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Blithe Spirit: Are Skylarks Being Overlooked in Impact Assessment?

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

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

Introduction

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

The highest densities of skylarks occur in upland and coastal regions and the arable heartlands of the east of England. Here, and in Northern Ireland, are the scenes of the greatest losses of skylarks in recent decades (Figure 2). The Centre for Ecology and Hydrology reported in 2020 that some 768,000 ha of grassland (including arable) were lost mostly to urban development and woodland planting between 1990 and 2015. Around 1–2% of greenbelt land is developed annually according to the Office for National Statistics, with the Government pledging to build a further 300,000 new homes per year. In a bid to tackle climate change and energy security, the Government has suggested the UK's solar energy generation capacity could grow five-fold to 70 GW and pledged a surge in support for onshore wind energy. While the fortunes of GNBs may be dramatically influenced by changes in agricultural policy, piecemeal developments have the potential to exacerbate local declines and place greater pressure on remaining habitats to absorb displaced birds.

Having examined publicly available Ecological Impact Assessments of developments on land supporting skylark territories, it would appear there is an inconsistency in understanding of not only skylark ecology, but opinion on what might constitute an impact, and what mitigation could be employed. This is likely to be the case for other GNBs but is understandable given the scant guidance on impact assessment for birds. Advice on the issue given to clients by different consultants varies wildly. This situation risks undermining the industry and creating a 'race to the bottom' where potentially ecologically harmful advice becomes prevalent.

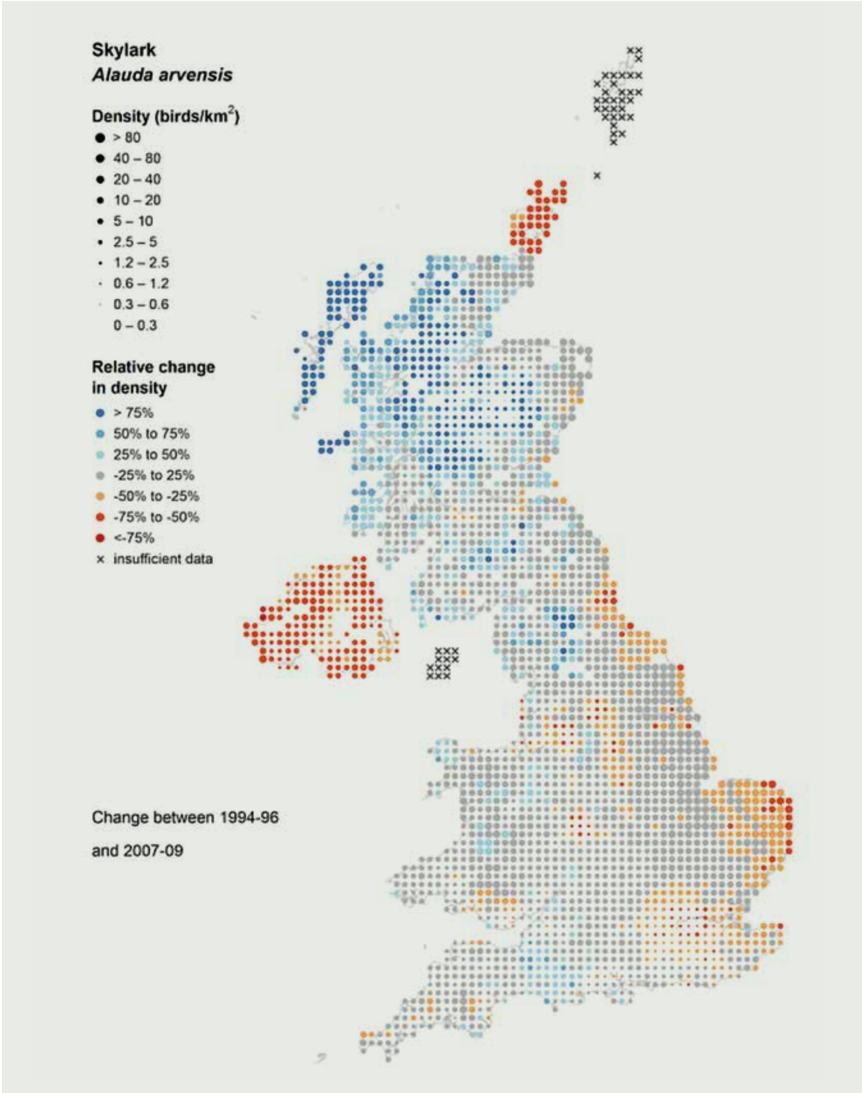

Figure 2. Skylark population change between 1994–96 and 2007–9. Data from the British Trust for Ornithology.

