PEGASUS GROUP

Planning Rebuttal Evidence.

Evidence of Paul Burrell.

In respect of Land at Grove Farm and land East of the Railway Line, Bentley, Suffolk.

Construction of a Solar Farm (up to 40MW export capacity) with ancillary infrastructure and cabling, DNO substation, customer substation and construction of new and altered accesses.

On behalf of Green Switch Capital Ltd

Date: January 2026 | Pegasus Ref: P25-0480

Appeal Ref: APP/D3505/W/25/3370515 | LPA Ref: DC/23/056656

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Appendices.

R1. Noise Rebuttal Evidence of Dean Robert Kettlewell, dated 8th January 2026

R2. Avian Ecology Statement prepared by Mr Howard Fearn, dated 8th January 2026

1. Introduction

1.1. My name is Paul Burrell. I hold a BSC (Soc Sci) Hons in Geography and a Diploma in Urban Planning. My particulars are set out in my earlier Proof of Evidence.

1.2. This Rebuttal Evidence has been prepared having reviewed the various Parties Proofs of Evidence, and I respond to several matters raised by Mr Steven Stroud on behalf of the LPA, and Mr Ian Poole on behalf of the Rule 6 Parties. This Rebuttal naturally does not cover every point raised by the above parties, and my not referencing each point should not be taken to necessarily indicate my agreement with the approach, analysis or findings presented in their evidence and statements.

1.3. The evidence that I have prepared and provide for this Section 78 appeal is true and has been prepared and is given in accordance with the guidance of my professional institution. I can confirm that the opinions expressed are my true and professional opinions.

2. Alternative Site Assessment

2.1. A number of comments are made by Mr Stroud concerning the updated Alternative Site Assessment (*ASA, Core Document C24*) in his evidence. Whilst I do not intend to rebut each and every point in evidence in this Note, I have sought to clarify the grid connection process and timescales in bringing forward a solar farm scheme in my evidence already. I would note that there is no prescribed methodology for undertaking such an ASA exercise at either the national level or at the Local level; this reaffirms my position that one is not required. Such studies where provided will be reliant on matters of professional judgement. Even if an alternative site were to be identified as potentially appropriate, without an available grid connection and/or secured land control, it would in my opinion be no more than a "phantom alternative" and not a genuine prospect to be able to deliver a solar project to the grid.

2.2. Specifically with regard to alternative Areas C1 and C2, Mr Stroud seeks to suggest that highways access is not an 'insurmountable issue' in paragraphs 5.29 to 5.30. However, the ASA considers whether or not development is preferable at C1 or C2, not whether development is achievable *per se*. The point is that whilst access to the Appeal Site is via Station Road, which is not a single track road (and then via upgraded farm tracks, not public highways, within the Appeal Site itself), access to C1 and C2 would be via single track adopted highway from its junction with the A137 to where it would access sites C1 and C2, which is a minimum distance of approximately 1.3km and which would therefore likely require upgrades and traffic management along this length of the public highway.

2.3. It should also be noted that sites C1 and C2 were also discounted in the ASA due to impacts upon ProWs that are not reflected at the Appeal Site, which is not mentioned by Mr Stroud.

3. Residential Amenity

3.1. In respect of noise matters, Mr Poole in his evidence makes a number of points in respect of noise and residential amenity. I attach at **Appendix R1** Rebuttal evidence by Mr Kettlewell in respect of noise matters and Mr Poole's evidence, in particular at paragraphs 4.34 and 7.3 whereby it would appear that some confusion has arisen from the lower level of noise generated by the use of string inverters as proposed as part of the Appeal scheme, and the use of centralised inverter stations at the Boxsted site which generated higher levels of noise. In summary, Mr Kettlewell concludes that noise generated by the proposed development can be effectively controlled by means of condition.

3.2. In respect of Glint and Glare, Mr Poole in his evidence at paragraphs 7.5 and 7.6 alleges that the screening available would not be effective in winter effects. Acknowledging that times vary by receptor due to the different locations, in response I would note that Table 4 of the Glint and Glare report (*Core Document A18*) does not identify a reflection during the winter months of November, December, January and February, with most occurrences in the spring and summer when hedgerows would be in leaf.

4. Biodiversity

4.1. With regard to the matter raised by Mr Poole with regard to ground nesting birds and Local Plan Policy LP16 at paragraphs 4.20 to 4.23 of his evidence, I attach a response prepared by Howard Fearn of Avian Ecology which addresses this matter as **Appendix R2**.

4.2. I note that Mr Fearn concludes that whilst single pair of each of yellow wagtail and skylark may be displaced from breeding within the Appeal Site, it is his view that the Proposed Development will not lead to any measurable reduction in the conservation of either species. Also, the conversion of arable to grassland/grazing pasture is likely to be beneficial to nearby breeding pairs of the same species.

4.3. Further, Mr Fearn concludes that the Proposed Development would deliver a substantial biodiversity net gain, retain and enhance higher-value habitats, and introduce long-term, low-intensity land management that represents an ecological improvement over the existing intensively managed arable baseline. He concludes too that effects on farmland birds, including skylark and yellow wagtail, have been considered appropriately.

5. Public benefits and level of significance

5.1. With regard to the matter raised by Mr Stroud in respect of the four renewable energy benefits, I note he relies upon the *Botteford* decision by the Secretary of State in his evidence at paragraph 5.10 *inter alia* that these benefits should collectively be given significant weight, and further that this approach by the Secretary of State departed from the approach adopted by the Inspector who had recommended substantial weight should be given . I make the following four points in response.

5.2. First, a Inspector is entitled to reach their own view on the weight to be afforded to renewable & low energy generation, in light of NPPF paragraph 168. This is because renewable energy generation and Net Zero are Government objectives, rather than solely benefits.

5.3. This distinction is important when the applying the judgment in *Bewley Homes PLC v SSLUHC [2024] EWHC 1166* and the Court's interpretation of the similar instruction in paragraph 81 (now in paragraph 85) to give "significant weight" to the need to support economic growth and productivity. Holgate J (as he then was) made clear that the "*need to support economic growth and productivity*" was an objective identified by Government and that the local policies and benefits associated with it may vary.

5.4. Applying that principle to this Appeal, it is clear that renewable energy generation and Net Zero are objectives and targets that Government has set out in various national policy documents, and that the benefits associated with them will require consideration in the specific circumstances of making a decision on any particular scheme. The reference in the NPPF at paragraph 168a to the benefits "*associated with*" those targets is both broad and open-ended. It cannot be right that the Government was at once introducing a remarkable new presumption that there is a need for renewable and low carbon energy, and that significant weight must be given to its benefits, whilst also proscribing a closed list of the benefits to be considered.

5.5. Second, I do not consider that the requirement to give "*significant weight*" to the benefits of renewable energy generation and the contribution to Net Zero should be taken as a ceiling. In *Bewley Homes* at paragraphs 48-53, Holgate J was clear that paragraph 81 of the NPPF did not compel a decision-maker to attribute the same level of weight ("significant") to any economic benefit flowing from any proposal irrespective of the merits of the economic case and the local or regional circumstances. The same is true of paragraph 168(a). Indeed, "*substantial weight*" is often given to the benefit associated with renewable and low carbon schemes, as I have already identified in my earlier evidence.

5.6. Third, I disagree with the Secretary of State's approach to applying paragraph 168a as expressed in the paragraph cited in Mr Stroud's evidence at paragraph 5.10. The interpretation notably involved the reading of the word "*collectively*" into a paragraph of the NPPF where it does simply does not exist. I believe the correct approach should be to carefully consider each of the 'associated benefits' and to ascribe an appropriate weight to each.

5.7. Fourth, the consultation draft NPPF now indicates in Policy W3 that "*substantial weight*" should be given to "*the benefits for improving energy security, supporting economic development and moving to a net zero future*". This are clearly identified individual benefits, noted separately, and with the enhanced level of weight attached to them. As stated in my evidence, I accept that is a consultation draft, but is a clear direction of travel, and is consistent with the significance accorded to NSIP scale projects in the very recently updated NPS.

6. Grid connection

6.1. There is reference by Mr Stroud to the EA register in his evidence at paragraph 3.6. To clarify, my understanding is that this date relates to the NESO (transmission network) connection date. UKPN (distribution network) offered a connection date, which Green Switch Capital accepted, for March 2028. The DNO / customer contracts are not listed on the NESO register, as NESO are not a party to those contracts.

Appendix R1

APPEAL AGAINST REFUSAL OF PLANNING PERMISSION FOR

PROPOSED DEVELOPMENT OF A PHOTOVOLTAIC SOLAR ARRAY ON LAND AT

GROVE FARM, BENTLEY

PINS Ref: APP/D3505/W/25/3370515
LPA Ref: DC/23/056656

NOISE

REBUTTAL EVIDENCE OF

DEAN ROBERT KETTLEWELL MSc MAE MIOA I.Eng

Ref: DRK/260102/0

Date: 8th January 2026

1 INTRODUCTION

1.1 This rebuttal evidence is provided in response to the proof of evidence of Ian Poole of Places4People Planning Consultancy for the Public Inquiry acting on behalf of Bentley Parish Council and Stop Grove Farm Solar (referred to hereafter as `P4PPC').

1.1.2 This evidence addresses each point raised by P4PPC and where appropriate, refers to evidence already covered in the Noise Impact Assessment (ref. R23.0708/DRK dated 31st August 2023). This report is provided as an appendix to the Planning Design and Access Statement (PDAS Appendix G – Noise and Vibration Assessment (Core Document: A14).

2 P4PPC SECTION 4: GROUND 1 PLANNING POLICY & SECTION 7: GROUND 4 RESIDENTIAL AMENITY

2.1 Reference P4PPC Paragraph 4.34 and paragraph 7.3:

"The Noise Assessment that accompanied the application as an appendix to the Planning Design and Access Statement (PDAS Appendix G – Noise and Vibration Assessment) (Core Document A14) stated that the inverters would "produce a noise level not exceeding 62dB LAeq15mins @ 1m (based on measured levels with maximum load)". However, the Acoustic Impact Assessment accompanying a current planning application being considered by Babergh District Council at Boxted, (DC/23/05127) suggests that the inverters will create a sound power level of 93 dB(A)."

2.2 My Noise Impact Assessment report (ref. R23.0708/DRK dated 31st August 2023) at paragraph 6.2.3, states:

"The following example of mitigation measures is based on typical plant noise from similar sites in the UK. It is important to note that there is more than one method to control noise levels (e.g. plant selection or design) that can achieve similar levels at NSRs. The mitigation strategy would be confirmed as part of any planning consent condition as proposed by the Environmental Health Protection Officer.

a) Transformer noise level of 70dB LAeq15mins @ 1m sound pressure level.

b) Solar plant string inverters produce a noise level not exceeding 62dB LAeq15mins @ 1m (based on measured levels with maximum load).

c) Substation switchgear noise level of 65dB LAeq15mins @ 1m sound pressure level.
d) Acoustic screen mounted around 2 of the transformers closest to R4 (Potash Lane). Refer to Figure 3 for location. The screen should 0.5m higher than the height of the transformer enclosure (e.g. height of container 2.9m, screen height would be 3.4m) and formed by a solid material of minimum 12kg/m2 mass e.g. close boarded fencing to appropriate thickness with no gaps between boards or between boards
and supports or ground."

2.3 As explained in the above paragraph, the proposed design for the solar panel inverters is based on **`string inverters'** and as such these are relatively small plant and normally located at the end of panel rows behind the panel. I provided a Technical Note in response to queries raised by the BMSDC Senior Environmental Health Protection Officer dated 2nd January 2024 (reference Core Document A39). This Technical Note is referenced in core document 14c. The examples in Appendix 2 of the Technical Note show that these do not produce any significant noise, with levels of <55dB and <62dB sound power level provided. This level of noise is similar to that I have experienced when undertaking commissioning solar plant field noise tests in the past.

2.4 The P4PPC evidence refers to the Boxted Solar Farm application (DC/23/05127), which is a completely different site, and indicates the inverters will create a sound power level of 93dB(A). The noise impact assessment submitted by RES in support of the Boxted application (Ref. RES 04806-6612352, Rev: 1 dated 17 October 2023) refers to the inverter level at section 5.1 of the RES report, which is shown as 6 **centralised inverter stations** in Appendix B4 noise mapping results. This is a completely different method of plant design to the Grove Farm Solar development, whereby numerous inverters are grouped together in the 6 containers across the site as opposed to `string inverters' which are located generally at the end of certain panel rows as being proposed for Grove Farm Solar. Also, the noise levels with the centralised inverter approach will be higher as the containers require fan cooling systems, due to them being enclosed, and therefore the reason why there is a differential in levels between the two systems. Additionally, even if the two sites were using a similar plant design, the noise levels commercially vary considerably depending on the Technology Provider and therefore the point raised in evidence is **completely misleading and inappropriate** as it refers to another solar site application's evidence using a different technology.

