

A photograph of a robin perched on a mossy tree branch against a clear blue sky. The robin is facing left, with its head slightly turned. It has a brown back, a reddish-brown breast, and a white belly with dark streaks. The tree branch is covered in yellowish-green moss. The background is a solid blue sky.

The value of the green belt south of Cambridge to populations of farmland birds (2022)

Report of an 11-year survey

John Meed, January 2023

Introduction

For the last eleven years I have conducted ecological surveys – focusing in particular on farmland birds – in a square kilometre of green belt south of the Cambridge Biomedical Campus to assess the levels of the biodiversity of an area close to the city.

The area studied is largely arable land, with mature hedgerows, watercourses, ponds, scrub and woodland, including the Nine Wells local nature reserve (LNR – right). It includes a cycle path and footpath, and land management has created several permissive footpaths, flower-rich field margins and additional woodland (see Appendix 1). It is widely used by walkers, cyclists and families.



Why do farmland birds matter?

Farmland birds have suffered major declines in recent decades.

- Grey partridge declined by 93% between 1970 and 2018 and corn bunting (right) by 89% while yellow wagtail declined by 68%, yellowhammer by 60% and skylark and linnet by 56% (1).
- Farmland birds are indicators for the UK Government Sustainable Development Strategy (2) and 11 of the 19 indicator species are 'red list' birds of 'high conservation concern' (3).
- Grey partridge are now classified as 'vulnerable' to extinction in the UK while corn bunting and yellow wagtail are classified as 'near threatened' with extinction (3).



Birds are indicator species because of their place as consumers in the ecosystem, and declines in bird populations indicate wider problems. The *State of Nature 2019* report (4) states that 'bird species most closely associated with farmland have declined more severely than birds in any other habitat, with a fall of 54% in the Farmland Bird Indicator since 1970'.

Methodology

I monitor the area using a combination of methods. As a British Trust for Ornithology (BTO) surveyor I adopt their Breeding Bird Survey methodology (5), which involves a habitat survey and walking two parallel transects, each of 1 km, on 2–3 occasions early and later in the breeding season; this approach gives a good snapshot of the species present in an area. I did my transect walks on April 14, May 6 and June 3.

In summer I build a more accurate picture of the number of breeding pairs, drawing on my experience as a surveyor for the Royal Society for the Protection of Birds (RSPB) Volunteer and Farmer Alliance (6). In these visits I observe breeding signs such as singing males, territorial behaviour, courtship displays, nest building and juvenile birds. In summer I also survey butterflies and dragonflies on behalf of the UK Butterfly Monitoring Scheme.

I also visit the site regularly in the autumn and winter, monitoring passage migrants and winter visitors, and in particular grey partridge populations. In 2022 I made over 30 visits.

Findings

Over the eleven years I have recorded 96 bird species including 22 red list species and 31 amber list species. See Appendices 2 and 3.

In 2022 I recorded 80 species on the three transect walks and other visits:

- On the first transect walk: 32 species and 275 individuals
- On the second transect walk: 33 species and 280 individuals
- On the third transect walk: 26 species and 170 individuals



The 80 species recorded included 17 of the 19 farmland bird indicator species for the Sustainable Development Strategy, of which 14 bred (Appendix 4). In total I recorded 17 red list species and 26 amber list species. This table shows the indicator species recorded.

Breeding red list indicator species	Other indicator species
<ul style="list-style-type: none">• 58 pairs of skylarks• 16 pairs of grey partridge• 17 pairs of linnets• 11 pairs of corn buntings• 11 pairs of yellowhammers (above)• 6 pairs of greenfinches• 2 pairs of yellow wagtails• 5 pairs of starlings• Lapwing displayed but bred nearby	<p>All the other amber and green-listed indicator species were present, and most bred:</p> <ul style="list-style-type: none">• 14 pairs of whitethroats• 4 pairs of reed buntings• 3 pairs of stock dove• Goldfinch, wood pigeons and jackdaws all bred in good numbers• Kestrels and rooks nest nearby and visit regularly

In total 44 species bred, including red listed house martins and mistle thrushes, as well as several other amber-listed species including song thrush and dunnock. The area continues to attract migrating birds, including this year several willow warblers and whinchat and stonechat on autumn passage.

I will discuss in more detail at my findings about the populations of two key red list species that do unusually well in the fields around Nine Wells:

- Grey partridge (right)
- Corn bunting

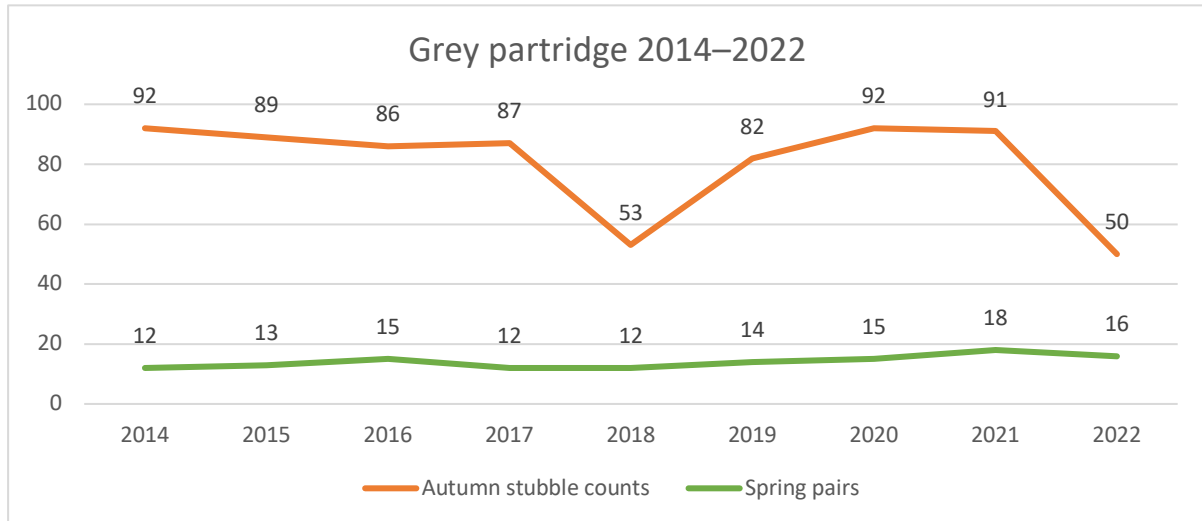


I will then go on to examine my findings for other species.

I have written up my observations of the fascinating behaviour of these species, and especially grey partridge and corn bunting, in much greater detail in my book *A haven for farmland birds* (7). For more information see johnmeed.net/ecology.

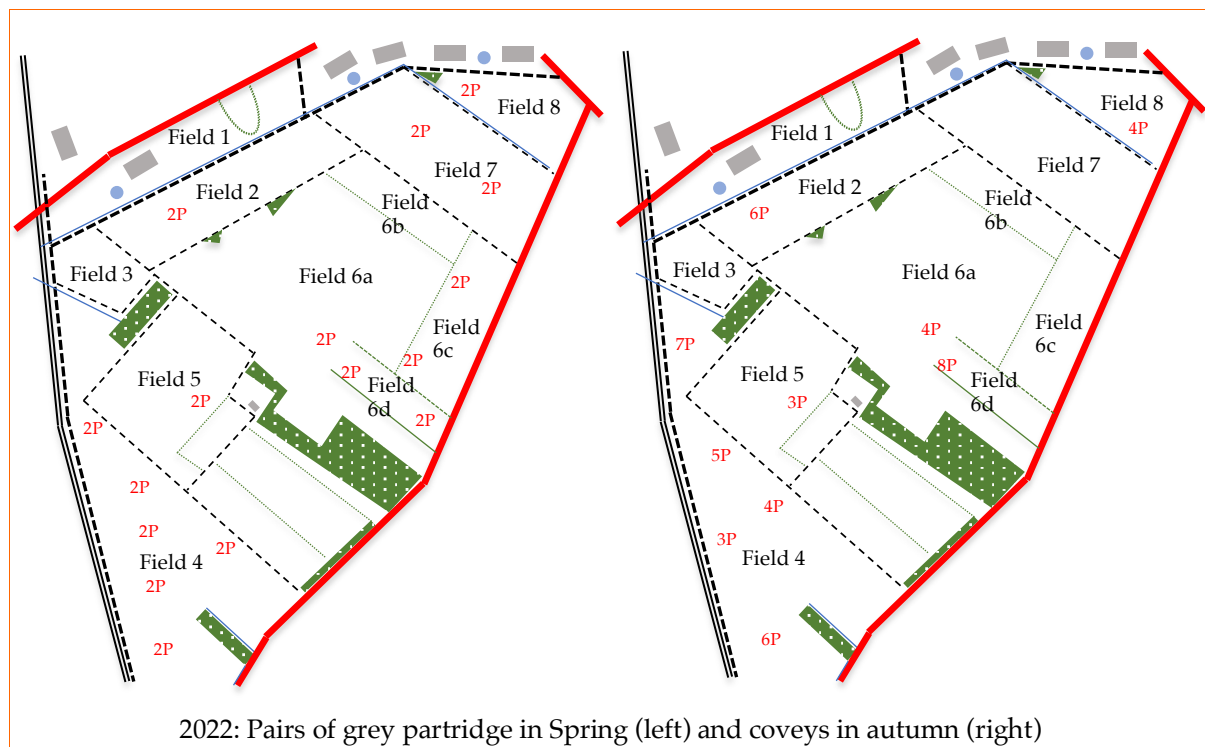
Grey partridge

Grey partridge spring pairs (16) were typical of other years, but c50 autumn birds was fewer than normal, though similar to the autumn of 2018, when there were also reduced numbers and smaller coveys. In both years there have been similar problems elsewhere in the country, possibly caused by a shortage of chick food resulting from exceptionally dry summers.



