

The risk of extinction for birds in Great Britain

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Golden Orioles *Oriolus oriolus*

Abstract Over the last 20 years, species priorities for bird conservation in the UK have been guided by ‘Birds of Conservation Concern’ – an in-depth assessment made possible by the top-class data available on the status of the UK’s birds. For other wildlife, priorities tend to be informed by measures of extinction risk, generated by the IUCN Regional Red List process. We carried out the first formal IUCN assessment for birds in Great Britain. Of the 241 species assessed, 100 (43%) had at least one population (breeding and/or non-breeding) that qualified as Threatened using the standard IUCN Red List criteria and categories. Of 289 separate assessments of breeding or non-breeding populations, 39% qualified as Threatened (8% Critically Endangered, 14% Endangered, 17% Vulnerable) with a further 10% classified as Near Threatened. Both Golden Oriole *Oriolus oriolus* and Fieldfare *Turdus pilaris* were assessed as being Critically Endangered (Possibly Extinct) as breeding species, in addition to seven species that are already extinct (either Extinct or Regionally Extinct). The proportion of GB birds qualifying as Threatened was high compared with birds elsewhere in Europe and other taxonomic groups in GB. We believe that, if similar data were available, levels of extinction risk would be higher for other areas/taxa than is currently estimated.

Introduction

Effective conservation relies on good evidence to inform decision-making – at all stages from identifying problems, through devising solutions, to assessing the effectiveness of the conservation response. One crucial step in evidence-based conservation is prioritisation, so that limited resources can be targeted and have the greatest possible impact. Modern conservation tends to rely on formal, rule-bound processes for identifying priorities. UK bird conservation has a relatively long history of assessment of species status and a well-established process for identifying species of concern, enabling a consensus on priorities, chiefly through the Birds of Conservation Concern (BoCC) approach (Gibbons *et al.* 1996 and subsequent reports).

The ‘species of conservation concern’ approach has not been widely applied, either at larger geographical scales or for other taxa. In part, this reflects differences in conservation philosophy, but also the fact that the information demanded by this approach is rarely available for other taxa or areas. No other taxa and few geographical areas have received the level of attention provided by the professionally steered volunteer force that has long been active in recording the UK’s birds. There are some exceptions: for example, the recent assessment of the status of vascular plants in England (Stroh *et al.* 2014) recognises not only threatened species but also those which are endemic (or nearly so) and for which the country has an international responsibility.

Conservation priorities for other taxa and in other areas tend to be informed by assessments of current extinction risk, almost always generated using the International Union for Conservation of Nature (IUCN) Red List guidelines (IUCN 2012, 2016). In Great Britain, the ongoing Species Status programme has so far produced modern IUCN assessments for some 12,000 species, embracing taxa as diverse as lichens, bryophytes, vascular plants and scarab beetles; see Webb & Brown (2016) for an overview and individual reports at publications.naturalengland.org.uk/category/4707656804597760. In Europe, the extinction risk faced by a range of taxa has been assessed,

while at a global scale the threat faced by all species within selected taxa is revised regularly – with that for birds being updated annually (see iucnredlist.org).

The emphasis of the IUCN Red List approach is on extinction risk, informed by species’ rarity, range restriction and rate of recent decline (measured over the last ten years or three generations, whichever is the longer). These assessments thus tend to identify species with extremely low numbers, restricted ranges or rapid recent declines: justifiably so, since these are the species most likely to become extinct. The BoCC process is concerned with more than just the threat of extinction. For the most part it looks at declines over a longer period (notably including a historical context); takes an international view, by automatically Red-listing species threatened at a global scale and considering the international importance of UK bird populations; and places less weight on rarity and range restriction (see discussion for further comparisons).

Crucially, this assessment (No. 34 in the Species Status series) is not an alternative to BoCC and does not replace it. It is a deliberate move to ensure that the status of bird species is determined according to IUCN guidelines, and thus can be measured alongside the results for all other taxa and potentially used in any future, multi-taxa assessments of extinction risk in GB (see Hayhow *et al.* 2016). Red List Indices (RLIs), which calculate a score from Red List assessments for multiple species and can track this through time (Butchart *et al.* 2005), are increasingly used for assessing pressures upon wildlife and the success of measures taken to conserve threatened species. Should a RLI be developed for GB, this assessment (and future revisions) will enable birds to be included.

Neither our assessments of extinction risk nor the more rounded BoCC approach should be used in isolation to identify priority species. Decisions on allocation of conservation resources must also consider factors such as cost (and funding opportunities); the likelihood of success; and synergies with other priorities (Miller *et al.* 2006). We recommend that the broader assessments of BoCC remain the starting point for identifying

which bird species are most deserving of conservation action, while the IUCN classifications presented here are of greatest value in enabling birds to be included in cross-taxa exercises on a 'level playing field'. Clearly, the identification of species most at risk of extinction must always be important for informing conservation decision-making, and for engaging a wide audience with the major conservation issues of the day.

This assessment has been conducted for Great Britain rather than the UK, providing consistency with IUCN assessments for other taxa; in addition, for most taxa, GB is a more logical biogeographic unit, and certainly allows for a simpler assessment.

Methods

The IUCN Red List process was developed primarily to identify species with a high risk of global extinction but with the addition of an extra stage, guidelines can allow assessment at regional, national or local scales (IUCN 2012). This 'regional' process comprises three stages: 1) identify the taxa to be assessed; 2) assess the extinction risk faced by

regional populations of each taxon as if in isolation, using the global Red List criteria (IUCN 2016); and 3) consider the influence of potential interactions with populations outside the region, for example if support from other populations could 'rescue' regional populations from extinction. These stages, with regard to birds in Great Britain, are described further below.

Stage 1: identifying the species, subspecies and populations to assess

Our assessment focused on the regular breeding and wintering birds of Great Britain, thus excluding birds in the Isle of Man, Channel Islands and Northern Ireland. We based our species list on that used by Eaton *et al.* (2015). This included all species on the British List (BOU 2013), other than non-natives, vagrants (defined by BBRC www.bbrc.org.uk) or scarce migrants (White & Kehoe 2016, 2017). We also applied an optional filter to exclude species that appear only on passage, such as Curlew Sandpiper *Calidris ferruginea* and Pomarine Skua *Stercorarius pomarinus*.

We followed the regional Red List recommendation (IUCN 2012) to exclude colonising species unless they have bred for ten consecutive years.



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000. Common Crane *Grus grus* family, Somerset, October 2011. Breeding Common Cranes were assessed at Stage 2 as being Endangered in Britain, due to the population being less than 250 mature individuals, but the species was downlisted to Vulnerable at the regional stage because of the potential of increased immigration 'rescuing' our population.

