

Scottish Natural Heritage

# Diversionsary feeding of hen harriers on grouse moors

a practical guide





# Contents

- 1 Contents**
- 2 Introduction**
- 5 Diversionary feeding harriers in the spring**
  - 5 Where to put the food
  - 5 What type of food?
  - 6 How much food?
  - 6 When to put out the food
  - 6 When to stop providing the food
- 9 Diversionary feeding harriers in the summer**
  - 9 Where to put the food
  - 9 How much food?
  - 11 When to put out the food
  - 11 When to stop providing the food
- 12 How much will it cost**
- 12 Diversionary feeding and the law**
- 15 Quick guide to diversionary feeding**
- 16 Addresses**
- 17 Diversionary feeding trial return form**

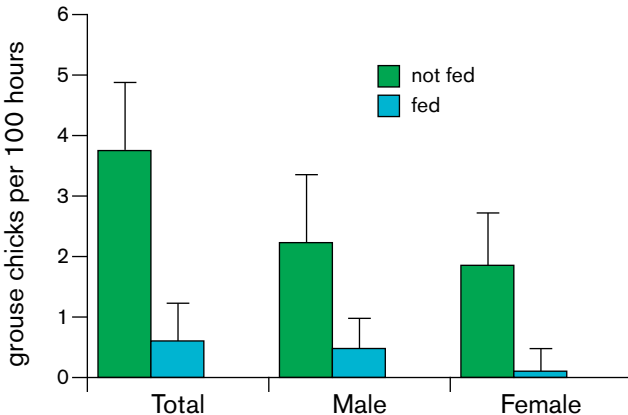
# Introduction

During the spring and summer of 1998 and 1999, hen harriers on Langholm moor, south Scotland, were provided with substitute food in an attempt to reduce the rate at which they preyed on grouse. The results from this work showed that harriers regularly fed on the substitute food. Moreover, harriers provided with substitute food brought grouse chicks back to their nests at a lower rate (0.5 chicks/100 hours) than harriers not provided with food (3.7 chicks/100 hours). Therefore, diversionary or substitute feeding could be a useful tool in reducing the number of grouse chicks taken by harriers.

In this booklet, the technique used to feed the harriers at Langholm is outlined, with an indication of the cost of the procedure. This booklet is designed primarily for the use of landowners and gamekeepers. It has been produced because a number of landowners have expressed an interest in diversionary feeding hen harriers. The methods presented here are based on a two-

year research trial which explored the impacts of diversionary feeding on the rate at which grouse checks were delivered to harrier nests. The research did not test the long-term impact of diversionary feeding on harrier numbers. Anyone using the methods outlined below is requested to contact SNH to fill in a return form (given at the end of the booklet).

The original (1999) version of this booklet was prepared by the Moorland Working Group (MWG), which was established by Scottish Natural Heritage in November 1997 to develop moorland management proposals for grouse moors in Scotland. It had members from the Buccleuch Estates, the Game Conservancy Trust, the Centre for Ecology and Hydrology, the Royal Society for the Protection of Birds, the Scottish Grouse Research Trust, the Scottish Landowners' Federation, The Scottish Office and Scottish Natural Heritage. Since then, a much larger Moorland Forum has been formed.







# Diversionary feeding harriers in the spring

This section deals with the period from when the harriers return to their breeding territories in March until they lay their eggs in late April. The date at which birds return and lay eggs varies across the country; Langholm harriers are relatively early compared to the rest of Scotland. There is still a possibility that by feeding harriers in early spring, you may increase the density of nesting harriers in the long-term. However, harriers fed in the spring tend to take more food during the nestling period in the summer, so providing food once the harriers have settled on territory is still recommended.

## Where to put the food

In good weather from March onwards male harriers return to their breeding grounds, where they start their characteristic display flights. These flights usually end with the bird dropping into tall heather in their territory, and can be used as an indication of where to place feeding perches. Alternatively, look for males sitting preening on the ground, which again is an indication of the territory location.

Once the location of territories has been established in late March, erect perches in the approximate centre of each territory. Standard 5' x 4" fence posts are suitable with a 12" cross-piece nailed on top. The posts should be hammered into the ground until stable (to a height of about 4'). Food can then be placed on these perches daily.

## What type of food?

During the Langholm study, harriers were offered a mixture of two types of carrion food (poultry chicks and white rats). These food types were selected so as to be obvious to observers. These were supplied frozen and defrosted the night before. A one day-old poultry chick weighed approximately 40g (1.5oz) and a small rat weighed 160g (5.5oz). These food types differ in their calorific values per unit of weight, with rats being the nutritionally better of the two. One danger of using poultry chicks is that they can carry some avian diseases, so chicks should only be defrosted the night before being put on the perches and removed the day after if not consumed. Studies at Langholm showed that both rats and chicks were consumed by harriers, but there seemed to be some preference for poultry chicks.

