The Eurasian Curlew – the most pressing bird conservation priority in the UK?

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Abstract Based on its adverse global conservation status, and the global importance but rapid decline of the UK's breeding population, the Eurasian Curlew *Numenius arquata* should now be considered the UK's highest conservation priority bird species. A co-ordinated UK recovery programme is urgently required to help ensure that this species does not suffer the same fate as that of some other *Numenius* species.

Phil McLean/FLPA

386. Eurasian Curlew *Numenius arquata*, Lammermuir Hills, Borders, June 2012. Most of the UK's breeding Curlews are in Scotland and England but these populations have declined by 55% and 32% respectively between 1995 and 2013 (see text for further detail).

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Introduction

If we consider the UK's bird populations from a global perspective, then, apart from the endemic Scottish Crossbill *Loxia scotica*, it is breeding seabirds and wintering waterbirds for which the UK shoulders the greatest global responsibility. For example, the UK supports over 50% of the world breeding populations of Manx Shearwater *Puffinus puffinus*, Northern Gannet *Morus bassanus*, and Great Skua *Stercorarius skua* (table 1). Our coasts and wetlands are renowned for supporting internationally important numbers of many species of waders and wildfowl during the winter, when the oceanic climate offers relatively mild conditions (Hayhow *et al.* 2014). However, if we consider species for which the UK supports globally important breeding populations (i.e. ≥10%) alongside the global conservation status of those species and their population trends within the UK, then a rather different picture emerges (table 1).

The UK supports more than 10% of the global breeding population of 18 bird species across a diverse range of taxa (table 1). Within this group, the Eurasian Curlew *Numenius arquata* (hereafter 'Curlew') stands out for all the wrong reasons: it is classified as globally Near Threatened (NT) on the IUCN Red List of Threatened Species (www.iucnredlist.org), and the UK population (an estimated 19–27% of the global breeding population) is declining rapidly. Indeed, the rate of the UK population's decline is among the highest recorded across the range (Brown 2015). On the basis of national population sizes and known trends, it is likely that UK declines are having a greater adverse impact on the global population than those of any other country.

International status

The Curlew was listed as globally Near Threatened in 2008, in response to the decline of several key national breeding populations, including that of the UK, and the resulting assessment that the species was undergoing a moderately rapid global population decline (www.birdlife.org). The nominate subspecies *N. a. arquata*, which accounts for most of the global population, breeds across northern Europe to the Ural Mountains; to the east, *N. a. arquata* intergrades into *N. a. orientalis*, while a third subspecies, the poorly studied *N. a. suschkini*, is confined to the steppes south of the Urals and in Kazakhstan (Engelmoer & Roselaar 1998; Delany *et al.* 2009; Wetlands International 2015).

Breeding and wintering populations in Britain and Ireland

The latest UK population estimate, of 68,000 breeding pairs in 2009 (Musgrove *et al.* 2013), means that only Russia and Finland have larger breeding populations (Brown 2015). However, this globally important breeding population has been declining since the 1970s (Baillie *et al.* 2014). Most of the UK's breeding Curlews are in Scotland and England (O'Brien 2004), but the Breeding Bird Survey (BBS) indicates declines of 55% and 32% respectively between 1995 and 2013 (Harris *et al.* 2015). BBS trends cannot be calculated for Wales or Northern Ireland, since Curlews now occur in too few squares. However, dedicated surveys reported a Welsh breeding population decline of 81% between 1993 and 2006 (Johnstone *et al.* 2007), and the population is now surely well below the estimate of c. 1,100 pairs in 2006. Dedicated surveys in Northern Ireland found 526 pairs in 2013, an 82% decline from 1985–87 (Colhoun *et al.* 2015). These sharp declines are accompanied by range contraction: in the 40 years up to 2007–11, the breeding range in mainland Great Britain declined by 17%, whilst there has been a catastrophic decline of 78% in the breeding range across Ireland as a whole (Balmer *et al.* 2013). The situation in the Republic of Ireland is also deeply troubling; recent surveys suggest that there are not more than 150 breeding pairs (A. Donaghy pers. comm.). Given a previous estimate of 12,000 pairs across the whole of Ireland (Reed 1985), current estimates represent a truly staggering rate of loss. Further range contractions and regional- or even country-level extinctions are now a real possibility for parts of Britain and Ireland over the next decade or so. This long-term decline in breeding numbers exceeds the threshold for Red-listing under Birds of Conservation Concern (BoCC) criteria; it is anticipated that the Curlew will join the Red list when the next BoCC review is published in *British*

