Department
for Environment
Food & Rural Affairs

Use of general licences for the management of certain wild birds

Government response to the call for evidence

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1. Introduction

1.1 This document summarises the evidence underpinning the decisions of the Secretary of State for the Environment (the Secretary of State) which followed the revocation by Natural England (NE) of three general licences (GL04, 05 and 06) to control certain bird species. It describes the range of evidence considered, and sets out the conclusions reached.

2. Background

2.1 On 25 April 2019, following a legal challenge by Wild Justice, NE revoked three general licences to kill or take certain species of wild birds to: prevent serious damage or disease (licence GL04); preserve public health or public safety (licence GL05); and conserve wild birds, and flora and fauna (licence GL06). In the course of the following two weeks, NE issued three new general licences to kill or take: carrion crows to prevent serious damage to certain types of livestock (licence GL26); Canada geese to preserve public health and safety (licence GL28); and woodpigeons to prevent serious damage to crops including fruit and vegetables (licence GL31).

2.2 NE informed user groups of the decision to revoke the general licences on 23 April at the same time as they conceded the case brought by Wild Justice, only two days before revocation took place. The lack of warning of this change meant that, with little notice, it was no longer lawful to control wild birds using the methods that had been permitted by the revoked licences.

2.3 By an exchange of letters on 4 May with the Chair of NE, the Secretary of State agreed that the function of granting certain general licences under section 16(1) of the Wildlife and Countryside Act 1981 (the Act) was to be exercised for the time being solely by the Secretary of State. The relevant purposes for which a general licence may be issued by the Secretary of State are:

- conserving wild birds;
- conserving flora or fauna;
- preserving public health or public or air safety;[1]
- preventing the spread of disease;
- preventing serious damage to livestock, foodstuffs for livestock, crops, vegetables, fruit, growing timber, fisheries or inland waters.

[1] This document does not consider the purpose of air safety, since there is a separate class licence (licence CL12) for the killing or taking of certain species of wild birds for this purpose.

2.4 The Secretary of State considered it appropriate to take over this function, recognising the scale of interest and concern that had been generated by the decision to revoke. He asked Defra officials to launch a call for evidence to inform the way forward.

3. Call for Evidence

3.1 On 4 May 2019, Defra launched a call for evidence to seek views from all concerned parties as to the effectiveness and practicability of alternatives to killing or taking wild birds, the benefits and problems with the revoked general licences, and the impact which the revocation of the licences had had on the ground. In particular the Secretary of State wanted to gain a clear understanding of the implications of the revocation for the protection of wild birds, and the impacts on crops, livestock, wildlife, disease, human health and safety and wider nature conservation efforts.

3.2 The questions were:

1) Your views on the alternatives to killing or taking a specific bird species for:

- *Conserving flora and fauna*
- *Preserving public health or safety*
- *Preventing serious damage or disease (serious damage relates to serious damage to livestock, foodstuffs for livestock, crops, vegetables, fruit, growing timber fisheries or inland waters)*

In particular, what are these alternatives and to which bird species do they relate? In your experience or evidence, how effective and practicable are they?

2) Your experience or evidence of any benefits that were delivered by the three revoked general licences?

3) Your experience or evidence of any problems with or caused by the three revoked general licences. Are there any conditions, in your view, that could be attached to general licences to address these issues?

4) Your experience or evidence of any problems caused by the revocation of the three revoked general licences.

3.3 Written submissions were invited either by post or to a dedicated email address. The call for evidence opened at noon on 4 May and closed at 17:00 on 13 May. The call for evidence was open for 10 days. We are aware that there has been some criticism because it was issued on the Saturday of a bank holiday weekend. While this may have reduced the amount of time that those with an interest had to consider

and respond, Defra considered that it was vital to gather information and evidence quickly to find a solution, given the urgency. There was a very high number of responses despite the relatively limited time available.

3.4 The Secretary of State has committed to conducting a further review later this year, including a consultation which Defra intends to launch in the summer. The review will take into account all the information and evidence already provided in response to the call for evidence.

Who responded to the call for evidence?

3.5 In total, Defra received 4,378 responses to the call for evidence. Some of these offered general opinions, and 3,952 responses were more specific and have provided a useful set of evidence and views. The majority of responses came from individuals or smaller businesses and organisations. 36 local and national organisations also responded (see Annex A), including conservation, animal welfare, pest control, farming, game keeping and land management organisations. Some of the organisations had surveyed their members and included a synthesis of the responses they had received.

Summary of findings from the call for evidence

3.6 On reviewing the 3,952 responses, most of the references to birds related to corvids and pigeons, and most of the references to benefits delivered by the revoked general licences related to the serious damage licence. The majority of the problems cited as being caused by pigeons related to loss of crops, while corvids were cited as causing problems around loss of livestock and crops. There were also many references to benefits relating to the conservation licence, again mostly linked to the control of corvids. Overall, very few responses related to public health and safety, although professional pest control organisations submitted evidence on this front.

3.7 A wide range of organisations and individuals raised concerns at the risks arising from the removal of the licences and, in particular, the adverse impact caused by such an abrupt decision. On damage to livestock, for example, many stakeholders had experienced crow attacks on lambs and ewes during lambing which had resulted in their death, and some submitted photographic evidence of this. Many people reported damage to crops, for example from woodpigeons feeding on emerging seedlings of peas, brassicas and oil seed rape, often severely damaging crop sowings. With regard to conserving wild birds, many stakeholders reported impacts on red-listed birds such as lapwing and skylark, including eggs and fledglings being vulnerable to predation, particularly from corvids, and nests being destroyed, for example by Canada and Egyptian geese. Additionally, evidence was received of the

impact of species such as feral pigeons and gulls in urban areas and the potential public health issues this could present.

3.8 Some respondents identified impacts caused by specific species but many used the general term ‘corvids’, rather than specifying whether the impact had been caused specifically by a carrion crow, jackdaw, jay, magpie or rook. Similarly, respondents were not always specific about whether impacts were caused by woodpigeons or feral (rock) pigeons; or herring gulls or lesser black-backed gulls.

3.9 Very few responses related specifically to the control or impacts of invasive non-native species. However, we have a duty under Regulation EU No 1143/2014 of the European Parliament and of the Council on the prevention and management of the introduction and spread of invasive alien species[2] to eradicate certain listed invasive non-native species where their introduction or presence (or re-introduction or presence in new locations) has been detected early.

3.10 Where eradication is demonstrated to be unfeasible, not cost effective, or would have serious adverse impacts on human health, the environment or other species, then we are obliged to apply appropriate containment and population control measures. Decisions on general licences for such species have been taken with this intention in mind, that is, for Canada goose, Egyptian goose, monk parakeet, ring-necked parakeet, sacred ibis and Indian house crow. The rest of this section concentrates on the other species covered by the revoked general licences, which is where the majority of responses were focused.

Organisational responses

3.11 36 organisations provided responses to the call for evidence, raising several key themes.

3.12 Many provided evidence that the sudden revocation of the licences had resulted in negative impacts, for example:

- The National Farmers Union said that it had ‘received an overwhelming response to its own call for evidence from our members which was launched on 8 May. This illustrates the united and significant strength of feeling across the breadth of our membership regarding the events of the last couple of weeks. Without exception, all have expressed concern with the sudden removal of general licences and the impact that a period without general licences for control of amongst other species, carrion crow and woodpigeon, has had on their business, as well as frustration and confusion with the new process for applying for individual licences. The timing of the revocation could

[2] Link: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014R1143

not have been at a worse time of year with the growing season and lambing underway.'

- BASC reported that an online survey of members had generated nearly 30,000 responses which showed that 96% of respondents had stopped all or some of their bird pest control with 86% reporting damage/loss of crops, 81% reporting financial or economic impacts, 79% reporting damage/loss of wild birds like songbirds or waders, 59% damage/loss of foodstuffs for livestock and 52% damage/loss of livestock.
- The National Gamekeepers' Organisation reported that 'our members have had to stand idly by and watch as crows and magpies destroy not only their precious game bird nests but also the eggs and chicks of rare and threatened waders such as curlew and lapwing'.
- Nabim, the trade association for UK flour millers, reported that: 'We have been informed of a situation where there were bird incursions into a food production facility on a weekend and the responsible pest control company was unable to even make contact to request a license until the next working day, and three days after making contact had still not been issued a license. For a food manufacturer, these delays have a critical impact on business operability. As such, it is essential that long-term licenses will be available, rather than specific licenses that can only be used for a specific circumstance or pest incident.'

3.13 Many considered that the revoked general licences had provided a valuable way of addressing human-wildlife conflict, for example:

- GWCT described scientific evidence that predation control carried out under general licences can lead to annual increases in breeding densities of a range of red-listed birds. For example, they conducted the Upland Predation Experiment on moorland in the north of England, which 'showed predation control led to benefits for breeding red grouse, but also curlew, lapwing, golden plover, black grouse, grey partridge and meadow pipit'.
- The Countryside Alliance set out that: 'It is estimated that the number of woodpigeons in England has increased by 39% from 1995 to 2017, and a 2014 estimate of woodpigeon damage to the overall UK oilseed rape crop was approximately £2 million for a 'low impact' year (2% of national crop severely damaged) and approximately £5 million for a 'high impact' year (5% of national crop severely damaged). These losses were incurred whilst woodpigeons were being controlled under the General Licence, and with no such control they would have been significantly higher.'
- The British Pest Control Association explained that: 'The core principle of pest management is to prevent a pest occurrence before it happens. … However, once a pest has entered a sensitive site, that site must be protected from the imminent threat to public health and safety as quickly as possible'.

Further details of organisational evidence relating to particular species and purposes is included in Annex B.

3.14 Some organisations, however, are opposed to general licences or how they were used, for example:

- The Hunt Saboteurs Organisation said that ‘any financial penalties individuals may claim to suffer from impact of wildlife should be weighed against the benefits of biodiversity and the natural balance that predators of all species create in nature’.
- Animal Aid said that ‘lethal controls are not only ineffective but also consistently unnecessary and cruel’.

3.15 Many organisations described how they and their members use alternatives to lethal control but that these are insufficient by themselves, for example:

- The National Farmers Union stated that ‘Our members have been clear in their responses that they don’t over use lethal control methods, but such methods are a crucial part of the arsenal for protecting livestock and crops where they are being damaged by large numbers of pest birds, and when other methods require reinforcement or have themselves failed. All stated that they are careful to use non-lethal controls alongside the lethal controls under the general licence; however some point out that often non-lethal controls either do not work, provide only a temporary solution, relocate the problem or create a nuisance to neighbours and visitors to the countryside.’
- Burnham Thorpe syndicate reported that ‘with regard to damage or disease to livestock, foodstuffs etc, tools such as scarecrows, gas guns, rockets and kites are already fully utilised. However, over a short period of time protecting arable and the wider avian community, pigeons, crows and other corvids become accustomed to these deterrents and disregard them’.
- The National Sheep Association discussed the issues of carrion crow attacking lambs and ewes, saying: ‘Alternatives to killing, such as scaring techniques, are usually temporary with birds quickly learning and ignoring scarecrows/kites and bangers. Alternatives are not effective over the long term and they allow undesirable behavioural traits to become established in individual and colonies of birds. On the other hand, the ability to kill a number of birds can quickly reduce undesirable behaviour such as attacking lambs at birth. It should be remembered that sheep farmers are being encouraged to lamb outside for health and welfare reasons and being encouraged to plant trees which act as cover and perch points for predatory birds. Both these actions increase the risks of bird attacks on sheep and lambs.’
- The British Oat and Barley Millers’ Association (BOBMA) reported: ‘BOBMA members need the ability for their contracted pest management companies to be able to use all reasonable means to prevent undue risk to food safety within their premises and processes. Predominantly this will continue to

include non-lethal means and deterrents, but trapping and lethal means do need to remain in their portfolio… Ultimately, only a professional pest management company with the right experience and training can decide what measures will work in each situation. A professional will balance all these considerations (and many more) before carrying out lethal control. Pest management professionals must be empowered with appropriate licences to make these difficult calls.'

- According to the Moorland Association: 'Disturbance-type alternative methods (audio, visual and human) have minimum impact on the predators which simply fly off a short distance and continue to hunt. Human disturbance during the nesting season can lead to eggs being deserted by adults and getting chilled and chicks being separated from their parents. Separation leads to alarm calling adults and chicks which attracts ground and avian predators.'

3.16 Several organisations reported that the conditions in the three new general licences issued by NE were onerous and ambiguous, while others preferred the greater level of control:

- The National Farmers Union said that 'The replacement licences that we have seen published so far contain numerous inconsistencies in drafting, resulting in ambiguity in interpretation, and lack of clarity between what is legally required and what is simply guidance and advice. This is unacceptable for our members and has led to significant confusion and frustration.'
- The Moorland Association stated that 'The three new General Licences and Individual Licences for conservation, as worded, are confusing so cannot be relied upon. They are in effect no better than no licences at all because they prevent the very purpose they are designed for.'
- RSPCA, however, said that they saw benefits in the new species specific licences which allowed for specific advice to be provided for different scenarios. They said that the introduction of guidance documents provided clarity for users. However, it is noted that the RSPCA state that they are 'by nature difficult to enforce'.

4. Assessments underpinning the Secretary of State's decisions

4.1 The Birds Directive (2009/147/EC) requires EU member states to prohibit the deliberate killing of wild birds. Article 9 of the Birds Directive allows member states to derogate "where there is no satisfactory solution" for the purposes listed in Article 9(1). The requirements of the Birds Directive are transposed into domestic law by the Wildlife and Countryside Act 1981 (the Act). Section 16(1) of the Act allows a licence to kill or take wild birds to be granted for the purposes set out in paragraph 2.3 above (amongst others). Section 16(1A)(a) of the Act provides that the appropriate authority "shall not grant a licence for any purpose mentioned in [section 16(1)] unless it is satisfied that, as regards that purpose, there is no other satisfactory solution".

