A future for the Hen Harrier in England?

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The charismatic and spectacular Hen Harrier is a rare breeding bird in England. We provide a summary of the species' recent status here and evidence that illegal persecution continues to thwart the efforts of the conservation community to restore its former range and numbers.

Summary

Since 2002 Natural England's Hen Harrier Recovery Project has monitored the numbers of breeding Hen Harriers in England. For the first time, new tracking technologies have been used to monitor the fate of Hen Harriers during the non-breeding season. The key findings are:

- The English Hen Harrier population remains perilously small, with no more than 23 nesting attempts in any one year in the period 2002-2008.
- Productivity from successful nests is high, but very few nesting attempts are successful on grouse moors.
- There is compelling evidence that persecution continues, both during and following the breeding season.
- Persecution continues to limit Hen Harrier recovery in England.

Introduction

The Hen Harrier breeds widely across Eurasia and North America. About 800 pairs nest in the UK and Isle of Man, with most in Scotland. However, the species' current English range is a fraction of that in historic times, with nearly all of the relatively few recent nesting attempts in the northern uplands.

The species has an unfavourable conservation status in Europe, is a red-listed UK Bird of Conservation Concern and appears on government's section 41 list of priority species. It is also listed on Annex 1 of the EU Directive on the Conservation of Wild Birds (1979) and Schedule 1 of the Wildlife and Countryside Act (1981). Breeding Hen Harriers are interest features of both the North Pennines and the Bowland Fells SPAs and several of their constituent SSSIs, although they no longer regularly breed in the North Pennines SPA.

The UK Hen Harrier population has long been adversely affected by habitat loss and persecution. Once breeding locally on both upland and lowland heathlands, in wetlands and on downlands and other rough grasslands throughout the UK, nesting birds gradually became restricted to Orkney during the early decades of the twentieth century. Following a considerable recovery in both range and numbers during and after the 1939-45 war, breeding birds returned to England in 1968. They have remained scarce breeders here, however, despite the availability of much apparently suitable habitat.

This report provides a summary of information gathered during an intensive Hen Harrier Recovery Project carried out by Natural England and its predecessors between 2002 and 2008. We report on the numbers, distribution and breeding success of Hen Harriers in England during this period and information on the very different rates of failure that are occurring outside of the species' core breeding sites.

The Hen Harrier in the breeding season

Hen Harriers are birds of open landscapes, usually avoiding closed-canopy woodland, conurbations and high mountain tops. Within England they currently nest on the ground almost exclusively in mature heather. Breeding activity generally commences with the appearance of adult males which prospect for potential nest sites and attempt to attract a mate during spectacular aerial displays known as sky-dances. The females normally lay four to six eggs between April and the end of May. The chicks fledge some 28-38 days after hatching. Both parents continue to provide food for their dependent young. Pairs often breed semi-colonially and occasionally a male may mate with, and provide food for, more than one female. Hen Harriers feed mainly on birds and rodents, especially voles, with the larger females tending to take larger prey.

Hen Harrier monitoring in England

The data used in this report have been collated from the following sources:

- Natural England Hen Harrier Recovery Project staff (a project officer and up to 4 field assistants) who have annually searched for Hen Harrier activity in areas with a recent history of occupancy.
- Natural England Hen Harrier Recovery Project volunteers.
- Natural England and RSPB reserve staff who have reported Hen Harrier activity to HHRP staff for follow-up.
- Licensed raptor enthusiasts and raptor study groups.

We take as evidence of a proven breeding attempt any of the following:

- Food pass between two adults
- Adult carrying prey
- Used nest or eggshells found
- Nest with eggs
- Nest with young
- Recently fledged young

Seven different causes of nest failure have been recorded, as described in Table 1.

