

Birds of Conservation Concern in Ireland 4: 2020–2026

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This is the fourth review of the status of birds in Ireland. Two hundred and eleven species were assessed and assigned to the Red, Amber or Green list of conservation concern. The criteria mainly follow previous assessments of conservation status at global and European levels; and within Ireland, include historical decline, trends in population and range, rarity, localised distribution and international importance. The availability of more data has allowed us to move closer towards the ideal time windows of existing criteria. Results show 23 species moving onto the Red list and only six leaving it. Twelve species are newly Red-listed due to changed European or global status. Three are Red-listed due to declines within the expanded short-term breeding time period. There is no doubt that having 54 (25.6%) of Ireland's regularly occurring bird species now on the Red list is alarming, with some species having shown dramatic declines and losses on this island. Existing conservation concerns are reinforced, such as the further catastrophic decline of waders with six more wading bird species joining the Red list; and generalist birds of farmland, like Kestrel *Falco tinnunculus* now Red-listed. When grouped by habitat, upland (50%) and farmland (35%) have the highest proportions of Red-listed species. Snipe *Gallinago gallinago* is now Red-listed with severe declines in its breeding and wintering populations and Swift *Apus apus* is Red-listed due to a decline in its breeding population. Good news comes from some recovery in the populations of species such as Black-headed Gull *Larus ridibundus* and European Herring Gull *Larus argentatus* which move from Red to Amber.

Introduction

This is the fourth assessment of Birds of Conservation Concern in Ireland (BoCCI4) based on an existing prioritisation procedure (e.g. Eaton *et al.* 2015). This assessment covers the island of Ireland, both the Republic of Ireland (RoI) and Northern Ireland (NI). Our objective is to update the list



of priority birds, so that limited resources for their recovery can be targeted in the most effective way. The first such list in Ireland (BoCCI1) (Newton *et al.* 1999) was based on the then relatively new UK system (Avery *et al.* 1995, Gibbons *et al.*

Plate 1. Balearic Shearwater (Niall Keogh).

1996) which updated and replaced existing Red-listing methods (Batten *et al.* 1990, Whilde 1993). Since then, BoCCI has been reviewed approximately every seven years (BoCCI2 (Lynas *et al.* 2007), BoCCI3 (Colhoun & Cummins 2013)) to ensure that new data are incorporated and emerging threats to existing bird populations are identified. The process involves collating quantitative data that describe bird populations and their distributions. These are assessed using criteria with set thresholds which place species within a 'traffic light' category of conservation concern. Each species on the resulting list are assigned with Red, Amber or Green levels of concern, with Red being the highest conservation priority. As is usual in these assessments, some of the criteria, which may trigger a species to be Red or Amber-listed, reflect global or European status regardless of how the species is faring in Ireland. It is important to have this wider context in status assessments to ensure protection of populations which are declining elsewhere in their range.

Many of the data are collected by volunteers who follow standardised survey methods for breeding and wintering birds to determine their abundance across a wide range of habitats. It is this multitude of individual efforts over time that enables us to take an overview of the health of bird species' populations and the importance of both the increased coverage of standardised bird surveys and of the longevity of repeat monitoring schemes across Ireland cannot be overstated in this respect. Standardised long-running bird surveys are organised in RoI mainly by BirdWatch Ireland (BWI) and the National Parks and Wildlife Service (NPWS) and in NI by the British Trust for Ornithology (BTO), the Royal Society for the Protection of Birds (RSPB) and the Joint Nature Conservancy Council (JNCC). Examples are, the Countryside Bird Survey (CBS) (Lewis *et al.* 2019a) and the Irish Wetland Bird Survey (I-WeBS) (Lewis *et al.* 2019b), both funded by the NPWS and coordinated by BWI in RoI; and the BTO/JNCC/RSPB Breeding Bird Survey (BBS) (Harris *et al.* 2020) and the BTO/JNCC/RSPB Wetland Bird survey (WeBS) (Frost *et al.* 2020) in NI. The ability to use equivalent data to make assessments across Ireland is invaluable.

The last BoCCI assessment (Colhoun & Cummins 2013) identified challenges for the future, such as the need to address data gaps for groups of species like breeding seabirds which require dedicated surveys; and a lack of standardised processes to collate data for some widely dispersed, scarce and passage species. Here we will report on progress in the last seven years on the many challenges that were listed.

Publication of the previous lists of priority Irish birds has helped to highlight conservation threats, such as the decline of species associated with farmland habitats (Lynas *et al.* 2007, Colhoun & Cummins 2013) and this in turn has resulted in conservation actions such as targeted agri-environment options and monitoring (Ó Huallacháin *et al.* 2015, Colhoun

et al. 2017). Ireland's National Biodiversity Action Plan (NPWS 2017) refers to the BoCCI3 list of priority species as a tool for targeted recovery. BoCCI has highlighted the critical status of severely declining species such as Curlew *Numenius arquata* with trans-disciplinary initiatives for their recovery sought across Ireland (Young *et al.* 2020) such as the Curlew Taskforce (<https://www.npws.ie/sites/default/files/general/curlew-taskforce-recommendations.pdf>). The continued updating of this list provides a quantitative check on the fate of species or groups of species, known to be vulnerable to ongoing wider threats such as climate change and the loss of wintering habitat of long-distance migrants.

Every previous BoCCI assessment has identified the declines of breeding wader populations as a priority issue, with the number of declining wader species growing with each assessment (Newton *et al.* 1999, Lynas *et al.* 2007, Colhoun & Cummins 2013). Alongside wintering populations of diving ducks highlighted in BoCCI3, other wintering waterbirds that occur in numbers of international importance remained on the Red list; and similarly in this update we will be looking for suites of species giving cause for concern which may be an indication of wider environmental problems while those moving from the Red category may be showing signs of recovery.

While there is some purpose to moving to the detailed criteria as used by the UK as it is a well-used and trusted methodology, the bird community composition (Kelly *et al.* 2014), the habitats, the legislation and the people are different in Ireland, so a separate assessment is required for the island of Ireland.

We aim to compile and review the latest data on bird populations to make priority assessments using standardised criteria. We list the birds of Ireland according to the category of their conservation status and we look for common explanations as to the assemblage of species of most concern. We also look across all four assessments since 1999 to determine any patterns of changing status.

Methods

Species list

Our starting point for species to assess was the Irish list of 468 bird species which have occurred once in a natural state in Ireland between 1950 and December 2019, (Irish Rare Birds Committee [http://www.irbc.ie/topbar/IrishList/IRBC_IrishList\(31122018\).pdf](http://www.irbc.ie/topbar/IrishList/IRBC_IrishList(31122018).pdf)). We follow the taxonomic list and nomenclature of BirdLife International (<http://datazone.birdlife.org/species/taxonomy>). We filtered this list to include birds directly connected with Ireland and its coastal waters, and for which data exist. Our filtering process included breeding species which have been or have become established (probable or confirmed as

breeding consecutively for ten years) since approximately 1800 (Gärdenfors *et al.* 2001). We did not include vagrants, classed as species that have accidentally strayed from their usual range or blown off their usual migration course. In BoCCI3, rarities were not included if they had not bred in Ireland on at least one occasion during the previous (2003–2012) assessment period. In this assessment (as in Eaton *et al.* 2015), rarities were not included if they had not bred (or strongly suspected to have bred) for five consecutive years within the most recent 25 years for which data are available (Perry 2014, Smiddy *et al.* 2014). Wherever possible decisions were based on evidence or expert opinion from the Irish Rare Breeding Birds Panel. As for previous BoCCI species lists, recently introduced non-native species with a self-sustaining breeding population were not assessed. The Irish populations of Brent Goose *Branta bernicla*, Bean Goose *Anser fabalis*, Greater White-fronted Goose *Anser albifrons* and Redpoll *Acanthis flammea* almost entirely consist of recognised subspecies, however all assessments are made for full species to ensure that all criteria including global and European importance can be considered. This is consistent with previous BoCCI assessments.

