

Review of 2023 general licences for wild bird control

October 2023

1. Background

This document presents the proposals arising from the first review of NRW's general licences (GLs) for wild bird control, since the conclusion of the Review of NRW's approach to regulating the shooting and trapping of wild birds ("the Wild Bird Review") in 2022.

The Wild Bird Review was undertaken between 2020 and 2022 by NRW staff, but an important element was gathering evidence and testing ideas and proposals through engagement with a wide range of external stakeholders. This included a call for evidence, commissioned evidence and a public consultation on proposals.

NRW's Board endorsed the proposed new approach to granting GLs in March 2022, including the use of a set of high-level principles to determine when the granting of a GL is appropriate. These principles are set out in [Appendix 1. Our decision document](#), setting out this and all the other decisions made in relation to GLs was published in April 2022. One of the decisions was that GLs should continue to be granted annually, and in December 2022 four new GLs authorising lethal control of wild birds were issued for 2023:

[GL 001](#) - Licence to kill or take six species of wild birds or to take or destroy their nests or eggs for the purposes of preventing serious damage or spread of disease to livestock, foodstuffs for livestock, crops, vegetables or fruit (the six species are Canada goose, carrion crow, feral pigeon, magpie, jackdaw and woodpigeon).

[GL 002](#) - Licence to kill or take feral pigeon or to take or destroy their nests or eggs for the purposes of preserving public health, public safety or preventing the spread of disease.

[GL 004](#) - Licence to kill or take carrion crow or to take or destroy their nests or eggs for the purpose of conserving wild birds.

[GL 005](#) - Licence to kill or take ruddy duck or destroy their nests or eggs for the purpose of conserving wild birds.

One of the recommendations agreed by NRW's Board was to establish a formal review process for GLs to take place at six-yearly intervals, intended to coincide with the periodic assessment and publication of Birds of Conservation Concern (BoCC) for Wales. The Board also agreed that the six-yearly reviews should be supported by an independent advisory panel comprising a broad range of stakeholders.

The fourth BoCC assessment for Wales ("[BoCC Wales 4](#)"¹) was published at the end of 2022, meaning that 2023 is the start of our six-yearly cycle of review. Given that it is only 18 months since the Wild Bird Review concluded, we have made this first review light touch, with the focus on considering any changes of approach required in light of BoCC Wales 4. We have also taken the opportunity to consider any further new evidence including any relevant publications or reports that have become available, and feedback from licence users and other stakeholders.

The scope of this light touch review does not include any changes to NRW's overall approach to licensing the lethal control of wild birds, including our principles relating to the granting of GLs, which were endorsed by NRW's Board at the conclusion of the Wild Bird Review. The aim is to initiate the ongoing periodic review process which formed part of the commitments made.

2. Review

NRW's GL001, GL002, GL004 and GL005, valid for 2023, have been reviewed internally by NRW ornithologists and regulatory approaches, policy and licensing staff.

Our proposals – either for change or no change – are set out below and are divided into those elements which apply to all of the GLs concerned, and then proposals specific to each GL. New GLs would take effect from the 1st January 2024 (or 1st February in the case of GL004).

2.1 Overarching Issues – relevant to all NRW general licences for wild bird control

Target species currently listed on general licences

Proposal: The following species are suitable for continued inclusion as target species on GLs for wild bird control based on their conservation status:

Bird species	Relevant GL	BoCC 4 Wales assessment
Canada Goose	GL001	Not assessed ²
Carrion Crow	GL001, GL004	Green

¹ Johnstone, I.G., Hughes, J., Balmer, D., Brenchley, A., Facey, R.J., Lindley, P., Noble, D.G. and Taylor, R.C. 2022. Birds of Conservation Concern Wales 4: the population status of birds in Wales. *Milvus* 2:1 (online).

² Not assessed as this is an introduced species from North America.

