; Liukkonen *et al.*, 2009; Kansky and Knight, 2014; Lühtrath and Schraml, 2015; National Sheep Association, 2015; Stalking Directory, 2015; White, 2015). In the list, “[+]” indicates a positive for the stakeholder and [-] indicates a negative, while letters in parentheses refer to the value type as defined in Box 1. The list is intended to be illustrative rather than exhaustive and it thus avoids duplication of items across stakeholder groups, even though there are some issues with broad relevance.

Conservation bodies and researchers

- [+] Helping to preserve lynx and natural processes for the future (Io, Ne).
- [-] Potentially hindering conservation of capercaillie (*Tetrao urogallus*) (Io, Ne).

Land-management bodies

- [+] Restoring natural processes, especially in forests (Ie).

Hunters and gamekeepers

- [+] Potentially enhancing recreational experience of deerstalking by providing an increased sense of challenge, through the presence of a rival hunter, in the lynx (Dn).
- [-] Potentially detrimental to “harvesting” of deer by stalkers, with lynx as a rival predator (De), although it seems this is likely to cause less concern in Britain than it has in some other European countries (Stalking Directory, 2015).

Forestry owners and workers

- [+] Aiding woodland regeneration through deer control, with benefits for production of timber (De).

Livestock farmers and their representative bodies

- [-] Potentially having negative financial implications from lynx predating on sheep in fields around forests (De) (although see White [2015]).
- [-] Undermining the experience of caring for a flock of sheep, if predation by lynx occurs (Ne).

Crop farmers

- [+] Potentially reducing damage to crops by deer, by helping control population levels (De).

People gaining income from tourism

- [+] Acting as a draw for visitors interested in nature and thus of potential benefit financially (Dn).

Transport and law agencies

- [+] Potentially impacting traffic accident risk (possibly reducing it through control of deer population) (Dn).
- [-] Increasing potential for conflict relating to illegal killing of animals (Dn).

Potential forest users and the wider public

- [+] Enhancing the enjoyment of being outdoors for many individuals (as touched upon in a recent issue of *Countryside* [Gray, 2015]) and reducing risk of Lyme disease owing to the controlling effect on deer populations (Dn; Ia).
- [-] Potentially having a negative impact on activities such as harvesting of mushrooms and berries by wary individuals (De).
- [-] Potentially being a deterrent for dog walkers, for instance, who might be fearful of the lynx (Dn).

It is clear from the list above that there is significant potential for conflict. Other more specific observations that can be made are as follows.

- Even within the conservation stakeholder group, there are potential value clashes. Bodies championing the conservation of capercaillie will, as a minimum, require extra assurance that their own goals will not be hindered through predation of the bird. An issue from which parallels may be drawn is the controversial idea of culling pine marten (*Martes martes*) in Scotland to allow capercaillie to increase in abundance, as has been critically examined by Mathews (2012). Also important to note here is that animal welfare groups, who are often allied with conservation interests, will be concerned with both the welfare of the reintroduced animals and the welfare of the prey they kill.
- The potential reintroduction of lynx to Britain presents an atypical example of biodiversity-related forest conflict. Often these conflicts pit biodiversity against recreation or the harvesting of forest resources (Niemelä *et al.*, 2005; Eckerberg and Sandström, 2013), but here the broad interests of conservationists, forest managers, and forest users are potentially aligned, in this case against those of livestock farmers.
- There is a need for great care in drawing up “definitive lists” of stakeholder groups. In particular, the impact of lynx reintroduction within the agricultural profession, as assessed by relevance for instrumental values, is likely to differ significantly between those growing crops and those rearing livestock, as well as between livestock farmers using enclosed fields and farmers whose livestock graze more extensive areas (Odden *et al.*, 2013), such as hill sheep farmers.
- Livestock farmers, particularly those rearing sheep, are likely to present a strong case against the lynx reintroduction. However, this might be allayed with a suitable compensation scheme for livestock loss and an education campaign that highlights the minimal impact that lynx reintroductions have had on sheep pastoralism in continental Europe (Stahl *et al.*, 2001).

- Deerstalkers may present a less vociferous lobby against the presence of lynx in Britain than they do in continental Europe, which is perhaps because hunting deer is not so deeply rooted in the culture of British society. Nevertheless, the views of deerstalkers are likely to be important and need to be taken into account.