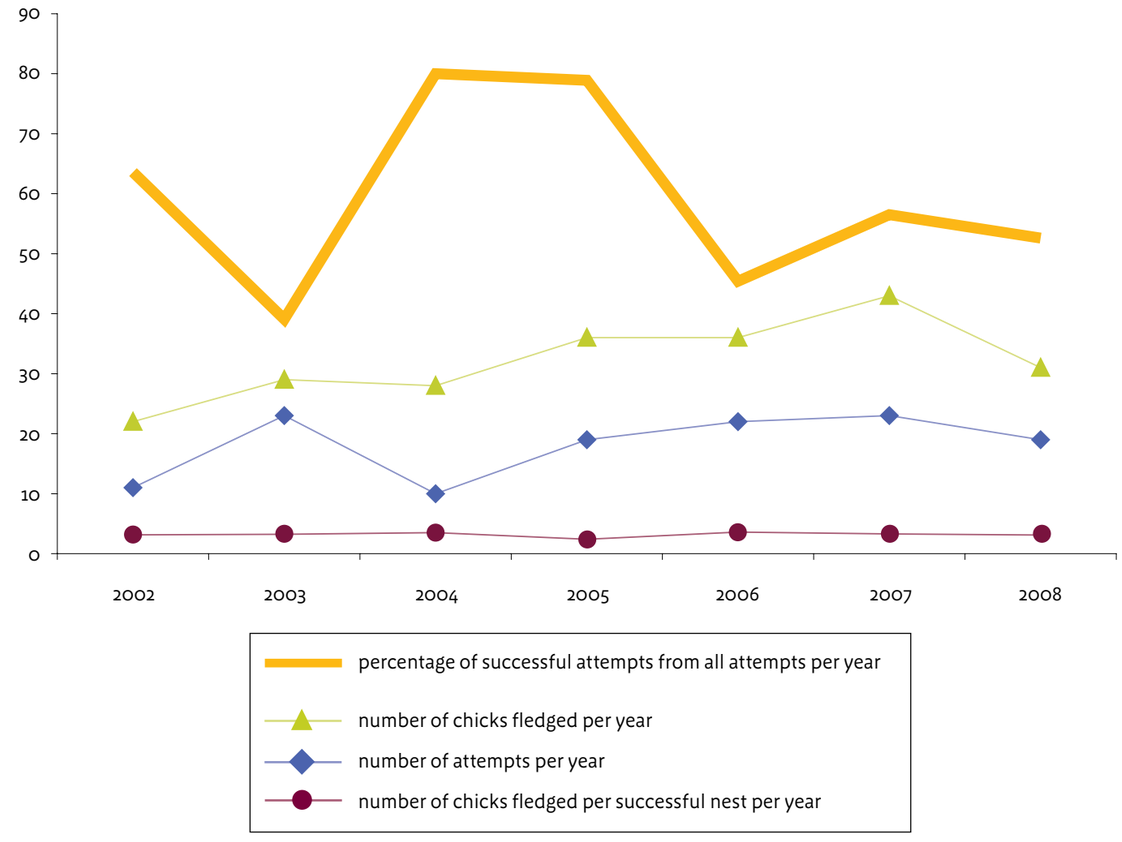
Table 1:
Reasons for Hen Harrier breeding failure in England 2002–2008

Failure reason	Definitions/qualifiers
Persecution	(i) Bird or birds settle in an area and build a nest then leave the area/disappear or settle elsewhere
	(ii) Nest built then destroyed, birds in area
	(iii) Eggs/Chicks destroyed/removed
Fire	Active nest sites burned
Weather	Nests washed out, deserted nests, parents in area
Predation	Tangible evidence of natural nest predation such as tooth/mandible marks in smashed eggs, dead chicks
Lack of provisioning	Female not provisioned well by male, deserted eggs, lack of male sightings (food passes) female away from nest for long periods
Infertility	Eggs fail to hatch despite full incubation and subsequent analysis results
Unknown	Instances where no hard evidence was found at an empty nest that was once active

The numbers of Hen Harriers breeding in England 2002–2008

Hen Harriers attempted to breed in England in each of the seven breeding seasons in the period 2002-2008. We recorded a total of 127 nesting attempts in the period, an average of 18.14 nesting attempts per year. The numbers each year (Figure 1) varied between 10 attempts in 2004 and 23 in both 2003 and 2007. There was no significant overall trend in numbers with time.