This excluded newly arriving species, such as Great White Egret *Ardea alba* and Eurasian Spoonbill *Platalea leucorodia*, and species for which breeding colonisation appears to have failed, including Snowy Owl *Bubo scandiacus* and Lapland Bunting *Calcarius lapponicus*. For species that have substantial and at least partially distinct breeding and non-breeding populations in GB (defined as having a population in the non-breeding season that is more than twice the size of the breeding population), notably waterbirds, we assessed breeding and wintering populations separately.

There are some notable bird subspecies in Britain. Based on data for the subspecies included in Eaton *et al.* (2015), we assessed all of those for which Britain is of international importance, i.e. more than 20% of the northwest European flyway (wildfowl), East Atlantic flyway (waders) or European (all others) population (but note that Dunnock *Prunella modularis hebridium* was excluded since a large proportion of the UK population occurs in Northern Ireland). We also assessed the two Bean Goose *Anser fabalis* taxa separately, *A. f. fabalis* and *A. f. rossicus*: although not occurring in internationally important numbers in GB, these are judged to be separate species by the IOC (Gill & Donsker 2017).

Stage 2: applying the IUCN Red List Categories and Criteria

Once the relevant taxa have been identified, the best available data are used to assess each against the five standard IUCN Red List criteria (summarised below). This highlights those at risk of regional extinction, which are generally taxa with small populations or ranges, those which have suffered population or range decline (or are predicted to do so) and/or show extreme population fluctuations. See IUCN (2016) for full details.

- **Criterion A:** Reduction in the size (either abundance or range) of the population, measured over ten years or three generations, whichever is longer.
- **Criterion B:** Restricted geographical range in conjunction with fragmentation, continuing decline or extreme population fluctuations. (Geographical range was measured in two ways. *Extent of Occurrence* (EoO) – uses a Minimum Convex Polygon fitted around the distribution as shown by 10 x 10-km square atlas data. *Area of Occupancy* (AoO) – within the IUCN process this is defined as the area within any taxon's EoO that is occupied, and excludes areas which are unsuitable or unoccupied. AoO was calculated using the method devised by Kunin (1998).)
- **Criterion C:** Small population size, measured as number of 'mature individuals', and contin-

uing decline. This criterion explores trends over one, two or three generations and also takes range fragmentation and/or extreme fluctuations into account.

- **Criterion D:** Very small population or very restricted distribution.
- **Criterion E:** Quantitative analysis of extinction risk.

Each species, subspecies or population is assessed against thresholds for each criterion and its subcriteria, which, if met or exceeded, qualify a species for one of the standard IUCN Red List Categories: Extinct, Regionally Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened and Least Concern. Each criterion has different thresholds for the three threatened categories (see IUCN 2016); for example, criterion A2, which explores recent trends and is one of the most frequently invoked qualifying criteria, classifies species with observed, estimated, inferred or suspected declines in excess of 80% as Critically Endangered, 50%–80% as Endangered and 30%–50% as Vulnerable.

In relation to criterion B, we followed Eaton *et al.* (2005) and used a threshold of a minimum 10% decline over three generations to indicate a continuing decline and exclude small-scale fluctuations. Within the guidelines (IUCN 2016), extreme fluctuations are defined as those typically greater than one order of magnitude. No British bird species were assessed as undergoing extreme fluctuations over the previous three generations.

Data sources and calculating trends

Population estimates were taken from Musgrove *et al.* (2013) unless substantial new evidence was available. For breeding assessments, the number of mature individuals was taken as twice the number of pairs, territories or nests.

Britain is fortunate in being able to draw upon data collected for a number of long-term monitoring schemes, such as the BTO/JNCC/RSPB Breeding Bird Survey (and its predecessor the BTO/JNCC Common Bird Census), BTO/JNCC/RSPB Wetland Bird Survey, WWT/JNCC/SNH Goose and Swan Monitoring Programme, and the Seabird Monitoring Programme (SMP). These schemes produce annual indices of abundance for many of our regular breeding or wintering species. We used smoothed indices where available. For scarcer species, we used data collected by single-species surveys and the Rare Breeding Birds Panel (RBBP). For RBBP species data, we examined changes in five-year means of the maximum number of pair/territories. The two measures of species range (Extent of Occurrence and Area of Occupancy) were calculated using data from the national breeding and wintering atlases (Sharrock 1976; Lack 1986;



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000. Puffin *Fratercula arctica*, Shetland, June 2011. The Puffin has been assessed globally as Vulnerable and as Endangered in Europe (BirdLife International 2015). Whilst populations are falling alarmingly elsewhere within their range, in Great Britain the species was assessed as being of Least Concern as the numbers increased by 37% between 1969 and 2000 (Mitchell *et al.* 2004). The trend since the last full census in 2000 is less clear, but currently Puffins are not believed to be decreasing at a sufficient rate to approach the threatened thresholds; however, as with other seabirds, up to date information is urgently required.

Gibbons *et al.* 1993; Balmer *et al.* 2013).

Population and range trends were calculated over the required period (one, two or three generations) mostly up to summer 2014 for breeding assessments and winter 2013/14 for non-breeding assessments; more recent data were used when available. Species generation lengths were taken from the BirdLife global assessments (<http://data-zone.birdlife.org>). Where the available data did not match the required period exactly, extrapolation or interpolation was used to estimate change over the desired window. Criteria A3 and A4 (IUCN 2016) specifically assess changes that are projected, inferred or suspected to occur in the future. Online supplementary information (britishbirds.co.uk/urlobetodetermined) explains how and in which cases this was adopted.

Regionally Extinct (RE), Near Threatened (NT), Data Deficient (DD) and the Possibly Extinct (PE) tag to Critically Endangered

The guidelines (IUCN 2012) allow regional assessors to adopt a historical time limit and a time frame to help classify a species as Regionally Extinct (RE). For the British assessments, a species was classed as RE if there had been no confirmed breeding records for at least ten years, based on RBBP data. We followed Eaton *et al.* (2015) and used a cut-off year of 1800 and did not consider species that occurred only before this date, e.g. Dalmatian Pelican *Pelicanus crispus*. A Possibly Extinct (PE) tag to the Critically Endangered category was used for species that, on the balance of evidence, are likely to be regionally extinct, but for which there is a small chance that they may still occur, or reoccur. Species were classed as PE if there had been no confirmed breeding records for between five and ten years.