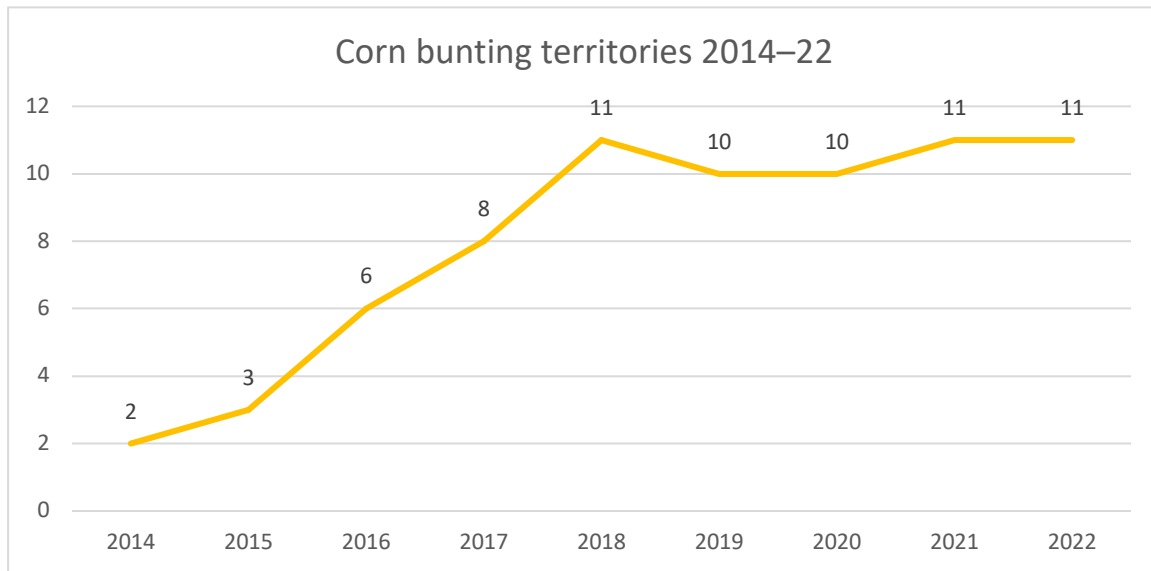
Nonetheless these counts are high: other studies suggest that the arable farms typical of Cambridgeshire support between 0–5 pairs/km² in spring and 0–20 birds/km² in the autumn. Only with high levels of management aimed at the species do numbers approach those at Nine Wells – the GWCT’s Grey Partridge Demonstration Project near Royston has around 15 pairs/km², while autumn densities increased from 8 birds/km² to around 80 birds/km² (8).

Field 4 has proved a centre of the 2022 population with 5 pairs and half the autumn groups.



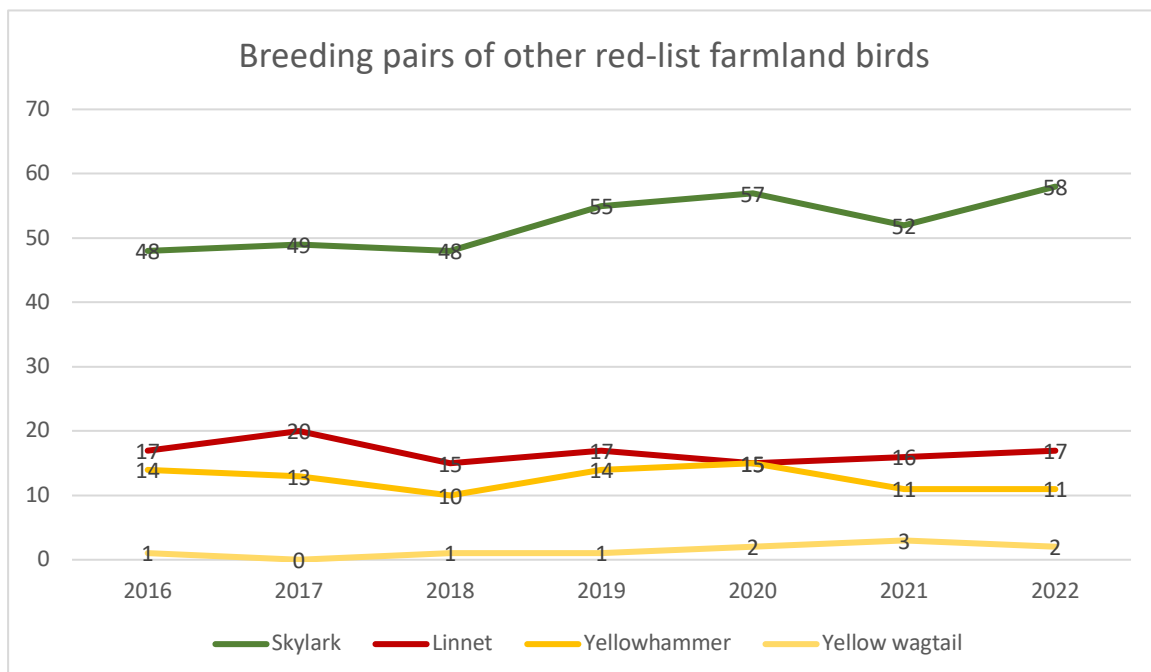
Corn bunting 2014–21

2022 was another excellent year for **corn bunting** with 11 singing males, the same as last year. Flocks of up to 25 birds in the early autumn suggested that breeding had been successful. The number of birds recorded in this study is important; there are now only 11,000 corn bunting territories in the UK and despite the fact that East Anglia is now one of their main remaining areas, a recent survey of populations found a very patchy distribution of singing males across Cambridgeshire (9). The species' recent extinction in Ireland risks being repeated in large parts of Britain if breeding sites like this are not protected.