Seasonal occurrence of species

Birds associated with Ireland, as breeding and as non-breeding (wintering or passage), were assessed primarily on the population present in the breeding season. If populations present during the breeding and non-breeding season are independent and data were available, an assessment was also made for the non-breeding season. Where species were excluded from assessment in the breeding season due to scarcity or being classed as former breeders, they may have had better-established non-breeding populations and were assessed accordingly. We have included a few Globally Threatened species (BirdLife International 2020) that have occurred in Ireland and whose scarcity is uncertain (Balearic Shearwater *Puffinus mauretanicus*, Velvet Scoter *Melanitta fusca*, Leach's Storm-petrel *Hydrobates leucorhous* and Snowy Owl *Bubo scandiacus*). Non-breeding species were more often assessed within the 'wintering' category for which there are more data here however, species such as Yellow-legged Gull *Larus michaëllis* and Ring-billed Gull *Larus delawarensis* may be more correctly termed non-breeding as they may arrive in Ireland, post breeding, in the summer months. Passage species are less easy to assess but may also depend on Ireland for a crucially important part of their year and life cycle. Ireland and its coastal waters may be a usual part of their migration or flyway route to stop off and feed and rest. As such, passage species are most frequently recorded in or around Ireland in the autumn and/or spring. Waxwing *Bombicilla garrullus* is the only species classed as a winter

irruptive, where numbers arriving in Ireland are unpredictable and dependent on factors like weather and food availability elsewhere.

Assessment criteria used

BoCCI assessments are made using quantitative criteria that classify species as Red, Amber or Green in terms of conservation priority. All species are assessed against both Red and Amber criteria, then placed on the highest priority list for which they qualify, and if they meet none of these criteria, they are placed on the Green list. Data deficient species can fall onto the Green list by default and a species can be assigned Green when perhaps if more data was available, it would not be so, this is further explored in the Data Gaps section below.

The first Irish Birds of Conservation Concern assessment was based on criteria developed for the UK with allowances for data availability. It is important to be able to make meaningful comparisons to previous assessment results and the criteria for BoCCI4, largely followed BoCCI3, with the following exceptions. As widespread standardised monitoring data are becoming available in Ireland for a longer period, we have adjusted the 'short-term time periods' used for assessment; which are now closer to 25 years (as for BoCCUK), and these can remain at 25 years in future assessments. There are other criteria used in BoCCUK which are not used in BoCCI and these have not been introduced here. These are non-breeding Rarity (WR), non-breeding Range Decline (WDR) and Historic Decline Recovery (HD-Rec) which are absent from BoCCI; and also BoCCI has a higher threshold for Range Decline (70% rather than 50% to qualify as Red; and 35% rather than 25% to qualify as Amber), these differences with BoCCUK remain.

Former breeders

Species were excluded from further assessment and placed on the list of Former Breeders if they had not bred in any of the ten most recent years for which data were available. BoCCUK specify five years (Eaton *et al.* 2015) and there are no set rules in IUCN guidelines (IUCN 2012). The conservation status of these species is presented separately.

Red list criteria

IUCN: This criterion puts species' status into a global context, with any species classified as Globally Threatened (Critically Endangered, Endangered or Vulnerable, but not Near Threatened; IUCN 2020) being Red-listed. These species are recognised as the highest priorities for action at a global scale and are thus priorities at an Ireland level.

SPEC 1: This criterion provides a European context. The conservation status of all European species was assessed most



Plate 2. Quail - a Red-listed species (BirdLife International)

recently by BirdLife International (2017a). SPEC 1 species are those of global conservation concern (including those classified as Near Threatened).

HD: Historical decline in breeding population. Species that declined severely in the historic past (since 1800) but have not subsequently recovered are classified as Red-listed. We rechecked, but left the historical decline assessments unchanged from BoCCI3, which lists a range of data sources including Holloway (1996), Gibbons *et al.* (1993), Ussher & Warren (1900), Kennedy *et al.* (1954), Ruttledge (1966), Hutchinson (1989), Whilde (1993) and D'Arcy (1999).

BDp: Breeding population decline over short (BDp1) and longer (BDp2) time periods. Severe decline in breeding population size (>50%) over 25 years (BDp1) which in effect was 'as close as possible' to 25 years and mainly 1998–2018. The longer term (BDp2), was defined as the entire period used for assessments since the first review, starting circa 1980. In the previous BoCCI3 assessment, short-term declines (BDp1), were over 13 years (1998–2011) and longer-term declines (BDp2), were closer to 25 years (1980–2013).

WDp: Non-breeding population decline by short (WDp1) and longer (WDp2) time periods. Severe decline in non-breeding population size (>50%) over the approximate 20-year period 1994 to 2015/16 (WDp1) or the longer-term approximate 30-year period from the 1980s to 2015/16 (WDp2).

BDr: Breeding range decline by short (BDr1) and longer (BDr2) time periods. Severe declines in breeding range of 70% or more over a short time period of about 20 years, comparing the recent Bird Atlas (2007–11) (Balmer *et al.* 2013) with the preceding Bird Atlas (1988–91) (Gibbons *et al.* 1993) (BDr1); and a longer time period of about 40 years, comparing the most recent Bird Atlas (2007–11) with the first Bird Atlas (1968–72) (Sharrock 1976) (BDr2). As measured by the change in the number of occupied 10km squares.

Amber list criteria

SPEC 2 and **SPEC 3:** Categories that depict an unfavourable conservation status in Europe, but not necessarily global concern. SPEC 2 are species for which the global population is concentrated in Europe. SPEC 3 species are those for which the global population is concentrated outside Europe.

BDMp: Moderate breeding population decline over short (BDMp1) and longer (BDMp2) time periods. Equivalent time periods as for BDP, but with moderate percentage change (25% to 49%) to qualify species as Amber-listed.

WDMp: Moderate non-breeding population decline in abundance of 25% to 49% over the same short (WDMp1) and longer (WDMp2) time periods as in WDP.

BDMr: Moderate breeding range decline over short (BDMr1) and longer (BDMr2) time periods. Equivalent breeding atlas time periods as for BDr, but with moderate percentage change (35% to 69%) to qualify species as Amber-listed.

BR: Breeding rarity: A population of fewer than 100 breeding pairs in Ireland.

BL or WL: Localised breeding or non-breeding populations. Species were considered localised if more than 50% of the population was found at ten or fewer sites in either the breeding (BL) or the non-breeding (WL) season. Rare breeders (see above) were not assessed against this criterion, as their small population sizes predispose them to be restricted to a small number of sites.

BI or WI: Internationally important breeding or non-breeding population. Where the Irish population represents more than 20% of the European population in either the breeding or non-breeding season, then the species is of international importance and qualifies for the Amber list.

Data sources

This assessment was only possible with the availability of baseline bird data from organised monitoring and the collaboration and co-operation of conservation organisations in both the Republic of Ireland and Northern Ireland. Monitoring carried out by dedicated volunteers and professional surveyors forms the bedrock of this assessment. Organised annual monitoring and species-specific surveys do not cover all species and the existing data gaps for these species undoubtedly affects their assessment results. We only summarise the main sources of data and their treatment here and further species-specific detail on data used per criteria can be provided (on request).

Breeding bird trend data for common and widespread breeding species were available from the Countryside Bird Survey (CBS) from the Republic of Ireland (1998–2019) (Lewis *et al.* 2019b) and Breeding Bird Survey (BBS) data from Northern Ireland (1994–2019) (Harris *et al.* 2020). These data, in species index form, were combined for both surveys by weighting the unsmoothed indices by respective year-specific population size and adding the results to form an annual combined estimate (Gibbons 2000). This estimate was smoothed for each species by applying a generalized additive

model (Fewster *et al.* 2000, Massimo *et al.* 2019). These trends were calculated for 51 species across Ireland (1998–2019) including 16 species with BBS coverage in Northern Ireland (of 15–30 survey squares rather than the desired 30+). The short-term breeding population BDP1 criteria was based on 1998–2018 trends for these common and widespread species, but there were large gaps in data on longer term trends BDP2 for these species. Data sources for other breeding species include over 100 species-specific reports for the Republic of Ireland produced to inform EU Birds Directive Article 12 Reporting (<https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-12>). From these we used the short (1998/02–2015/18) and long-term (1985/87–2015/18) trends for breeding seabirds (Cummins *et al.* 2019) alongside BTO seabird reports for Northern Ireland (Booth-Jones *et al.* 2020). Trends for rarer breeding birds were available from Crowe (2019) and rare bird reports from across Ireland (e.g. Barton & Flynn 2019) as well as from expert opinion, and short-term trends were largely based on more recent years (2006–2016). Species-specific reports, for example on Hen Harrier *Circus cyaneus* (Ruddock *et al.* 2016) and Red Grouse *Lagopus lagopus* (Cummins *et al.* 2015), were used where available, with some of these being out of date, for example Chough *Pyrrhocorax pyrrhocorax* (Gray *et al.* 2003, Johnstone *et al.* 2007, Barham *et al.* 2009).