For the Near Threatened category, intended to identify those species not considered formally threatened with extinction, but sufficiently close to be worth highlighting, we followed the examples in the guidelines (IUCN 2016). The following qualifying thresholds were used: i) criterion A: declines of at least 20%, but less than 30% over three generation lengths; ii) criterion B, taxa that met either

20,000 km² (EoO) or 2,000 km² (AoO) thresholds but only one of the three set conditions, or two of the conditions but with larger ranges (up to 30,000 km² for EoO or 3,000 km² for AoO); iii) criterion C using fewer than 15,000 mature individuals, rather than 10,000; and iv) criterion D using less than 1,500 mature individuals rather than 1,000.

The IUCN Red List process allows taxa to be classified as Data Deficient (DD) if no direct or indirect information is available. DD can also be used to indicate that the taxon was evaluated using available data, but this was found to be insufficient to place the taxon into a category; however, for this to apply, both Threatened (CR, EN or VU) and Least Concern must be plausible outcomes using the available data (IUCN 2016).

Stage 3: Applying the regional IUCN Red List guidelines

Once each taxon has been assessed against the Red List Criteria, the final stage of the regional process examines to what extent neighbouring populations of the same taxon, outside the region, may affect extinction risk within the region by, for example, providing a 'rescue effect'. For breeding taxa, it evaluates whether: i) there is significant immigration of individuals likely to breed; ii) this rate of immigration is expected to decrease; and iii) the regional population is a biological sink. For the non-breeding taxa, it explores whether conditions both inside and outside the region are deteriorating (IUCN 2012). A decline of at least 10% over three generations, or an assessment under A4 at Stage 2, was used to signify a deterioration of conditions within the region for the non-breeding assessments.

Under favourable conditions, such as a continuing or even increasing flow of immigrants into the region, it might be appropriate to downlist the threat category. For breeding species, this required evidence of significant immigration of individuals likely to reproduce successfully in the region. We used Wernham *et al.* (2002) and expert opinion to judge immigration.

We used published trend and range information from other European countries to evaluate conditions outside Britain (Article 12 reporting: <http://bd.eionet.europa.eu/article12/summary>, European Red List of Birds: <http://datazone.birdlife.org/info/euroredlist>). As a general premise, declines in more than 50% of immediately surrounding countries denoted deteriorating conditions outside the region and a likely decrease in the rate of immigration into GB; however, expert judgement was also used, depending on which countries were likely to be the source of immigration, and the trend shown in the Pan-European Common Bird Monitoring Scheme (www.ebcc.info/pecbm.html).

Results

Threatened and Near Threatened birds in Great Britain

IUCN Red List assessments were carried out for 241 species and 68 subspecies. At a species level, this involved 289 (208 breeding, 81 non-breeding) assessments, with 48 species being assessed for both breeding and non-breeding populations separately. One species (Great Auk *Pinguinus impennis*) was classed as globally Extinct, with a further six cur-

rently deemed Regionally Extinct as breeding species, i.e. no confirmed breeding records for at least ten years (Great Bustard *Otis tarda*¹, Kentish Plover *Anarhynchus alexandrinus*, Temminck's Stint *Calidris temminckii*, Black Tern *Chlidonias niger*, Wryneck *Jynx torquilla* and Serin *Serinus serinus*; see Eaton *et al.* (2015) for last recorded dates). Two Critically Endangered species (Golden Oriole *Oriolus oriolus* and Fieldfare *Turdus pilaris*) were given the Possibly Extinct (PE) tag, since they are on the verge of being lost as breeding birds in GB: neither has been recorded breeding for at least five years.

Tables 1 & 2 present the final assessments for the species and subspecies respectively that were classified as Threatened or Near Threatened. Those classed as of Least Concern are presented in supplementary online information (britishbirds.co.uk/url-tobedetermined). Of the species assessed, 100 (43%) had at least one population (breeding and/or non-breeding) that qualified as Threatened (CR, EN or VU). Of the 289 separate population assessments conducted, 39% qualified as Threatened and a further 10% as Near Threatened (excluding those classed as Extinct or Regionally Extinct; table 3).

The proportion of species considered Threatened was slightly higher for non-breeding (43%) than breeding assessments (38%). Of the 111 species populations whose status was assessed to be Threatened, most qualified against criterion A (declines in population, 68%), followed by criterion D (very small population size, 36%) and criterion C (small population size and decline, 25%). Some taxa qualified against more than one criterion.

No regional assessments were uplisted owing to the GB population being known to be a biological sink. Twenty-two (8%) of the species placed in a threatened category in the second stage of assessment were subsequently downlisted when external factors were considered, including breeding Whooper Swan *Cygnus cygnus*, Common Quail *Coturnix coturnix* and Common Crane *Grus grus*, and non-breeding Eurasian Bittern *Botaurus stellaris*, Yellow-legged Gull *Larus michahellis*

¹ Although a reintroduction project has been under way since 2004, the population is still considered to be under direct support and therefore does not currently qualify under the Red List Guidelines (IUCN 2016).

Table 1. Species classified as Threatened or Near Threatened in GB, and criteria under which they qualified. Species assessed as Least Concern are listed in Supplementary Online Material.