Figure 1:
Nesting Hen Harriers in England 2002–2008



The distribution of Hen Harrier nesting attempts in England 2002–2008

The 127 nesting attempts identified in the period were very unequally distributed between 12 localities. We recorded just two attempts in the lowlands; one on the Lizard peninsula in Cornwall and one on Salisbury Plain in Wiltshire. The remaining 125 attempts were all in the un-enclosed northern uplands. A remarkable two-thirds of all the upland attempts (a total of 83 of the 125) were made in the Bowland Fells. The remaining 42 upland attempts took place in a total of 9 separate geographical areas widely spread along the Pennines from the Goyt Valley in the Peak District in the south, to the Cheviots in Northumberland in the north (Figure 2).

In order to avoid drawing undue attention to nesting Hen Harriers, we refrain from making reference to the exact locations of nest sites. However, in order to provide further insight into the distribution of Hen Harriers in England, we refer to nesting attempts in Kielder Forest (Northumberland), Ridsdale (Northumberland), Cheviots (Northumberland), Geltsdale RSPB reserve (Cumbria), Cumbria (unspecified), Northern Pennines (County Durham), Yorkshire Dales, Bowland Fells, Goyt Valley (Peak District), Upper Derwent Valley (Peak District), Wiltshire and Cornwall.

The Bowland Fells was the only area in which breeding attempts took place in all years: nesting attempts were identified in 6 areas away from the Bowland Fells in 2006, the maximum number of geographical areas occupied in any one year, but attempts were known from just three areas in 2008 and no attempts were known outside of the Bowland Fells in 2004. Neither the number of areas occupied nor the range of the Hen Harrier overall has shown any tendency to increase over the period.

Figure 2:
Hen Harrier known breeding sites in England 2002–2008

Sites shown below from north to south

2002 – Kielder, Geltsdale, Yorkshire Dales, Bowland, Cornwall

2003 – Kielder, Geltsdale, Yorkshire Dales, Bowland, Goyt Valley, Wiltshire

2004 – Bowland

2005 – Geltsdale, Cumbria (unspecified), Northern Pennines, Yorkshire Dales, Bowland

2006 – Kielder, Ridsdale, Geltsdale, Cumbria (unspecified), Yorkshire Dales, Bowland, Upper Derwent Valley*

