

The value of the green belt south of Cambridge to populations of farmland birds (2020)

Report of a nine-year survey

John Meed, January 2021

Introduction

For the last nine 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.

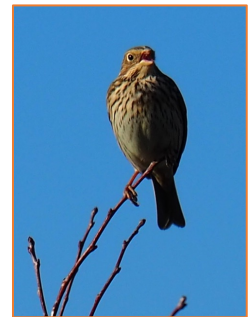
The area studied is largely arable land, with mature hedgerows, watercourses, ponds, scrub and woodland, including the Nine Wells local nature reserve (LNR – right). It includes a cycle path and footpath, and land management has created several permissive footpaths, flower-rich field margins and additional 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 9 of the 18 indicator species are 'red list' birds of 'high conservation concern' (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. 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 May 5 (later than usual because of Covid 19), May 20 and June 23.

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 46 visits over the year.

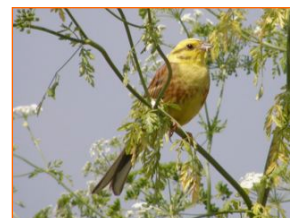
I also conduct surveys of butterflies and dragonflies, using the methodology of the UK Butterfly Monitoring Scheme.

Findings

Over the nine years I have recorded 91 bird species including 18 red list species and 28 amber list species. See Appendices 2 – 4.

In 2020 I recorded 76 species on the three transect walks and other visits:

- On the first transect walk: 33 species and 212 individuals
- On the second transect walk: 31 species and 218 individuals
- On the third transect walk: 31 species and 256 individuals



The 76 species recorded included 16 of the 18 farmland bird indicator species for the Sustainable Development Strategy, of which 14 bred (Appendix 5). In total I recorded 13 red list species and 22 amber list species as follows.

Breeding red list species (8-9)	Breeding amber list species (6-8)
<ul style="list-style-type: none"> • 57 pairs of skylarks • 15 pairs of linnets • 15 pairs of grey partridge • 15 pairs of yellowhammers (above) • 10 pairs of corn buntings • 2 pairs of yellow wagtails • 2 pairs of song thrush and starlings • Male mistle thrush and cuckoo recorded singing 	<ul style="list-style-type: none"> • 21 pairs of whitethroats • 15 pairs of dunnocks • 6 pairs of reed buntings • 2 pairs of swallows, green woodpecker and mallard • 1 pair of stock dove and possible tawny owl and bullfinch • Kestrels, swifts and house martins nest nearby and visit regularly

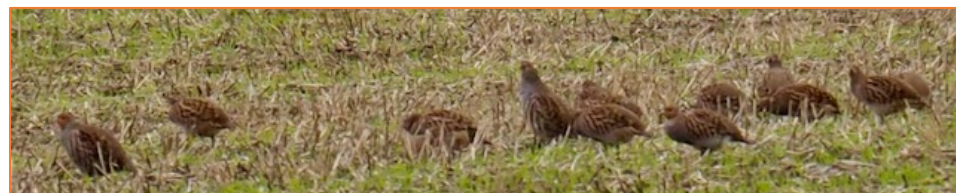
Red list visitors include herring gull, fieldfare, merlin and redwing. In other years I have recorded house sparrow and in 2019 a juvenile turtle dove (the 17th indicator species).

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

I will go on now to look in more detail at my findings about the populations between 2014 and 2020 of two key red list species that do unusually well in the fields around Nine Wells:

- Grey partridge (below)
- Corn bunting

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



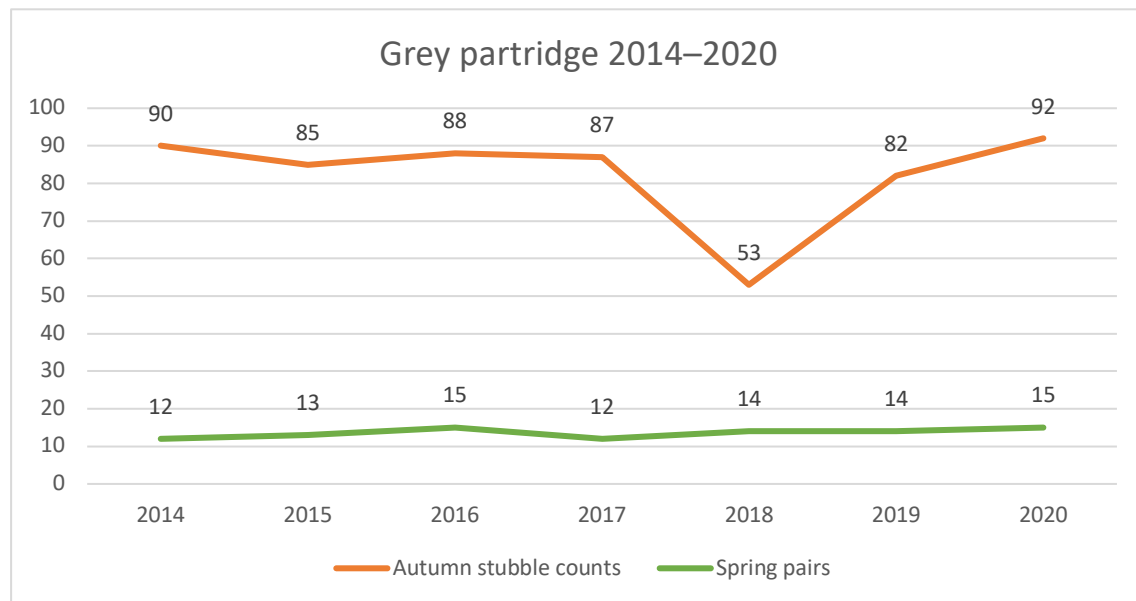
Grey partridge 2014–20

Grey partridge numbers have been remarkably high over the study.

- Between 2014 and 2020 autumn counts consistently revealed between 80 and 90 individuals, except in 2018.
- Pairs have varied between 12 and 15.



The following chart shows numbers for the last six 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).