Public consultation and conflict management

The article now turns to consider the mechanisms by which a fair decision – from a utilitarian (i.e. anthropocentric) – perspective, might be reached when such conflicting viewpoints exist. If the decision-making process is restricted to use values (Box 1), then it is possible, in theory, to project the various considerations onto a single quality-of-life or monetary scale (the latter has been attempted by White [2015], for the Lynx UK Trust). If non-use values are also included, then achieving such commensurability becomes much more difficult (Ives and Kendal, 2014). In either case, though, public consultation is a crucial element of the process. Arx and Breitenmoser (2004) have observed that “diverging interests need to be enabled to negotiate on a clear and long-term goal of reintroducing and managing a lynx population.” In addition, there is empirical evidence that indicates the dangers of inadequate consultation mechanisms. As noted by Hetherington (2006):

“A lack of public involvement in the governmental project to reintroduce lynx in Switzerland in the 1970s led to a sense of disenfranchisement, particularly among sheep farmers and hunters. As a result, the illegal killing of lynx in Switzerland still regularly occurs and is a significant source of mortality for the lynx population there.”

Poor public consultation is also a probable explanatory factor in the widespread illegal hunting of lynx in the Šumava Mountains of the Czech Republic and the Bavarian Forest across the border with Germany (Wölfel *et al.*, 2001).

In contrast to the bulk of previous lynx reintroduction projects, the announcement of the proposed reintroduction of lynx to Britain was swiftly followed by public polling. A crude online survey found that 91% of respondents were in favour of a trial reintroduction (Pan European Networks, 2015). An additional survey, this time using opinion-polling techniques aimed at achieving a sample more representatively spread across age and social demographics, found that up to 70% of just over 1000 respondents were in support of the proposal (Pan European Networks, 2015). While these surveys are unlikely to have gained meaningful responses from all relevant groups, there is evidence to suggest that, outside of the known key opponents (chiefly, the livestock farming lobby), the level of variation in viewpoints on large predator reintroductions is limited and largely supportive (Nilsen *et al.*, 2007).

In parallel with the public surveys, the Lynx UK Trust established a consultation process to gather the views of local communities in the potential pilot release areas (Eagle, 2015) as well as a wide range of other stakeholder groups. A well-run consultation process should help to reduce the magnitude of conflict if the lynx is reintroduced – especially if the outputs of the consultation inform a clear long-term management plan (Linnell *et al.*, 2009). At the time of writing, a total of 210 groups had been contacted (see <http://lynxuk.org/consultation>). One group not included in the consultation directly but nevertheless likely to have an important impact on the outcome is the media (Burke *et al.*, 2014).

Should the reintroduction proceed following the consultation, the long-term plan informed by the process will ideally have conflict management and monitoring built into it, in order to facilitate a management strategy that is adaptive and that can continue to be shaped by a range of stakeholders (Niemelä *et al.*, 2005). Of particular relevance to conflict management is the work of Lühtrath and Schraml (2015) that was informed by group discussions with hunters in Germany. Their work identified that opposition which is related to the impacts of the lynx is magnified by a desire to defend one’s social identity and counteract perceived impairment of freedoms by other interest groups. They argue that actively dealing with such group dynamics could provide “the missing link” in conflict management for future large carnivore reintroduction projects.

Nevertheless, even a well-conducted consultation may fail to adequately engage with the small minority of individuals carrying out illegal killing, who may have deeply held motivations that are unlikely to be swayed by factual information. Here, broad public backing should not be interpreted as an indication that this is unlikely. In Switzerland, a country in which the Eurasian lynx has already been reintroduced, two opinion surveys yielded results of 75% and 82% in favour of reintroductions (Breitenmoser, 1998; Breitenmoser *et al.*, 2007), which is similar to what has been found in Britain, yet illegal killings still occur. Indeed, even with a large majority of the public apparently in support of a reintroduction, the potential for a determined anti-lynx minority to create a strong lobby should not be discounted. Here, pro-lynx elements within the conservation and forestry sectors may wish to provide educational outreach on the ecological characteristics of the lynx and on how a controlled and monitored reintroduction of an extirpated species differs from an unwitting introduction of a non-native species (such as the grey squirrel [*Sciurus carolinensis*]). Acknowledging this, Hetherington (2006) observed:

“Those people who are most unfamiliar with lynx may be unclear about their size and habits, and assume that lynx pose a physical threat to them. The dissemination of good quality information on the species is essential to prevent the formation of myths and public concerns about safety should be straightforward to allay.”

The adequate resourcing of such dissemination efforts should not be underestimated, however, and the task is by no means a simple one.

