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## Publicatie



# Lange termijn populatiedynamiek van de Blauwe Kiekendief op de Wadden: inzichten uit een geïntegreerd populatiemodel

Long-term population dynamics of the Hen Harrier *Circus cyaneus* on the Dutch Wadden Sea Islands: insights from an integrated population model.

In this paper we present an Integrated Population Model for breeding Hen Harriers *Circus cyaneus* on the Dutch Wadden Sea islands in the period 1970-2012. The population was established in the 1940s and reached a maximum of over 100 breeding pairs in the first half of the 1990s (Fig. 1). Subsequently numbers declined, to 70 pairs around 2000 and only 11 in 2012. The island of Texel is now the last stronghold. Reproduction appears not to have decreased since the 1980s, but fluctuated without a clear trend. The number of fledged young per female was on average  $1.42 \pm \text{SE } 0.07$  over the entire study period, and  $1.43 \pm 0.10$  after 2004. However, annual survival of juvenile birds has declined strongly, from 65% before 1990 to 35% thereafter. Although less strongly, annual survival of adults has decreased as well: from 82% before 1990 to 74%. An apparent increase in the survival of immature birds is based on very small sample sizes compared to both other age classes. Recoveries of Hen Harriers ringed during the breeding season on the Wadden Sea islands show that the proportion of birds wintering in France, the United Kingdom and Germany has decreased over the

past decades, probably because birds have reduced their migration distance (Fig. 4). We were not able to estimate temporal variation in emigration and immigration. More than half of the young that survived their first year were estimated to settle outside the Dutch Wadden Sea islands (59%, 95% confidence interval 49-71%). The number of immigrants was estimated at on average five birds per year (1-10). Annual changes in the number of territorial females correlated strongly with annual survival of adult birds ( $r=0.73$ ) and, to a lesser extent, survival of juvenile birds ( $r=0.51$ ), but not with either reproduction or survival of immature birds (Fig. 5). Given the observed changes in vital rates, we hypothesize that food shortage outside the nesting period is the main cause of the decline. In farmland, vole and passerine populations have decreased. In coastal dunes, rabbit populations have diminished and introduction of grazing by semi-wild herbivores has negatively affected local vole populations.

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**Auteurs:**

van Turnhout C., Hallmann C., de Boer P., Dijkse L., Klaassen O., Foppen R. & van der Jeugd H.

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