Autumn and winter coveys

Grey partridge 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 ranged 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 14 pairs produced just 8, generally smaller, coveys. In autumn 2020 15 pairs produced at least 12 coveys.



One of the benefits of working with such a large population of grey partridge has been the opportunity to observe the ways in which coveys behave.

- 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 2020 a small area of Field 6 was planted with a wild bird mix and held six coveys (as well as meadow pipits, larks and finches). In 2019 five coveys of 34 birds used Field 4 (stubble direct drilled without ploughing) and sometimes Field 5, roosting along the hedge bottom between the two fields – much the same happened in both 2016 and 2020. Field 6 had five coveys of 40 birds on stubble in 2019, but only two coveys in 2014 and 2016 when ploughed; in 2017 and 2018 an area close to Granham's Road which remained unploughed and close to cover held four coveys.
- Generally speaking, coveys move relatively little between fields. However, this does vary: while the group of 15 in Field 4 in 2020 stayed in a small area, the 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, 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. In December 2019 I once watched five coveys in Field 5 follow each other around. I have not witnessed aggression between coveys, though within a covey there are occasional disputes. On a few occasions I have observed red-legged partridge mixing with greys, though temporarily.

The autumn coveys appear to suffer little loss from predators. While I often record fewer birds from mid November onwards, I have the impression that this results from changing covey habits or location, rather than a reduction in the size of coveys.

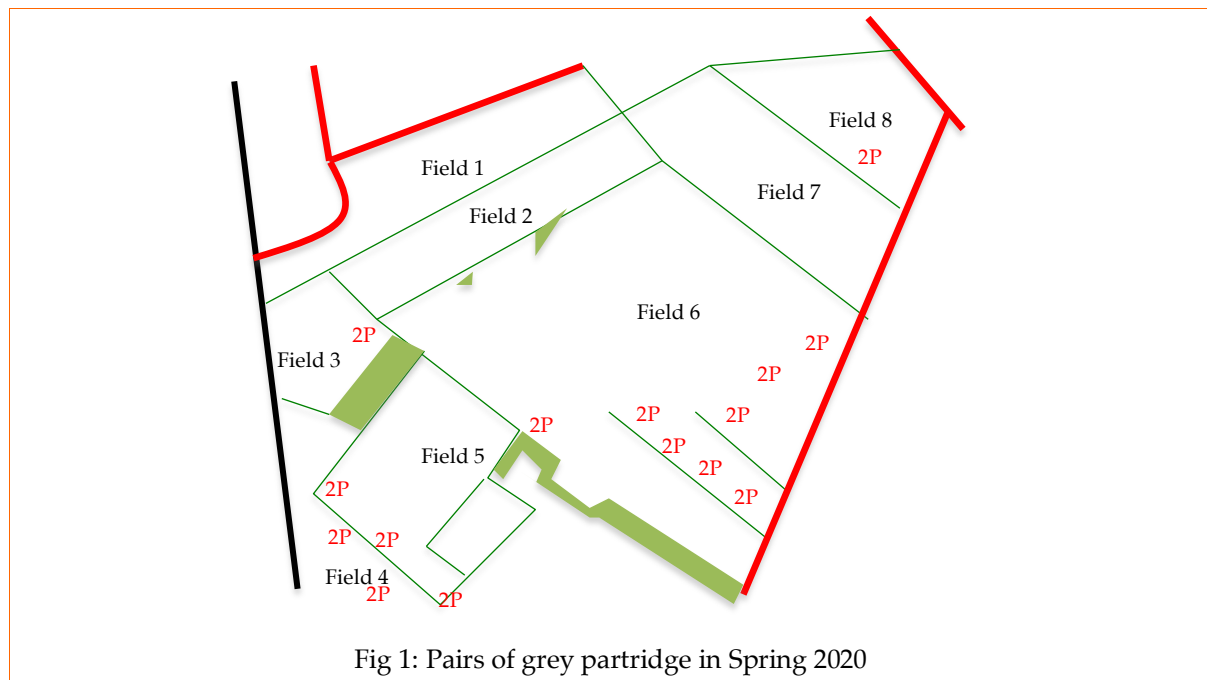
Two factors may help to explain the success of grey partridge around Nine Wells.

- 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, provide nesting sites and food for chicks while autumn stubbles provide foraging for the coveys.
- Population: Jenkins found that pairs come from different coveys, except when last year's pair reforms (8). It is easier for birds to find mates when there are large numbers of autumn coveys, and this may lead to a virtuous cycle in the fields I study.

Spring pairs

Pairs begin to form in the new year, though timing varies from year to year, from mid-January in 2017 to mid-February in 2015. 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.

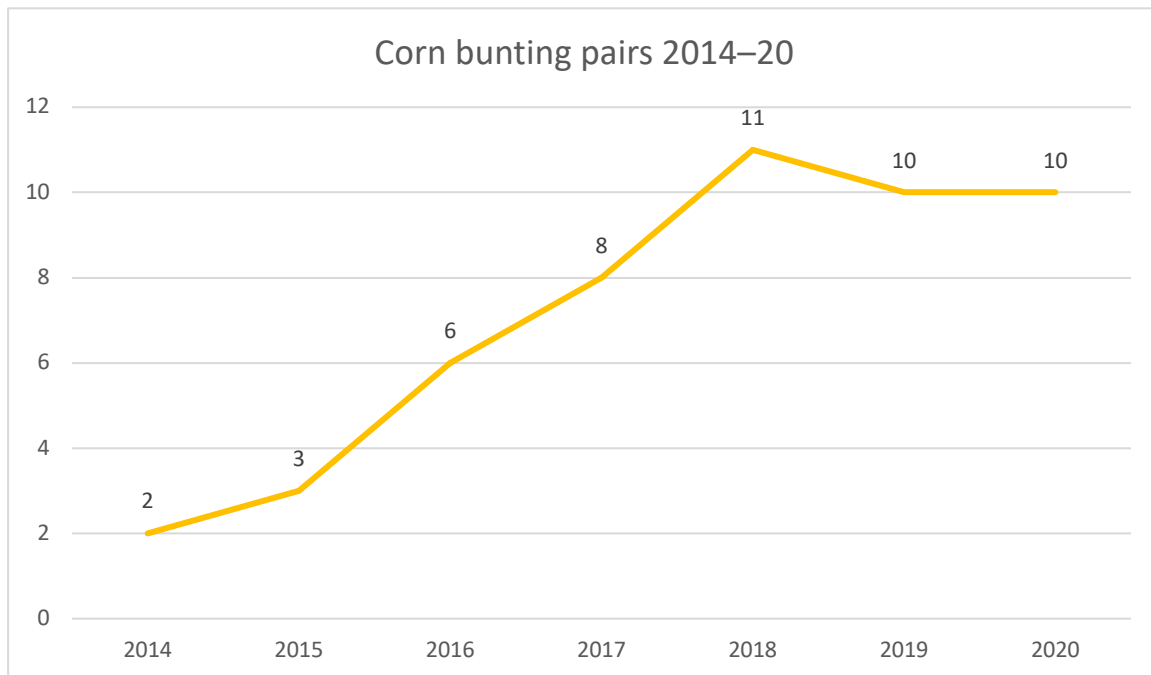
- Initial pairing is often concentrated in specific fields. In early 2017 there were 8 pairs (out of 12) in Field 6. In 2016 there were 12 pairs (out of 15) in Fields 1 and 2
- Following pairing, the pairs disperse more widely across the area. Figure 1 shows the distribution of pairs in Spring 2020.