2.5 The P4PPC evidence at paragraph 4.35 continues on, to state:

"Given this conflicting evidence, although I am not a noise expert, I am doubtful whether the Noise Assessment submitted is reliable to determine the potential impacts on the residential amenity of nearby residents. I have also spent time close to solar farms in the summer months, when power is being generated and the noise emanating from them is most clearly audible. It seems highly likely that the residents living closest to the site would experience these negative impacts."

2.6 We therefore conclude that this statement is completely incorrect and a misleading use of information and shows a lack of understanding of how solar array plant designs work. As an expert, it is my experience over 40 years' experience, that with appropriate design and mitigation solar farms do not produce any significant noise impacts and audibility is subjective and depends on numerous factors including separation distance from plant and site-specific characteristics. The results of my Noise Impact Assessment show a **low impact** and therefore conclude the noise to be **not significant**.

2.7 Reference P4PPC Paragraph 4.41 Planning Policy BEN 3 Development Design states:
"b) do not materially harm the amenities nearby residents by reason of noise, smell, vibration, overshadowing, loss of light and outlook, other pollution (including light pollution), or volume or type of vehicular activity generated, and/or residential amenity unless adequate and appropriate mitigation can be implemented;
I have demonstrated above that residential amenity could be negatively impacted though noise."

2.8 P4PPC suggest they have demonstrated that residential amenity would be impacted. The Noise Impact Assessment has shown that with appropriate design and mitigation the impact would be **low** and **not significant**. The P4PPC evidence presented simply relies on the assumption that plant noise source levels would be much higher than the example of plant levels indicated in the NVC report, which we have clarified in paragraph 2.2 to 2.6 above.

3 P4PPC SECTION 3: RULE 6 PARTY'S CASE & SECTION 7: GROUND 4 RESIDENTIAL AMENITY

3.1 Reference P4PPC paragraph 3.1 sub-section 4 case includes:

"4. The proposal would have significant impact on residents' amenities by reason of noise, glint and glare and visual impact."

3.2 The claim that a significant impact on residential amenity in respect of noise would occur has been shown in section 2.0 of this rebuttal and analysis in the Noise Impact Assessment to be unfounded and misleading.

3.3 Reference P4PPC paragraph 7.7 states:

"I am therefore of the opinion that insufficient consideration has been given to the impacts on residential amenity arising from noise, outlook and glint and glare and that the proposal is contrary to Local Plan Policy LP25 and Planning Practice Guidance. As I note above, local residents will also be giving their own evidence under this head."

3.4 The opinion, which is non-expert, provided by P4PPC in respect of noise does not present any evidence to support the case that noise would result in an adverse or significant impact and the results of the analysis and conclusions provided within the relevant Noise Impact Assessment are valid.

4 CONCLUSIONS

4.1 All the matters raised in the proof of P4PPC in respect of noise have been addressed in the points set out above. Noise generated by the proposed development can be effectively controlled by condition.

4.2 As such it is the appellant's case that there is nothing in the evidence of P4PPC that would amount to basis for refusal on the grounds of noise for the proposed development in this case.

Appendix R2

Client Name: **Green Switch Capital Ltd**

Site Name: **Grove Farm, Bentley, Ipswich**

Date: **8th January 2026**

Appeal reference: APP/D3505/W/25/3370515

1.1 Introduction

1.1.1 This statement has been prepared on behalf of the Appellant and relates to a planning appeal submitted pursuant to Section 78 of the Town and Country Planning Act 1990, concerning the proposed construction of a solar farm and battery storage together with all associated works, landscaping, equipment and necessary infrastructure ('the Proposed Development') on land at Grove Farm and Land East of the Railway Line, Bentley ('the Appeal Site').

1.1.2 This statement is prepared in response to the Rule 6 Party Case, submitted by Places4People Planning Consultancy and authored by Mr Ian Poole. My statement addresses matters raised with regards to ground nesting birds and specifically Local Policy LP16 (Biodiversity and Geodiversity) and paragraphs 4.20 to 4.23 of the Rule 6 party submission.

2.1 Qualifications and Relevant Experience

1.2.1 My name is Howard Fearn. I am the Director of Avian Ecology Ltd. ('AEL'), an ecological consultancy which currently employs thirty-two professional ecologists. I have been a practicing professional ecologist for twenty-three years.

1.2.2 I hold a Master's degree in Ecology and Environmental Management, and I am a full member of the Chartered Institute of Environmental Management ('CIEEM'). I am required by CIEEM to abide by the Code of Professional Conduct which includes exercising sound professional judgement in my work, identifying clearly the limitations and applying objectivity, relevance, accuracy, proportionality and impartiality to the information and professional advice I provide.

1.2.3 My professional experience is primarily in renewable energy developments, in particular onshore wind and solar energy projects of all scales across the UK. This includes all aspects of terrestrial ecology; however, my primary specialism is in ornithology. This includes involvement in many solar farm applications across the whole of England, including Development Consent Orders (DCO). I have authored numerous mitigation strategies for farmland birds, in particular skylarks, in relation to solar farms.

1.2.4 AEL personnel were involved in the original planning application for the Appeal Site, having produced the ecological assessment, biodiversity net gain (BNG) metric and biodiversity management plan for the proposals.

1.2.5 The evidence which I have prepared and provide for this appeal in this Appeal Statement is true and I confirm that the opinions expressed are my true and professional opinions. My professional fees in respect of this project do not depend upon the outcome of this Inquiry.

3.1 Rule 6 Party Case

1.3.1 The Rule 6 party contends that the application does not accord with Policy LP16 on the basis that the site supports a single pair of each of two ground-nesting bird species; skylark and yellow wagtail. Policy LP16 states:

Development which would have an adverse impact on species protected by legislation, or subsequent legislation, will not be permitted unless there is no alternative and the LPA is satisfied that suitable measures have been taken to:

a. Reduce disturbance to a minimum;

b. Maintain the population identified on site; and

c. Provide adequate alternative habitats to sustain at least the current levels of population.

4.1 Case for the Appellant

1.4.1 The breeding bird assemblage using the Site is typical of similar habitats in the region and is of no more than local value.

1.4.2 Recent research by the RSPB and the University of Cambridge (Copping et al 2025, Appendix 1), supports the benefits of solar farm landscape schemes within arable landscapes. They found that mixed habitat solar farms in an agricultural landscape, designed with biodiversity in mind and managed for nature supported nearly three times as many birds and a greater variety of species than nearby arable farmland. Furthermore, well managed solar farms "*could provide relief from the effects of agricultural intensification on biodiversity in the surrounding landscape*".

1.4.3 The landscape scheme outlined in drawing ref 3223-01-13 Rev A (CD:C4 and C5), with species diverse grassland planting around the edges, species rich hedgerow with trees around the solar perimeter fencing is considered to represent a mixed habitat solar farm in terms of the research categories and should greatly enhance the Site for a variety of bird species, in addition to other species groups such as bats and invertebrates. This is due to the increased heterogeneity of flora, providing increased food sources such as seeds and invertebrate species.

1.4.4 It is therefore appropriate to conclude that the Site will be improved for breeding birds overall, including multiple species with identical conservation status and protections to skylark and yellow wagtail. I therefore do not agree with Mr Poole (his paragraph 4.2.3) that the conclusions of the submitted ecological impact assessment are 'sweeping'; it is quite clear from the evidence that solar farms are typically beneficial for breeding birds.

Skylarks

1.4.5 Once abundant across Britain's open farmland, Skylarks have experienced significant population declines since the 1970s, primarily due to agricultural intensification and changes in cropping patterns. This decline led to the species' listing on the UK 'Red List' of Birds of Conservation Concern (Stanbury *et al*., 2021, Appendix 2), and categorising as a species of principal importance under the NERC Act (2006). Despite declines, skylarks remain a familiar feature of the UK countryside, with an estimated 1.6 million breeding pairs in 2016 (Woodward *et al.,* 2020, Appendix 3). According to the most recently available BTO report

(Heywood *et al*., 2025, Appendix 4), numbers have increased by 9% during the past decade and nearly 20% in the last five years in south-east England and the East Midlands, suggesting at least some level of stabilisation has occurred in recent years and that this is likely to be the case around the Appeal site also. It is therefore reasonable to consider that the potential displacement of a single pair of skylarks from the Site will be insignificant beyond site level, and negligible at a district or county level.

1.4.6 Further, research highlighted within the planning application EAR (Montag *et al.,* 2016, Appendix 5) and Fox (2022, Appendix 6) notes there was no statistical difference in the number of skylark territories between solar and control plots, and that skylarks were frequently observed foraging in, and around, solar farms, including with recently fledged young. These findings indicate that solar farms should not be viewed as absolute habitat losses for skylarks. Instead, they represent a functional shift in habitat use, from nesting to foraging (for other pairs in the vicinity), with potential population-level benefits when well managed.

1.4.7 It is also relevant that land management practices strongly influence local and regional populations. Within arable landscapes, different crop-types support varying densities of Skylarks, meaning that abundance and breeding productivity are heavily dependent on crop variation and populations are forced to adapt to local agricultural rotation. There is some evidence that breeding pairs will relocate during a breeding season where crops have grown and rendered their early-season location unsuitable for later breeding attempts (Donald, *et al*., 2001). Consequently, Skylark populations cannot be meaningfully measured at an individual site level.

1.4.8 It is considered that the landscaping enhancements across the Site will result in increased breeding success opportunities for nearby skylarks, with the conversion of arable land to permanent meadow grassland. The cessation of farming activities (which can disturb and destroy ground nesting bird nests), including removal of crop cycles, ploughing activities and pesticide/herbicide use will likely lead to an increase in breeding season prey (invertebrate) abundance, which in turn should allow retained local pairs to breed more successfully (i.e., raise more young).

1.4.9 As such, whilst a single skylark territory may be displaced, this is not considered a significant impact and the quality of land created post development is far more beneficial for a range of protected bird species, including several species with identical protected status as skylarks.

Yellow Wagtail

1.4.10 Yellow Wagtails are summer visitors to UK farmland, favouring damp pastures, marshes, and arable fields where they follow livestock or forage in sparse vegetation for insects. They nest on the ground in long grass or crops like beans and potatoes, but their numbers have declined due to habitat changes. This species is also a species of principal importance under the NERC Act and is a Red List (Birds of Conservation Concern) species. According to the British Trust for Ornithology 'Birdfacts' website (Appendix 7), yellow wagtails have been in decline since the early 1980s. The most recent population figure available is approximately 20,000 pairs in 2016 and is likely to have declined further since. Range contraction has occurred towards a core area in central England, especially in the west and south and in parts of East Anglia. As with skylark, breeding yellow wagtails feed on invertebrates and these are subsequently vital for rearing young. Population declines in arable landscapes are attributed to reductions in insect availability and changes in farming practice, i.e., the same as skylark.

1.4.11 Unlike skylark, there is little or no specific research in to the impacts of solar farm developments on breeding yellow wagtails. However, given that both species typically nest in open spaces away, it can reasonably be assumed that impacts are similar; i.e., birds probably do not breed within solar farms but will still use the solar farm area as a foraging resource. This view is supported by the annual 'Solar Habitat Reports', commissioned by Solar Energy UK (2023, 2024, 2025, Appendix 8), which show regular presence of yellow wagtails at operational solar farms. For example, the most recent (2025) report noted yellow wagtails were recorded at around 15% of sites surveyed. I consider this to be a high proportion given the much smaller number of yellow wagtails present in the UK than skylarks.

1.4.12 Consequently, as with skylark, it is highly likely that the appeal site will provide an enhanced foraging resource for yellow wagtails in the surrounding area and may well lead to an increase in breeding productivity. As such, whilst a single territory may be displaced, I do not consider this significant impact at any measurable population level.

Legislation and Policy Consideration

1.4.13 Skylark in particular, has been afforded significant weight when it comes to the impact of developments on the species. Skylarks and yellow wagtails have the same legal protection under the Wildlife and Countryside Act 1981 afforded to all species of nesting birds concerning deliberate disturbance and damage/ destruction of nests and eggs, rather than the loss of breeding habitat.

