

Birds in Wales
Adar yng Nghymru

Vol. 13 No. 1

September 2016

ISSN 2045-6263



Edited by Rhion Pritchard

CONTENTS

Editorial and acknowledgements	2
Birds of Conservation Concern in Wales 3: the population status of birds in Wales	3
Changes in breeding bird abundances in the Elenydd SSSI between 1982 and 2012	32
The distribution of birds breeding in Wales at tetrad level: what we know now and future prospects	37
Diet, ecology and biosecurity: analysis of owl pellets from Skomer Island	57
RSPB Conwy Nature Reserve: a review of the first 20 years	73

Welsh translations by Rhion Pritchard

Published in September 2016 by The Welsh Ornithological Society
www.birdsinwales.org.uk
Charity No. 1037823
Price: £12.00

Birds of Conservation Concern in Wales 3: the population status of birds in Wales

I. Johnstone & S. Bladwell

RSPB Unit 14, Llys Castan, Parc Menai, Bangor, LL57 4FH

Crynodeb

- Mae'r prif sefydliadau cadwraeth yng Nghymru wedi adolygu statws poblogaeth y rhywogaethau adar a geir yma'n rheolaidd, gan ddiweddarau'r asesiad a gyhoeddwyd yn 2010 ar sail dull arolwg 2015 y DU.
- Adolygwyd cyfanswm o 213 o rywogaethau, a rhoddwyd pob un ar un o dair rhestr. Rhoddwyd 54 o rywogaethau ar y rhestr Goch (cynnydd o wyth), sydd ar gyfer y rhywogaethau sydd mewn perygl yn fyd-eang neu sydd wedi lleihau'n sylweddol yn hanesyddol neu'n ddiweddar. Gosodwyd 90 ar y rhestr Ambr (gostyngiad o naw), sydd ar gyfer rhywogaethau sy'n cynyddu yn dilyn lleihad hanesyddol neu gymhedrol, neu sy'n lleol, prin neu o bwysigrwydd rhyngwladol. Rhoddwyd y 69 sy'n weddill ar y rhestr Werdd (cynnydd o un).
- Roedd y rhan fwyaf o symudiadau rhwng y rhestri Coch ac Ambr (naw i fyny, tri i lawr), ond symudodd dau rywogaeth (Gwylan Goesddu *Rissa tridactyla* a Chrec yr Eithin *Saxicola rubetra*) o Wyrdd i Goch. Y prif reswm dros symud oedd newidiadau mewn data poblogaeth, er i newid yn y meini prawf fod yn gyfrifol am rai.
- Roedd y gyfran o rywogaethau adar nythu yn amrywio yn ôl cynefin, gyda mwy o rywogaethau sy'n nythu mewn cynefinoedd ar y glannau, tir amaethyddol a'r ucheldir ar y rhestri Coch ac Ambr na grwpiau eraill. Hefyd, bu mwy o ychwanegiadau i'r rhestr Goch ymhlith adar sy'n nythu ar y glannau a'r ucheldiroedd nag ymhlith adar sy'n nythu mewn cynefinoedd eraill. Grŵp arall sy'n fwy niferus ar y rhestri Coch ac Ambr yw adar sy'n gaeafu neu'n mudo trwy Gymru ond nad ydynt yn nythu yma.
- Tra bod lefel pryder cadwraeth rhai rhywogaethau wedi newid ers yr asesiadau blaenorol, mae'n anodd gweld cysylltiadau clir ar gyfer rhywogaethau unigol rhwng hyn a ffactorau fel rheolaeth tir, newid hinsawdd a gweithgareddau cadwraeth. Er hynny, mae'r ail-asesiad yma yn tanlinellu fod adar y glannau yn grŵp newydd sydd angen sylw, yn ogystal â'r grwpiau pwysig eraill, adar tir amaethyddol ac adar yr ucheldir.

Summary

- The leading bird conservation organisations in Wales have revised the population status of the bird species that are regularly found here, updating the assessment published in 2010 and based on the method of the 2015 UK review.

- A total of 213 bird species were assessed and each placed on one of three lists. Fifty four species were placed on the Red list (an increase of eight), which is for those that are globally threatened, or have historically or recently shown severe decline. Ninety were placed on the Amber list (a fall of nine), which is for those showing recovery from historic decline, moderate decline, or are localised, rare or internationally important. The remaining 69 were placed on the Green list (an increase of one).
- Most movements were between Red and Amber lists (nine upward, three downward), but two species, Kittiwake *Rissa tridactyla* and Whinchat *Saxicola rubetra* moved from Green to Red. Movements could be accounted for primarily by changes in population data, although changes to criteria did account for some.
- For breeding birds, the proportion of species on each list varied by habitat, with more breeding birds of coastal, farmland and upland habitats being Red and Amber listed than other groups. Furthermore, there were more additions to the Red list among coastal and upland breeding birds than among breeding birds in other habitats. Wintering and passage migrants that do not breed in Wales represent a fourth group of birds over-represented among Red and Amber lists.
- Whilst the level of conservation concern of some species has changed since the previous assessment, clear links with drivers such as land management, climate change and conservation action are difficult to make for individual species. Nevertheless, this reassessment highlights that coastal breeding birds is a new group to watch, in addition to the already important farmland and upland bird groups.

Introduction

This paper presents the third 'Birds of Conservation Concern in Wales' (BoCC W) assessment, previous assessments having been made in 2002 (Thorpe & Young 2002) and 2010 (Johnstone *et al* 2010). Using a well established approach, based on quantitative assessments against standardised criteria, birds are placed on 'Red', 'Amber' or 'Green' lists to indicate the level of 'conservation concern' we have for them. In the first assessment (BoCC W1) we acknowledged that such assessments should be revised periodically to inform conservation action and that they should also take a hierarchical approach to geographic scale. Thus, the status of species at smaller geographic scales must take into account their status at larger scales (i.e. Wales < UK < Europe < international < global).

At the centre of this assessment are the same eight broad criteria used in the first assessment ensuring consistency between successive reviews. However, some changes have been made to the methods used due to changes in data availability (Table 1) as well as to reflect our growing understanding and experience, mirroring those made at the UK level (BoCC4: Eaton *et al* 2015). Though the process for individual species assessments is consistent with those undertaken in the UK assessment (BoCC4), Wales has a particular responsibility for the populations of UK species with populations concentrated in Wales. Consequently, we continue to make use of criteria that show when Wales has 50% or more

of the UK population of a species, and 10% or more of UK rare breeding or non-breeding species (excluding those not established as breeding species in Wales).

If we are to track our progress towards environmental goals we need regular, quantitative measures of the state of our environment and the means to ensure effective use of resources. With the ongoing decline of nature in Wales (Burns *et al* 2013) and the resultant threat to the health and resilience of our ecosystems, this need has never been more pressing. BoCCW3 provides up to date knowledge, enabling us to identify the threatened bird species that require urgent conservation action and helping to prioritise where resources should be directed.

Methods

Species assessed

Thorpe & Young identified extinct species as those that had been regular breeders since 1800 but had not successfully bred in Wales in the 20 years before the assessment year (1994 for this assessment). As with the two previous assessments we included all those species on the Welsh list, excluding those that occur solely as vagrants and rare and scarce migrants, but have included the only globally threatened species that has occurred in Wales in each of the 20 years prior to 2014 (Balearic Shearwater *Puffinus mauretanicus*). The year of colonisation (or re-colonisation) was that in which the population first met a mean of one pair per year over the previous five years.

Non-breeding birds were considered established when removed from the lists of vagrants and rare or scarce migrants. Also excluded were non-native species that have established self-sustaining breeding populations. These species could not have arrived in Wales naturally, and are not considered of conservation interest: None of the non-native species in Wales are considered threatened within their native ranges, which, with the exception of Little Owl, *Athene noctua* are outside of Europe.

