



## INTRODUCTION

The hen harrier (*Circus cyaneus*) is a species of high conservation concern in Ireland and the UK and protected regionally under The Wildlife Act 1976 & Amendment Act 2000 and in Northern Ireland under The Wildlife (Northern Ireland) Order 1985. They are listed on Annex 1 of the Birds Directive (79/409/EEC) and considered an All-Ireland and UK priority species. The EU Birds Directive provides a legislative framework of measures required to assess and ensure the conservation status of the hen harrier, this includes monitoring, research and the designation of Special Protection Areas (SPAs). In addition, survey and monitoring data collected during national surveys are vitally important as these data are used by the government and other agencies to help inform management and conservation decisions.

The first national hen harrier survey in Ireland was undertaken in 1998-2000 by NPWS, the Irish Raptor Study Group (IRSG) and Birdwatch Ireland (BWI) and estimated the breeding population as 102 – 129 pairs (Norriss et al., 2002). In 2005, the second national survey was conducted and an increase in the breeding population was noted with 132 – 153 pairs recorded (Barton et al., 2006). In the interim there is an on-going monitoring and research program at University College Cork (UCC) into hen harrier ecology examining dispersal (through wing-tagging), productivity, foraging and nesting requirements funded by NPWS and COFORD. In addition, annual monitoring since 2005 is undertaken by NPWS, IRSG, BWI and other raptor workers at a sample of sites and recently the IRSG fitted two hen harriers with satellite tags to monitor dispersal and winter ranging behaviour. During 2010 there is a simultaneous UK hen harrier survey, co-ordinated by RSPB, including Northern Ireland; therefore the All-Ireland population will be monitored and allow comprehensive estimates of the breeding population.

The 2010 National Hen Harrier Survey has two main objectives:

- To obtain a reliable estimate of the size of the hen harrier breeding population in the Republic of Ireland
- To estimate the change in population size and distribution since the last survey in 2005

## PROJECT MANAGEMENT

The 2010 survey is funded by the National Parks & Wildlife Service and co-ordinated by the Irish Raptor Study Group and Golden Eagle Trust Ltd. The project is managed by Marc Ruddock and Brendan Dunlop. All recording forms and maps should be returned by 31<sup>st</sup> August 2010.

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## **THE HEN HARRIER BREEDING SEASON**

The hen harrier is an upland raptor species which primarily nests within heather dominated moorland and pre-thicket (first and second rotation) forests. Hen harriers will forage in a variety of habitats including bog, rough pasture, improved pasture, young forest, but generally prefer moorland/grassland mosaic habitats which contain high densities of prey species, principally meadow pipits and skylarks.

Hen harriers occupy territories throughout March and courtship displays peak between early April and early May; however this can range from late March through to late May. Both males and females perform spectacular undulating “sky-dancing” or “high circling” displays, although “ringtails” female and immature males will usually display less intensively and closer to the ground. Displays often occur within 500m to 1000m from potential nest locations.

Moorland nests are usually built in deep heather (>30cm) but occasionally patches consist of rush, birch or willow scrub, purple moor grass and/or bog myrtle. Pre-thicket forest nests are found on the ground in both first and second rotation crops within the prolific herb and scrub vegetation. Within forests nest can also be found in unplanted areas, typically in forest rides or along steep banks. Both males and females collect nest material, carrying it in the beak or feet and the ground nest is built using heather, rushes, grass and twigs and lined with finer vegetation between April and May. Exceptionally, within Northern Ireland, hen harriers are known to nest in the tops of mature Sitka spruce trees on a broken leader branch. Tree nests are constructed in the same way as a ground nest and nests are prone to collapse.

A clutch of two to seven eggs is laid at 48 hour intervals primarily during late April to mid May with incubation undertaken entirely by the female. Brooding is intermittent until the last or penultimate egg is laid. Incubation lasts between 29 and 31 days. During this time the female is provisioned with food by the male usually 3 to 4 times per day, calling her off the nest and passing the food to her in the air. Observer can visually follow food passes and by following the female as she returns to the nest allowing the nest to be located. However, females will usually feed away from the nest until the young have hatched.

