

# Could refuges from human disturbance stem the decline of Capercaillie in Scotland?

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## Abstract

Capercaillie in Scotland have declined in number and contracted in range since the 1970s, most remaining in Strathspey on the northwest flank of the Cairngorm mountains. Strathspey, however, is popular for recreation and suffers anthropogenic disturbance from visitors and their use of new forest tracks and remote, off-track areas. Disturbance reduces the area of forest available to Capercaillie. Refuge areas wherein the creation of new tracks is not allowed, and in which recreation is not encouraged, are a management option that might mitigate such effects. We simulate this possibility for the area covered by Forest and Land Scotland's Strathspey Land Management Plan. Spatially explicit, stage-based matrix models assessed the potential of protecting this population with refuges under 'optimistic', 'central' and 'pessimistic' scenarios based on observed demographic data. Fifteen potential refuges comprised less-disturbed areas of forest still used by Capercaillie. We simulated population growth using combinations of 1, 3, 5, 7, 10, 12 and the full complement of 15 refuge areas. An increasing Capercaillie population could be sustained by a network of refuges, but refuges could not arrest a wider population decline due to causes other than disturbance. This suggests that refuges could play a role in mitigating the increasingly damaging effects of disturbance on Capercaillie in the Strathspey LMP but that the birds' long-term prospects will depend upon improving their performance more widely.

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