



The value of the green belt south of Addenbrookes, Cambridge to populations of farmland birds (2016)

Report of a survey of grid square TL4654

John Meed, January 2017



Introduction

For the last five years I have surveyed breeding populations of farmland birds on a square kilometre of green belt south of Addenbrooke's Hospital in Cambridge (grid reference TL4654), to assess the levels of the biodiversity of an area close to the city.

The area studied is largely arable land, with 2.5km of mature hedgerows, 1km of streams/ditches, and 4+ha of scrub and woodland, including the Nine Wells nature reserve (right). It includes a cycle path and footpath, and sensitive land management has created several permissive footpaths, flower-rich field margins and additional woodland (see Appendix 1). 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 92% between 1970 and 2013 and corn bunting (right) by 90% while yellow wagtail declined by 67%, skylark and linnet by 60%, and yellowhammer by 55% (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).
- The city council's local plan identifies skylark (and brown hare) as 'priority species'.



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 2016* report (4) states that 'the indicator of butterfly species of the wider countryside has declined by 41% since 1976'.

Methodology

I monitored the area throughout 2016, using a combination of methods. I adopted 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 19, June 14 and June 29

I carried out 31 further visits over the year. Between April and July I built 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 focused on other areas in the square and on specific breeding signs such as singing males, territorial behaviour and calls, courtship displays, nest building and juvenile birds. I also visited the site regularly in the early spring, autumn and winter, monitoring winter flocks and in particular grey partridge populations.

Findings

Appendices 2 – 4 show the 74 species recorded on the three transect walks and other visits:

- On the first transect walk: 30 species and 212 individuals
- On the second transect walk: 34 species and 186 individuals
- On the third transect walk: 31 species and 190 individuals



The 74 species recorded included 16 of the 18 farmland bird indicator species for the Sustainable Development Strategy, of which 14 are breeding (Appendix 5). In total I recorded 16 red list species and 24 amber list species as follows:

Breeding red list species (10)	Breeding amber list species (8)
<ul style="list-style-type: none"> • 33 pairs of skylarks • 17 pairs of linnets • 15 pairs of grey partridge • 14 pairs of yellowhammers (above) • 6–7 pairs of corn buntings • 2 pairs of starlings • 2 pairs each of song and mistle thrush • 1–2 pairs yellow wagtails • 1 cuckoo <p>Red list visitors include lapwing, herring gull and in winter merlin, fieldfare, redwing and whinchat.</p>	<ul style="list-style-type: none"> • 18 pairs of whitethroats • 14 pairs of dunnocks • 4+ pairs of reed buntings, 4 pairs of swallows and 2 pairs green woodpecker • 1 pair each of bullfinch, stock dove and tawny owl • Kestrels, swifts and house martins nest nearby and visit regularly <p>Amber list visitors include common tern, mallard, marsh harrier, mute swan, red kite, redstart, black-headed, great and lesser black-backed gull and in winter little egret, kingfisher, golden plover and meadow pipit</p>

Grey partridge

Grey partridge numbers remain remarkably high.

- Autumn counts towards the end of 2015 had shown at least 85 birds present.
- Pairs began to form in late January and at least 14 or 15 pairs formed.
- Autumn counts in late 2016 showed around 88 birds present, in at least 10 coveys.



Despite the continued high numbers, the development of the Biomedical Campus is starting to have an impact. Two of the pairs were on land since developed (Field 0 in Appendix 4) and it is highly unlikely they were able to rear young successfully. In autumn there was significant disturbance of Field 1 and I recorded no partridge there after October 17th.

Nonetheless the counts remain exceptional compared to other studies which 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 on the Nine Wells site. For example, on the GWCT's Grey Partridge Demonstration Project near Royston the density of grey partridge pairs rose from under 3 pairs/km² before management to around 15 pairs/km², while autumn densities increased from 8 birds/km² before management to around 80 birds/km² (7).

Several aspects of the habitat may help to explain the success of grey partridge around Nine Wells. The birds feed at dawn and dusk in open fields, but need suitable cover during the day and the Nine Wells nature reserve together with the hedge, margin and copses running north-west from the reserve appear ideal. Grassy margins such as that running north from the reserve also provide food for chicks while autumn stubbles provide foraging for the coveys. Recent mild winters have also helped.

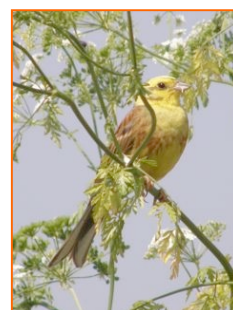
Skylark

Skylark populations (right), with at least 33 breeding pairs, show an increase on last year (8) that may simply be due to better recording. Skylark are mainly seen in song flight and so numbers are estimated on singing males observed (greatest on June 7th). This population density is higher than the mean recorded for similar crops in the BTO's skylark survey (9). Winter flocks regularly numbered 15+ birds.



Yellowhammer

Yellowhammer populations, at around 14 breeding pairs, are slightly higher than last year. This represents over 4 pairs per km of hedgerow, which compares well with populations found by Bradbury et al (10). Densities were highest in the hedges close to Nine Wells and along Granhams Road. The most birds recorded on one occasion was 15, on March 10th. Winter flocks were also present.