1.4.14 The legal position on breeding birds is set out in the NERC Act 2006 and the Wildlife and Countryside Act 1981. NERC designates both species as of principal importance for the purpose of conserving or enhancing biodiversity in England under s.41. Under s.41(3) the Secretary of State must–

> *"(a) take such steps as appear to the Secretary of State to be reasonably practicable to further the conservation of the living organisms and types of habitats included in any list published under this section, or*
>
> *(b) promote the taking by others of such steps."*

1.4.15 NERC also provides for a general biodiversity objective under s.40 as follows (and so far as relevant):

> *"40 Duty to conserve and enhance biodiversity (A1) For the purposes of this section 'the general biodiversity objective' is the conservation and enhancement of biodiversity in England through the exercise of functions in relation to England.*
>
> *(1) A public authority which has any functions exercisable in relation to England must from time to time consider what action the authority can properly take, consistently with the proper exercise of its functions, to further the general biodiversity objective."*

Specific protection for nesting birds is found in the WCA, which protects them from deliberate disturbance and their nests and eggs from destruction ***in precisely the same way as all wild birds under s.1. To breach this section is a criminal offence.***

1.4.16 Natural England has provided standing advice on protected species (which the Skylark is, falling under NERC). This provides, so far as relevant:

"If avoidance or mitigation measures are not possible, as a last resort you should agree compensation measures with the developer and put these in place as part of the planning permission. These should:

(a) make sure that no more habitat is lost than is replaced ('no net loss') and aim to provide a better alternative in terms of quality or area compared to the habitat that would be lost
(b) provide like-for-like habitat replacements next to or near existing species populations and in a safe position to provide a long-term habitat
(c) provide alternative habitats further away from the impacted population if the natural range of the species is not going to be adversely affected."

References to "no net loss" / "like-for-like" within the guidance do not refer to individual members of a species and represent aspirations in relation to habitat loss set out in generic advice. This is not a legal or policy obligation.

1.4.17 Nowhere within the legislative or policy framework is a pair-for-pair / like-for-like replacement of individual members of a sub-species population required. Even in the case of Great Crested Newts or bats, which are protected by Annex 1 of the Habitats Directive and therefore given the highest level of international legal protection available, there is no obligation for individual animal-for-animal replacement.

1.4.18 As such, whilst it is acknowledged that Local Policy LP16 requires a development to 'maintain the population identified on site', this sets a higher bar than is required under either the NPPF or Natural England standing advice. Further, should this approach be applied to all species of principal importance, which includes numerous widespread birds and other animals (such as hedgehog, brown hare and common toad), it would be prohibitive to any form of development to apply this requirement.

5.1 Conclusion

1.5.1 Whilst I accept that a single pair of each of yellow wagtail and skylark may be displaced from breeding within the Appeal site, it is my view that the Proposed Development will not lead to any measurable reduction in the conservation of either species, and in fact the conversion of arable to permanent grassland/ grazing pasture is likely to be beneficial to nearby breeding pairs of these same species.

1.5.2 The Proposed Development would deliver a substantial biodiversity net gain, retain and enhance higher-value habitats, and introduce long-term, low-intensity land management that represents an ecological improvement over the existing intensively managed arable baseline. Effects on farmland birds, including skylark and yellow wagtail, have been considered appropriately.

1.5.3 In my view, there is nothing to indicate that the Proposed Development would result in significant biodiversity loss or harm to protected/priority species. As outlined, evidence in fact indicates that well-managed solar farms in arable landscapes can deliver positive biodiversity outcomes. Consequently, it is my view that the Proposed Development will deliver a positive contribution to local and national targets to the restoration of biodiversity.

6.1 Appendices

- Appendix 1 – Copping et al (2025). Solar farm management influences breeding bird responses in an arable dominated landscape. Accessed via: https://www.tandfonline.com/doi/epdf/10.1080/00063657.2025.2450392?needAccess=true [22/04/2025)
- Appendix 2 – Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. 2021. “The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain”. British Birds 114: 723-747. Available online at https://britishbirds.co.uk/content/status-our-bird-populations.
- Appendix 3 – Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D.A. & Noble, D. (2020). Population estimates of birds in Great Britain and the United Kingdom. British Birds 113: 69–104.
- Appendix 4 – Heywood, J. J. N., Massimino, D., Baker, L., Balmer, D. E., Brighton, C. H., Gillings, S., Kelly, L., Noble, D. G., Pearce-Higgins, J. W., White, D. M., Woodcock, P., Workman, E. and Wotton, S., The Breeding Bird Survey 2024: Population trends of the UK’s breeding birds (BTO Research Report 787, Thetford: British Trust for Ornithology, Joint Nature Conservation Committee & Royal Society for the Protection of Birds, 2025), https://www.bto.org/sites/default/files/BBS-Report-2024.pdf.
- Appendix 5 – Montag H, Parker G & Clarkson T. (2016). The effects of solar farms on local biodiversity. A comparative study. Clarkson and Woods & Wychwood.
- Appendix 6 – Fox, H. (2022). Blithe spirit: Are skylarks being overlooked in impact assessment? CIEEM – In Practice, 117: pp47-51.
- Appendix 7 – https://www.bto.org/learn/about-birds/birdfacts/yellow-wagtail [accessed January 2025]
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Appendix R2.1

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Bird Study

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Solar farm management influences breeding bird responses in an arable-dominated landscape

Joshua P. Copping, Catherine E. Waite, Andrew Balmford, Richard B. Bradbury, Rob H. Field, Isobel Morris & Tom Finch

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comparator was natural grassland, as was the case in Visser *et al.* (2019), rather than the arable land used in this study, which is the most common land-use context for solar development in the UK. The addition of new grassland habitat in the form of mixed habitat solar, as well as the structural complexity provided by the panels, is likely to be more beneficial in an arable-dominated context than if sites were located in an already grassland-dominated landscape (Hovick *et al.* 2015).

Variation in management across different solar farms also appears to be important for other taxa. Solar farms have been shown to negatively affect the activity of bats (Barré *et al.* 2023, Tinsley *et al.* 2023). However, both these studies focused on solar sites that were situated on grassland that was grazed or mown, or on cut arable crops. Conversely, as we have demonstrated for birds, Blaydes *et al.* (2021, 2022) and Walston *et al.* (2023) demonstrated the importance of mixed habitat management for pollinators. Bumblebee (*Bombus* spp.) foraging and nest density was doubled inside solar farms managed as wildflower meadows compared to those with wildflower margins only (Blaydes *et al.* 2022), and systematically reviewing relevant land management practices reveals that a range of interventions applied to solar farms could increase their ability to enhance pollinator biodiversity (Blaydes *et al.* 2021).

Our results indicate the beneficial effect that solar farm management can have on bird abundance and diversity. This should be considered in the planning and development of new solar energy projects, and in the management of existing solar farms, further outlined by Carvalho *et al.* (2024). Including biodiversity considerations in solar farm planning would allow for complementary generation of electricity and provision of habitat to support bird communities and other wildlife. In this way, we can enhance multifunctionality by stacking multiple benefits together in a system that combines human needs for energy and biodiversity needs for complex habitats.

Our results do not reduce the need to ensure that solar farms are developed away from nature-sensitive areas that are locally, nationally, or internationally important for wildlife. Solar farm proposals should be informed by national and local policy documents, such as local nature recovery strategies in England, the Nature Recovery Plan in Wales and Scotland's forthcoming Biodiversity Strategy to 2045. Whilst field-scale solar is generally incompatible with continued crop production (though see agrivoltaics: Dinesh & Pearce 2016), and care should be taken when siting solar farms on high grade farmland, given potential leakage effects (Don *et al.* 2024), modelling at the national scale suggests that the total land-take of solar farms under future climate mitigation scenarios is likely to be small (Copping *et al.* 2024).

Considering biodiversity needs in solar farm planning would also help address public concerns; Roddis *et al.* (2020) found that the most common concern raised by the public regarding solar farms was the impact on wildlife and habitats. Our findings show that in nature depleted landscapes, like arable farmland, solar farms managed for mixed habitat can increase bird abundance and diversity; this effect has also been observed with other taxa (Blaydes *et al.* 2021, Walston *et al.* 2023). Whilst careful planning is needed to ensure solar farms are sited in suitable areas, if managed with biodiversity in mind then their impact can be beneficial and could provide relief from the effects of agricultural intensification on biodiversity in the surrounding landscape.

Acknowledgments

We thank each of the landowners for allowing us to conduct bird surveys on their land.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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ORCID

Joshua P. Copping http://orcid.org/0000-0002-1205-8547
Catherine E. Waite http://orcid.org/0000-0003-3092-5867
Tom Finch http://orcid.org/0000-0003-1122-8513

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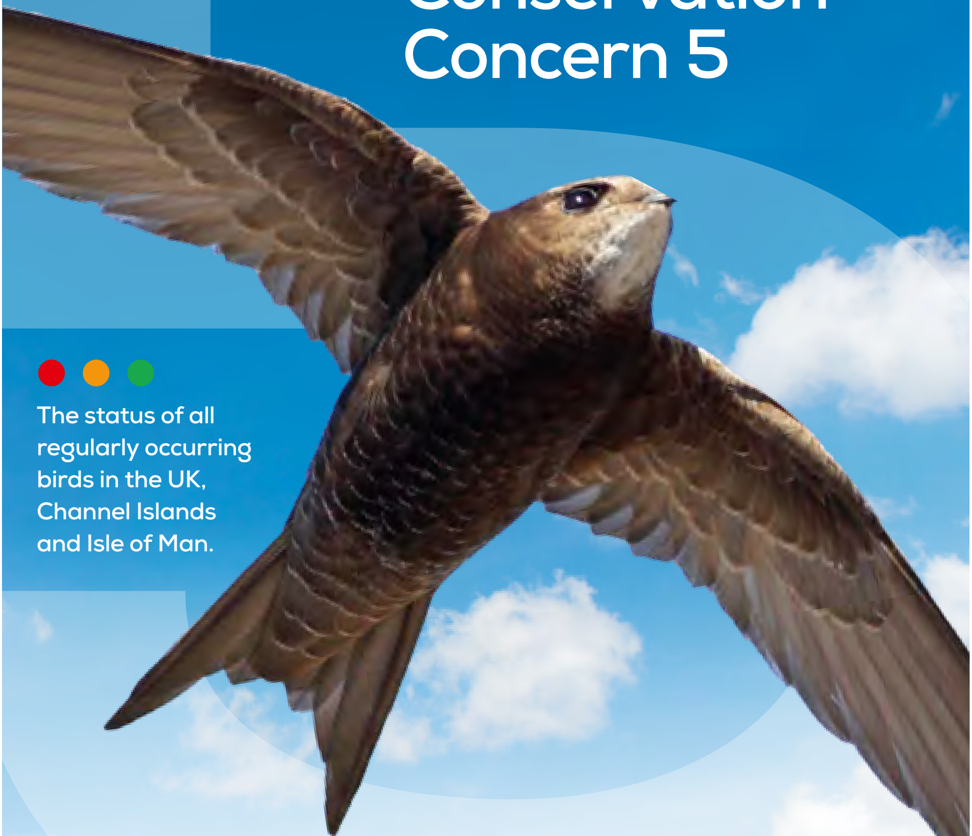
Appendix R2.2

Birds of Conservation Concern 5

The status of all regularly occurring birds in the UK, Channel Islands and Isle of Man.



rspb giving nature a home

BTO Looking out for birds

Game & Wildlife Conservation Trust

Natural England

JNCC Joint Nature Conservation Committee

Scottish Natural Heritage Dualchas Nàdair na h-Alba nature.scot

Cyfoeth Naturiol Cymru Natural Resources Wales

NIEA Northern Ireland Environment Agency www.daera-ni.gov.uk

***Birds of Conservation Concern* is compiled by a coalition of the UK's leading bird conservation and monitoring organisations and reviews the status of all regularly occurring birds in the UK, Channel Islands and Isle of Man.**

This is the 5th Birds of Conservation Concern review, with the first published in 1996. The bird species that breed or overwinter here have been assessed against a set of objective criteria and placed on the Green, Amber or Red lists to indicate an increasing level of conservation concern. Data delays prevented an assessment of breeding seabirds (apart from Leach's storm-petrel), so their status was carried over from *Birds of Conservation Concern 4*.

The quantitative criteria assessed the historical decline, recent trends in population and range, population size, localisation and international importance of each species, as well as its global and European threat status.

The assessments show that the status of UK bird populations continues to decline. Since the last review in 2015, the golden oriole has been lost as a breeding species. In addition, the length of the Red list has grown by three; 11 species have been added, but six have moved to Amber and two are now no longer assessed as they have either ceased breeding in the UK or were excluded from the process for other reasons. The length of the Amber list has also grown by seven species.