Feral Pigeon	GL001, GL002	Not assessed ³
Jackdaw	GL001	Green
Wood Pigeon	GL001	Green
Ruddy Duck	GL005	Not assessed ⁴

Reason: These species are Green-listed on BoCC Wales 4 or otherwise not of conservation concern, and thus their continued inclusion as GL target species is appropriate in the context of Principle 5 of NRW's principles for general licensing:

Principle 5: *Allowing lethal control of a target species under a general licence will not risk putting it into an unfavourable conservation status.*

General licences do not specify limits on the number of birds that may be taken, and do not require licence users to report how many birds they have taken under the licence. In order to ensure that allowing the lethal control of a species under a general licence does not jeopardise its conservation status, there are limited circumstances under which a species can be included on a general licence. We consider that the only species suitable for inclusion on a general licence are those which are not of conservation concern. We will use the 'Birds of Conservation Concern' (BoCC) Green/Amber/Red listings for Wales, to inform our assessment of which target species of wild bird are of conservation concern.

Wider consideration around any changes in the evidence base of the relevant target species-to-purpose combination is given below for each GL.

Proposal: We will not include magpie as a target species on any GLs for wild bird control, effective from 1st January 2024. Magpie is currently listed as a target species on GL001.

Reason: Magpie has moved from the Green-list in BoCC Wales 3⁵ to the Amber list in BoCC Wales 4. The reason for magpie being Amber-listed is that this species meets the criterion BDMp1, meaning that there has been at least 25% but less than 50% decline in the breeding population over a 25-year period. Further detail is provided in [Appendix 2](#).

³ Not assessed as this is a species domesticated from rock dove.

⁴ Not assessed as this is an introduced species from North America. UK policy position is to eradicate.

⁵ **Johnstone, I and Bladwell, S.** 2016. Birds of Conservation Concern in Wales 3: the population status of birds in Wales. *Birds in Wales* **13**(1): 3-31.

Inclusion of any additional target species on general licences

Proposal: We will not be including any additional target species in our GLs for wild bird control at this review point.

Reason: No additional species meet our criteria for being listed as a target species.

The NRW Board agreed our principles for deciding when GLs are appropriate (refer to [Appendix 1](#) and [our decision document](#) for full details). All principles need to be met. For the purposes of this review two of the seven principles were initially considered:

***Principle 4:** Allowing lethal control of the species in question under general licence, rather than only under specific licences subject to individual applications, is a proportionate response, given the frequency, scale and severity of the problem or need.*

***Principle 5:** Allowing lethal control of a target species under a general licence will not risk putting it into an unfavourable conservation status.*

We have considered a number of species in the context of these two principles:

Herring Gull and Lesser Black-backed Gull. Both species are Red-listed in BoCC 4 Wales and therefore do not meet Principle 5. On this basis, herring gull and lesser black-backed gull are ruled out of any further consideration of suitability as target species on any GL.

Canada goose. NRW has received a number of enquiries during 2022 and 2023 regarding Canada goose and public safety, which has resulted in three licence applications, none of which have been granted. We are aware that this species is listed on GLs in England (Defra GL41) and Scotland (NatureScot GL03/2023) authorising its lethal control for public health and safety purposes. However, we consider that a GL authorising control of Canada goose for public health or safety purposes would not satisfy Principle 4 because of the small number of applications. We are therefore not proposing to add Canada goose as a target species to our GL002, under licence purpose 16(1)(i) for the purposes of preserving public health and public safety and 16(1)(j) for the purpose of preventing the spread of disease at this time.

Other wild bird species. NRW has issued specific licences to control several other wild bird species for a number of licence purposes. In 2023 to date, these have amounted to fewer than five specific licences for any one target species, for any one purpose. For example for the purpose of conserving wild birds (section 16(1)(c) of the Wildlife and Countryside Act 1981) we have issued the following number of specific licences to control the named species: barnacle goose (1), black-headed gull (1), Canada goose (2), great black-backed gull (2), herring gull (3), jackdaw (1), lesser black-backed gull (2), and carrion crow (in circumstances where GL004 did not apply) (2). As such we do not consider that the grant of a GL for these species-purposes would satisfy Principle 4.

Meanwhile, consideration of our approach to licensing the control of **fish-eating birds** (in particular **cormorant** and **goosander**) is ongoing. Any change of approach would follow the conclusion of this work. Until then any lethal control of either of these species will continue to be subject to specific licensing.