The approach

The approach, as established by two previous Wales-level assessments (Thorpe & Young 2002, Johnstone *et al* 2010), and four UK-level reviews (Gibbons *et al* 1996, Gregory *et al* 2002, Eaton *et al* 2009, Eaton *et al* 2015), assesses bird populations against a series of quantitative criteria relating to aspects of population status. Meeting one or more criteria qualifies a species for the relevant list; with species being placed on the highest priority list for which they qualify (i.e. those qualifying against a Red criterion will be placed on the Red list regardless of qualification against Amber criteria). Those species that meet none of the criteria along with any that have continued to recover from historic decline are placed on the Green list.

The criteria

The criteria determine population status based on: global importance, historical population decline, recent population decline, European importance, breeding rarity, localised distribution, UK importance and international importance, reflecting a hierarchical approach to geographical scale. The eight main criteria and their sub-criteria are summarised in Table

1, where differences between the criteria used in this assessment, the previous Wales assessments and the current UK assessment are identified, and expanded upon below.

1. GLOBAL POPULATION STATUS (IUCN). This criterion considers the population status of each species in a global context. Species that meet this criterion are those of the highest priority for action, and hence should be so in Wales regardless of national status (i.e. should be Red-listed even if they only occur briefly and in low numbers). In assessing species against this criterion, we have used the latest 2015 assessment of globally threatened species (www.iucnredlist.org).

2. HISTORICAL DECLINE IN BREEDING POPULATION (HD). The period over which population trends are assessed is recent, reflecting the period that formal monitoring schemes have been in place. It would thus be possible for a species to have undergone a large population decline over the last two centuries, but for its population to have remained stable during the last few decades.

In line with the approach for Ireland (Colhoun & Cummins 2013), the Wales assessment uses information from reliable historical sources (Lovegrove *et al* 1994, Holloway 1996) and the 1988-1991 Breeding Bird Atlas (Gibbons *et al* 1993) to establish historical trends for the period 1800-1994. We used the same assessment as compiled for BoCC W1 (Thorpe & Young 2002).

Populations of species that have declined will recover if conditions become more suitable through, for example, successful conservation action or more favourable climate. We used the sub-criteria to allow species that have shown recovery from historic decline to move sequentially from Red to Amber to Green lists. This recognizes recovery in numbers, while not ignoring small populations or UK, European and international status. The process by which species were considered to have shown partial recovery from historical decline (hence move to the Amber list), or complete recovery (move to the Green list), or subsequently faltered from those recoveries, follows that used by BoCC4. Thus any HD species doubling its population size or more within the 25-year period, and exceeding 10 breeding pairs (10% of the UK value of 100 pairs) moves to the Amber list (provided it did not qualify as Red under other criteria). One change was made to this step to be consistent with other criteria, and introduced an assessment of trend over the BoCC longer-term period (since 1969 as the earliest data used by BoCC Wales). Therefore, in BoCC W3 we used the following rationale: a species should be moved to the Green list (if not qualifying against other Red or Amber criteria) if it shows continued and substantial recovery from historical decline beyond the level that qualified the species for the Amber list. When it moves to Green, the species should be considered as having recovered permanently and would no longer be assessed against the HD criterion, i.e. any subsequent decline would be assessed only against the relevant decline criteria such as BDp (Breeding population decline). A further increase of at least 167% from its HDrec (Historical Decline recorded) level is required to move to the Green list. This higher threshold ensured that if a species subsequently declines by anything less than 25% (thus does not trigger a return to the Amber list under the moderate decline criterion), it will still remain at more than double its HDrec numbers.

3. RECENT BREEDING AND NON-BREEDING POPULATION DECLINE (BD / WD). This criterion is used to assess the extent of decline for birds that spend different life-stages in Wales, and consists of several sub-criteria and thresholds. Data on change in breeding

abundance (numbers) and range (geographic distribution) are used to assess resident and migrant breeding species. Change in abundance outside the breeding season was used to assess non-breeding populations that breed elsewhere. Some non-breeding migrants occur in greater numbers than during breeding (sometimes involving different races or geographic populations), and where possible both breeding and non-breeding populations were assessed. As only waterbirds are regularly monitored during the non-breeding season, many species could not be assessed against the non-breeding criterion (e.g. Starling *Sturnus vulgaris* and Fieldfare *Turdus pilaris*).

Change in geographical distribution is important evidence for change in population status. However this can be misleading where ranges are consistently small, when small and biologically insignificant numerical change may result in percentage change sufficient for red-list qualification. As in previous assessments therefore, range change assessments were not carried out for species occupying <20 10 km squares in both time periods (such as Spotted Crake *Porzana porzana* and Hooded Crow *Corvus cornix*). The exception to this was seabirds, as range approximates to number of colonies (each of which may be large). Change in the distribution of these is an important component of population status even if they are few in number. For the first time in this series of assessments we were able to assess trends in wintering range following completion of the 2007-2011 Atlas.

For each of the sub criteria (time-period and abundance/range), we distinguish between three levels of change: rapid (at least 50% decline), moderate (at least 25% but less than 50% decline) and none (less than 25% decline) to distinguish between qualification for Red, Amber or Green lists. As in BoCC W2, data from 25 year and longer-term periods were used (1967-2013). This takes account of species whose decline lies between historical and recent, and from which there has been no recovery.

4. EUROPEAN IMPORTANCE (ERLOB). Previous assessments have used Species of European Conservation Concern assessments (SPECs; see Tucker & Heath 1994 and BirdLife International 2004) as an indication of wider regional concern (species on the SPEC list were Amber listed in Wales). Although a new European assessment, the European Red List of Birds (ERLOB; BirdLife International 2015), is newly available, this assessed against IUCN Red List criteria (IUCN 2012) with no consideration of the wider measures (species rarity, localisation, moderate decline and depletion) included in SPEC assessments. Because it is unclear when or if SPECs will be revised, therefore, following BoCC4, we chose to Amber-list any species on the ERLOB, recognising that this has had an impact on the BoCC W3 lists.

5. BREEDING AND NON-BREEDING RARITY (BR / WR). Species were categorised as rare breeders in Wales if they had a breeding population of fewer than 30 pairs, and, for the first time, as rare non-breeders if the non-breeding population was fewer than 90 individuals (small non-breeding populations are as important as breeding populations). We continue to include a sub-criterion to highlight, by Amber-listing, species for which Wales supports $\geq 10\%$ of the UK's population of rare breeding or (for the first time) wintering birds (i.e. ≤ 30 breeding pairs or ≤ 90 winter individuals in UK). This reflects the importance of those populations in Wales to the overall UK populations.

Breeding rarity was assessed from recent formal single-species surveys (e.g. Hen Harrier *Circus cyaneus*), and two informal sources published annually (the UK Rare Breeding Birds

Panel reports published in *British Birds* and the Welsh Ornithological Society classified records for the period 2008-2013 published in *Birds in Wales*). Non-breeding rarity was assessed from mean maximum number of individuals per winter between 2007-08 and 2012-13. Assessments from such informal data were reviewed by experts and in cases where they were considered to underestimate population size for some species, such as breeding Water Rail *Rallus aquaticus* and non-breeding Dotterel *Charadrius morinellus* qualification under this criterion was informed by expert opinion.

6. LOCALISED POPULATIONS (BL / WL). This criterion was used because populations that are geographically concentrated face greater threats from chance events than those that are more dispersed. Rare breeders or non-breeders (species qualifying under criteria 5 (Table 1)) were not assessed against this criterion as their small numbers and range make them more likely to be localised. Amber listing under the localised criterion is intended to signal a species' vulnerability as relatively local pressures (e.g. pollution or development) could adversely impact a large proportion of the population.

The criterion was based on the single best site (SPA and/or IBA), rather than the best 10 in the UK-level assessment, to reflect the extent of Wales within the UK. Species with 50% or more of their population in a site qualified for the Amber list. If the Wales population estimate was presented as a range, we took a conservative approach by requiring that the site held at least 50% of the upper range limit. Data for the most populous site in the breeding and non-breeding seasons were compared with Wales' population estimates for the same period, using site-level data (often using single-species breeding surveys and the Wetland Bird Survey for wintering populations).