Wintering waterbird trend (WDP) data for 48 species came from the results of an analysis of short-term trends in counts combining WeBS (BTO/JNCC/RSPB) and I-WeBS (NPWS/BirdWatch Ireland) data for the 16-year period 1994 to 2015/2016 (WDP1). A long-term trend comparing population estimates for the period 2011/12–2015/16 (Burke *et al.* 2018) with the national population estimates produced for the mid-1980s (Sheppard 1993) (about 25 years; WDP2) was calculated for 34 species.

To measure trends in range, we relied on the three Breeding Bird Atlases (Sharrock 1976, Gibbons *et al.* 1993 and Balmer *et al.* 2013). Although the data had not changed, for consistency these were recalculated from the last assessment. The percentage change in the total number of occupied 10-km squares was calculated using 'confirmed', 'probable' and 'possible' (except for seabirds) breeding categories from the most recent Bird Atlas (Balmer *et al.* 2013) and using both 'breeding' or 'seen' categories from the previous atlases. Species present in fewer than 15 squares during both atlas periods were excluded from the analysis. We only deviated from the use of atlas data where more recent estimates of range change were available for the Republic of Ireland (mainly from Article 12 reporting). In this latter case, these were used in conjunction with atlas range changes for Northern Ireland to estimate trends.

We used data from breeding population estimates for Ireland for assessments of breeding rarity and international



Plate 3. Bearded Reedling (Dick Coombes).

importance and these were derived from the following sources: Crowe *et al.* (2014); Burke *et al.* (2018); Lewis *et al.* (2019a); Lewis *et al.* (2019b); Cummins *et al.* (2019); Woodward *et al.* 2020; RoI Article 12 Reporting (<https://www.eionet.europa.eu/etcs/etc-bd/activities/reporting/article-12>). Expert opinion (from IRBBP members) was called upon to assess whether some species were likely to be under or over 100 breeding pairs. European population estimates were taken from BirdLife International (2017a). For non-breeding waterbirds, population estimates were also assessed against the relevant flyway estimates published by Wetlands International (<http://wpe.wetlands.org>). To assess whether populations were localised in the breeding BL and non-breeding seasons WL; additional data were used

for colonial seabirds from the results of Seabird 2000 (Mitchell *et al.* 2004), whereas for waterbirds mean WeBS/ I-WeBS site counts between winter 2011/12 and 2015/16 were extracted from Lewis *et al.* (2019a) for the Republic of Ireland and WeBS online report (<https://app.bto.org/webs-reporting/>) for Northern Ireland. BL was calculated for all relevant species, however due to the paucity of data on non-breeding populations WL was calculated for 50 species.

The changing status of 196 species, included within all four BoCCI assessments was examined. We grouped species according to habitat following Gibbons *et al.* (1993), species groupings and taxonomy are self-explanatory, with classification of long-distant migrants following Vickery *et al.* (2014).

Table 1. Former regular breeders in Ireland. Species which appear to have bred for a minimum of 10 consecutive years since 18th century, but with no probable or confirmed breeding in the last 10 years. Some species have been assessed against Red and Amber list criteria in BoCCI4 for either their wintering or passage populations.

Species	Most recent evidence of breeding	
Western Capercaillie <i>Tetrao urogallus</i>	ca.1750	Yalden & Carthy 2004
Turtle Dove <i>Streptopelia turtur</i>	1980s	Gibbons <i>et al.</i> 1993
Bittern <i>Botaurus stellaris</i>	ca.1840	Sharrock 1976
Great Auk <i>Pinguinus impennis</i>	1834	Serjeantson 2001
Osprey <i>Pandion haliaetus</i>	ca. 1790	Bijleveld 1974
Woodlark <i>Lullula arborea</i>	mid-19th century; but two subsequent records in 1905 and 1954.	Langston <i>et al.</i> 2007
Corn Bunting <i>Emberiza calandra</i>	1992	Lynas <i>et al.</i> 2007

Results

A total of 211 species were assessed in BoCCI4 as having Red, Amber or Green conservation status in Ireland. There was some updating of the species list from BoCCI3 in line with the methods. The following species were not known to have had probable or confirmed breeding for a minimum of ten consecutive years since about 1800, and were therefore excluded as breeding species: Goldeneye *Bucephala clangula*, Scaup *Aythya marila*, Pintail *Anas acuta*, Cory's Shearwater *Calonectris borealis*, Avocet *Recurvirostra avosetta*, Black-tailed Godwit *Limosa limosa*, Greenshank *Tringa nebularia*, Yellow-legged Gull *Larus michabellis*, Black Tern *Chlidonias niger*, Snowy Owl *Bubo scandiacus*, Montagu's Harrier *Circus pygargus* and Lesser Whitethroat *Sylvia curruca*. This took Lesser Whitethroat and Avocet off our assessment list (Avocet was classed as extinct in BoCCI3), with the rest assessed for their non-breeding populations. We would recommend that Lesser Whitethroat is considered in the next assessment as breeding data may surface. A further ten species have been added for assessment in BoCCI4: Bean Goose, Spoonbill *Platalea leucorodia*, Bittern *Botaurus stellaris*, Black Tern, Snowy Owl, Wryneck *Jynx torquilla*,

Hobby *Falco subbuteo*, Tree Pipit *Anthus trivialis* and Water Pipit *Anthus spinoletta* for their non-breeding populations and Bearded Reedling *Panurus biarmicus* for its breeding population.

Seven species were classed as Former Breeders (Table 1) and their breeding populations were not assessed further. Of these, Turtle Dove *Streptopelia turtur* was assessed as a breeding species in BoCCI3 and is assessed here as a passage species; the rest were not assessed last time. Common Crane *Grus grus* was not considered in BoCCI4, as although once common in Ireland, the last breeding population was in the 17th century. Two species were almost included on this list of Former Breeders, Pied Flycatcher *Ficedula hypoleuca* and Western Yellow Wagtail *Motacilla flava*, as both breed irregularly and there is uncertainty as to the last confirmed year of breeding, but we have included and assessed both of these species as breeding and passage species.

Of the 211 species, BoCCI4 placed 54 (25.6%) on the Red list, 79 (37.4%) on the Amber list and 78 (37%) on the Green list. Lists of species' qualifying criteria and previous assessment are given in Tables 2–4. There has been considerable change in species prioritisation since BoCCI3 with 25% of those reassessed species changing their status Table 5.



Plate 4. Western Capercaillie, a former regular breeder in Ireland (Louise Greenhorn - rspb-images.com).

Table 2. Species on the BoCCl4 Red list, the criteria under which they qualify, and all-Ireland estimated values for those criteria. Seasons assessed are breeding (B), passage (P) and wintering (W). The status R (Red), A (Amber), G (Green) or na (not assessed) in the previous BoCCl assessment (Colhoun & Cummins 2013; BoCCl3). **Red** or **Amber** list criteria and values that fulfil these thresholds and categories.

