

The value of the green belt south of Cambridge to populations of farmland birds (2021)

Interim report of a ten-year survey

Please note – this interim report will be revised in early 2022

John Meed, November 2021

Introduction

For the last ten 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 1a). It is widely used by walkers, cyclists, families and dog owners.



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 10 of the 19 indicator species are 'red list' birds of 'high conservation concern' (3). Grey partridge may indeed be vulnerable to extinction in the UK.



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. I adopt the British Trust for Ornithology (BTO) 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 20, May 12 and June 6.

Between April and July I build up 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. I also visit the site regularly in the autumn and winter, monitoring winter visitors and in particular grey partridge populations. I carried out over visits during the year.

I also conduct surveys of butterflies and dragonflies, using the methodology of the UK Butterfly Monitoring Scheme.

Findings

Over the ten years I have recorded 93 bird species including 20 red list species and 28 amber list species. See Appendices 2 – 4.

In 2021 I recorded 80 species on the three transect walks and other visits:

- On the first transect walk: 29 species and 215 individuals
- On the second transect walk: 34 species and 224 individuals
- On the third transect walk: 33 species and 224 individuals



The 80 species recorded included 17 of the 19 farmland bird indicator species for the Sustainable Development Strategy, of which 14 bred (Appendix 5). In total I recorded 13 red list species and 21 amber list species as follows.

Breeding red list species (9)	Breeding amber list species (7-9)
<ul style="list-style-type: none"> • 52 pairs of skylarks • 18 pairs of grey partridge • 16 pairs of linnets • 11 pairs of corn buntings • 11 pairs of yellowhammers (above) • 5 pairs of song thrush • 3 pairs of yellow wagtails • 3 pairs of starlings • 2 pairs of mistle thrush 	<ul style="list-style-type: none"> • 20 pairs of dunnocks • 5 pairs of reed buntings • 3 pairs of stock dove and mallard • 2 pairs of green woodpeckers • Swallows have always nested; recently both they and house martins have nested in the bridge over the railway line • Possible tawny owl and bullfinch • Kestrels and swifts nest nearby and visit regularly

Red list visitors include resident lapwing; herring gull, fieldfare, merlin and redwing in winter; and ring ouzel and tree pipit on passage. In other years I have recorded one juvenile turtle dove (another indicator species) and house sparrow.

Amber list visitors include red kite, kingfisher, mute swan, marsh harrier, black-headed, common, great and lesser black-backed gull, willow warbler on passage and in winter golden plover, meadow pipit and little egret. In other years I have recorded redstart and snipe.

I will go on now to look 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.



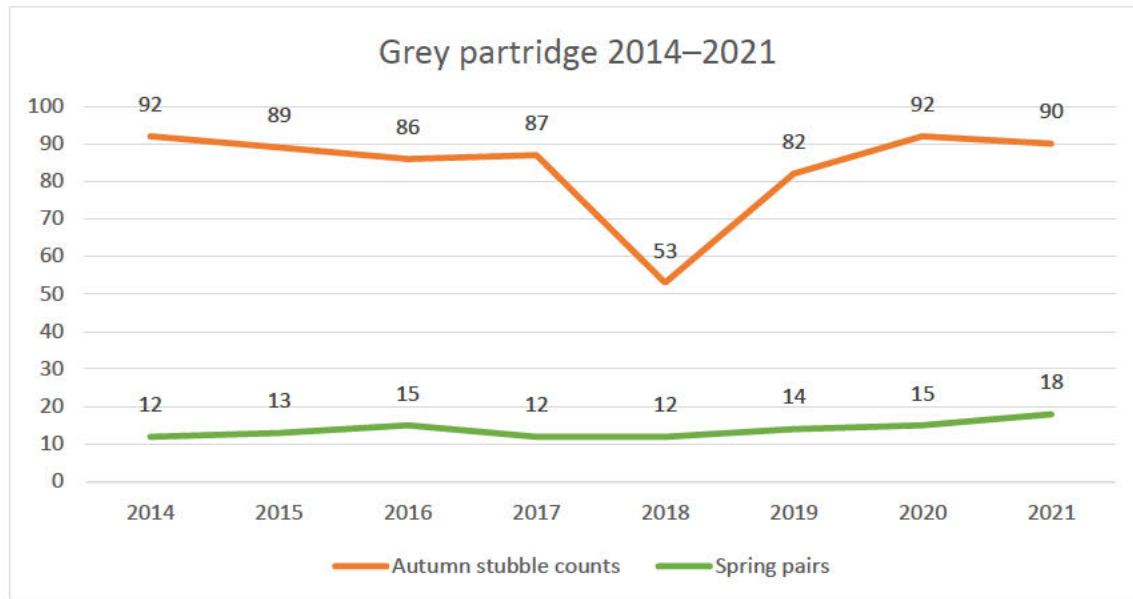
Grey partridge 2014–21

Grey partridge numbers have been remarkably high over the study.

- Between 2014 and 2021 autumn counts consistently revealed between 82 and 92 individuals, except in 2018.
- Pairs have varied between 12 and 18.



The following chart shows numbers for the last seven years.



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. For example, the GWCT’s Grey Partridge Demonstration Project near Royston saw the density of grey partridge pairs rise from under 3 pairs/km² before management to around 15 pairs/km², while autumn densities increased from 8 birds/km² to around 80 birds/km² (7).