Linnet

The **linnet** population increased to at least 17 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 birds, with 35 on April 21st and 33 on June 29th. In the autumn there were flocks of up to 80 birds.

Corn bunting

6–7 pairs of corn bunting bred, twice the number of the previous year. It seems likely that young birds from 2015 survived the winter to breed. This is an important population – there are just 11,000 birds in the UK and its recent extinction in Ireland risks being repeated in large parts of Britain if its breeding sites are not protected. The RSPB's Hope Farm had 3 pairs in 2016 in 1.8km² (12). Corn bunting also joined winter mixed flocks.

Yellow wagtail

1–2 pairs of **yellow wagtail** (right) were also present, though I did not have definite evidence of successful breeding.



Other red list species

For the first time I recorded a pair of **cuckoo**, with the female laying eggs on one occasion.

At least two pairs of **starlings** bred; large flocks were present in the autumn with several hundred on November 14th. Two pairs of **song thrush** and **mistle thrush** also bred. **Lapwing** continued to feed and display in the area, but do not breed on the site. **Herring gull** visit regularly and **fieldfare** and **redwing** in the winter. I recorded migrating **common redstart** twice in the spring, **whinchat** on three occasions in the autumn, and one **merlin** in January.

Amber list species

For the amber list farmland bird indicator species present:

- **Whitethroat** populations, with 18 breeding pairs, are significantly higher than last year. Densities were highest along the hedges around Nine Wells and in the hedges along Granham's Road. The most birds on one occasion was 20, on May 9th.
- Around 14 pairs of **duncock** bred. The increase compared to last year in probably the result of better recording.
- **Reed bunting** (right) did well with at least 4 pairs, compared to 1 in recent years. A pair of **stock dove** also breed.
- **Kestrel** are present and breed nearby. A nest box has been erected on the edge of Nine Wells.



Other notable amber list breeding species include **bullfinch**, **green woodpecker** and **swallow**. In winter the site provides habitat for **meadow pipit** while the water courses are used by **little egret**, **kingfisher** and **snipe**. I recorded flocks of up to 80 **golden plover**. **Mallard**, **mute swan**, **red kite**, **black-headed**, **great** and **lesser black-backed gull** also visit.

Green list species

The remaining green list indicator species are all present as well as breeding lesser whitethroat, greater-spotted woodpecker, pied wagtail (with flocks of up to 15 in the autumn) and moorhen. Buzzards bred in the woods on White Hill. Wheatear stopped to feed during their autumn migration.

The habitat survey showed:

- 10 mature, species rich hedgerows with thick growth and good variety
- 2 important watercourses and extensive grassy and flower-rich margins
- 3 small areas of scrub and woodland, plus the Nine Wells nature reserve.

The area also supports:

- regular counts of 20+ brown hare, a city council 'priority species'; Hutchings and Harris (13) recorded 7.12 hares/km² on arable land
- muntjac and roe deer, badger, fox, stoat, rabbit, bank vole and wood mouse (right)
- good populations of butterflies including small tortoiseshell, speckled wood, red admiral, ringlet, peacock, small white, orange tip, holly blue, brimstone, common blue, comma and other invertebrates
- good populations of threatened arable flowers, including chamomile, cornflower, furmity, mallow, poppy, speedwell and viper's bugloss.



Conclusions

- 1 The green belt arable land immediately south of the Addenbrooke's site (grid reference TL4654) continues to support important breeding populations of farmland birds. Populations compare favourably both with other larger studies, and with the other areas I survey further from the city. The area also includes important populations of mammals, plants, butterflies and other invertebrates.
- 2 In particular, the population of grey partridge (a species that has declined by 90% since 1970) is quite exceptional and the site may well be among the best in Cambridgeshire for this species.
- 3 Habitat variety and sympathetic land-management contribute to the richness of the area. The combination of arable crops with margins and areas of bare earth benefit grey partridge, skylark, corn bunting and yellow wagtail; the ditches benefit yellowhammer and reed bunting while hedges are well used by linnet, yellowhammer, whitethroat and dunnock, and by grey partridge for cover. In particular, the hedge, margin and copses running north-west from the Nine Wells nature reserve provide excellent habitat for grey partridge, linnet and yellowhammer and must be conserved.
- 4 Development of Addenbrooke's is now having a significant impact. Development of Field 0, probably preventing breeding of grey partridge and skylark there. Disturbance in Field 1 is already affecting these species and is likely to reduce breeding sites for yellowhammer (right), corn bunting and yellow wagtail. Proposed development of Field 2 would have a further detrimental effect 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 that covered by the Gog Magog Countryside Project proposed in the Cambridgeshire Green Infrastructure Strategy.