The female continues brooding young periodically for the first 14 to 21 days until young can regulate their own body temperature. Females will usually perch near the nest and wait for males to provide food for the first 7 to 12 days post-hatching. Females will usually return straight to the nest after a food pass, allowing the nest to be located by an observer. After this time females will begin hunting more frequently, and they will usually forage in closer range of the nest than males. Chicks are able to feed themselves at about 21 days and food will usually be dropped onto the nest by the adult females, and very occasionally by adult males. Chicks can often be seen flying

short distances vertically upwards from the nest to receive food once they are fully feathered.

Male chicks, being smaller, will usually fledge at approximately 28 days and females at 32 days, dependent largely on food availability and weather conditions, as poor food supplies and weather can delay fledging. After fledging, chicks can be noisy and highly conspicuous and rapidly learn to receive food during food passes and can often be seen chasing one another. They are dependent on food from the adults for the first two weeks although can move away from the nest site rapidly, especially if disturbed and the time spent around the nest is highly variable ranging from less than a week up to five weeks.

***Summary of hen harrier breeding season (Hardey et al., 2009)***

<b>Breeding activity (No. of days)</b>	<b>Range</b>	<b>Peak period</b>
Site occupation & display	Late February to late May	Early April to early May
Nest building	April to late May	-
Egg laying (5-12 days)	Mid April to late June	Late April to mid May
Incubation (29-31 days)	Mid April to late July	Late April to mid June
Hatching	Mid May to late July	Late May to mid June
Young in nest (28-39 days)	Mid May to late August	Late May to mid July
Fledging	Mid June to late August	Late June to mid July
Juvenile dispersal	August to September	-

## **FIELDWORK INSTRUCTIONS**

### **Field season**

Fieldwork should be undertaken between late March/early April and the end of July in all regions.

### **Number of visits**

A minimum of two visits are required between late March and late May. A third visit is desirable to areas during late May to late June to check for evidence of breeding when no signs were recorded or confirmed during the first two visits. A fourth visit is required between late June and the end of July.

### **Timing of visits**

Daylight hours from 0700 to 2100. Harriers are rarely active at dawn or in the early morning, but peaks in activity will occur during calm, clear, sunny weather particularly during the early season during displays or immediately after heavy rain showers. Harriers are unlikely to be active during prolonged rain. Visits should be 2.5 to 3 hours in duration.

### **Survey areas**

It is required to assess all suitable hen harrier breeding habitat within your allocated 10km square(s). It may not be possible to analyse the results from incompletely covered squares, so please contact survey co-ordinators to obtain additional monitoring support where required. Hen harriers will forage over most habitat types including moorland, young forest, bog, rough grassland and improved grassland. Suitable nesting areas to survey include the following:

- 1) Moorland. Heather dominated moorland (>50% heather cover) is a main breeding habitat for hen harriers, although they will also utilise grass-dominated or degraded moors with poor quality heather. Deep, old, well-drained heather with good all-round visibility is preferred; therefore slopes and river valleys are often selected. Please be aware that harriers may nest in clearings, forest rides or in deep heather at the edge of forest plantations particularly where livestock has been excluded by fencing associated with afforestation.
- 2) Upland young forest. Young conifer forests are also a major breeding habitat for harriers providing secure nest sites and temporarily abundant prey sources resulting in high numbers of hen harriers. Both first rotation and second rotation pre-thicket stage crops are utilised for nesting and are characterised by prolific shrub layers in which harriers will nest.
- 3) Mature coniferous forest. Hen harriers in Northern Ireland are recorded to nest in the top of closed canopy Sitka spruce plantations. This unusual habit should not be discounted during surveys where harriers are seen over mature coniferous forests.