Several factors help to explain the success of grey partridge here. Above all, the mosaic of habitats helps provide their three key requirements:

- Nesting and roosting habitat: the birds feed in open fields, but need suitable cover during the day in hedges and margins. Grassy, raised hedge bottoms, notably between Fields 4 and 5 and on the slope of Field 6 (see Figure 1), provide good nesting sites.
- Food for chicks – potential chick food in the form of invertebrates live in the field margins and in arable weeds.
- Winter food – autumn stubbles provide foraging for the coveys, while in 2020-21 a cover crop in one part of Field 6 helped contribute to high survival rates, with 39 birds present in around three hectares (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.

Autumn and winter coveys

Grey partridges have large broods and in the autumn families form groups known as 'coveys'. Numbers are at their highest in November and December, once youngsters have matured but before spring pairing starts. Most coveys range between 5 and 15 birds.

Generally speaking, the number of autumn coveys has reflected the number of spring pairs, suggesting that most pairs reared young successfully. Autumn 2018 was a significant exception, when 12 pairs produced just 8, generally smaller, coveys. More typically, in autumn 2020 15 pairs produced at least 12 coveys.



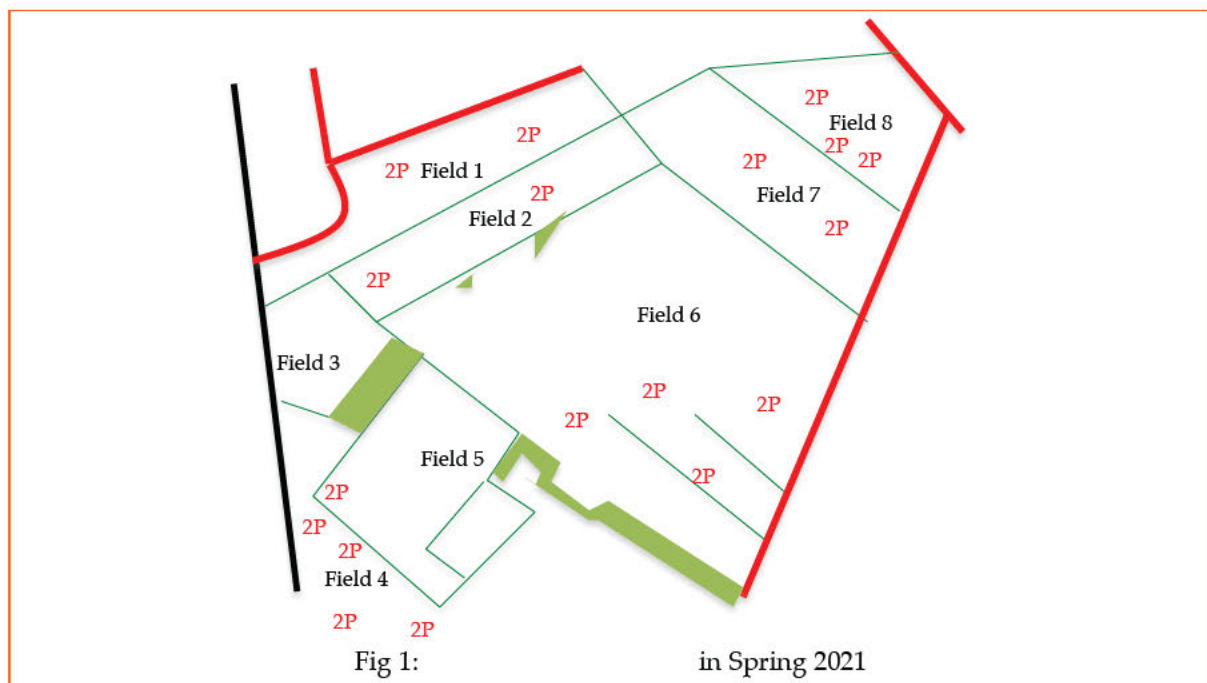
- Coveys show a distinct preference for stubbles over freshly ploughed land and in 2019 all coveys remained in Fields 3, 4, 5 and 6 which retained stubble throughout the autumn; in autumn 2016 four coveys were regularly present in Field 2 but moved to Field 1 after ploughing. Later they seem more comfortable where winter wheat is starting to grow.
- Coveys often feed in the early morning and before dusk, probably to avoid predation. They roost in areas of longer grass, hedge bottoms or patchy scrub. They generally avoid woodland and I have rarely recorded them near to the wood at the top of White Hill. When feeding one or two birds keep watch for predators while the rest of the covey eats.
- These two factors – cropping and access to cover – have a major influence over where coveys spend their autumn. In late 2021 there were four coveys in Fields 7 and 8 which were lightly cultivated so that some food was always available. In 2019 the Field 4 stubble was direct drilled without ploughing and held five coveys of 34 birds which also used Field 5, roosting along the hedge bottom between the two fields. Field 6 had five coveys of 40 birds on stubble in 2019, but only two coveys in 2014 and 2016 when ploughed.
- Generally speaking, coveys move relatively little between fields. However, this does vary: while a group of 15 in Field 4 in 2020/21 stayed in a small area, groups of 5 and 11 ranged more widely across the field and spent time in Field 5. A group of 10 at the top of Field 6 ventured further away from their cover than other groups.
- Covey feeding times also vary. In 2020/21, the group of 7 in Field 2 emerged in the hour or so before dark, while the group of 11 in Field 4 often emerged earlier and were more often out in the morning.
- There can be interaction between coveys – normally calling, but sometimes two coveys move closer together and may even intermingle. I have not witnessed aggression between coveys, though within a covey there are occasional disputes.