Ecocentric values

Thus far we have considered the conflicts that might arise within the range of human-centred values. An extra layer of complexity is added by the robust ethical argument that the “sphere of interests” extends beyond human ones to also include those of the lynx and other biotic and abiotic ecosystem components and processes (Curry, 2011). At this point, it is necessary to introduce some further terminology. In an ecocentric worldview, non-human nature (extending to entities with abiotic components such as soil) is considered to have “intrinsic” worth, which is a value independent of any benefit to humans. Values that concern direct and indirect benefits to humans, in contrast, can be termed “instrumental”. Building on this, an “ecocentric” worldview is one that recognizes both the intrinsic and instrumental value of non-human nature, while an “anthropocentric” worldview supports just the instrumental value (Curry 2011). It is perhaps worthwhile clarifying the important distinction between non-use value and intrinsic value. The former, although not based on human use of a resource, still relates to benefits to humans in a broad sense (through, for instance, the spiritual benefit of saving a species from extinction).

For this article, a key implication of ecocentric ethics, which contends that non-human species have a right to survive and thrive, is that restoring the lynx to part of its native range after anthropogenic extirpation is a manifestation of this right. Moreover, since intrinsic value extends to ecosystems, it is also highly relevant that large carnivores are a significant element of fully functioning ecosystems (as is the presence of mega-herbivores; Ripple *et al.*, 2014; Ripple *et al.*, 2015). As an aside, other manifestations of an ecocentric ethic relevant to ecological restoration include defragmentation of the landscape, interventions to respond to anthropogenic climate change, and the control of some invasive species, “especially when those species are a result of human interference, when their impact is non-benign, and when such control restores ecocentrically directed evolutionary processes” (Gray and Curry, 2015). All of these are significant for the broader rewilding discourse.

Ecodemocracy

Returning to the topic of the proposed lynx reintroduction, we pose the following question: Is there some means by which the democratic spirit of the consultation process on human-centred values could be broadened to also

encapsulate the intrinsic value of non-human nature? Conservation-minded parties might present arguments inspired, at least in part, by the intrinsic value of non-human nature, but the impact of such arguments is liable to being substantially reduced by the inherent weighting of traditional decision-making processes towards human-centred interests. An alternative approach has recently been proposed by Gray and Curry (2016). They present a range of mechanisms for implementing “ecodemocracy”, which they define as:

“Groups and communities using decision-making systems that respect the principles of human democracy while explicitly extending valuation to include the intrinsic value of non-human nature, with the ultimate goal of evaluating human wants equally to those of other species and the living systems that make up the Ecosphere.”

Such an approach to decision-making could lead, in the words of the late forest ecologist and environmentalist Aldo Leopold, to “a land community” with humans as a “plain member and citizen of it” (Leopold, 1968). It is important to stress that this would not create a system that was anti-human in character (Mosquin and Rowe, 2002), and it would, as a minimum, be compatible with sustainable consumption. However, it would stress the need for limits. On this point, Stan Rowe, a geo-ecologist and pioneer of ecological ethics, reached the viewpoint that humans “have no right to reduce the diversity of Earth's ecosystems and their vital constituents, organic and inorganic” (Rowe, 1996). Only time will tell if the trajectory of humanity's future is towards a mainstream persistence with anthropocentrism or to an ecocentric “awakening”.

Final thoughts

This article represents a new examination of ethical conflicts in species reintroduction initiatives. It advances the work of Gamborg and Sandøe (2004), for instance, who explored the ethics relating to the reintroduction of beavers to southern Scandinavia. More recently, Sandler (2010) considered the range of values inherent in, and the ethical foundation of, the closely related ecological issue of assisted colonization. Nonetheless, we hope that we have advanced and broadened this important and extremely topical debate. Furthermore, we believe that the thoughts presented in the article have an applicability that extends beyond Britain to evaluations of large predator reintroductions in other parts of the world. Such reintroductions are occurring at a great pace globally, with multiple projects occurring in southern Africa, for instance (Hayward *et al.*, 2007; Slotow and Hunter, 2009), and proposals emerging for the reintroduction of large predators to other areas such as Australia (Newsome *et al.*, 2015).

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Figure 1. A map of Great Britain showing the counties of the potential pilot release areas proposed by the Lynx UK Trust. Contains Ordnance Survey OpenData © Crown copyright and database rights 2015. (“Boundary-Line”, updated 18 May 2015, and “GB National Outlines”, updated 8 June 2005; using EDINA Digimap Ordnance Survey Service.)