### ***Areas to exclude from survey:***

The following areas are unsuitable for nesting hen harriers and can be excluded on maps and from survey effort:

- Ground above 600m

- Built up areas and within 100m of farms or occupied dwellings
- Improved pasture and arable farmland
- The interior of unbroken closed-canopy forest blocks
- Sheep-walk, extensive areas of bracken and degraded (overgrazed) upland areas without any heather cover
- The vicinity of sea-cliffs, inland crags, rocky outcrops, boulder fields and scree

### **Disturbance**

Hen harriers are protected on Schedule II of the Wildlife Act (1976) and Amendment Act (2000). There is **no** requirement to visit nests as part of this survey, rather the aim is to identify locations and count breeding pairs of hen harriers within each 10km square. Hen harriers are variable in their response to human disturbance and it is recommended that vantage points are maintained at least 500 – 700m from known nest sites. Harriers are particularly vulnerable to disturbance during the egg-laying period (late April to mid May). Hen harriers can be persecuted in some areas and as such discretion with nest location information is required.

### **Field work schedule**

#### **Confirming occupancy**

***First visits (essential)*** must take place between late March and mid April and cover all areas of suitable habitat:

- Mark on your map (using a highlighter or hatching) all areas that are unsuitable for breeding (see above). These can be excluded from any further fieldwork.
- Select vantage points to watch areas of suitable habitat. Please mark vantage points on the map. A vantage point is a location with good views over suitable nest habitat, avoid sitting on prominent hilltops and rather use sites mid-way up the slope to observe opposite hillsides.
- Please mark the area that is visible from your vantage point on your map.
- On open moorland views are often expansive, but first you should visit areas which are well drained and contain the deepest, most dense areas of heather particularly along slopes, hillsides, valley sides, gullies and hummocks are most likely to contain breeding harriers.
- Some areas may have restricted views e.g. young forest and it may be necessary to walk closer and observe habitat from a concealed location. Similar to moorland young forest that occurs on slopes are preferred for nesting.
- Scan hillsides, valleys and skylines regularly with binoculars watching for movement of birds and breeding activity.
- When birds are observed, keep it in view for as long as possible, noting sex, age, behaviour, vocalisations and habitat in which the bird is seen.
- If birds are observed close to you or flying towards you, adopt a concealed position as a food pass may be imminent. Move to a more distant vantage

point if birds are noticeably disturbed and/or begin alarming (chattering) in response to your presence.

- It is recommended that 2.5 to 3 hours should be spent at each vantage point.
- Continue to watch for the recommended duration; even if breeding behaviour is recorded from one pair as there may be more than one pair in the area and note that harriers can be polygynous i.e. one male can provision more than one female. Try to discriminate different individuals (e.g. wing-tags, missing feathers, distinctive plumage), but avoid double-counting.

**Second visits (essential)** must take place between mid April and late May and at least 10 days after the first visit. This is to confirm territory occupancy and locate incubating females. Confirming occupancy is important during this visit since pairs may fail to lay eggs or fail shortly after laying. Please cover all suitable habitats as during the first visit. Particularly watch for females returning to nest locations after food passes. Vantage point observations can be shortened once breeding has been confirmed and if no polygynous pairs are suspected in close proximity.

**Third visits (desirable)** should take place between late May and late June to check for evidence of breeding where breeding has not already been confirmed during the first two visits. Particularly watch for females returning to nest locations after food passes, with food for young. Vantage point observations may be shortened once breeding is confirmed.

**Fourth visits (essential)** should take place between late June and the end of July in order to confirm territorial status (e.g. continued food provisioning to a nest), if breeding has not already confirmed, and to look for fledged young. Fourth visits should ideally be completed by mid July as young can disperse rapidly.

### **Breeding status of territories**

Fieldworkers should be looking to classify each identified territory into one of the following categories:

#### **Confirmed**

- food pass between two adults
- adult carrying prey
- direct evidence of a nest (e.g. eggshells, nest with eggs or young found). Please don't visit nests, unless you have the necessary licence.
- recently fledged young

#### **Probable**

- agitated behaviour or alarm calling by the adults
- courtship & display behaviour is noted on two visits separated by at least a week
- birds observed visiting a probable nest site on two visits separated by at least a week
- a bird or pair apparently holding territory (i.e. territorial defence)
- nest building or carrying nest material

### ***Possible***

- a female or pair are observed in suitable breeding habitat between mid-May and the end of June

The minimum number of breeding pairs of hen harriers is the number of confirmed pairs and the maximum is the number of confirmed\* + probable\* + possible pairs.