The autumn coveys appear to suffer relatively little loss from predators.

Spring pairs

Pairs begin to form in the new year, and may be starting slightly earlier now than when I began my survey. Pairing can vary from field to field: in 2017 the partridge in Field 6 were paired on January 18th, whereas those in Field 4 paired a week later.

Initial pairing is often concentrated in specific fields – in early 2021 this was true of a small area of In 2016 (prior to development) there were 12 pairs (out of 15) in . Following pairing, the pairs disperse more widely across the area. Figure 1 shows the in Spring 2021.



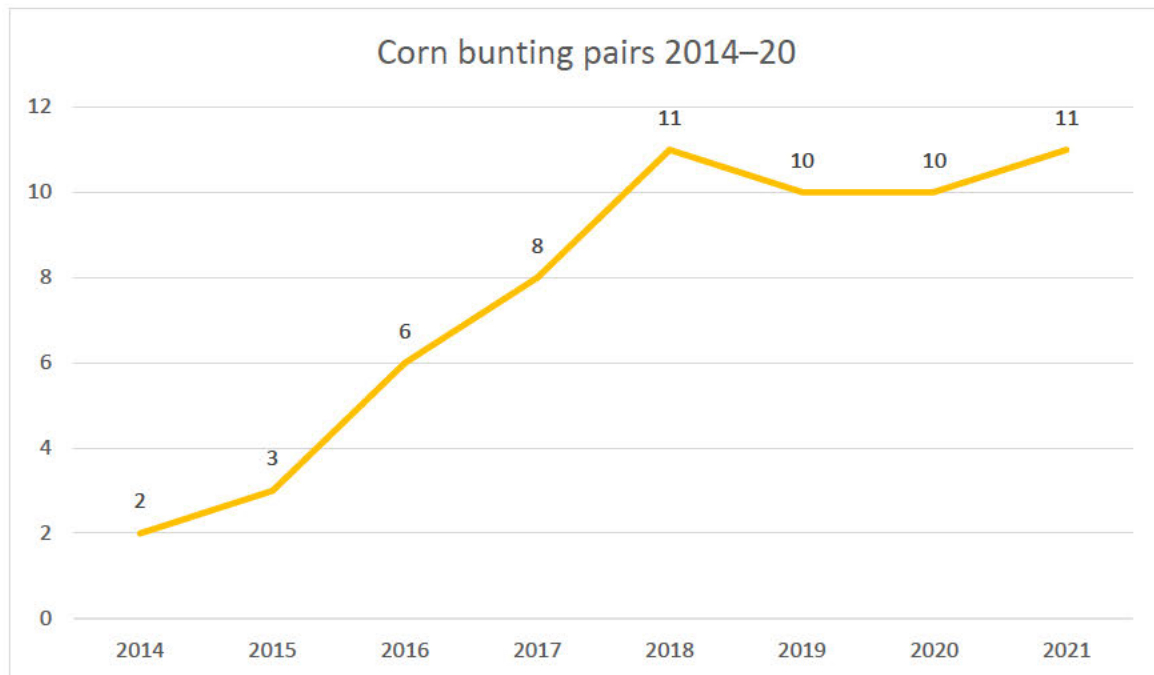
- Partridge behaviour changes during pairing. In the process of seeking a mate birds would call repeatedly – one bird calling could spark off others – and display their breast patches much more obviously. Birds will run and on occasion chase each other, which can end in flying to another spot.
- Paired birds resume their normal placid behaviour, even if the above activity carries on in the same field, though they sometimes call. Interaction between pairs, even when close together, is also usually calm, with occasional breast patch display. As the spring develops and crop cover increases the pairs become increasingly discrete.
- However some unpaired male birds remain (most noticeably in 2018). Unpaired males call and display their breast patch more than those in pairs.

In 2021 most pairs in reared a family. However of the four pairs in I have so far seen only one group of four youngsters. As the autumn progresses, I hope to become clearer about what may be happening here, and why.

For more detail on what I have learnt about grey partridge behaviour, see my forthcoming book *A haven for farmland birds*.

Corn bunting 2014–21

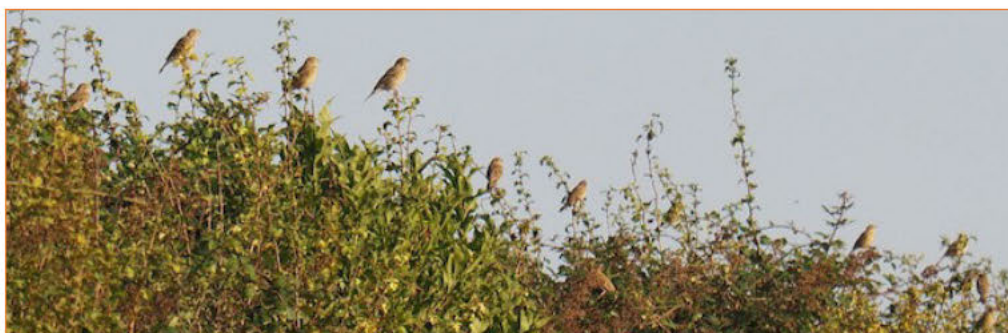
2021 was another excellent year for **corn bunting** with 11 singing males.