However, it might also be possible to use locally available food items such as rabbits, which could help reduce costs. Ideally, these should not be shot by shotguns as there is a risk associated with lead ingestion by harriers from rabbit corpses.

*Note: It is illegal to provide harriers with live prey.*

## How much food?

Observations of harriers in the spring of previous years showed that male harriers gave their females one small piece of food (such as a vole or meadow pipit) roughly every 3 hours, or 3 items per day. These prey weigh about 25-40g each, giving a total weight of 75-120g. Studies of harriers in captivity showed that birds consumed 12-19% of their body weight per day. Female hen harriers weigh on average 527g, suggesting 100g per day should provide sufficient food for inactive birds. Active birds require slightly more food than this, so the aim of feeding at this time of year should be to provide female harriers with about 150g (c5.5oz) of substitute food. This is equivalent to four poultry chicks or one rat every day.

The quantity of food required at this time of year depends to a large extent on the abundance of corvids: ravens, crows and rooks were responsible for taking most of the food at Langholm.

Do not expect to see the harriers taking to the food immediately. At Langholm, no food was seen taken by harriers in the first 11 days. If crows and ravens are taking food the amount put out should be increased accordingly. Remember that these birds bury food items for later use.

## When to put out food

Harriers are most likely to take the substitute food in the early morning or at dusk before they roost. Therefore the food should be placed on perches either first thing in the morning or in the late afternoon.

## When to stop providing food

Spring feeding can be stopped once the female has started to incubate her eggs.

This is for two reasons:

- No grouse are killed by harriers while the female is on eggs, and the smaller male does all the hunting.
- Continued feeding may attract other egg predators to the moor.





# Diversionsary feeding harriers in the summer

Harrier eggs hatch about 30 days after incubation has started. It is not necessary to visit the nest to see if there are chicks. By observing birds from a distance you can tell when to start providing food. Females will only return to the nest with food once chicks have hatched. After hatching, chicks stay in the nest for about 35 days and in the general area for a further 25 days; so diversionary feeding needs to be continued for about 60 days in total to minimise the number of grouse chicks killed.

If feeding is not carried out in the spring, there is a strong possibility that diversionary feeding in the summer may be less successful. At Langholm, spring-fed harriers took 53 supplementary food items back to their nests per 100 hours during the summer; this compared to 23 items per 100 hours for those harriers not fed in the spring.

## Where to put the food

The location of perches is important at this time of year. If they are too close to the nest, there is regular disturbance to the birds, which can lead to chick death in cold or wet weather. However, if the perches are too far from the nest, the substitute food may not be utilised to the same extent. Perches should be around 20m from the nest for summer feeding. If there is too much food to fit on top of the perch, clear an area underneath and spread the rest of the food there.

## How much food?

The food requirements of harrier broods vary according to the age and number of young. Observations at Langholm showed that even when substitute food was readily available, male harriers continued to deliver wild prey to their female and chicks, although this food was very rarely grouse chicks. The rate at which harriers utilised the substitute food during the nestling period at Langholm in 1998 was used to determine food requirements.



Age of harrier chicks	Food per chick	Dead poultry chicks for brood of 3	Dead rats for brood of 3
1 week	40g (1.5oz)	3	1
2 weeks	70g (2.5oz)	6	2
3 weeks	140g (5oz)	11	3
4 weeks	155g (5.5oz)	12	3
5 weeks	185g (6.5oz)	14	4

After the chicks have left the nest, continue to feed them at the same rate (185g/6.5oz each per day) until the chicks are 60 days old.

### When to put food out

As in the spring, feed early in the morning as this is when the chicks are likely to be most hungry after a night without food. Remove all uneaten substitute food present from the previous day to reduce the risk of disease.

### When to stop providing food

Harrier chicks disperse at around 60 days, so feeding needs to be continued until this time. Feeding beyond this time may lead to chicks staying on site far longer.

## How much will it cost?

A number of factors will influence the cost of diversionary feeding:

- number of hen harriers requiring food;
- size of the harrier broods;
- type and cost of food used;
- travel costs to reach the nest locations; and
- distance of the nests from the road and from each other, i.e. travelling time.

At Langholm, costs were estimated to be £172 - £256 per harrier brood. This excluded the costs of freezer storage and staff wages over a 5 month period. In terms of grouse chicks 'saved' the financial benefit could be considerable.

## Diversionsary feeding and the law

There are two laws which directly affect diversionary feeding:

The Animal By-Products (Scotland) Regulations 2003 which points to the legal requirement to remove all uneaten food from the moor on a regular basis. If it is not possible to make regular 1-2 day checks you should consult your local Animal Health Office.