\* Both confirmed and probable will be combined for comparison to 2005 survey data

### **Survey map & recording forms**

- You have been provided with a map and an aerial photograph of your allocated 10km square(s). Please use a different map for each visit to an area to record surveyed areas and the locations of hen harrier sightings and/or nests. Familiarise yourself with the map, suitable hen harrier habitat, main roads and potential vantage point locations and areas that are likely to be excluded. Exclude unsuitable hen harrier habitat on the map during your first field visit and during vantage point watches. The aerial photograph may be used to assist in excluding unsuitable habitat prior to your first visit, but please be aware these photos were taken during 2005 and some habitat changes may have occurred.
- During vantage point watches please mark the area visible during your observations, vantage point grid references will be recorded in the main recording form. If a nest is located please mark with an **X** on the map.
- Complete the survey form during each vantage point watch and finalise at the end of your survey day. It is important to submit nil return sheets if you have no sightings, but still record all survey details. Hard copies of maps (with hatched areas marked) and recording forms should be returned to the survey co-ordinators by the 31<sup>st</sup> August 2010.

During each vantage point please record the following information:

- the name(s) of observer surveying the 10km square
- the name of the organisation or study group to which the observer(s) belong
- the email address of the surveyor
- the phone number of the surveyor
- the 10km grid reference of the square (1 letter & 2 numbers)
- the county in which the 10km square is located
- the number of pages and current page number e.g. page 1 of 2, 2 of 2 etc
- the nearest place name to the surveyed area (taken from the survey map)
- the date, please use the following format e.g. 01 06 = 1<sup>st</sup> June
- the vantage point grid reference (1 letter & 6 numbers). Specify the location from which your observation was made
- the start time of your vantage point watch or observation

- the end time of your vantage point watch or observation
- the sighting number. Number each observation of a hen harrier or pair sequentially as it occurs during each vantage point watch.
- the grid reference of the sighting (1 letter & 6 numbers). Specify the grid reference of mid-point of activity where it occurs over a large distance or in multiple locations by the same pair/individual. Please specify clearly the grid reference of the nest (if located) and mark this on your map with an **X**. This data will all be kept confidentially.
- The hen harrier numbers. Identify the number of individuals (1,2,3 etc) seen during each sighting, noting their age and sex.
- the behaviour code (see below), please record all behaviours noted during sighting
- the habitat code, which is the dominant habitat within 100m of the sighting or nest (see below)
- the comments section is for you to add any additional relevant information. In particular, this should include any suspected persecution of hen harriers or disturbance recorded during your fieldwork, details of wing tagged hen harriers seen or any other raptors observed during your vantage point watches. Please record grid references of any other raptors observed.

**Behaviour codes:**

Please record the following behaviours during your observations:

**D** – Display. Including “skydancing” or aerial display involving rapid stooping and climbing and occasionally mutual high circling may be observed

**FP** – Food pass. Male passing food to female or adult to juvenile

**H** – Hunting. Usually low level “quartering” flights <5m above ground level

**F** – Flying. Bird flying or commuting where no other behaviours are recorded

**A** – Alarm. Adults calling or appearing agitated, usually occurs close to the nest

**WP** – With prey. Bird carrying prey

**S** – Soaring. Bird circling very high on thermals

**C** – Circling. Bird circling below tree-top height

**P** – Perched. Bird perched on a tree or fence post

**G** – on Ground. Bird perched on the ground

**M** – Mobbing. Territorial behaviour and chasing or attacking other harriers or other bird species. May occasionally be observed to attack mammal predators

**O** – Other: please specify if any other behaviours not indicated above are recorded

### **Habitat classifications:**

**1F** – First rotation (or new) forest. First-rotation forest plantations before canopy closure. Characterised by prolific herb layer with varying shrub layer development. Trees generally >1m tall with large open spaces between lines of planting.