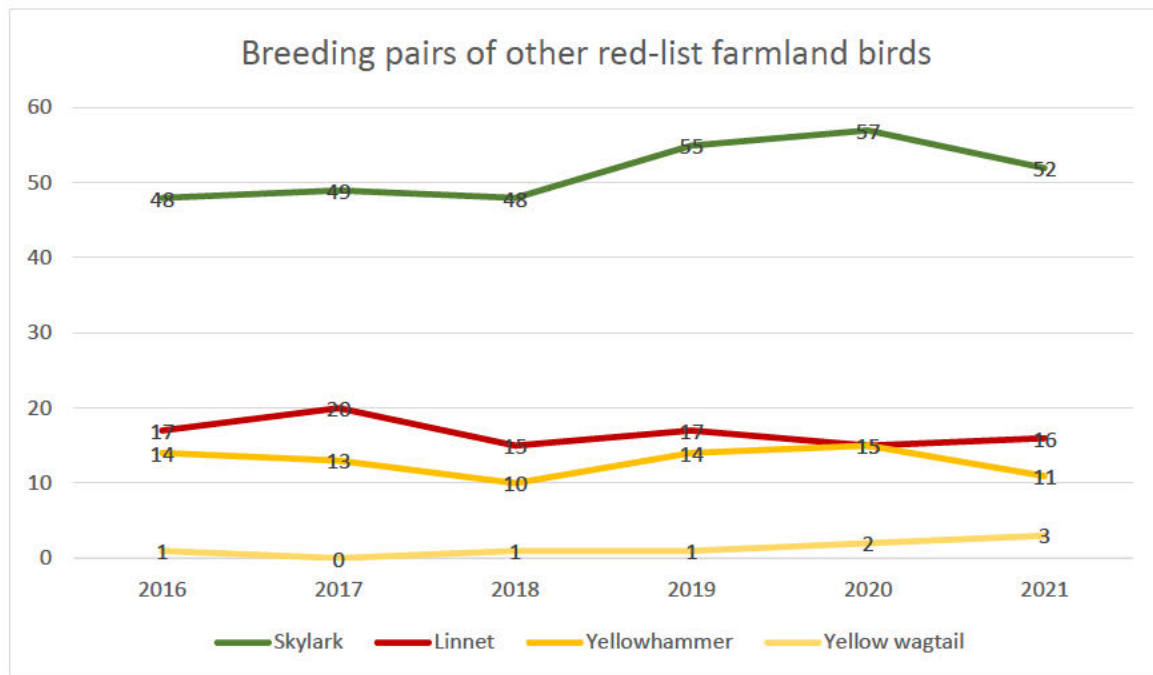
Corn bunting populations in the UK declined by 89% between 1970 and 2015, and their breeding range has contracted by 56% over the same period. There are now only 11,000 birds in the UK and the BTO's 2019 Breeding Birds Survey recorded corn buntings in just 148 of the 4,005 squares surveyed. The species' recent extinction in Ireland risks being repeated in large parts of Britain if its breeding sites are not protected. A recent survey of populations across Cambridgeshire found singing males in only just over half the tetrads surveyed, and in only two tetrads did they approach the population density of the area I survey (9).

So, the number of birds recorded in this study is important. This importance increases when added to the population across the railway line in _____ – the 2018 Bioblitz there recorded 8 singing males.

I have also recorded some interesting behaviour – which could only be observed because of the good numbers of populations. In May 2018 I twice recorded gatherings of over 10 corn buntings on the corner of the hedge between _____ – too late to be a winter flock, and too early to be a family group. In Autumn 2020 I observed gatherings of 25+ birds on August 2nd and 21 (below left in the _____) on September 21st. In October 2021 I recorded some 15 birds in _____ at least three of which were singing.



Other red-list farmland birds

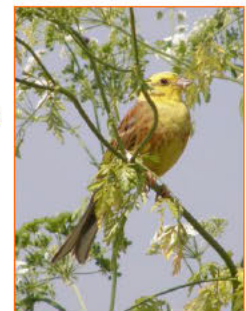


- **Skylark** populations (right), with around 52 breeding pairs, had another good year. I base estimates of skylark numbers on singing males observed (greatest on May 30th). This population density is higher than the mean recorded for similar crops in the BTO's skylark survey (10). Winter flocks regularly numbered over 80 birds.



- I estimated the **linnet** population at 16 pairs; linnets are less territorial and more communal than some other species (11) so this estimate is based on the number of regularly used song posts; from April onwards I regularly recorded 20-30 birds. Winter flocks were also present, with 80+ birds on September 16th.

- **Yellowhammer** populations, at around 11 breeding pairs, were lower than the 15 recorded last year, but still compares well with populations found by Bradbury et al (12). Densities were highest in the _____ and _____. Birds were also present in winter, with 40+ birds on February 16th.



- Three pairs of **yellow wagtail** (below) also bred, in or near to _____. Both 2020 and 2021 have been their best breeding seasons for several years.

At least two pairs of **starlings** bred; flocks of over 50 were present in the autumn. Five pairs of **song thrush** and two pairs of **mistle thrush** bred. In late spring 2021 a **ring ouzel** spent three days in Field 3, and **tree pipit** also visited in spring and **whinchat** on autumn passage.

