



***Optimum scenarios for Hen Harrier  
conservation in Ireland***

**HENHARRIER**

FINAL REPORT

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By

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## Executive Summary

Though widely distributed across the island of Ireland, Hen Harriers (*Circus cyaneus*) are relatively rare with a current estimated breeding population of just 128-172 pairs in the Republic of Ireland, and 63 territorial pairs in Northern Ireland. Hen Harriers have declined in range and population over the past 200 years, and the breeding population is now concentrated in the south and west of Ireland, particularly in the counties of Cork, Limerick and Kerry. Despite some, more recent, population increases, this species remains vulnerable and is listed as a species of conservation concern on Annex 1 of the European Union Birds Directive. This Directive requires that Ireland takes measures to ensure the persistence of Hen Harriers through designation of Special Protection Areas (SPAs), within which appropriate steps must be taken to provide and maintain suitable habitat for Hen Harriers. There are six designated Hen Harrier SPAs in Ireland at present, all of which all include suitable Hen Harrier breeding habitat such as heaths and bogs, rough grassland and conifer plantations. These SPAs must be managed in order to ensure the provision of suitable habitat in the face of future developments and land use change. The aim of the present study was to increase our knowledge of Hen Harrier breeding biology and habitat requirements to inform conservation management of this species in Ireland. During five breeding seasons from 2007 to 2011 detailed data was collected on Hen Harrier ecology in four study areas in Ireland using a range of appropriate methodologies including direct observations, nest cameras, GPS tags, pellet analysis and wing-tagging of juveniles.

In order to meet our obligations to Hen Harriers under the EU Birds Directive it is essential that we are able to monitor land use change over time and to predict the impact of proposed land use change on Hen Harriers. To this end we created a customised GIS habitat database for Hen Harrier SPAs in Ireland to facilitate analysis of the degree to which land use change may affect Hen Harrier breeding success. This database will require updating to take account of future changes in the landscape within SPAs, but provides a framework and reference point against which such updating, and future monitoring can take place.

Habitat change is the biggest single factor implicated in biodiversity loss today and is of critical importance to Hen Harriers, which are traditionally birds of open heathers and moors and depend on open habitat for foraging. The GIS habitat database that was created during this project was used to investigate Hen Harrier nesting habitat preferences and the influence of habitat composition at the landscape scale on nest-site selection. We also investigated whether changes in the numbers of breeding Hen Harriers between the 2000 and 2005 National Surveys in Ireland were in any way related to nesting habitat, and whether there was evidence of Hen Harrier nesting distribution being restricted by cover of unsuitable habitat for nesting and foraging. The main nesting habitats selected by Hen Harriers were pre-thicket stage forests, particularly of second rotation plantations of exotic conifers. Improved grassland was strongly avoided as a nesting habitat and landscapes with a high percentage cover of grassland were also avoided. There was no evidence that the area of post-closure plantations impacted negatively on Hen Harrier nest distribution. There was a positive association between changes in numbers of Hen Harrier nests between 2000 and 2005 and changes in the area of pre-thicket second rotation plantations over the same period. These findings suggest that the overall effect of plantation forests on breeding Hen Harriers in Ireland is positive, and that further agricultural intensification of grassland in areas where Hen Harriers breed is likely to have a negative impact. With an increasing proportion of afforestation taking place in grassland habitats, some of which are of low value to Hen Harriers, the influence of afforestation is likely to be increasingly a positive one.

Studies of Hen Harrier habitat use are commonly based on data collected by direct observation. This is an inefficient method for studying Hen Harriers, due to the low rate at which observations are made on this rare and wide-ranging species. Remote tracking would allow detailed information on habitat use by Hen Harriers to be collected much more efficiently but, until recently, such work has been constrained by the relatively small size of this raptor (which restricts the weight of the device that it can carry), as well as the cost of available technologies. Recent advances in remote tracking have resulted in the development of systems that are better suited to studying Hen Harriers. Following a thorough review of available technologies and published literature that considered the tag size, battery lifetime, positional accuracy, data retrieval and cost of available technologies, GPS (Global Positioning System) tags were selected for collection of foraging data from breeding adult Hen Harriers. In collaboration with Italian company TechnoSmArt, tags combining GPS units with a custom-designed attachment