**2F** – Second rotation forest. Second-rotation forest plantations before canopy closure. Characterised by varying shrub layer development, and brash and tree root-plates from the previous crop and large open spaces between lines of planting. Newly established second-rotation trees are not always obvious.

**T** – Thicket (pole or mature) stage forest. Closed-canopy forest plantations. Usually >10 years old. Characterised by absence of shrub layer, except in rides between stands of trees and in small patches of unplanted ground or failed crop

**CF** – Clearfell. Harvested plantation not yet restocked with trees. Characterised by limited development of herb and shrub layer, and brash and tree root-plates evident from the previous crop.

**H** – Heather moorland/bog. Unenclosed heather-dominated moorland characterised by species such as heather, bilberry and purple-moor grass plus blanket bog characterised by *Calluna* and bell heather, bog cotton, deer grass and moss. Typically grazed by red deer and low densities of sheep.

**G** – Grass moorland. Unenclosed grass-dominated moorland usually grazed by sheep. Characterised by species such as wavy hair grass, mat grass and heath rush. Stands of *Juncus spp.* and bracken occasionally occur.

**RG** – Rough grazing. Unenclosed or enclosed, neglected pastures occasionally stocked with sheep or cattle that have not recently been improved, re-seeded or fertilised. Usually contains long grass, waterlogged areas and stands of rushes (*Juncus spp*)

**IG** – Improved grazing. Enclosed pastures that have been drained, fertilised or re-seeded characterised by lush green grass vegetation and containing higher densities of sheep or cattle. Also includes hay meadows.

**S** – Scrub. Areas outwith plantation forests consisting of willow, bramble, furze etc which have not been tended by humans. Includes bushy vegetation such as Willow (*Salix spp*), Gorse (*Ulex spp*), Bramble (*Rubus spp*), Alder (*Alnus spp*), Birch (*Betula spp*) and Bracken (*Pteridium spp*).

**O** – Other. Please specify habitat where it does not fall into one of the categories outlined above.

### **Notes**

Some 10km squares may not contain nesting hen harriers, it is important that the suitable habitat is still covered and that negative results are submitted. Please enter visit dates and in the number of hen harriers box please write NIL RETURN and provide comments on the suitability of the habitat for nesting hen harriers. Casual sightings of hen harriers in other squares are also welcomed, please submit a recording form for the relevant 10km square and write CASUAL SIGHTING in the comments section.

## Safety & Access

It is recommended that fieldworkers:

- Always carry a small first-aid kit, map, compass and whistle (attached to binoculars)
- Wear suitable clothing and footwear for fieldwork and be prepared for adverse weather conditions. This includes carrying a survival bag, additional warm clothing and waterproofs since weather can change rapidly (notably fog) in the uplands particularly during April and May.
- Always make sure someone else knows which square you are working and your expected return time, particularly if you are working alone. Working in teams of two (or more) can increase the enjoyment of fieldwork, efficiency and safety.
- Always be careful driving and allow plenty of time to complete your journey at a safe speed.
- Always be aware of areas of sensitivity in relation to private landownership, game-rearing, forestry or farming practices. Maintaining a good relation with landowners is important and they may often have valuable information on the locations of hen harriers under their stewardship so can be a good source of knowledge.

## REFERENCES

- Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2009). *Raptors: A fieldguide for surveys and monitoring*. Stationery Office Ltd., Edinburgh.
- Norriss, D.W., Marsh, J., McMahon D. & Oliver, G.A. 2002. A national survey of breeding Hen Harriers *Circus cyaneus* in Ireland 1998-2000. *Irish Birds* 7:1-10.
- Barton, C., Pollack, C., Norriss, D.W., Nagle, T., Oliver, G.A. & Newton, S. (2006). The second national survey of breeding hen harriers *Circus cyaneus* in Ireland 2005. *Irish Birds* 8: 1-20.



**Further comments:** include details of other raptor species seen, wing-tagged hen harriers (please include colours and codes for both wings) or information on proven or suspected persecution of hen harriers, or further information on your conclusions for territory failure or any other relevant information.