In 2019 a **cuckoo** laid eggs in the _____ and a young **turtle dove** visited in autumn.



Other farmland bird indicator species

All the amber list farmland bird indicator species are present:

- Around 20 pairs of **duncock** bred.
- **Reed bunting** (right) populations (5 pairs) were similar to 2020. At least three pairs of **stock dove** also bred.
- **Kestrel** breed nearby and visit regularly.



The green list indicator species are all present. **Whitethroat** populations, with 18 breeding pairs, were slightly down on the 21 in 2020, but higher than the 14 in 2018. Densities were highest along the _____ and in the _____. The most birds on one occasion was 11, on May 12th.

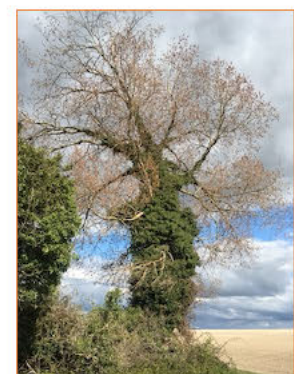
Other amber list breeding species include **green woodpecker**, **mallard** and **swallow** and in some years **tawny owl** and **bullfinch**. In winter the site provided habitat for **meadow pipit** (over 20 regularly present in late 2021) and **little egret**, **black-headed**, **common**, **great** and **lesser black-backed gull** also visit to feed and **common tern** fly over in summer, sometimes carrying food. A **willow warbler** visited on autumn passage.

Lesser whitethroat and **buzzard** also breed while pairs of **stonechat** spent the winters of 2017/18 and 2020/21 on the site. In 2021 a pair of **reed warblers** bred in the _____.



Habitat survey and plant species

The habitat survey showed 10 (2.5km) mature, species rich hedgerows with thick growth and good variety; extensive grassy and flower-rich margins; 2 important watercourses (1km) and 3 ponds; and 4+ha of scrub and woodland including the Nine Wells nature reserve. I have recorded over 40 trees and shrubs, most of which are native species. The hedge between Fields 2 and 6 is home to several willows and the rare and imposing black poplar (right).



I have also recorded well over 100 species of flowering plants, including threatened arable flowers such as knapweed, fumitory, mallow, poppy, speedwell and viper's bugloss. A 2017 survey (14) recorded 45 species of flowering plant in the Nine Wells nature reserve alone, as well as 12 trees/shrubs, 9 mosses and 7 grasses.

Mammals

Mammals include good numbers of **water vole** – important as water vole numbers in Britain have fallen disastrously; and regular spring counts of 20+ **brown hare** – Hutchings and Harris (13) recorded 7.12 hares/km² on arable land.

Other mammals include muntjac and roe deer, badger, fox, stoat, weasel, rabbit, mole, field and bank vole, and wood mouse, as well as common pipistrelle, soprano pipistrelle and noctule bats (14).



Invertebrates

In 2019 I began formally surveying butterflies and have so far recorded 25 species across the site (see Appendix 2). In 2020 I found 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.

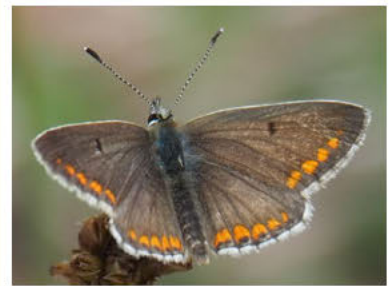
In late August 2021 I recorded a clouded yellow on three occasions – the first time I have seen this stunning species. This butterfly does not have a permanently resident population this far north, so individuals are either migrants or their immediate offspring. The area has a good amount of clover, their favourite egg-laying plant, so it is possible that this was a male patrolling a good breeding spot in the hope that female might pass through.



Small copper



Common blue



Brown argus

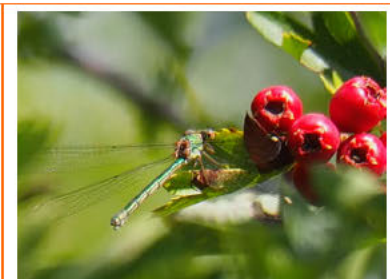
I also extended my survey to include dragonflies and damselflies and have so far recorded 14 species breeding in the area, including the willow emerald (around Nine Wells LNR) and small red-eyed damselfly (in one of the new ponds) which are very recent UK species.



Banded demoiselle



Migrant hawker

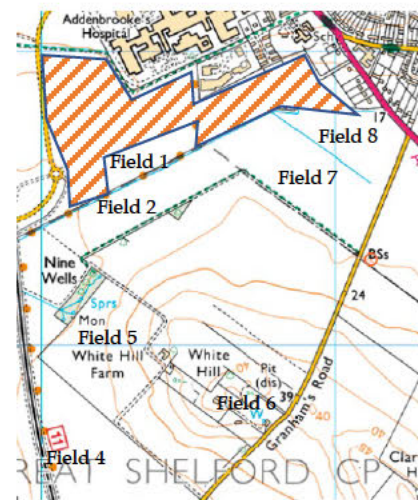


Willow emerald

The site supports good populations of other invertebrates including grasshoppers, crickets, beetles, ants, bees and wasps. A moth trap in June 2017 recorded 30 species of moth (14).

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, but also the Nine Wells housing development and infrastructure projects. The map on the left shows in orange shading the area of land that has been developed over the nine years. I have compensated for this by extending my study area to the south by an equivalent amount to maintain an area of around 1km², principally into Fields 4 and 5 and the far south of Field 6.