- 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. On one occasion in 2018 behaviour in the Field 6 stubble recalled a lek with 3 males displaying.
- 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. Jenkins observed an excess of males which would sometimes pair later in the year with a female whose partner had died, or whose original pair bond was weak (8).

Corn bunting 2014–20

2020 was another excellent year for **corn bunting** with 10 singing males.



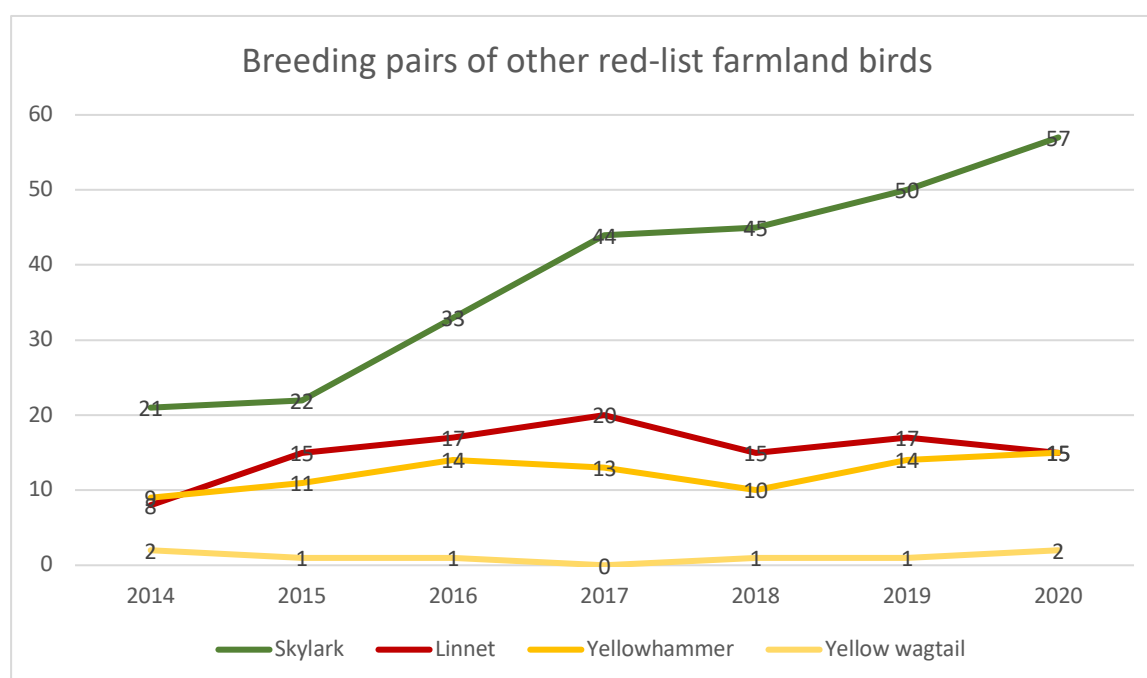
Corn bunting populations in the UK declined by 89% between 1970 and 2015, and their breeding range has contracted by 56% over the same period. There are now only 11,000 birds in the UK and the BTO's 2019 Breeding Birds Survey recorded corn buntings in just 148 of the 4,005 squares surveyed. The species' 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 Hobson's Park – 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. On both May 7 and 9 2018 I recorded a gathering of over 10 corn buntings on the corner of the hedge between Fields 4 and 5 – too late to be a winter flock, and too early to be a family group. Males had been singing for some weeks by then. In Autumn 2020 I observed gatherings of 25+ birds on August 2nd and 21 (below left in the hedge between Fields 4 and 5) on September 21st.



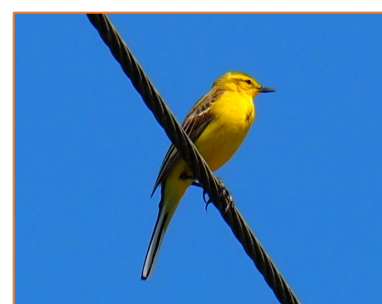
Other red-list farmland birds



- **Skylark** populations (right), with around 57 breeding pairs, had a good year. The increase between 2015 and 2020 may result from better recording – I base estimates of skylark numbers on singing males observed (greatest on May 21st). This population density is higher than the mean recorded for similar crops in the BTO's skylark survey (10). Winter flocks regularly numbered over 100 birds.
- I estimated the **linnet** population at 15 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 over 20 birds. Winter flocks were also present, with 30+ birds on October 7th.
- **Yellowhammer** populations, at around 15 breeding pairs, were higher than the 10 recorded last year. This compares 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. Birds were also present in winter, with 30+ birds on November 26th.
- At least two pairs of **yellow wagtail** (below) also bred successfully, both in Field 7. A third male also sang in the same field. This was their best breeding season for several years.