Part C Conditions

Proposal: No changes to GL conditions are proposed.

Reason: We consider the conditions attached to our GLs for wild bird control remain necessary and that the wording is fit for purpose. To date we have not received any comments or feedback on our GL conditions to suggest there are any issues with the conditions as currently worded, since they were last revised at the conclusion of the Wild Bird Review.

Part D. Definitions

Proposal: No changes to the definitions of terms used in the GLs are proposed.

Reason: We consider that the definitions set out in Part D of our GLs for wild bird control remain fit for purpose. To date we have not received any comment or feedback on our GL Definitions to suggest there are any issues with the definitions as currently worded, since they were last revised at the conclusion of the Wild Bird Review.

Part E. Advice to licence users

Proposal: No changes to the advice to licence users given in Part E of our GLs for wild bird control are proposed.

Reason: We consider that the advice to licence users given is fit for purpose. To date we have not received any further comment or feedback on our GL advice to licence users to suggest there are any issues with the advice as currently worded, since this was last revised at the conclusion of the Wild Bird Review.

Protected sites where the GLs do not apply

Proposal: We propose that no protected sites will be removed from the list of sites where GLs 001, 002 and 004 do not apply (these sites are listed in Annex 1 of GL001 and GL002, and Annex 2 of GL004).

Reason: The protected sites listed in the relevant GL Annex are those protected sites designated for species which may be sensitive to disturbance from licensed activities. This list was reviewed in 2022, when the number of Sites of Special Scientific Interest (SSSIs) where the GLs do not apply was reduced from 198 to 141. To date we have not received any further comments or feedback on this topic since the list of protected sites was amended as part of the Wild Bird Review.

Proposal: We propose to add one additional site, Scoveston Fort SSSI, to the list of sites excluded from the three GLs.

Reason: Scoveston Fort SSSI has been recently notified and confirmed as a SSSI. The notified feature is hibernating greater horseshoe bat, and our approach is that the GLs do not apply to any SSSIs which include a mammal species as a notified feature. Several other new SSSIs have also been notified since the 2023 GLs were issued, but do not include any features which we consider potentially sensitive to disturbance from activities licensed under the GL.

Format of GLs for wild bird control on NRW's website

Proposal: GLs for wild bird control will continue to be presented in HTML format on our website, with the ability to save as a PDF where required. We will consider whether to add additional wording to our general licensing webpage to highlight that this is possible following clicking the "Print this page" option on each webpage.

Reason: In common with other public bodies, and in response to statutory requirements concerning the accessibility of information, NRW has moved to a greater use of HTML in our electronic publications and reduced the use of PDF documents across our website. As electronic publications, GLs fall within the scope of that work.

We have received some feedback regarding the presentation of GLs, specifically from some GL users who wish to print off the relevant GL, including for example so as to carry a hardcopy when carrying out licensed activity. Our advice remains that GL users should refer to the online version before undertaking any activity as this will represent the most up to date version of the GL, reflecting any recent amendments/updates that may have been made. However the facility to print the relevant webpage remains available. Users also have the option to save any of the GLs as a PDF which can then be saved to a file/desktop and then printed. This option can be found by clicking on "Print this page" and then selecting "Save as PDF" from the printer drop down menu which appears (users may need to scroll up or down the available list to find this option). Users then can save the GL as a PDF to their preferred device.

2.2 Review of matters specific to each general licence

GL001 - Licence to kill or take wild birds or to take or destroy their nests or eggs for the purposes of preventing serious damage or spread of disease to livestock, foodstuffs for livestock, crops, vegetables or fruit

Part A – Legal basis and purpose of the licence

Proposal: No changes to Part A of GL001 are proposed.

Reason: We consider that the legal basis remains for the granting of this GL and that the wording is fit for purpose.

Part B – What this licence authorises

Proposal: We propose that Magpie will no longer be included in Table 1, meaning that this GL will no longer authorise the lethal control of magpie. No other changes are proposed to Part B. For clarity, the proposed revised Table 1 is set out below.