The Birds of Conservation Concern 5 Red list

Grey partridge	Lapwing	Grasshopper warbler
Ptarmigan [g]	Whimbrel	House martin [a]
Capercaillie	Curlew	Wood warbler
Black grouse	Black-tailed godwit	Starling
Bewick's swan [a]	Ruff	Mistle thrush
White-fronted goose	Dunlin [a]	Fieldfare
Long-tailed duck	Purple sandpiper [a]	Ring ouzel
Velvet scoter	Woodcock	Spotted flycatcher
Common scoter	Red-necked phalarope	Nightingale
Goldeneye [a]	Kittiwake	Whinchat
Smew [a]	Herring gull	House sparrow
Pochard	Roseate tern	Tree sparrow
Scaup	Arctic skua	Tree pipit
Red-necked grebe	Puffin	Yellow wagtail
Slavonian grebe	Hen harrier	Hawfinch
Turtle dove	Montagu's harrier [a]	Greenfinch [g]
Swift [a]	Lesser spotted woodpecker	Twite
Cuckoo	Merlin	Linnet
Corncrake	Red-backed shrike	Redpoll
Leach's storm-petrel [a]	Marsh tit	Corn bunting
Balearic shearwater	Willow tit	Cirl bunting
Shag	Skylark	Yellowhammer
Dotterel	Marsh warbler	
Ringed plover	Savi's warbler	

a - species on the Amber list previously, g - species on the Green list previously

Appendix R2.3

APEP 4

Population estimates of birds in Great Britain and the United Kingdom

BTO · Game & Wildlife Conservation Trust · JNCC · RSPB giving nature a home · WWT

INTRODUCTION & APPROACH

Population estimates of birds have many applications in conservation and ecological research, as well as being of significant public interest. This is a summary of the fourth report by the Avian Population Estimates Panel, following those in 1997, 2006 and 2013, presenting population estimates of birds in Great Britain and the United Kingdom.

INTRODUCTION

Knowing the absolute number of birds in a population is of particular importance to those who make decisions about conservation policy and engage in site management. It can be difficult to produce robust estimates of population size; firstly because numbers fluctuate from year to year – or even from month to month – as individuals breed, die and migrate; and secondly, because for all but the scarcest species it is usually impossible to carry out a full census (i.e. count every individual) and we have to rely on surveys from which estimates of population size can be derived.

Estimates of population size are a key conservation tool, used alongside population trend information and that on other aspects of bird ecology (such as survival and productivity rates). Although trends over time are particularly valuable for assessing the status of species and biodiversity for many conservation purposes, knowledge of the absolute size of an animal population is also needed to fully understand threats to that species, to evaluate the risk of extinction and to make decisions about how to protect it.

The European Union (EU) Directive on the conservation of wild birds requires Member States to report on the status of native bird species every six years. This report includes an assessment of species population status (population sizes and distributions, and changes in these parameters over time).

The Avian Population Estimates Panel (APEP) is a collaboration between the UK statutory conservation agencies and relevant non-governmental organisations. Three previous APEP assessments have been published APEP 1 (Stone *et al.* 1997), APEP 2 (Baker *et al.* 2006) and APEP 3 (Musgrove *et al.* 2013).

This report (APEP 4) presents the most recent estimates for both Great Britain and the United Kingdom. Most of these estimates were submitted, together with other data and information, as part of the UK's Article 12 report to the EU in September 2019 (JNCC 2019).

APPROACH

The role of APEP is to collate the best estimates of breeding and non-breeding bird population size and present a consensus view on the most appropriate estimates for relevant conservation applications, such as defining thresholds for statutory site designations. Most estimates are for the breeding season. Breeding estimates are presented for all species included in APEP 3 and for additional species (including non-natives) with at least one case of proven breeding from 2011 onwards.

Non-breeding season estimates for winter visitors are included only for waterbirds and a small number of other species included in APEP 3. In general, non-breeding estimates have been omitted for largely resident species, even where resident populations are supplemented in winter by large-scale arrivals, except for waterbirds where statutory site protection and reporting is based around non-breeding estimates. Estimates of passage numbers have been excluded, with the exception of the globally threatened Aquatic Warbler.

The table that makes up the bulk of this summary reports the population estimates of full species listed in categories A–C of the British List. Each estimate is accompanied by the following information:

- **Season**: B = Breeding; P = Passage; W = Wintering.
- **Unit** (of measurement): AOS = Apparently Occupied Sites; F = females; I = individuals; M = males; N = nests; P = pairs; T = territories.
- The **estimate** may be presented as a single figure or a range is given; in some cases a mean with 95% confidence intervals in parentheses is shown. Estimates tagged '+' or '-' are known to be larger (+) or smaller (-) than the estimate listed, but no better estimate is available.
- **Date** is the date/period to which the UK estimate relates.

Dipper, by Edmund Fellowes / BTO. Dipper population size was based on the 1988–91 Bird Atlas estimate, extrapolated using the Waterways Breeding Bird Surveys.

Species name	Season	Unit	GB Estimate	UK Estimate	UK Date
Marsh Tit	B	T	28,500	28,500	2016
Willow Tit	B	P	$2,750^{-}$	$2,750^{-}$	2016
Blue Tit	B	T	3,250,000	3,400,000	2016
Great Tit	B	T	2,200,000	2,350,000	2016
Bearded Tit	B	P	695	695	2013–17
Woodlark	B	P	2,300 (1,850–2,750)	2,300 (1,850–2,750)	2016
Skylark	B	T	1,500,000	1,550,000	2016
Shore Lark	W	I	110	110	2012/13–2016/17
Sand Martin	B	N	(64,500–210,000)	(70,500–225,000)	2016
Swallow	B	T	625,000	705,000	2016
House Martin	B	P	470,000 (330,000–610,000)	480,000 (335,000–620,000)	2016
Cetti's Warbler	B	M	$3,450^{+}$	$3,450^{+}$	2016
Long-tailed Tit	B	T	370,000	380,000	2016
Wood Warbler	B	M	6,500 (6,000–7,050)	6,500 (6,000–7,050)	2016
Yellow-browed Warbler	W	I	25	25	2012/13–2016/17
Willow Warbler	B	T	2,050,000	2,300,000	2016
Chiffchaff	B	T	1,650,000	1,750,000	2016
Iberian Chiffchaff	B	P	(0–1)	(0–1)	2013–17
Aquatic Warbler	A	I	3^{+}	3^{+}	2013–17
Sedge Warbler	B	T	220,000	240,000	2016
Reed Warbler	B	P	$130,000 (100,000–155,000)^{+}$	$130,000 (100,000–155,000)^{+}$	2016
Marsh Warbler	B	P	8	8	2013–17
Icterine Warbler	B	P	(0–2)	(0–2)	2013–17
Grasshopper Warbler	B	T	9,750	12,000	2016
Savi's Warbler	B	P	5	5	2013–17
Blackcap	B	T	1,600,000	1,650,000	2016
Garden Warbler	B	T	145,000	145,000	2016
Lesser Whitethroat	B	T	79,000	79,000	2016
Whitethroat	B	T	1,100,000	1,100,000	2016
Dartford Warbler	B	P	2,200	2,200	2017
Firecrest	B	T	$2,000^{+}$	$2,000^{+}$	2017
Goldcrest	B	T	675,000	790,000	2016
Wren	B	T	9,750,000	11,000,000	2016
Nuthatch	B	T	250,000	250,000	2016
Treecreeper	B	T	210,000	225,000	2016
Starling	B	P	1,650,000 (1,450,000–1,800,000)	1,750,000 (1,550,000–1,950,000)	2016
Ring Ouzel	B	P	7,300 (5,550–9,400)	7,300 (5,550–9,400)	2016
Blackbird	B	P	4,850,000 (4,600,000–5,050,000)	5,050,000 (4,800,000–5,250,000)	2016
Fieldfare	B	P	(0–1)	(0–1)	2013–17
	W	I	680,000	720,000	1981–84
Redwing	B	P	24	24	2013–17
	W	I	650,000	690,000	1981–84
Song Thrush	B	T	1,200,000	1,300,000	2016
Mistle Thrush	B	T	150,000	165,000	2016
Spotted Flycatcher	B	T	38,500	41,500	2016
Robin	B	T	6,650,000	7,350,000	2016
Bluethroat	B	P	(0–1)	(0–1)	2013–17
Nightingale	B	M	5,550 (5,100–6,000)	5,550 (5,100–6,000)	2012
Pied Flycatcher	B	P	(22,000–25,000)	(22,000–25,000)	2016
Black Redstart	B	P	58	58	2013–17
	W	I	400	400	1981–84
Redstart	B	P	135,000 (97,000–170,000)	135,000 (97,000–170,000)	2016

Appendix R2.4

BTO Main menu

Page menu >

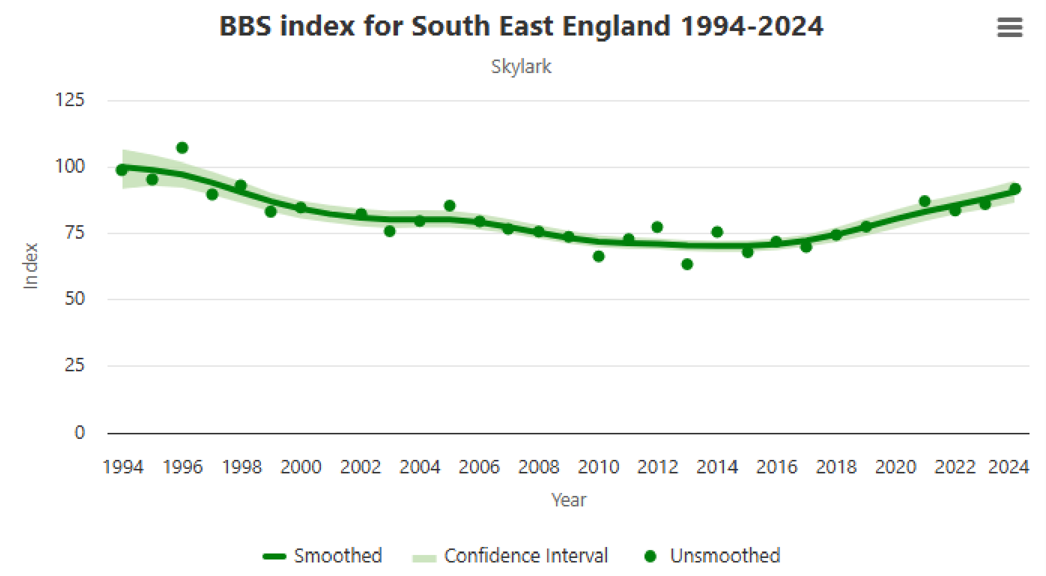
different areas (UK, Country, English Region) at a time.

Export and download

Select the menu icon (three horizontal bars in the top right of the graph area) to view export / download options for the graph data.

These graphs may be reproduced, subject to the appropriate acknowledgement of the BTO/JNCC/RSPB Breeding Bird Survey. Spreadsheets containing the data points for each graph may be obtained by submitting a Data Request Form.

Species	Country / Region	Second Country / Region
Skylark	South East England	None



From: https://www.bto.org/get-involved/volunteer/projects/bbs/results/population-trend-graphs

The Breeding Bird Survey 2024 *incorporating the Waterways Breeding Bird Survey*

Population trends of the UK's breeding birds

BTO JNCC RSPB

THE 2024 BBS REPORT

THE BBS PARTNERSHIP

The BTO/JNCC/RSPB Breeding Bird Survey is a partnership jointly funded by the BTO, JNCC and RSPB, with fieldwork conducted by volunteers. The Breeding Bird Survey (BBS) now incorporates the Waterways Breeding Bird Survey (WBBS).

The members of the BBS Steering Committee in 2024 were James Pearce-Higgins (Chair), Dawn Balmer, Simon Gillings, Dario Massimino, David Noble (all BTO), Simon Wotton, Leah Kelly (both RSPB), Ethan Workman, Lucy Baker and Paul Woodcock (all JNCC).

British Trust for Ornithology

The Nunnery
Thetford
Norfolk
IP24 2PU
www.bto.org

Joint Nature Conservation Committee

Quay House
2 East Station Road
Fletton Quays
Peterborough
PE2 8YY
www.jncc.gov.uk

Royal Society for the Protection of Birds

The Lodge
Sandy
Bedfordshire
SG19 2DL
www.rspb.org.uk

THE BBS TEAM AT BTO

James Heywood is the BBS National Organiser and first point of contact for BBS or WBBS queries. James is responsible for the day-to-day running of these surveys, liaising with BTO Regional Organisers and volunteers, maintaining the databases, promoting the schemes, and producing the annual report. David White, Engagement & Surveys Officer for England, supports the National Organiser, primarily with the volunteer coordination of these surveys.

Caroline Brighton, Research Ecologist and Dario Massimino, Senior Data Scientist, both in the Bioacoustics and Data Science Team, produced the bird and mammal population trends for 2024. David Noble is the Principal Ecologist for Monitoring, responsible for strategic developments in biodiversity monitoring. Dawn Balmer is Head of Surveys, which includes both BBS and WBBS among other surveys. Maria Knight, Secretary in the Science Department, works closely with James and David assisting with the running of the surveys. Simon Gillings oversees the BBS and WBBS research programmes, and James Pearce-Higgins is the Director of Science.

Contact the BBS National Organiser:

James Heywood, British Trust for Ornithology
Email: **bbs@bto.org** Tel: **01842 750050**

ONLINE RESOURCES

The Official Statistics for BBS are formally published at: https://jncc.gov.uk/our-work/bbs-official-statistics

Further information, including graphs of population change, can be found at www.bto.org/bbs and www.bto.org/wbbs. A full species-by-species discussion of these results, and those from other surveys, can be found on the BirdFacts website at: www.bto.org/birdfacts.