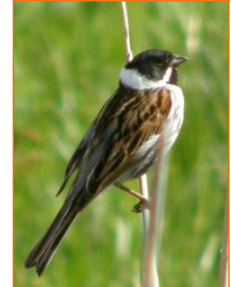
At least two pairs of **starlings** bred; flocks of over 50 were present in the autumn with over 350 birds on October 13th. Two pairs of **song thrush** bred – **mistle thrush** and **cuckoo** sang and have also bred in the past but I am not certain they did so this year. **Herring gull** visit regularly and **fieldfare**, **merlin** and **redwing** in the winter, while 3 **whinchat** visited on autumn passage on separate occasions.



Amber list farmland birds

For the amber list farmland bird indicator species present:

- **Whitethroat** populations, with 21 breeding pairs, were much higher than 2018 (14). Densities were highest along the hedges around Nine Wells and in the hedges along Granham's Road. The most birds on one occasion was 9, on June 9th.
- Around 15 pairs of **duncock** bred, similar to recent years.
- **Reed bunting** (right) populations (6 pairs) were higher than the 3 in 2020. At least one pair of **stock dove** also breed, and possibly **bullfinch**.
- **Kestrel** are present and breed nearby.



Other notable amber list breeding species include **green woodpecker**, **mallard** and **swallow** and in some years **tawny owl**. In winter the site provided habitat for **meadow pipit** (over 20 regularly present in late 2020) 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.

The remaining green list indicator species are all present. **Lesser whitethroat** and **buzzard** breed while pairs of **stonechat** spent the winters of 2017 and 2020 on the site.

Habitat survey and plant species

The habitat survey showed 10 (2.5km) of 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 also recorded threatened arable flowers, including chamomile, furmity, mallow, poppy, speedwell and viper's bugloss. A 2017 survey (14) recorded a further 45 species of flowering plant in the Nine Wells nature reserve, as well as 12 trees/shrubs, 9 mosses and 7 grasses.

Mammals

Mammals present include:

- good numbers of **water vole** in Hobson's Brook; water vole numbers in Britain have fallen disastrously so this population is important.
- regular spring counts of 20+ **brown hare**; Hutchings and Harris (13) recorded 7.12 hares/km² on arable land.

Over the course of my study I have also recorded muntjac and roe deer, badger, fox, stoat (right), weasel, rabbit, mole, bank vole and wood mouse. A survey in June 2017 (14) also recorded common pipistrelle, soprano pipistrelle and noctule bats.



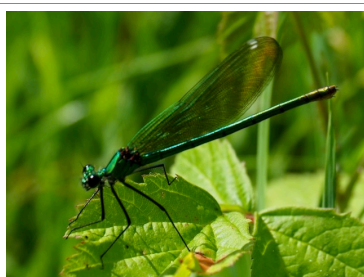
Invertebrates

In 2019 I began formally surveying butterflies (see Appendix 1b) and dragonflies. This table shows maximum counts of each species present over the last two years:

Butterfly species	2019	2020		2019	2020
Brimstone	1	2	Orange tip (recorded 2018)		
Brown argus		3	Painted lady	1	
Comma	2	3	Peacock	1	7
Common blue	3	12	Red admiral	5	4
Essex skipper	1	18	Ringlet	30	9
Gatekeeper	28	70	Small copper		3
Green-veined white	12	4	Small heath		5
Holly blue	2	1	Small skipper	3	9
Large skipper	1	1	Small tortoiseshell	1	7
Large white	6	9	Small white	51	40
Marbled white	5	2	Speckled wood	9	6
Meadow brown	13	30			
Dragonfly species	2019	2020		2019	2020
Banded demoiselle	1	1	Migrant hawker	–	27
Black-tailed skimmer	1	2	Ruddy darter	7	11
Brown hawker	7	4	Small red-eyed damselfly	–	2
Common darter	5	30	Southern hawker	6	17
Emperor	3	4	Willow emerald	–	3

In 2020 I found that a small area held colonies of brown argos and small copper butterflies – both of which were new sightings – as well as common blue and small heath (see Appendix 1b). Both willow emerald damselfly (around Nine Wells LNR) and small red-eyed damselfly (in one of the new ponds) are very recent UK species, and new to the site.

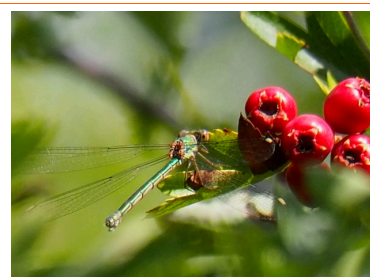
The site supports good populations of other invertebrates including grasshoppers, crickets, bees and wasps. A moth trap in June 2017 also recorded 30 species of moth (14).



Banded demoiselle



Migrant hawker



Willow emerald

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.

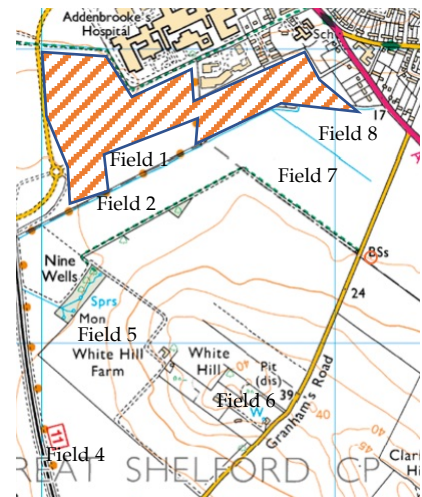
The shaded area no longer provides suitable habitat for farmland birds, and I no longer record any of the red list farmland species there. The impact on the wider area has been more complex.

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 Fields 1 and 2 adjacent to the new development, and indeed have used the young trees that line the ditch beside the Abcam building as song posts. A small patch of grassland on the southern slope of the road bridge now supports small colonies of brown argos and small copper (as well as common blue and small heath) butterflies. New pond areas are also used as breeding sites by dragonflies.