mechanism (allowing the tag to fall off after data had been collected) and VHF transmitters (to enable tag retrieval) were developed. Using these tags, accurate data on habitat use by foraging Hen Harriers were collected remotely for the first time, at a much higher resolution than ever before possible with this bird species, from three breeding adults in the Ballyhouras. Analysis of the GPS data shows that these birds range over greater distances than was found by researchers using VHF telemetry to study ranging behaviour of Hen Harriers in Scotland. During four days of tracking, the maximum distance from the nest travelled by a GPS-tracked female was 7.5 km and by a male was 11.4 km. Both forest and non-forest habitats were used in proportion to their availability but, within these categories, Hen Harriers showed preferences for second rotation pre-thicket forest, particularly forests between 3 and 9 years of age, and for grasslands managed at low intensity. These preferences broadly confirm the findings of previous studies on Hen Harrier foraging, but provide much more detailed information on which to base management recommendations.

The protection of Hen Harriers in Ireland through the designation of SPAs also relies on accurate information on their breeding biology and breeding in Ireland. Such information allows the development of effective conservation strategies including, but not exclusively to, those centred on habitat management. Between 2007 and 2011 a detailed study of the breeding biology of Hen Harriers in four study areas (Slieve Aughty Mountains, West Clare, Kerry and Ballyhoura Mountains) in Ireland was undertaken. The study sites in the Slieve Aughty Mountains and in Kerry are designated SPAs, while the other two study sites hold relatively dense concentrations of breeding Hen Harriers. The aim of this study was to provide an understanding of the breeding ecology of Hen Harriers in order to inform conservation and land use planning. Data were collected during the breeding season between April and August each year. Territories were located by vantage point watches, nest locations subsequently identified and nest visits undertaken to gather information on breeding biology. The number of pairs of breeding Hen Harriers detected in each of three study areas, and included in our analyses, declined over the five years of the study. Nest success and fledged brood sizes were similar across study sites and did not show consistent trends during this period, except in West Clare where success rate of nests decreased. Although the number of young fledged by successful Hen Harrier nests in this study was low, and the breeding productivity over the course of the study was low, this is theoretically sufficient to allow Hen Harrier populations in these areas to remain stable, provided that juvenile survival and recruitment to the breeding population are sufficiently high. Detailed studies of juvenile Hen Harrier survival to breeding age in Ireland are therefore required to explore this further.

Hen Harriers in Ireland currently appear to have responded favourably to recent afforestation of their upland breeding areas and, over the past two centuries and more, have proven their ability to adapt successfully to anthropogenic habitat changes in the landscapes they inhabit. However, some changes to these landscapes, including upland afforestation, are a relatively recent phenomenon and this species has co-existed with forested areas for only a few decades, and it is possible that its use of such landscapes may not be optimal. We therefore examined the relationship between breeding success and breeding habitat in Ireland to provide conservation managers with up-to-date information on which to base decisions about management and land use change in areas with Hen Harriers. We tested whether nest success and brood size were related to habitat type, both at the nest site and in the surrounding landscape. Neither measure of breeding productivity was related to total forest cover or to percentage cover of closed canopy forest in the landscape. However, in a subset of areas, second rotation pre-thicket forest (young forests planted on land from which a first rotation has already been harvested) was associated with low levels of breeding success. This may be due to local factors related to predation, disturbance or prey availability. The fact that second rotation pre-thicket forest is a preferred habitat for nesting in Ireland suggests that Hen Harriers may be making suboptimal selections from the habitats available to them in the landscape. However, further long-term investigation is required to improve our understanding of this relationship, enabling more effective conservation of Hen Harriers in forested landscapes.

Hen Harriers are breeding successfully in Ireland at present and populations appear to be functioning sufficiently well at our study sites to allow them to persist in the forested landscapes that have replaced much of their traditional breeding habitat. In the future careful targeted management is required to ensure their long-term survival and reproduction. This project provides detailed scientific data on Hen Harriers that is essential if Ireland is to meet its obligations to protect Hen Harriers and their habitats under the EU Birds Directive, which can only be achieved with the support of good policies and management practices. A number of recommendations are made,

addressing different aspects of policy and practice and priorities for future research. There is scope to build on this significant body of work in the future to provide a more thorough understanding of Hen Harrier population ecology in Ireland, particularly in light of continued land use and climate change. The challenges that we face in this regard include investigations of the role of habitat quality in breeding success, the interaction between breeding and roosting populations, the fate of fledged young in Ireland and the source of our breeding population and factors of importance to Hen Harrier populations in the changing landscapes of the future.



*Young Hen Harrier*

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