This report can be downloaded from: www.bto.org/bbs-report

ACKNOWLEDGEMENTS

We would firstly like to thank all the volunteers who spend many hours in the field collecting the data for this report. Without their efforts, this scheme would not be possible. We are also grateful to the following people for their help in 2024: Lee Carnihan, Ben Darvill, Jemma Davies, Mark Hammond, Gethin Jenkins-Jones, Andrew Joys, Sorrel Lyall, Drew Lyness, Justin Walker and Steve Willis. Many people have contributed to both the BBS and WBBS schemes' development and organisation, including Nicholas Aebischer, Mandy Andrews, Mark Avery, Stephen Baillie, Ian Bainbridge, Helen Baker, Richard Bashford, Jessa Battersby, George Boobyer, Andy Brown, Steve Buckland, Nick Carter, Steve Carter, Dan Chamberlain, Rachel Coombes, Humphrey Crick, Sarah Davis, Iain Downie, Mark Eaton, Sarah Eglington, Steve Freeman, Colin Galbraith, David Gibbons, John Goss-Custard, Rhys Green, Jeremy Greenwood, Richard Gregory, Sarah Harris, Rob Keen, John Marchant, Ian McLean, Mike Meharg, Richard Minter, Ian Mitchell, David Morris, Dorian Moss, Stuart Newson, Nancy Ockendon, Will Peach, Ken Perry, Mike Raven, Brenda Read, Warren Read, Angela Rickard, Kate Risely, Anna Robinson, William Skellorn, Ken Smith, Sandra Sparkes, David Stroud, Pierre Tellier, Chris Thaxter, Richard Thewlis, Derek Thomas, Mike Toms, Lawrence Way, Richard Weyl, Andy Wilson (BBS and WBBS logos), Mark Wilson, Karen Wright and Lucy Wright.

We acknowledge the support of the Northern Ireland Environment Agency, who fund professional fieldworkers to cover squares in Northern Ireland. Natural England, NatureScot and Forestry Commission Scotland (now Scottish Forestry) have contributed to additional surveys on Upland BBS and Scottish Woodland BBS squares in previous years. We are very grateful to the RSPB for funding the initial development of BBS Online, and to the BTO Information Systems Team who have continued to develop the system and provide technical support.

The founder sponsors of the 1998 WBBS pilot year were Thames Water, British Waterways, Severn Trent, Hyder (Welsh Water) and Anglian Water. Since then surveys have been funded by the Environment Agency, BTO, JNCC and RSPB, and sponsored by Severn Trent, Anglian Water and by Essex & Suffolk Water. The WBBS was adopted into the BBS Partnership in 2017.

The report was produced by James Heywood. The cover photo of a Raven was kindly supplied by Edmund Fellowes/BTO images and the report was printed by Swallowtail Print, Norwich, using carbon-balanced paper from responsible sources.

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Interpreting the results

Pages 18–31 contain the annual bird and mammal population trend statistics for BBS, and pages 34–35 cover WBBS results. Some guidance on reading and interpreting these tables and graphs is provided below.

THRESHOLDS FOR TRENDS

To ensure robust results, we produce trends only for species with sufficient data. To judge this, we look at the average number of squares on which a species has been recorded per year during the trend period. For UK BBS trends, we consider species above a reporting threshold of 40 squares. For countries within the UK, English Regions and UK WBBS trends, the threshold is an average of 30 squares during the trend period. The one-year change for 2023–24 is shown where the sample size reaches the reporting threshold for one of the longer trend periods. Therefore, if there is a 10-year or 'all-time' (28-year) trend, a one-year change is presented.

BBS 'ADD-ON' SQUARES

'Add-on' squares surveyed during the lifetime of the BBS, using BBS methodologies, have been included in these trends. These include Upland BBS, Upland Adjacent and Scottish Woodland squares. Upland BBS and Scottish Woodland squares were originally surveyed by professional fieldworkers: Scottish Woodland squares are now surveyed by volunteers. Upland Adjacent squares are also covered by volunteers during visits to survey their core BBS square: these were introduced as an option to increase coverage in remote upland areas.

TRENDS AND TABLES EXPLAINED

Species	Min. sample	1-year (23-24)	10-year (13-23)	28-year (95-23)	LCL	UCL
(Little Egret)	74	33 *	68 *	2,726 *	867	inf
Sparrowhawk	354	-15	-18 *	-25 *	-35	-13

- Trends for species in brackets are reported with caveats (explanation on pages 16, 31 and 34).
- For bird trends, **Red-listed** and **Amber-listed** species from *Birds of Conservation Concern 5* (BoCC5) are shown in the relevant colour. The exception to this is in the Wales Population trends, where the *Birds of Conservation Concern 4 Wales* (BoCC4 Wales) assessments are used.
- The sample size refers to the mean number of squares per year on which the species was recorded during BBS or WBBS. The figure shown in the tables, 'Min. Sample', is the smaller of these sample size figures for the 10-year and all-time trends, per species, per region.
- Trends are presented as the percentage change over three periods: one-year, 10-year and all-time.
- The short-term change covers the most recent years of the survey, i.e. for BBS and WBBS: 2023 to 2024.
- The long-term changes for both BBS and WBBS, cover the lifetime of the survey (BBS birds: 1994–2024, BBS mammals: 1995–2024, WBBS: 1998–2024). The 10-year trends cover 2013–23 for both surveys. All-time and 10-year periods have been smoothed, and the end years truncated.
- Trends with statistically significant changes are marked with an asterisk (*), where the 95% confidence limits of the change do not overlap zero.
- LCL and UCL are the lower and upper 95% confidence limits for the longest BBS bird trend: 1995–2023, BBS mammal trend: 1996–2023 and WBBS bird trend 1999–2023. Any confidence limit greater than 10,000 is displayed as 'inf'.

INTERPRETING GRAPHS

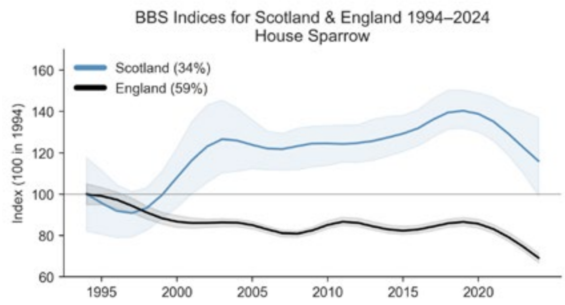
All BBS and WBBS graphs are displayed in the same way throughout the report. Beware, however, that the index and time period axes do vary in scale.

Single region BBS and WBBS index graphs show:

- smoothed trend – dark line
- confidence interval (85%) – pale shading
- annual index values – dots

In addition to these, we produce plots of multiple countries or regions for the same species on the same graph. This is used to illustrate where trends differ among geographical areas, either in their direction, or in the timing of particular changes. Care should be taken interpreting these; higher or lower indices for one region compared to another do not necessarily mean higher or lower abundance or prevalence.

In the example below, House Sparrow have – until recently – been increasing in Scotland and are decreasing in England. However, occupancy (number of squares observed as a percentage of the number surveyed) is still higher in England (59%) compared with Scotland (34%). For comparisons of countries and some regions, occupancy rates from 2024 are presented in the figure legend for reference. For clarity, annual index values are not shown in multi-region plots.



ONLINE RESOURCES

BBS BIRD TREND GRAPHS ONLINE: www.bto.org/bbs-graphs
BBS BIRD TREND TABLES ONLINE: www.bto.org/bbs-tables
BBS MAMMAL TRENDS ONLINE: www.bto.org/bbs-mammals
WBBS RESULTS ONLINE: www.bto.org/wbbs-results

Table 3: Trends in England during 2023–24, 2013–23 and 1995–2023.

Species	Min. sample	1-year (23-24)	10-year (13-23)	28-year (95-23)	LCL	UCL
Canada Goose	532	**14**	**26 ***	**92 ***	42	167
Greylag Goose	261	**32 ***	**22 ***	**342 ***	181	657
Mute Swan	238	**25**	**13**	**26**	-7	94
Egyptian Goose	40	**6**	**58 ***	**1,965 ***	648	inf
Shelduck	128	**0**	**-15**	**0**	-42	29
Mandarin Duck	40	**-15**	**61 ***	**592 ***	295	1,641
Gadwall	50	**-17**	**63 ***	**197 ***	76	511
Mallard	1,215	**6**	**-10 ***	**10 ***	1	20
Teal	30	**-57**	**124 ***	**–**	–	–
Tufted Duck	141	**11**	**-24 ***	**-4**	-33	33
Red Grouse	88	**1**	**-19 ***	**-5**	-33	55
Grey Partridge	165	**-2**	**-21 ***	**-63 ***	-69	-55
Pheasant	1,744	**5**	**-7 ***	**20 ***	12	29
Indian Peafowl	43	**-9**	**-34**	**–**	–	–
Red-legged Partridge	588	**36 ***	**-11 ***	**-7**	-20	6
Swift	856	**14**	**-47 ***	**-69 ***	-73	-65
Cuckoo	419	**16 ***	**-9 ***	**-71 ***	-75	-67
Feral Pigeon	615	**-4**	**18 ***	**-15 ***	-25	-1
Stock Dove	903	**5**	**47 ***	**52 ***	34	74
Woodpigeon	2,264	**1**	**-3 ***	**38 ***	29	46
Turtle Dove	23	**-15**	**-75 ***	**-98 ***	-99	-97
Collared Dove	1,271	**-11 ***	**-33 ***	**-28 ***	-34	-23
Moorhen	618	**7**	**-16 ***	**-29 ***	-37	-19
Coot	257	**4**	**-28 ***	**-15**	-35	14
Little Grebe	59	**10**	**-2**	**-1**	-37	71
Great Crested Grebe	68	**-9**	**-24 ***	**-29 ***	-47	-2
Oystercatcher	225	**1**	**6**	**61 ***	30	101
Lapwing	539	**-5**	**-21 ***	**-43 ***	-49	-36
Golden Plover	62	**-24 ***	**-35 ***	**-21**	-43	11
Curlew	343	**7**	**-2**	**-32 ***	-44	-21
Snipe	96	**-2**	**12**	**1**	-23	36
Common Sandpiper	33	**26**	**5**	**-30**	-54	4
Redshank	62	**9**	**-18**	**-44 ***	-63	-18
(Common Tern)	61	**-19**	**-15**	**10**	-43	70
(Cormorant)	233	**-16 ***	**15**	**31 ***	5	74
(Grey Heron)	570	**6**	**-2**	**-21 ***	-31	-9
(Little Egret)	68	**35 ***	**62 ***	**2,479 ***	906	inf
Sparrowhawk	289	**-17 ***	**-21 ***	**-33 ***	-40	-23
Marsh Harrier	30	**3**	**-8**	**231 ***	132	436
Red Kite	222	**16 ***	**166 ***	**24,725 ***	inf	inf
Buzzard	939	**9 ***	**7 ***	**200 ***	164	251
(Barn Owl)	53	**-11**	**4**	**242 ***	140	516
Little Owl	57	**-24**	**-52 ***	**-78 ***	-83	-71
(Tawny Owl)	83	**9**	**-24 ***	**-38 ***	-54	-20
Kingfisher	51	**83 ***	**-17**	**-27**	-49	11
Gt Spotted Woodpecker	1,107	**-2**	**-12 ***	**88 ***	74	104
Green Woodpecker	828	**-11 ***	**-34 ***	**-4**	-11	5
Kestrel	606	**-1**	**-4**	**-24 ***	-31	-17
Hobby	44	**-37 ***	**-13**	**-17**	-48	20
Peregrine	35	**31**	**-21**	**15**	-26	103
Ring-necked Parakeet	109	**7**	**94 ***	**2,397 ***	875	inf
Jay	763	**-10**	**-15 ***	**-5**	-12	3
Magpie	1,793	**4**	**3**	**2**	-3	8
Jackdaw	1,667	**1**	**12 ***	**78 ***	65	92
Rook	1,166	**-2**	**-4**	**-16 ***	-25	-5
Carrion Crow	2,217	**-3**	**2**	**27 ***	15	35
Raven	214	**-14**	**4**	**25**	-34	290