By contrast, I have not recorded grey partridge in what remains of Field 1, and only one pair and covey in Field 2 in 2020 (and no yellow wagtails in either field). Both autumn 2019 and all of 2020 have seen a concentration of grey partridge in Fields 4, 5 and 6, where fortunately cropping patterns have been favourable to them. We will need to wait to assess what the longer-term impact may be, especially as what remains of Field 1, and the whole of Field 2 are scheduled for development under the local plan.

It has been suggested that birds displaced by development will find homes in neighbouring fields. It is true that grey partridge will on occasion cross Granham's Road, but do so on a temporary basis. The fields across the road do not appear as attractive to grey partridge as those I study, and I have no evidence that they use these fields for breeding or permanent winter cover and feeding.

Other parts of the site also face potential threats. Fields 7 and 8 have been put forward for development under the call for sites for the next local plan. And the south east guided busway is currently proposed to run through Field 4, risking further disruption and habitat fragmentation.



Grey partridge in Field 4 below White Hill Farm

Conclusions

The data I have gathered over the last nine years – and particularly between 2014 and 2020 – 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 skylark, yellowhammer, linnet and yellow wagtail. 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 Fields 4 and 5) provide excellent nesting habitat for grey partridge in particular and must be conserved.
- 4 The expansion of the Biomedical campus 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 it is difficult to assess what the longer-term impact may be. Further construction and infrastructure development would place real pressure on populations.
- 5 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 Gog Magog Countryside Project proposed in the Cambridgeshire Green Infrastructure Strategy.

John Meed, January 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.

See: <http://johnmeed.net/john-meed/nine-wells/>

References

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- 2 HMSO (2005) *Securing the Future: Delivering UK Sustainable Development Strategy*, London, The Stationery Office
- 3 Eaton M A, Aebischer N J, Brown A F, Hearn R D, Lock, L, Musgrove A J, Noble D G, Stroud D A and Gregory R D (2015) Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds* 108, 708–746
- 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 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 RSPB's Hope Farm Project, also nearby, recorded no grey partridge prior to management. Following management changes the population rose to 3 pairs/km² in 2011. 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.)
- 8 Jenkins, D (1961) 'Social behaviour in the partridge *Perdix perdix*', *The Ibis*, Vol 103a, No 2 – a 3-year study of partridge on 640 acres (260 ha or 2.6km²) of downland near Winchester
- 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 (Density for spring cereals: just over 12 per km²; for root crops was under 10. The RSPB's Hope Farm skylark density was 6 per km² before management and 19 per km² after management – see 12 below)
- 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 was 3 before and 11 per km² 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 km² of hedgerow, and two thirds of hedges surveyed in 1997 held fewer than 2 pairs per km². The RSPB's Hope Farm density was 8 before and 17 per km² after management)
- 13 Hutchings, M.R. and Harris, S., (1996), *The current status of the brown hare (*Lepus europaeus*) in Britain*
- 14 Boreham, S, *Hobson's Brook Bioblitz*, <http://hobsonsbioblitz.org.uk/>