2007 – Cheviots, Ridsdale, Cumbria (unspecified), Yorkshire Dales*, Bowland

2008 – Ridsdale, Cumbria (unspecified), Bowland, Upper Derwent Valley

* supplementary fed due to missing male parent

Key	
●	1–5 breeding attempts
▲	6–10 breeding attempts
■	11–15 breeding attempts

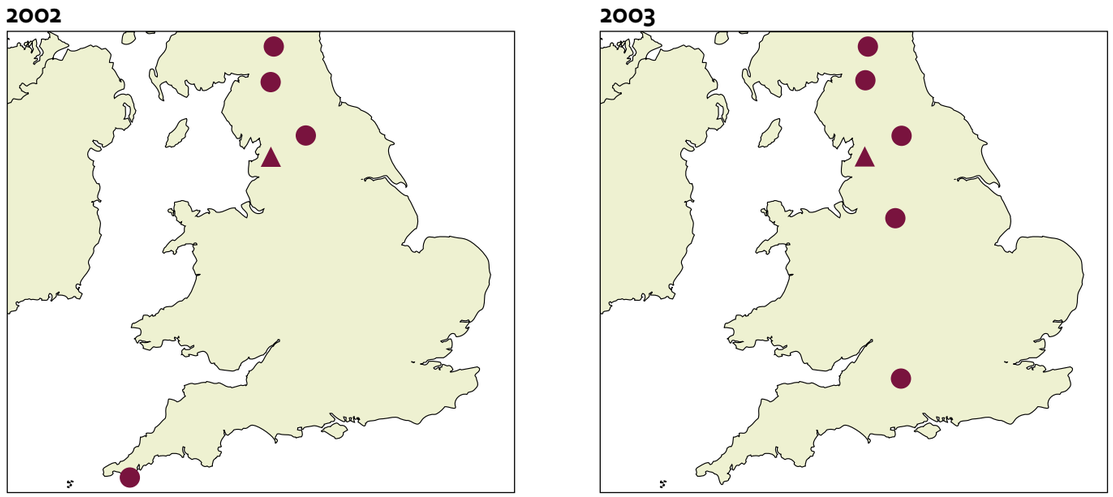


Figure 2 continued:
Hen Harrier known breeding sites in England 2002–2008

2004

2005

2006

2007

2008

Key	
●	1–5 breeding attempts
▲	6–10 breeding attempts
■	11–15 breeding attempts

The success of Hen Harrier nesting attempts in England 2002–2008

A total of 72 nesting attempts were successful in the period, just over half (56.69%) of the total number of known attempts. The successful pairs produced a total of 225 fledged young, at a rate of 3.23 fledged chicks per successful attempt and 1.57 per attempt overall. There was no evidence of a consistent pattern of change in breeding success over time. Whilst the productivity per successful nest compares favourably with that recorded elsewhere in the UK, productivity overall is comparatively low (Table 2).

Table 2:
Hen Harrier productivity elsewhere in the UK

Author	Year	Place of study	Productivity	
			Per successful nest	Per attempt
Balfour, E.	1959	Orkney	2.4	1.58
Watson, D.	1977	Scotland (SW) moorland	3.1	1.2
Watson, D.	1977	Scotland (SW) forestry	2.6	2.1
Watson, D.	1977	Scotland (SW) combined	2.8	1.6
O'Donoghue, B.	2008	Ireland	2.5	1.63
Whitfield, P.	2008	Wales	3.3	1.85

Variation in the success of Hen Harrier nesting attempts by land use in England 2002–2008

The geographical distribution of nesting attempts offers some scope for further exploration of the data concerning nesting success. Both of the lowland nesting attempts were successful, resulting in the production of 4 fledged young from a nest in Cornwall in 2002 and of 4 fledged young from a nest in Wiltshire in 2003. We have already seen that the upland nesting attempts were very unevenly distributed, with a surprisingly large number in the Bowland Fells. Interestingly, the attempts within this area were also very unevenly distributed. Over three quarters (78.31%) of the nesting attempts here were on an area of land owned and managed by a water company, United Utilities. The remainder were widely spread in the area but all were on land managed as driven grouse shoots.

This highly skewed distribution of nesting attempts might be taken to suggest that either there is something rather special (for Hen Harriers, at least) about that part of the Bowland Fells managed by United Utilities or, conversely, that the rest of England is far less suitable for nesting Hen Harriers. Note that the land managed by United Utilities is only some 10,500 ha: there is some 2.2 million ha (land in Less Favoured Areas which closely follows the extent of the uplands (Backshall, Manley & Rebane 2001)), which support exceedingly few nesting Hen Harriers.

Away from the Bowland Fells, birds also breed on land managed as driven grouse shoots as well as on other land. Table 2 provides a summary of the data by each of these five 'land classes'. Away from the lowlands (with very few) and the land managed by United Utilities (with a majority), the numbers of nesting attempts were distributed approximately equally between the three other classes.

It is evident from the table that relatively few of the Hen Harrier nesting attempts on grouse moors were successful away from the Bowland Fells (26% compared to 55-65 % on the other upland land classes). Notwithstanding the overall poor level of success on grouse moors away from the Bowland Fells, the birds which did manage a successful attempt here raised more young per successful attempt than those in any other class. This strongly suggests that grouse moors provide good quality habitat for those pairs which are successful.

Table 3:
A summary of Hen Harrier breeding statistics by land class in England 2002–2008

Land Class	Number of breeding attempts	Mean (SD) number of breeding attempts per year	Number (%) of successful breeding attempts	Number (%) of breeding attempts failed	Number of chicks fledged	Mean (SD) number of chicks fledged per year	Mean number of chicks fledged per successful breeding attempt	Mean number of chicks fledged per breeding attempt
Bowland Fells United Utilities	65	9.28 (2.62)	42 (64.62)	23 (35.38)	128	18.29 (7.38)	3.04	1.96
Bowland Fells grouse moors	18	2.57 (1.13)	10 (55.56)	8 (44.44)	22	2.85 (1.34)	2.20	1.22
Uplands elsewhere: non-grouse moors	23	3.28 (2.21)	13 (56.52)	10 (43.48)	48	6.57 (5.16)	3.69	2.08
Uplands elsewhere: grouse moors	19	2.71 (2.28)	5 (26.32)	14[1] (73.68)	20[2]	2.86 (2.97)	4.00	1.05
Lowland	2	0.28	2 (100)	0 (0)	7	1	3.50	3.50
Totals	**127**	**18.14 (3.36)**	**72 (56.69)**	**55 (43.3)**	**225**	**32.14 (6.99)**	**3.23 (0.79)**	**1.57 (0.51)**

[1] Includes nesting attempts where females were artificially fed following disappearance of male birds (presumed shot) and would have failed under normal circumstances.