Species	Min. sample	1-year (23-24)	10-year (13-23)	28-year (95-23)	LCL	UCL
Coal Tit	645	**-3**	**-8**	**12**	-3	27
Marsh Tit	136	**4**	**-25 ***	**-50 ***	-60	-39
Willow Tit	21	**-10**	**-53 ***	**-91 ***	-94	-84
Blue Tit	2,134	**-5 ***	**-7 ***	**-4 ***	-8	-1
Great Tit	2,034	**-5 ***	**-14 ***	**14 ***	9	18
Skylark	1,531	**0**	**14 ***	**-12 ***	-17	-7
Sand Martin	90	**-23 ***	**-2**	**-6**	-36	55
Swallow	1,647	**-15 ***	**-48 ***	**-34 ***	-37	-28
House Martin	734	**7**	**-44 ***	**-59 ***	-63	-52
Cetti's Warbler	47	**35 ***	**400 ***	**932 ***	428	inf
Long-tailed Tit	990	**-4**	**-9 ***	**3**	-7	15
Willow Warbler	922	**7**	**-17 ***	**-47 ***	-54	-41
Chiffchaff	1,600	**8 ***	**39 ***	**181 ***	163	199
Sedge Warbler	199	**-11**	**-7**	**-18**	-34	6
Reed Warbler	143	**-4**	**21 ***	**42 ***	13	85
Grasshopper Warbler	42	**-10**	**11**	**-23**	-51	22
Blackcap	1,669	**12 ***	**17 ***	**148 ***	134	165
Garden Warbler	378	**-18 ***	**-19 ***	**-42 ***	-48	-33
Lesser Whitethroat	298	**41 ***	**3**	**-1**	-15	12
Whitethroat	1,327	**-12 ***	**-18 ***	**9 ***	3	16
Firecrest	43	**39 ***	**226 ***	**–**	–	–
Goldcrest	676	**4**	**7**	**32 ***	15	54
Wren	2,187	**12 ***	**23 ***	**30 ***	25	35
Nuthatch	550	**2**	**9 ***	**111 ***	86	139
Treecreeper	307	**-1**	**-5**	**-2**	-20	14
Starling	1,485	**-11 ***	**-15 ***	**-66 ***	-68	-63
Song Thrush	1,800	**8 ***	**13 ***	**25 ***	18	31
Mistle Thrush	934	**-11 ***	**-21 ***	**-53 ***	-56	-49
Blackbird	2,237	**-2**	**-10 ***	**7 ***	4	11
Ring Ouzel	23	**26**	**12**	**–**	–	–
Spotted Flycatcher	106	**4**	**-25 ***	**-71 ***	-77	-63
Robin	2,144	**8 ***	**15 ***	**36 ***	31	42
Nightingale	34	**-4**	**-3**	**-40**	-61	3
Redstart	111	**4**	**-14**	**1**	-22	27
Whinchat	25	**-15**	**-53 ***	**-70 ***	-85	-56
Stonechat	86	**-1**	**233 ***	**308 ***	180	561
Wheatear	199	**-15**	**-40 ***	**-30 ***	-50	-1
Dipper	31	**-25**	**-41 ***	**-61 ***	-80	-11
Tree Sparrow	153	**-4**	**-48 ***	**-9**	-30	15
House Sparrow	1,460	**-11 ***	**-12 ***	**-25 ***	-31	-19
Dunnock	1,913	**-6 ***	**-14 ***	**-1**	-6	4
Yellow Wagtail	165	**-12**	**-19 ***	**-53 ***	-61	-43
Grey Wagtail	164	**15**	**11**	**3**	-17	26
Pied Wagtail	1,035	**-3**	**-8 ***	**-20 ***	-27	-14
Meadow Pipit	450	**-13 ***	**-16 ***	**-24 ***	-35	-14
Tree Pipit	69	**22**	**-37 ***	**-67 ***	-81	-51
Chaffinch	2,151	**-4 ***	**-48 ***	**-45 ***	-48	-42
Bullfinch	534	**-14**	**-36 ***	**-33 ***	-41	-25
Greenfinch	1,499	**5**	**-48 ***	**-63 ***	-66	-60
Linnet	1,075	**-7**	**-3**	**-27 ***	-34	-18
Redpoll	68	**42**	**-33 ***	**-27**	-58	21
Crossbill	30	**22**	**-45 ***	**–**	–	–
Goldfinch	1,687	**3**	**15 ***	**141 ***	124	157
Siskin	92	**4**	**12**	**85**	-7	438
Corn Bunting	144	**14 ***	**38 ***	**-13**	-33	20
Yellowhammer	1,086	**-12 ***	**-22 ***	**-42 ***	-47	-37
Reed Bunting	423	**-19 ***	**-9 ***	**23 ***	5	43

TREND GRAPHS ONLINE: www.bto.org/bbs-graphs TREND TABLES ONLINE: www.bto.org/bbs-tables

INTERPRETING THE RESULTS: see page 17

Table 8: Trends in English regions during 1995–2023.

Species	North West		North East		Yorkshire & Humber		East Midlands		East of England		West Midlands		South East		South West		London	
	95-23	Sample	95-23	Sample	95-23	Sample	95-23	Sample	95-23	Sample	95-23	Sample	95-23	Sample	95-23	Sample	95-23	Sample
Canada Goose	122 *	75	–	–	216 *	37	42	48	57	61	42 *	73	39	140	191	61	–	–
Greylag Goose	–	–	–	–	1,037 *	51	552 *	39	181 *	57	–	–	128 *	50	–	–	–	–
Mute Swan	–	–	–	–	–	–	–	–	237 *	43	–	–	-43	59	19	40	–	–
Shelduck	–	–	–	–	–	–	–	–	3	37	–	–	–	–	–	–	–	–
Mallard	6	156	92 *	40	24	114	2	115	-4	197	33 *	120	1	259	23	171	-29	43
Tufted Duck	–	–	–	–	–	–	–	–	–	–	–	–	4	31	–	–	–	–
Red Grouse	–	–	–	–	-13	52	–	–	–	–	–	–	–	–	–	–	–	–
Grey Partridge	-73 *	22	–	–	-55 *	30	-43	32	-65 *	42	–	–	-81 *	27	–	–	–	–
Pheasant	126 *	144	28	80	53 *	165	13	170	-23 *	288	75 *	146	2	429	41 *	313	–	–
Red-legged Partridge	–	–	–	–	0	57	-40 *	77	-39 *	181	49	36	81 *	134	128 *	67	–	–
Swift	-76 *	97	-80 *	33	-61 *	84	-70 *	79	-58 *	145	-67 *	69	-72 *	169	-74 *	146	-70 *	57
Cuckoo	-51 *	30	–	–	-68 *	45	-73 *	46	-67 *	99	-79 *	46	-77 *	153	-83 *	69	–	–
Feral Pigeon	-27	75	–	–	-39	66	-12	53	0	79	-19	43	21	123	-12	74	-10	75
Stock Dove	32	59	–	–	115 *	64	6	87	40 *	159	111 *	92	78 *	248	40 *	152	–	–
Woodpigeon	86 *	217	41 *	96	112 *	191	39 *	211	22 *	338	29 *	187	12	544	51 *	396	38 *	85
Turtle Dove	–	–	–	–	–	–	–	–	-97 *	48	–	–	-99 *	34	–	–	–	–
Collared Dove	-19	130	-34	36	-47 *	88	-31 *	114	4	210	-46 *	114	-33 *	314	-27 *	211	-33 *	52
Moorhen	-31 *	68	–	–	1	41	-35 *	60	-42 *	122	-21	59	-38 *	148	-33	74	–	–
Coot	-45	30	–	–	–	–	-11	30	-32	38	38	30	-10	68	–	–	–	–
Oystercatcher	15	61	30	33	305 *	56	–	–	41 *	37	–	–	–	–	–	–	–	–
Lapwing	-37 *	111	-24	51	-14	113	-72 *	58	-53 *	70	-48 *	35	-75 *	93	-77 *	23	–	–
Golden Plover	–	–	–	–	-13	40	–	–	–	–	–	–	–	–	–	–	–	–
Curlew	-48 *	85	-32 *	54	4	119	–	–	–	–	-70 *	24	–	–	–	–	–	–
Snipe	–	–	–	–	36	40	–	–	–	–	–	–	–	–	–	–	–	–
(Cormorant)	–	–	–	–	–	–	–	–	3	50	–	–	42	58	2	36	–	–
(Grey Heron)	-34 *	75	–	–	66 *	39	-19	53	-40 *	82	-2	56	-24	134	-36 *	88	–	–
Sparrowhawk	-51 *	31	–	–	–	–	–	–	-27	45	–	–	-40 *	65	-21	50	–	–
Red Kite	–	–	–	–	–	–	–	–	28,628*	42	–	–	16,080*	115	–	–	–	–
Buzzard	74 *	81	6,114 *	37	3,282 *	58	7,963 *	78	25,721*	101	135 *	106	1,057 *	220	-3	256	–	–
Gt Spotted Woodpecker	86 *	87	55	32	65 *	58	172 *	71	77 *	158	86 *	112	66 *	350	126 *	199	89 *	41
Green Woodpecker	–	–	–	–	–	–	149 *	54	31 *	171	7	63	-22 *	324	-16	144	-12	30
Kestrel	-34 *	66	–	–	-7	65	12	68	-12	112	-37 *	39	-40 *	138	-46 *	79	–	–
Ring-necked Parakeet	–	–	–	–	–	–	–	–	–	–	–	–	602 *	42	–	–	38,091*	53
Jay	18	70	–	–	–	–	28	37	22 *	126	-23	63	-23 *	258	-1	124	-38 *	41
Magpie	-17 *	183	-6	43	-10	112	15	163	43 *	258	-5	165	6	461	-10	326	50 *	83
Jackdaw	89 *	149	12	73	73 *	136	113 *	144	168 *	245	124 *	146	75 *	428	31 *	318	–	–
Rook	-28	86	-40 *	53	-25	120	-6	106	8	186	12	88	-20	280	-22 *	244	–	–
Carrion Crow	26 *	224	-10	92	37 *	195	48 *	200	113 *	317	13	185	17 *	526	8	392	51 *	84
Raven	–	–	–	–	–	–	–	–	–	–	148 *	35	–	–	-17	95	–	–
Coal Tit	72 *	74	-2	47	55 *	52	7	43	-23 *	68	27	52	-10	173	10	119	–	–
Marsh Tit	–	–	–	–	–	–	–	–	–	–	–	–	-47 *	53	-18	31	–	–
Blue Tit	-22 *	203	-18 *	74	-7	167	26 *	197	25 *	318	-8	185	-8 *	529	-17 *	378	-7	84
Great Tit	8	191	34 *	67	15	148	37 *	184	6	301	4	180	5	515	28 *	368	114 *	80
Skylark	-13	115	-20 *	80	3	161	-1	171	-18 *	289	-2	119	-11 *	341	-23 *	244	–	–
Swallow	-49 *	188	-37 *	84	-47 *	167	-18 *	159	-35 *	227	-37 *	144	-30 *	338	-12	325	–	–
House Martin	-45 *	92	-51 *	32	-46 *	69	-48 *	59	-68 *	94	-58 *	77	-74 *	142	-62 *	155	–	–
Long-tailed Tit	23	87	–	–	26	59	46 *	89	0	162	-4	92	-33 *	271	32 *	173	-22	33
Willow Warbler	-5	143	-29	77	-40 *	125	-46 *	94	-87 *	102	-52 *	87	-88 *	145	-66 *	151	–	–
Chiffchaff	549 *	117	524 *	57	483 *	100	648 *	127	229 *	237	272 *	153	97 *	434	55 *	339	252 *	37
Sedge Warbler	–	–	–	–	–	–	–	–	-7	46	–	–	-19	36	-3	35	–	–
Reed Warbler	–	–	–	–	–	–	–	–	29	42	–	–	-4	37	–	–	–	–
Blackcap	272 *	125	98 *	53	130 *	108	190 *	144	130 *	264	171 *	147	140 *	450	130 *	325	200 *	52
Garden Warbler	-75 *	27	–	–	–	–	-25	35	-32 *	59	-21	45	-41 *	103	-54 *	64	–	–
Lesser Whitethroat	–	–	–	–	–	–	-3	39	26	84	4	30	-21	62	-35 *	43	–	–
Whitethroat	-20 *	87	36 *	48	-5	92	22 *	150	8	263	19 *	109	31 *	327	-14	229	–	–
Goldcrest	104 *	51	-7	30	32	30	67	36	40 *	83	140 *	51	16	225	-8	149	–	–
Wren	66 *	215	29 *	90	37 *	194	50 *	202	41 *	314	43 *	182	14 *	522	9	389	34 *	79
Nuthatch	243 *	50	–	–	–	–	–	–	212 *	39	148 *	57	65 *	221	94 *	106	–	–
Treecreeper	–	–	–	–	–	–	–	–	14	32	–	–	-6	105	-19	56	–	–
Starling	-64 *	168	-58 *	66	-66 *	129	-68 *	137	-50 *	230	-73 *	124	-69 *	351	-73 *	200	-72 *	80
Song Thrush	91 *	168	11	73	60 *	133	64 *	155	2	253	97 *	160	-8	472	12	334	-47 *	51
Mistle Thrush	-37 *	114	-29 *	43	-57 *	85	-51 *	83	-70 *	126	-28 *	87	-62 *	233	-48 *	134	-83 *	31
Blackbird	36 *	214	19	85	25 *	186	11	209	-9 *	330	18 *	188	-11 *	543	13 *	398	-66 *	85
Spotted Flycatcher	–	–	–	–	–	–	–	–	-88 *	17	–	–	-66 *	28	-61 *	28	–	–
Robin	50 *	206	24 *	81	62 *	166	50 *	198	46 *	313	57 *	185	20 *	527	16 *	385	91 *	83
Wheatear	-52 *	49	–	–	10	49	–	–	–	–	–	–	–	–	–	–	–	–
Tree Sparrow	9	29	–	–	20	45	-36	30	–	–	–	–	–	–	–	–	–	–
House Sparrow	-17	158	-41	50	-30 *	109	-29 *	130	-37 *	198	-16 *	145	-36 *	334	11	265	-62 *	71
Dunnock	-1	178	3	68	-17 *	144	-5	184	-1	285	32 *	171	-14 *	469	1	352	-15	64
Yellow Wagtail	–	–	–	–	–	–	-46 *	39	-48 *	48	–	–	–	–	–	–	–	–
Grey Wagtail	–	–	–	–	–	–	–	–	–	–	–	–	11	31	-25	33	–	–
Pied Wagtail	-30 *	127	-19	54	-31 *	112	-17	102	-10	153	-9	87	-26 *	214	-15	164	–	–
Meadow Pipit	-17	86	-19	59	-8	108	-52 *	41	-70 *	39	–	–	-54 *	50	-11	51	–	–
Chaffinch	-39 *	210	-20	94	-21 *	190	-29 *	204	-54 *	323	-61 *	181	-58 *	513	-48 *	384	-60 *	53
Bullfinch	8	43	–	–	55	35	1	54	-74 *	62	-31 *	54	-62 *	140	-36 *	119	–	–
Greenfinch	-53 *	144	-67 *	44	-57 *	102	-53 *	137	-57 *	243	-55 *	133	-79 *	372	-65 *	272	-68 *	54
Linnet	-15	87	-41 *	53	-28 *	102	-32 *	125	-8	184	-24	77	-43 *	239	-23 *	200	–	–
Goldfinch	163 *	171	178 *	64	124 *	142	163 *	159	119 *	242	233 *	138	112 *	397	121 *	316	364 *	57
Corn Bunting	–	–	–	–	–	–	–	–	-22	39	–	–	-32	32	184 *	30	–	–
Yellowhammer	-64 *	49	-52 *	47	-24 *	94	-27 *	143	-27 *	223	-74 *	97	-50 *	256	-51 *	173	–	–
Reed Bunting	8	64	–	–	101 *	52	66 *	70	13	84	–	–	-54 *	62	9	36	–	–