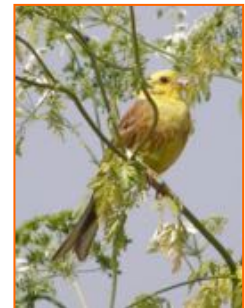


Other red-list farmland indicator species

Four other red-listed species have also been a key focus of my study, and this graph shows their breeding populations over recent years:



- **Skylark** populations (right), with around 58 breeding pairs, had another good year. I base estimates of skylark numbers on singing males observed (greatest on May 6th). This population density is higher than the mean recorded for similar crops in the BTO's skylark survey (10). Winter counts regularly numbered some 80 birds, attracting a merlin on November 10th.
- I estimated the **linnet** population (right) at 17 pairs; linnets tend to nest more communally than other species (11) so populations are harder to estimate than species with distinct territories; on April 13th I recorded 35 birds. Winter flocks included 50+ birds on October 3rd.
- **Yellowhammer** populations (right), at around 11 breeding pairs, were similar to last year, and compare well with populations found by Bradbury et al (12). Densities were highest in the hedge along Granhams Road and the ditch along the cycle path. Winter flocks were frequent, with 30+ birds regularly during October and even 40+ in December.
- Two pairs of **yellow wagtail** (below) also bred, in or near to Field 7. In recent years 2–3 pairs have bred consistently. This species is now classified as 'near threatened' in the UK, with just 20,000 breeding pairs.
- **Greenfinch** were moved to the red list this year, following a decline of 68% in the years 2008-2018, largely as a result of the trichomonas parasite. However, they have recovered well in my study area. In 2012, I recorded a single pair. By 2016 I recorded 4 pairs, and this year at least 6 pairs bred.
- At least 5 pairs of **starlings** bred, and increase over previous years; flocks of up to 400 were present in the winter.
- A **lapwing** pair displayed several times in March, and were joined by a second pair on the 14th, and while they did not breed this does raise hopes that they may breed in the future.



All the other farmland bird indicator species were present:

- Whitethroat (right) with 14 breeding pairs, were slightly down on the 18 in 2021. Densities were highest along the hedges around Nine Wells and in the hedges along Granham's Road. The most birds on one occasion was 8, on May 12th.
- Two–three pairs of stock dove bred.
- Reed bunting (right) populations (4 pairs) were one down on 2021.
- Kestrel and rooks breed nearby and visit regularly.



Goldfinch, jackdaws and wood pigeon all bred.

Other species

Other notable bird records included:

- I only recorded a single chaffinch, on November 10th. This is concerning – in the early years of my study I regularly recorded 5 or 6 singing males on my transects with an estimated 6 breeding pairs, and I regularly recorded flocks in the winter. However numbers have declined sharply in the last 2-3 years and none bred this year. This reflects a national decline in the species – 27% in the years 2008-2018 – which may also be a result of the spread of the trichomonas parasite. For the first time this year I had no records of bullfinch, a species that used to breed here.
- I recorded three male reed warblers singing. As in 2021 a pair bred in the bushes along Hobson's Brook and it is probable that a second pair also bred this year – quite unusual for a species which normally prefers extensive reedbeds.
- Visits from red kite have increased considerably over recent years, and this year I recorded between 1 and 3 birds on 60% of my visits. Increasingly birds have started to rest in the wooded areas, raising hopes that they may one day breed – remarkable for a species that became extinct in England in 1871 and did not breed again until reintroduced in 1989.
- December 5th saw the start of a very cold fortnight: temperatures rarely rose above zero, and fell below -10°C early in the morning of the 15th; 10+cm of snow fell in the night of the 11th and stayed until the 19th. The lake in Hobson's Park froze over, but the springs in Nine Wells continued to flow, and several water birds sought refuge here. These included up to five snipe, 2 teal, grey heron and little egret, while a group of five barnacle goose fed among the snow-covered stubble. I also recorded a lesser redpoll.

I continue to record other, non-bird, species:

- **Mammals:** I continue to record water vole in Hobson's Brook – important as water vole numbers in Britain have fallen disastrously. Up to 20 brown hare, principally in Fields 4 and 6, represent a good population of another declining species (13). I recorded my first common shrew on May 12th and otter spraint on September 7th, bringing the total number of mammals recorded over the course of the study to 20.
- **Invertebrates:** The warm autumn weather meant I recorded several butterflies and dragonflies well into November. Across the summer I recorded 22 butterfly species – these include colonies of brown argus, small copper, common blue and small heath butterflies. The small heath is now a priority species because of the decline in its population. I also recorded 10 species of dragonfly and damselfly. The site supports good populations of other invertebrates including moths, grasshoppers, crickets, beetles, flies, ants, bees and wasps.
- **Flora:** I have recorded over 40 trees and shrubs and well over 100 species of flowering plants. The area has 10 (2.5km) of mature hedgerows with thick growth and good variety including the rare black poplar (right) and extensive grassy and flower-rich margins.