However, because of issues of data availability, as previously, we treated the entire Dee and Severn estuaries including parts that were outside of designated areas as single sites. Because of this, and the simple head-count method used to calculate waterbird population estimates, we took a precautionary approach to assessing non-breeding waterbirds. Two waterbirds (Bewick's Swan *Cygnus columbianus* and White-fronted Goose *Anser albifrons*) were treated differently. In both cases, there was evidence that populations on the Dee and Severn estuaries were almost exclusively limited in their distribution to the eastern shore and adjacent agricultural land in England (Robinson *et al* 2004). Therefore, these species were assessed using non-WeBS data for Wales.

7. UK IMPORTANCE. This criterion is used to assess the population status of each species in a UK context: Red list qualification at the UK-level is used as an Amber list qualification in Wales. This ensures that UK priorities are fully considered at the Wales-level in the same way that European priorities are considered in both the UK and Welsh assessments.

Wales may have a particular responsibility for the populations of some UK species with a western distribution. Consequently, sub-criteria show when Wales has 50% or more of the UK population of a species, and 10% or more of a UK rare breeding or non-breeding species, excluding any not established as breeding species in Wales.

8. INTERNATIONAL IMPORTANCE. Species for which Wales holds at least 2% of the European population in either the breeding or non-breeding season were considered present in internationally important numbers. Again this was less than the 20% used for the UK criterion, to reflect the extent of Wales within the UK. We use the same international

population estimates as the UK assessment (Eaton *et al* 2015). The UK assessment used Musgrove *et al* 2013 as their source of data on the population sizes of widespread breeding species. However, these are not available for Wales, so as in previous assessments we were unable to assess some species against these criteria.

European estimates are often of uncertain quality and expressed as a large range owing to poor knowledge in many countries. We required the Wales population estimate to exceed 2% of the upper range limit of the European or flyway population for a species to qualify under this criterion.

Data sources

The monitoring of bird populations in Wales is good, thanks largely to the many skilled and enthusiastic volunteer bird watchers that take part. Data sources used for this assessment are summarised in Table 2. They cover schemes ranging from the formal Breeding Bird Survey (BBS), whose results are of known precision, to the informal classified records, which provide the only information on some rare breeding, passage and wintering birds but which need to be interpreted more cautiously owing to their lack of rigorous method. Furthermore, some species lack population monitoring in Wales because they are too scarce to be reported on by annual schemes such as the BBS, but still too widespread for informal records to be useful. BoCC W1 and BoCC W2 took a precautionary approach for such species: where there was no evidence in Wales to contradict UK-level population change, the same listing was adopted (and UK values are reported in results tables and labelled as such).

This approach was continued in this third assessment. UK data for individual species were only used if they were considered representative of national populations based on expert opinion. In addition, we took a precautionary approach to using trends for species reported on by BBS with marginal sample sizes (mean squares with records $n=20-29$), with species only qualifying based on such data if there was other supporting evidence from Wales.

However, there is a trade off between using Wales-specific sources that may be based on specific habitats or be relatively out of date, and robust UK sources, such as the longer-term CBC/BBS trend, that may mask within-UK variation. Indeed, it is known that trends vary across the UK for some species, and we cannot rule this out for other species that lack formal data in Wales. We took the decision to prioritise data sources according to Table 3, but anticipate that some sources will be too out of date to be used in future assessments.

In separating data from the UK, Welsh 10km squares were taken as those along the border that were at least 50% in Wales by land area. There were a few squares which were not covered in all three Atlases (2 during breeding and three during winter), and these were excluded from assessments of percentage change in occupied squares between Atlas periods.

Results

Species assessed

The breeding populations of nine former regularly breeding species became extinct between 1800 and 1984 (Table 3), three of which continue to be assessed as winter migrants. No species has become extinct since BoCC W2, although given a lack of records in recent years, the Corncrake *Crex crex*, Turtle Dove *Streptopelia turtur* and Corn Bunting *Emberiza calandra* are close to meeting the definition. Since 1800 a few species have established small temporary breeding populations once (the Common Gull *Larus canus* currently assessed as a winter migrant) or more than once (Bearded Tit *Panurus biarmicus* currently established), while other species have established as breeders within the last decade or so (Little Egret *Egretta garzetta*, Osprey *Pandion haliaetus*), while still others are likely to do so in the future (Mediterranean Gull *Larus melanocephalus*). Three species, Bittern *Botaurus stellaris* Woodlark *Lullula arborea* and Red-backed Shrike *Lanius collurio* have bred or showed signs of breeding in single locations in some recent years, but have not yet met the definition for being considered established (or re-established) breeders.

The new Red, Amber and Green lists

Of the 213 species assessed, 54 species (25%) were placed on the Red list, an increase of eight (Table 5), while 90 (42%) were placed on the Amber list (Table 6), a decline of nine. The remaining 69 species (33%) were placed on the Green list, a decline of two (Table 7). Twenty five species moved to higher lists while 20 species moved to lower lists between BoCC W2 and BoCC W3 (Table 8). Thirty nine species were on a higher UK list while 38 were on a lower UK list. Two species were Red-listed in Wales but Green-listed at UK level (European Golden Plover *Pluvialis apricaria*, Whitethroat *Sylvia communis*) (Table 8). The number of species on the Welsh Red and Amber lists has steadily increased over time, but the proportions of species assessed on each list is very similar to that for the same species at UK-level (Figure 1).

Reasons for changes between BoCCW2 and BoCCW3

The majority of moves between lists could be explained by changes in underlying population data, with 15 upward moves and nine downward moves solely accounted for by this. Furthermore, among Red list species, the majority of qualifications were due to decline in abundance (Figure 2), suggesting that placement on the lists is most sensitive to population data. The remainder of the 45 moves between lists were solely (nine species) or partly (12 species) due to changes to the criteria used in this assessment (Table 9). In particular the use of the ERLOB list in place of the SPEC list resulted in seven species dropping to the Green list (Table 9).

BoCC Wales and breeding habitats

There were patterns among breeding habitats for the proportions of species placed on each

list, based on the breeding habitat associations used by Gibbons *et al* (1993). Coastal, farmland and upland birds had the greatest proportions of species on the Red and Amber lists (70-93%), while upland and coastal groups had the greatest number of additions to the Red list (three each, Figure 3). The level of conservation concern of breeding birds associated with lowland wetland, woodland and urban habitats is more reassuring, with half or more of species in these groups being placed on the Green list (50-52%, Figure 3).

Winter and passage migrants without breeding populations in Wales, with the exception of Redwing *Turdus iliacus*, Snow Bunting *Plectrophenax nivalis*, Waxwing *Bombycilla garrulus* and Fieldfare, inhabit coastal and lowland wetland habitats, with a high proportion of this group (59%) being Amber listed but one of the lowest proportions (16%) on the Red list (Fig.3). Knot *Calidris canutus*, Long-tailed Duck *Clangula hyemalis* and Bewick's Swan joined the Red list for this group.

Discussion

Red list increases in length again

Our assessment shows that length of the Red list has increased by a further eight species since BoCC W2 in 2010, and by 17 species since BoCC W1 in 2002. This increase is accounted for by population data showing worsened and now severe decline.

A feature of the successive assessments since BoCC W1 has been the incremental 'fine tuning' of the criteria and the incorporation of new data as they become available. These changes are essential to adapting successive assessment to increased knowledge and improving and changing datasets over time. Thus a species' movement to the Red list can be as a result of the same data source showing successively worsening declines, and/or the inclusion of criteria which incorporate previously unused data. For example, previously data deficient, the Whinchat has moved from the Green to Red list on account of new Wales data on longer term trends becoming available for use with an existing criterion. In contrast, the Bewick's Swan has moved from Amber to Red on account of the new winter range criterion.