Appendix R2.5

THE EFFECTS OF SOLAR FARMS ON LOCAL BIODIVERSITY: A COMPARATIVE STUDY

BY

HANNAH MONTAG, DR GUY PARKER & TOM CLARKSON

Joint Funded By:

APRIL 2016

Table 5.14: Weighted Scoring of Abundance of Birds Compared Between Solar Plots (S) and Control Plots (C) for Each Site using Chi-Square Test (Scoring: Red Listed=3; Amber Listed=2; Non-Notable=1). An Overall Comparison between Solar and Control using Mann-Whitney U Test is Shown in the Bottom Row

Site	Mean Score Across All Surveys		Significance
	S	C	
Site 1	64	48	NS (P=0.12)
Site 2	115	69	HSD (P=<0.001)
Site 3	37	35	NS (P=0.84)
Site 4	140	97	HSD (P=0.005)
Site 5	61	35	HSD (P=0.006)
Site 6	92	79	NS (P=0.31)
Site 7	47	44	NS (P=0.78)
Site 8	37	35	NS (P=0.78)
Site 9	27	26	NS (P=0.86)
Site 10	88	51	HSD (P=0.0014)
Site 11	55	64	NS (P=0.39)
Overall comparison of solar plots and control plots			SD (P=0.04)

Ground Nesting Birds

5.4.18 Where ground nesting birds were identified, behaviour and movements were mapped in order to ascertain the likely number of territories and active nests within each plot.

5.4.19 The only species of ground-nesting bird consistently recorded across all but one site was skylark. The only other ground-nesting bird species recorded was one juvenile meadow pipit *Anthus pratensis*; calling within the boundary of the control plot at Site 9.

Skylark Territories

5.4.20 The results of the territory mapping are shown in Appendix C. Mapping of ground nesting birds was not carried out at Site 5.

5.4.21 The total number of territories recorded for control and solar plots were 29 and 26 respectively. Table 5.15 below provides the number of territories recorded for each site in solar and control plots; with the results of a Chi-Square test on this data also being presented. The sites varied greatly, with several solar plots accommodating more territories and some control sites accommodating more territories, however, only Site 11 had significantly more skylark territories on the control plot when compared with the solar plot (P=0.014). The overall comparison of solar and control plots was also not significant.

Table 5.15: Number of Ground Nesting Bird Territories Compared between Solar Plots (S) and Control Plots (C) for Each Site using Chi-Square Test. An Overall Comparison between Solar and Control using Mann-Whitney U Test is Shown in the Bottom Row

Site	No. Territories		Significance
	S	C	
Site 1	4	7	NS (P=0.37)
Site 2	3	2	NS (P=0.65)
Site 3	2	0	NS (P=0.16)
Site 4	3	3	NS (P=1.00)
Site 5 (no data)			
Site 6	2	0	NS (P=0.16)
Site 7	1	1	NS (P=1.00)
Site 8	2	4	NS (P=0.41)
Site 9	2	1	NS (P=0.56)
Site 10	7	5	NS (P=0.56)
Site 11	0	6	SD (P=0.014)
Overall comparison of solar plots and control plots			NS (P=0.97)

<u>Skylark Nesting</u>

Skylark nesting was confirmed through observing adults carrying food to a site repeatedly. The actual nests were not searched for in order to avoid disturbance and prevent accidental damage to the nest through trampling.

5.4.22 Skylark nesting was confirmed by surveyors at Site 10 within the solar plot, but outside of the footprint of the array itself (Appendix C refers). This was the only instance of a confirmed nest within any of the solar plots surveyed.

5.4.23 Skylark nesting behaviour was recorded within several of the control plots. Surveyors noted that possible nesting within tramlines of the control plot at Site 10 was occurring, but could not be confirmed due to the dense arable crop. Site 11 had an unconfirmed skylark nest recorded adjacent the western boundary of (but outside of) the control plot. Unconfirmed numbers of skylark nesting were recorded at Site 7, with skylark noted as nesting within the centre of the control plot.

<u>Skylark Foraging</u>

5.4.24 Skylark foraging was observed across all but two of the sites included in the study. Table 5.16 below details the numbers of skylark recorded foraging across solar and control plots.

5.4.25 There were significantly more skylarks recorded foraging within the solar plots when compared with the control plots at two of the sites, however, the overall comparison between solar and control was not significant.

Table 5.16: Number of Instances of Skylark Foraging Compared between Solar Plots (S) and Control Plots (C) for Each Site using Chi-Square Test. An Overall Comparison between Solar and Control using Mann-Whitney U Test is Shown in the Bottom Row

Site	No. Foraging Instances		Significance
	S	C	
Site 1	0	1	NS (P=0.32)
Site 2	11	1	HSD (P=<0.01)
Site 3	2	2	NS (P=1.00)
Site 4	8	0	HSD (P=<0.01)
Site 5	0	0	N/A
Site 6	1	1	NS (P=1.00)
Site 7	0	1	NS (P=0.32)
Site 8	3	0	NS (P=0.08)
Site 9	0	0	N/A
Site 10	3	9	NS (P=0.08)
Site 11	0	3	NS (P=0.08)
Overall comparison of solar plots and control plots			NS (P=0.81)

5.5 Bats

5.5.1 Both the numbers of bats recorded and the species diversity were examined for solar plots and control plots. Due to equipment failure, only eight of the eleven sites were surveyed.

5.5.2 Overall, when looking at the number of bat species found on all solar plots combined (8) compared with control plots (8), there was no difference. There was, however, a significantly higher total number of bat passes on the control plots when compared with solar (Chi-Squared P=<0.001), as shown in Figure 5.4.

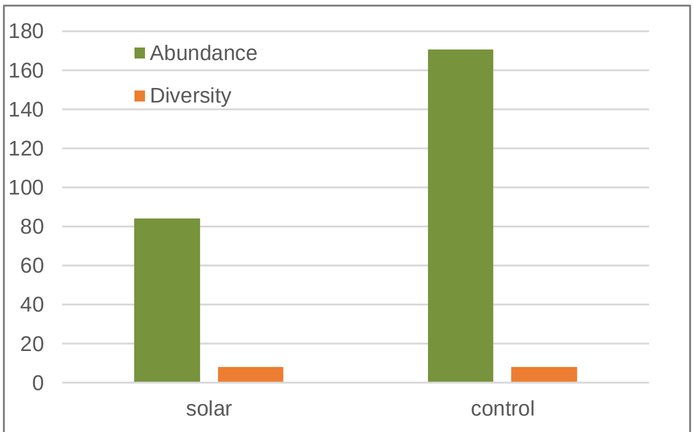


Figure 5.4: Overall Comparison of Solar and Control Plot Bat Diversity and Activity

<u>Comparing Bat Activity Between Solar and Control Plots</u>

5.5.3 The number of bat passes per night ranged from 1.78 to 24.44 on solar plots and 7.22 to 71.5 on control plots. When considering all sites combined, there was no significant difference between the numbers of bat passes between solar and control plots (P=0.08), as shown in Table 5.17.

5.5.4 When comparing the number of bat passes per night between solar plots and control plots, three of the sites showed significantly higher numbers of bat passes within the control plots when compared with the solar plots (and this was a highly significant difference). The five remaining sites showed no significant

Appendix R2.6

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CIEEM inpractice

Bulletin of the Chartered Institute of Ecology and Environmental Management

What's that Fungus? A Guide to Finding and Identifying Fungi

Waxcap Grasslands: The Forgotten Treasure

Using Bryophytes as Indicator Species in Habitat Surveys

Know Thy *Sphagnum*: Lessons for Understanding Bogs

Bryophytes, Lichens and Fungi

Blithe Spirit: Are Skylarks Being Overlooked in Impact Assessment?

Figure 1. Skylark, *Alauda arvensis*, in flight. Photo credit: Keith Williams.

Harry Fox MCIEEM
Clarkson and Woods

Keywords: arable farmland, bird mitigation, ground nesting birds, set-aside

In the absence of guidance, potential effects of development on ground-nesting birds (GNBs) of open habitats are being overlooked, with mitigation often being arbitrarily formulated. This article focuses on skylarks *Alauda arvensis* to encourage a re-examination and discussion of assessment and mitigation best practice for GNBs of conservation concern.

Introduction

The spiralling song of the skylark is so embedded in the national psyche that for many, it embodies much of the British landscape. The likely UK population is around 1.5 million pairs, less than half of what it was in the early 1980s (https://app.bto.org/birdtrends/species.jsp?s=skyla&year=2018). The steady decline of the skylark population since the 1970s due to agricultural intensification and habitat loss is well documented and has led to their inclusion on the IUCN Red List, as well as being Priority Species throughout the UK. Indeed, the species is emblematic of the general decline in populations of many farmland birds, especially ground-nesting birds (GNBs) of open habitats, including lapwing *Vanellus vanellus*, yellow wagtail *Motacilla flava* and grey partridge *Perdix perdix*. Yet despite the publicity, and their capability of being material considerations in the planning process, it appears that skylarks and other GNBs are often undervalued – or simply missed altogether – in ecological assessments. Furthermore, where mitigation *is* recommended, are we sure that it is based on an ecologically sound rationale?

The highest densities of skylarks occur in upland and coastal regions and the arable heartlands of the east of England. Here, and in Northern Ireland, are the scenes of the greatest losses of skylarks in recent decades (Figure 2). The Centre for Ecology and Hydrology reported in 2020 that some 768,000 ha of

2008), while more spraying and an earlier harvest together cause significant nest mortality. The loss of spring cereals alone has been said to account for the majority of change in skylark population in the last 30 years (Donald 2004).

While chicks are almost exclusively fed on invertebrates, adult birds also feed on seeds, grains and leaf shoots. As grassland habitats are usually less productive for invertebrates than for example, woodland, skylarks nest at comparatively lower densities than many other songbirds. Table 1 shows the relative densities of skylarks foraging in different agricultural habitats. The greatest densities are in unimproved grasslands and heaths, but in an agricultural setting, set-aside and fallow (where weeds encroach) is best (Poulsen *et al.* 1998). Pasture and other improved grassland usually supports the very lowest densities of skylarks on farmland (Donald 2004).