Season	BoCCl3	IUCN	SPEC 1, 2 or 3	HD	BDp1 or BDMp1	BDp2 or BDMp2	WDp1 or WDMp1	WDp2 or WDMp2	BDp1 or BDMp1	BDp2 or BDMp2	BR	BL	WL	BI	WI
Quail Coturnix coturnix	B	R	3	Y						-54%	Y				
Grey Partridge Perdix perdix	B	R	2	Y	>-25%<50%	>-50%			-66%	-95%					
Red Grouse Lagopus lagopus	B	R	3							-66%					
Bewick's Swan Cygnus columbianus	W	R	3				-99%	-99%					Y		
Long-tailed Duck Clangula hyemalis	W	R	1				-82%						Y		
Eider Somateria mollissima	BW	A	1												
Velvet Scoter Melanitta fusca	W	R	1												
Common Scoter Melanitta nigra	BW	R			>-25%>61%		-43%				Y		Y		
Goldeneye Bucephala clangula	W	R					-68%						Y		
Pochard Aythya farina	BW	R	1				-77%		-40%	-53%	Y		Y		
Scaup Aythya marila	W	A	3				-58%						Y		
Shoveler Spatula clypeata	BW	R					-33%	-52%			Y		Y		
Slavonian Grebe Podiceps auritus	W	A	1												
Black-necked Grebe Podiceps nigricollis	B	R		Y							Y				
Stock Dove Columba oenas	B	A			-54%				-40%	-47%					
Turtle Dove Streptopelia turtur	P	A	1						-90%	-94%					
Nightjar Caprimulgus europaeus	B	R	3	Y						-95%	Y				
Swift Apus apus	B	A	3		-56%				-38%	-47%					
Corncrake Crex crex	B	R	2		-83%				-69%	-91%					
Leach's Storm-petrel Hydrobates leucorhous	B	R	1									Y			
Balearic Shearwater Puffinus mauretanicus	P	R	1												
Oystercatcher Haematopus ostralegus	BW	A	1										Y		

[illegible]

Table 3. Species on the BoCCl4 Amber list, the criteria under which they qualify, and all-Ireland estimated values for those criteria. Seasons assessed are breeding (B), passage (P) and wintering (W). The status R (Red), A (Amber), G (Green) or na (not assessed) in the previous BoCCI assessment (Colhoun & Cummins 2013; BoCCl3). Amber list criteria and values that fulfil the thresholds and categories. * considered internationally important for the following flyway populations: Pale-bellied Brent Goose *B. b. hrota*, Greenland Barnacle Goose *B. leucopsis* and Greenland White-fronted Goose *A. a. flavirostris*.

	Season	BoCCl3	SPEC	BDMp1	BDMp2	WDMp1	WDMp2	BDMt1	BDMt2	BR	BL	WL	BI	WI
Mute Swan	Cygnus olor	B/W	A									Y		100%
Whooper Swan	Cygnus cygnus	B/W	A							Y		Y		45%
Brent Goose	Branta bernicla	W	A									Y		96%*
Barnacle Goose	Branta leucopsis	W	A											23%*
Greylag Goose	Anser anser	W	A									Y		
Greater White-fronted Goose	Anser albifrons	W	A									Y		47%*
Smew	Mergellus albellus	W	A	3										
Goosander	Mergus merganser	B	A							Y				
Red-breasted Merganser	Mergus serrator	B/W	G	3		-34%			-50%			Y		
Shelduck	Tadorna tadorna	B/W	A			-30%						Y		
Tufted Duck	Aythya fuligula	B/W	R	3		-34%						Y		
Garganey	Spatula querquedula	B	A	3						Y				
Gadwall	Mareca strepera	B/W	A							Y		Y		
Wigeon	Mareca penelope	B/W	R			-38%	-44%			Y		Y		
Mallard	Anas platyrhynchos	B/W	G			-41%								
Pintail	Anas acuta	W	R	3								Y		
Teal	Anas crecca	B/W	A						-46%					
Great Crested Grebe	Podiceps cristatus	B/W	A			-43%						Y		
Spotted Crane	Porzana porzana	B	A							Y				
Coot	Fulica atra	B/W	A	3		-35%			-36%			Y		
Red-throated Diver	Gavia stellata	B/W	A	3		-39%				Y				
Black-throated Diver	Gavia arctica	W	A	3										
Great Northern Diver	Gavia immer	W	A	3										44%

[illegible]

Table 3 (continued). Species on the BoCCl4 Amber list, the criteria under which they qualify, and all-Ireland estimated values for those criteria. Seasons assessed are breeding (B), passage (P) and wintering (W). The status R (Red), A (Amber), G (Green) or na (not assessed) in the previous BoCCl assessment (Colhoun & Cummins 2013; BoCCl3). Amber list criteria and values that fulfil the thresholds and categories. * considered internationally important for the following flyway populations: Pale-bellied Brent Goose *B. b. hrota*, Greenland Barnacle Goose *B. leucopsis* and Greenland White-fronted Goose *A. a. flavirostris*.

Species	Season	BoCCl3	SPEC	BDMp1	BDMp2	WDMp1	WDMp2	BDMt1	BDMt2	BR	BL	WL	BI	WI
Goshawk	Accipiter gentilis	B	A							Y				
Kingfisher	Alcedo atthis	B	A	3	-45%									
Wryneck	Jynx torquilla	P	na	3										
Merlin	Falco columbarius	B	A						-40%					
Chough	Pyrrhonorax pyrrhonorax	B	A	3	-33%				-29%					
Skylark	Alauda arvensis	B	A	3										
Bearded Reedling	Panurus biarmicus	B	na							Y				
House Martin	Delichon urbicum	B	A	2										
Swallow	Hirundo rustica	B	A	3										
Sand Martin	Riparia riparia	B	A	3										
Willow Warbler	Phylloscopus trochilus	B	G	3										
Starling	Sturnus vulgaris	B	A	3										
Spotted Flycatcher	Muscicapa striata	B	A	2										
Pied Flycatcher	Ficedula hypoleuca	B/P	A							Y				
Northern Wheatear	Oenanthe oenanthe	B	A	3										
Goldcrest	Regulus regulus	B	A	2										
House Sparrow	Passer domesticus	B	A	3										
Tree Sparrow	Passer montanus	B	A	3										
Tree Pipit	Anthus trivialis	P	na	3										
Western Yellow Wagtail	Motacilla flava	B/P	A	3						Y				
Brambling	Fringilla montifringilla	W	G	3										
Greenfinch	Chloris chloris	B	A		-48%									
Linnet	Linaria cannabina	B	A	2										

Table 4. Species on the BoCCI4 Green list. These species did not fulfil any Red or Amber list assessment criteria. Seasons assessed are breeding (B), passage (P) and wintering (W). The status R (Red), A (Amber), G (Green) or na (not assessed) in the previous BoCCI assessment (Colhoun & Cummins, 2013; BoCCI3).