This assessment at a Wales level highlighted key differences between the status of some species in Wales when compared to the UK. European Golden Plover and Chough *Pyrhocorax pyrrhocorax* both moved onto the Green list in the latest UK assessment (BoCC4) though they remain Red and Amber respectively in Wales and of key conservation concern. Golden Plover have shown catastrophic declines in Wales, where they are on the south west edge of their UK and European breeding range and remain on the Red list. Chough is on the UK Green list in BoCC4, due partly to the change in this latest assessment of the treatment of conservation concern at the European level. However, they remain relatively rare and range restricted in the UK and with more than 50% of the UK breeding population in Wales they remain on the Amber list in this assessment and continue to merit conservation concern.

The lists and breeding habitats

Among the habitats compared for breeding birds, birds of coastal habitats, which include

many of our well known seabirds, are faring particularly poorly, with 93% of the 29 breeding species on the Red or Amber lists, and three joining the Red list at this review. Moving from Green to Amber are the cliff nesting Shag *Phalacrocorax aristotelis* (now of European importance and on the UK Red list), Fulmar *Fulmarus glacialis* and Razorbill *Alca torda* (both now of European importance). Kittiwake has moved straight from Green to Red on account of population decline. Although conservation efforts directed at seabirds have been greatest in the other UK countries, the high and increased proportion of Red and Amber listed coastal birds in Wales may suggest an increasing need for such measures in Wales also. There are, however, some improvements in status, such as the Common Tern *Sterna hirundo* whose range decline has improved from severe to moderate.

Farmland and upland birds are two other habitat groups which are over-represented on the Red and Amber lists, with three species joining the Red list. Characteristic of fast flowing streams, the Grey Wagtail *Motacilla cinerea* is of greater concern following breeding decline and joining the UK Red list. Another bird of upland streams, the Common Sandpiper *Actitis hypoleucos* has also joined the red list because of population decline. The moorland nesting Merlin *Falco columbarius* has re-qualified for the Red list under historic decline, as it has also done at UK-level. Finally, with new data available for the long-term period, the Whinchat has joined the Red list, mirroring its status at UK level. Among lowland farmland birds, the Greenfinch *Chloris chloris* has moved from Green to Amber on account of a moderate 25 year breeding decline. This change likely provides an example of the impact of disease on the lists, with populations affected by *Trichomonosis* in recent years (Lawson *et al* 2012).

Birds breeding in lowland wetland, woodland and urban habitats were among those that are particularly well represented on the Green list, and there were few movements between lists. Grey Heron *Ardea cinerea* and Coot *Fulica atra* move from Green to Amber due to moderate range decline and European importance respectively. Just one woodland bird, the Woodcock *Scolopax rusticola* moved from Amber to Red on account of breeding population decline, and this species selects farmland in early spring for foraging (Hoodless & Hirons 2007). Finally among urban birds, there were no movements to higher lists.

Note that assessments were made at the species level and that there are no separate lists for breeding and wintering populations. For example, there is no separate assessment for the two races of White-fronted Geese that overwinter in Wales, though it is recognised that Wales supports the most southerly wintering flocks of the critically endangered Greenland race (*Anser albifrons flavirostris*). Indeed, many species with important wintering populations also breed in Wales in widely varying numbers (e.g. Robin *Erithacus rubecula* and European Golden Plover). Therefore whilst comparing between breeding habitats provides a useful way to contrast important groups of birds, in some cases the listing of individual species will be the result of wintering rather than breeding criteria. Of the winter and passage migrants which do not breed in Wales, three quarters were Red or Amber listed, making them a fourth important group of birds in terms of their levels of conservation concern, particularly for Amber listed species.

Drivers of movement between lists

Although there are some methodological influences on the revised lists, movement of bird

species between lists is primarily influenced by responses to environmental change, and key drivers of this change are land management, and climate change (Burns *et al* 2016). Furthermore, differing magnitudes of impacts of land management and climate might be expected to explain the variation in listings between preferred breeding habitats. For example, coastal breeding birds might be impacted more by climate change than farmland birds, where land use change may be most important.

It is tempting to link listings and movements between lists to specific drivers. In many cases, however, this is difficult without detailed diagnostic research and may in fact be the result of multiple drivers. For example, whilst the move of Mediterranean Gull from Amber to Green and Kittiwake from Green to Red might be examples of likely climate change effects on marine food resources, the move of Whinchat from Green to Red or Merlin from Amber to Red are at this stage hard to explain. In both cases land use such as inappropriately high or low management intensity or climate change may be influencing populations.

Nevertheless, some themes are reinforced by this reassessment while other themes have emerged. First, farmland and upland birds continue to be over-represented on Red and Amber lists. Second, coastal birds have emerged as a new important group within the Red and Amber lists. Climate change and land management remain likely important drivers of membership of and movements between the lists, but allocating their impact at the level of individual species will remain a challenge for most species.

The future

Birds are being added to the Red list faster than our collective ability to deliver conservation actions to improve their status. For example, whilst the Glastir agri-environment scheme has objectives for priority bird species, there is currently no evidence to link it to change in their conservation status, and this may be because the correct combination of critical resources is not provided and/or that scheme extent has not been sufficient. Funding to progress conservation research and delivery has been limited by the climate of austerity within governments in recent years, and this may continue for the UK and Wales as we leave the EU. It is vital therefore that the monitoring programmes upon which BoCC Wales and BoCC UK depends are continued to inform future reassessments of BoCC Wales, and this will only be possible thanks to the army of dedicated volunteers that take part.

References

- Amar, A., Hewson, C. M., Thewlis R.M., Smith, K.W., Fuller, R.J., Lindsell J.A., Conway, G., Butler, S. & MacDonald, M.A. 2006. *What's happening to our woodland birds? Long term changes in populations of British Birds*. RSPB Research Report 19 / BTO Research Report 169. Sandy: RSPB / Thetford: BTO.
- BirdLife International 2004. *Birds in Europe: population estimates, trends and conservation status*. BirdLife International, Cambridge.
- BirdLife International 2015. *European Red List of Birds*. Office for Official Publications of the European Communities, Luxembourg.

- Burns, F., Eaton, M. A., Gregory, R. D., Al Fulajj, N., August, T. A., Biggs, J., Bladwell, S., Brereton, T., Brooks, D. R., Clubbe, C., Dawson, J., Dunn, E., Edwards, B., Falk, S. J., Gent, T., Gibbons, D. W., Gurney, M., Haysom, K. A., Henshaw, S., Hodgetts, N. G., Isaac, N. J. B., McLaughlin, M., Musgrove, A. J., Noble, D. G., O'Mahony, E., Pacheco, M., Roy, D. B., Sears, J., Shardlow, M., Stringer, C., Taylor, A., Thompson, P., Walker, K. J., Walton, P., Willing, M. J., Wilson, J., & Wynde, R. 2013. *State of Nature Report*. The State of Nature Partnership.
- Burns, F., Eaton, M., Barlow, K., Beckmann, B., Brereton, T., Brooks, D., Brown, P., Fulajj, N., Gent, T., Henderson, I., Noble, D., Parsons, M., Powney, G., Roy, H., Stroh, P., Walker, K., Wilkinson, J., Wotton, S. & Gregory, R. 2016. Agricultural management and climatic change are the major drivers of biodiversity change in the UK. *Plos One* DOI:10.1371/journal.pone.0151595 March 23, 2016
- Colhoun, K. & Cummins, S. 2013. Birds of conservation concern in Ireland 2014-2019. *Irish Birds* **9**: 523-554.
- Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D. & Gregory, R. 2015. Birds of Conservation Concern 4: the populations status of birds in the UK, Channel Islands and Isle of Man. *British Birds* **108**: 708-746.
- Gibbons, D.W., Reid, J.B. & Chapman, R.A. 1993. *The New Atlas of Breeding Birds in Britain and Ireland:1988-1991*. London.
- Gibbons, D.W., Avery, M.I., Baillie, S.R., Gregory, R.D., Kirby, J., Porter, R.F., Tucker, G.M. & Williams, G. 1996. Bird Species of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man: revising the Red Data List. *RSPB Conservation Review* **10**: 7-18.
- Gregory, R.D., Wilkinson, N.I., Noble, D.G., Robinson, J.A., Brown, A.F., Hughes, J., Procter, D., Gibbons, D.W. & Galbraith, C.A. 2002. The population status of birds in the United Kingdom, Channel Island and Isle of Man: an analysis of conservation concern 2002-2007. *British Birds* **95**: 410-448.
- Gibbons, W.D., Evans, A. & Gregory, R.D. 2009. Birds of Conservation Concern 3: The population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* **102**: 296-341.
- Hoodless, A. & Hirons, G. 2007. Habitat selection and foraging behaviour of breeding Eurasian Woodcock *Scolopax rusticola* : a comparison between contrasting landscapes. *Ibis* **149**: 232-249.
- Holloway, S.J. 1996. *The historical atlas of breeding birds in Britain and Ireland: 1875-1900*. T & AD Poyser, London.
- IUCN 2012. *Guidelines for Application of IUCN Red List Criteria at Regional and National Levels: Version 4.0*. IUCN, Gland, Switzerland & Cambridge, UK.
- Johnstone, I. & Thorpe, R. 2010. The revised population status of birds in Wales. *Welsh Birds* **7**: 39-91.

