Smith, E.M.W. (2025) Spatial and behavioural impacts of disturbance on red deer, Cervus elaphus, in the Scottish uplands (Doctoral Thesis Durham University), https://etheses.dur.ac.uk/16041/

Abstract

Human activity in wildlife habitat has increased significantly in recent decades, causing widespread changes in animal movement and behaviour. These changes can lead to cascading environmental, welfare, and economic effects. Deer, Cervids, are of particular environmental and economic importance. This is especially true of red deer in Scotland, where contrasting management imperatives and land uses, including outdoor recreation, often lead to conflict. I investigated the effects of hillwalking on red deer within a focal estate in Scotland.

I found that red deer responded to hillwalker disturbances by substantially avoiding paths and altering their behaviour. Higher numbers of hillwalkers led to a more concentrated deer distribution, potentially causing significant ecological consequences from overgrazing and trampling. All measures of disturbance studied showed some response to hillwalker disturbances, though the extent varied depending on spatial and temporal contexts. Deer respond to disturbance in multiple ways, necessitating diverse approaches to accurately assess these responses. This complexity was highlighted by reviewing existing research on deer responses to recreation and hunting. Disturbance responses occurred over varying spatial and temporal scales, which must be considered when quantifying these behaviours. Cover is a critical modulator of deer disturbance responses; while topography can provide some protection, vegetation is more effective at reducing disturbance impacts. The study suggests that in open areas with high human disturbance, providing woodland cover and refuge zones can mitigate impacts on wildlife. Current tree planting initiatives in Scotland could be directed more effectively for this purpose. Additionally, the Scottish Outdoor Access Code should be updated to inform the public about the specific effects of hillwalking on deer, emphasising the importance of staying on established paths in sensitive areas to minimise wildlife impacts.

The results of this thesis underscore the value of tracking individual deer to understand the full extent of disturbance responses and their ecological and economic consequences, despite the challenges in obtaining such data. This research highlights the complexity of wildlife responses to human activities and emphasises the importance of tailored management strategies to mitigate these impacts for the benefit of both wildlife and human interests.