Species	Season	BoCCI3	Species	Season	BoCCI3
Bean Goose <i>Anser fabalis</i>	W	na	Rook <i>Corvus frugilegus</i>	B	G
Pink-footed Goose <i>Anser brachyrhynchus</i>	W	G	Raven <i>Corvus corax</i>	B	G
Little Grebe <i>Tachybaptus ruficollis</i>	B/W	A	Hooded Crow <i>Corvus corone</i>	B	G
Rock Dove <i>Columba livia</i>	B	G	Coal Tit <i>Periparus ater</i>	B	G
Woodpigeon <i>Columba palumbus</i>	B	G	Blue Tit <i>Cyanistes caeruleus</i>	B	G
Collared Dove <i>Streptopelia decaocto</i>	B	G	Great Tit <i>Parus major</i>	B	G
Cuckoo <i>Cuculus canorus</i>	B	G	Sedge Warbler		
Water Rail <i>Rallus aquaticus</i>	B	G	<i>Acrocephalus schoenobaenus</i>	B	G
Moorhen <i>Gallinula chloropus</i>	B	G	Reed Warbler <i>Acrocephalus scirpaceus</i>	B	A
Sooty Shearwater <i>Ardenna grisea</i>	P	R	Grasshopper Warbler <i>Locustella naevia</i>	B	G
Great Shearwater <i>Ardenna gravis</i>	P	G	Chiffchaff <i>Phylloscopus collybita</i>	B	G
Spoonbill <i>Platalea leucorodia</i>	W	na	Long-tailed Tit <i>Aegithalos caudatus</i>	B	G
Grey Heron <i>Ardea cinerea</i>	B/W	G	Blackcap <i>Sylvia atricapilla</i>	B	G
Little Egret <i>Egretta garzetta</i>	B/W	G	Garden Warbler <i>Sylvia borin</i>	B	G
Whimbrel <i>Numenius phaeopus</i>	P	G	Whitethroat <i>Sylvia communis</i>	B	G
Sanderling <i>Calidris alba</i>	W	G	Treecreeper <i>Certhia familiaris</i>	B	G
Little Stint <i>Calidris minuta</i>	P	G	Wren <i>Troglodytes troglodytes</i>	B	G
Jack Snipe <i>Lymnocyptes minimus</i>	W	A	Dipper <i>Cinclus cinclus</i>	B	G
Grey Phalarope <i>Phalaropus fulicarius</i>	P	G	Mistle Thrush <i>Turdus viscivorus</i>	B	A
Green Sandpiper <i>Tringa ochropus</i>	P	G	Song Thrush <i>Turdus philomelos</i>	B	G
Greenshank <i>Tringa nebularia</i>	W	G	Blackbird <i>Turdus merula</i>	B	G
Sabine's Gull <i>Xema sabini</i>	P	G	Fieldfare <i>Turdus pilaris</i>	W	G
Ring-billed Gull <i>Larus delawarensis</i>	W	G	Robin <i>Erithacus rubecula</i>	B	A
Yellow-legged Gull <i>Larus michahellis</i>	W	G	Black Redstart <i>Phoenicurus ochruros</i>	P/W	G
Iceland Gull <i>Larus glaucoideus</i>	W	G	Stonechat <i>Saxicola torquatus</i>	B	A
Glaucous Gull <i>Larus hyperboreus</i>	W	G	Firecrest <i>Regulus ignicapilla</i>	P	G
Great Black-backed Gull <i>Larus marinus</i>	B/W	A	Waxwing <i>Bombicilla garrulus</i>	W	G
Arctic Skua <i>Stercorarius parasiticus</i>	P	G	Dunnock <i>Prunella modularis</i>	B	G
Pomarine Skua <i>Stercorarius pomarinus</i>	P	G	Water Pipit <i>Anthus spinoletta</i>	W	na
Little Auk <i>Alle alle</i>	P	G	Rock Pipit <i>Anthus petrosus</i>	B	G
Long-eared Owl <i>Asio otus</i>	B	G	Pied Wagtail <i>Motacilla alba yarrelli</i>	B	G
Sparrowhawk <i>Accipiter nisus</i>	B	A	Chaffinch <i>Fringilla coelebs</i>	B	G
Buzzard <i>Buteo buteo</i>	B	G	Bullfinch <i>Pyrrhula pyrrhula</i>	B	G
Great Spotted Woodpecker			Redpoll <i>Acanthis flammea</i>	B	G
<i>Dendrocopos major</i>	B	A	Common Crossbill <i>Loxia curvirostra</i>	B	G
Hobby <i>Falco subbuteo</i>	P	na	Goldfinch <i>Carduelis carduelis</i>	B	G
Peregrine Falcon <i>Falco peregrinus</i>	B	G	Siskin <i>Spinus spinus</i>	B	G
Jay <i>Garrulus glandarius</i>	B	G	Lapland Bunting <i>Calcarius lapponicus</i>	P	G
Magpie <i>Pica pica</i>	B	G	Snow Bunting <i>Plectrophenax nivalis</i>	W	G
Jackdaw <i>Corvus monedula</i>	B	G	Reed Bunting <i>Emberiza schoeniclus</i>	B	G

The Red list overall has increased by 17 species, with 23 species being newly Red-listed, including Knot *Calidris canutus* returning to the Red list, and Snowy Owl being assessed after an absence in BoCCI3. There are three new Red-listed species that have moved directly from the Green list. Both Redwing *Turdus iliacus* (assessed for its wintering population) and Curlew Sandpiper *Calidris ferruginea* (assessed as a passage species) are now Red-listed as

European species of global conservation concern (SPEC 1) (Birdlife International 2017a) and Purple Sandpiper *Calidris maritima* due to the severity of long and short-term declines in its wintering population. Of those species moving from the Amber to the Red list, 11 are of high conservation concern from a wider global (four) and European (seven) perspective and this elevates their priority for conservation consideration in Ireland. Two groups of species, seabirds (Puffin *Fratercula*

Table 5. Comparison of the numbers of species moving between Red, Amber and Green lists between BoCCI3 and BoCCI4.

		BoCCI4 species status↓				Total BoCCI3
		Red	Amber	Green	Not assessed	
BoCCI3 species status →	Red	31	5	1	0	37
	Amber	19	62	9	1	91
	Green	3	7	64	0	74
	Not assessed	1	5	4	-	10
	Total BoCCI4	54	79	78	1	212

arctica, Kittiwake *Rissa tridactyla* and Razorbill *Alca torda*) and waders (Oystercatcher *Haematopus ostralegus*, Bar-tailed Godwit *Limosa lapponica*, Black-tailed Godwit *Limosa limosa* and Knot), make up many of these now internationally important Irish populations. The demise of these species outside of Ireland, across their global range is not as well reported as for some others like Turtle Dove, Slavonian Grebe *Podiceps auritus*, Red Kite *Milvus milvus* and Eider *Somateria mollissima*, also now Red-listed. Three species (Swift *Apus apus*, Stock Dove *Columba oenas*, Kestrel *Falco tinnunculus*) move from the Amber to the Red-list partly due to an increase in the time span of the short-term breeding decline criteria. The remaining species moving from the Amber to the Red list have either a declining breeding population (Wood Warbler *Phylloscopus sibilatrix* and Snipe *Gallinago gallinago*), breeding range (Common Redstart *Phoenicurus phoenicurus*) or wintering population (Grey Plover *Pluvialis squatarola* and Scaup). The seven species that were previously Green-listed and are now Amber have either increased in priority status across Europe (Fulmar *Fulmarus glacialis*, Willow Warbler *Phylloscopus trochilus*, Brambling *Fringilla montifringilla*, Red-breasted Merganser *Mergus serrator* and Ringed Plover *Charadrius biaticula*) or their wintering population is in decline in Ireland (Turnstone *Arenaria interpres* and Mallard *Anas platyrhynchos*).

There are species with improved status since the previous assessment, with five species moving from Red to Amber (European Herring Gull *Larus argentatus*, Black-headed Gull *Larus ridibundus*, Pintail *Anas acuta*, Wigeon *Mareca penelope* and Tufted Duck *Aythya fuligula*) all of which have populations with less severe declines. Overall, the Amber list is shorter by eleven species and the Green list is longer by four. Welcome positives are nine species moving from Amber to Green. Sparrowhawk *Accipiter nisus*, Great Spotted Woodpecker *Dendrocopos major*, Reed Warbler *Acrocephalus scirpaceus*, Mistle Thrush *Turdus viscivorus* and Robin *Erithacus rubecula*, all of which have improved status, whereas Stonechat *Saxicola torquatus*, Jack Snipe

Lymnocyptes minimus, Little Grebe *Tachybaptus ruficollis*, and Great Black-backed Gull *Larus marinus* have all moved onto the Green list but have some question marks against the availability of data to confidently confirm their improved status. Sooty Shearwater *Ardena grisea*, assessed as a passage species, moved directly from the Red to the Green list due to it no longer being assessed as a European species of concern (BirdLife International 2017b).