Appendix 1a: 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

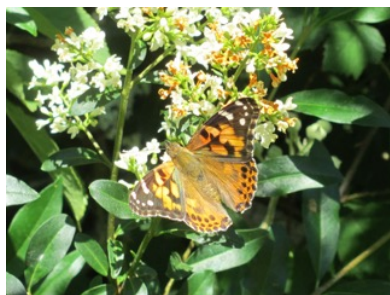


Grey partridge on Field 4, autumn 2020



Yellowhammer on Field 4/5 hedge, 2020

Appendix 1b: Butterflies around Nine Wells



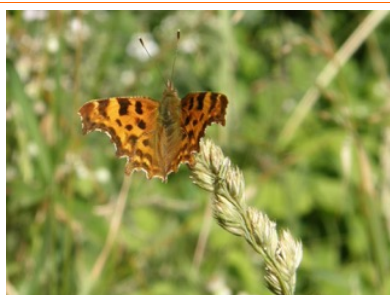
Painted lady



Marbled white



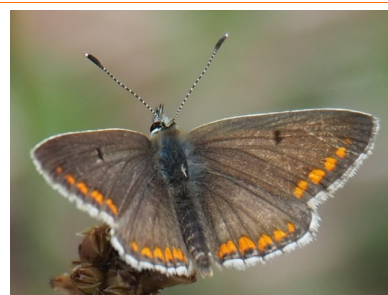
Small tortoiseshell



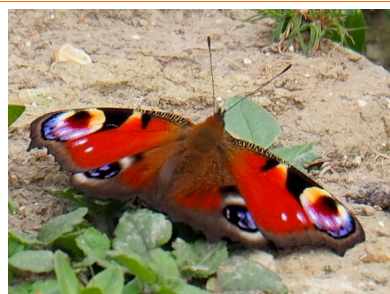
Comma



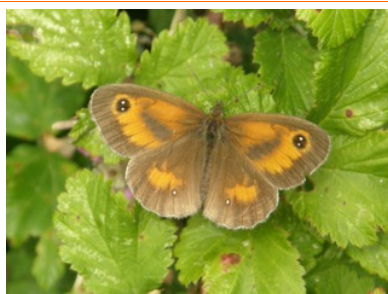
Ringlet



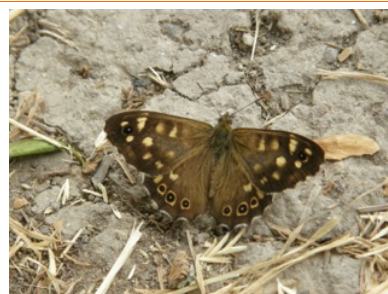
Brown argus



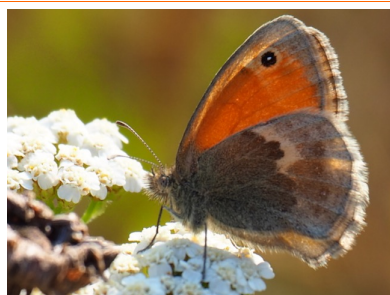
Peacock



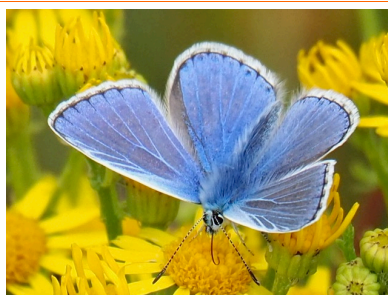
Gatekeeper



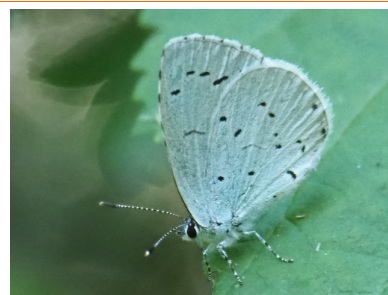
Speckled wood



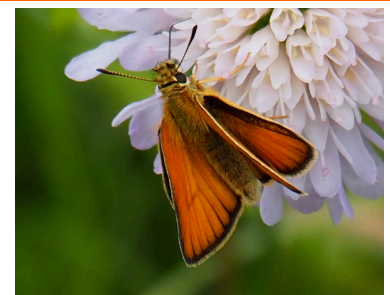
Small heath



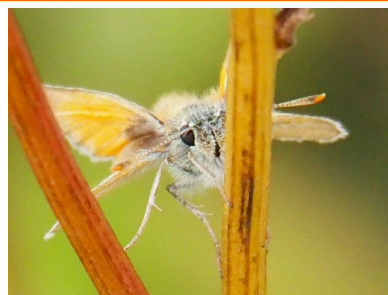
Common blue



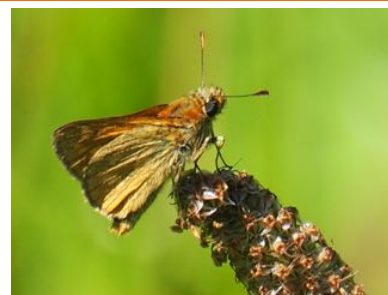
Holly blue



Essex skipper



Small skipper



Large skipper

Appendix 2: Species recorded (2012–20)

This list shows the 91 species recorded over the last 9 years, organised in order of **18 red list** birds, **28 amber list** birds, and **45 green list** species (*italic* = not recorded in 2020).

Species	1 st transect	2 nd transect	3 rd transect	Other visits	Estimated pairs
Corn bunting	6	6	9	x	10
Cuckoo				x	–
Fieldfare				x	–
Grey partridge	13	7	4	x	15
Herring gull		2		x	–
<i>House sparrow</i>				–	–
<i>Lapwing</i>				–	–
Linnet	10	13	19	x	15
Merlin				x	–
Mistle thrush				x	?
Redwing				x	–
Skylark	30	41	16	x	57
Song thrush	1	3		x	2
Starling		1		x	2
<i>Turtle dove</i>				-	–
Whinchat				x	–
Yellowhammer	7	8	5	x	15
Yellow wagtail		2		x	2
Black-headed gull		3	5	x	–
Bullfinch				x	?
Common gull				x	–
Common tern				x	–
<i>Crane</i>				–	–
Duncock	5	3	4	x	15
Golden plover				x	–
Green woodpecker	2	1		x	2
Great b-b gull				x	–
House martin			5	x	–
Kestrel				x	–
<i>Kingfisher</i>				–	–
Lesser b-b gull				x	–
Little egret				x	–
Mallard	9	-	1	x	–
Marsh harrier				x	–
Meadow pipit				x	–
<i>Mute swan</i>				–	–
Red kite				x	–
<i>Redstart</i>				–	–
Reed bunting	2	3	2	x	3
<i>Snipe</i>				–	–
Stock dove			1	x	1
Swallow	1	7	3	x	2
Swift		2	2	x	–
Tawny owl				x	–
Whitethroat		5	6	x	21
Willow warbler				x	–

Species	1 st transect	2 nd transect	3 rd transect	Other visits	Estimated pairs
Blackbird	5	5	9	x	13
Blackcap	4	4	5	x	8
Blue tit	11	5	4	x	10
Buzzard			2	x	1
Canada goose				x	–
Carrion crow	9	7	10	x	Not counted
Chaffinch	2	4	2	x	3
Chiffchaff	3	2	1	x	7
<i>Coal tit</i>				–	–
Collared dove				x	–
Cormorant				x	–
<i>Egyptian goose</i>				–	–
Feral pigeon			1	x	–
Garden warbler		1	1	x	2
Goldcrest	1			x	?
Goldfinch	2	8	9	x	3
Gt-sp woodpecker	1	1		x	1
Great tit	2	4	4	x	8-9
Greenfinch	2	2	4	x	4
Grey heron				x	–
Greylag goose	1	4		x	–
Hobby				x	–
Jackdaw	1	3	2	x	Not counted
<i>Jack snipe</i>				–	–
Jay	2	1		x	1
Lesser whitethroat	3		1	x	3
Long-tailed tit	2	1	7	x	5
Magpie	3	4	9	x	Not counted
Moorhen	1	1	1	x	2
<i>Peregrine</i>				–	–
Pheasant	2	1		x	3
Pied wagtail		1		x	2
Raven				x	–
R-L partridge	2			x	6
<i>Reed warbler</i>				–	–
Robin	6	5	3	x	12
Rook	4	17	24	x	–
<i>Sand martin</i>				–	–
Sedge warbler				x	–
Siskin				x	–
Sparrowhawk				x	–
Stonechat				x	–
<i>Wheatear</i>				–	–
Wood pigeon	42	27	38	x	Not counted
Wren	7	3	6	x	15