- Lawson, B., Robinson, R.A., Colvile, K.M., Peck, K.M., Chantrey, J., Pennycott, T.W., Simpson, V.R., Toms, M.P. & Cunningham, A.A. 2012. The emergence and spread of finch trichomonosis in the British Isles. *Philosophical Transactions of the Royal Society B* **367**: 2852–2863.
- Lovegrove, R., Williams, G. & Williams, I. 1994. *Birds in Wales*. T.&A.D. Poyser. London.
- Musgrove, A., Aebischer, N., Eaton, M., Hearn, R., Newson, S., Noble, D., Parson, M., Risely, K. & Stroud, D. 2013. Population estimates of birds in Great Britain and the United Kingdom. *British Birds* **106**: 64–100.
- Robinson, J., Colhoun, K., McElwaine, G. & Rees, E. 2004. Bewick's Swan *Cygnus columbianus bewickii* (Northwest European population) in Britain and Ireland 1960/61-1999/2000. *Waterbird Review Series*, WWT/JNCC, Slimbridge.
- Sim, I.M.W., Gregory, R.D., Hancock, M.H. & Brown, A.F. 2005. Recent changes in the abundance of British upland breeding birds. *Bird Study* **52**: 261–275.
- Thorpe, R.I. & Young, A. 2002. The population status of birds in Wales: an analysis of conservation concern 2002-2007. *Welsh Birds* **3**: 289-302.
- Wilson, A.M., Vickery, J.A., Brown, A., Langston, R.H.W., Smallshire, D., Wotton, S. & Vanhinsbergh, D. 2005. Changes in the numbers of breeding waders on lowland wet grasslands in England and Wales between 1982 and 2002. *Bird Study* **52**: 55-69.

List	Criteria	Name	Definition	Abbrev	First use
Red	1	Global importance	IUCN globally endangered, critically threatened, endangered or vulnerable, excluding	IUCN	1
Red	2	Historic decline	Severe historical decline 1800-1994	HD	1
Red	3	Recent population decline	At least 50% decline in breeding population (25yrs)	BDp1	1
Red	3	Recent population decline	At least 50% decline in wintering population (25yrs)	WDP1	1
Red	3	Recent population decline	At least 50% decline in breeding population (longer-term)	BDp2	2
Red	3	Recent population decline	At least 50% decline in wintering population (longer-term)	WDP2	2
Red	3	Recent population decline	At least 50% decline in breeding range (25yrs)	BDr1	1 ¹
Red	3	Recent population decline	At least 50% decline in breeding range (longer term)	BDr2	2
Red	3	Recent population decline	At least 50% decline in wintering range (25yrs)	WDr1	3
Amber	4	European importance	Included in the European Red List of Birds (ERLOB)	ERLOB	1 ²
Amber	2	Historic decline - recovery	Was Red but population increase of greater than 100% in last 25 yrs.	HDrec	1
Amber	3	Recent population decline	At least 25% but less than 50% decline in breeding population (25yrs)	BDMp1	1
Amber	3	Recent population decline	At least 25% but less than 50% decline in breeding population (longer term)	BGMp2	2
Amber	3	Recent population decline	At least 25% but less than 50% decline in wintering population (25yrs)	WDMp1	1
Amber	3	Recent population decline	At least 25% but less than 50% decline in wintering population (longer term)	WDMp2	2
Amber	3	Recent population decline	At least 25% but less than 50% decline in breeding range (25yrs)	BDMr1	1 ¹
Amber	3	Recent population decline	At least 25% but less than 50% decline in breeding range (longer term)	BDMr2	2
Amber	3	Recent population decline	At least 25% but less than 50% decline in wintering range (25yrs)	WDMR1	3
Amber	5	Breeding or non-breeding rarity	Mean of less than 30prps or 90 individuals in the most recent 5yr period with data.	BR	1
		Breeding or non-breeding rarity	Mean of less than 30prps or 90 individuals in the most recent 5yr period with data.	WR	1
Amber	6	Localised breeding or non-breeding	At least 50% of population occurs at one site, but not a rare breeder	BL	1
Amber	7	Localised breeding or non-breeding	At least 50% of population occurs at one site, but not a rare breeder	WL	1

Amber	7	UK	Red listed at UK-level	UKRed	1 ³
Amber	7	UK	At least 50% of the UK population occurs in Wales	UK50	2 ³
Amber	7	UK	At least 10% of the population of a UK rare breeding or wintering species	Bruk	2 ³
		UK	At least 10% of the population of a UK rare breeding or wintering species	WRuk	2 ³
Amber	8	International importance	At least 2% of the European or East Atlantic flyway population	BI	1
Amber	8	International importance	At least 2% of the European or East Atlantic flyway population	WI	1
Green	2	Historic decline	Further recovery: was Amber and at least 167% increase since first HDrec qualification	HDrec2	1

Table 1. The criteria used for the BoCC W3 assessments, along with differences between this and other assessments. Also shown is the original BoCC Wales assessment in which each sub-criteria was first used.

-
1. Only assessed if range greater than 20 10km squares in both years. This requirement relaxed for seabirds from BoCCw2 owing to colonial nature.
 2. ERLOB replaced SPEC for BoCCw3
 3. Used for Wales assessment only

Source	Life-stage	Metric	Key organisa-	Time-period	Description
BBS	Breeding	Annual abundance index	BTO/JNCC/RSPB	BBS 1995-2013	Random sample of 1km sqrs surveyed annually using a standard method to generate an abundance index. Sp inclusion depends on number of sqrs with records and has increased over time
SCARABBS	Breeding	Periodic abundance	RSPB/BTO/NRW	Typically 6 or 12 year repeats	Full or sample surveys to estimate population size using species-specific field methods
Seabird censuses	Breeding	Periodic absolute abundance	JNCC/NRW	1969-70, 1985-88, 2000	Full census of all breeding seabirds using species-specific methods
SMP	Breeding	Annual abundance index	JNCC/RSPB	1986-2013	Sample census using species-specific methods
Atlas	Breeding	Periodic, range	BTO	1968-72, 1988-91, 2007-11	Species geographical distribution at the 10 km sqr scale. Range change was the % change in occupied sqrs between Atlas periods where at least 50% of each square was within Wales (and its coastal waters), including only squares surveyed in each time period of interest.
RBBP	Breeding	Annual abundance	RBBP	1970s-2013	County-level reports of numbers of breeding pairs using informal coverage
Classified records	Breeding and wintering	Annual abundance	WOS/RBBP	Up to 2013	County-level breeding, passage and wintering species numbers not included in RBBP reports
WeBS	Wintering	Annual abundance	BTO/RSPB/JNC	1969-2013	Systematic counts of roosting waterbirds birds on estuaries and inland water bodies expressed as an abundance index
NEWS	Wintering	Periodic abundance	BTO	1997/98 - 2006/07	Non-estuarine waterbird survey. The objective of this is to cover coastline outside of established webs sites
WinGS	Wintering	Periodic abundance	BTO	1983-2004	Wintering gull survey. Repeat roost counts at known sites
Atlas	Wintering	Periodic, range	BTO	1981/82-83/84, 2007/08-10/11	Species geographical distribution at the 10 km sqr scale (see also breeding Atlas above)

Table 2. The main data sources providing data on Welsh bird populations and used in the BoCCw3 assessment.