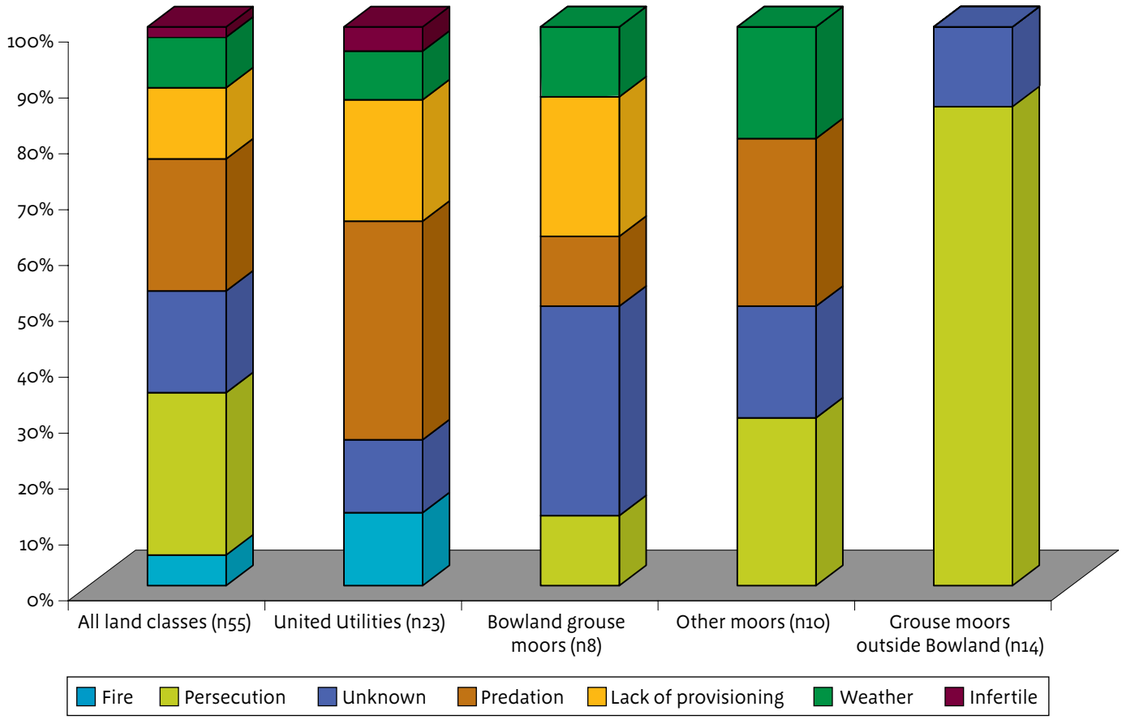
[2] Excluding juveniles fledged following artificial feeding.

The causes of Hen Harrier breeding failure in England 2002–2008

We identified the cause of failure in 45 of the 55 failed attempts. For convenience, we have allocated each failure to one of seven categories of cause (for definitions see Table 1), with the largest three categories; **persecution, predation** and **unknown,** respectively accounting for 29.1%, 23.6% and 18.1% of failures overall (Figure 3).

It is evident that the main causes of failure differ between land classes. Persecution accounted for the failure of nearly all failed attempts on driven grouse moors away from the Bowland Fells. It was a much less important factor on grouse moors in the Bowland Fells and on other moorlands and absent as a cause of failure on land managed by United Utilities. By contrast, failures due to predators were relative high away from grouse moors.

Figure 3:
Proportional reasons for Hen Harrier nest failures in different land classes in England 2002–2008 (n55)



The frequency with which Hen Harriers disappeared whilst breeding

An unusual feature of some of the Hen Harrier breeding attempts was the disappearance of one, or occasionally both, of the adult birds. Considering the amount of persecution recorded overall, the proportion of persecution incidents reported at nests was surprisingly low, possibly reflecting the monitoring presence. However, we noted that the number of birds that disappeared whilst foraging away from these nests was high (Figure 4).