Reason: We are not aware of any new evidence which changes our view on the target species-to-purpose combinations authorised, other than in relation to the population status of magpie, as explained above and in [Appendix 2](#).

Species	Prevent serious damage to livestock through direct attack	Prevent serious damage to livestock foodstuffs	Prevent serious damage to crops, vegetables or fruit	Prevent spread of disease to livestock or livestock foodstuffs
Canada goose	No	No	Yes	No
Feral pigeon	No	Yes	Yes	Yes
Woodpigeon	No	No	Yes	Yes

Jackdaw	No	Yes	Yes	Yes
Carrion crow	Yes	Yes	No	Yes

GL002 - Licence to kill or take feral pigeon or to take or destroy their nests or eggs for the purposes of preserving public health, public safety or preventing the spread of disease.

Part A – Legal basis and purpose of the licence

Proposal: No changes to Part A of GL002 are proposed.

Reason: We consider that the legal basis remains for the granting of this GL and that the wording is fit for purpose.

Part B – What this licence authorises

Proposal: No changes to Part B of GL002 are proposed.

Reason: We consider that the content of Part B remains fit for purpose.

GL004 - Licence to kill or take carrion crow or to take or destroy their nests or eggs for the purpose of conserving wild birds.

Part A – Legal basis and purpose of the licence

Proposal: No changes to Part A of GL004 are proposed.

Reason: We consider that the legal basis remains for the granting of this GL and that the wording is fit for purpose.

Part B What this licence authorises

Proposal: No changes to Part B of GL004 are proposed.

Reason: We consider that the content of Part B remains fit for purpose.

Beneficiary species – species listed in Annex 1

Proposal: We propose not to include **cormorant, red kite, reed bunting** and **song thrush** in Annex 1 of GL004, meaning that GL004 would no longer authorise the control of carrion crow for the purpose of conserving these species.

Reason: These species are now Green-listed in BoCC Wales 4, and therefore no longer meet our principles for conservation licensing as set out in Appendix 4 of [decisions in relation to general licences](#). Specifically:

***Principle 1** - only species which are of conservation concern should be the intended “beneficiaries” of lethal bird control.*

Proposal: We propose to include **chaffinch, dunnock, garden warbler, Mediterranean gull and rook** in Annex 1 of GL004.

Reason: These species were previously Green-listed in BoCC Wales 3 but have moved to the Amber or Red lists in BoCC Wales 4 and they are considered vulnerable to predation by carrion crow (for further detail see [Appendix 3](#)). We therefore consider that the inclusion of these species in the list of species intended to benefit from control of carrion crow meets our principles for conservation licensing, as set out in Appendix 4 of [decisions in relation to general licences](#).

GL005 – Licence to kill or take ruddy duck or to take or destroy their nests or eggs for the purpose of conserving wild birds

Proposal: No changes to this GL are proposed at this time.

Reason: We consider that the GL remains fit for purpose and is an appropriate mechanism to enable timely control of ruddy duck, which is an invasive non-native species subject to a policy of eradication.

Appendix 1

NRW's Principles for deciding when general licences are appropriate

(These are taken from [Decisions in relation to general licences April 2022](#))

Principle 1: There is an apparent and genuine need to allow the killing or taking of the species of wild bird in question, or to take or destroy their eggs or nests, in order to further one or more of the purposes outlined in section 16 of the Act.

All wild birds are protected by law, and derogations from that protective regime may only be granted for particular purposes.

Principle 2: Allowing the lethal control of birds of the species concerned under general licence can reasonably be expected to contribute to resolving the problem or meeting the need.

Even if Principle 1 is satisfied, we consider lethal control of wild birds should only be authorised if, on the basis of available evidence, it is reasonable to consider that such action will contribute to meeting the need for resolving the problem concerned.

Principle 3: There are no satisfactory solutions that would resolve that problem or address the need in question, other than to grant a general licence allowing the killing or taking of the wild bird species concerned.

NRW is permitted by the legislation to authorise lethal control of wild birds for specified purposes but only where we are satisfied as regards those purposes that there is no other satisfactory solution. Therefore, we need to be satisfied that granting a general licence is the only satisfactory way to address the problem or satisfy the purpose in question, and that the purpose cannot satisfactorily be addressed by using only non-lethal methods, or through granting specific licences on application.