	Season (B=Breeding, NB= Non-breeding)	Global IUCN species-level assessment (assessed 5/10/16)	Stage 2: Applying the standard IUCN Red List criteria (see supplementary information on the individual data sources used)				Stage 3: Applying the regional guidelines (0= unchanged, -1 down-listed by one category). No species were up-listed	Final GB Assessment (CR= Critically Endangered, EN= Endangered, VU= Vulnerable, NT= Near Threatened; see IUCN (2016) for additional information on the Sub-criteria)	
			Recent observed, estimated, inferred or suspected declines (criteria A2). Parentheses denote declines in range rather than population.	Observed, estimated, inferred or suspected decline in population where the time period includes both past and the future (criteria A4)	Restricted geographical range (criteria B)	Small population size and decline (criteria C)			Very small or restricted population (criteria D)
Golden Oriole <i>Oriolus oriolus</i>	B	LC	-85%			<250	<50	0	CR (PE) A2a+3a+4a; C1+2a(ii); D
Fieldfare <i>Turdus pilaris</i>	B	LC	(-81%)			<250	<50	0	CR (PE) A2c+3c+4c; C1+2a(ii); D
Bewick's Swan <i>Cygnus columbianus</i>	NB	LC		-84%				0	CR A4a
Bean Goose <i>Anser fabalis</i>	NB	LC		-89%				0	CR A4a
White-fronted Goose <i>A. albifrons</i>	NB	LC		-85%				0	CR A4a
Pintail <i>Anas acuta</i>	B	LC				<250		0	CR C2a(ii)
Garganey <i>A. querquedula</i>	B	LC				<250		0	CR C2a(ii)
Common Scoter <i>Melanitta nigra</i>	B	LC				<250		0	CR C2a(ii)
Smew <i>Mergellus albellus</i>	NB	LC		-82%		<250		0	CR A4a; C2a(ii)
Red-necked Grebe <i>Podiceps grisegena</i>	NB	LC	-87%			<250		0	CR A2a+3a+4a; C1+2a(ii)
Slavonian Grebe <i>P. auritus</i>	B	VU				<250		0	CR C1+2a(ii)
Montagu's Harrier <i>Circus pygargus</i>	B	LC					<50	0	CR D
Whimbrel <i>Numenius phaeopus</i>	B	LC	-81%					0	CR A2a+3a+4a
Ruff <i>Calidris pugnax</i>	B	LC					<50	0	CR D
Purple Sandpiper <i>C. maritima</i>	B	LC			<10km ²	<250	<50	0	CR B2ab(ii,v); D
Arctic Skua <i>Stercorarius parasiticus</i>	B	LC		-85%				0	CR A4a
Kittiwake <i>Rissa tridactyla</i>	B	LC		-81%				0	CR A4a
Turtle Dove <i>Streptopelia turtur</i>	B	VU	-91%					0	CR A2a+3a+4a
Red-backed Shrike <i>Lanius collurio</i>	B	LC				<250	<50	0	CR C2a(ii); D
Savi's Warbler <i>Locustella luscinioides</i>	B	LC				<250	<50	0	CR C2a(ii); D
Marsh Warbler <i>Acrocephalus palustris</i>	B	LC				<250	<50	0	CR C2a(ii); D
Redwing <i>Turdus iliacus</i>	B	NT				<250	<50	0	CR C2a(ii); D
Common Redpoll <i>Acanthis flammea</i>	B	LC					<50	0	CR D
Whooper Swan <i>Cygnus cygnus</i>	B	LC					<50	-1	EN D
Common Shelduck <i>Tadorna tadorna</i>	B	LC	-58%					0	EN A2a+3a+4a
	NB	LC		-68%				0	EN A4a
Pintail <i>Anas acuta</i>	NB	LC		-61%				0	EN A4a

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Common Pochard <i>Aythya ferina</i>	B	VU	(-56%)				0	EN A2c+3c+4c
	NB	VU	-56%				0	EN A2a+3a+4a
Greater Scaup <i>A. marila</i>	NB	LC	-52%				0	EN A2a+3a+4a
Capercaillie <i>Tetrao urogallus</i>	B	LC			<2,500		0	EN C1
Shag <i>Phalacrocorax aristotelis</i>	B	LC	-52%				0	EN A2a+3a+4a
Eurasian Spoonbill <i>Platalea leucorodia</i>	NB	LC				<50	-1	EN D
Black-necked Grebe <i>Podiceps nigricollis</i>	B	LC				<250	0	EN D
Honey-buzzard <i>Pernis apivorus</i>	B	LC				<250	0	EN D
White-tailed Eagle <i>Haliaeetus albicilla</i>	B	LC				<250	0	EN D
Spotted Crake <i>Porzana porzana</i>	B	LC				<250	0	EN D
Dotterel <i>Charadrius morinellus</i>	B	LC	-58%		<2,500		0	EN A2a+3a+4a; C1+2a(ii)
Northern Lapwing <i>Vanellus vanellus</i>	B	NT	-59%				0	EN A2a+3a+4a
Eurasian Curlew <i>Numenius arquata</i>	B	NT	-65%				0	EN A2a+3a+4a
Black-tailed Godwit <i>Limosa limosa</i>	B	NT				<250	0	EN D
Ruff <i>Calidris pugnax</i>	NB	LC			<2,500		0	EN C1
Dunlin <i>C. alpina</i>	NB	LC		-51%			0	EN A4a
Purple Sandpiper <i>C. maritima</i>	NB	LC	-50%				0	EN A2a+3a+4a
Red-necked Phalarope <i>Phalaropus lobatus</i>	B	LC				<250	0	EN D
Green Sandpiper <i>Tringa ochropus</i>	B	LC				<50	-1	EN D
	NB	LC				<2,500	0	EN C2a(ii)
Spotted Redshank <i>T. erythropus</i>	NB	LC				<250	0	EN D
Wood Sandpiper <i>T. glareola</i>	B	LC				<250	0	EN D
Roseate Tern <i>Sterna dougallii</i>	B	LC	-82%			<250	-1	EN A2a; C2a(ii)
Yellow-legged Gull <i>Larus michahellis</i>	B	LC				<50	-1	EN D
Herring Gull <i>L. argentatus</i>	NB	LC	-79%				0	EN A2a+3a+4a
Yellow-legged Gull <i>L. michahellis</i>	B	LC				<50	-1	EN D
Great Black-backed Gull <i>L. marinus</i>	NB	LC	-65%				0	EN A2a+3a+4a
Short-eared Owl <i>Asio flammeus</i>	B	LC	(-61%)				0	EN A2c+3c+4c
Common Swift <i>Apus apus</i>	B	LC	-50%				0	EN A2a+3a+4a
Lesser Spotted Woodpecker <i>Dryobates minor</i>	B	LC	-57%		<2,500		0	EN A2a+3a+4a; C1+2a(ii)
Merlin <i>Falco columbarius</i>	B	LC			<2,500		0	EN C2a(ii)
Willow Tit <i>Poecile montana</i>	B	LC	-64%				0	EN A2ac+3ac+4ac
Shore Lark <i>Eremophila alpestris</i>	NB	LC				<250	0	EN D
Black Redstart <i>Phoenicurus ochruros</i>	B	LC				<250	-1	EN C2a(ii)
Hawfinch <i>Coccothraustes coccothraustes</i>	B	LC	-70%		<2,500		0	EN A2ac+3ac+4ac; C1+2a(ii)
Greenfinch <i>Chloris chloris</i>	B	LC		-69%			0	EN A4a
Parrot Crossbill <i>Loxia pytyopsittacus</i>	B	LC				<250	0	EN D
Snow Bunting <i>Plectrophenax nivalis</i>	B	LC				<250	0	EN D
Common Eider <i>Somateria mollissima</i>	NB	NT		-33%			0	VU A4a