4.2 The existing overarching Wildlife Management Policy published in 2011 and its Wildlife Management Policy Making Framework are relevant to the decisions taken. The framework provides a consistent, evidence-based and sustainable approach to managing interactions between wildlife and people. It sets out the core principles that will underpin the approach to wildlife management and how decisions are made on whether or not to intervene. It supports the following stepwise approach:

- **Avoidance and tolerance** – Wildlife conflicts are often minor and tolerable, especially if basic avoidance measures are employed. If the problem is significant enough to warrant action, options should be explored that avoid harmful impacts on the species concerned while still resolving the problem (e.g. the when, how and where of operations and the consideration of other satisfactory solutions).
- **Using legal methods** – Where a conflict is intolerable and unavoidable, direct action against the problem species may be justified. In the first instance, legal non-lethal measures (e.g. habitat management, proofing to keep animals out or in, using deterrents and repellents) should be considered. Only if these fail, are impractical or deemed ineffective, should available legal lethal options be considered (e.g. if applicable, shooting animals in the Open Season or using certain traps and pesticides).
- **Licensed action** – In some conflict situations, the best or only effective course of remedial action may be prohibited by law and, in such situations, acting lawfully requires a licence derogating from the protective provisions (e.g. trapping, exclusion, translocation, killing during prohibited periods or by prohibited means). Reflecting the statutory requirements set out above, Defra policy is to derogate from the general protection of wild birds and issue licences to take or kill wild birds in defined circumstances where: (1) all other reasonable non-lethal solutions have been tried and/or shown to be ineffective; (2) there is a genuine problem/need; (3) there are no satisfactory

alternatives; (4) the licensed action will be effective at resolving the problem and (5) the action is proportionate to the problem. Wherever possible, humane methods of lethal control are used.

4.3 As a result of these requirements and policies, the Secretary of State worked through a number of tests to arrive at decisions on whether general licences which permit the killing or taking of wild birds should be issued:

- Is there is a need for a licence for the purpose in question?
- Is a general licence is appropriate in principle?
- Is there no other satisfactory solution as required by s.16(1A)(a) WCA 1981? If there are some circumstances in which there are other satisfactory solutions, should certain species be excluded from a licence?
- What methods of control should be permitted?
- What other conditions should be attached to the licences?

The Secretary of State's conclusions in respect of these questions are set out below.

Is there a need for a licence for the purpose in question? Is a general licence appropriate in principle?

4.4 In terms of whether a general licence is appropriate in principle, the call for evidence showed that large numbers of users were facing practical and urgent problems as a result of the revocation of the previous general licences. The Secretary of State concluded that the wealth of evidence relating to these highlighted problems indicates a clear need for licensing for certain purposes, and general licences are appropriate given that common issues are likely to arise. Issuing individual licences in this context would be less than satisfactory: it risks inconsistency, is likely to be unnecessary given the common issues, and it significantly increases costs and administration both centrally and for licensees. Therefore it was decided that, pending a further review, the issue of time-limited general licences for specific species and purposes was appropriate.

4.5 In terms of which species should be included on new general licences, Defra Group ecologists conducted a literature review of the published scientific evidence relevant to the revoked licences. This was cross-checked with literature referred to in organisations' responses to the call for evidence. This analysis reached conclusions on the strength of scientific evidence available on the impact that each species had for each purpose to which the revoked general licences applied. These assessments are included in the species papers that support this document and to which the reader should refer (Annex B).

4.6 The evidence from this literature review was considered in combination with the information from the call for evidence and advice from NE, the government's statutory advisor on nature conservation (see Section 5 for more detail on NE's advice and our response). Defra analytical staff carrying out the evidence assessments have consulted senior statisticians, social scientists and economists in their preparation and assurance of the analysis, to ensure that the different types of evidence (e.g. scientific and qualitative) are treated appropriately for the value that each brings to the analysis.

Our overall assessment of the evidence

4.7 Uncertainty in the evidence suggests that it would not be appropriate to make precipitous changes to the control of the relevant bird species at this sensitive time of year for the environment and agricultural industries, and therefore there is a need to reinstate options for control of those birds that we are not proposing to remove under general licence. Crop growing, livestock rearing and bird breeding seasons are all in progress, and these bring with them an increase in wildlife conflicts. Even if these are specific and localised, in practice, it is not possible to identify each situation and issue licences in the time available. This could result in significant damage.

4.8 We therefore need to be proportionate and we consider that this justifies a decision to issue time-limited licences. Not to do so could result in negative outcomes with implications for bird conservation, human health and safety, and for some crops and livestock. In addition, experience shows that general licences have not previously affected the conservation status of the licensed species. In the case of native species, we have only issued licences for those which have healthy populations. The Secretary of State has made a decision to issue time-limited licences in the context of a further review being carried out later this year, which will give users an opportunity to engage once again, submitting any further evidence they would like to be considered.

4.9 Looking ahead to this further review, the scientific evidence and the evidence we have received indicates to us that there are likely to be benefits in developing a future system of licensing that differentiates local tactical and national strategic needs, adopts licensing to support their achievement at appropriate spatial scales, and considers different species and purposes at a finer spatial scale. This could, for example, have a clearly described relationship to national policies such as Higher Tier Countryside Stewardship, species recovery programmes, and invasive non-native species control.

4.10 To achieve this ambition in the longer term beyond the review, we will need to enhance the joint evidence base through a partnership between government, its advisors and, critically, the licence users. This would be intended to inform how to develop a licensing regime that enables all parties to achieve government's

ambitions set out in the 25 Year Environment Plan and to have thriving rural communities and a world-leading farming industry.

Which purposes should new general licences cover?

4.11 We have considered the most appropriate structure for new licences. One option would be to link species and purposes together more narrowly, following the approach of Natural England's new general licences (kill or take Canada geese to preserve public health and safety (GL28), kill or take carrion crows to prevent serious damage to livestock (GL26) and kill or take woodpigeons to prevent serious damage to crops (GL31)). The Secretary of State considered that the urgent imperative to restore clarity to the system meant that following the structure of the revoked general licences was justified and preferable, recognising that a fuller review and consultation is to follow.

4.12 The Secretary of State determined that a new general licence for control of species to prevent the spread of disease should not be issued. Combatting the spread of disease is critically important. However, where there is risk of disease transmission (for example the contamination of human food or animal feed), this will be covered by either the public health or public safety licence, or the serious damage licence. Beyond this, the evidence did not support a need for a general licence to prevent the spread of disease.

Geographical considerations: European protected sites

4.13 European protected sites are subject to specific EU law requirements given their particular importance to conservation. These include a process for ensuring that any impacts on the site are properly considered before any plan or project can be undertaken, known as a Habitats Regulations Assessment (HRA).

4.14 At this stage the three new general licences will not apply to European protected sites, or to land within 300 metres of those sites. Defra will continue to work closely with conservationists, farmers, landowners, pest controllers, gamekeepers and all interested stakeholders in order to develop solutions that may be available for activity on protected sites.

4.15 There are a number of ways in which people can continue to carry out control on European protected sites – which include Special Areas of Conservation (SACs), Special Protection Areas (SPAs) – as well as Ramsar sites. For instance, they can apply to Natural England for an individual licence if they are not already covered by an existing individual licence or the specific circumstances provided for by Natural England's three recent general licences (carrion crow, Canada goose and woodpigeon). Users who already have an individual licence issued since 25 April 2019 can continue to operate under that should they wish.

Licence determinations

4.16 The Secretary of State has assessed the evidence as summarised at Annex B and made the following determinations for which species should be included on new general licences:

Table 1: Species covered on new general licences

Licence	Species covered	Species no longer included
Conservation (GL34)	Carrion Crow, jackdaw, jay, magpie, rook, Canada goose, Egyptian goose, monk parakeet, ring-necked parakeet, sacred ibis and Indian house-crow	Feral pigeon, lesser black-backed gull
Public health and safety (GL35)	Carrion crow, jackdaw, magpie, feral pigeon, rook, Canada goose and monk parakeet	Jay, woodpigeon, collared dove, herring gull, and lesser black-backed gull
Serious damage (GL36)	Carrion crow, jackdaw, magpie, feral pigeon, rook, woodpigeon, Canada goose, Egyptian goose, monk parakeet and ring-necked parakeet	Jay, lesser black-backed gull and collared dove

4.17 In terms of crows, previously the hooded crow was considered the same species as the crow and was covered by previous iterations of the general licences. Compared with the carrion crow, the hooded crow is relatively scarce in England and therefore we consider that its inclusion in this interim general licence is not justified – however, we will keep the status of hooded crow in England under review.

4.18 Herring gulls and lesser black-backed gulls have not been included in the new general licences due to their poorer conservation status. Users can continue to apply to Natural England for an individual licence for control of herring gulls, and now for lesser black-backed gulls. In terms of control of nests and eggs, their breeding season for this year is largely complete, so Natural England is developing a new class licence for these species to be ready in good time for next year's breeding season.

4.19 Natural England gave statutory advice to the Secretary of State, which is discussed in more detail in Section 5. In terms of species to be covered by the general licences, NE disagreed with six of our proposals:

- **Non-crow corvids for conservation purposes:** NE supported including carrion crow on the conservation licence but assessed that there was

insufficient evidence to include the other corvids (jay, jackdaw, magpie and rook). Previous general licences have included all corvid species for conservation purposes. While there may be limited evidence for population level impacts of the four contested species, corvids are generalist predators which may have species-specific impacts and/or localised impacts on vulnerable species. It has not been possible to carry out an assessment of the complex interactions of these predatory species with species of conservation concern to inform the necessary and immediate decisions on the general licences. None of these species are of conservation concern and previous inclusion of these species on the general licence has not had an impact on their conservation status. The Secretary of State therefore concluded that the removal of jay, jackdaw, magpie and rook from the conservation licence risks unforeseen impacts; and

- **Woodpigeon and magpie for public health or public safety purposes:** NE recommended that woodpigeon and magpie should not be included on the public health or safety licence. The Secretary of State accepted NE's arguments for not including the woodpigeon but did not agree with their opinion on magpie. Evidence for public health or safety is primarily concerned with corvids and is not broken down sufficiently at the species level to assess individual species. As a result, it is not possible to predict the impact of suspending control of magpies for this purpose at this stage. The ecological differences noted by NE differentiate magpies less from other corvids than do the ecological and behavioural differences of the jay as a shy woodland bird. So, in line with the overall approach taken, the Secretary of State considers that a further examination of this question should be undertaken in the upcoming review.

4.20 In six other cases, NE concluded there was insufficient evidence to make a determination – for public health or safety in relation to crow, rook, jackdaw and ring-necked parakeet; and for serious damage in relation to jackdaw and magpie. The Secretary of State is content to issue licences in these cases on the basis of the evidence presented in Annex B, with the exception of the ring-necked parakeet which was not previously included on the public health and safety licence, and we are not including now.

Is there no other satisfactory solution as required by s.16(1A)(a) WCA 1981? If there are some circumstances in which there are other satisfactory solutions, should certain species be excluded from a licence?

4.21 In deciding whether or not there is another satisfactory solution, relevant factors include:

a) the severity of the problem that the derogation is designed to solve, including in terms of the likelihood of harm and the extent of harm;
b) the urgency of solving the problem;
c) the relative effectiveness of lethal versus non-lethal methods of control;
d) the proportionality of other solutions, including in terms of their practicality, economic cost and effectiveness;
e) the duration and scope of the proposed derogation; and
f) the conservation consequences of the various alternative solutions.

4.22 There has been wide-ranging innovative research for many years on other satisfactory solutions for controlling wild birds. This is described in detail at Annex C. The research has considered all the purposes for which the revoked general licences were issued. The conclusions do not outline other satisfactory solutions to killing or taking birds on a species by species, or purpose by purpose, basis. Ecologists initially carried out the analysis of alternatives by species, but the analysis was aggregated because it became apparent that there was a high degree of commonality across species. These findings are consistent with the information received on other satisfactory solutions in the call for evidence (see Section 3 and Annex B for more details).

4.23 For all purposes and all native species there are other solutions – sometimes more than one – to killing or taking of birds, their eggs or nests. They include scaring, habitat modification and change, enclosing crops, fertility control, and livestock (including released game bird) husbandry. However, in all these cases the practicality and effectiveness of the other solution is specific to the situation which includes time of year, species, and affected features. In most cases, there is also an elevated cost that may exceed what could be considered reasonable and proportionate. For example, in many cases there is a need for rigour in deploying the technique; scaring can be effective if the research-based guidelines are followed (multiple scaring techniques, frequent movement of devices, including human scarers), and this could affect profitability or financial viability. Similarly, netting crops is expensive and only considered financially viable for high-value crops such as soft fruit. Other solutions also have consequences such as displacement and welfare challenges. Finally, no technique is fully effective, and in most cases it is recognised

that these techniques will need to operate alongside the methods for killing or taking birds.

4.24 Accordingly, the evidence indicates that there is no alternative to killing or taking the birds, or damaging or destroying their nests or their eggs, which is fully effective – as the alternatives are either insufficiently effective by themselves or disproportionately burdensome, without resort to lethal control. A lack of full effectiveness is particularly important where the harm being caused or threatened is particularly serious (for example, in relation to the purpose of public health or safety, given the potential impact).

4.25 On considering the evidence, the Secretary of State is satisfied that there is no other satisfactory solution to issuing the general licences for the identified purposes. However, he is also clear that the licences should state that other methods of control should be tried as appropriate, both instead of and alongside the methods permitted under the licence. This reflects the evidence of ecologists and practitioners that mixed methods of control are the most effective, and will ensure that licence holders only resort to killing or taking where it is necessary. The revised Condition 1 in the licences is discussed further in the following section.

What methods of control should be permitted? What other conditions should be attached to the licences?

4.26 Overall, the Secretary of State considered that there was not a clear case for deviating from the position set out in the revoked general licences, especially given the urgency of the current situation, and in light of the review and consultation to follow. Some changes have been incorporated with respect to trapping following NE advice (see Section 5 for more information).

4.27 Condition 1 of the licences is new. To strengthen proportionate use of the licences, this condition requires that, before and alongside their use, reasonable endeavours are made to achieve the purpose in question using lawful methods not covered by the licences, unless such endeavours would be impractical, without effect or disproportionate in the circumstances.

5. Statutory advice from Natural England

5.1 The Secretary of State is obliged to consult NE as statutory adviser to government before issuing general licences. He sought the following:

- under s16(9)(a) of the Act, in relation to the granting of licences for the purposes of conserving wild birds and conserving flora or fauna, advice on whether such licences should be granted. Strictly speaking, this requirement only relates to the conservation purpose, but we sought NE's advice on all three of the proposed licences; and

- under s16(10)(b) of the Act, in relation to the grant of a licence of any description, advice as to the circumstances in which, in NE's opinion, licences of that description should be granted.

5.2 NE responded with two letters of advice[3]. The first dated 21 May responded to our request for advice under section 16(10)(b). The second dated 6 June provided their advice under section 16(9)(a).