Discussion

In *A haven for farmland birds* I argue that ‘three key factors that contribute to the success of the farmland birds and other wildlife in the fields around Nine Wells:

- ‘Firstly, the geology of the site – the combination of the low chalk hill of White Hill with the flatter surrounding fields – provides an important foundation. Above all, this produces the springs that are a vital source of water and essential for the populations of water voles, dragonflies and other aquatic plants and animals.
- ‘Secondly, the variety of habitats – copses, hedgerows, ditches, ponds and grassy and flower-rich margins – provide an important complement to the arable fields. They offer food, shelter and nesting habitat for the endangered farmland birds and brown hares, and they also help to explain the richness of the overall flora and fauna across the site.
- ‘Thirdly, the management of the land – the restrained use of pesticides, the approaches to cultivation, the attention to spring chick food and winter bird food – all help to create space for nature.’

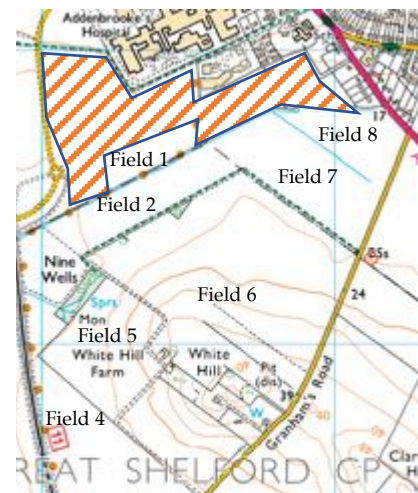
For grey partridge, the mosaic of habitats helps provide their three key requirements. Grassy, raised hedge bottoms, notably between Fields 4 and 5 and on the slope of Field 6, provide good nesting sites. Food for chicks in the form of invertebrates live in the field margins and on arable weeds. Autumn stubbles provide winter food for the coveys, while since 2020 a cover crop in one part of Field 6 have helped contribute to high survival rates (as well as meadow pipits, larks and finches).

By contrast, the land on the other side of Granham’s Road comprises larger fields and fewer hedges and margins, and while partridge occasionally feed there they are unlikely to breed.

The impact of development

Since I began my study of the area there have been some important changes – principally the expansion of the Biomedical Campus and the Nine Wells housing. The map on the right shows in orange shading the area of land that has been developed over the ten years. I have compensated for this by extending my study area by an equivalent amount into more southern areas of Fields 4, 5 and 6 to maintain an area of around 1km².

The shaded area no longer provides suitable habitat for farmland birds, and I no longer record any of the red list farmland species there. This year more of Field 1 has been lost.



This has had a significant impact on grey partridge. In 2017 I recorded 11 pairs in Field 1 and the nearby shaded field, still undeveloped at the time. I recorded no partridge there this year, and indeed only one pair and one small covey in Field 2. The partridges have become concentrated in the other fields, where changes in land management – notably an area of winter bird food near the top of Field 6 – have been positive.

The impact of development is not all negative: corn bunting, yellowhammer and linnet have used the young trees that line the ditch beside Field 2 as song posts. Grassland on the southern slope of the road bridge now supports small colonies of brown argus and small copper (as well as common blue and small heath) butterflies. New pond areas are also used as breeding sites by dragonflies.

What little remains of Field 1, and all of Field 2 are scheduled for development, while Fields 7 and 8 have been recommended for development by the local councils in the next local plan. Such development would remove the last breeding sites of yellow wagtail, halve the number of corn bunting and reduce breeding sites for grey partridge and other red list birds.

The problem is where wildlife can go if good existing habitat is lost. The square kilometre of land on the other side of Granham's Road comprises just three fields, far less margin habitat and two hedges, one of which is in a poor state with large gaps. The land does support skylark, but is less welcoming to the other red list species. Should further fields be lost, it will be essential to improve habitat here to provide a refuge for displaced wildlife.

Conclusions

The data I have gathered over the last eleven years provide a picture of an area of green belt arable land on the outskirts of the city of Cambridge that supports important breeding populations of threatened farmland birds and other wildlife.

- 1 Over the period of my study the site has supported exceptional populations of grey partridge and corn bunting (species that have declined by around 90% since 1970) and the site may well be among the best in Cambridgeshire for both species.
- 2 Other red list farmland species also thrive in the area, notably yellow wagtail, linnet, skylark and yellowhammer. The area also supports good populations of water vole and brown hare, as well as plants and invertebrates.
- 3 Habitat variety and land management contribute to the richness of the area. The combination of arable crops with grassy hedgerow bottoms and margins benefit grey partridge, skylark, corn bunting and yellow wagtail; the ditches benefit yellowhammer and reed bunting, as well as water vole.
- 4 Development and infrastructure work has resulted in lost farmland habitat and some habitat fragmentation. This has led to a concentration of birds in the relatively undisturbed areas.
- 5 Proposed further construction and infrastructure development would place real pressure on populations. If this were to go ahead, considerable, and urgent, new habitat creation would be needed in adjoining fields to provide a refuge for displaced wildlife.