Velvet Scoter <i>Melanitta fusca</i>	NB	VU			<10,000		0	VU C1+2a(ii)
Common Goldeneye <i>Bucephala clangula</i>	B	LC				<1,000	0	VU D1
	NB	LC		-39%			0	VU A4a
Red-breasted Merganser <i>Mergus serrator</i>	NB	LC		-36%	<10,000		0	VU A4a; C1+2a(ii)
Black Grouse <i>Tetrao tetrix</i> #	B	LC			<10,000		0	VU C1
Grey Partridge <i>Perdix perdix</i>	B	LC		-38%			0	VU A2a+3a+4a
Black-throated Diver <i>Gavia arctica</i>	B	LC				<1,000	0	VU D1
Balearic Shearwater <i>Puffinus mauretanicus</i>	NB	CR				<1,000	0	VU D1
Eurasian Bittern <i>Botaurus stellaris</i>	B	LC				<1,000	0	VU D1
Great Crested Grebe <i>Podiceps cristatus</i>	B	LC			<10,000		0	VU C1+2a(ii)
Black-necked Grebe <i>P. nigricollis</i>	NB	LC				<250	-1	VU D1
Hen Harrier <i>Circus cyaneus</i>	B	LC				<1,000	0	VU D1
Moorhen <i>Gallinula chloropus</i>	B	LC		-30%			0	VU A4a
Common Crane <i>Grus grus</i>	B	LC				<250	-1	VU D1
Stone-curlew <i>Burhinus oedicephalus</i>	B	LC		(-31%)	<1,000		0	VU A2c+3c+4c; D1
Grey Plover <i>Pluvialis squatarola</i>	NB	LC		-40%			0	VU A2a+3a+4a
Ringed Plover <i>Charadrius hiaticula</i>	NB	LC		-49%			0	VU A2a+3a+4a
Northern Lapwing <i>Vanellus vanellus</i>	NB	NT		-49%			0	VU A4a
Turnstone <i>Arenaria interpres</i>	NB	LC		-42%			0	VU A2a+3a+4a
Dunlin <i>Calidris alpina</i>	B	LC		-43%			0	VU A2ac+3ac+4ac
Common Sandpiper <i>Actitis hypoleucos</i>	B	LC		-32%			0	VU A2a+3a+4a
Common Redshank <i>Tringa totanus</i>	B	LC		-45%			0	VU A2ac+3ac+4ac
Woodcock <i>Scolopax rusticola</i>	B	LC		(-41%)			0	VU A2c+3c+4c
Little Tern <i>Sterna albifrons</i>	B	LC		(-36%)			0	VU A2c+3c+4c
Arctic Tern <i>Sterna paradisaea</i>	B	LC		(-44%)			0	VU A2c+3c+4c
Black-headed Gull <i>Chroicocephalus ridibundus</i>	NB	LC		-47%			0	VU A2a+3a+4a
Caspian Gull <i>Larus cachinnans</i>	NB	LC				<250	-1	VU D1
Glaucous Gull <i>L. hyperboreus</i>	NB	LC				<250	-1	VU D1
Iceland Gull <i>L. glaucoideus</i>	NB	LC				<250	-1	VU D1
Common Cuckoo <i>Cuculus canorus</i>	B	LC		-39%			0	VU A2a+3a+4a
Common Kestrel <i>Falco tinnunculus</i>	B	LC		-40%			0	VU A4a
Red-billed Chough <i>Pyrrhocorax pyrrhocorax</i>	B	LC				<1,000	0	VU D1
Marsh Tit <i>Poecile palustris</i>	B	LC		-36%			0	VU A2a+3a+4a
Woodlark <i>Lullula arborea</i> #	B	LC			<10,000		0	VU C1+2a(ii)
House Martin <i>Delichon urbicum</i>	B	LC		-33%			0	VU A4a
Wood Warbler <i>Phylloscopus sibilatrix</i>	B	LC		(-31%)			0	VU A2c+3c+4c
Dartford Warbler <i>Sylvia undata</i>	B	NT			<10,000		0	VU C1+2a(ii)
Common Starling <i>Sturnus vulgaris</i>	B	LC		-47%			0	VU A2a+3a+4a
Ring Ouzel <i>Turdus torquatus</i>	B	LC		-38%			0	VU A2a+3a+4a

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Mistle Thrush <i>T. viscivorus</i>	B	LC	-30%				0	VU A2a+3a+4a
Common Nightingale <i>Luscinia megarhynchos</i>	B	LC			<10,000		0	VU C1+2a(ii)
Pied Flycatcher <i>Ficedula hypoleuca</i>	B	LC	-34%				0	VU A2a+3a+4a
Tree Sparrow <i>Passer montanus</i>	B	LC	(-31%)				0	VU A2c+3c+4c
Water Pipit <i>Anthus spinoletta</i>	NB	LC				<250	-1	VU D1
Common Redpoll <i>Acanthis flammea</i>	NB	LC				<1,000	0	VU D1
Lapland Bunting <i>Calcarius lapponicus</i>	NB	LC				<1,000	0	VU D1
Eurasian Wigeon <i>Anas penelope</i>	B	LC				<1,000	-1	NT D1
Mallard <i>A. platyrhynchos</i>	NB	LC	-27%				0	NT A2a+3a+4a
Long-tailed Duck <i>Clangula hyemalis</i>	NB	VU	-27%		<15,000		0	NT A2a+3a+4a; C1+2a(ii)
Great Cormorant <i>Phalacrocorax carbo</i>	B	LC		-33%			-1	NT A4a
Eurasian Bittern <i>Botaurus stellaris</i>	NB	LC				<1,000	-1	NT D1
Grey Heron <i>Ardea cinerea</i>	B	LC		-28%			0	NT A4a
Slavonian Grebe <i>Podiceps auritus</i>	NB	VU				<1,500	0	NT D1
Marsh Harrier <i>Circus aeruginosus</i>	B	LC				<1,000	-1	NT D1
Northern Goshawk <i>Accipiter gentilis</i>	B	LC				<1,500	0	NT D1
Eurasian Sparrowhawk <i>A. nisus</i>	B	LC		-28%			0	NT A4a
Golden Eagle <i>Aquila chrysaetos</i>	B	LC				<1,500	0	NT D1
Osprey <i>Pandion haliaetus</i>	B	LC				<1,000	-1	NT D1
Common Coot <i>Fulica atra</i>	B	LC		-29%			0	NT A4a
	NB	LC		-21%			0	NT A4a
Ringed Plover <i>Charadrius hiaticula</i>	B	LC	-26%				0	NT A2a+3a+4a
Common Redshank <i>Tringa totanus</i>	NB	LC		-28%			0	NT A4a
Common Snipe <i>Gallinago gallinago</i>	NB	LC	-28%				0	NT A2a+3a+4a
Common Tern <i>Sterna hirundo</i>	B	LC	-23%				0	NT A2a+3a+4a
Collared Dove <i>Streptopelia decaocto</i>	B	LC		-33%			-1	NT A4a
Tawny Owl <i>Strix aluco</i>	B	LC	-21%				0	NT A2a+3a+4a
Rook <i>Corvus frugilegus</i>	B	LC		-26%			0	NT A4a
Hooded Crow <i>C. cornix</i>	B	LC	-27%				0	NT A2a+3a+4a
Dipper <i>Cinclus cinclus</i>	B	LC			<15,000		0	NT C1
Black Redstart <i>Phoenicurus ochruros</i>	NB	LC				<1,000	-1	NT D1
Whinchat <i>Saxicola rubetra</i>	B	LC	-25%				0	NT A2ac+3ac+4ac
Yellow Wagtail <i>Motacilla flava</i>	B	LC	-21%				0	NT A2ac+3ac+4ac
Grey Wagtail <i>M. cinerea</i>	B	LC	-28%				0	NT A2a+3a+4a
Linnet <i>Linaria cannabina</i>	B	LC	-20%				0	NT A2a+3a+4a
Corn Bunting <i>Emberiza calandra</i>	B	LC	(-24%)				0	NT A2c+3c+4c