Principle 4: Allowing lethal control of the species in question under general licence, rather than only under specific licences subject to individual applications, is a proportionate response, given the frequency, scale and severity of the problem or need.

General licences are appropriate only where it would be impractical or disproportionately burdensome on users, and on NRW, to regulate the killing or taking of birds or destruction of eggs and nests for that purpose, through requiring specific licences. For example, a general licence may be appropriate where NRW would otherwise receive a large number of applications for specific licences, all seeking authorisation to carry out the same types of actions against the same species for the same purposes.

Principle 5: Allowing lethal control of a target species under a general licence will not risk putting it into an unfavourable conservation status.

General licences do not specify limits on the number of birds that may be taken, and do not require licence users to report how many birds they have taken under the licence. In order to ensure that allowing the lethal control of a species under a general licence does not jeopardise its conservation status, there are limited circumstances under which a species can be included on a general licence. We consider that the only species suitable for inclusion on a general licence are those which are not of conservation concern. We will use the 'Birds of Conservation Concern' (BoCC) Green/Amber/Red listings for Wales, to inform our assessment of which target species of wild bird are of conservation concern.

Principle 6: No action authorised by a general licence will adversely affect the conservation status of any species other than the target species.

In addition to considering the impact of a general licence on the target species (under Principle 5 above), we will not grant a general licence if we consider that any action taken under that licence would place the conservation of other species at risk. It may be necessary to include conditions in a general licence in order to satisfy this principle, including in particular in relation to the potential impact on protected sites.

Principle 7: The general licence can be framed in terms which are clear to all users, compliant with all relevant legal requirements, and enforceable.

We consider that NRW should not issue a general licence unless we are satisfied that the purpose or purposes for which the licence may be used, and the circumstances and conditions under which it may be used, can be set out sufficiently clearly for all users to understand.

Appendix 2

Conservation status of magpie in Wales

Background

1. The Wild Bird Review concluded that it was appropriate for magpie *Pica pica* to be listed on GL001 for the purposes of preventing serious damage to livestock and preventing the spread of disease to livestock. At that point (early 2022) magpie was a Green-listed species. However, under the fourth assessment of Birds of Conservation Concern (“BoCC”) in Wales, published at the end of 2022, magpie is now Amber-listed due to long-term changes in population abundance (Johnstone *et al.*, 2022).
2. BoCC assessments use a well-established approach, based on quantitative review against standardised criteria (global importance, historical population decline, short and long-term population decline, European importance, breeding rarity, localized distribution, UK importance and international importance). Following assessment, bird species are placed on ‘Red’, ‘Amber’ or ‘Green’ lists to indicate their level of conservation concern.
3. By applying a transparent and standardised approach, based on the best available evidence, and conducted collaboratively by a multi-partner group of both statutory and non-government sectors, *BoCC 4 Wales* is a robust assessment of the status of wild bird species in Wales.
4. Under NRW’s principles for the use of general licences (GLs), the level of conservation concern about a given species is an important factor when considering that species’ suitability for inclusion as a target species on any GLs authorising lethal control. In particular, under Principle 5 we do not consider that species of conservation concern are suitable for inclusion on GLs, and we use the BoCC Red/Amber/Green listing to inform that assessment.

Magpie conservation status in Wales

5. Magpie has moved from the Green list in BoCC 3 Wales (Johnstone and Bladwell, 2016) to the Amber list in BoCC 4 Wales (Johnstone *et al.*, 2022). The reason for magpie being Amber-listed is that this species meets the criterion BDMp1, namely there has been at least 25% but less than 50% decline in the breeding population over a 25-year period. Magpie populations in Wales do not meet any of the other criteria for BoCC Amber listing.
6. The reasons behind magpie population decline in Wales are not fully understood, though several studies have reported lower breeding success and population density of magpies in areas of high carrion crow abundance (see Birkhead, 1991). Declining breeding performance metrics (e.g. clutch size, brood size and fledging success) over the last 35 years suggest poor breeding success may be an important driver of population change (Massimino *et al.*, 2022).