Table 1. Global status, population and trend estimates of bird species for which the UK is estimated to support at least 10% of their global breeding population, ordered by magnitude of recent UK decline. Key to global status: LC = Least Concern; NT = Near Threatened (www.iucnredlist.org). UK Trend: n/a = no trend available. For consistency, global population estimates were based on data from www.birdlife.org where available, otherwise Wetlands International (2013) or BirdLife International (2004) as indicated.

Species	Global status	Global breeding population (pairs)[a]	UK breeding population (pairs)	UK population as % of global breeding population	UK breeding population trend
Lesser Black-backed Gull *Larus fuscus*	LC	312,000–689,000[b]	110,000	16–35	-48[f]
Eurasian Curlew *Numenius arquata*	**NT**	**255,000–355,000[c]**	**68,000**	**19–27**	**-43[g]**
Shag *Phalacrocorax aristotelis*	LC	78,000–80,000[b]	27,000	34–35	-41[f]
Herring Gull *Larus argentatus*	LC	906,000–1,555,000[b]	140,000	9–15	-30[f]
Meadow Pipit *Anthus pratensis*	LC	7.4–21.3 million[c]	1.8–2.3 million	8–31	-17[g]
Moorhen *Gallinula chloropus*	LC	967,000–2,067,000[c]	270,000	13–28	-14[g]
Oystercatcher *Haematopus ostralegus*	LC	367,000–400,000[c]	110,000	28–30	-13[g]
Common Guillemot *Uria aalge*	LC	6,000,000[c]	950,000	16	+9[f]
Stock Dove *Columba oenas*	LC	567,000–1,000,000[c]	260,000	26–46	+12[g]
Razorbill *Alca torda*	LC	457,000–1,027,000[d]	130,000	13–28	+13[f]
Great Skua *Stercorarius skua*	LC	16,000[c]	9,600	60	+19[f]
Dunnock *Prunella modularis*	LC	12–26 million[c]	2,500,000	10–21	+21[g]
Northern Gannet *Morus bassanus*	LC	317,000–400,000[c]	220,000	55–69	+39[h]
Wood Pigeon *Columba palumbus*	LC	10–23.3 million[c]	5.1–5.4 million	22–54	+42[g]
Greylag Goose *Anser anser*	LC	333,000–367,000[c]	46,000	13–14	+203[g]
Scottish Crossbill *Loxia scotica*	LC	6,800[c]	6,800	100	n/a
Manx Shearwater *Puffinus puffinus*	LC	350,000–390,000[c]	280,000–320,000	72–91	n/a
Rock Pipit *Anthus petrosus*	LC	110,000–290,000[c]	36,000	12–33	stable[c]

Sources

[a] Where population estimates provided as individuals, breeding pairs were calculated as individuals/3, following BirdLife International (2004)
[b] Summing biogeographic population estimates in Wetlands International (2015)
[c] BirdLife International (2015)
[d] BirdLife International (2004)
[e] Musgrove *et al.* (2013)
[f] For the period 2000–13 (JNCC 2014)
[g] For the period 1995–2012 (Harris *et al.* 2014)
[h] For the period 1984–85 to 2004–05 (JNCC 2014)

Birds in December 2015. For one of the most evocative species of our uplands and coasts, and a bird whose haunting song introduced BBC Radio's first natural history programme, *The Naturalist*, in 1946, this is a shocking prospect, and the decline of the Curlew should perhaps concern us more than that of any other breeding bird in the UK. The parlous state of the Curlew is probably also an indicator of the decline in both the extent and the quality of the UK's semi-natural habitats that support breeding Curlews, including upland grassland and moorland and lowland wet grasslands.