We looked across all BoCCI assessments at the 196 species assessed every time, and we note a negative trend in the status of Ireland’s birds since 1999, with increasing numbers of Red-listed species on each assessment (Figure 1). The criteria which determined the increases in Red and Amber assessments over the years were those measuring the international status and declines in both breeding and wintering

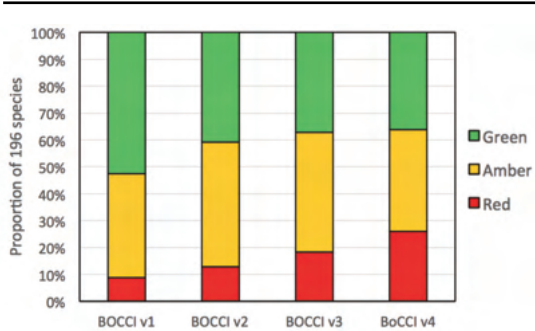


Figure 1. Summary of status for 196 species assessed in each of the four Birds of Conservation Concern Ireland (BoCCI) assessments which were carried out in 1999, 2007, 2013 and 2020. In BoCCI1, 207 species were assessed but Green species were not categorically listed, so we assume that all in 1999 species that were not Red or Amber were Green. Of the 26% (51) Red species in BoCCI4 1.6% (3) were due to use of a longer time window within existing criteria.

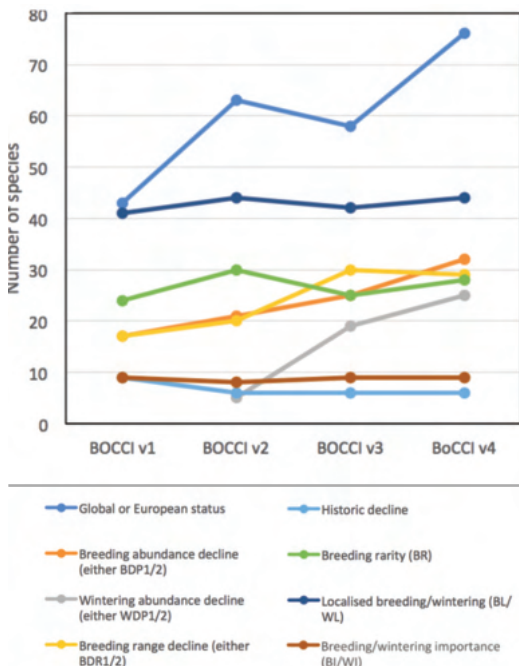


Figure 2. The number of species assessed as either Red or Amber within each of four Birds of Conservation Concern Ireland (BoCCI) assessments and the criteria on which the Red or Amber status was decided. The four BoCCI assessments were carried out in 1999, 2007, 2013 and 2020 and only those 196 species assessed each time were considered.

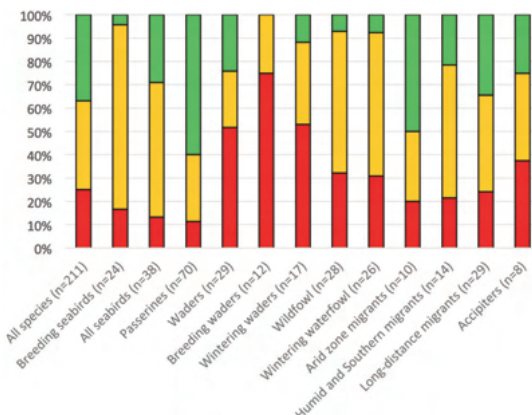


Figure 3. The proportion of species categorised as Red Amber or Green within the Birds of Conservation Concern Ireland 4 assessment, compared between taxonomic groups of birds. The number of species in each taxonomic group is given for each column. Migrant classification follows Vickery *et al.* (2014).

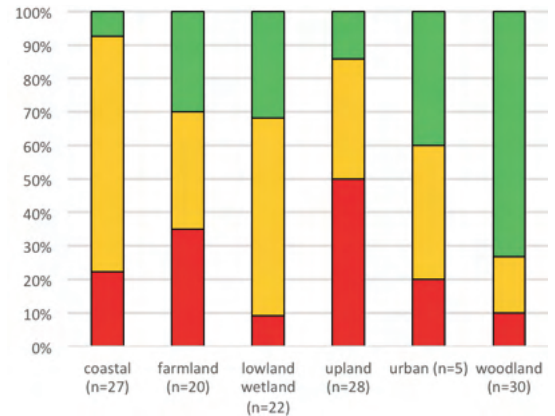


Figure 4. Species grouped by breeding habitat association, compared using the proportions categorised as Red Amber or Green within the Birds of Conservation Concern Ireland 4 assessment. Habitat categories follow Gibbons *et al.* (1993). The number of species within each habitat group is given for each column.



Plate 5. Common Snipe (Tom Ormond).

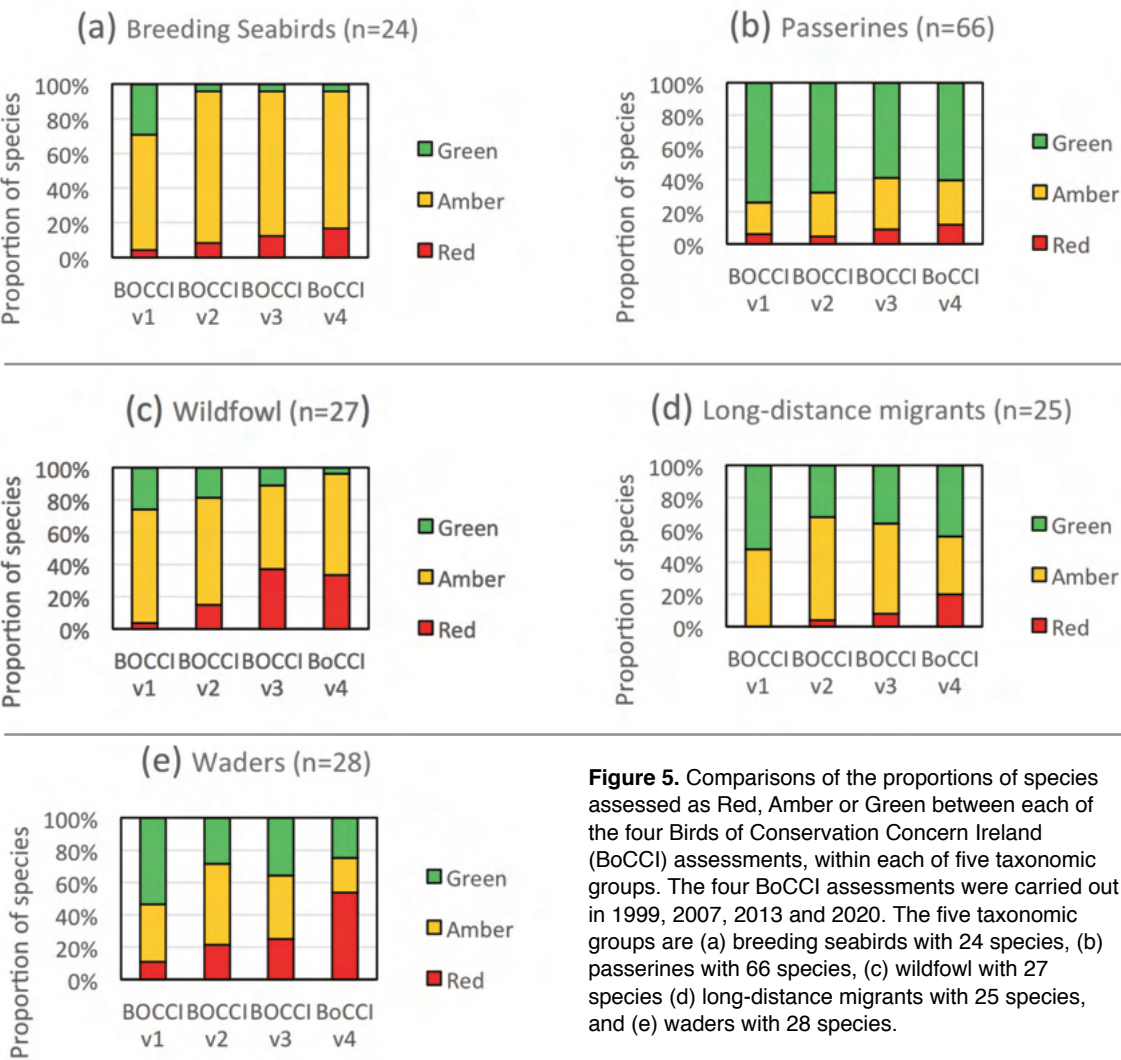


Figure 5. Comparisons of the proportions of species assessed as Red, Amber or Green between each of the four Birds of Conservation Concern Ireland (BoCCI) assessments, within each of five taxonomic groups. The four BoCCI assessments were carried out in 1999, 2007, 2013 and 2020. The five taxonomic groups are (a) breeding seabirds with 24 species, (b) passerines with 66 species, (c) wildfowl with 27 species (d) long-distance migrants with 25 species, and (e) waders with 28 species.

populations (Figure 2). Waders have the most concerning status (Figure 3), and species associated with upland and farmland habitats (Figure 4). Looking at the status of different taxonomic groups over all BoCCI assessments we see that the proportion of species of concern has increased for all groups, with a gradual increase for seabirds (5a) and passerines (5b). There were a few groups with notably larger increases in concern between assessments such as for wildfowl between BoCCI2 and BoCCI3 which continued to this assessment (5c). Both long-distant migrants (5d) and waders (5e) had large increases in the proportions of species of concern between the two most recent assessments.