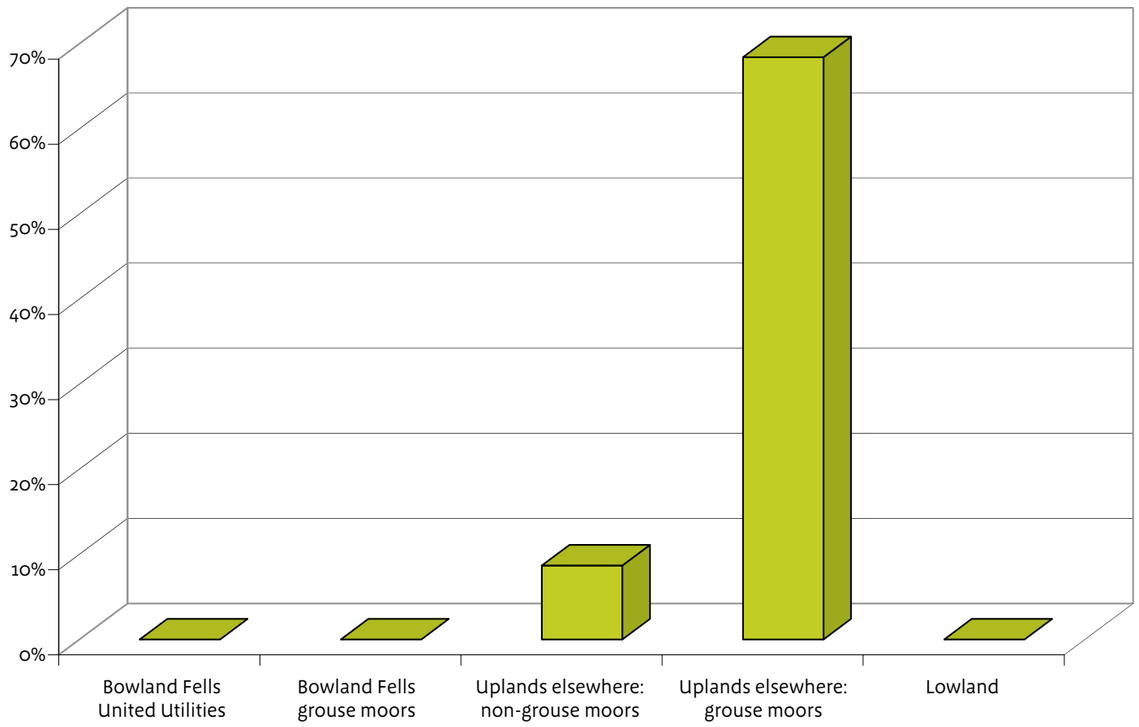
Lack of provisioning by an adult male Hen Harrier has occasionally been recorded as a natural cause of breeding failure, especially where an adult male has more than one nesting female and is infrequently attendant upon one of them. We have thus only recorded the disappearance of an adult as a cause of nest failure when we are sure that the male is not attending to more than one female. Our observations on the number and regularity of food passes made by males which disappeared often allowed us to confirm that they were able to exploit a plentiful food supply and made regular visits to the nest which stopped abruptly with no further sightings. We conclude that in these cases, the disappearing male Hen Harriers were dead.

The only natural cause of death in a healthy adult Hen Harrier is predation by another predator. Golden Eagles have been noted killing Hen Harriers where the species' ranges overlap, but records of adult Hen Harriers being predated away from the nest are virtually non-existent and cannot account for the frequency of disappearances in England, not least because of the virtual absence of Golden Eagles from the country. Three radio-tracked juvenile Hen Harriers were assumed to be predated in Northumberland when the carcasses were found near a Peregrine's eyrie.

In the Bowland Fells, where Peregrines were numerous, none of the 83 breeding attempts recorded since 2002 failed as a result of disappearing adult Hen Harriers. Furthermore, Peregrines were absent from some of the areas where Hen Harriers were recorded disappearing whilst breeding. A pair of Eagle Owls in the Bowland Fells, the only known pair in the vicinity of Hen Harrier nests, predated an adult Hen Harrier in 2007. Neither of these instances resulted in breeding failure.