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387. An important site for Curlews is the farmland around Duneaton Water in South Lanarkshire. The valley is within the RSPB's Clyde Valley Wader Initiative, which is working with farmers to conserve breeding waders and their habitats.

Most breeding populations of the Curlew are migratory, with some European breeding birds overwintering as far south as West Africa, where important wintering populations congregate at sites in Guinea-Bissau and Mauritania (Delany *et al.* 2009). However, the bulk of the *N. a. arquata* population winters in northwest Europe, particularly around the coasts of Britain, Ireland, France and the Wadden Sea (Delany *et al.* 2009). The UK is thus of great importance for the species outside the breeding season too. With an estimated wintering population of 150,000 individuals for the period 2004/05–2008/09 (Musgrove *et al.* 2013), considered against a global population estimate of 765,000–1,065,000 individuals (BirdLife International 2015), the UK accounts for 14–20% of the global wintering population. A large proportion of wintering birds congregate at coastal sites, which are generally well protected by the designated site network, at least in Britain, where an ongoing review reports that 32.8% of the British and 6% of the all-Ireland wintering populations are within the Special Protection Area (SPA) network (Stroud *et al.* in prep.). In Britain, this proportion of coverage is considered adequate for the species' needs during the non-breeding season, and overwinter survival is estimated to be high in the absence of direct threats such as hunting, which was banned in mainland Britain in 1982 (Taylor & Dodd 2013) and Northern Ireland in 2011. While the wintering population has declined recently (-17% between 2000/01 and 2011/12), the longer-term trend is stable (+3% for the period 1986/87–2011/12)

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388. New woodland plantings, as shown here in South Lanarkshire, sited in existing Curlew breeding areas replace breeding habitat and fragment what remains.

(Austin *et al.* 2014). Furthermore, wintering trends may be complicated by climate-driven range shifts: the wintering distribution of many shorebirds across the UK and northwest Europe, including the Curlew, has shifted to the east, north and northeast in response to increases in mean temperatures (Rehfisch *et al.* 2004; Maclean *et al.* 2008). Yet the fortunes of the breeding population, showing a clear and rapid population decline, are a dramatically different matter.

Why is the Curlew declining?

Curlews need to produce 0.48–0.62 fledglings per pair per year in order for the population to remain stable (Grant *et al.* 1999). However, in over half of European studies that reported fledging estimates, those estimates are below this threshold (fig. 1). Predation of eggs and chicks is typically identified as the most frequent source of low productivity (Berg 1992; Grant 1997; Grant *et al.* 1999; Valkama & Currie 1999). The most influential predator may differ between sites, but various studies have identified key predators, including the Red Fox *Vulpes vulpes*, Hooded *Corvus cornix* and Carrion Crows *C. corone* and/or Lesser Black-backed Gull *Larus fuscus* (Grant *et al.* 1999), and the Stoat *Mustela erminea*, the last where intensive control by gamekeepers probably rendered other predators (such as the Red Fox) rare (Grant 1997). An experiment on moorland in northern England confirmed that predator control reduced the abundance of Red Foxes and Carrion Crows, and that this led to a greater than threefold increase in Curlew breeding success, and annual increases in breeding numbers (Fletcher *et al.* 2010). Where no predator control occurred, only 15% of Curlew pairs produced young, meaning that each successful pair would need to produce a (highly unlikely) minimum of 3.2 fledglings annually, according to the estimates of Grant *et al.* (1999), to maintain breeding numbers (Fletcher *et al.* 2010). In this context, it is noteworthy that high Curlew densities, higher nesting success and/or stable populations in the UK are often associated with Red Grouse *Lagopus lagopus* management (Tharme *et al.* 2001; Baines *et al.* 2008; Douglas *et al.* 2014). In these areas, intensive production of high grouse densities for driven shooting may benefit other ground-nesting birds, but is associated with a suite of other environmental issues including illegal