5.3 The Secretary of State has given considerable weight to NE's advice. He has weighed NE's advice together with all other relevant considerations including two additional relevant factors that NE's advice did not consider, namely:

- the circumstances in which the decision needed to be made (i.e. the urgent necessity to bring certainty to the current situation); and

- the practical risks inherent in changing the licensing system without a full consultation or research into the potential consequences of change. These issues are of particular concern where the consequences involve potential criminal liability for individuals.

Interpretation of no other satisfactory solution

5.4 NE's interpretation of section 16(1A) of that Act is that, if the licensing authority cannot satisfy itself that the general licence will only be used where there are no other satisfactory solutions on each occasion that the licence is used, then a general licence is not an appropriate mechanism for derogating from the protection afforded by Part 1 of the Act. NE's view is that it is necessary to include conditions in any general licence to ensure that its use is limited to situations where the authority can

[3] https://www.gov.uk/government/publications/natural-englands-advice-to-defra-on-interim-general-licences

be confident that all appropriate alternative solutions will have been considered and, if applicable, employed to resolve the problem prior to use of the licence.

5.5 That interpretation caused serious concerns amongst stakeholders which were strongly highlighted in the responses to the call for evidence as discussed above. For the individual on the ground, that condition also creates uncertainty as to the circumstances in which the licence can be used which is of particular concern because the consequence for the individual of not properly complying with that condition is that he or she commits a criminal offence.

5.6 The Secretary of State has taken his own legal advice on this point and considers that NE's interpretation of s.16(1A) is overly restrictive.

NE's policy advice under Section 16(10)(b)

5.7 NE provided views on the details of the tests they considered should be taken into account when considering whether to grant licences under section 16(10)(b) of the Act; they also provided details of both internal and external guidance currently being used by their wildlife advisers when deciding whether to grant a licence, as well as wider evidence they consider, for example, the EU Guide on Sustainable Hunting (which offers useful information on applying the derogation in Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (the Birds Directive)[4] which permits control of some bird species).

5.8 In broad terms, there is a high degree of alignment between NE's advice and our general principles and approach to licensing. There were, however, some differences on points of detail. NE provided two internal guidance notes on licences for conservation purposes and the interpretation of serious damage. These appear to have been developed to support decisions on more complex individual licensing decisions.

5.9.While there is much we can agree with, there are certain points where we would differ. For example, the note on conservation purposes introduces a comparative criterion: the species to benefit from the action should be in a poorer conservation status than the species for which the licence is sought. While this is sound practice, and may be an appropriate consideration for an individual licence determination, we do not consider that it is appropriate to use this in determining a general licence.

5.10 NE reference Article 13 of the Birds Directive and Article 9 of the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention)[5]

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009L0147
[5] http://conventions.coe.int/Treaty/EN/Treaties/Html/104.htm

in noting that licensed action must not lead to the deterioration in the conservation status of a species, and thus any proposal to permit lethal control under a licence should take into consideration the conservation status of that species.

5.11 On this basis, they recommend that the lesser black backed gull should not be included in any general licence, with which we agree as set out in Section 4 above. NE make some further general points about reducing reliance on licences to control wild birds, noting Law Commission proposals in 2015 and in particular making certain species huntable species that can be shot outside of a close season without licence. They also note the need for effective monitoring of any general licence. These two broader points we consider are best addressed in the full review of general licences to follow.

NE's policy advice under Section 16(10)(a)

5.12 This advice looked more specifically at the proposed form and content of the general licences. NE's advice around which species to include is discussed in Section 4 above. NE advised that the purposes be defined more tightly, and they commented that the information available to them did not indicate how the Secretary of State had properly decided certain aspects of the licence, in particular:

- How licensing determinations are being made, particularly the thresholds and criteria for decision making;
- The no other satisfactory solution test;
- Whether the licensed action is proportionate to the scale of the problem and whether it is expected to contribute sufficiently to resolving that problem; and
- The effects on the conservation status of the species and other species or habitats.

5.13 Details of our approach to these points have been set out elsewhere in this publication. In relation to the final point, we have considered long term population trends of species as part of the licence determinations – and for native species, licences are not issued for control of species unless they have a healthy population. Moreover, NE noted in their advice that there was no evidence to suggest that the conservation status of the licenced species had been affected by general licences.

5.14 NE provided several helpful pieces of advice that we incorporated into the drafting of the licences. They also covered a number of points in relation to traps. They noted the draft licences could be potentially confusing by mixing conditions and advice on trapping, as well as reference to NE's new document on standard licence

conditions for trapping wild birds as good practice.[6] We have not followed their recommendation to require compliance with the latter as a condition of the licence, but we have updated our draft licence to reflect essential new material in GL33 in relation to release of non-target species caught by the traps.

5.15 NE raised a specific point about which traps are permitted to be used under the licence; drawing a distinction between larger traps that can be baited with live decoys and smaller 'clam type' traps typically baited with food.

5.16 NE's advice presented two options: to follow the approach of their new licences to explicitly limit the traps permitted to only Larsen and multi-catch cage traps or, if we are to permit a wider range of traps (including Larsen mate and similar 'clam type' traps), to include conditions on the use of these traps included in the equivalent Scottish Natural Heritage issued licences in Scotland. This would require limits on bait, and potentially a registration system and reporting on non-target species caught. We understand the main conservation concern about the Larsen mate type traps is the enhanced risk of catching non-target species.

5.17 Our view is that there is insufficient evidence to take an informed view on a change at this point. In their 2014 consultation, NE recognised that the wording of the licence could be taken to include Larsen mate traps but they did not subsequently change the licences to specifically exclude these traps. We recommend that the use and type of traps permitted under general licences is reviewed at an early stage.

6. Next steps

6.1 The licences will be valid until 29 February 2020. In the meantime, Defra will lead a review of the longer-term general licensing arrangements. We intend to launch an initial public consultation by the end of the summer, with further details to follow. Defra will work closely on this review with Natural England, who have already indicated the need to examine a wider range of general and class licences.

[6] www.gov.uk/government/publications/standard-licence-conditions-for-trapping-wild-bird-and-using-decoys-gl33

Annex A: List of responding organisations

- Animal Aid (AA)
- British Association for Shooting and Conservation (BASC)
- British Game Alliance (BGA)
- British Oat and Barley Millers' Association (BOBMA)
- British Pest Control Association (BPCA)
- British Trust for Ornithology (BTO)
- Burnham Thorpe Syndicate (BTS)
- Countryside Alliance (CA)
- Country Land and Business Association (CLA)
- European Federation for Hunting and Conservation (FACE)
- Great Broughton Woodpigeon Club (GBWPC)
- Greater Exmoor Shoots Association (GESA)
- Gun Trade Association (GTA)
- Game and Wildlife Conservation Trust (GWCT)
- Hunt Saboteurs Association (HSA)
- Kent Wildfowling and Conservation Association (KWCA)
- League Against Cruel Sports (LACS)
- Little Dowling Pigeon Club (LDPC)
- Moorland Association (MA)
- Maize Growers Association (MGA)
- National Association of British and Irish Millers (NABIM)
- National Farmers Union (NFU)
- National Gamekeepers' Organisation (NGO)
- National Pest Technicians Association (NPTA)
- National Sheep Association (NSA)
- Pest Management Alliance (PMA)
- Royal Agricultural Society of England (RASE) and Innovation for Agriculture (IFA)
- Royal Society for Protection of Birds (RSPB)
- Royal Society for the Prevention of Cruelty to Animals (RSPCA)
- Royal Society of Wildlife Trusts (RSWLT)
- Scottish Association for Country Sports (SACS)
- SongBird Survival (SBS)
- Shooting Times and Country Magazine (STCM)
- Wild Animal Welfare Committee (WAWC)
- Wild Justice (WJ)
- An organisation which did not wish to be named

Annex B: Species evidence summaries

To note, in all summaries of the scientific evidence, a level of confidence was assigned to the key findings by adapting the approach and terminology used in the UK National Ecosystem Assessment (UKNEA); itself adapted from the approach and terminology used by the Intergovernmental Panel on Climate Change (IPCC) and the Millennium Assessment (MA):

1 .Well established: high agreement based on significant evidence

2. Established but incomplete evidence: high agreement based on limited evidence

3. Competing explanations: low agreement, albeit with significant evidence

4. Speculative: low agreement based on limited evidence

The evidence used to reach our assessments is set out in the reference list for each species.

Canada goose

Population status

An established invasive non-native species that showed a population increase of 9.3% per year from 1991 to 2000 to an estimated 130,000 individuals. It had declined by 2017 to the 2008 level of around 62,000 breeding pairs and a wintering population (that includes birds breeding outside the UK) of 190,000 individuals.

Scientific evidence

Conservation

High densities are likely to result in bank erosion, vegetation grazing and trampling damage, reedbed reduction, impact on other waterfowl by exclusion, and competition with Brent geese for winter coastal food. However most of these potential impacts have not been systematically studied. There is a risk that expansion in Scotland could bring conflict with native wintering geese. Hybridisation is usually with other feral geese as UK has few breeding native geese.

Faecal deposits could change vegetation structure although eutrophication results are equivocal.

Summary: ‘Speculative’ evidence of low risk – hybridisation, competition for food and habitat modification

Risk to public health and safety

Largely anecdotal evidence of aggression and slipping on droppings. Host of several pathogens but little conclusive evidence of transmission to humans.

Summary: ‘Well established’ as host for numerous diseases but ‘Speculative’ low agreement on transmission of disease. Anecdotal evidence for aggression and slip risk.

Damage

A flocking bird that therefore concentrates damage; crop and pasture damage has increased as the population has grown. Large birds can also result in soil compaction and erosion. Yield loss reported of 5-20%, with a study estimating loss of £1.3M in 2000, when the population was half its current size. Amenity loss can also be significant to golf course and parklands.

Summary: ‘Well established’ impact on crops, grassland and parkland.

Consultation evidence

Very few responses in the call for evidence related specifically to the control or impacts of invasive non-native species.

Conservation

Several organisations, including BASC and BTO, state concerns of trampled ground birds' nests and thus of reducing the survival of lapwing and curlew. A GWCT member reports that ‘We also have a growing colony of Canada Geese which are depriving the waders of breeding territory and will most likely trample nests. Non-lethal methods are not satisfactory; we have tried rockets but all this seems to do is scare the waders we are trying to protect…’

Additionally GWCT report that their members ‘have regularly had problems with Canada geese coming on to the pond and being aggressive to other species and in a number of cases killing ducklings and other chicks’

Risk to public health and safety

CLA, Wildlife Management and PMA highlight concerns of disease spreading.

It was noted by organisations that they are large and aggressive birds with no natural predators that contaminate land with copious quantities of faeces and can attack humans, pets and other birds that enter their territory. A member of GWCT reports ‘I control the Canada Geese on a local lake which is situated in the grounds of a family home. The geese make a substantial amount of mess meaning that it is not safe for the children of the family to go out. We have tried all means of deterrents but these have little effect.’

Damage

BASC mention that the Canada goose damages crops and thus lethal methods are deployed for the protection of crops. GWCT notes that a member reports that ‘plants sown to encourage protection of invertebrates destroyed’, with another of their members reporting ‘Canada geese are also a problem at the moment. I have chased them off on several occasions this spring but they come back in the evening and now refuse to fly away. Normally the answer would be to shoot 1 or 2 in full view of the rest… The problem I have is that we have planted areas or nectar rich plants nearby for the benefit of endangered insects and the geese have grazed it off already. No point replanting as they will eat it again. What a waste of time and effort and no help for insects’

Furthermore a GWCT member highlights their concerns ‘(I)..shoot Canada Geese at another farm that has a large resident population of Geese on Course Fishing Lakes

next door the Geese are constantly feeding on the crops and trying to stop them by walking them off is a waste of time'

Licence determination – is a general licence justified by the evidence?

Conservation

Yes. Non-native invasive species with large population that has the potential to expand. Impact evidence is anecdotally strong. The scientific evidence is 'Speculative evidence of low risk', because there has been little study of the issue. As this is an invasive non-native species that has undergone a recent reduction in the population, a precautionary approach that weighs positively for the anecdotal practitioner evidence is recommended.

Risk to public health and safety

Yes. Non-native invasive species with large population that has the potential to expand. Impact evidence anecdotally strong and scientific evidence is well established as host for numerous diseases.

Damage

Yes. Non-native invasive species with large population that has the potential to expand. Well established evidence for impact on crops, grassland and parkland.

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Collared Dove

Population status

Conservation classification is ‘Green, of least concern’. Collared dove was first recorded in Britain in 1955. The population rose rapidly to 15,000-25,000 pairs by 1970. Populations of collared dove in the UK are unchanged between 1995 and 2017 although there was a decline towards the end of that period of 21% between 2007 and 2017. The trend varies by region.

Scientific evidence

Conservation

N/A. No evidence of impact.

Risk to public health and safety

Although a carrier of some infectious diseases and acting as a tick vector, there is no evidence in either case that this results in a risk to humans.

Summary: Speculative evidence of risk to public health.

Damage

Little evidence the species has become an agricultural pest of economic significance due to colonizing greener suburban areas rather than intensive farming areas. In a few cases where they are perceived as a pest, e.g. poultry, alternatives such as passive management, deterrents, building proofing etc. are most common and effective means of addressing the issue.

Summary: Established but incomplete evidence of low risk to crops, crop storage and poultry.

Consultation evidence

Very few responses made reference specifically to Collared Dove.

Conservation

Collared Doves are not licenced for the purpose of conserving wild fauna or flora, however the British Association for Shooting and Conservation (BASC) stated that Collared Dove are a main carrier for the disease *Trichomonosis* which can infect wild birds including UK birds of prey: 'Trichomonosis is continuing to spread in Europe and has led to epidemic mortality of finches, including greenfinches and chaffinches (Stabler 1954, Chi et al. 2013, Marx et al. 2017).'

Risk to public health and safety

BASC stated that Collared Doves carry *Chlamydia psittaci*, which could spread to other wild birds or humans.

Damage

Kent Wildfowling stated that Collared Doves and feral pigeons raid stock pens and grain storage facilities, causing pollution by defecating around and within buildings and storage facilities. Counter to this the RSPB questioned the evidence indicating that some birds, including collared doves, routinely cause widespread agricultural damage. This organisation states that collared doves quickly habituate to scaring.

Licence determination – is a general licence justified by the evidence?

Conservation

No. No evidence presently to consider that the population of collared doves should be reduced to protect other birds from Trichomonosis.