The Wildlife and Countryside Act (1981) - which states the need for a licence from Scottish Natural Heritage (SNH),

Nature England (NE) or Countryside Council for Wales (CCW) to visit and disturb wild nesting birds at their nests. Such a licence is not required as long as the hen harriers are not disturbed at the nest. However, if disturbance is likely to take place you should seek a licence from SNH, NE or CCW.

If you are in doubt, please take legal advice.





# Quick guide to diversionary feeding harriers

Apply for a licence if you are likely to disturb harriers at the nest

## Spring feeding

- Locate territories in late March/early April
- Erect perches in territories.
- Put out 150g (5.5oz) of carrion food each day, until the start of incubation.
- Remove all uneaten food the next day.
- Stop diversionary feeding during incubation.

## Summer feeding

- At hatch, move perch to 20m from nest and restart diversionary feeding.
- In first week, put out 40g (1.5oz) of food on perch per chick per day.
- In second week, put out 70g (2.5oz) of food on perch per chick each day.
- In third week, put out 140g (5oz) of food on perch per chick each day.
- In fourth week, put out 155g (5.5oz) of food on perch per chick each day.
- From fifth week onwards, put out 185g (6.5oz) of food on perch per chick each day.
- Stop feeding 60 days after chicks have hatched.



## Scotland's Moorland Forum

This booklet builds on the partnership activities described in the *Action for Scotland's moorland; a statement of intent (1998)*. Since then, Scotland's Moorland Forum has been formed ([www.moorlandforum.org.uk](http://www.moorlandforum.org.uk)). The Forum published *Principles of Moorland Management (2003 reprint)*.

SNH is particularly grateful to the Centre for Ecology and Hydrology (formerly the Institute of Terrestrial Ecology) and the Game Conservancy Trust for work in preparing this booklet.

Further copies are available from:  
Publications  
Scottish Natural Heritage  
Battleby  
Redgorton  
Perth  
PH1 3EW

T: 01738 458530  
F: 01738 456613  
E: [pubs@snh.gov.uk](mailto:pubs@snh.gov.uk)

## Reference

Redpath, S.M., Thirgood, S.J. and Leckie F.M. (2001) Does supplementary feeding reduce predation of red grouse by hen harriers? *Journal of Applied Ecology* 38, 1157-1168

## Addresses

Anyone proposing to use the methods outlined here is requested to fill in a Diversionary feeding trial return form and send to SNH, NE or CCW, as appropriate. This form will help us assess the effectiveness of this technique.

### **SNH contact:**

Ornithology Group  
Policy and Advice  
Scottish Natural Heritage  
Great Glen House,  
Leachkin Road,  
Inverness IV3 8NW  
Tel: 01463 725000

### **NE contact:**

Uplands Team  
Natural England  
Northminster House  
Peterborough PE1 1UA

### **CCW contact:**

Natural Science Group  
Countryside Council for Wales  
Plas Penrhos  
Ffordd Penrhoss  
Bangor  
Gwynedd LL57 2LQ

SNH would be grateful for any feedback on the use of this booklet. Please contact:

Ornithology Group  
Policy and Advice  
Scottish Natural Heritage  
Great Glen House,  
Leachkin Road,  
Inverness IV3 8NW  
Tel: 01463 725000

# Diversionsary feeding trial return form

Name of Estate.....

Harrier nest site fed (6 fig grid ref) .....

Date at start of diversionsary feeding.....

Date at finish of diversionsary feeding .....

How much food was put out and how often? .....

.....

Were harriers seen to use substitute food? .....

If so, how many days after start of food being put out? .....

Any other species seen using food? .....

.....

What stage in the breeding cycle were harriers at when diversionsary feeding was started (pre-lay/eggs/chicks)? .....

How many chicks fledged from nest? .....

Any comments on methods? .....

.....

.....

.....

Any comments on booklet? .....

.....

.....

.....

Pleas return to SNH contact. Thank you





## SNH commitment to customers

- We will ask customers for their views
- We will put things right if they go wrong
- We will give high standards of customer care
- We will publish our customer care performance

**[www.snh.org.uk](http://www.snh.org.uk)**

© Scottish Natural Heritage 2010

Photography: Front cover © Mark Hamblin, page 3 © David Whittaker, page 8 and page 13 top © Lorne Gill/SNH, all other images © Laurie Campbell.

ISBN: 1 85397 375 0

Further copies are available from:

Publications  
Scottish Natural Heritage  
Battleby  
Redgorton  
Perth  
PH1 3EW

T: 01738 458530

F: 01738 456613

E: [pubs@snh.gov.uk](mailto:pubs@snh.gov.uk)



**Scottish Natural Heritage**

All of nature for all of Scotland