Rank	Source	Earliest/latest years for trend	Data specific to:
1	SCARABBS and other national single species surveys	1982/2014 (both Chough)	Wales
2	Wales smoothed BBS	1995-2013	Wales
3	Wales small sample smoothed BBS, with supporting evidence	1995-2013	Wales
4	Habitat surveys, with supporting evidence	1968-2003/04 RWBS) ¹ 1982-2002 (WWM) ² 1983-2002 (RUBS) ³	Wales
5	UK CBC/BBS, with supporting evidence	1967-2013 ⁴	UK

Table 3. Ranked priority for use of data sources for assessment under the Recent Population Decline criteria.

1. Repeat woodland bird survey (Amar et al 2006)
2. Waders of wet meadows (Wilson et al 2005)
3. Repeat upland birds survey (Sim et al 2005)
4. From BTO Bird Trends www.bto.org/about-birds/birdtrends

Species	Scientific name	Current status	Most recent breeding
Black-necked Grebe	<i>Podiceps nigricollis</i>	Winter migrant	1957
Bittern	<i>Botaurus stellaris</i>	Winter migrant	1984
Marsh Harrier	<i>Circus aeruginosus</i>	Winter migrant	1992
Montagu's Harrier	<i>Circus pygargus</i>	Rare migrant	1964
Wryneck	<i>Jynx torquilla</i>	Scarce migrant	1904
Woodlark	<i>Lullula arborea</i>	Rare migrant	2006
Nightingale	<i>Luscinia megarhynchos</i>	Rare migrant	1981
Red-backed Shrike	<i>Lanius collurio</i>	Rare migrant	2006
Cirl Bunting	<i>Emberiza cirlus</i>	Rare migrant	1960

Table 4. Birds that bred regularly in Wales in 1800 but whose breeding populations have since become extinct, with current status and most recent year with breeding (to year of this assessment).

English name	BocC W2	IUCN	HD	BDp1 & BDMp1	BDp2 & BDMp2	BDt1 & BDMt1	BDr2 & BDMr2	WDP1 & WDMp1	WDP2 & WDMp2	WDr1 & WDMr1	HDrect1	ERLOB	UK Red	BR	WR	UK50%	BRuk	WLRuk	BL50%	BI	WI	WL50%	HDrect2
Bewick's Swan	A							>50		-55	EN											70-80 ^{Bath}	
White-fronted Goose	R							>50							61								
Pochard	R	VU						-64	-73	-28	VU	*											
Long-tailed Duck	R	VU								-37	VU				21								
Red Grouse	R	*					-44				VU												
Black Grouse	R	*					-48	-67		-46		*											
Grey Partridge	R	*					-78			-67		*											
Balearic Shearwater	R	CR									CR	*											
Slavonian Grebe	A	VU													45								
Hen Harrier	R	*													55								
Corncrake	R	*					-98						*	0									
European Golden Plover	R						-27						*										
Grey Plover	R							-63	-44													10-20 ^{SPA}	
Lapwing	R						-46														4		
Ringed Plover	A							-62	-52				*										
Curlew	R						-39						*								2		
Bar-tailed Godwit	R							-28	-58														
Knot	A							-31	-56												4		
Dunlin	R							-26	-51					17							3	40-50 ^{Bath}	
Common Sandpiper	A																						
Redshank	A						-67														4	70-80 ^{Bath}	
Woodcock	A						-77						*										

English name	BCC W2	IUCN	HD	BDp1 & BDMp1	BDp2 & BDMp2	BD1 & BDM1	BD2 & BDM2	BD1 & BDM1	BD2 & BDM2	WDP1 & WDMp1	WDP2 & WDMp2	WDP1 & WDM1	HDrect1	ERLOB	UK Red	BR	WR	UK50%	BRUK	WRUK	BL50%	BI	WI	WL50%	HDrect2
Puffin	R	VU												EN	*						90-100 ^{SPA}			*	
Little Tern	R					-50															90-100 ^{both}				
Roseate Tern	R			-100	-100	-25										1					90-100 ^{both}				
Arctic Tern	R						-60														90-100 ^{both}			*	
Kittiwake	G			-51											VU	*									
Black-headed Gull	R			-34	-75	-46	-39																2		
Common Gull	R							-70																	
Herring Gull	R				-68		-57								NT	*							4		
Great Black-backed Gull	R				-53																				
Turtle Dove	R	VU		-94 ^{uk}	-97 ^{uk}	-82	-96								VU	*									
Cuckoo	R			-29	-75 ^{uk}																				
Short-eared Owl	R			-69		-51	-62									5	70				70-80 ^{both}				
Lesser Spotted Woodpecker	R			-73 ^{uk}	-60 ^{uk}	-26	-32					-26			*										
Kestrel	R			-77																					
Merlin	A		*	-38		-28	-36														60-70 ^{both}				
Willow Tit	R				-92 ^{uk}	-43	-41					-43			LC	*									
Marsh Tit	R			-39	-68										*										
Wood Warbler	R			-72											*										
Willow Warbler	R				-68																				
Whitethroat	A				-57 ^{uk}																				
Grasshopper Warbler	R			-68 ^{uk}	-93 ^{uk}										*										

English name	BoCC W2	IUCN	HD	BDp1 & BDMp1	BDp2 & BDMp2	BDp1 & BDMr1	BDp2 & BDMr2	BDp1 & BDMp1	BDp2 & WDMp2	WDp1 & WDMr1	HDrec1	ERLOB	UK Red	BR	WR	UK50%	BRuk	WRuk	BL50%	BI	WI	WL50%	HDrec2
Starling	R			-70	-89 ^{uk}								*										
Ring Ouzel	R					-50							*										
Spotted Flycatcher	R			-48	-63								*										
Pied Flycatcher	R			-55									*										
Whinchat	G			-54 ^{uk}	-67	-29	-34						*										
Tree Sparrow	R			-49 ^{uk}	-95 ^{uk}	-53	-66						*										
Yellow Wagtail	R			-61 ^{uk}	-71 ^{uk}	-75				-45			*										
Bullfinch	R				-52																		
Linnnet	R			-26	-74								*										
Yellowhammer	R			-56	-56 ^{uk}	-25	-35			-32			*										
Corn Bunting	R		*	-100	-88 ^{uk}								*										

Table 5. Species on the BoCC W3 Red list, the criteria under which they qualify for both Red and Amber lists, and their supporting data. Red-list criteria are: IUCN: Globally Threatened (CR = Critically Endangered, EN = Endangered, VU = Vulnerable). HD: historical decline in the breeding population (* = qualifies). BDp1/2: severe breeding population decline over 25 years/longer term. WDP1/2: severe non-breeding population decline over 25 years/longer term. BDr1/2: severe breeding range decline over 25 years/longer term. WDr1: severe non-breeding range decline over 25 years. Amber-list criteria are: ERLOB: Threatened in Europe (CR = Critically Endangered, EN = Endangered, VU = Vulnerable). HDrec1/2: historical decline – recovery/further recovery since BoCCW2. BDMp1/2: moderate breeding population decline over 25 years/longer term. WDMp1/2: moderate non-breeding population decline over 25 years/longer term. BDMr1/2: moderate breeding range decline over 25 years/longer term. WDMr1: moderate non-breeding range decline over 25 years. Superscript 'uk' indicates cases where UK data are used. BR/WR: breeding/non-breeding rarity. BL/WL: breeding/non-breeding localisation. Superscript text indicates whether species qualified as localised in IBAs, SPAs, or both. BI/WI: breeding/non-breeding international importance. Figures are given in bands for species exceeding the qualifying thresholds for the localisation and international importance criteria. Red and Amber criteria for population and range trends are given as % change, and are combined in the same columns (BDp1 = normal text, BDMp1 = italic). When a species has changed list since BoCCW2, shading indicates the criteria responsible for that change.