Risk to public health and safety

No. As for many other species, risk of transmission is theoretical, and not cause for a General Licence.

Damage

No. No evidence to warrant General Licence. Specific instances should seek individual licence, and so demonstrate that control is necessary because the otherwise common and effective alternatives are not effective in the specific case.

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Corvids: Carrion & Hooded Crow, Jackdaw, Jay, Rook, Magpie

Population status

Carrion crow: 1970-2015 trend +98%, 1995-2015 +18%. Green 'least concern' status.

Hooded crow: 1970-2015 trend N/A, 1995-2015 +17%. Green 'least concern' status. Note very scarce in England, confined to the East Coast.

Jackdaw: 1970-2015 trend +149%, 1995-2015 +54%. Green 'least concern' status.

Jay: 1970-2015 trend +8%, 1995-2015 +19%. Green 'least concern' status.

Rook: 1970-2015 trend N/A, 1995-2015 -20%. Green 'least concern' status.

Magpie: 1970-2015 trend +97%, 1995-2015 -2%. Green 'least concern' status.

Scientific evidence

Conservation

Much evidence on corvids and their effects on wild birds is contained in studies on general predator control. However there have been a sufficient number of studies to undertake meta-studies and systematic reviews to draw conclusions and to differentiate to some extent between species of corvid.

Meta-analyses and systematic reviews show that removing predators improves hatching success of prey bird species, can in some cases improve breeding success, and is more effective if control affects all predators. More detailed recent analysis suggested corvids limited prey populations in 13.6% of studies, with some groups such as seabirds, game birds and waders especially affected, and crows (both carrion and hooded) the main predator implicated with the other corvids less so.

There is emerging evidence that songbirds may be affected, at least locally, by corvid predation.

A different approach looked at national population changes, finding that of 29 prey bird species, 22 were unaffected by a suite of nest predators, and up to 7 could be negatively affected.

National populations of generalist predators (especially fox and both crow species) are known to be some of the highest, or highest in Europe. Habitat change is

regularly cited as a cause in the literature. However whilst unstudied, there is speculation of the effect that the 35-60 million pheasants and red-legged partridges released each year as game birds (9-fold increase in pheasants between 1961 and 2011) could have as a food source that can elevate predator populations. The industries' own figures indicate that 60% are neither shot nor recovered. This subject warrants attention.

Carrion crow summary: 'Speculative evidence' of breeding bird population impact, that strengthens to 'Established but incomplete' for seabirds and 'Competing explanations' for game birds, ducks, waders, raptors and owls, and some passerines. Emerging evidence suggests 'Competing explanations' for local population effects on some other species.

Others summary: Speculative evidence of breeding population impact on wild birds. Speculative evidence of post-breeding game bird population impact. Emerging evidence suggests 'Competing explanations' for local population effects on some other species.

Risk to public health and safety

There is little evidence that corvids pose a health risk to humans. Much evidence centres on being disease carriers but only theoretical risks of transfer.

Carrion crow summary: speculative evidence of public health (West Nile Virus); very low likelihood of transmission to humans.

Jay: no evidence of impact, unlikely to come into human contact due to ecology and behaviour - shy woodland bird.

Others summary: No or speculative evidence of impact.

Damage

The evidence on the wide range of possible impacts under this purpose is mixed and often old. Damage to crops, pasture, stored livestock food, fruit, vary with species and the effectiveness of alternatives also vary. Damage to reared game birds seems consistent with wild game birds, but as for conservation is difficult to separate from wider predator control.

Carrion crow summary: 'Competing explanations' for crop damage and impacts on game birds and livestock.

Rook: 'Competing explanations' for crop damage

Other summary: Jackdaw, jay, magpie: 'Speculative evidence' for damage to crops, and to game birds and livestock.

Consultation evidence

Most of the negative references to birds covered by the 3 revoked general licences relate to some type of corvid.

Most of the references to benefits delivered by the 3 revoked general licences relate to the licence for ‘preventing serious damage to livestock, foodstuffs for livestock, crops, vegetables, fruit, growing timber, fisheries or inland waters and preventing the spread of disease’. Of these references, most are linked to the control of some type of corvid.

Many of the references to benefits delivered by the 3 revoked general licences relate to the licence for ‘conserving wild birds and conserving flora or fauna’. Most of these references are linked to the control of some type of corvid.

Very few of the references to benefits delivered by the 3 revoked general licences relate to the licence for ‘preserving public health or safety’.

Many of the references to problems caused by revoking the 3 general licences were associated with (largely anecdotal evidence relating to) the loss of crops and many are also associated with the loss of wild birds. Fewer related to loss of livestock or financial loss.

Conservation

Many organisations provided submissions which included references to scientific evidence, showing the efficacy of predator control in achieving positive outcomes for songbirds, waders and game birds; what was often impossible to tell was how much of that was attributable to the stopping of corvid predation. The BTO said that there was good evidence demonstrating that high populations of some of the licenced species, particularly crows, may have impacts on a number of bird species of conservation concern, particularly ground nesting waders and gamebirds.

The GWCT cited several studies:

Manipulative experiments on **Salisbury Plain** (grey partridge) and **Otterburn** (red grouse, curlew, lapwing, golden plover, black grouse, grey partridge and meadow pipit) were predator removal experiments that showed greater production of young, and this carried forward into an enhanced spring breeding populations for the listed species.

The **Loddington demonstration**, another manipulation, took place from 1993 to 2001. GWCT began a programme of management for wild gamebirds and songbirds on ‘330ha of unexceptional land’ which included habitat enhancement, winter feeding and seasonal predator control using general licences to control corvids. In that

period they achieved a recovery of songbird numbers to 1960s levels. When corvid control stopped songbird numbers fell back. To try to find the role that predator control played they kept the other management tools running and withdrew predator control for 5 years. They found songbirds numbers fell.

Many organisations including the CLA, confirmed that they use the general licences to control corvids. Songbird Survival said that 25% of reported songbird nest predation is attributable to corvids and some songbird species select sub-optimal breeding sites to avoid magpies, citing *Capstick 2018: Variation in the effect of corvid predation on songbird populations.* Other organisations provided views:

> ‘Magpies will damage nests and people should be able to take preventative action rather than have to wait for damage to occur. If you scare from one nest the bird will go to another. Time spent undertaking reasonable endeavours is wasted and threatens nearby birds’ (Countryside Alliance member)

> ‘Trusts have used control to protect Sandwich, Common and Little Terns, Redshank, Ringed Plover, Lapwing, Tufted Duck and Common Gull’ (Wildlife Trusts)

> ‘The evidence suggests that songbirds are not seriously affected by Carrion Crows; their impact seems particularly manifest with ground-nesting birds, but not all ground-nesting birds. The main species of ground-nesting bird where some control of Carrion Crows appears to be justified, on conservation terms, by the science, are Curlew, Lapwing and Grey Partridge. These three species do not occur in all parts of England or in all habitats and so we question the wisdom of any nationwide general licence. Killing Carrion Crows in Cornwall, for example, is of no value to the conservation of Curlew, Lapwing or Grey Partridge and such a general licence would be disproportionate.’ (Wild Justice.)

> ‘We question what evidence there is of conflict between either magpie, jackdaw, rook or jay with other species of any taxa (to the extent that it causes population impacts on species of conservation concern), in order to justify inclusion on the General Licence to kill or take in order to preserve flora or fauna. (RSPB)

> ‘I am using scarecrows (moved regularly along with firing shots into the air, beeping car horn - along with instructing shepherds/farmers to do the same), due to the sheer numbers of corvids in our area, this has little impact and I am still finding “sucked” eggs (Golden Plover, Curlew, Red Grouse, Lapwing, and Pheasant), I have not been issued with a gas banger licence this year from NE.’ (MA member)

‘On all the Estates I have worked on over 30 years (Cumbria, Northumberland, Yorkshire, Dumfries, Norfolk, Worcestershire, Derbyshire) I have had to carry out lethal control, each year I catch the same or more Corvids (lethal control doesn’t seem to appear to have any effect on their population numbers, but does reduce a higher level of predation than we currently experience), in many of those areas I have successfully produced stable to increasing levels of successfully fledged nests of, Lapwing, Red Grouse, Black Grouse, Merlin, Short Eared Owl, Hobby, Buzzard, Raven, Golden Plover, Curlew, Ring Ouzle, Grey Partridge, all manner of species of duck, Common Snipe, Jack Snipe etc – If the population numbers of Corvids hadn’t been controlled I am in no doubt that I wouldn’t have seen this kind of diversity and the SPA designation of some of these areas would have suffered drastically or been withdrawn?’ (MA member)

‘Species as unique and diverse as short-eared owls, skylarks, turtle dove, grey partridge, yellowhammer, stone curlew, lapwing …breed at Burnham Thorpe. Without the protection afforded them by the control of corvids in particular, they would not flourish as they do.’ (Burnham Thorpe Syndicate)

‘We have client sites with several ground-nesting bird species of conservation concern, including nightjar and woodlark, which would normally expect to benefit from consistent predator control at this time of year.’ (A pest controller)

Corvids eat the eggs and young of gamebirds, whether wild or captive bred, and captive bred birds are especially vulnerable as they go through the release process as they must at some point be in open topped pens.’ (GBWPC)

Risk to public health and safety

The PMA and the NPTA reported that the jackdaw has a habit of making nests in chimneys, with dangers to the health and safety of people living in affected properties. Blocked chimneys have to be cleared out before they can be safely used again. This was possible under the old general licences but pest technicians involved with this work have had to suspend such work for the time being.

The BASC cited a number of studies which state that crows can transmit a variety of diseases but did not confirm any evidence of disease breakouts or transmissions to humans. Diseases mentioned included avian influenza and West Nile virus.

The NFU and the Kent Wildfowling and Conservation Association both reported fouling of grain stores from corvids.

The RSPB questioned what evidence there is to show that any native corvid species has been shown to pose a threat to public health or safety.

Damage

a. Damage to livestock

Many organisations supplied first-hand accounts from their members of damage done to lambs and ewes by corvids during lambing. These included BASC, the NFU, the CA, the CLA, the MA and the NSA. Typical examples given include:

> ‘The general licences reduced the incidences of pain and suffering to sheep and lambs (the tearing out of tongues of lambs at birth, the pecking out of eyes in ewes giving birth or being cast on their backs, and the opening of lambs’ stomachs to eat internal organs). They also reduced sheep losses and contributed towards productivity gains.’ (NSA member)

> ‘I exercise Corvid control for lamb and ewe protection, I have experienced higher than usual outdoor loses. This is due to bigger lambs (effect of a mild open winter) giving Ewes a struggle at birth, lambs heads hanging out of a Ewes uterus which are easily picked off by a mob of Crows (tongues and eyes generally, but also the Ewes uterus).’ (MA member)

> ‘We have thousands of Rooks, Crows, Jackdaws in our outdoor pig fields, eating pig food, spreading diseases and killing your piglets that get out of the pig huts and are weak before the stockmen have time to put them back in the huts’ and ‘Young piglets (outdoor) have been attacked (Notts).’ (2 NFU members)

> ‘On all the farmland I control Corvids for outdoor lambing farmer’s, I am still picking up lambs with eyes, tongues, and navels pecked out (last year I lost a ewe from a flock, from the uterus being pecked out on a pre lambing prolapse), all my farmers move afterbirths, pick up dead lambs and lamb as close to the farm as possible.’ (MA member)

> ‘It should be remembered that sheep farmers are being encouraged to lamb outside for health and welfare reasons and being encouraged to plant trees which act as cover and perch points for predatory birds. Both these actions increase the risks of bird attacks on sheep and lambs.’ (NSA member)

Furthermore the NFU provided some extensive evidence from their members about the damage that corvids had done to their businesses, both in terms of damage to livestock, to silage bales and to crops.

Primarily the concerns raised by NFU members of the damage that corvids have on livestock include the attacking on lambs and ewes, poultry and pigs. Members have stated that:

> ‘we were just coming in to the end of lambing on the week the licenses were revoked… we had a mob of over 200 crows attacking lambs pecking out the new born lambs eyes and rectums.’
>
> ‘Carrion crows attack my sheep, removing the eyes and attacking weak lambs before I can get to them… injuries to tongue, navels and stomachs.’
>
> ‘I try to reduce my carbon footprint and farm in a more sympathetic way, so I have swapped to lambing later and outside… but to have the number of crows, not to mention ravens, circling my lambing fields, almost prevent me from lambing outside.’

Poultry is also affected as one member states:

> ‘I have to protect my free range laying hens from stress and harassment from Rooks, crows and magpies.’

Additionally members have highlighted that piglets have been attacked with:

> ‘thousands of rooks, crows and jackdaws in our outdoor pig fields, eating pig food, spreading diseases and killing our piglets’

The PMA said that although they had limited experience in this area, they had knowledge of significant damage caused by corvids to livestock (fatalities during lambing season due to corvid activity).

Great Broughton Woodpigeon Club said:

> ‘Crows and magpies attack livestock and cause injury and death, especially to sheep when they are unable to get up and to lambs, which is a particular problem for hill farmers. Good farming practices will limit the damage but there are no viable alternatives to killing the birds when stock cannot be protected.’
>
> ‘Corvids eat the eggs and young of gamebirds, whether wild or captive bred, and captive bred birds are especially vulnerable as they go through the release process as they must at some point be in open topped pens. Corvids also eat the food supplied for the game birds, both in the pen and outside, as there is no practical way of protecting it from e.g. a crow, while making it available to e.g. a pheasant or partridge.’

Some organisations countered these claims with suggestions that husbandry could be improved or that corvids preyed on animals that would have likely died:

> ‘Killing of lambs by CC [carrion crow] is disproportionate and is often only the weak/dying/dead lambs that are targeted.’ (Animal Aid)

‘Any initial responsibility on avian predation on livestock needs to rest firmly in the hands of the owners of such stock, a factor which seems to be forgotten in most debates. In most cases the ‘culprit’ are large corvids with the blame being firmly placed on them due to the natural inclination to scavenge from carrion, this will include animals which are near to death. The general information is from individual cases presented by livestock owners with no awareness of the lack of basic animal husbandry which allows such attacks on dying or dead animals. In the majority of cases an assumption is made that the animal was attacked while alive.’ (HSA)

‘We question the evidence indicating that collared doves, jackdaws and jays are routinely causing widespread agricultural damage and therefore believe that they should be removed from the General Licence’ (RSPB).

b. Damage to crops

Many organisations supplied first-hand accounts from their members of damage done to crops by various corvids. These are some examples:

‘Maize damage (by corvids such as crows Corvus corone and magpies Pica due to pecking at sheeting where the maize has been kept in a clamp on a farm to be used for animal feed in the winter; similar damage in fruit and vegetable farming. Proofing and scaring in these situations are known to have limited effect without combining with killing and taking of relevant bird species.’ (PMA)

‘Rook will eat seed drillings; the only way to prevent serious damage is to shoot.’ (CA member)

‘Damage bean crops, rooks kept off the field when the member kept a land rover radio on for a day, but then returned. Shooting only option.’ (CLA member)

‘30 acres of spring oat seeds taken by rooks estimated loss 10-15%. Rooks make holes in silage sheets spoiling the maize. Peck out seedlings.’ (NFU member)

‘Recognise there may be a case for authorising lethal control of jackdaws because of serious damage to crops or livestock, but the case for serious damage is for others to make.’ (Wild Justice).