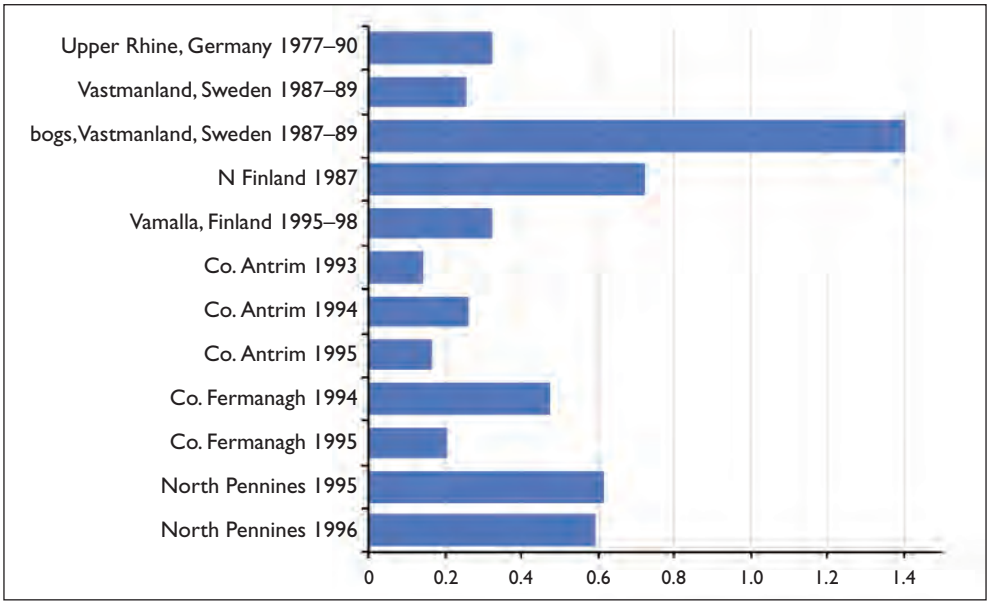

Fig. 1. Estimated Curlew *Numenius arquata* productivity (fledglings per breeding pair) from studies across Europe. Grant *et al.* (1999) estimated that each pair must produce 0.48–0.62 young per year to maintain a stable population. Sources: England (Grant 1997); Northern Ireland (Grant *et al.* 1999); southern Finland (Valkama & Currie 1999); northern Finland (Ylimaunu *et al.* 1987); Sweden (Berg 1992); Upper Rhine (Boschert & Rupp 1993).

killing of birds of prey, peatland damage and culling of Mountain Hares *Lepus timidus* (e.g. Thompson *et al.* 2009).

Predator control may be an effective interim management strategy for improving breeding success of the Curlew. However, the efficacy of predator control as a conservation tool for breeding waders, outside intensive grouse-moor systems, may be variable (Bolton *et al.* 2007) and requires further testing. Furthermore, it is expensive and labour-intensive (Sotherton *et al.* 2009), and there are currently no funding mechanisms for widescale and concerted delivery of this management outside of some protected areas, or where it is privately funded for sporting interests. It may also be necessary to address underlying reasons as to why predation pressure on this species is such a problem, including those that may require a more strategic land-management response. In the UK, the expansion of commercial conifer forests since the mid twentieth century has led to substantial loss and fragmentation of moorland breeding areas. For example, the habitat of 5,000 pairs of Curlews may have been lost through afforestation in the uplands of southwest Scotland (Ratcliffe 2007). Moreover, there is growing evidence that forests have 'edge' effects well beyond their boundaries by supporting populations of generalist predators such as foxes and crows. As a result, greater predation pressure in the remaining open landscape may lead to lower densities and nesting success, and more negative population trends of ground-nesting birds, including the Curlew and other waders, on open ground within a kilometre or more of forest edges (Berg 1992; Valkama *et al.* 1998; Douglas *et al.* 2014; Wilson *et al.* 2014). In southern Finland, for example, nest predation was higher in a fragmented landscape consisting of woodland and farmland, compared with an area of continuous farmland; the study found that 64% and 5% of Curlew nests respectively were predated in the two landscape types (Valkama *et al.* 1999). In the UK, Curlew population changes are inversely related to the area of woodland surrounding breeding sites, and positively related to gamekeeper densities; modelling has suggested that increasing woodland cover from 0% to 10% of the land area within 1 km of Curlew breeding sites would require a 50% increase in human predator-control effort to maintain population stability (Douglas *et al.* 2014).

