

Red grouse and their predators

Sir — We read with interest articles by May¹ and Mead² on the persecution of hen harriers and the impact of raptor predation on grouse-shooting bags. Some of Mead's comments, however, are misleading².

Mead suggests that the economic effects of harriers on grouse shooting are minimal. Unfortunately, that is not always the case. We recently completed six years of research on harrier and peregrine predation on grouse at Langholm in southwest Scotland³. Raptors had bred freely on this moor since 1990, and female harrier numbers increased from two to twenty between 1992 and 1997. Peregrine numbers increased from three to six pairs.

When raptor numbers were high, they removed 30% of breeding grouse in April and May and harriers removed 37% of the grouse chicks between June and August. Most of these losses appeared to be additional to other mortality, and we estimated that they reduced post-breeding numbers of grouse by 50%.

Historically, grouse bags at Langholm have shown a six-year cycle, peaking last in 1990, with 4,038 grouse shot (Fig. 1). Since 1990, grouse bags have declined, with 51 birds shot in 1997.

In contrast, grouse bags on two nearby moors, with low raptor densities, having previously fluctuated in synchrony with Langholm moor, increased to high levels in 1997.

Increased predation by raptors at Langholm was considered the most likely cause for low grouse bags. Grouse management at Langholm cost £99,500 (US\$168,000) in 1997 and, with grouse shooting producing £40 per bird, a bag of 2,487 grouse was required to balance costs.

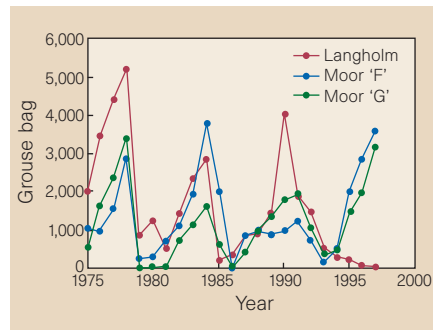


Figure 1 Numbers of red grouse shot on Langholm moor during 1975–97 in comparison with numbers shot on nearby moors F and G during the same period. Grouse bags on all three moors fluctuated in synchrony from 1975 to 1993. After 1993, grouse bags on moors F and G increased while bags on Langholm moor continued to decline. Harrier and peregrine numbers on Langholm moor increased between 1992 and 1997 whereas the numbers of these raptors on moors F and G remained low.

Clearly, if bags remain low the economic cost will be considerable.

Mead² suggests that more red grouse are killed on deer fences than are taken by harriers, citing work in Highland Scotland⁴.

There are several flaws in this argument. First, deer fences are uncommon in red grouse range outside the Highlands, and indeed on many Highland moors. For example, there is little fencing at Langholm and collisions account for fewer than 1% of all recorded deaths³. Second, Highland studies⁵ suggest that 11% of red grouse deaths are due to collisions but 48% are due to raptor predation. Third, fences pose fewer problems to red grouse than to woodland grouse as strikes are

concentrated near young plantations⁴ and red grouse are birds of open moorland.

Finally, how can conflicts between raptors and grouse shooting be resolved¹? As suggested by Mead⁶, predation patterns observed at Langholm will not apply everywhere. Our data suggest that, in the absence of persecution, harrier numbers will be related to densities of prey other than grouse³. In the long term, reducing the amount of grassland on moors may reduce the numbers of songbirds and voles, leading to reductions in harrier density and reducing their impact on grouse populations.

In the short term, however, raptor–grouse problems may require more active intervention in the form of supplementary feeding or raptor translocation. Such measures require the cooperation of conservation and shooting interests. The future of raptors, grouse, the moorland habitats they share and the rural communities they support depends upon it.

Simon Thirgood

Game Conservancy Trust,
Newtonmore,
Inverness-shire PH20 1BE, UK
e-mail: sthirgood@compuserve.com

Steve Redpath

Institute of Terrestrial Ecology,
Banchory,
Kincardineshire AB31 4BY, UK
e-mail: s.redpath@ite.ac.uk

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2. Mead, C. *Nature* **389**, 780 (1997).
3. Redpath, S. M. & Thirgood, S. J. *Birds of Prey and Red Grouse* (HMSO, 1997).
4. Baines, D. & Summers, R. W. J. *Appl. Ecol.* **34**, 941–948 (1997).
5. Hudson, P. J. *Grouse in Space and Time* (Game Conservancy Trust, 1992).
6. Mead, C. *The Times*, 7 & 23 November 1997.

Exaggeration or underestimate?

Sir — John Maddox urged caution in approaching the Kyoto conference on climate change for three reasons (*Nature* **390**, 111; 1997). In each of these reasons he is seriously mistaken.

(1) He suggests that the predictions of the Intergovernmental Panel on Climate Change (IPCC) may exaggerate the rate of change by a factor of two. The fact is that they may underestimate the rate of change by a factor of two. The potential for an underestimation seems especially great because of the uncertainties of biotic responses, especially the possibility of releasing large quantities of additional carbon as carbon dioxide and methane

from high-latitude forests and tundra.

(2) He suggests that the IPCC has not provided a study of the effects on the global economy of restricting the use of fossil fuels. He is correct, but there are ample studies to show that the transition can be made with great advantage. I suggest he consults a recent study by the World Resources Institute led by Dr Robert Repetto.

(3) He suggests that the problem of inequity between rich and poor countries has not been resolved. The issue will never be resolved to the satisfaction of all, but there is good basis for believing that the less-developed world can leap over the fossil-fuel age into an era of far more efficient use of energy with reliance on enduring sources. The developed world can and should aid this transition. The gains will

be mutual. Again, there will always be an argument on the basis of equity, but we have never previously allowed such arguments to prevent major transitions in human affairs.

The Kyoto meeting has been dealing with the most important social and political issue of our time. It is essential that systematic and rapid progress be made towards stabilizing, not the emissions, but the atmospheric burden of heat-trapping gases. The cost of failure is progressive environmental impoverishment and political chaos.

George M. Woodwell

(Director)
Woods Hole Research Center,
13 Church Street, PO Box 296,
Woods Hole,
Massachusetts 02543, USA