‘The MGA are writing to support the general licences after many years’ experience of the damage that these birds, particularly corvids [and pigeons], can inflict on undressed maize seed and emerging maize plants. We have heard of many cases of crop damage, particularly by corvids.’ (MGA).

‘Rooks, crows and jackdaws cause similar problems to woodpigeons for recently sown grain crops and attempts to deter them by scaring alone using scarecrows, gas guns, etc., will be effective for only a few hours. They cause particular damage to wheat and barley fields when the first shoots appear above ground as they pull out and eat the seed. It is not uncommon for 25% to 30% of a field to be destroyed in this way.’ (GBWPC)

‘Species such as carrion crow and rook are a particularly problem once crops first emerge after planting, as they will systematically pull seedlings from the ground and the resultant crop damage can often be extensive. Scaring would only work if it involved a dawn to dusk human presence on site to drive birds off and prevent them from returning. This would place an intolerable financial burden on the farming and nature conservation communities.’ (KWCA)

‘Scaring and deterrent methods are usually employed to prevent serious damage to crops, though can also be employed by a few to protect lambs from corvids…. Aside from being ineffective at both tacking the root cause of the problem (pest bird numbers) and scaring the birds, gas cannons are expensive at around £400 for the Scatterbird scarer.’ (Shooting and Country Sports UK)

Licence determination – is a general licence justified by the evidence?

Conservation

Carrion crow: Yes. Uncertainty in the evidence suggests there is a need to reinstate the General Licence at this sensitive time of year. The sensitivity is due to the progressing breeding season of prey species.

Jackdaw, jay, rook and magpie: Yes. Uncertainty in the evidence suggests there is a need to reinstate the General Licence at this sensitive time of year. The sensitivity is due to progressing breeding season of prey species.

Risk to public health and safety

Carrion crow, jackdaw, rook and magpie: Yes. Uncertainty in the evidence suggests there is a need to reinstate the General Licence at this sensitive time of year. The sensitivity is due to the risks caused by accessing human food stores, blocking chimneys during nesting etc.

Jay: No. There is insufficient evidence to warrant General Licence.

Damage

Carrion crow, jackdaw, rook and magpie: Yes. Uncertainty in the evidence suggests there is a need to reinstate the General Licence at this sensitive time of year. The sensitivity is due to the progressing crop growing and livestock breeding period.

Jay: No: There is insufficient evidence to warrant General Licence.

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Egyptian goose

Population status

An invasive non-native species. The British population has been relatively stable for many years. More recently it has begun to increase substantially, also spreading from its traditional Norfolk stronghold, with new populations formed in the Thames basin and scattered records across England, Wales and Scotland. In 2018, using the latest available Wetland Bird Survey data (2015-16), modelling estimated a GB population of 6,095 for 2011-12 and projected estimates of 8,361 (+37%) for 2017-18 and 9,661 (+59%) at the end of December 2018. It has also been introduced to several other European countries and there are now self-sustaining populations in Belgium, The Netherlands, Denmark, Germany, France, Spain and Switzerland.

Scientific evidence

Conservation

Evidence of aggression towards other bird species resulting in displacement from moult and feeding sites. Evidence of nest displacement of other waterbirds and several birds of prey from nests and from nest boxes, and several hole-nesting species. Evidence this depresses breeding success.

Large moulting flocks may intensify eutrophication by defecating in small water reservoirs.

Summary: ‘Well established’ evidence for aggression, competition for nest sites and nest usurpation toward a number of native species. ‘Speculative’ evidence of low risk to eutrophication of water bodies.

Risk to public health and safety

N/A

Damage

In Europe, facts are lacking but grazing and eutrophication are suspected. Evidence well-established from other countries and increasing from Netherlands.

Summary: ‘Established but incomplete evidence’ for impact on crops.

Consultation evidence

Very few responses in the call for evidence related specifically to the control or impacts of invasive non-native species.

Conservation

The British Association for Shooting and Conservation (BASC) reported that Egyptian geese can exhibit dominant and aggressive behaviour towards other birds, preventing smaller native species from establishing territories. They can reduce the productivity of birds of prey such as osprey and barn owl by usurping nests and out-competing them for artificial nesting platforms or nestboxes.

Risk to public health and safety

One minor study was cited by BASC who suggested that Egyptian goose could carry and transmit avian influenza, citing a study[7] that looked at six birds and infected them with H7N1 and measured patterns of viral shedding over 28 days. The research seems to have been seeking confirmation that Egyptian geese were responsible for cross infecting ostriches in Africa and is unlikely to read across to infection of UK wildlife by invasive non-native individuals.

Damage

One Game and Wildlife Conservation Trust (GWCT) member reported shooting Egyptian geese at a farm that has a large resident population on its coarse fishing lakes. They reported that the geese are constantly feeding on the nearby crops and that trying to stop them by walking them off is a waste of time as they just move to another field and carry on feeding.

Licence determination– is a general licence justified by the evidence?

Conservation

Yes. Significant displacement of native species reducing breeding success.

Risk to public health and safety

N/A

Damage

Yes. Sufficient evidence that damage can occur and will worsen if population increases.

[7] Christina E. Burger, Celia Abolnik, and Geoffrey T. Fosgate (2012): Antibody Response and Viral Shedding Profile of Egyptian Geese (Alopochen aegyptiacus) Infected with Low Pathogenicity H7N1 and H6N8 Avian Influenza Viruses. Avian Diseases: June 2012, Vol. 56, No. 2, pp. 341-346.

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Herring gull

Population status

Species described as 'Red listed' with the population possibly at its lowest since 1969-70. There is no trend available due to inadequate time series of data. *Botulism* and reduced food at land-fill sites are cited as possible reasons for decline.

Scientific evidence

Conservation

N/A

Risk to public health and safety

Disease

The extent to which Herring gulls are responsible for the transmission of bacteria to humans has not been quantified, making accurate estimates for the scale difficult. Whilst a significant carrier of salmonella and may act as a vector for *Campylobacter spp*., evidence from 1985 found limited evidence of transmission. In practice there is limited opportunity for humans to ingest an infective pathogen dose.

Recent studies have found high antibiotic resistance in English Herring (and lesser black-backed) Gulls. The species is also a potential vector for avian flu (H5N1), but no specific public health threat has been confirmed and the disease is not easily transmissible to humans.

Summary: ‘Established but incomplete’ evidence that gulls do not pose a significant risk to public health, but theoretical risk of Salmonella, Campylobacter, antibiotic resistant bacteria and Avian Influenza.

Safety

Aggression towards humans reported by various Councils. Herring (and lesser black-backed) gulls scavenge for food in urban areas, resulting in reported human-bird conflict. However evidence is confined to the non-peer reviewed literature and likely exaggerated by perceptions.

Summary: Speculative evidence of risk to public safety from aggressive behaviour.

Damage

N/A

Consultation evidence

Very few respondents made references specifically to Herring Gull.

Very few of the references to benefits delivered by the 3 revoked general licences relate to the licence for ‘preserving public health or safety’.

Conservation

N/A

Risk to public health and safety

Both the NPTA and PMA said that Herring gulls have established breeding colonies on the roofs of buildings in many places throughout the country. Whilst their droppings can contain harmful micro-organisms, their main threat is to public safety, as they can be extremely aggressive to humans whilst raising their chicks. Physical attacks are quite common place. Their presence on roofs of domestic properties can be extremely mentally distressing for those people living there due to the noise and mess that ensues.

These birds have a specific breeding season, when most pest control activity takes place. Large-scale culling has never been considered a viable solution, so most management programmes involve bird-proofing (out of the breeding season) and scaring techniques (as the breeding season commences).

One technique that has proved successful, when proofing has not been an option, is to destroy nests to discourage the birds from establishing themselves at a specific site. This involves either the removal of eggs, or the replacement of eggs with plastic replicas. The latter means the adults remain sitting on eggs, when they are far less aggressive and also, eventually, this has a contraceptive effect on breeding success. As these birds frequently live for 30 or more years, such egg-replacement programmes are long-term projects.

The withdrawal of GL05 occurred just as such breeding season treatment programmes were about to start, so have been put on hold pending the issuing of a new general licence. Both organisations say that it is extremely important that a suitable general licence be issued as a matter of urgency as once the eggs have hatched it will be too late to do anything further this year, as chicks and adults of the Herring Gull are protected. Only the nests and eggs could be removed under the old GL05.

They report that postponement of work on the nests and eggs could cause great damage to long-term management programmes, as birds from this year’s hatch which survive to adulthood will return to the same roof that they were raised upon, putting back such a programme accordingly.

Their members have highlighted considerable concerns over the withdrawal of the General Licence for approved Gull control and need to apply for individual licences. See below for a sample of responses:

‘I am concerned over public health and safety. I service a large hospital and undertake egg and nest removal. The air ambulance also lands on the roof adding to my concerns. I now need to apply for a license before I can carry out this work and due to the delays in receiving this, I am very concerned.’

Another member noted:

‘Factory health & safety managers are ringing me on a daily basis to sort their gulls out. I decided yesterday, …… to apply for an A08 licence to deal with nuisance gulls at factories in Somerset & Wiltshire. …….’

On the other hand, RSPCA questions the inclusion of the Herring gull on the general licence for nest and egg destruction. They believe that many people take action under this licence when the need is perceived as pressing, i.e. when there are chicks on the nest, but that no actions are taken subsequently to prevent this happening again. The RSPCA collects many herring gull chicks a year, and some may have been evicted from their nest, in order to prevent the perceived nuisance. They also state that ‘We also see each summer examples of Herring gulls being persecuted and have had to take prosecutions under the Animal Welfare Act and s1(1)(a) of the Wildlife and Countryside Act 1981 in some serious cases.’

Damage

N/A

Licence determination – is a general licence justified by the evidence?

Conservation

N/A

Risk to public health and safety

No. General licence not warranted given conservation status of species.

Damage

N/A

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Indian House Crow

Population status

The Indian House Crow is currently absent from the UK, but has established breeding colonies in c.20 tropical and sub-tropical countries outside its native range; sightings of solitary birds have been reported from a further 12 countries.

Scientific evidence

Conservation

Has a serious impact on other bird species through predation and harassment. Predates eggs, chick and adults, displaces through competition and aggression. Can attack domestic animals, pets and people.

Summary: ‘Well established’ evidence for predation on native species where established.

Risk to public health and safety

Can attack domestic animals, pets and people.

Not licensed for this purpose, but to deal with single birds, this could be a reasonable purpose.

Damage

N/A

Consultation evidence

No organisations provided evidence about impacts from the Indian house crow

Conservation

Not mentioned by respondents

Risk to public health and safety

Not mentioned by respondents

Damage

Not mentioned by respondents

Licence determination – is a general licence justified by the evidence?

Conservation

Yes. Sufficient evidence of risk.

Risk to public health and safety

No. As can attack pets and people, there could be a case for adding this purpose in future, but was not recently licensed and there are currently no known birds in the UK.

Damage

N/A

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Lesser black-backed gull

Population status

Described as 'Amber listed' in Birds of Conservation Concern 4 - 2015. No recent trend due to inadequate time series of data but increased numbers between 1988 and 2002.

Scientific evidence

Conservation

Little published evidence to support anecdotal evidence that predation by gull species affects other bird populations. Recent meta-analysis of studies found only four cases of predation by both lesser black-backed gull and herring gull on other bird species. In all cases predation was not limiting the population of the prey species.

Summary: ‘Speculative evidence’ of impact on wading bird populations.

Risk to public health and safety

Herring gull has been more studied than lesser black-backed gull, but even combining the evidence, it shows that disease does not pass from gulls to humans.

Summary: ‘Established but incomplete evidence’ that gulls do not pose a significant risk to public health, but theoretical risk of Salmonella, Campylobacter, antibiotic resistant bacteria and Avian Influenza.

Various UK town councils have reported a problem with Herring gulls and Lesser Black-backed gulls with regards to aggression. Gulls scavenge food in urban areas, which can create problems with the gulls attacking people, especially when they are holding or eating food on the streets. However, documentation of aggression is focussed in the non-peer reviewed literature and is likely to be exaggerated by people’s perceptions of the nuisance caused (Defra, 2014).

‘Speculative evidence’ of risk to public safety from aggressive behaviour.

Damage

Summary: ‘No evidence’ for impact

Consultation evidence

Very few respondents made references specifically to lesser black-backed gull.

Conservation

Nothing submitted.

Risk to public health and safety

The PMA reported the problems caused by herring gull and lesser black backed gull, including fouling but most importantly aggression.

Damage

Nothing submitted.

Licence determination – is a general licence justified by the evidence?

Conservation

No: insufficient evidence to warrant General Licence in light of effects identified and conservation status of species.

Risk to public health and safety

No: General licence not warranted given conservation status of species.

Damage

No: No insufficient evidence to warrant General Licence in light of effects identified and conservation status of species.

Future consideration

Due to the uncertain conservation status, this decision should be re-visited once better population information becomes available.

BASC stated that the lesser black-backed gull is not covered by the same surveys as the other species. The L. f. graellsii sub-species is in decline at the flyway level, but Birds of Conservation Concern does not report any significant decline at the UK level.

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Monk Parakeet

Population status

An invasive non-native species undergoing management to eradicate it from the wild. In 2008 it was identified by the GB Non-native Species Programme Board as one of six priority invasive non-native species for rapid reaction. In February 2011, a ministerial approved eradication was initiated. Following actions to remove monk parakeets from the wild in England, the population has been reduced from c100 individuals in three locations across London to around 20 individuals in one location at present.