Development impacts

On a typical housing or solar scheme, it is difficult to see how potential displacement impacts on skylarks can be overlooked. Even with the inclusion of amenity grassland, easements or buffers of retained habitats are likely to be incompatible with the requirements of nesting skylarks, unless very large, undisturbed and managed to promote invertebrates. For example, in preparing this article, no conclusive records of skylark nests within an active solar array were found. This includes data derived from the post-construction monitoring of over 100 solar installations in England and Wales by our company and from observations from associates in the industry.

Male skylarks are frequently observed advertising territories over solar arrays. However, singing is not a conclusive indicator of a viable nest. Skylarks, like many other birds, exhibit strong nest-site fidelity (Donald 2004) and results from one well-established 60 ha solar site that we monitor showed that numbers of singing birds waned following construction from a peak of seven in 2015 to zero in 2020 and 2021.

Skylarks have, however, been recorded many times foraging within solar arrays and even feeding recently fledged young. Fledglings can disperse considerable distances from their nests in just a few days and continue to be fed by parent birds for between 8 and 12 days after fledging (Donald 2004), so this behaviour alone may not be considered evidence of nesting on site. It is possible, therefore, that development sites with suitable grassland might even provide 'nursery' habitat where nesting takes place on adjacent farmland.

The fate of displaced skylarks is unclear. As ecologists we will need to decide the likely significance of effects and whether mitigation should be considered. This decision will be informed by the number of territories displaced versus retained, any wider habitat fragmentation, the habitat type and territory density on surrounding land and the management of any retained or created habitat.

Considering the above, if the carrying capacity of neighbouring habitat allows, some degree of 'absorption' into the surroundings is theoretically possible. Where sites are in proximity to heaths, moorland or coastal grassland this may be more likely. However, in intensive arable landscapes, this is less so and an acceleration of a decline of local breeding success is possible, especially in combination with other development.

Options for mitigation

Their specific nesting requirements mean that effective compensation for skylark displacement requires either the provision of newly available habitat or the enhancement of existing habitat. Habitat enhancement could be designed to increase either the carrying capacity within mitigation land (thereby hosting displaced pairs) or the breeding success of pairs already present.

Arable sward-diversification measures which have been trialled with success for GNB enhancement include 'beetle banks', wider uncultivated margins and increased numbers of tramlines. While margins may be less likely to host actual nest sites, they are often incorporated into territories to exploit the foraging habitat they support and reduce the distance flown per foraging bout (Wilson *et al.* 1997, Donald 2004).

Perhaps the most familiar enhancement is the inclusion of 'skylark plots' within neighbouring arable land. Developed

Table 1. Example skylark territory densities according to habitat type and management. Adapted from Donald (2004) with additional data from research in References.

Habitat	Average density per hectare
Coastal marshes	0.76
Organic set-aside	0.56
Heath and steppe	0.56
Spring cereals	0.46
Set-aside/fallow	0.39
Organic cereals	0.38
Organic winter cereals	0.36
Intensive set-aside	0.36
Arable farmland	0.28
Rootcrops	0.27
Natural grassland	0.27
Moorland	0.26
Winter cereals	0.23
Mixed farmland	0.23
Organic silage	0.22
Pastoral farmland	0.18
Intensive cereals	0.17
Intensive winter cereals	0.15
Legumes	0.12
Oilseed	0.12
Organic grazed pasture	0.1
Brassicas	0.1
Intensive silage	0.08
Orchards	0.07
Rough grazing	0.06
Improved grassland	0.05
Intensive grazed pasture	0.02

Appendix R2.7

Yellow Wagtail

Motacilla flava

Introduction

The Yellow Wagtail is a summer visitor, breeding primarily in southern and eastern Britain.

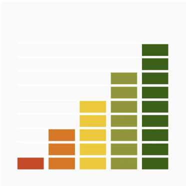
This is a strongly migratory species, wintering in trans-Saharan Africa and returning from early April to breed in grassy habitats, particularly in proximity to cattle. There has been a major decline in numbers since the 1970s, albeit with more stability over the last decade. The decline appears strongly linked to agricultural intensification.

Along with the decline in numbers, the Yellow Wagtail has also undergone range contraction. Most of our breeding birds are now found in central and northern England. It is extinct as a breeding bird on the island of Ireland, where is now only found while on passage.

- Our Trends Explorer gives you the latest insight into how this species' population is changing.

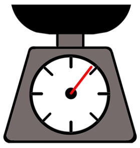
Key Stats

Status



Common

Weight

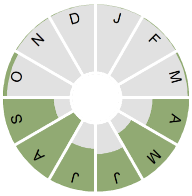


17.6g

Eggs

5-6

Seasonality



3%

BTO Records

180k records

Publications

1

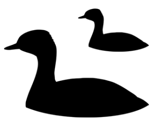
Population and distribution stats for:

Breeding

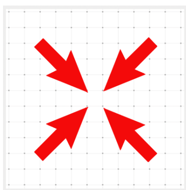
Winter

Population Change

Population Size



Distribution Change



78% decrease 1967 to 2023

20k territories

-32.3% contraction

Identification

Curated resources to aid in the identification of Yellow Wagtail

ID Videos

Close

This section features BTO training videos headlining this species, or featuring it as a potential confusion species.

Yellow-coloured wagtails

Songs and Calls

Close

* First documented occurrence. Most species undoubtedly occurred before this. See About Birdfacts for more information.

Population Change

Close ✕

UK breeding population: -78% (1967 to 2023), Source

Britain holds almost the entire world population of the distinctive race *flavissima*, so population changes in the UK are of global conservation significance. Yellow Wagtails have been in rapid decline since the early 1980s, according to CBC/BBS and especially WBS/WBBS and, after a shift from the green to the amber list in 2002, the species was moved to the red list in 2009 (Eaton *et al.* 2009). Gibbons *et al.* (1993) identified a range contraction towards a core area in central England, concurrent with the early years of decline. Further range contraction has occurred extensively since then, especially in the west and south and in parts of East Anglia (Balmer *et al.* 2013). The European trend, which comprises several races of the species, has shown a decline since 1980 (PECBMS: PECBMS 2020a>).

Visit our Trends Explorer **for trend graphs and country statistics.**

Distribution

Close ✕

The majority of the UK's Yellow Wagtails now breed in England, with none breeding in Ireland and only a few squares occupied in Wales and Scotland during 2008–11. Densities are highest in East Yorkshire, Lincolnshire, the Fens, Broadland and the Essex and Kent coastal marshes.

Appendix R2.8

Solar Energy UK

Solar Habitat 2025:

Ecological trends on solar farms in the UK

Birds

Birds are a much-valued component of the UK's biodiversity, and their populations provide an indication of the broader state of wildlife as they occupy a wide range of habitats and respond to environmental pressures that affect other biodiversity groups. However, wild bird numbers across the UK are falling and since 2018 many bird species have suffered population declines19. The worst affected groups are farmland and woodland birds, which have declined by 61% and 35% since 1970[19]. However, there is emerging evidence that solar farms can support some bird species in agricultural landscapes by increasing structural diversity[20] and providing safe breeding areas[21].

Bird surveys

A total of 78 bird surveys were undertaken across 63 solar farms, with some sites being surveyed once (76% sites) and others twice (24% sites). Surveys involved a walked transect across each solar farm so that all habitats within 50 m of a transect were covered and all birds that were heard or seen were recorded.

Birds recorded as part of surveys

A total of 94 bird species were recorded as part of surveys and most were BTO Green Listed (49%; 46 species), although a significant proportion were Amber (28%; 26 species) or Red (20%; 19 species) Listed Species of Conservation Concern. There were also three species (3%) recorded which had no status, representing those which are not categorised by the BTO, as they are introduced species (e.g. little owl, *Athene noctua*) or game bird species (e.g. common pheasant, *Phasianus colchicus* and red legged partridge, *Alectoris rufa*).

In terms of bird count, a total of 7,459 individual birds were recorded. The most abundant Green Listed species was blue tit (*Cyanistes caeruleus*; 485 individuals), closely followed by goldfinch (*Carduelis carduelis*; 447 individuals).

The most abundant Amber Listed species was wood pigeon (*Columba palumbus*; 645 individuals), followed by wren (*Troglodytes troglodytes*; 589 individuals). It is unsurprising that these species were abundant and frequently recorded at solar farms given both woodpigeon and wren are generalist species that thrive in a variety of habitats. Although wren is on the Amber List, they are the most abundant species in the UK and were recorded during almost all bird surveys undertaken at solar farms (Figure 9). It is likely that they are attracted to the hedgerows and tussock grassland associated with solar farm boundaries.

The most abundant Red Listed species (in terms of the number of individuals counted) was starling (*Sturnus vulgaris*; 333 individuals), followed by linnet (*Linaria cannabina*; 223 individuals). When considering how frequently species were recorded (in terms of in how many surveys they were observed), starling were seen within around a third of all bird surveys (32%; Figure 9) and linnet were recorded within around half (49%; Figure 9). However, the most frequently observed Red Listed species was skylark (*Alauda arvensis*), recorded during 59% of all bird surveys undertaken (Figure 9).

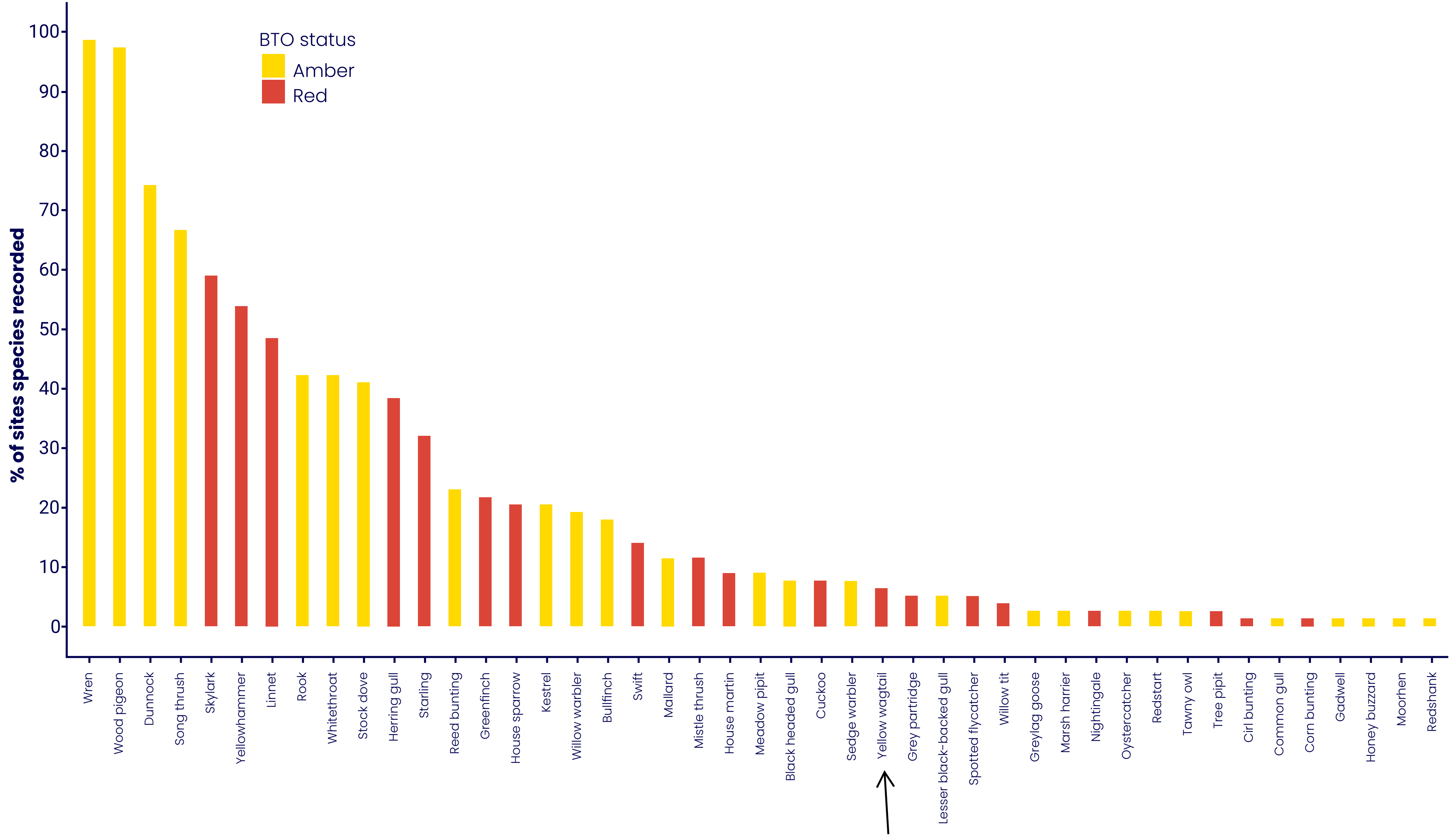


Figure 9. Observation frequency of Birds of Conservation Concern. The percentage of individual bird surveys during which each BTO Amber or Red Listed bird species was observed, arranged by most to least frequently recorded.