Discussion

Updating this list of priority bird species provides a quantitative indicator as to the status of Ireland’s bird populations. New data have been incorporated and the assessment criteria have been re-examined. The resultant BOCCI 4 list provides a robust framework for conservation actions, a sound backdrop for individual species policy and guidance on the most efficient targeting of resources. However, with the continuing decline in the status of Irish birds with a 46% increase in the number of Red-listed species, we acknowledge that finite conservation resources must be even further prioritised and directed where they will have the most impact.

Gone but not forgotten

Part of this process was to create a separate list of Former Breeders which may not be part of the main Red list, but their historic status and priority is still borne in mind. Otherwise species such as the recently extinct Corn Bunting *Emberiza calandra* will suffer from the shifting baselines of our prioritisation processes; they, and the reasons they were lost, may be forgotten (Taylor & O'Halloran 2002). It is important to recognise how recently a species last bred before becoming extinct, as this may affect any plans for re-introduction or assessment of remaining habitat. By placing a date of around 1800 we should still remember those species, once common, but lost as breeding species before this date.

Changes in status

The thresholds across which species distribution or population sizes must cross for their status to be within the Red category of concern are set high at more than 50% population decline, and more than 70% distribution lost. Although some fatigue and habituation are inevitable with growing communication around global biodiversity loss, we must pay close attention to the increased number of species now on the Red list of Birds of Conservation Concern for Ireland. It is difficult to reverse such sustained population declines and they tend to be followed by further declines or lack of recovery (Hutchings 2015). The most common reason for a species moving into a category of greater concern is their increased global and European status (Figure 2). Those species remaining on the Red list from BoCCI3 because of their international status include globally threatened wintering ducks; Long-tailed Duck *Clangula hyemalis*, Velvet Scoter and Pochard *Aythya farina*, now joined by Scaup and Eider.



Plate 6. Curlew Sandpiper (Dick Coombes).

Two seabird species (Leach's Storm-petrel and Balearic Shearwater) remain on the Red list as they are globally Vulnerable and Critically Endangered respectfully, and are joined by Kittiwake, now classed as globally Vulnerable; and Puffin and Razorbill for their European status. Four waders of European importance remain on the Red list (Lapwing *Vanellus vanellus*, Curlew, Dunlin *Calidris alpina* and Redshank *Tringa totanus*) and all exhibit continued severe population declines in Ireland. A further six waders join the Red list, as being of European concern (including Oystercatcher, Black-tailed Godwit and Curlew Sandpiper). Snipe breeding populations in Ireland are now in severe decline, and notable declines in the wintering populations of Bar-tailed Godwit and Knot have occurred.

When we look at those groups of species whose breeding and wintering populations are declining severely across both long and short-term time periods, none are declining as catastrophically in Ireland as wading birds, including Lapwing, Curlew and Dunlin, of which Dunlin is the least common breeding species.

Kestrel, Swift and Stock Dove move from the Amber list onto the Red list due to more recent severe declines in their breeding populations using a time period closer to the ideal 25-year period for this category. Causes for the decline of Kestrel in Ireland in recent years are not clear cut, but possibly due to prey availability, agricultural changes and reduced feeding opportunities (Wilson-Parr & O'Brien 2019), as well as secondary rodenticide poisoning (Nakayama *et al.* 2018). Swifts exhibit strong fidelity to their nest sites and it is possible that the steady decline in numbers is linked to the loss of many traditional nest cavities in buildings which have been renovated or demolished (Whelan *et al.* 2018). The pattern and scale of decline in Stock Dove is thought to be due to the loss of mixed farming in the west and midlands (McMahon *et al.* 2008, Lewis *et al.* 2019b), meaning that Stock Dove is confined to the arable farming areas in counties in the east and south (Balmer *et al.* 2013).

Wintering Goldeneye and Pochard remain on the Red list having experienced severe declines in their wintering populations. These species rely on coastal and inland sites such as Loughs Neagh and Beg in NI which support internationally important numbers of wintering waterbirds. A decline in their numbers has been evident for some time (Maclean *et al.* 2006). Previous research suggested that high levels of nutrient input caused hyper-trophic conditions, with detrimental effects on the chironomid larvae that constitute a major dietary component of Pochard and other diving duck species (Maclean *et al.* 2006). It is likely that climate-driven shifts in wintering distributions were also responsible for these declines (Tománková *et al.* 2013) and there is evidence of long-term north-eastward shifts in the abundance of species such as Pochard, which prefer deep water (Pavón-Jordán *et*

al. 2019). Wintering population declines in Goldeneye have been attributed to a shift in their wintering distributions in a north-eastward direction as a response to changes in temperature, with the birds remaining closer to their breeding grounds and fewer migrating to Ireland (Lehikoinen *et al.* 2013). Protection of Irish wetlands remains a very high conservation priority with site-related habitat loss and degradation issues at least partially responsible for these declines.

Emerging themes

The uplands form Ireland's largest expanses of semi-natural habitats and are of major conservation importance, with over 20 habitat types listed under Annex I of the EU Habitats Directive being recorded in these areas (Colhoun & Cummins 2013). The breeding range of Whinchat *Saxicola rubetra* has declined significantly, probably due to progressive agricultural intensification. Half of the breeding bird species associated with upland habitats are Red-listed, which is the highest proportion by habitat. These Red-listed species are associated with a variety of upland habitats: unenclosed moorland (Red Grouse *Lagopus lagopus*, Golden Plover *Pluvialis apricaria*, Dunlin *Calidris alpina*, Snipe *Gallinago gallinago*, Ring Ouzel *Turdus torquatus* and Twite *Linaria flavirostris*), river valleys (Grey Wagtail *Motacilla cinerea*), enclosed farmland (Curlew *Numenius arquata*) and cliffs or sloping and broken ground (Northern Wheatear *Oenanthe oenanthe*, Whinchat and Golden Eagle *Aquila chrysaetos*) (Brown *et al.* 1995). Increased threats to upland bird species may come from predation impacts on ground-nesting species (McMahon *et al.* 2020), degradation of upland habitats through extensive afforestation, loss and exploitation of peatlands, agricultural improvement, overstocking of sheep, and erosion and drainage, while wind energy development and climate change present further threats. Agricultural improvement continues to negatively affect birds associated with farmland habitats particularly the suite of Red-listed breeding waders; Quail *Coturnix coturnix*, Grey Partridge *Perdix perdix* and Corncrake *Crex crex* remain on the Red list and show no sign of recovery.

Since the last assessment BoCCI3 which was published only seven years ago, the number of long-distance migrants and waders on the Red-list has more than doubled (waders 7–15, migrants 2–5). Of the eight waders newly Red-listed, five are Red-listed due to their European conservation status, but the non-breeding populations on which they have been assessed have also declined, as has the breeding population of Snipe.