Scientific evidence

Conservation

Evidence is sparse on the effects of Monk Parakeet on native species. In the USA they have been documented killing blue jays and robins, and they can frequently dominate feeding areas. In Europe and Australia they exert damage to trees and plantations.

Summary: ‘Speculative’ evidence of low risk – domination of feeding sites. ‘Speculative’ evidence of low risk – consumption and damage.

Risk to public health and safety

The most-reported issue from other countries where the species has established is the building of nests on electrical structures and the subsequent short-circuits this causes.

Summary: ‘Well established’ evidence of risk to public health or public safety from nesting on electrical utility structures (in USA).

Damage

Serious agricultural pest of a range of crops in countries in North and South America from a large number of studies.

Summary: ‘Well established’ impact on crops in native and introduced range.

Consultation evidence

Very few responses in the call for evidence related specifically to the control or impacts of invasive non-native species.

Conservation

Nothing submitted.

Risk to public health and safety

Nothing submitted.

Damage

It was highlighted by one organisation that their members have highlighted damage to crops by monk parakeet.

Licence determination – is a general licence justified by the evidence?

Conservation

Yes: sufficient evidence that species would be a conservation risk.

Risk to public health and safety

Yes: sufficient evidence of risk.

Damage

Yes: sufficient evidence of damage

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Ring-necked Parakeet

Population status

An invasive non-native species. The Ring-necked parakeet is a non-native species that has been expanding rapidly as a breeding species in the UK, with the current population estimated to be around 30,000 birds in the South-east of England, plus satellite populations which have been emerging across the UK. With the expansion in numbers of the greater London population that has been observed over the last 40 years, it seems likely that established satellite populations could follow the same trend, especially as it has been shown that the UK has ample suitable habitat for the species. A predicted rate of spread of 6.9km/year was made for the satellite population in Manchester.

Scientific evidence

Conservation

An aggressive bird that nests in existing cavities, it is able to out-compete native species, with several studies in different countries demonstrating this for birds of many sizes, as the parakeet is able to enlarge cavities. The problem in the UK will be exacerbated because nest holes are declining with the removal of older trees and buildings. No studies have yet found an impact in the UK, but the evidence that there will be one once the population reaches a size where nest sites are occupied is persuasive.

Bats that also use cavities are also at risk.

Summary: ‘Established but incomplete’ evidence of risk to native species through nest competition and domination of feeding areas. ‘Established but incomplete’ evidence of risk to native species (bats).

Risk to public health and safety

N/A

Damage

One prominent organisation reported their members’ experiences of increased significant crop damage in England, notably within the South East soft fruit growers. There is also concern about maize and sunflower, both expanding crops, which are also at risk. Organisations have also highlighted that there have been reports of structural damage to buildings, running to £several 000’s.

Summary: ‘Well established’ impact on crops.

Consultation evidence

Very few responses in the call for evidence related specifically to the control or impacts of invasive non-native species.

Conservation

Nothing submitted.

Risk to public health and safety

N/A

Damage

Nothing submitted.

Licence determination – is a general licence justified by the evidence?

Conservation

Yes: Sufficient evidence of threat to native species.

Risk to public health and safety

N/A

Damage

Yes: sufficient evidence of damage to crops including fruit.

Future consideration

It has been highlighted by concerned organisations that the Ring necked Parakeet has been found further North in the UK, previously only been habiting the SE of England. There are concerns regarding that the impact of climate change and how this may encourage the Ring necked parakeet to travel further.

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Rock pigeon

Population status

Rock pigeon is the term used for the wild pigeon from which the homing pigeon and the feral pigeon are derived. The conservation status of Rock pigeon is rated ‘Green’ (least concern). Trend data is not available for a long-term period 1970-2015, but is for a shorter period 1995-2015 where it exhibited a 21% decline.

Scientific evidence

Conservation

No known impact

Risk to public health and safety

Feral pigeons carry at least 110 human-pathogenic organisms. However risk of transmission to humans is low; a 2004 study finding 230 instances in total worldwide between 1941 and 2003, of which 13 were fatal. The greatest risk comes to those closely exposed to dust and faeces, such as pigeon breeders and demolition/construction workers.

Summary: ‘Well-established’ evidence that pigeons harbour a wide range of potential harmful organisms, but also ‘well-established evidence’ that risk to public health is low, with greatest risk to pigeon breeders and demolition/construction workers. ‘Established but incomplete evidence’ of risk to public safety (slipping) where droppings build up in large numbers.

Damage

The amount of damage that can be caused to crops and particularly stored feed appears to be very significant if appropriate prevention methods, including killing and taking, are not employed. The species can occur in very large numbers. Summary: ‘Well established evidence’ for impacts of damage to stored feed. ‘Established but incomplete evidence’ of damage to crops.

Consultation evidence

Many of the negative references to birds covered by the 3 revoked general licences relate to some type of pigeon.

Very few of the references to benefits delivered by the 3 revoked general licences relate to the licence for ‘preserving public health or safety’.

Many of the references to problems caused by revoking the 3 general licences were associated with (largely anecdotal evidence relating to) the loss of crops. Fewer related to financial loss.

Conservation

BASC highlight that feral pigeons are known to be one of the main carriers of Trichomonas gallinae which can cause Trichomonosis disease in wild bird populations including UK birds of prey: 'Trichomonosis is continuing to spread in Europe and has led to epidemic mortality of finches, including greenfinches and chaffinches (Stabler 1954, Chi et al. 2013, Marx et al. 2017).'

Risk to public health and safety

There have been many responses by organisations about pigeons, unfortunately many have not differentiated between a rock/feral pigeon and a woodpigeon. However, a generalisation can be applied to the differing behaviours of the species.

BASC state that breathing dust or water droplets containing contaminated bird (e.g. pigeon) droppings can lead to bacterial infections in humans such as Psittacosis and Salmonella.

BASC continue to state that 'pigeons can transmit dermatitis and pruritus via red blood mites and the pigeon tick – both of which can migrate into human living space (Regan, Metersky & Craven 1987).

BASC state that lethal control is often used to control pigeons to preserve public health and safety around ports by reducing the local population at times when, or in places where, members of the public aren't present.

The Pest Management Association state that 'droppings can harbour many micro-organisms, including some that can be detrimental to human health, including Chlamydia psittaci, which can lead to potentially fatal Ornithosis.' They go on to highlight that 'the health risks posed by feral pigeons in particular are well documented and cases of disease transmission have been demonstrated as detailed by Haag Wackernagel (2006) plus recent media reports of hospital deaths related to feral pigeons https://www.bbc.com/news/uk-scotland-glasgow-west-46953707

PMA note that the droppings can also be a slip hazard, when present in quantity in wet conditions. Their presence can therefore pose a significant threat to human health and safety. PMA state that feral pigeons are peculiar amongst birds as they have no distinct breeding season and, if the conditions are favourable, will breed all year round producing up to 8 clutches of eggs per year, so nests and eggs can therefore be found at any time of the year. Alternatives to killing or taking specific

bird species for preserving public health or safety are not always 100% effective, based on field experience.

The ability for technicians to be able to respond to urgent public health/safety issues promptly was the essence of the general licences. Such examples would include where pest birds (pigeons in particular) enter hospital / healthcare premises, food production or food retail areas where their immediate removal is paramount to prevent contamination and therefore the need to apply for an individual licence is impractical due to the urgency of the situation. Similarly, public safety issues, such as pavements being made slippery due to pigeon droppings, also need prompt attention.

Damage

GWCT note that the revoked general licenses meant that pigeons have damaged pea crops. They go on to flag that the inability to control pigeons effectively on Brassica crops will be financially harmful, as one member put it ‘damage caused to crops by marauding pigeon cannot be overstated as a cost to the farming community’. BASC believe that the revocation of licenses will have caused large-scale damage and loss to animal feed by feral pigeons.

BASC highlight the Defra (2018a) report that avian influenza has been found in pigeons and these species pose a disease risk to livestock through direct and indirect contact (e.g. contamination of feed, water, bedding and equipment).

Licence determination – is a general licence justified by the evidence?

Conservation

No: No evidence presently to consider that the population of rock pigeons should be reduced to protect other birds from Trichomonosis.

Risk to public health and safety

Yes: sufficient evidence of risks.

Damage

Yes: sufficient evidence of impact on stored feed and crops.

Future consideration

Whilst not known to be at risk, there is a hypothetical risk to the wild (non-feral) rock pigeon populations that warrants further consideration. Limiting the new General

Licence to exclude the previous conservation purpose will reduce that theoretical risk. However an evaluation of the risk should take place to ensure that the terms of any future General Licence are drawn appropriately to the problem population.

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Sacred ibis

Population status

An invasive non-native species. The Sacred Ibis is not established in the UK. There are, however, occasional sightings, largely in southern and eastern England. The species has established breeding populations in Spain, Italy and France, as a result of escapes from captivity. In France, birds are dispersing to northern Brittany and Normandy.

Scientific evidence

Conservation

A largely predatory omnivore, feeding on a range of prey including eggs and chicks. In its native South Africa it is the most serious cause of mortality on seabird colonies, and where established in France there are records of a pair removing all the eggs from a Sandwich Tern colony in a few hours, causing desertion of the colony.

Summary: ‘Well established’ evidence for predation on native bird species where established.

Summary: ‘Established but incomplete’ evidence of risk to native species (e.g. amphibians) where established.

Risk to public health and safety

N/A

Damage

N/A

Consultation evidence

No organisations provided evidence regarding impacts from the Sacred ibis

Conservation

Nothing submitted.

Risk to public health and safety

N/A

Damage

N/A

Licence determination – is a general licence justified by the evidence?

Conservation

Yes. Well-evidenced impacts.

Risk to public health and safety

N/A

Damage

N/A

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Woodpigeon

Population status

2009 population of 5.4M pairs. Long-term trend (1970-2015) of +123%; short-term trend (1995-2015) of +35% showing a steady steep increase is beginning to level off. Significant regional variations in increase noted.

Scientific evidence

Conservation

Woodpigeons are not licenced for the purpose of conserving wild fauna or flora, however The British Association for Shooting and Conservation (BASC) stated that woodpigeons are a main carrier for the disease *Trichomonosis* which can infect wild birds including UK birds of prey: 'Trichomonosis is continuing to spread in Europe and has led to epidemic mortality of finches, including greenfinches and chaffinches (Stabler 1954, Chi et al. 2013, Marx et al. 2017).'

Risk to public health and safety

No evidence for disease transmission to humans. Will have a lower disease load than feral pigeon due to location and behaviour. No literature evidence of accessing stored foodstuffs.

Summary: speculative evidence that can act as host for a number of diseases.

Damage

Estimates for damage vary, but no disagreement that damage occurs. An NFU event (2014) estimated damage of Oil Seed Rape (OSR) at 2-5% of annual crop with financial costs of £2-5M per year, based upon mean loss of £131/ha for severe damage. A late 1970s/early 1980s estimate that predates the expansion of OSR planting and the dramatic expansion of the woodpigeon population considered damage to be £2.2M, so would have predicted damage today could be much higher than the NFU event suggests.

Summary: 'Well established' impact on crops.

Consultation evidence

Many of the negative references to birds covered by the 3 revoked general licences relate to some type of pigeon.

Very few of the references to benefits delivered by the 3 revoked general licences relate to the licence for ‘preserving public health or safety’.

Many of the references to problems caused by revoking the 3 general licences were associated with (largely anecdotal evidence relating to) the loss of crops. Fewer related to financial loss.

Conservation

BASC highlight that woodpigeons are known to be one of the main carriers of Trichomonas gallinae which can cause Trichomonosis disease in wild bird populations including UK birds of prey: ‘Trichomonosis is continuing to spread in Europe and has led to epidemic mortality of finches, including greenfinches and chaffinches (Stabler 1954, Chi et al. 2013, Marx et al. 2017).’

Risk to public health and safety

BASC reported that pigeons along with other birds can transmit avian influenza; that breathing dust or water droplets containing contaminated pigeon droppings could lead to Salmonella in humans; and that dermatitis and pruritus could be transmitted via the red mites they carry. They did not cite particular cases where this had occurred.

Damage

The CA reported that woodpigeon damage to the overall UK oilseed rape crop was approximately £2 million for a ‘low impact’ year (2% of national crop severely damaged) and approximately £5 million for a ‘high impact’ year (5% of national crop severely damaged); this damage occurred while general licence control was happening.

GWCT members report damage to crops with woodpigeons feeding on emerging seedlings, particularly peas and oil seed rape. One member reported that the protection of arable crops particularly on poorly established Oil Seed Rape and spring planed emerging leguminous crops was severely affected locally when it [general licences] was curtailed. This was nearly all caused by the large flocks of woodpigeon.

Another member said with regard to arable cropping, the biggest issue was with the seed emergence from the ground when the seeds are small, easily dislodged and eaten by birds or left on the surface to whither having been disturbed by birds. The ability to control at short notice large flocks of woodpigeons in particular was imperative. Another reported they needed general licences to lethally control woodpigeons which would otherwise rake up seed that was sown in the week

preceding their response. They expected their cover crops, this year, to suffer as a result of their inability to control pigeons (and corvids).

The CLA included many reports from its members of crop damage to emerging seedlings from woodpigeons. One member said they had spent many nights watching woodpigeons moving from field to field decimating crops. Crops reported as damaged included oil seed rape, wheat, beans, and vining peas, both at drilling and emergence.

BASC had surveyed its members with over 26,000 responding. Across all birds, 86% reported damage to or loss of crops and 59% damage to livestock feed. BASC supplied their guidance 'Woodpigeon shooting in the UK' which highlights the damage pigeons can do to crops, particularly oilseed rape, peas and cereals. It quotes the Agriculture and Horticulture Development Board which estimates the value of damage to be £115m annually and that woodpigeons are responsible for between 10 and 40% yield loss.

NFU have reported that the financial impact to businesses can be huge due to crop damage by woodpigeon. They estimate that in England, £1-2million per annum to cereals and £2.2m for oilseed rape has been lost historically, however, it is noted that this was when woodpigeon populations were lower. Members report that they regularly lose about 1-3 acres of oil seed rape crop to woodpigeons and that that there are reports that a new sown clover ley was half destroyed by pigeons. This involved reseeding with 70kg of seed at £5.15/kg, whereas further members have reported that a 25% yield loss on the oil seed rape crop could amount to a loss revenue of £90,000. Many members report damage from pigeon grazers has resulted in loss of 20% of crop in certain fields. Furthermore members report that there are no alternative options to lethal control for woodpigeons due to the birds becoming accustomed to the nonlethal methods and ignoring any auditory and visual techniques.