Appendix 3: Evidence of breeding populations

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

Species	Estimated pairs*	Breeding signs
Skylark	57 (50)	Singing males; pairs; fledged young
Yellowhammer	15 (14)	Singing males; pairs; nest sites; fledged young
Linnet	15 (15)	Singing males; pairs; nest sites; fledged young
Grey partridge	15 (13)	Courtship behaviour; pairs; fledged young
Corn bunting	10 (10)	Singing males; pairs; nest sites; fledged young
Yellow wagtail	2 (1)	Singing males; pairs; nest sites; fledged young
Song thrush	2 (4)	Singing males
Starling	2 (2)	Pairs; nest sites; fledged young
Cuckoo	? (?)	Singing male; breeding uncertain
Mistle thrush	? (?)	Singing male; breeding uncertain
Whitethroat	21 (14)	Singing males; pairs; nest sites; fledged young
Dunnock	15 (15)	Singing males; pairs; nest sites; fledged young
Green woodpecker	2 (2)	Pairs
Mallard	2 (–)	Pairs; nest sites; fledged young
Reed bunting	6 (3)	Singing males; pairs; nest sites; fledged young
Stock dove	1 (1)	Pair
Swallow	2 (2)	Singing males; pairs; nest sites; fledged young
Bullfinch	? (?)	Recorded; breeding uncertain
Tawny owl	? (?)	Recorded: fledged young in 2017

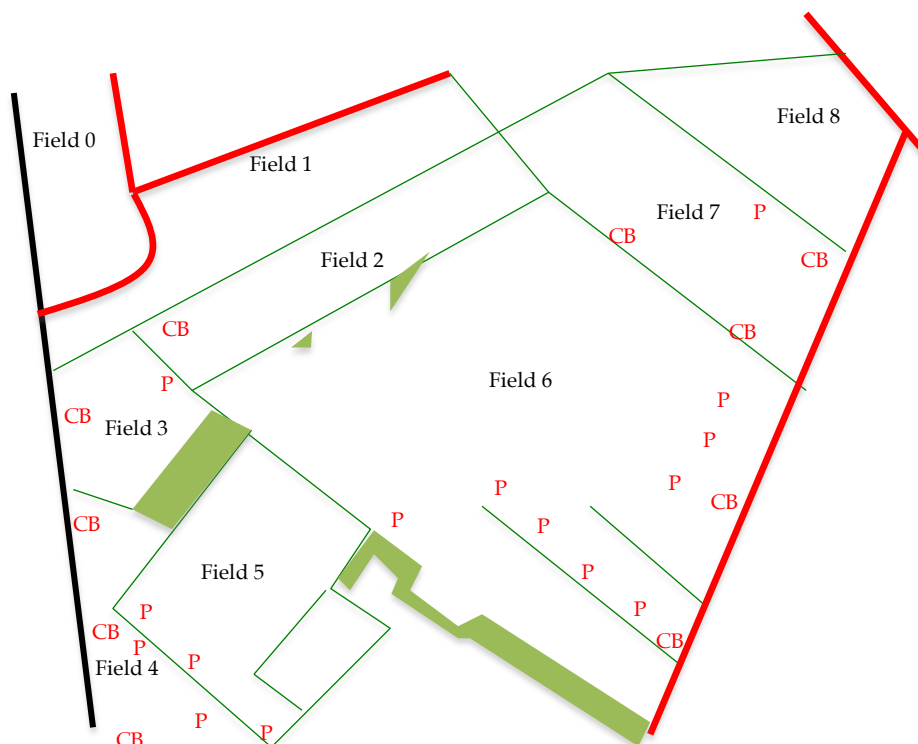
* Figures in brackets show estimates for 2019

For other red and amber species: no breeding signs were observed for **herring gull**, **black-headed gull**, **kestrel**, **house martin**, **red kite** and **swift**: these species visit to feed. The **whinchat** and **willow warbler** were on autumn passage. The **common terns** were flying over, carrying food. The **fieldfare**, **redwing**, **meadow pipit**, **little egret**, **lesser, common and great-black-backed gull** (and stonechat) were winter visitors, all using the site to feed.