7. Whilst the decline in magpie abundance in Wales reported by the most recent BTO/JNCC/RSPB Breeding Bird Survey is the greatest across UK countries and regions, there is evidence from BBS for declines in Northern Ireland and several English regions (Heywood *et al.*, 2023).
8. Published UK avian demographic metrics of clutch size, brood size and overall breeding success suggest some populations may be limited by poor breeding success.

References

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Appendix 3

A review of the assessment of the vulnerability to predation by carrion crow *Corvus corone* of Birds of Conservation Concern (Wales) and implications for GL004

Introduction

In 2022, as part of the Wild Bird Review, NRW commissioned the British Trust for Ornithology (BTO) to provide an evidence assessment of the level of vulnerability of nest predation (eggs and chicks) of breeding Red and Amber-listed Birds of Conservation Concern Wales 3 by all four species of corvid listed on GL004 at the time (carrion crow, magpie *Pica pica*, jay *Garrulus glandarius* and jackdaw *Corvus monedula*). That work was reported in Taylor et al. (2022). Specifically we asked BTO to:

- Summarise the evidence on the season of occurrence, breeding ecology and habitat preferences of Red and Amber-listed birds, to calculate an index of ecological vulnerability to nest predation by carrion crow, magpie, jay, and jackdaw. This describes the likelihood of these corvids predated the eggs and/or chicks of each breeding bird species on the Red and Amber lists of BoCC Wales 3 (Johnstone and Bladwell 2016);
- Summarise the available **evidence of impact** from predation (of eggs or young) by carrion crow, magpie, jay, and jackdaw on species listed on the Red and Amber lists of BoCC Wales 3 where predation vulnerability is considered likely, and;
- Summarise **possible impact** by noting species where relevant breeding demographic rates may be driving population change, or where predation has been noted as a potential driver of change at any demographic stage or spatial scale.

BoCC Wales 4 was published at the end of 2022 (Johnstone *et al.*, 2022). A number of wild bird species have moved from Green to either the Red or Amber lists, and a number of species moved from Red or Amber to the Green list. In response to these changes we have reviewed the species listed on Annex 1 of the current (2023) [GL004](#), which lists the species whose conservation is intended to benefit from the lethal control of carrion crow under GL004.

This Appendix provides a re-assessment of the level of vulnerability of nest predation (eggs and/or chicks) by carrion crow *Corvus corone*, of breeding birds which are Red or Amber-listed in BoCC Wales 4. We repeat the method of Taylor *et al.* (2022) and propose a revised list of beneficiary species for whose conservation lethal control of carrion crow is authorised.

Method

The step-wise approach of Taylor *et al.* (2022) was applied. In summary, these steps were:

Step 1. Determination of breeding status for Red and Amber-listed BoCC Wales 4

Step 2. Assessing ecological vulnerability to predation through ecological overlap

Step 3. Assessing evidence of impact at national and local scales

Results

Step 1. Determination of breeding status for Red and Amber-listed BoCC Wales 4

BoCC Wales 4 assessed and assigned 220 species to updated Red, Amber and Green lists, and showed a continuing decline in the status of Welsh birds. 14 species not previously assessed were reviewed in BoCC Wales 4, 14 species which were Green-listed in BoCC Wales 3 changed to a higher level of conservation concern (i.e. to the Red or Amber-list) and 14 species which were Red or Amber-listed in BoCC Wales 3 moved to the lowest conservation concern level (i.e. Green) in BoCC Wales 4 (Table 1).

Of the 14 species that were assessed for the first time in BoCC Wales 4, all fourteen species were categorised as non-breeding in Wales with a breeding value of zero (Table 1). On this basis none of these species were taken forward for further assessment in Step 2.

Of the 14 species that moved from Green to Red or Amber, three species do not breed in Wales and had a breeding score of zero (these were goldeneye *Bucephala clangula*, Leach's petrel *Oceanodroma leucorhoa* and purple sandpiper *Calidris maritima*). Following the approach of Taylor *et al.* (2022), these three species were not assessed further. The remaining 11 species were considered under Step 2.

