

Briefing Note 1: Are plantation forests suitable for lynx?

Introduction

During the national consultation exercise undertaken by the Lynx UK Trust a question was raised over the extent to which plantation forests in the UK would be suitable to support lynx populations given the lack of natural structure, secondary undergrowth, and disturbance from commercial forestry activities. AECOM were asked by the Lynx UK Trust to review the literature looking at the extent to which plantation forests are suitable for lynx. The results are summarised below.

Can lynx survive in plantation forests?

Niedziałkowska et al. (2006) looked at lynx populations in Poland in an area where forests are largely comprised of commercial stands, with around 76% of the area occupied by coniferous plantation. Lynx were supported throughout the plantation area and were found to tolerate a wide range of forest cover densities (greater than 40% cover was found to be sufficient) although higher forest cover was the strongest predictor of presence. The most significant negative impacts on lynx occurrence were found to be human settlements and transport infrastructure. Linnell et al. (2000) also point out that Scandinavian forests support stable populations of lynx and the area is dominated by plantation forestry.

While not looking specifically at plantation forests, Bouyer et al. (2015a) tracked lynx across 49 home ranges in Norway to identify the impact of human disturbance (defined as human and road density). The results suggest that lynx were found in areas of high roe deer abundance, they typically occupied areas with moderate disturbance, and tended to avoid areas of highest disturbance.

Further work in Norway by Bouyer et al. (2015b) found that lynx showed a preference for areas with moderate levels of human modification compared to areas of higher or lower disturbance. Areas with high levels of human modification were more frequently used by lynx when the modified sites were more 'rugged' and were more elevated. The authors also reported that lynx appear to show nuanced habitat preferences; changing their criteria for habitat selection according to their behaviour (e.g. hunting, resting, moving). Females, in particular, appear to be less tolerant of human disturbance than males, especially when it comes to the selection of resting sites.

On balance, the evidence suggests that lynx can and do survive in plantation forests although they tend to avoid particular areas of high human and transport infrastructure density.

Do lynx require forests with stands of specific age or structure?

According to Podgorski et al. (2008) lynx show no strong preference for age or type of forest. They do, however, show a preference in summer and winter for stalking in habitats with fallen logs, dense bushes, and root plates. While these features may be less common in plantation forestry, kill sites were often more open with increased visibility and little undergrowth, suggesting that successful predation may not strongly rely on undisturbed habitat. The areas selected by lynx as resting sites were densely vegetated; these were usually young pine and spruce thickets or dense undergrowth of oak, lime, hornbeam, ash, and alder forests in summer.

Mowat and Slough (2003) assessed habitat preference over an eight year snowshoe hare population cycle in a forest that was partly recovering from wildfire. It was found that *Lynx canadensis* showed a strong preference for regenerating habitats over mature white spruce. Lodgepole pine appeared to be preferred over spruce-willow stands of similar age, potentially suggesting that coniferous forestry in varying stages of growth might not only be sufficient, but may actually be a preferred habitat type over mature boreal or broadleaf forest.

On balance, the evidence suggests that lynx show no strong preference for specific ages of types of forest, although forests with a mix of stands of varying ages may be most suitable.

Are lynx impacted negatively by tree felling?

There is insufficient published evidence to draw conclusions on this question. However, the Scandinavian and Polish lynx populations mentioned in this Briefing Note do exist and reproduce in plantation forestry, where tree felling is likely to be conducted on a regular rotational basis. Further, even in populations where they are actively hunted by people, Sunde et al. (1998) found that lynx can tolerate high levels of human activity if they have access to dense forest cover.

On balance, there is limited evidence on the effects of tree felling although lynx do occur in plantation forests in Europe.

What is the importance of prey availability in relation to habitat availability?

Linnell et al. (2000) make the observation that carnivores often only require prey and protection to thrive. This is further supported by Basille et al. (2009) who find that roe deer population is the strongest predictor of lynx spatial distribution and by Remmen (2012) who report that dense coniferous forest increases the probability of lynx roe deer predation relative to other habitat types.

Roe deer density for lynx in UK plantation forestry is reported to be high, suggesting that they may be suitable for supporting lynx populations. Gill (2000) report that deer are present in plantation forests and have substantial negative (and some positive) impacts due to high population densities. This grazing impact is particularly acute on rides and edges but is also severe in pine growth areas.

Reports of high deer densities leading to negative impacts in the UK's plantation forests are corroborated by further studies. For example, Scottish Natural Heritage (2012) found that the damage caused to commercial forestry in Scotland by deer is substantial, and the cost of this damage is greater in monetary terms than the sum of the benefits afforded by the deer population. This issue is also reported by White et al. (2003) in the East of England.

On balance, the evidence suggests that the availability of suitable prey species (in particular roe deer) is a key determinant of the ability of a habitat to support lynx and that UK plantation forests have significant prey densities.

Conclusions

The evidence suggests that lynx can and do survive in plantation forests in Europe and are widely found in areas of moderate human disturbance although they typically avoid areas with higher levels of disturbance, with the key factors being human and transport infrastructure density.

On the whole, lynx show no strong preference for specific ages or types of forest, although forests with a mix of stands of varying ages may be most suitable. This may be because lynx habitat preferences are nuanced; with less dense areas favoured for stalking and denser areas for resting.

Prey availability is a key determinant of lynx occurrence and, more widely, large carnivores are typically resilient to imperfect habitat providing that they have sufficient prey and protection from human persecution. UK plantation forestry holds large populations of suitable prey items for lynx and there is no evidence to suggest that these habitats would not be suitable for supporting lynx.

References

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