English name	BoCCw2	HDrect1	BDMp1	BDMp2	BDMr1	BDMr2	WDMp1	WDMp2	WDMr1	ERLOB	UKred	BR	WR	UK50%	BRuk	WRuk	BL50%	BI	WI	WL50%	HDrec2
Shelduck	A						-33											2	7	90-100 ^{Both}	
Wigeon	A									LC		2							3		
Teal	A					-30													4		
Mallard	A						-40														
Pintail	A									LC		0							12	90-100 ^{Both}	
Garganey	A									LC		2			*						
Shoveler	A											10							4		
Scapup	A										*		64								
Eider	A									VU		3									
Common Scoter	A																		4	90-100 ^{Both}	
Velvet Scoter	A									VU	*		34								
Smew	A												5								
Red-breasted Merganser	A					-29				NT											
Quail	A											28									
Red-throated Diver	A																			70-80 ^{SPA}	
Black-throated Diver	A												9								
Great Northern Diver	A									VU			89								
Fulmar	G									EN											
Sooty Shearwater	A												70								
Manx Shearwater	A					-40								57						90-100 ^{Both}	43
Storm Petrel	A																			90-100 ^{Both}	

English name	BOGCW2	HDrec1	BDMp1	BDMp2	BDM1	BDM2	WDMp1	WDMp2	WDM1	ERLOB	UKred	BR	WR	UK50%	BRuk	WRuk	BL50%	BI	WI	WLS0%	HDrec2
Leach's Petrel	A									LC											
Gannet	A																80-90 ^{SPA}	13			
Cormorant	A																		2		
Shag	G									LC *											
Bittern	A											1	24								
Grey Heron	G			-25																	
Spoonbill	A												8		*						
Red-necked Grebe	A										*		2								
Black-necked Grebe	A												6								
Honey-buzzard	A											10			*						
Red Kite	A									NT								2			*
Marsh Harrier	A												5								
Osprey	A											3									
Coot	G									NT											
Avocet	A											16									
Oystercatcher	A									VU								7	60-70 ^{Both}		
Dotterel	G										*										
Whimbrel	A										*										
Black-tailed Godwit	A									VU								3	50-60 ^{Both}		
Turnstone	A									LC											
Ruff	A									LC			26								

English name	BoCCw2	Hdrec1	BDmp1	BDmp2	BDmr1	BDmr2	WDMp1	WDMp2	WDMr1	ERLOB	UKred	BR	WR	UK50%	BRuk	WRuk	BL50%	BI	WI	WL50%	Hdrec2
Curlew Sandpiper	G									VU			63								
Sanderling	A									LC									3		
Purple Sandpiper	G																				
Green Sandpiper	G												36								
Spotted Redshank	A									LC			42			*					
Jack Snipe	A												69								
Snipe	G					-45															
Pomarine Skua	A												84								
Arctic Skua	A										*										
Long-tailed Skua	A												31								
Black Guillemot	G									LC		28									
Razorbill	A									NT							50-60 ^{Both}	2			
Guillemot	A									NT							80-90 ^{Both}				
Sandwich Tern	A																90-100 ^{Both}				
Common Tern	R					-46															
Little Gull	A									NT			30								
Lesser Black-backed Gull	A																				
Long-eared Owl	A													10							
Nightjar	A	*																			
Swift	A																				
Kingfisher	A									VU											

Full English name	BoCCw2	HDrct1	BDMp1	BDMp2	BDM1	BDM2	WDMp1	WDMp2	WDM1	ERLOB	UKred	BR	WR	UK50%	BRuk	WRuk	BL50%	BI	WI	WL50%	HDrec2
Green Woodpecker	A	-35				-31								55							
Chough	A												6								
Hooded Crow	A																				
Goldcrest	A	-32								LC											
Firecrest	A											6									
Bearded Tit	A											2	13								
Skylark	A										*										
Long-tailed Tit	A	-41																			
Dartford Warbler	A									NT											
Dipper	A	-35																			
Fieldfare	A									LC											
Song Thrush	A										*										
Redwing	A									NT	*										
Mistle Thrush	G										*										
Black Redstart	A										*										
House Sparrow	A										*										
Grey Wagtail	G	-28									*										
Tree Pipit	A	-25									*										
Meadow Pipit	A	-46**								NT											
Brambling	G									LC											
Hawfinch	A	-26									*										

English name	BoCCw2	HDrec1	BDMp1	BDMp2	BDMr1	BDMr2	WDMp1	WDMp2	WDMr1	ERLOB	UKred	BR	WR	UK50%	BRuk	WRuk	BL50%	BI	WI	WL50%	HDrec2
Greenfinch	G	-38																			
Twite	R	-38								LC	*	16	65								
Lesser Redpoll	R										*										
Snow Bunting	A												29								
Lapland Bunting	A												61								
Reed Bunting	A			-25 ^{uk}																	

Table 6. Species on the BoCC W3 Amber list, the criteria under which they qualify, and the supporting values. Amber-list criteria are ERLOB: Threatened in Europe (CR = Critically Endangered, EN = Endangered, VU = Vulnerable). HDrec1/2: historical decline – recovery/further recovery since BoCCW2. BDMp1/2: moderate breeding population decline over 25 years/longer term. WDMp1/2: moderate non-breeding population decline over 25 years/longer term. BDMr1/2: moderate breeding range decline over 25 years/longer term. WDMr1: moderate non-breeding range decline over 25 years. BR/WR: breeding/non-breeding rarity. BL/WL: breeding/non-breeding localisation. Superscript ‘uk’ indicates cases where UK data are used. Superscript text indicates whether species qualified as localised in IBAs, SPAs, or both. BI/WI: breeding/non-breeding international importance. Figures are given in bands for species exceeding the qualifying thresholds for the localisation and international importance criteria. Amber criteria for population and range trends are given as % change, and are combined in the same columns (BDp1 = normal text, BDMp1 = italic). When a species has changed list since BoCCW2, shading indicates the criteria responsible for that change.

Name	BoCCW2	Name	BoCCW2
Mute Swan	A ^f	Jackdaw	G
Whooper Swan	G	Rook	G
Pink-footed Goose	G	Carrion Crow	G
Barnacle Goose	A ^{cg}	Raven	G
Brent Goose	A ^{cfg}	Blue Tit	G
Gadwall	A ^{cg}	Great Tit	G
Tufted Duck	A ^c	Coal Tit	A ^a
Goldeneye	G	Sand Martin	A ^c
Goosander	G	Swallow	A ^c
Little Egret	G	House Martin	A ^c
Little Grebe	G	Cetti's Warbler	G
Great Crested Grebe	G	Chiffchaff	G
Goshawk	G	Blackcap	G
Sparrowhawk	G	Garden Warbler	A ^b
Buzzard	G	Lesser Whitethroat	G
Water Rail	G	Sedge Warbler	G
Spotted Crake	A	Reed Warbler	G
Moorhen	G	Waxwing	G
Little Ringed Plover	G	Nuthatch	G
Little Stint	G	Treecreeper	G
Greenshank	G	Wren	G
Great Skua	G	Blackbird	G
Black Tern	A ^c	Robin	G
Mediterranean Gull	A ^e	Redstart	A ^c
Rock Dove	G	Stonechat	G
Stock Dove	G	Wheatear	A ^c
Woodpigeon	G	Dunnock	G
Collared Dove	G	White / Pied Wagtail	G
Barn Owl	A ^c	Rock Pipit	G
Tawny Owl	G	Water Pipit	G
Great Spotted Woodpecker	G	Chaffinch	G
Hobby	A ^d	Common Crossbill	G
Peregrine	G	Goldfinch	G
Magpie	G	Siskin	G
Jay	G		

Table 7. The BoCC W3 Green list. Superscripts indicate which criteria are no longer qualified for. ^a No longer BDMP1, ^b No longer BDMP2, ^c Not on ERLOB but was on SPEC, ^d No longer BR, ^e No longer WR, ^f No longer WI, ^g No longer LW50%.