Licence determination – is a general licence justified by the evidence?

Conservation

No. No evidence presently to consider that the population of woodpigeons should be reduced to protect other birds from Trichomonosis.

Risk to public health and safety

No: No evidence for disease transmission to humans. No literature evidence of accessing stored foodstuffs.

Damage

Yes: Adequate evidence of damage.

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Annex C: Other satisfactory solutions to lethal control

Summary of other solutions to lethal control:

- Scaring to protect crops and airfields, can be effective if deployed as a combination of different scaring methods and especially with human scarers, but is costly as it requires intensive and persistent application.
- Habitat modification to reduce the attractiveness of the sensitive sites is site-specific, can be effective or not effective, but is generally low cost to implement.
- Habitat change to enhance wild bird populations is considered to be effective, but the changes required can be significant. Costs will vary widely.
- Enclosing crops with temporary or permanent netting is highly effective but costly so viable only for high value crops.
- Fertility control of target avian species can sometimes be effective, as shown overseas. For the UK, however, there are no registered fertility control agents available for managing wildlife populations. The cost of registration for a wildlife contraceptive is high.
- Chemicals to deter feeding on crops lose any effectiveness as they are quickly washed off. The cost to register a product for use is high.
- Livestock management such as keeping lambs indoors, shepherding and providing harbourage for game birds can be effective, with cost and practicality varying.
- Dogs with handlers can be effective at airfields and landfill sites with a high cost.

A detailed consideration of other satisfactory solutions is set out below. The responses from the call for evidence supported this specialist evaluation of possible methods. Few respondents identified other satisfactory solutions that were effective.

Non-lethal techniques can be categorised into three different types of action:

- **Deterrents**: prevent or reduce the utilisation of a vulnerable site or commodity by the target species, with no overt attempt to reduce the size of the overall population (other than potentially shooting a few individuals to aid scaring);

- **Population control**: seeks to directly reduce the population (i.e. fertility control); and

- **Mitigation measures**: species are targeted indirectly, via the resources they utilise (i.e. food source or habitat).

These three types of action can be further split into five categories of management techniques: **visual, auditory, chemical, exclusion, habitat modification and 'other'** (e.g. livestock/crop management).

This annex is organised into two sections:

1. A summary table of the main categories of techniques for mitigating the impacts of wild birds; and

2. Outline details for individual techniques within each main category of management.

Summary table

Table 2: Summary of main techniques for mitigating the impacts of wild birds

Option	Application	Benefits	Disadvantages	Effectiveness low (L), medium (M), high (H)	Cost low (L), medium (M), high (H)
Scaring	Various visual and auditory devices. Most effective when used in combinations.	Individual techniques are relatively cheap. Humane.	Continual scaring with rotation and/or combined use of techniques can become expensive. Noise (e.g. gas cannons) and safety issues (e.g. pyrotechnics) with some techniques. Constant effort critical.	L-M (most scaring techniques when used solely) M-H (when used in combination) H (human-scarer)	L-M-H Scaring techniques vary in price from low (kite) to high (laser) Costly in terms of effort
Sacrificial or decoy crops	Alternative attractive food source is supplied away from the sensitive crop. Scaring should continue at the sensitive crop.	Humane.	Sacrificial food must be continually available during damage season. The additional food may attract increased numbers of birds to the area, increasing the risk to the crop.	M	M-H

Option	Application	Benefits	Disadvantages	Effectiveness low (L), medium (M), high (H)	Cost low (L), medium (M), high (H)
Habitat modification e.g. perch removal, food removal.	Reduce the attractiveness of the sensitive site.	Long-term. Non-lethal. Humane.	Potential actions are site-specific.	L-H Depending on other site availability	L
Habitat change	To improve wild bird breeding success and over-winter survival by reducing predation, improving food and shelter etc.	Achieves enhanced conservation outcomes, usually multiple outcomes	Timescale over which the intervention becomes effective will vary. Requires change to existing practices.	H but will alter preferred land use	Unknown: but likely to achieve multiple benefits
Netting	Enclose crops with temporary or permanent netting.	Effective and long-term. Humane.	High initial capital outlay. Not economic for low-value crops. May obstruct farm practices. Requires maintenance. Reduces air movement so may increase risk of crop diseases.	H	H

Option	Application	Benefits	Disadvantages	Effectiveness low (L), medium (M), high (H)	Cost low (L), medium (M), high (H)
Repellents	Sprayed onto crops or onto bait broadcast amongst the crop.	Non-lethal.	Only one licensed product in England. Not effective in adverse weather conditions Cinnamamide not available in UK.	L	M
Fertility control	Presented on treated bait at feeding stations. Species-specific feeders.	Humane.	Possible exposure of non-target species. Technique in development stage.	M-H	H Cost of product and application
Livestock management	Providing harbourage for game birds Keeping lambs indoors.	Humane	Potentially costly Not always possible	M-H	L-H Cost depending on availability of suitable resources
Use of dogs or falcons	Airfield/landfill sites	Dogs effective in long term. Falcons have more short term effects	Costly to very costly Falcons restricted with weather and time of year. Dogs require specialist handling and training.	L-M (falcons) H (dogs)	H

Outline details of individual techniques

Visual

a) Lasers

Low-power lasers that work under low light conditions can be targeted on specific problem birds, making laser devices an attractive alternative to other avian scaring devices. Birds are startled by the strong contrast between the ambient light and the laser beam. During low light conditions this technique is very selective, but at night the light beam is visible over a large distance and hence can cause non-selective disturbance. Low-powered hand-held lasers have been used successfully to disperse a number of avian species (Glahn et al. 2001, Blackwell 2002ab).

In a pilot study, an automated laser deterred woodpigeons Columba palumbus from fields of brassica (APHA 2018). The effectiveness, however, varies between species and is context dependent. The equipment, however, is expensive and specialised training is required, adding to the costs. As the effectiveness of the laser decreases with increasing light levels, it is likely to be most effective at dawn and dusk. Its usefulness may therefore be confined to night-time roosts and feeding sites at dawn.

b) Human-scarer

Human activity can disturb birds from specific areas either deliberately by direct harassment (Vickery and Summers 1992). Human presence is a feature of many bird deterrent methods, and it should be appreciated that it is difficult to separate the effects of the device, e.g. pyrotechnics, from the effects of human presence. In the USA, human activity in lambing paddocks was considered to help alleviate livestock losses to eagles (Matchett and O'Gara 1987). Effectiveness is influenced by a number of variables, such as the season, the type and maturation stage of the crop, the problem species and its abundance, the size of the field and the diligence and enthusiasm of the scarers.

c) Scarecrows

For scarecrows to maximise effectiveness, devices should possess biological significance, appear life-like, be highly visible and their location changed frequently in order to extend the period of habituation (Vaudry 1979; Shivik 2004). The effectiveness of scarecrows may be enhanced if fitted with loose clothing and bright streamers that move and create noise in the wind (Vaudry 1979) - effectively becoming a moving visual. Ultimately, however lifelike, under most circumstances scarecrows do not present a threat that is sufficiently alarming to birds (Inglis 1980). Over a period of time birds learn that effigies or models do not represent an actual threat and are no longer alarmed by them. To increase the threat and, therefore, the

habituation time, it is recommended that these devices be reinforced with other sound-producing or visual deterrents. Ideally, for example, scarecrows should be periodically reinforced by human activity. A successful example of the latter approach was used to successfully deter birds from crops in Israel (Nemtzov and Galili 2006).

Life-like mannequins, reinforced with a gas cannon, rope-bangers and a live marksman (dressed identically to the mannequins) reduced woodpigeon damage to fields of brassica crops (APHA 2018).

d) Corpses

Deploying dead specimens or taxidermic effigies of the target species in a manner which signals danger to conspecifics has been used to disperse birds from areas. Initially birds often approach the corpse but often leave when they see the unnatural position of the bird. This approach has been frequently used in attempts to deter gulls from airports (Harris and Davies 1998). However, the models were ineffective when placed in a highly desirable location (e.g. nest sites and the active face of a landfill) and alternative areas were not readily available. When placed in desired loafing areas away from food sources, however, gulls relocated to alternative areas and avoided loafing areas with effigies for an extended time. Carcasses and effigies were not effective in deterring carrion crows *Corvus corone* or Canada geese *Branta Canadensis* (Naef-Daenzer 1983; Seamans and Bernhardt 2004).

e) Eyespots

Eyespot patterns are a commonly used deterrent, either painted onto a substrate or on devices such as balloons and kites. These patterns are images of eyes composed of a small circle (the ‘pupil’) centred in a larger circle of another colour (the ‘iris’). Laboratory studies have shown that eyespot patterns can induce an aversive response in birds (Inglis et al. 1983). Habituation to eyespots, however, was rapid. McNamara et al. (2002) found that ‘eyes’ painted on the black plastic which covered silage bales reduced damage to the bales by 65%.

f) Balloons

Balloons tethered in a crop have been used as an inexpensive method of bird deterrence, but studies show that they are not very effective and birds quickly habituate to them. An 18ha field of early-sown barley was successfully protected from rooks for the 13 days up to plant emergence using five single balloons tethered at a height of 30m (Feare 1974). On a second field containing late-sown oats, however, a higher density of balloons was completely ineffective.

g) Kites

Kites and kite-hawks (kites that simulate birds of prey) work as mobile predator models, which birds perceive as a threat. The kites bear an image of a soaring raptor and are tethered to the ground. Conover (1983) (cited in Harris and Davis 1998) tested four designs of kite-hawks, but none effectively deterred birds from feeding on corn.

To be effective, kite-hawks need to be ‘flown’ beneath helium balloons in order to possess sufficient ‘threatening’ movement (Conover 1984). When this was done, the kites became more effective at scaring birds from the cornfields. Helium-filled bird scaring kites have been deployed between dawn and dusk at landfill sites. Numbers of gulls, corvids and starlings on sites remained relatively unchanged and there was little evidence that birds were deterred from the sites (Baxter 2002). Conversely, kites were effective in greatly reducing woodpigeon damage to fields of spring cabbage on two farms (Fazlul Haque and Broom 1985).

h) Drones

A small-scale investigation tested whether flying an unmanned aerial vehicle (drone) could deter grazing woodpigeons from a field of brassica (APHA 2018). The deterrent effect of the drone was very short-term: woodpigeons flying from the field at the approach of the drone, and taking refuge in nearby trees or hedges; the median distance flown was 300m (100-420m). On 100% of occasions woodpigeons returned to the field; median time to return was <20 minutes (<3 to <45 minutes).There was no difference in the overall pattern of woodpigeon activity (median numbers of woodpigeons; and percentage time on field) on the treatment field (drone) and a similar control field (without drone) during pre-treatment, treatment and post-treatment periods.

i) Lights

Flashing, rotating, strobe and searchlights are a novel stimulus to birds, which encourage an avoidance response (Harris and Davis 1998). Although lights are easy to deploy and require very little maintenance, they should not be used where they might cause a visual nuisance to neighbouring properties. They may not be effective during daylight hours and their ability to scare birds at night varies with the bird species. Lights are best used with other deterrent methods.

j) Mirrors/reflectors

Mirrors and reflectors work on the principle that sudden bright flashes of light produce a startle response and drive the bird from an area. Although easy and inexpensive to put up and easy to relocate, the effectiveness of mirrors and reflectors as a bird scaring technique is variable.

As they are only effective when they reflect sunlight and so are useless before sunrise (Nakamura 1997), they are best combined with other methods of scaring.

A device consisting of a rotating pyramid of mirrors has been recommended for deterring birds in a number of settings including the protection of crops. There is, however, little scientific research into the effectiveness of this device (or other mirrors/reflectors). In New Zealand, such a device had minimal effect on reduction in bird (mainly starling) damage to grapes, relative to an eye-spot balloon (Fukuda *et al*. 2008).

k) Tapes

Suspended tapes as a scaring device act as a combination of visual and exclusion deterrence. They are easy to erect and a wide selection of twines and tapes are readily available. Reflecting tape such as Mylar tape has been used in attempts to deter birds in a number of circumstances. The tape has a silver metal coating on one side that reflects sunlight and also produces a humming or crackling noise when moved by the wind.

A variety of birds have been deterred by tape suspended in parallel rows over ripening crops (Bruggers *et al*. 1986). Other studies have found reflective tape to be ineffective. Tobin *et al*. (1988) found that birds were not deterred from eating blueberries or from flying into taped plots, and Conover and Dolbeer (1988) found that tapes in cornfields did not reduce damage by red-winged blackbirds.

l) Flags, rags and streamers (fladry)

Fladry is a method where strips of fabric are hung from cords or fences and strung to encircle pastures or areas that need protection. The effectiveness of fladry against avian predators is considered limited (Shivik *et al*. 2003 cited in Shivik 2006). The placing of flags, usually made from old sacks, amongst a crop, is one of the simplest and cheapest forms of bird scaring. The movement of the flag or rag in the wind is perceived as a threat by birds, which then avoid the area.

Auditory

Auditory deterrent devices include gas cannons, pyrotechnics, bio-acoustics, acoustics, ultrasonics and high intensity sound. In addition, there are numerous low-tech methods for producing sounds, such as tin cans and chains. The application of auditory deterrents (indeed to a lesser extent also some other categories of deterrents) requires careful consideration, as there is the potential to disturb the stock they are meant to protect in addition to scaring predators.

a) Gas cannons

Gas cannons are mechanical devices that produce loud banging noises (like a shotgun) by igniting either acetylene or propane gas. Gas cannons are commonly used to scare birds off agricultural crops. Their effectiveness, however, is variable and is dependent upon the method of their deployment, the bird species involved and the availability of alternative feeding areas.

Habituation seems to be the main reason for their loss of effectiveness; a cannon firing repeatedly without any variation in timing or direction quickly loses its potential to scare birds. Moving the cannon every few days is recommended (NFU undated; Transport Canada 1994; Harris and Davis 1998; Gorenzel *et al.* 1994), along with variable firing intervals (Harris and Davis 1998). Gas cannons that produce a double explosion may be more effective than those emitting a single bang (Inlgis unpublished data).

b) Pyrotechnics

Pyrotechnics include a wide variety of noise-producing cartridges usually fired from rockets or rope bangers, or on aerodromes from modified pistols or shotguns, which produce a loud bang and emit flashes of light. Pyrotechnic-charged cartridges (e.g. Bird Frite®) provide a combined visual and aural stimulus. A pyrotechnic shell is fired from a conventional 12-gauge shotgun, and the explosion of the shell produces a bright flash and smoke. Most species of birds immediately take flight in response.