The shaded area no longer provides suitable habitat for farmland birds, and I no longer record any of the red list farmland species there. The impact on the wider area has been more complex.

So far, the loss of habitat does not appear to have led to a significant reduction in numbers of farmland birds across the whole site. Corn bunting, yellowhammer and linnet continue to use

as song posts. Grassland on the of the now supports small colonies of brown argus and small copper (as well as common blue and small heath) butterflies. are also used as breeding sites by dragonflies.

By contrast, while grey partridge had a good year across the site as a whole, I have concerns that what remains of may be becoming less hospitable for them. This has led to a concentration of grey partridge in We will need to wait to assess what the longer-term impact may be, especially as what remains of and the whole of are scheduled for development.

Other parts of the site also face potential threats. and have been recommended for development by the local councils in their next local plan. Such development would remove the last breeding sites of yellow wagtail, halve the population of corn bunting and reduce breeding sites for grey partridge and the other red list birds. And the south east guided busway is currently proposed to run through risking further disruption and habitat fragmentation.



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, two hedges, one of which is in a poor state with large gaps, and far less margin habitat. The land does support , but is less welcoming to the other red list species.

Conclusions

The data I have gathered over the last ten 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, as well as mammals, plants, butterflies and other invertebrates.

- 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, while hedges are well used by linnet, yellowhammer, whitethroat and dunnock, and by grey partridge for cover. In particular, hedges which are around 2 metres high with slightly raised bottoms (such as that between) provide excellent nesting habitat for grey partridge in particular and must be conserved.
- 4 Development and infrastructure work has resulted in lost farmland habitat and some habitat fragmentation. This has not yet reduced significantly populations of red list birds, but may well have led to a concentration of birds in the relatively undisturbed areas, and I will continue to assess the longer-term impact.
- 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.
- 6 The area provides an important green space and area for walking, cycling and relaxation for local residents who are clearly able to co-exist with nature; the land also forms part of the area covered by the local councils' *Strategic Green Infrastructure Initiative 3*.

John Meed, November 2021

John Meed is a researcher, writer and musician who lives in south Cambridge. He conducts regular surveys on behalf of the BTO and RSPB. His forthcoming 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: <http://johnmeed.net/john-meed/nine-wells/>

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- 5 BTO/JNCC/RSPB (2018) *Breeding Bird Survey Instructions*
- 6 RSPB (2012) *RSPB Volunteer and Farmer Alliance Training Manual*
- 7 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.)
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Appendix 1: The area covered



Looking towards White Hill



The Nine Wells LNR from White Hill



Mature hedge and permissive path



Cycle path and flower-rich margin



Grey partridge , autumn 2020



Yellowhammer on hedge, 2020

Appendix 2: Species recorded (2012–21)

This list shows the 93 bird species recorded over the last 10 years, organised in order of 20 red list birds, 27 amber list birds, and 46 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 2021.

Species		Species		Species		Species	
Black-headed gull		Golden plover	W	Long-tailed tit	5	<i>Siskin</i>	W
Blackbird	12	Goldfinch	5	Magpie	c7	Skylark	52
Blackcap	7 (S)	Great black-back gull	W	Mallard	3	<i>Snipe</i>	W
Blue tit	c10	Gt spot woodpecker	1	<i>Marsh harrier</i>		Song thrush	5
Bullfinch	1?	Great tit	c10	Meadow pipit	W	Sparrowhawk	
Buzzard	1	Green woodpecker	2	Merlin	W	Starling	2
Canada goose	W	Greenfinch	4	Mistle thrush	2	Stock dove	3
Carrion crow	n/c	Grey heron		Moorhen	3	Stonechat	W
Chaffinch	1?	Grey partridge	18	Mute swan		Swallow	2
Chiffchaff	5 (S)	Greylag goose		Peregrine		Swift	S
Coal tit	1	Herring gull	W	Pheasant	3	Tawny owl	1?
Collared dove	1	Hobby	P	Pied wagtail	2	Tree pipit	P
Common gull	W	House martin	4 (S)	<i>Raven</i>		<i>Turtle dove</i>	P
<i>Common tern</i>	S	<i>House sparrow</i>		Red kite		Wheatear	P
Cormorant		<i>Jack snipe</i>		Red-legged partridge	5	Whinchat	P
Corn bunting	11	Jackdaw	n/c	<i>Redstart</i>	P	Whitethroat	18
<i>Crane</i>		Jay	2	Redwing	W	Willow warbler	P
<i>Cuckoo</i>		Kestrel		Reed bunting	5	Wood pigeon	n/c
Dunnock	20	Kingfisher	W	Reed warbler	2	Wren	15
<i>Egyptian goose</i>		Lapwing		Ring ouzel	P	Yellow wagtail	3
Feral pigeon	R	Lesser black-back gull	W	Robin	27	Yellowhammer	11
Fieldfare	W	Lesser whitethroat	3	Rook			
Garden warbler	3 (S)	Linnet	16	<i>Sand martin</i>	P		
Goldcrest	1	Little egret	W	Sedge warbler	P		

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: Evidence of breeding populations

This table shows breeding signs recorded in 2021 for the red and amber list species on the site:

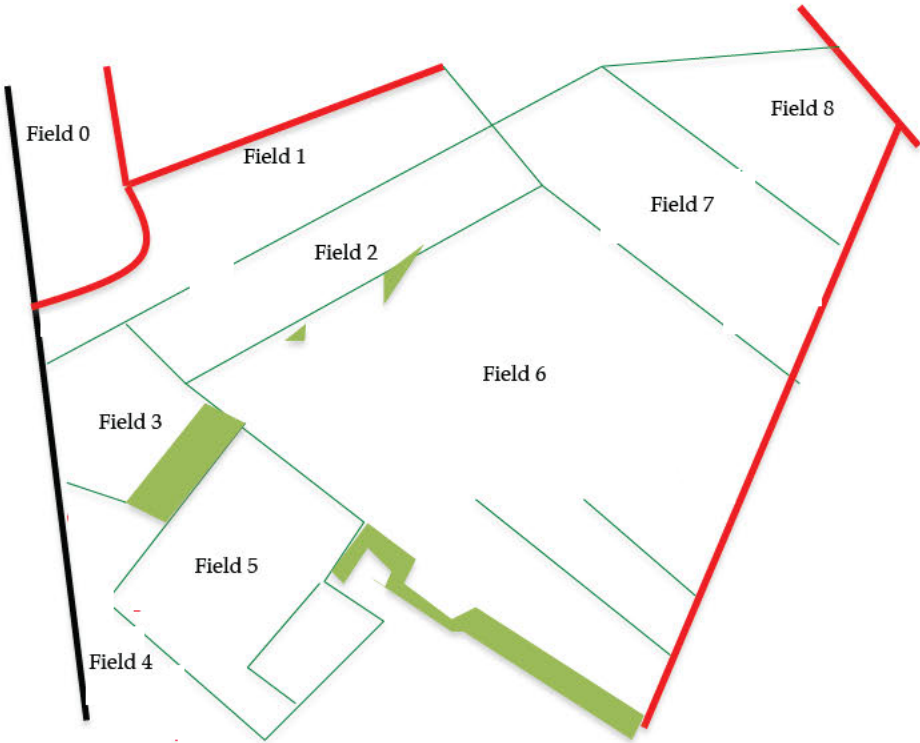
Species	Estimated pairs*	Breeding signs
Skylark	52 (57)	Singing males; pairs; fledged young
Yellowhammer	11 (15)	Singing males; pairs; nest sites; fledged young
Linnet	16 (15)	Singing males; pairs; nest sites; fledged young
Grey partridge	18 (15)	Courtship behaviour; pairs; fledged young
Corn bunting	11 (10)	Singing males; pairs; nest sites; fledged young
Yellow wagtail	3 (2)	Singing males; pairs; nest sites; fledged young
Song thrush	5 (2)	Singing males
Starling	2 (2)	Pairs; nest sites; fledged young
Cuckoo	? (?)	Probably laid eggs in 2019
Mistle thrush	2 (?)	Singing male; breeding uncertain
Dunnock	20 (15)	Singing males; pairs; nest sites; fledged young
Green woodpecker	2 (2)	Pairs
Mallard	3 (2)	Pairs; nest sites; fledged young
Reed bunting	5 (6)	Singing males; pairs; nest sites; fledged young
Stock dove	3 (1)	Pair
Swallow	2 (2)	Singing males; pairs; nest sites; fledged young
Bullfinch	1? (1?)	Recorded; breeding uncertain
Tawny owl	1? (1?)	Recorded: fledged young in 2017

* Figures in brackets show estimates for 2020

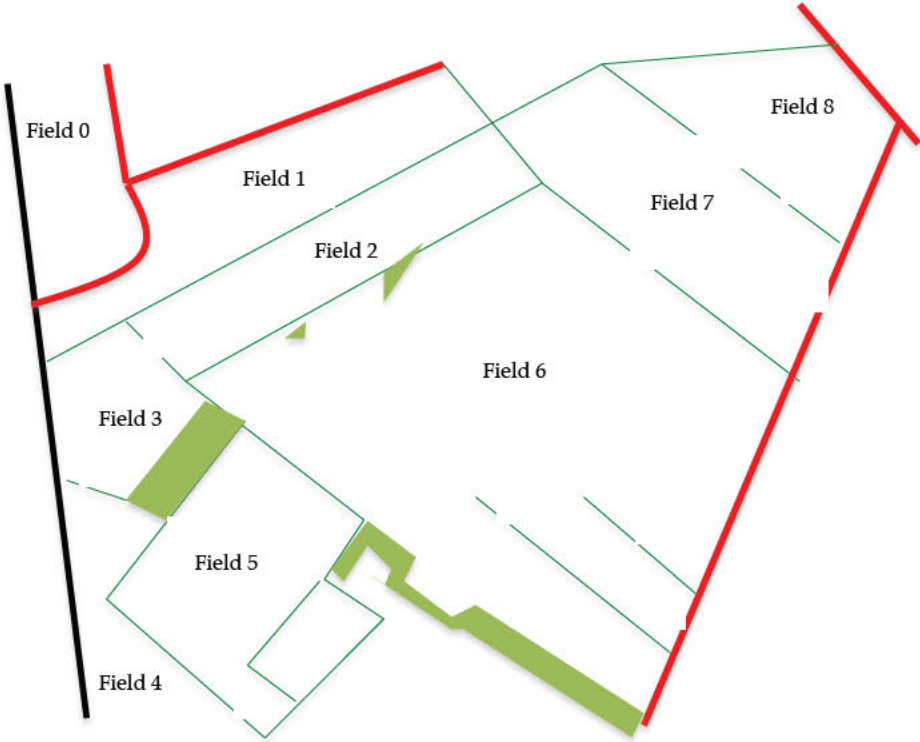
Appendix 4: Maps showing breeding pairs

These maps show estimated breeding pairs in 2020 of the red- or amber-listed farmland bird indicator species, plus green-listed whitethroat, breeding in the one kilometre square:

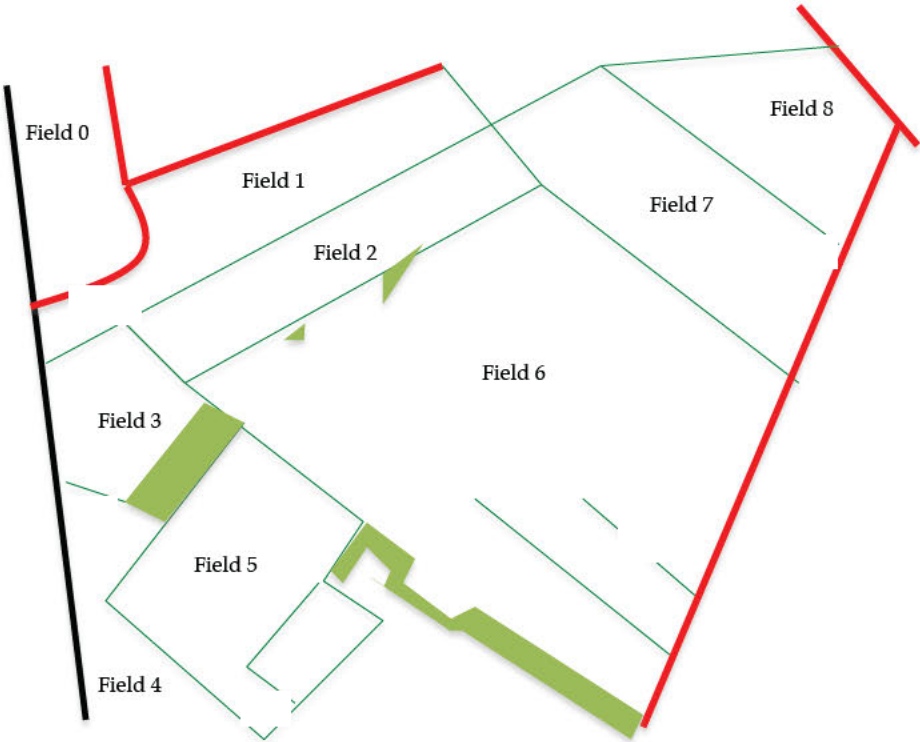
Grey partridge (P) and corn bunting (CB)



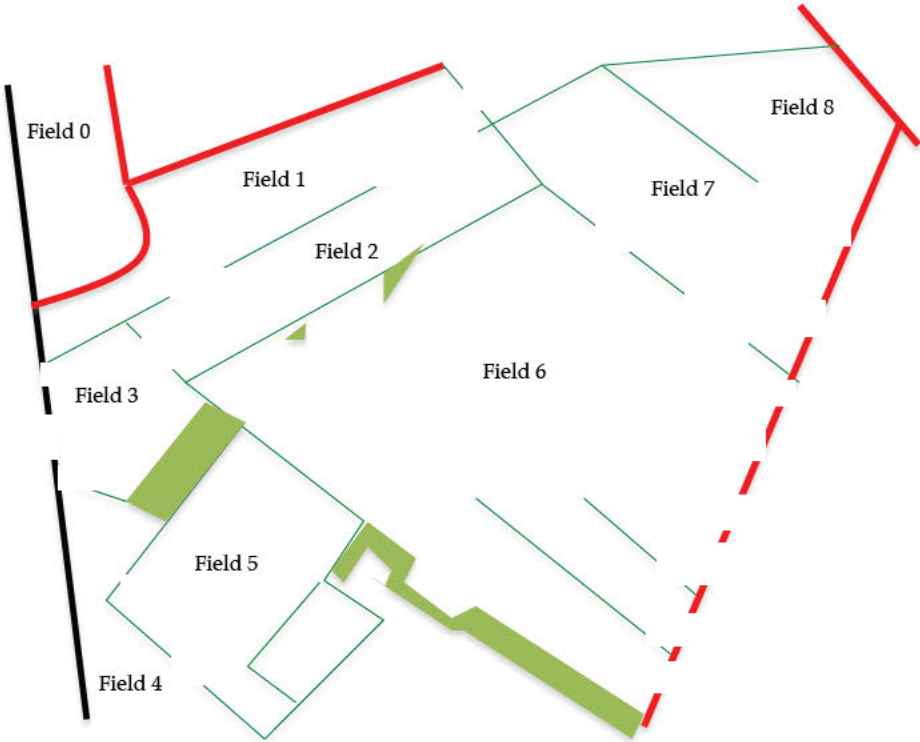
Yellowhammer (Y) and yellow wagtail (YW)



Linnet (LI) and skylark (S)



Whitethroat (WH) and reed bunting (RB)



Appendix 5: Farmland bird indicator species

This table shows the 19 species on the UK Farmland Bird Indicator; the second column shows which I recorded on the site in 2021; the second column shows 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