(A)	Rw3	Aw3	Gw3	Total
Rw2	43	3 Twite Lesser Redpoll Common Tern	0	46
Aw2	9 Woodcock Ringed Plover Knot Pintail Merlin Long-tailed Duck Long-eared Owl Common Sandpiper Bewick's Swan Redshank	73	17	99
Gw2	2 Whinchat Kittiwake	14	52	68
Total	54	90	69	213

(B)	Ruk4	Auk4	Guk4	Total
Rw3	35	17	2 European Golden Plover Whitethroat	55
Aw3	22	47	21	90
Gw3	0	17	52	69
Total	57	81	75	213

Table 8. Numbers of birds moving between lists from BoCCw2 to BoCCw3, with species named for movements between Red and Amber and Red and Green **(A)**, and comparison of number of species in each list between BoCC W3 and BoCC UK4, with species named for differences between Red and Green **(B)**. Notation: first letter = list (Red Amber or Green), second letter = country (Wales or UK), number = assessment (first to fourth).

Change	Effect (BoCCW2 > BoCCW3)	Species affected
HDrec modified	Amber > Red	Merlin
ERLOB instead of SPEC	Amber > Green	Barn Owl, Black Tern, Redstart, House Martin, Wheatear, Swallow, Tufted Duck
New Winter Distribution (WDR) criteria	Red	Bewick's Swan

Table 9. Impact of new and changed criteria on the BoCC W3 lists. Species listed are those that change list solely because of the named change.

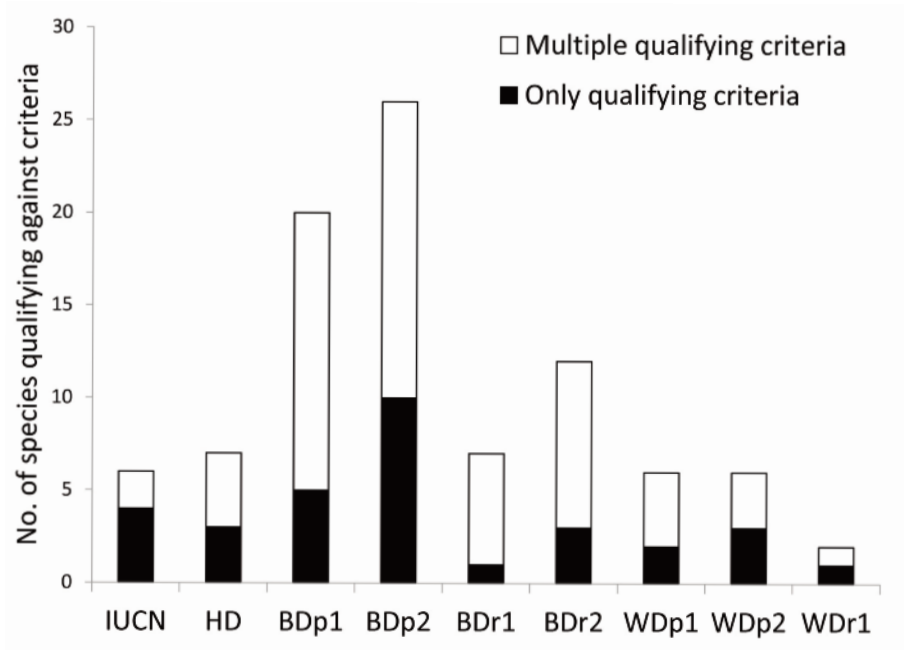


Figure 2. Frequency of species qualifying under the different BoCC W3 Red list criteria. The black parts of bars show those species qualifying Red on only a single criterion.

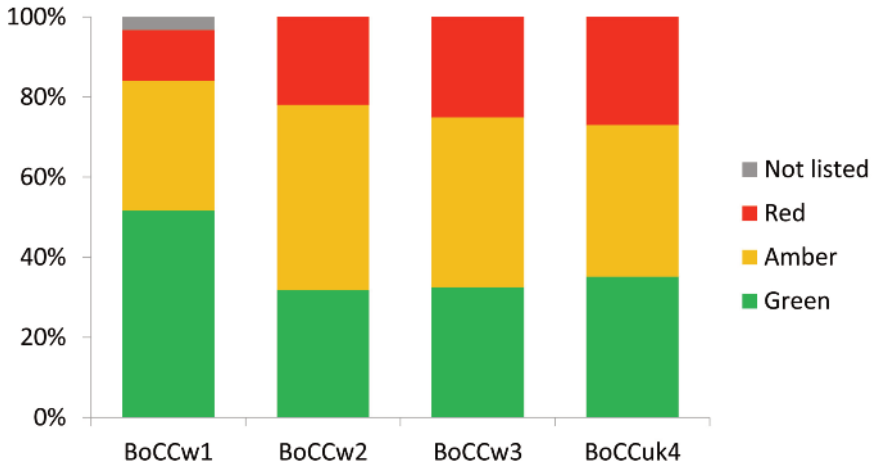


Figure 1. The number of species on each list for successive BoCC Wales assessments, and the numbers of those species placed on each list by BoCC UK4.

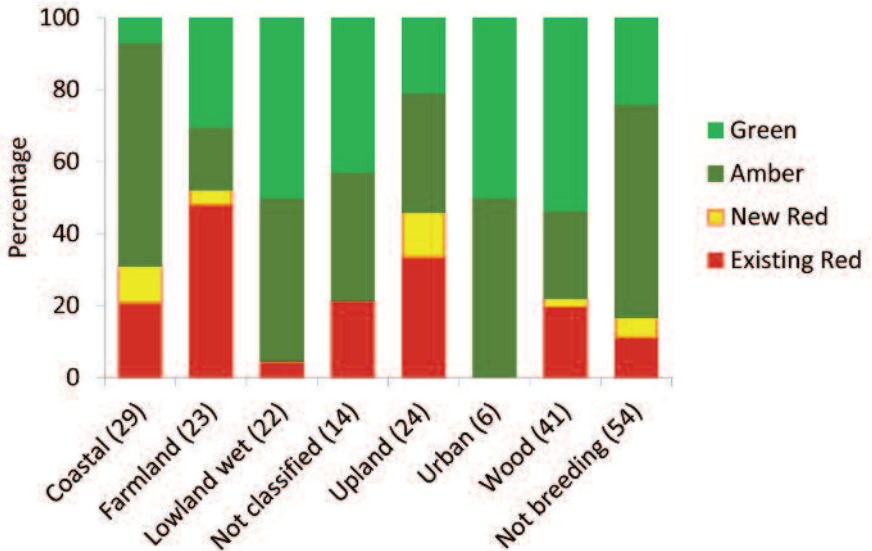


Figure 3. Proportion of breeding birds associated with major habitat types (following Gibbons et al 1993) that have been placed on each list (distinguishing between those already on the Red list in BoCC W2 and those added to the Red list for BoCC W3). Also shown are those species which occur only as wintering or passage populations in Wales (largely in coastal and lowland wetland habitats), along with the number of species in each group.