Species and populations that qualify under the different assessment criteria, at the various IUCN Red List threat categories are shown in dark blue and purple (Critically Endangered), peach (Endangered), yellow, (Vulnerable), and light blue (Near Threatened). A 'PE' tag was attached to Fieldfare and Golden Oriole to denote that they are Possibly Extinct as breeding species in Britain. # See online supplementary information (britishbirds.co.uk/urlobedetermined) for additional detail.

Table 2. Subspecies classified as Threatened or Near Threatened in GB, and criteria under which they qualified. Based on data in Eaton et al. (2015): only subspecies for which GB is of international importance have been assessed.

	Season (B=Breeding, NB= Non-breeding)	Global IUCN species-level assessment (assessed 5/10/16)	Stage 2: Applying the standard IUCN Red List criteria (see supplementary information on the individual data sources used)				Stage 3: Applying the regional guidelines (0= unchanged, -1 down-listed by one category). No species were up-listed	Final GB Assessment (CR= Critically Endangered, EN= Endangered, VU= Vulnerable, NT= Near Threatened; see IUCN (2016) for additional information on the Sub-criteria)
			Recent observed, estimated, inferred or suspected declines (sub-criterion A2).	Observed, estimated, inferred or suspected decline in population where the time period includes both past and the future (sub-criterion A4).	Restricted geographical range (criterion B)	Small population size and decline (criterion C)		
Taiga Bean Goose <i>Anser f. fabalis</i>	NB	LC		-86%			0	CR A4a
Greenland White-fronted Goose <i>Anser albifrons flavirostris</i>	NB	LC		-85%			0	CR A4a
Corn Bunting <i>Emberiza calandra clanceyi</i>	B	LC				<250	0	CR C1+2a(ii)
Common Redshank <i>Tringa totanus robusta</i>	NB	LC		-51%			0	EN A4a
Linnet <i>Linaria cannabina autochthona</i>	B	LC	-52%				0	EN A2a+3a+4a
Tundra Bean Goose <i>Anser fabalis rossicus</i>	NB	LC				<1,000	0	VU D1
Common Eider <i>Somateria mollissima faeroensis</i>	B	NT	-33%			<10,000	0	VU A2a+3a+4a; C1
Skylark <i>Alauda arvensis scotica</i>	B	LC		-40%			0	VU A4a
St Kilda Wren <i>Troglodytes troglodytes hirtensis</i>	B	LC				<1,000	0	VU D1+2
Twite <i>Linaria flavirostris bensonorum</i>	B	LC	-47%				0	VU A2a+3a+4a
Great Cormorant <i>Phalacrocorax carbo carbo</i>	B	LC		-24%			0	NT A4a
Dipper <i>Cinclus cinclus hibernicus</i>	B	LC				<1,500	0	NT D1
Hebridean Song Thrush <i>Turdus philomelos hebridensis</i>	B	LC					<1,500	0 NT D1
Twite <i>Linaria flavirostris pipilans</i>	B	LC				<15,000	0	NT C1

The species-level assessments were used for the following subspecies: Bewick's Swan (*Cygnus columbianus bewickii*), Shag (*Phalacrocorax a. aristotelis*), Dunlin (*Calidris a. alpina*), Eurasian Curlew (*Numenius a. arquata*), Lesser Black-backed Gull (*Larus fuscus graellsii*), Herring Gull (*Larus argentatus argentus*), Lesser Spotted Woodpecker (*Dryobates minor comminutus*), Willow Tit (*Poecile montana kleinschmidti*), Greenfinch (*Chloris chloris harrisoni*), Black Grouse (*Tetrao tetrix britannicus*), Ringed Plover (*Charadrius h. hiaticula*), Turnstone (*Arenaria i. interpres*), Marsh Tit (*Poecile palustris dresseri*), Red-billed Chough (*Pyrrhocorax p. pyrrhocorax*), Yellow Wagtail (*Motacilla flava flavissima*), Dipper (*Cinclus cinclus gularis*). No subspecies were either downlisted or uplisted at Stage 3. Species and populations that qualify under the different assessment criteria, at the various IUCN Red List threat categories are shown in dark blue (Critically Endangered), peach (Endangered), yellow, (Vulnerable), and light blue (Near Threatened).

and Black Redstart *Phoenicurus ochruros*. For several breeding species, such as Red-backed Shrike *Lanius collurio*, Marsh Warbler *Acrocephalus palustris*, Fieldfare and Redwing *T. iliacus*, current immigration does lead to regular, if not annual, breeding in Britain. However, the rates were considered below the level needed to maintain a regional population (for example, no evidence of offspring contributing to the long-term sustainability

of the population) and as a result these species were not downlisted.

Data Deficient

Of the 357 assessments, only five taxa – three species (two of which were also affected at subspecies level) and a further two subspecies – were categorised as DD. The Little Auk *Alle alle* winters in British waters, probably in considerable numbers; however, there is no

Table 3. Number and percentage of species and subspecies assessments qualifying for the IUCN Red List Threatened Categories in Great Britain, excluding those classed as Extinct or Regionally Extinct.