Skylark ecology

Skylarks have evolved to rely on secrecy and vigilance to avoid predation. Edge habitats are used by predators for hunting and cover (Donald 2004), so when selecting nest sites, skylarks require long, unbroken sightlines (Wilson *et al.* 1997). Tall structures such as trees, buildings or tall hedgerows all cause even optimal habitat to be avoided (Donald *et al.* 2001), unless the field area is particularly large (Whittingham *et al.* 2003). One study estimated the effect of dissuasion by tall structures to span approximately 200 m (Oelke 1968).

The height and density of vegetation for nesting is important because access to the ground, for moving through the vegetation back to nests, needs to be sufficiently free. Consequently, skylarks have a clear preference for vegetation height of between 20 and 60 cm, although taller crops such as linseed and rapeseed can be tolerated where the vegetation is less dense at ground level (Toepfer and Stubbe 2001).

Figure 3. Skylark nest.
Photo credit: Hannah Montag.

In optimal habitat, skylarks can have up to four broods per year. The number of nesting attempts a pair is able to make each year is a strong indicator of the stability of a skylark population (Donald 2004). As arable farmland is typified by 'winter cereals' (where the next crop is sown shortly after the summer harvest), the head start that crops receive over traditional spring sowing often precludes a third – or even a second – brood as they overtop 60 cm sooner (Donald and Vickery 2000). Additionally, taller vegetation forces birds to nest closer to tramlines, thereby increasing predation rates (Morris and Gilroy

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

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

Development impacts

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

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

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

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

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

Options for mitigation

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

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

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

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

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

by the RSPB in the 1990s, skylark plots are small (approx. 5 × 5 m) patches of undrilled land within arable fields created by turning off the seed drill momentarily at a rate of two per hectare. Plots are not designed to provide nest locations; rather, once colonised by weeds, they act as oases for invertebrates upon which birds can feed, increasing prey accessibility by opening up the sward. Several studies indicate success of plots in increasing territory densities, especially later in the season as the sward rises (Ogilvy *et al.* 2006).

It is common to see ecologists propose a basic metric such as two plots for each skylark territory displaced. It is not clear how this is decided upon and appears to confuse the 2 plots/ha rate of RSPB farmland management advice with a suggested rate per displaced territory. Territory densities in cereal crops vary between approximately 0.1 and 0.4 territories/ha (Donald 2004), increasing up to 0.8/ha with plots, so it is highly unlikely that 1 ha with plots would be able to support an additional displaced territory. We therefore argue against using this rate.

More recent research suggests confounding effects of plots on breeding success. An increase in predation has been shown in fields with plots (especially alongside aforementioned sward-diversification measures which create 'edges'; Morris and Gilroy 2008). Other studies fail to show significant benefits from incorporating plots, possibly due to poor colonisation by weeds, or increased pesticide overspray (Smith *et al.* 2009, Field *et al.* 2010). It is clear that the use of plots must be carefully judged and be just one of several options used, although not in the same fields.

The reversion to traditional spring-sown regimes with retention of winter stubbles provides a longer nesting season and better winter forage (Donald 2004). This is perhaps the best conventional arable management for skylarks, while set-aside and fallow are also excellent habitats (Poulsen *et al.* 1998), with organic farming showing further benefits, owing to reduced pesticide use and slower growing varieties.

An alternative mitigation metric

In the absence of other guidance, an alternative metric is presented that promotes optimal off-site compensation based on research into territory densities across different habitat types. The following method determines the amount of land which, when managed or enhanced accordingly, should accommodate a desired number of displaced skylark territories.