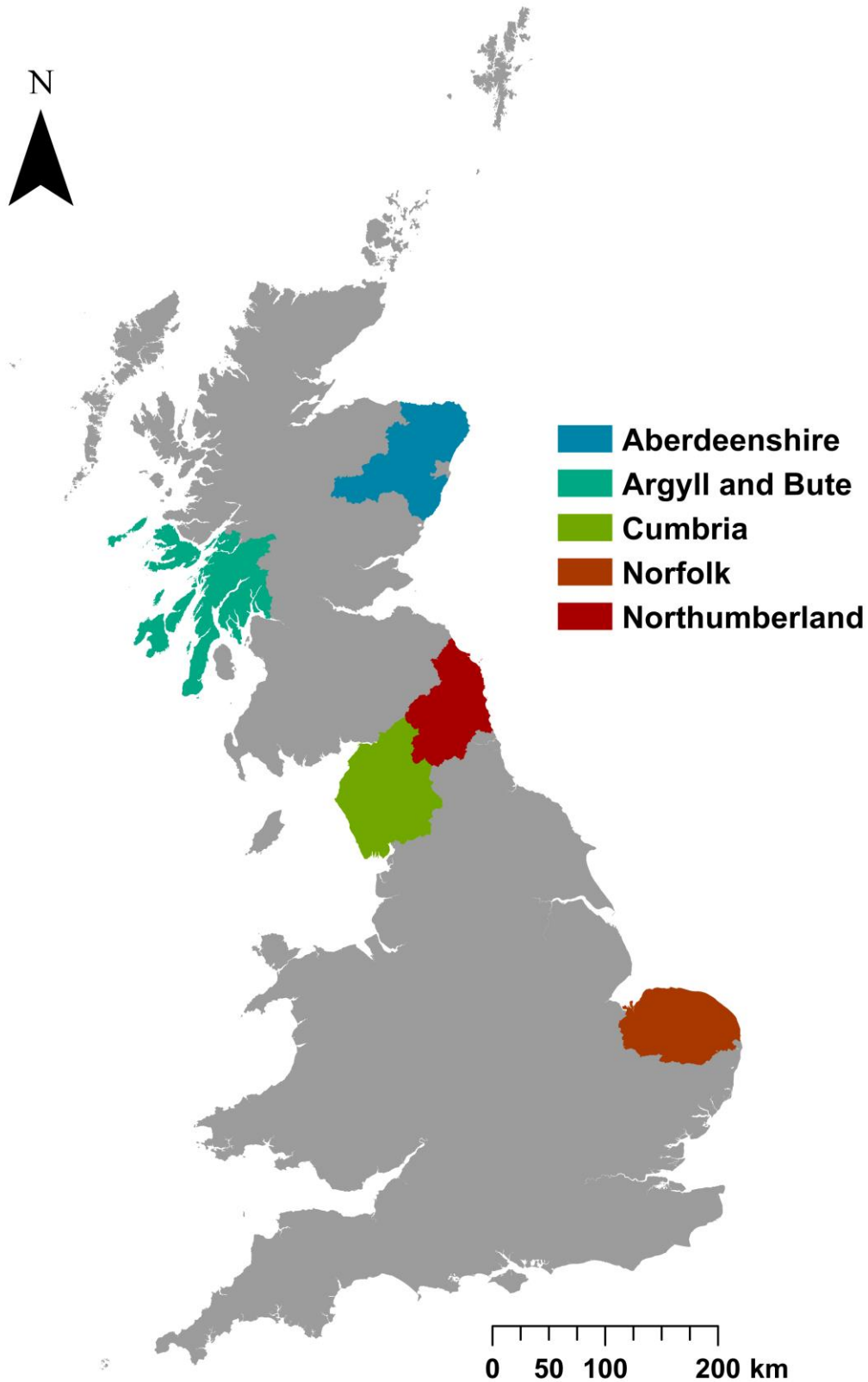


Table 1. Ecological characteristics of the Eurasian lynx (*Lynx lynx*) most relevant to interactions with human activities, adapted from Breitenmoser (1998).

Characteristic	Details	Relevance for human–lynx interactions
Habitat requirements	Forest (dense cover)	Reduces potential interactions
Social structure	Solitary, although juveniles group with females for 10 months	Reduces impact of each interaction
Spatial mobility	Potentially high (approximate estimated individual ranges in the UK of 200–500 km ²)	Means that the potential for interactions exists over large areas of the country
Hunting tactic	Stalking by individuals	–
Main prey	Small ungulates	–
Alternative prey	Sheep, hares, and grouse	Means that some livestock are vulnerable
Diversity of diet	Small	–
Scavenging	Very rare	Reduces likelihood of lynx being attracted to wild animal carcasses from road accidents
Use of clumped food resources	No (except by females with juveniles)	–
Characteristic	Details	Relevance for human–lynx interactions

Box 1. Anthropocentric values – types of benefit that humans can derive from non-human nature (described in the text).

- **Use**

- *Direct*

- Extractive (De)
 - Non-extractive (Dn)

- *Indirect*

- Ecosystem functioning (Ie)
 - Aesthetic (Ia)
 - Option (Io)

- **Non-use**

- Existence (Ne)
 - Bequest (Nb)