Land use can also have a more direct impact. In the North Pennines, 20–33% of nest failures were attributed to trampling by livestock. Curlews there nested within a variety of marginal agricultural habitats, including wetlands, rough grasslands and

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389. Tagging projects can provide information on the survival rates and movements of local populations, while GPS tracking devices improve our understanding of fine-scale habitat use during the breeding season.

Richard Chandler

390. A 'bubbling' Curlew on its wintering grounds in north Norfolk, February 2010. Currently, the UK accounts for some 14–20% of the global wintering population.

moorland, but avoided nesting in improved grasslands with a homogenous sward structure lacking in rushes or grass tussocks (Grant 1997). While improved grasslands may provide important foraging opportunities for breeding adults (Robson 1998), the widespread agricultural improvement and homogenisation of agricultural grasslands through drainage, fertilisation, reseeding, high livestock densities and silage management (Vickery *et al.* 2001) suggest that the reduction of habitat quality for breeding Curlews is likely to have been substantial, especially at lower altitudes (Wilson *et al.* 2005). The proliferation of windfarms in the UK uplands also poses an increasing threat; the Curlew is among the more susceptible species to windfarm displacement effects, with breeding birds showing behavioural avoidance up to 800 m from turbines, and breeding bird densities may be reduced by 42% within a 500-m buffer of turbines (Pearce-Higgins *et al.* 2009). Curlew densities may be reduced at windfarms during the construction phase, and there is currently no evidence of recovery to pre-construction levels during operation (Pearce-Higgins *et al.* 2012). These findings are based on correlative analyses and there is a need for much more robust studies to fully quantify the magnitude and likely causes of any windfarm impacts, and assess the effectiveness of mitigation measures.

Conclusions

Based on global conservation status, UK population trends and the global importance of the UK breeding population, the Curlew should currently be considered the UK's highest conservation priority bird species. A comprehensive recovery programme, including the testing of trial management interventions and co-ordinated conservation delivery, in particular beyond driven grouse moors, is needed urgently across the UK. The RSPB is currently working with statutory conservation agencies to this end. Yet delivery opportunities in upland agricultural landscapes, which support a large proportion of breeding Curlews, are at present limited by the poor availability and resourcing of well-targeted and suitably structured management options in agri-environment schemes (Scridel 2014). There is also a pressing need to undertake further research into the impact of windfarms on Curlew populations. The adverse conservation status of the Curlew should also be given greater consideration in planning decisions for windfarms and other developments that may affect the species

The urgency described in this short paper is real and it is salutary to consider the global status of other members of the genus *Numenius*. The Eskimo Curlew *N. borealis* was one of the most abundant breeding shorebirds in North America but is now almost certainly extinct. The Slender-billed Curlew *N.*

tenuirostris of Eurasia has not been seen since the 1990s and no breeding, passage or wintering populations are known. Both the Far Eastern Curlew *N. madagascariensis*, breeding in eastern Siberia and wintering in Oceania, and the Bristle-thighed Curlew *N. tahitiensis*, which breeds in Alaska and winters on Pacific Islands, are classified as globally Vulnerable on the IUCN Red List (www.iucnredlist.org). The genus *Numenius* is a highly threatened one, and as a global stronghold for the Eurasian Curlew, we must act now in the UK to avoid this species becoming further endangered.

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391. Eurasian Curlews *Numenius arquata* in Cornwall, September 2012.