1. Use survey data to quantify the number of breeding territories in the development footprint.
   Example: 20 territories.
2. Calculate the density of territories across all skylark-suitable habitat to be impacted (the 'donor' site).
   Example: 20 territories/100 ha site = 0.2 territories/ha.
3. Decide on the number of territories to be compensated.
   a. It may be appropriate to discuss 100% compensation with your client as a worst-case scenario. Depending on the balance of other likely ecological impacts and benefits, there may be an 'acceptable' number of un-compensated displaced territories. Ultimately, this will be a professional judgement call based on site and development specifics.
   b. Other ecological effects inherent in the proposals may allow for a reduction in the need for compensation. For example, where the development site will retain or create sufficient grassland *foraging* habitat for skylarks, territories close to the edges of the development may benefit through increased breeding productivity. For example, we might assume that 50% of on-site territories occurring within 75 m of the development edge may not need to be compensated when suitable foraging land will be present on site, provided *sufficient nesting habitat is present on adjacent land to absorb them*. Example: eight on-site territories within 75 m of development boundary; 50% × 8 = 4 so 20 territories to be compensated becomes 16.
   c. If sufficiently open habitat is retained within proposals, or where there is an abundance of suitable habitat nearby which is likely to be below carrying capacity for GNBs, some absorption may theoretically reduce this further. However, caution should be exercised, and this effect may require baseline survey evidence.
   d. Cumulative impacts due to other development in proximity to donor and receptor sites should be examined, potentially raising compensation requirements.

Figure 4. Skylark on the ground. Photo credit: Keith Williams.

4. Determine the baseline territory density at the receptor site either from site survey or referencing research-based figures by crop type/ land use (e.g. Table 1). If the habitat is sufficiently similar to the 'donor site', it may be more appropriate to apply the figure calculated in step 2.
5. Calculate the net change in territory density possible at a receptor site before and after enhancement.
   a. Determine the theoretical territory density achievable through a positive change in management at the receptor site (see Table 1). Example: 0.56 territories/ha in set-aside.
   b. From this, subtract the actual (surveyed) or assumed (Table 1/step 2) receptor baseline. Example: 0.56 – 0.2 = 0.36.
6. Divide the number of territories to be compensated by the net density change figure (step 5b) to give the number of hectares to be positively managed to accommodate displaced territories. For example, 12/0.36 = 44.4 ha.

Candidate receptor fields should feature low (<2 m high) boundary features, no buildings and a short axis of >200 m. The more ambitious the proposed habitat enhancement (e.g. grazed pasture to set-aside), the less receptor land required. In the absence of grassland creation or arable de-intensification, this calculation could at least indicate the area over which measures such as skylark plots, margins, headlands, etc., should be adopted. The management prescriptions on farmed receptor sites resemble familiar agri-environment scheme options and would cause a slight reduction in agricultural productivity. The concept of reimbursement for income foregone is well-established and serves as a useful starting point for discussion with landowners. Agreements may need to build in a degree of crop rotation within the landholding. Compensatory management should be secured in the long term and be accompanied by a degree of monitoring to further understanding of development impacts and mitigation effectiveness.

Conclusions

The prototype methodology given here is not perfect, makes several assumptions and is as yet without monitoring data. However, it is anticipated to provide a starting point for discussion on GNB mitigation. Hopefully, potential impacts on GNBs can be better anticipated and considered within impact assessment. We look forward to hearing the opinions of other ecologists and researchers on the severity or otherwise of development upon GNBs and the potential for successful mitigation, including refinements to data in Table 1. We would like to see the development of a forum on bird mitigation for use by practitioners, with examples and resources. In time, this should improve the general understanding of bird ecology among ecologists and result in more consistency.

Since GNBs require a lot of space, it is unsurprising that these calculations often indicate large compensation areas might be required. Clearly, this is likely to result in difficult conversations with clients where previously none may have taken place. In our opinion, this only serves to reinforce the need for more scrutiny of the issue by the industry, and more widely by policy-makers.

On development projects, the onus is typically placed on developers or agents to source receptor sites, negotiate management contracts and ensure monitoring is undertaken. Often, this can lead to poor outcomes for wildlife with the breakdown of agreements or lack of follow-up, continuity of personnel or enforcement. Perhaps there is an opportunity to integrate compensation with targets under schemes such as the proposed Environmental Land Management programme? Or alternatively, a system for brokering ecological mitigation between developers and land managers along the lines of that carried out through district-level licensing or natural capital marketplaces. The reversion of relatively small areas of intensive farmland to traditional, low-intensity management with the inclusion of set-aside and wide headlands and winter stubbles could contribute meaningfully to net gain and Nature Recovery targets.

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