John Meed, January 2023

John Meed is a researcher, writer and musician who lives in south Cambridge. His book *A haven for farmland birds* provides much more detail about the ecology, behaviour and social lives of the birds he has studied in this area. See: johnmeed.net/ecology

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- 2 HMSO (2005) *Securing the Future: Delivering UK Sustainable Development Strategy*, London, The Stationery Office
- 3 Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. 2021. The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *British Birds* 114: 723-747.
- 4 Hayhow, D.B., Eaton, M.A., Stanbury, A.J., Burns, F., Kirby, W.B., Bailey, N., Beckmann, B., Bedford, J., Boersch-supan, P., Coomber, F., Dennis, E., Dolman, S., Dunn, E., Hall, J., Harrower, C., Hatfield, J., Hawley, J., Haysom, K., Hughes, J., Johns, D., Mathews, F., McQuatters-Gollop, A. Noble, D., O'Brien, D., Outhwaite, C., Parry, M., Pearce-Higgins, J., Prescott, O., Powney, G., Symes, N., Weighell, T. and Williams, J. (2019) *The State of Nature 2019*. The State of Nature partnership.
- 5 BTO/JNCC/RSPB (2018) *Breeding Bird Survey Instructions*
- 6 RSPB (2012) *RSPB Volunteer and Farmer Alliance Training Manual*
- 7 Meed, J (2022) *A haven for farmland birds*. See johnmeed.net/ecology
- 8 Aebischer, N J and Ewald, J A (2012) The grey partridge in the UK: population status, research, policy and prospects. *Animal Biodiversity and Conservation*, 35.2: 353–362. (Other comparisons: the largest UK partridge study, the Sussex Study, recorded under 2 pairs /km² with typically 5 birds /km² in the autumn. Major changes in management – including game keeping and predator control – on one area of the Sussex Study led to autumn densities of 64 birds /km² by 2008 with around 20 breeding pairs /km² by 2014. The RSPB's *Hope Farm Annual Review 2019*, describes how on their farm also near Cambridge, there were no grey partridge prior to management. Following management changes the population rose to 3 pairs in 2019.)
- 9 Bedfordshire Bird Club, Cambridgeshire Bird Club and Herts Bird Club (2014) *Three counties breeding corn bunting survey*, cornbunting.birdsurvey.org.uk
- 10 Browne, S, Vickery, J and Chamberlain, D (2000) Densities and population estimates of breeding skylarks *Alauda arvensis* in Britain in 1997, *Bird Study* 47, 52-56
- 11 Moorcroft, D and Wilson, J (2000) The ecology of linnets *Carduelis cannabina* on lowland farmland, in Aebischer, N J et al, *Ecology and conservation of lowland farmland birds*, British Ornithologists' Union, pp 173–181. The RSPB's Hope Farm density rose from 3 pairs to 19 pairs after management.
- 12 Bradbury, R et al (2000) Habitat associations and breeding success of yellowhammers in lowland farmland, *Journal of Applied Ecology*, 37, 789-805 (The density of breeding yellowhammers varied between 0.5 and 3 pairs per km of hedgerow, and two thirds of hedges surveyed in 1997 held fewer than 2 pairs per km. The RSPB's Hope Farm density rose from 14 pairs to 27 pairs after management).
- 13 Hutchings, M.R. and Harris, S., (1996), *The current status of the brown hare (Lepus europaeus) in Britain* recorded a mean density of 7.12 hares /km² on arable land

Appendix 1: The area covered



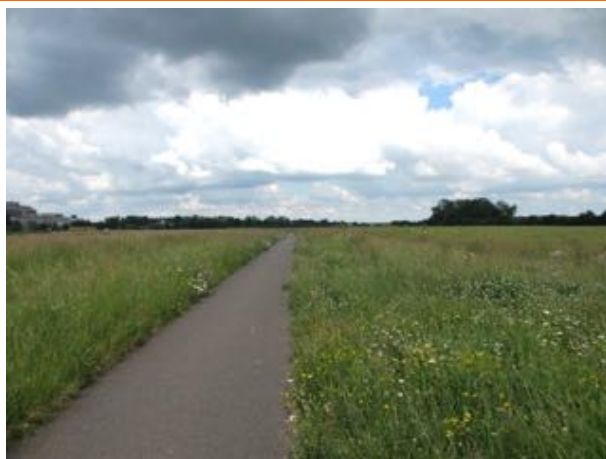
Looking towards White Hill



The Nine Wells LNR from White Hill



Mature hedge and copse



Cycle path and flower-rich margin



Grey partridge on Field 4, winter 2022



Yellowhammer on Field 4/5 hedge, 2020

Appendix 2: Species recorded (2012–22)

This list shows the 96 bird species recorded over the last 11 years: **22 red list** birds, **31 amber list** birds, and **43 green list** species. The numbers show the number of breeding pairs / territories (except n/c where not counted); (S) denotes summer visitor, (W) winter visitor, (P) passage migrant and *italic* = not recorded in 2022.