The only other avian predator capable of killing a Hen Harrier foraging away from the nest is a Goshawk. This species was present in the same area of the Peak District within which Hen Harriers disappeared in 2006, yet the Goshawks were also disappearing with proven evidence that these birds were being persecuted.

Figure 4:
The % of breeding attempts failing as a result of adult Hen Harriers disappearing, by land class



The Hen Harrier in England outside the breeding season

Hen Harriers which breed in continental Europe are largely migratory, moving southwards and westwards to winter in areas where weather and prey availability allows them to hunt efficiently. Many over winter in England, frequenting agricultural land, downland, lowland heathland, raised mires, reed swamps, grazing marshes and saltmarshes, particularly in the south and east of the country.

The preliminary results from our own intensive study of the movements made by 106 English-born Hen Harriers, each of which has been fitted with a radio or a satellite transmitter, indicates that some individuals, like their continental counterparts, travel large distances. We have, for example, found birds hundreds of kilometres from their breeding grounds, on mainland Europe, in Ireland and in Denmark. These individuals have proved to be exceptional, however, and a majority remain much closer to home.

The general pattern is that during the first few months after fledging, virtually all the individuals monitored, including those which go on to make a long-distance movement, remain in the vicinity of their breeding areas. Some move away from their breeding areas in November, but the great majority remain in the northern uplands of England all winter, before a return to their breeding areas in spring.

Population spread

Although virtually all recent Hen Harrier nesting attempts in England have been in the uplands, the species is not, in fact, an obligate upland bird. We have seen that birds have nested successfully in lowland England and we know they were widespread here in the past. They also nest in lowland areas across continental Europe. However, whilst our breeding birds produce insufficient recruits to populate even the moorlands adjacent to the current breeding areas and whilst they continue to be killed both within and away from protected areas, the prospects of a return to lowland haunts looks distant indeed.

Hen Harriers, in common with many other bird species, are also site faithful and tend to return to the area in which they were born or close to it to breed themselves. Such behaviour is unlikely to facilitate rapid colonisation of areas away from the existing heartland. We believe that the re-colonisation of England will be a gradual process, if persecution ceases, with nesting densities first increasing in the existing heartlands, followed by slow expansion into neighbouring moorlands where the habitat is similar. Eventually, some individuals may break the mould and nest in other habitats and/or at some distance from the current area of importance.

Table 4:
Hen Harrier nesting densities in key upland areas

Site	Average number pairs (2002–2008)	Area (ha)[3]	Hen Harrier density (km² per nest)
Bowland	11.86	16,002	13.5
South Pennines	0.71	20,937	293.1
North Pennines	2.43	147,246	606.3

[3] Figures based on size of equivalent Special Protection Areas

The nature of confirmed and suspected persecution incidents involving Hen Harriers in England

During the course of our on the ground monitoring work, we have operated exclusively on public land or on private land with the permission of owners.

We have nevertheless found direct evidence that Hen Harriers have been persecuted. In three incidents nests had been destroyed by illegal burning and we have come across two more where nests of eggs had been removed. In other incidents territorial Hen Harriers disappeared during breeding attempts, 12 of which have been under suspicious circumstances.

In other instances we have observed masked and/or armed individuals in the vicinity of nest and roost sites and recorded activities likely to disturb birds at or near their nests. We have also come across eight instances where other birds of prey have been shot, poisoned or disappeared on sites where Hen Harriers have been observed.

We believe that we underestimate the numbers of these incidents because many others both in the remote uplands and the under-watched lowlands will go undetected.

Our studies of the movements of satellite-tagged birds are continuing, as they are yielding much useful information on the movements, habitat use, and ecology of Hen Harriers. But they are also raising questions about their ultimate fate. We have, for instance, been looking into the disappearance of six Hen Harriers at an autumn roost known to us in the northern uplands. The anecdotal evidence of deliberate persecution given to us in confidence by a local land manager correlates with the information provided by the last known location of a number of birds that were being radio-tracked by project staff.

In the same way, a number of birds, including six birds fitted with satellite transmitters have been tracked from the Bowland Fells into parts of the North Pennines managed principally as driven grouse moors, and have not been recorded subsequently.