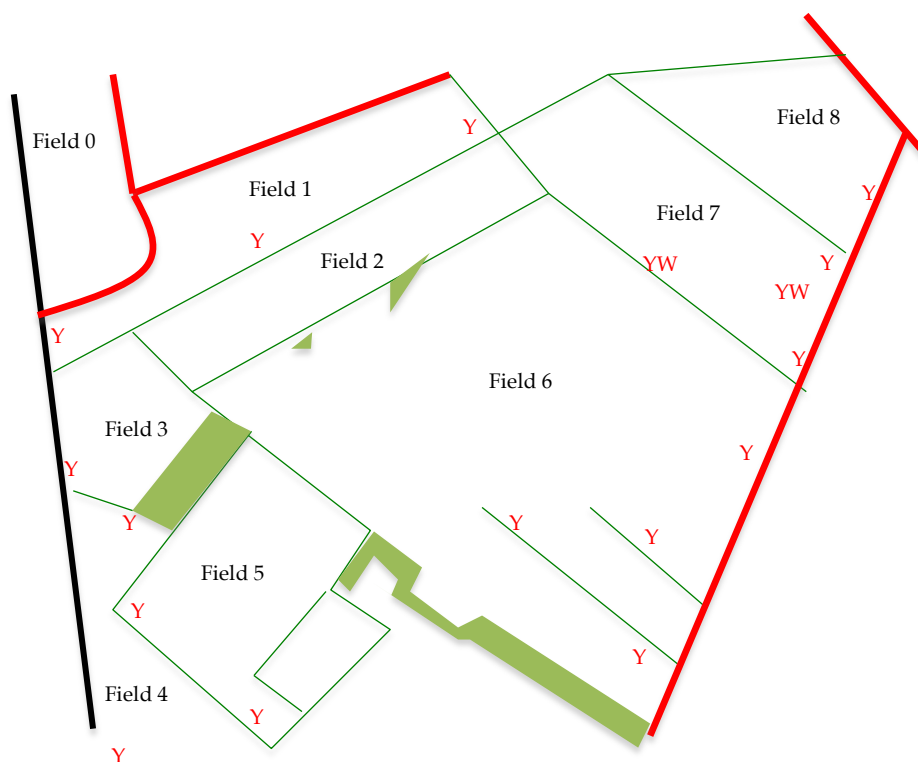
Appendix 4: Maps showing breeding pairs

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

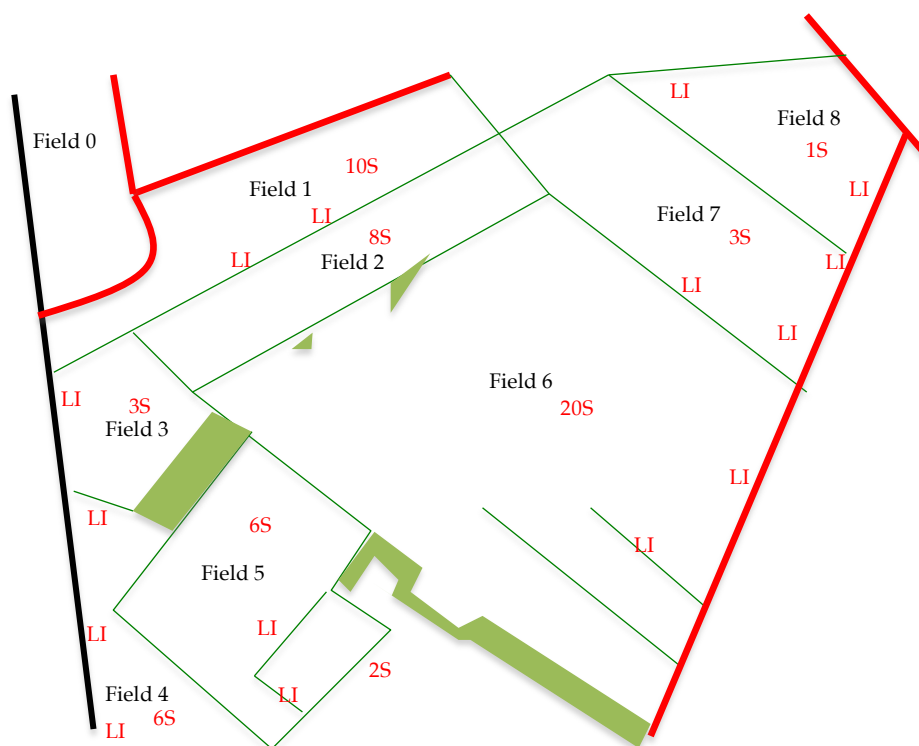
Grey partridge (P) and corn bunting (CB)



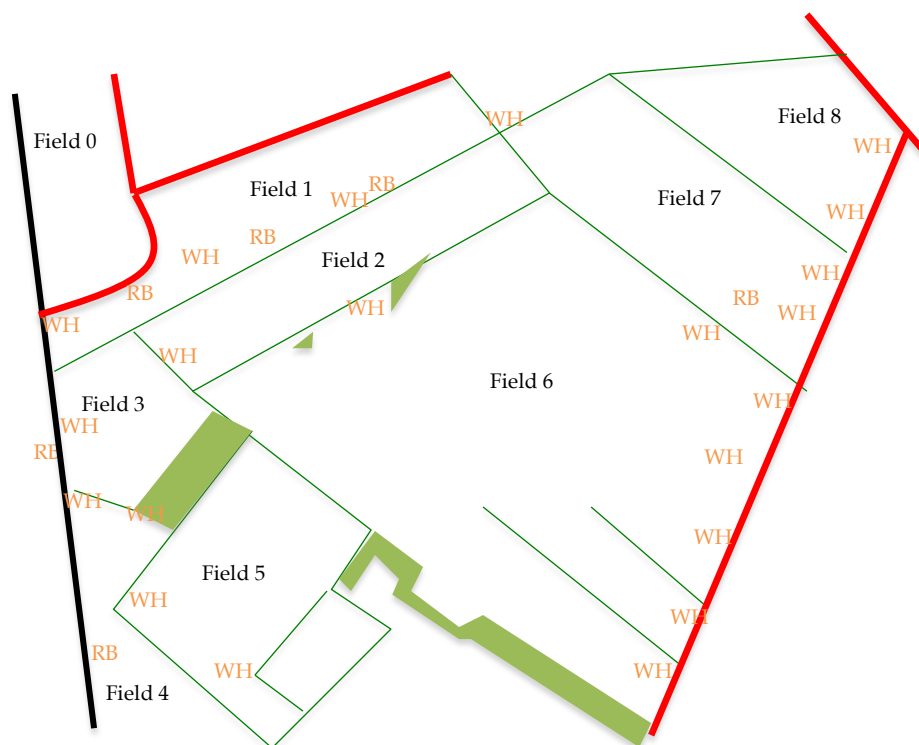
Yellowhammer (Y) and yellow wagtail (YW)



Linnet (LI) and skylark (S)



Whitethroat (WH) and reed bunting (RB)



Appendix 5: Farmland bird indicator species

This table shows the 18 species on the UK Farmland Bird Indicator; the per cent change shows their population trends for the period 1970-2015:

Species	Present?	Breeding?	Per cent change**
Turtle dove	(2019*)	–	-98%
Grey partridge	☒	☒	-92%
Corn bunting	☒	☒	-89%
Tree sparrow	–	–	-90%
Starling	☒	☒	-81%
Yellow wagtail	☒	☒	-67%
Skylark	☒	☒	-59%
Yellowhammer	☒	☒	-56%
Linnet	☒	☒	-55%
Kestrel	☒	–	-50%
Reed bunting	☒	☒	-31%
Greenfinch	☒	☒	-46%
Whitethroat	☒	☒	+6%
Stock dove	☒	☒	+113%
Woodpigeon	☒	☒	+123%
Jackdaw	☒	☒	+149%
Goldfinch	☒	☒	+159%
Rook	☒	–	n/a

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

** Source: Hayhow D.B., Ausden M.A., Bradbury R.B., Burnell D., Copeland A.I., Crick H.Q.P., Eaton M.A., Frost T., Grice P.V., Hall C., Harris S.J., Morecroft M.D., Noble D.G., Pearce-Higgins J.W., Watts O., Williams J.M. (2017) *The state of the UK's birds 2017*. RSPB, BTO, WWT, DAEFRA, JNCC, NE and NRW, Sandy