Out of a total of 14 species that had moved from Red or Amber to Green, four species (cormorant *Phalacrocorax carbo*, red kite *Milvus milvus*, reed bunting *Emberiza schoeniclus* and song thrush *Turdus philomelos*) are on Annex 1 of the current (2023) GL004 (Table 1). **It is proposed that these four species are no longer included in Annex 1 of GL004** since they are not considered to be of conservation concern. The summarised habitat-use data for carrion crow, applying the data determined from BTO's BirdFacts (Robinson, 2005), and referenced in Taylor *et al.* (2022) remained the same (Table 2).

Step 2. Assessing ecological vulnerability to predation through ecological overlap

For those 11 breeding species that had moved from Green in BoCC Wales 3 to Red or Amber in BoCC Wales 4, the nest types (i.e. ground and open) were determined following the approach of Taylor *et al.* (2022) (Table 3).

Table 1. A change in species status between BoCC Wales 3 and BoCC Wales 4 and the breeding status code. Breeding codes were assigned to each species as follows: **1** = regular breeding in Wales; **0.75** = breeding in Wales but categorised rare/scarce; **0.5** = occasionally breeding in Wales; **0.25** = very occasional, not confirmed absent and **0** = not breeding in Wales. Species shaded in grey are currently listed as beneficiary species in Annex 1 of GL004.

Species	BoCC Wales 3	BoCC Wales 4	Breeding code
Chaffinch			1
Coal tit			1
Dunnock			1
Garden warbler			1
Goldeneye			0
Goshawk			1
House martin			1
Leach's petrel			0
Magpie			1
Mediterranean gull			0.75
Purple sandpiper			0
Rook			1
Water rail			1
Wheatear			1
Avocet			0.75
Cormorant			1
Dipper			1
Great Northern diver			0
Kingfisher			1
Long-tailed tit			1
Mallard			1
Nightjar			1
Red kite			1
Redwing			0
Reed bunting			1
Sanderling			0
Song thrush			1
Sooty shearwater			0
Cattle Egret	Not assessed		0
Glaucous gull	Not assessed		0
Great grey shrike	Not assessed		0
Great white egret	Not assessed		0
Grey phalarope	Not assessed		0
Hoopoe	Not assessed		0
Iceland gull	Not assessed		0
Little Auk	Not assessed		0
Richard's pipit	Not assessed		0
Sabine's gull	Not assessed		0
Wood sandpiper	Not assessed		0
Wryneck	Not assessed		0
Yellow-browed warbler	Not assessed		0
Yellow-legged gull	Not assessed		0

Table 2. Habitat associations for carrion crow based on habitat information recorded during BBS surveys in 2011 (BTO BirdFacts; Robinson, 2005). Habitat scores are provided in Table 4.

Species	Habitat categories applied by Taylor et al. (2022)
Carrion crow	Arable Farmland, Villages & Rural Areas, Towns & Cities, Scrub & Bushy Commons, Broad-leaved Woodland

Table 3. Nest type and location of species that changed from low conservation concern (Green-listed) to medium or high conservation status (Amber/Red-listed) between BoCC Wales 3 and BoCC Wales 4.

Species	Ground nest	Open nest	Cavity nest
Chaffinch	0	1	0
Coal tit	0	0	1
Dunnock	0	1	0
Garden warbler	0	1	0
Goshawk	0	1	0
House martin	0	0	1
Magpie	0	0	0
Mediterranean gull	1	1	0
Rook	0	1	0
Water rail	1	1	0
Wheatear	1	0	1

Of the 11 species assessed, five species (chaffinch *Fringilla coelebs*, dunnock *Prunella modularis*, garden warbler *Sylvia borin*, Mediterranean gull *Larus melanocephalus* and rook *Corvus frugilegus*) were considered to be likely or highly likely to be vulnerable to predation by carrion crow (Table 4). Of these five species four are Amber-listed (chaffinch, dunnock, garden warbler and Mediterranean gull, whilst rook is Red-listed in BoCC Wales 4. It is proposed that these five species should be included in Annex 1 of GL004, since they are of conservation concern and they are considered vulnerable to nest predation by carrion crow.