	Species		Subspecies	
	No. of assessments	Percentage in each threat category	No. of assessments	Percentage in each threat category
Critically Endangered (CR)	23	8.2%	4	5.9%
Endangered (EN)	41	14.5%	9	13.2%
Vulnerable (VU)	47	16.7%	10	14.7%
Near Threatened (NT)	29	10.3%	6	8.8%
Least Concern (LC)	139	49.3%	35	51.5%
Data Deficient (DD)	3	1.1%	4	5.9%

information on its total population or trends. Geographically incomplete data from the Seabird Monitoring Programme are now considered insufficient to provide confidence in breeding trends for Herring *Larus argentatus* and Lesser Black-backed Gulls *L. fuscus* (Ilka Win pers. comm.). The most recent comprehensive data available are from the last national census, in 1998–2002 (Mitchell *et al.* 2004). Since there is good evidence of considerable change in these species' status since then, we judged DD to be the only appropriate option. Owing to a lack of information, Merlin *Falco columbarius subaesalon* (which breeds in Iceland) and Common Snipe *Gallinago gallinago faeroeensis* (breeds in Iceland, Faeroes, Shetland and Orkney) were also classed as DD.

Discussion

The paper represents the first formal assessment of extinction risk of British birds; although Eaton *et al.* (2005) made a provisional assessment with a previous iteration of the IUCN regional guidelines, they did so to explore the process and the full assessments were not published. Using the internationally recognised IUCN Red List process, we found that 43% of regularly occurring species and nearly 40% of populations assessed were classed as Threatened with regional extinction from GB, and a further 10% were Near Threatened. Twenty-three populations were categorised as Critically Endangered, with breeding Whimbrel *Numenius phaeopus*, Turtle Dove *Streptopelia turtur*, Golden Oriole and Fieldfare, plus non-breeding



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000. Turtle Dove *Streptopelia turtur*, Cambridgeshire, August 2011. The Turtle Dove was the most abundant species to be assessed as Critically Endangered in Great Britain under criterion A2. This was due to a dramatic decline of 91% over the last three generations (16 years).

Table 4. A comparison of the main factors considered by the IUCN Regional Red List (IUCN 2012, 2016) and Birds of Conservation Concern (Eaton et al. 2015). *The figures relate to qualifying thresholds for Critically Endangered, Endangered, and Vulnerable respectively, for the main IUCN Criteria used to assess current and future trend (A2 & A4) and small population size (D1). Less stringent thresholds apply to species that show a combination of decline and limited population size.

Assessment component	Regional IUCN	BoCC
Trends in population size	Yes (declines of >80%, >50% and >30% *)	Yes (declines of >50% = Red, >25% = Amber)
Trends in range	Yes (declines of >80%, >50% and >30% *)	Yes (declines of >50% = Red, >25% = Amber)
Assessment period	Measured up to a maximum of three generations in the past	25 years, and 'long-term' (since 1969)
Population size	Yes (<50, <250, <1,000 mature individuals *)	Yes (<300 breeding pairs or <900 individuals wintering)
Restricted range	Yes (Extent of Occurrence and Area of Occupancy)	Yes (whether localised to a few sites)
Species status outside of region	In part via the assessment of 'rescue effects'	Yes; Global, European and/or flyway
International responsibility	No	Yes
Historical status	No	Yes

Red-necked Grebe *Podiceps grisegena*, undergoing declines of at least 80% over the previous three generations. Golden Oriole and Fieldfare are close to being lost as British breeders, with no records of proven breeding since 2009 and 2012 respectively. A further six populations qualified as Critically Endangered owing to predicted future declines (based on recent rates of decline): breeding Arctic Skua *Stercorarius parasiticus* and Kittiwake *Rissa tridactyla*, plus wintering Bewick's Swan *Cygnus columbianus*, Bean and White-fronted Geese *Anser albifrons* and Smew *Mergellus albellus*.

The percentage of birds categorised as Threatened in GB (43%) is high compared with that in Europe (13%, Birdlife International 2015) and for most other taxonomic groups that have been assessed within GB (13%, Hayhow et al. 2016). There are good reasons for this. First, there are fundamental biological differences between taxonomic groups. Even scarce invertebrates or plants can still have populations in the thousands of individuals, and thus not approach qualification on the grounds of small population size. Secondly, and probably significant at least for other taxa in GB, is that data availability for birds far exceeds that of virtually any other taxonomic group, so species are able to be tested – and qualify against – more of the criteria. For example, criteria C and D1 are con-

cerned mainly with absolute population size, which is rarely known for invertebrates or plants. Similarly, criterion A largely concerns decline in population size and while this embraces change in range as well as numbers, sufficient data are rarely available for other taxa to allow frequent use of this criterion.

To illustrate this, we know that all birds qualifying as Threatened in GB were categorised using criteria A, C and/or D1 (these criteria being essentially those which rely on information on population size and/or trends). Within a group of 3,870 recently assessed invertebrates, just 11% were assessed as Threatened, but criteria A, C and D1 were used for only 13% of these (Natural England unpublished). Within this large invertebrate group are the butterflies, which are now relatively well monitored; both the percentage Threatened (31%) and the percentage of those Threatened owing to categorisation using criteria A, C and/or D1 (74%) are much more similar to the values for birds than the assessments for other invertebrates. Similarly, in the relatively well-recorded groups of vascular plants (excluding the so-called 'critical groups' – the very many recently recognised hawkweeds and dandelions), some 20% of the 1,794 taxa are Threatened, 69% of these due to categorisation against criteria A, C and/or D1. The fact that the better studied a taxon is, the more

likely it is to be found to be Threatened, is counter-intuitive but a product of the IUCN's multilayered assessment system and increased knowledge.

The proportion of threatened species from a given 'region' might be expected to increase as the size of the 'region' declines, other things being equal, so we might expect a larger proportion of birds to be threatened in GB than within those same species across Europe – although some criteria (A and E) are not scale-dependent and others (B and C) are only partly so, so this effect should not be overstated. We might also anticipate that GB's island status has the effect of reducing the likelihood of rescue from neighbouring populations, especially for more sedentary species. So while the proportion of threatened species in our assessment appears high, we can understand why. The most recent IUCN Red List for breeding birds in Switzerland – a smaller country (thus potentially with an increased threat risk) but surrounded by neighbouring populations (so potentially lowering the threat through greater rescue possibilities) and with similarly good data sources – is very similar to ours, with 39% of species categorised as Threatened (Keller *et al.* 2010).

Overall, the scale of threat observed in birds – and particularly birds in GB – is likely to be indicative of the true scale of threat across other taxa and in other areas and if monitoring improves to match that of GB's birds, this will become evident.