Pyrotechnics have proved effective in dispersing birds at some airports, landfill sites and agricultural sites (reviewed in Harris and Davis 1998). Pyrotechnic rockets were also effective at reducing gull and corvid numbers at landfill sites (Baxter and Robinson 2007). However, the frequency of firings had to be increased over the 12-week study period to maintain effectiveness.

Rope-firecrackers are inexpensive, commercially available and require little manpower (Booth 1994). Fuses of the firecrackers are inserted through an 8 or 9.5 mm cotton rope. The rope is ignited and as it burns the firecrackers produce a series of loud explosions at approximately 20 minute intervals (Henley 1992). Their noise levels can be enhanced by placing them inside empty oils drums (P. Haynes pers. comm.).

c) Shoot to scare

As an alternative to the use of pyrotechnics, birds can be dispersed from pastures by firing .22 caliber or larger rifle ammunition or shotguns nearby (Avery and Cummings 2004). As with pyrotechnics the effect was only short-term.

In a large scale replicated field experiment to deter cormorants from inland fisheries, no lesser scaring effect of shooting blanks compared to shooting to kill was detected; however, differences between shoot to kill and blank sites may have contributed to this lack of difference in effectiveness (McKay *et al*. 1999; Parrott *et al*. 2003).

d) Bio-acoustics and other acoustics

Bio-acoustic deterrents are sonic devices that transmit sounds of biological relevance: recorded bird alarm and distress calls. In general, alarm calls are given when birds perceive danger, whilst distress calls are vocalised when birds are captured, restrained or injured. These calls are species-specific and can cause conspecifics to take flight. Alarm and distress calls, however, may also evoke a response in other species that are taxonomically related to the call-producing species (Baxter *et al*. 1999) or which closely associate with it.

Responding to alarm/distress calls has high survival value, therefore such biologically meaningful sounds are more repellent and more resistant to habituation than other sounds (Bomford and O'Brien 1990, Harris and Davis 1998). However reactions to distress calls can vary both with the species and the individual bird (Schmidt and Johnson 1983); in some groups such as gulls, alarm/distress calls initially act as an attractant with birds approaching the source, apparently to investigate, before flying away (Brough 1968).

Although such systems can be placed in a resource location on a random timer sequence, birds will quickly habituate to such a device if it is not frequently moved, and it may cause noise nuisance in adjacent areas. A manually-operated system that is used only when birds are present will be more expensive but will also be more effective and less likely to become a nuisance. Success requires high-quality recordings of suitable calls and specific calls changed frequently (Bomford and Sinclair 2002

Sonic systems that produce a variety of electronically-produced sounds are also commercially available. The range of loud and sudden noises they produce can frighten birds but as they have no biological meaning the risk of habituation is great (Harris and Davis 1998).

There is no evidence that ultrasonic devices deter birds (Bomford and O'Brien 1990). In fact, evidence indicates that most species of birds do not hear in the ultrasonic range (>20kHz) (Erickson et al. 1992, Harris and Davis 1998) and so there is no biological basis for their use.

Chemical

a) Egg oiling

Egg oiling involves coating the egg shells with oil such as liquid paraffin (Baker et al. 1993). This stops air from passing through the shell to the embryo and prevents it from developing properly. Baker et al. (1993) tested this method on Canada geese and achieved a 100% success rate; none of the 231 treated eggs hatched. It is a time-consuming process as all nests have to be located and treated, and this may be hindered by problems of access. The timing of destruction is important and any reduction in a population caused by the loss of young birds may well be offset by immigration of new birds from nearby non-treated areas. Engeman et al. (2012) show evidence that egg oiling effectively reduces gull numbers, but that it is expensive for the reasons described above and, if not carried out correctly, gulls will re-lay eggs within the same season.

b) Repellents

These techniques can be very effective in laboratory and cage trials, but less effective in the field due to practical problems such as persistence (the chemical soon washes off) and presentation of treated bait.

Only one chemical is registered for use in the UK as a bird repellent by the Chemical Regulations Directorate. Aluminium ammonium sulphate is marketed under several product names and can be used in agricultural premises, on many different crops (The UK Pesticide Guide 2012).

Cinnamamide (primary repellent) did reduce woodpigeon damage on oilseed rape by 73% (Cotterill *et al*. 2001). However, Cinnamamide is not registered as an avian repellent in the UK. Tactile repellents involve the use of sticking substances that discourage birds because of their ‘tacky’ feel. They can be applied as clay-based seed coatings, or as pastes and liquids on ledges and other roosting structures to deter settling birds.

c) Fertility control

The avian contraceptive Nicarbazin is registered for use in the USA for use with Canada geese and feral pigeons and in Italy to control urban populations of feral pigeons; for which effective population reduction has been reported. At the present time no avian fertility products are licensed for use in the UK.

Exclusion

a) Netting

The use of nets to cover resources and totally exclude birds is considered one of the most effective bird deterrents. It is used to prevent birds from feeding on high value crops such as cherries, blueberries and grapes (Grun 1978; Biber and Meylan 1984 both cited in Harris and Davis 1998). The greater the degree of exclusion, however, the more expensive the technique is. For this reason netting tends to be restricted to high value crops. There are some concerns amongst growers with the use of nets and other coverings as the micro-habitat beneath the cover can result in reductions in some aspects of produce quality (e.g. firmness and shelf-life) and the facilitation of disease.

b) Suspended lines/tapes

Overhead wires or lines strung over the area from which birds are to be excluded can be an effective deterrent, and a less expensive method than full exclusion. Studies investigating the effectiveness of suspended tapes or lines in deterring birds from crops have provided mixed results (Pochop *et al*. 1990). In Italy, to protect pheasants in release pens from raptors coloured tapes (or wires) are stretched at 2-3 meters intervals across the open top pen at discrete points at which predation more often occurs (e.g. near corners, over feeders). In some cases this has been considered effective by game managers.

Although a close configuration of tapes may be successful in terms of crop protection, it can interfere with crop husbandry and increase costs in terms of labour and materials. In such situations, this technique is best suited to small areas of high value crops. Good maintenance of the tapes is essential in order to prevent them from becoming tangled in the crop, and to stop gaps resulting from broken tapes being exploited as entry points by birds.

Habitat manipulation

a) Natural and artificial cover

The use of natural and artificial cover has been identified as an important factor in lower raptor predation at pheasant release pens.

b) Anti-perching devices

These prevent birds from perching, roosting and nesting on surfaces and ledges and involve wires, gels, coils or point systems. All either prevent physical access or else provide an unstable surface for perching. Installing a thin wire over the perch, which prevents the bird from landing, is probably the simplest method.

All these designs may help to deter perching birds but their success is dependent on all perches being treated to discourage birds from the area.

Bird Free® Optical Gel a product that is marketed as an anti-perching treatment. The gel is deployed in shallow saucers arranged in a sequence along a preferred perching substrate (e.g. ledge). Deterrence is claimed to be achieved through utilising the birds' visual spectrum (that includes ultraviolet) with the product giving the appearance of fire to the birds (so acting as a visual deterrent rather than a tactile one).

Anecdotal evidence suggest it is effective at discouraging pigeons from perching but this is in urbanised areas where there are many other options for perching. A recent study concluded that the gel showed a restricted, transient repellent effect but failed to prove the claimed complete effectiveness (Stock and Haag-Wackernagel 2014).

c) Diversionary feeding

Deploying diversionary (decoy) or sacrificial food is a technique used to divert feeding birds away from the susceptible resource. In the UK, at pheasant release pens, the provision of an alternative food source was suggested to be effective in reducing predation by buzzards *Buteo buteo* (Harradine *et al*. 1997).

Strips of kale are sometimes planted along the edges of fields for use by game birds; these also form valuable decoy crops for woodpigeons (Inglis & Haynes unpublished data). A sacrificial crop can be created along the edges of oilseed rape fields by simply sowing the rape at a lower density in these areas; woodpigeons prefer to forage in the less density areas of the crop (Inglis & Isaacson unpublished data).

There is, however, a potential danger in providing supplementary food, which is that in the long term it may lead to an increase in species-density, if the availability of food resources is limiting numbers. Supplementary food may also increase the survival rates of young birds and exacerbate the long-term problem.

d) Manipulation of natural landscape vegetation

Agricultural intensification tends to remove cover and presumably increases prey vulnerability. Also, by reducing or concentrating natural sources of food and/or providing artificial supplementary sources, prey activity and aggregation may increase, thus attracting predators. For some prey animals (game birds), vulnerability to predation could be reduced by encouraging the growth of more cover in their natural habitat. The effect of available cover has been investigated on the susceptibility of red grouse to predation by hen harriers (Thirgood et al. 2002). It is necessary to consider whether habitat management is likely to have consequences for other aspects of biodiversity.

e) Habitat change

For the conservation of wild birds, many authors refer to the benefits of habitat change to achieve an enhanced conservation status for breeding bird populations without the need for predator control, or where there study was of predator effect on bird populations, that the effect was probably enhanced by a sub-optimal habitat. Habitat change would seek to enhance those features that benefit most wild bird populations (food nest, sites, cover from predators), and reduce the opportunities for predation, and so reduce the relative size of the predator population compared to the prey population. A review by Conservation Evidence (Williams et al 2018) found the provision of set-aside areas in farmland to be beneficial for birds, rating effectiveness at 70% with 75% certainty. The summary states:

- Three replicated studies and a review of five studies from Europe and North America examining species richness or diversity found that more species were found on set-aside than on crops. One found fewer species on set-aside than other agricultural habitats.
- All 21 studies, including a systematic review, 12 replicated experiments and two reviews, from Europe and North America that investigated population trends or habitat associations found that some species were found at higher densities or used set-aside more than other habitats, or were found on set-aside. Four studies (three replicated) from the UK found that some species were found at lower densities on set-aside compared to other habitats.
- Three of four replicated studies from the UK found that waders and Eurasian skylarks had higher productivities on set-aside, compared to other habitats.
- One study found that skylarks nesting on set-aside had lower productivity compared to those on cereal crops, and similar productivities to those on other crops.
- One replicated paired study from the UK found that rotational set-aside was used more than non-rotational set-aside, a replicated paired study found no differences between rotational and non-rotational set-aside. A review from Europe and North America found that naturally regenerated set-aside held more birds and more species than sown set-aside.

Other

a) Livestock practices

Livestock practices could be altered to reduce the exposure of vulnerable animals in certain areas or during critical periods (Shivik 2006). Lambs are especially vulnerable when they have gained enough age and confidence to distance themselves from their mother ewes (Warren *et al*. 2001).

To counter this risk lambs could be kept indoors until they have matured to a size/weight that reduces their attractiveness as prey. It has been recognised that small improvements in sheep flock management may be far more beneficial to productivity than large-scale attempts to control predators (Davies 1999). The simplest and most effective method has been to place a shepherd with the flock during the lambing period.

b) Crop management

Changes in crop management involving a variety of measures have been reported (Smith et al. 1995). These have involved consideration of topographical features to avoid siting vulnerable crops in high risk areas, such as adjacent to woodland or in isolated, undisturbed fields. Changes in planting patterns have included a switch to spring-sown from winter-sown oilseed rape, abandonment of growing vulnerable crops, particularly oilseed rape and beans/peas. Such measures can represent a financial loss in themselves as a result of foregone income. Planting sacrificial areas of crop along the margins of fields can help reduce woodpigeon pressure on the main crop area. Scope for growers to implement changes in crop management in respect to siting vulnerable crops and adopting alternative (potentially novel) less vulnerable crops will depend on farm-specific factors and market forces.

c) Dogs or falcons

Active deterrence can be performed by trained birds of prey particularly for gulls at landfill sites. In trials at landfill sites the number of scavenging gulls and corvids was reduced during all flights of falcons but this was not achieved during flights of hawks (Baxter and Robinson 2007).

Although falconry has shown some promising results (mainly at airports) there are a number of issues that impact detrimentally on its effectiveness; the birds cannot be flown under certain weather conditions (strong winds, rain, fog) and when in moult; the birds' behaviour can sometimes be unpredictable; and the dependency on a trained falconer renders the techniques relatively expensive (Erickson *et al*. 1990). With few exceptions, it has been necessary to deploy other scaring techniques in conjunction with falconry.

The use of falconry in agricultural and other settings has been very limited. Goshawk attacks, even when repeated and successful, usually failed to keep the pigeons off the field for any length of time. Woodpigeons resettled on the field immediately after 23% of attacks and returned to the field within the same day following 50% of attacks (Kenward 1978).

The control of birds by trained border collies has been used at aerodromes, golf courses and agricultural land (Castelli and Sleggs 2000). The dogs represent an actual, not just perceived, threat and so elicit flight reactions. Habituation is unlikely as they can continually pursue and change their behaviour.

Border collies are used as they are working dogs bred to herd animals and to avoid attack, and they respond well to whistle and verbal commands (Erwin 1999). A single border collie and its handler can keep an area of approximately 50 square kilometres free of larger birds and wildlife (Carter, undated).

The use of dogs, however, is labour-intensive, as the dogs need to be constantly directed by a trained handler. The initial costs of implementing a border-collie programme may be high with the purchase of dogs, training, plus food and veterinary bills, and they may be no more effective than a human bird-controller. In addition, safety is an issue on runways.

Integrated management

A recurring theme in the management of avian pests, to protect vulnerable resources, is the necessity for an *integrated management strategy*. Such an approach involves combining and interchanging a suite of different scaring techniques deployed unpredictably both spatially and temporally. Scaring can be reinforced with shooting. In addition, habitat-based techniques should be utilised, where appropriate, such as diversionary (sacrificial) feeding areas and siting crops with respect to local topography (e.g. away from woods, close to human disturbance). Exclusion methods such as poly-tunnels and netting should also be applied when appropriate.

Although the adoption of an integrated strategy is accepted as best practice, the actual nature of any management programme (i.e. techniques, intensity, timing and duration) will need to be developed to address the site-specific features and context of individual sites.

In respect to the wider ecological perspective, for any bird deterrent its effectiveness will depend on a number of factors in addition to the deterrent itself, such as the *motivational state* of the animal and the *availability of alternative resources*. Motivational state will be influenced, for example, by the degree of hunger or the drive to feed young. Birds will be more easily deterred from crops where there are plentiful alternative (unprotected) food resources available than from sites where there are few alternatives; hence the value of sacrificial crops in some circumstances.

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