Table 4. Vulnerability to nest predation by carrion crow for 11 Red or Amber-listed BoCC Wales 4. Cells shaded in grey represent species–carrion pairs with an ecological vulnerability to predation index ≥ 3 or an expert assessment classing predation vulnerability as *likely* or *highly likely*.

Species	Breeds in Wales?	Ground Nest	Open Nest	Ecological vulnerability to predation
				Carrion crow
Chaffinch	1	1	1	<i>Highly likely</i>
Coal tit	1	1	1	<i>Not likely</i>
Dunnock	1	0	1	<i>Highly likely</i>
Garden warbler	1	1	1	<i>Highly likely</i>
Goshawk	1	1	1	<i>Highly unlikely</i>
House martin	1	0.5	0	<i>Highly unlikely</i>
Magpie	1	1	1	<i>Not likely</i>
Mediterranean gull	0.5	0	0	<i>Likely</i>
Rook	1	0	1	<i>Likely</i>
Water rail	1	0	0	<i>Not likely</i>
Wheatear	1	1	1	<i>Not likely</i>

Step 3 Assessing evidence of impact at national and local scales

All five species with a vulnerability to predation of *Likely* or *Highly likely* are Amber or Red-listed in BoCC Wales 4 due to long-term declines (up to 25 years) in breeding population, breeding range or both (Johnstone *et al.*, 2022). Long-term (1975 to 2020) BTO demographic data suggests that for chaffinch, dunnock, garden warbler and rook, there are measurable declining trends in demographic metrics of breeding success (failure at egg or chick stage, or overall productivity declines) (Massimino *et al.*, 2022). There are no productivity metrics provided for Mediterranean gull. The findings of Massimino *et al.*, (2022) suggests predation by carrion crow is not a key driver of negative population change for chaffinch, dunnock, garden warbler and rook.

Table 5 provides a summary of the five species remaining after the three assessment stages.

Table 5. Summary information for species remaining after three assessment stages. The five species presented in this table are a) recently revised to Red or Amber in BoCC Wales 4; b) breeding in Wales; c) are 'likely' or 'highly likely' to be ecologically vulnerable to carrion crow nest predation owing to i) habitat preferences that overlap with carrion crow and ii) nesting behaviour that does not limit access by carrion crow; d) are present in BoCC Wales 4 because of declines in population and e) UK demographic trends, vulnerability of predation by carrion crow and likely drivers of demographic and population change.

Species	GB data assessment						Predation vulnerability by Carrion Crow	Data source
	BoCC Wales 4 assessment		Demographic trend					
	BoCC Wales 4	Population Decline?	Range Decline?	Breeding failure (egg)	Breeding failure (chick)	Productivity		
Chaffinch	Amber	Yes	No	No	No	Yes	Highly likely	Unclear but it is likely due to the Trichomonosis outbreak
Dunnock	Amber	Yes	No	No	No	Yes	Highly likely	Loss of understorey due to canopy closure and deer browsing
Garden warbler	Amber	Yes	No	No	No	Possibly	Highly likely	Reduced productivity and juvenile survival and loss of understorey due to deer browsing
Mediterranean gull	Amber	Yes	No	DD ¹	DD ¹	DD ¹	Likely	
Rook	Red	Yes	No	No	No	Possibly	Likely	Unclear what are the drivers of population change

1. DD is data deficient

Conclusion: Proposed changes to Annex 1 of GL004

Following publication of the fourth BoCC Wales assessment (Johnstone *et al.*, 2022) and review of the species currently listed on Annex 1 of GL004 following the approach of Taylor *et al.* (2022), it is proposed that:

- four species (cormorant, red kite, reed bunting and song thrush) are no longer included in Annex 1 of GL004 on the basis that all these species are now Green-listed.
- five additional species (chaffinch, dunnock, garden warbler, Mediterranean gull and rook) are included in Annex 1 of GL004 on the basis that they are now Amber or

Red-listed and are likely or highly likely to be vulnerable to nest predation by carrion crow.

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