Young female fitted with transmitter

Female with chick

The future of the Hen Harrier as a breeding bird in England

Of all birds of prey, the Hen Harrier is the most heavily persecuted in relation to population size in the UK. The significance of persecution for Hen Harrier populations is well-established: populations in Scotland have been proven to be limited by persecution (Redpath & Thirgood 1997); and models suggest that in the absence of persecution, numbers in Scotland would rapidly recover (Etheridge *et al.* 1997). Potts (1998) estimated that in the absence of persecution the English uplands would support 232 territorial females.

Whilst evidence of persecution is irrefutable, it should be noted there is no proof linking incidents to particular individuals, as proven by the lack of successful prosecutions. This in no way diminishes the effect of criminality. We believe that whilst illegal killing continues to be a widespread activity both in this and in neighbouring countries, the prospects for the Hen Harrier's return to its former range and numbers unaided are slight.

Our studies of the critically small English Hen Harrier population will continue and we will redouble our efforts to help the police stamp out illegal persecution. We intend to reveal both the true beauty and the plight of The Hen Harrier to a much wider audience in an attempt to encourage more land managers to place a greater value on Hen Harriers live than dead. We will also be examining the feasibility of re-introducing Hen Harriers to the lowland part of their former range, but public attitudes and likely levels of illegal killing here will be critical in making our decisions.

References

Amar, A. & Redpath, S.M. 2002. Determining the cause of the hen harrier decline on the Orkney Islands: an experimental test of two hypotheses. Anim. Conserv. **5:** 21–28.

Amar, A., Redpath, S.M. & Thirgood, S.J. 2003. Evidence for food limitation in the declining hen harrier population on the Orkney Islands, Scotland. Biol. Conserv. **111:** 377–384.

Backshall, J., Manley, J. and Rebane, M. (eds.). 2001. The Upland Management Handbook. English Nature, Peterborough.

Balfour, E. 1962. The nest and eggs of the hen harrier in Orkney, Bird Notes **30:** 69–73.

Brown, A., Grice, P. and Nurney, D. 2005. Birds in England. Poyser, London.

Etheridge, B., Summers, R.W. & Green, R.E. 1997. The effects of illegal killing and destruction of nests by humans on the population dynamics of the Hen Harrier *Circus cyaneus* in Scotland. J. Appl. Ecol. **34:** 1081–1105.

Holmes, J., Walker, D., Davies, P. & Carter, I. 2000. The Illegal Persecution of Raptors in England. Research Report No. 343. English Nature, Peterborough.

Madders, M. 2000. Habitat selection and foraging success of Hen Harriers *Circus cyaneus* in west Scotland. Bird Study **47:** 32–40.

Newton, I. 1979. Population ecology of raptors. Poyser, London.

O'Donoghue, B. In prep. PhD Thesis. University College Cork.

Picozzi, N. 1978. Dispersion, breeding and prey of the hen harrier *Circus cyaneus* in Glen Dye, Kincardineshire. Ibis **120:** 498–509.

Potts, G.R. 1998. Global dispersion of nesting Hen Harriers *Circus cyaneus*; implications for grouse moors in the UK. Ibis **140:** 76–88.

Redpath, S.M. & Thirgood, S.J. 1997. Birds of Prey and Red Grouse. Stationery Office, London.

.

Redpath, S.M. 1991. The impact of hen harriers on red grouse breeding success. J. Appl. Ecol. **28:** 659–671.

Sim, I.M.W., Dillon, I.A., Eaton, M.A, Etheridge, B.,Lindley, P., Riley, H., Saunders, R., Sharpe, C. & Tickner, M. (2007). Status of the hen harrier *Circus cyaneus* in the UK and the Isle of Man in 2004, and a comparison with the 1988/89 and 1998 surveys. Bird Study 54, 256–267.

Stott, M. 1998. Hen harrier breeding success on English grouse moors. British Birds 91 (3): 107–108.

Watson, D. 1977. The Hen Harrier. Poyser, Berkhamsted.

Whitfield, D. P., Fielding, A. H. and Whitehead, S. 2008. Long-term increase in the fecundity of hen harriers in Wales is explained by reduced human interference and warmer weather. Animal Conservation *(in prep.)*.

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