As noted in the introduction, the primary focus of the IUCN Red List process is on determining extinction risk, so is quite different from the BoCC assessment process, which embraces other attributes such as international importance (and thus responsibility) and historical decline (and thus current depletion). Much of the difference between the outputs of the two approaches can be explained by differences in their assessment criteria (table 4). One of the most significant differences is that declines in the IUCN process are assessed over generation lengths, as opposed to the set 25-year and long-term trends used across all species in BoCC. In many cases, particularly for passerines (since they have short generation lengths), the IUCN assessment process

employs a shorter time-frame to measure change. Consequently, a number of species that have declined dramatically in recent decades, but for which the pace of that decline has slowed more recently, are not identified as being at risk of extinction. From a BoCC perspective, species such as Skylark *Alauda arvensis*, Spotted Flycatcher *Muscicapa striata* and House Sparrow *Passer domesticus* are of high concern because their populations are much depleted, but these species have not declined to the extent that they fall below the thresholds set by IUCN for small population size or range. Another significant difference concerns the concept of international responsibility. Species such as Pink-footed Goose *Anser brachyrhynchus* and Razorbill *Alca torda*, which occur in the UK in internationally important numbers, do not qualify as IUCN Threatened, but are Amber-listed species in BoCC.

Interestingly, the IUCN process draws attention to a small number of species whose status is currently assessed as being of low conservation concern by Eaton *et al.* (2015), including Red-breasted Merganser *Mergus serrator*, Great Crested Grebe *Podiceps cristatus*, Moorhen *Gallinula chloropus*, Red-billed Chough *Pyrrhocorax pyrrhocorax*, Woodlark *Lullula arborea* and Greenfinch *Chloris chloris*. Although some of the differences may be explained by differences in assessment methods, and perhaps the sensitivity of the IUCN process to natural population fluctuations over short timescales, current declines in these species are of concern and warrant careful attention in future.

We identify a number of species in imminent danger of extinction in GB. However, there is much that GB conservation agencies and organisations are doing – and more that can be done – to prevent their loss. For example, targeted recovery programmes have been successful in halting losses, and in effecting modest recoveries in species such as Stone-curlew *Burhinus oedicnemus*, Corn Crake *Crex crex* and Cirl Bunting *Emberiza cirlus*, even though these species remain absent from much of their historical ranges and in much-depleted numbers. Perhaps only the Red Kite *Milvus milvus* is showing recovery to a situation that may approach

historical levels. The UK has lost eight species of breeding bird in the last 200 years. Three of those have been recently lost (Temminck's Stint, Wryneck and Serin) and we suspect that two more may be imminent (Fieldfare and Golden Oriole). Anthropogenic pressures, perhaps most significantly from climate change, show no signs of abating and may continue to drive an increasing rate of depletion and, ultimately, of regional extinction (Szabo *et al.* 2012; Burns *et al.* 2016). While preventing extinction is the final, no-regrets measure of conservation action, we must be careful to guard against the loss of a wider perspective and work towards an ultimate goal of restored, healthy ecosystems and landscapes across the country.

We categorised Little Auk, Herring and Lesser Black-backed Gulls as Data Deficient, highlighting the lack of sufficient information to assess these species adequately. The status of our large gulls is a concern. There is good evidence of significant loss and decline at 'traditional' colonies but little robust information on numbers and breeding success in urban areas where populations are thought to be increasing but where there are efforts to limit their numbers. This assessment has again highlighted a wider problem with seabird data. Britain is of international importance for its breeding seabirds, but the last full census was in 1998–2002 (Mitchell *et al.* 2004). Changes in some seabirds are monitored adequately by the SMP, but no reliable trends are available currently for Manx Shearwater *Puffinus puffinus*, the storm-petrels, Black Guillemot *Cephus grylle* or Puffin *Fratercula arctica*. The limited evidence available suggests that none of these species has declined at a sufficiently rapid rate to approach the IUCN thresholds but we cannot be certain of this. Up-to-date information for many of our seabirds is urgently required.

Eaton *et al.* (2015) drew attention to other gaps in our knowledge, and many of these remain an issue. Some of the additional gaps highlighted during this assessment were recent data in breeding populations of Water Rail *Rallus aquaticus*, Greenshank *Tringa nebularia*, European Nightjar *Caprimulgus europaeus*, Crested Tit *Lophophanes cristatus*, Woodlark, Dartford Warbler *Sylvia undata*

and Hawfinch *Coccothraustes coccothraustes*, and non-breeding trends for Skylark, Common Starling *Sturnus vulgaris*, Water Pipit *Anthus spinoletta*, Brambling *Fringilla montifringilla*, Snow Bunting *Plectrophenax nivalis* and Lapland Bunting.

This new listing is important because it is the first assessment of the extinction risk faced by Britain's birds to have been conducted in accordance with the widely accepted IUCN guidelines. It allows the threats faced by birds to be placed in the same context as those for other species, making it possible to identify priorities across taxonomic groups using a standard approach. By repeating the exercise at intervals – perhaps every six years – we ought to be able to measure changes in extinction risk, not only for birds, but across all taxa for which we have assessments. This provides a new and powerful means for identifying adverse trends, and for recognising and celebrating conservation successes. In addition, while we still believe that the wider view taken by BoCC assessments provides a more robust basis for identifying priority bird species, the risk of extinction is easily communicated and allows us to garner widespread support for conservation action: 'the Turtle Dove is Critically Endangered in Britain' is a powerful message.

We have been careful to emphasise that the IUCN assessment of extinction risk and BoCC are different assessments. Clearly, however, the two are complementary and interrelated. On the one hand, those conducting the next BoCC assessment (BoCC5) should give consideration as to how it might incorporate the new IUCN threat assessments. On the other, the IUCN process might evolve to include species' populations with other attributes that indicate signs of conservation concern – such as the endemics, near-endemics, those species with populations depleted far below the levels of historical times, and those declining steadily over several decades.

Acknowledgments

The authors would like to acknowledge the cumulative millions of hours that volunteers have contributed to the surveys and monitoring schemes that underpin assessments such as this. We would like to take this opportunity to thank Alex Banks, Helen Booker, Jamie

Boyle, Malcolm Burgess, Niall Burton, John Clark, John Eyre, Mark Hancock, Daniel Hayhow, Chris Heward, Dario Massimino, Tony Morris, Andy Musgrove, Susan Rendell-Read, Jen Smart, Des Sussex, Mark Thomas, Phil Warren, Nick Wilkinson, Ilka Win and Simon Wotton for providing data or species-specific advice; and Ian Burfield, Caroline Pollock and Andy Symes for guidance on the IUCN process. We are also very grateful to Ian Taylor and John Martin for detailed and insightful comments on the draft assessments and manuscript.

This assessment is Number 34 in the GB Species Status series and was funded by RSPB and Natural England as part of the 'Action for Birds in England' partnership.

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