Wood Warbler, Swift and Common Redstart are the migrants moving onto the Red list due to breeding population and range declines. Wood Warbler and Common Redstart are rare breeding birds in Ireland, and both are vulnerable to factors

affecting their woodland breeding habitat, as well as a range of threats taking place on their wintering grounds. Both woodland breeding habitat specialists are exposed to forestry practices that reduce the quality of their nesting habitat or main food supply (Collar & Christie 2019). Both migrants are also affected notably by changes in weather conditions posed by climate change (Wright *et al.* 2009) and, as a summer migrant that breeds across Europe and winters in West Africa, it has been shown that Common Redstart populations are affected by rainfall conditions in the Sahel (Kristensen *et al.* 2013).

Prioritisation

When more than 25% of species are Red-listed it is not possible to prioritise them all for conservation action and we would not advocate that resources can be spent on all of these species. Further prioritisation of the Red-list may come from examining the breadth of criteria which trigger Red-listing of a species, for example Curlew which has six criteria at the Red level, including one reflecting poor European status. We could focus prioritisation on the forty species with at least one Red level criteria of Irish origin, Dunlin for example has five; with severe short and long-term breeding and wintering population declines as well as breeding range decline. Criteria which should not be forgotten are those that measure localisation and international importance. Both criteria highlight aspects of species' vulnerability in Ireland and the role that Ireland can play in protecting important populations. For example, Ireland hosts up to an estimated 40% of Europe's breeding Roseate Terns *Sterna dougallii* and up to an estimated 44% of its wintering great Northern Divers *Gavia immer*. In Ireland, we believe that resources should be targeted at the protection and safeguarding of our declining breeding farmland and upland birds and our seabirds and wintering waterfowl. These are the groups with the most severely declining breeding and wintering populations for which conservation action on the ground can have the most impact on several species of concern at the same time.

Good news

Within each of the Red, Amber and Green-listed species categories in BoCCI3, 64 species remained within the Green list category in BoCCI4, which was more than remained within the Red or Amber categories. Thirty-three of these species have increasing breeding populations, for example Little Egret *Egretta garzetta*, Blackcap *Sylvia atricapilla*, Redpoll *Acanthis cabaret*, Collared Dove *Streptopelia decaocto*, Bullfinch *Pyrrhula pyrrhula*, Buzzard *Buteo buteo* and Goldfinch *Carduelis carduelis*, and examples of species with increasing wintering populations are Sanderling *Calidris alba*



Plate 7. Song Thrush (Richard T. Mills).

and Greenshank *Tringa nebularia*. Those species whose status has improved and have moved onto the Green list from Amber, include Great Spotted Woodpecker with a range that has expanded since recolonisation (Coombes & Wilson 2015), Reed Warbler, Mistle Thrush and Robin. The changes in breeding relative abundance between Mistle Thrush and Song Thrush are broadly similar over much of Ireland, with both species increasing almost everywhere except Clare and Connacht, where the Song Thrush is largely stable, but Mistle Thrush has declined. Given the similarities, it may be the case that similar environmental (weather) and habitat-related (agricultural change and land-management) issues may be impacting both species (Thomson *et al.* 1997; Peach *et al.* 2004). Given that Mistle Thrush can occur in much lower numbers than Song Thrush, it is more likely the former would undergo more dramatic changes.

Data gaps

Species are defaulted onto the Green list if they do not trigger Amber or Red-list criteria thresholds. There are some, therefore, that are on the Green list due to a lack of available data, rather than a firm understanding of their favourable status. There are a group of six species assessed as passage species for which data are difficult to assess: Great Shearwater *Ardenna gravis*, Little Stint *Calidris minuta*, Sabine's Gull *Xema sabini*, Arctic Skua *Stercorarius parasiticus*, Pomarine Skua *Stercorarius pomarinus* and Little Auk *Alle alle*. Each of these remain on the Green list but are under the radar of

assessment. Firecrest *Regulus ignicapilla* is an example of a species that is a relatively scarce passage migrant in Ireland, and for which there is no method available to assess its status. Gaps were found in the bird monitoring data available for the BoCCI3 assessment and Colhoun & Cummins (2013) made comprehensive recommendations as to how these might be filled. Since 2013 the National Seabird Monitoring Programme has been running and has continued to identify and fill data gaps on breeding seabirds (Cummins *et al.* 2019). Importantly this programme also maintained and expanded the national breeding seabird database in Ireland in order that data are easily retrievable for analyses and much of this has been used for this conservation assessment. There are still species gaps and further work is required to provide up-to-date estimates of our burrow nesting seabirds including Puffin *Fratercula arctica*, Manx Shearwater *Puffinus puffinus* and European Storm-petrel *Hydrobates pelagicus* with preliminary surveys suggesting declines in these populations (Cummins *et al.* 2019). We perhaps need better systems for making best use of valuable monitoring data for passage and offshore species, such as determining for internationally important populations of Great and Sooty Shearwater and wintering seaducks, Grebes and Divers. Rare breeding birds are monitored annually through the Irish Rare Breeding Birds Panel, and data compiled and analysed since BoCCI3 (Crowe 2019) have been extremely valuable and were used for this assessment. An equivalent system for rare wintering birds would be useful to fill data gaps for many non-breeding populations which slip through the monitoring net. Wintering and breeding

waterbirds which are not adequately covered by existing surveys such as I-WeBS, WeBS and Low Tide Waterbird Surveys (Lewis & Tierney 2014) still need some attention. We had difficulty assessing the breeding status of species like Coot *Fulica atra*, Water Rail *Rallus aquaticus*, Little Grebe *Tachybaptus ruficollis*, Great Crested Grebe *Podiceps cristatus*, Oystercatcher *Haematopus ostralegus* and Red-breasted Merganser *Mergus serrator* for this assessment. There is also the need to acknowledge the impact that out-of-date data has on our ability to re-evaluate species such as Chough, for which a national survey is overdue.

Changes in assessment methodology

We made adjustments to bring the assessment process more in line with BoCCUK, but comparison to previous BoCCI assessments remained objective. We introduced a Former Breeders category and the availability of more data allowed us to lengthen the time periods over which assessments were made, bringing them closer towards the ideal time windows of existing criteria. There are criteria used in the BoCCUK assessment which have not previously been considered within BoCCI primarily because of lack of data. BoCCI does not have an HD-Rec (recovery from historic decline) criteria, which moves species Red-listed due to historic decline onto the Amber-list when population size has at least doubled within the relevant 25-year period, and exceeds 100 breeding pairs (provided it does not qualify as Red under other criteria). None of the 5 species Red-listed only by HD in this assessment would currently qualify for this, but this may change in the future. BoCCI does not consider measures of changing wintering range, nor winter rarity. Introducing a measure of wintering range change would not have altered any assessment outcomes on this occasion, but that may not be the case in the future. If a measure of wintering rarity (and using a threshold of less than 300 birds) was introduced, it would introduce Iceland Gull *Larus glaucoideus*, Glaucous Gull *Larus hyperboreus* and Pink-footed Goose *Anser brachyrhynchus*; however, this would require wintering population estimates for some quite difficult-to-observe and scarce wintering species e.g. Bittern *Botaurus stellaris*, Spotted Redshank *Tringa erythropus* and Yellow-legged Gull *Larus michabellis*. The other difference between BoCCI and BoCCUK criteria are the range change thresholds. Reducing the BoCCI 70% down to the BoCCUK 50% threshold, would place Black-headed Gull *Larus ridibundus*, Arctic Tern *Sterna paradisaea* and Red-breasted Merganser *Mergus serrator* onto the Red-list rather than Amber; while having a BoCCI 25% range change threshold (rather than 35% in the Amber criteria) would result in Cuckoo *Cuculus canorus* and Great Black-backed Gull *Larus marinus* being Amber-listed rather than Green.

Future assessments

It is essential to update the assessment of conservation concern for Ireland's birds to provide baseline knowledge with which we can begin to understand their changing status. We can make the most use of newly available data and methodological insights and we would recommend that this evaluation is repeated in six years time. Considerable progress has been made in filling some of the monitoring gaps and the momentum for this will continue, as will co-operation and working together across borders and organisations. Although it is not the only information used when decisions are made on which species are most deserving of conservation action, the objective approach highlights gaps in our knowledge and provides useful structured conservation evidence. The result of this process is just one example of the critical importance of every hour of volunteer and professional bird survey that takes place in Ireland.

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