Species		Species		Species		Species	
Barnacle goose	W	Goldcrest	1	Linnet	17	Sand martin	P
Blackbird	c12	Golden plover	W	Little egret	W	Sedge warbler	P
Blackcap	8 (S)	Goldfinch	c5	Long-tailed tit	c5	Siskin	W
Black-headed gull		Great black-back gull	W	Magpie	c7	Skylark	58
Blue tit	c10	Gt spot woodpecker	2	Mallard	3	Snipe	W
Bullfinch	?	Great tit	c10	Marsh harrier		Song thrush	3
Buzzard	1	Green woodpecker	2	Meadow pipit	W	Sparrowhawk	
Canada goose	W	Greenfinch	6	Merlin	W	Starling	c5
Carrion crow	n/c	Grey heron		Mistle thrush	1	Stock dove	3
Chaffinch	W	Greylag goose		Moorhen	3	Stonechat	W
Chiffchaff	7 (S)	Grey partridge	16	Mute swan		Swallow	c3
Coal tit	1	Herring gull	W	Peregrine		Swift	S
Collared dove	?	Hobby	P	Pheasant	3	Tawny owl	?
Common gull	W	House martin	12+	Pied wagtail	2	Teal	W
Common tern	S	House sparrow		Raven		Tree pipit	P
Cormorant		Jack snipe		Red kite		Turtle dove	P
Corn bunting	11	Jackdaw	n/c	Red-legged partridge	n/c	Wheatear	P
Crane		Jay	2	Redstart	P	Whinchat	P
Cuckoo	S	Kestrel		Redwing	W	Whitethroat	14
Duncock	c20	Kingfisher	W	Reed bunting	4	Willow warbler	P
Egyptian goose		Lapwing		Reed warbler	2	Wood pigeon	n/c
Feral pigeon	n/c	Lesser black-back gull	W	Ring ouzel	P	Wren	c15
Fieldfare	W	Lesser redpoll	W	Robin	c25	Yellow wagtail	2
Garden warbler	2 (S)	Lesser whitethroat	3	Rook		Yellowhammer	11

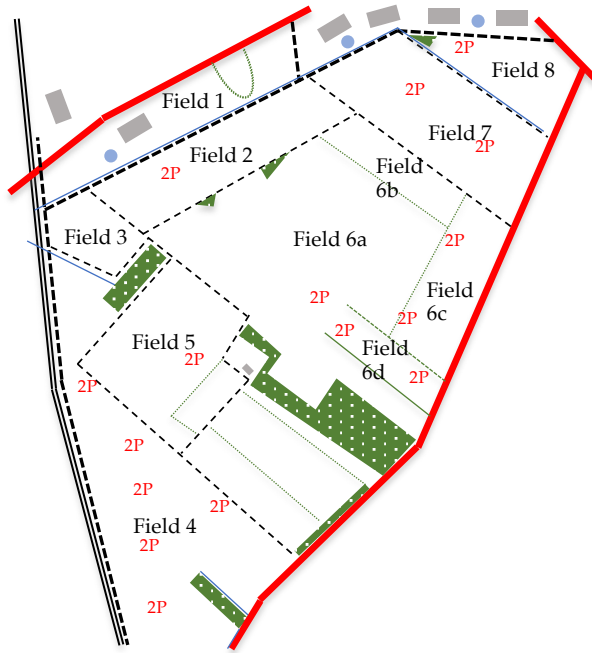
This table shows the 25 butterfly species and 14 dragonfly / damselfly species recorded:

Butterflies			
Brimstone	Green-veined white	Orange tip	Small skipper
Brown argus	Grizzled skipper	Painted lady	Small tortoiseshell
Clouded yellow	Holly blue	Peacock	Small white
Comma	Large skipper	Red admiral	Speckled wood
Common blue	Large white	Ringlet	
Essex skipper	Marbled white	Small copper	
Gatekeeper	Meadow brown	Small heath	
Dragonflies			
Azure damselfly	Brown hawker	Large red damselfly	Southern hawker
Banded demoiselle	Common darter	Migrant hawker	Willow emerald
Black-tailed skimmer	Emperor	Ruddy darter	
Broad-bodied chaser	Four-spotted chaser	Small red-eyed damselfly	

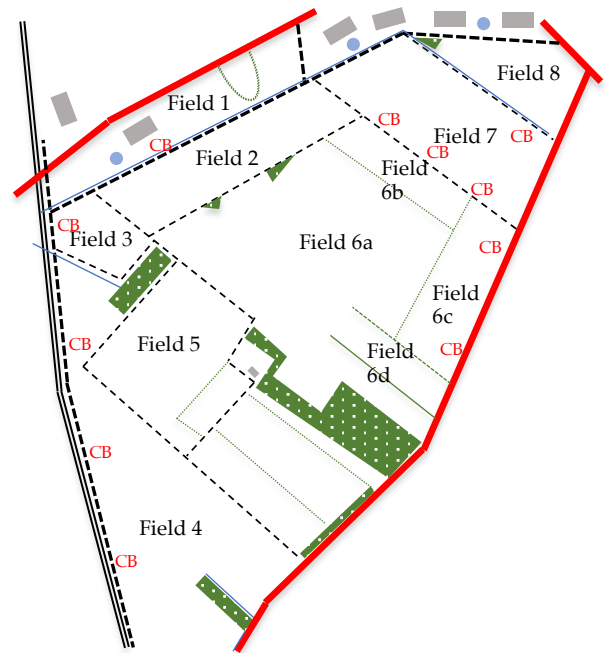
Appendix 3: Maps showing breeding pairs

These maps show estimated breeding pairs/territories in 2022 of six red-listed farmland bird indicator species breeding in the study area:

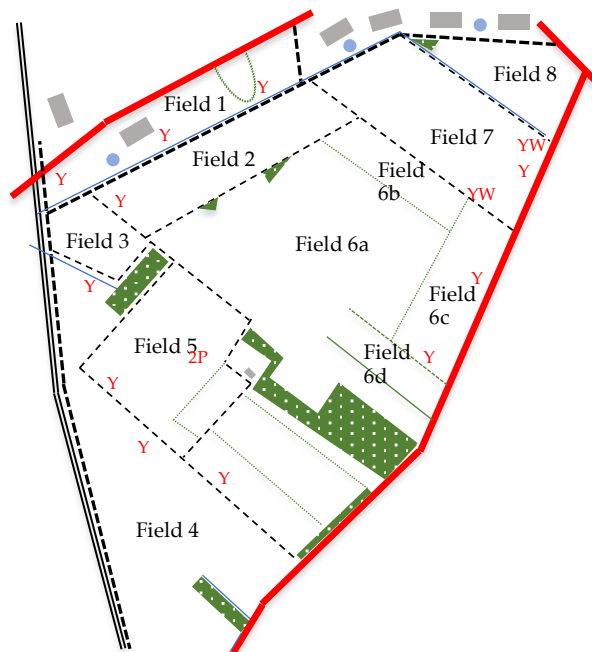
Grey partridge (P)



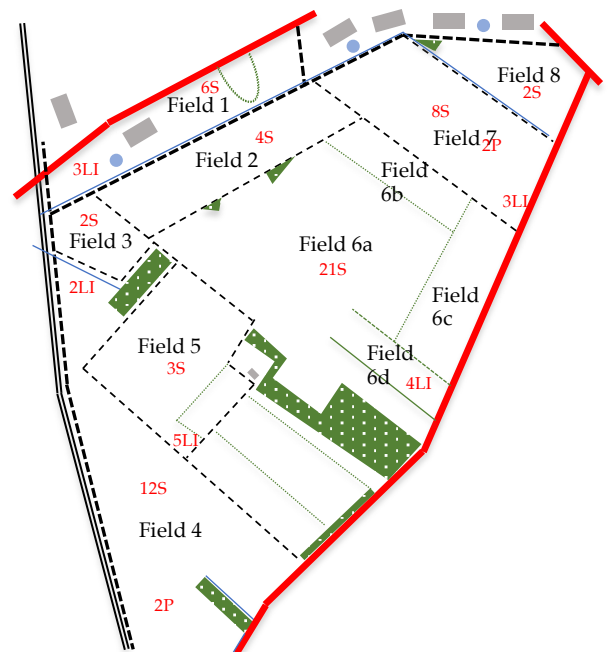
Corn bunting (CB)



Yellowhammer (Y), yellow wagtail (YW)



Linnet (LI) and skylark (S)



Appendix 4: Farmland bird indicator species

This table shows the 19 species on the UK Farmland Bird Indicator; the second column shows species which I recorded on the site in 2021; the third column shows species which bred on the site; and the final column shows the percentage change in their national populations for the period 1970-2018:

Species	Present?	Breeding?	Per cent change**
Turtle dove	(2019*)	–	-98%
Grey partridge	☒	☒	-93%
Tree sparrow	–	–	-90%
Corn bunting	☒	☒	-89%
Starling	☒	☒	-82%
Yellow wagtail	☒	☒	-68%
Lapwing	☒	–	-64%
Greenfinch	☒	☒	-64%
Yellowhammer	☒	☒	-60%
Skylark	☒	☒	-56%
Linnet	☒	☒	-56%
Kestrel	☒	–	-48%
Reed bunting	☒	☒	-28%
Whitethroat	☒	☒	-13%
Rook	☒	–	+5%
Woodpigeon	☒	☒	+121%
Stock dove	☒	☒	+127%
Jackdaw	☒	☒	+157%
Goldfinch	☒	☒	+197%

* A juvenile turtle dove passed through on migration in 2019.

** Source: Burns F, Eaton MA, Balmer DE, Banks A, Caldow R, Donelan JL, Douse A, Duigan C, Foster S, Frost T, Grice PV, Hall C, Hanmer HJ, Harris SJ, Johnstone I, Lindley P, McCulloch N, Noble DG, Risely K, Robinson RA, Wotton S (2020) *The state of the UK's birds 2020*. The RSPB, BTO, WWT, DAERA, JNCC, NatureScot, NE and NRW, Sandy, Bedfordshire