John Meed, January 2017

References

- 1 Hayhow D B, Bond A L, Eaton M A, Grice P V, Hall C, Hall J, Harris S J, Hearn R D, Holt C A, Noble D G, Stroud D A and Wotton S (2015) *The state of the UK's birds 2015*. RSPB, BTO, WWT, JNCC, NE, NIEA, NRW and SNH
- 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 DB, Burns F, Eaton MA, Al Fulaij N, August TA, Babey L, Bacon L, Bingham C, Boswell J, Boughey KL, Brereton T, Brookman E, Brooks DR, Bullock DJ, Burke O, Collis M, Corbet L, Cornish N, De Massimi S, Densham J, Dunn E, Elliott S, Gent T, Godber J, Hamilton S, Havery S, Hawkins S, Henney J, Holmes K, Hutchinson N, Isaac NJB, Johns D, Macadam CR, Mathews F, Nicolet P, Noble DG, Outhwaite CL, Powney GD, Richardson P, Roy DB, Sims D, Smart S, Stevenson K, Stroud RA, Walker KJ, Webb JR, Webb TJ, Wynde R and Gregory RD (2016) *State of Nature 2016*. The State of Nature partnership
- 5 BTO/JNCC/RSPB (2015) *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 Meed, John (2015) *The value of the green belt south of Cambridge to populations of farmland birds: Report of a survey of grid square TL4654* (2015), www.johnmeed.net
- 9 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)
- 10 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 was 8 before and 17 per km² after management)
- 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 Dillon, Ian (2016) *The Great British Farmland Bird Choir: Hope Farm Ensemble*, RSPB (at <http://www.rspb.org.uk/community/ourwork/farming/b/farming-blog/archive/2016/10/03/the-great-british-farmland-bird-choir-hope-farm-ensemble.aspx>). The Hope Farm before and after management figures provide useful comparisons but it is important to recognise that the Hope Farm bird-friendly management measures are more extensive than those on the Nine Wells site.
- 13 Hutchings, M.R. and Harris, S., (1996), *The current status of the brown hare (Lepus europaeus) in Britain* (out of print)

Appendix 1: The area covered



Looking towards White Hill



Nine wells from White Hill



Mature hedge and permissive path



Cycle path and flower-rich margin



Grey partridge on Field 2, autumn 2016



Yellowhammer on Field 2 ditch, spring 2016

Appendix 2: Species recorded on visits

This list shows the 74 species recorded during the year, organised in order of **red list** birds of high conservation concern, **amber list** birds of medium conservation concern, and **green list** species (overleaf) which are of less conservation concern.

Species	1 st transect	2 nd transect	3 rd transect	Other visits	Estimated pairs
Corn bunting	3	4	6	x	6–7
Cuckoo				x	1
Fieldfare				x	–
Grey partridge	12	2	2	x	15
Herring gull	1			x	–
Lapwing				x	–
Linnet	19	11	33	x	17
Merlin				x	–
Mistle thrush		1		x	2
Redwing				x	–
Skylark	26	25	14	x	33
Song thrush	1	1	2	x	2
Starling	1	1		x	2
Whinchat				x	–
Yellowhammer	12	6	13	x	14
Yellow wagtail		1		x	1–2
Black-headed gull				x	–
Bullfinch		1		x	1
Common redstart				x	–
Common tern			2	x	–
Duncock	6	2	5	x	14
Golden plover				x	–
Green woodpecker	1		1		2
Great b-b gull				x	–
House martin		8	4	x	–
Kestrel		1	1	x	–
Kingfisher				x	–
Lesser b-b gull				x	–
Little egret				x	–
Mallard	4	2		x	–
Marsh harrier				x	–
Meadow pipit				x	–
Mute swan				x	–
Red kite				x	–
Reed bunting	4	2	1	x	4+
Stock dove	6			x	1
Swallow		2	4	x	4
Swift		4	1	x	–
Tawny owl	6			x	1
Whitethroat		10	8	x	18

Species	1 st transect	2 nd transect	3 rd transect	Other visits	Estimated pairs
Blackbird	10	8	4	x	8
Blackcap	3	4	1	x	5
Blue tit	9	7	8	x	5
Buzzard		1	1	x	1
Canada goose				x	–
Carrion crow	6	3		x	Not counted
Chaffinch	2	2	1	x	3
Chiffchaff	3	2	3	x	3
Cormorant				x	–
Egyptian goose				x	–
Feral pigeon				x	–
Goldcrest				x	1
Goldfinch	1		8	x	2
Gt-sp woodpecker				x	1
Great tit	6		6	x	4
Greenfinch	4	7	6	x	4
Grey heron				x	–
Greylag goose	1			x	–
Jackdaw	4			x	Not counted
Jay		1	1	x	1
Lesser whitethroat	1	1		x	4
Long-tailed tit	4	1	2	x	4
Magpie	8	3	1	x	Not counted
Moorhen				x	1
Pheasant		1		x	1+
Pied wagtail				x	1+
R-L partridge				x	2+
Robin	11	5	7	x	10
Rook	10	4	3	x	Not counted
Sedge warbler				x	–
Sparrowhawk				x	–
Wheatear				x	–
Wood pigeon	26	46	33	x	Not counted
Wren	8	7	8	x	10

Species recorded in other years include **common gull**, **snipe**, **coal tit**, **collared dove**, **hobby**, **reed warbler**, **peregrine falcon** and **siskin**, to give a total of 82 species recorded on the site over the last five years.

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	33 (22)	Singing males; pairs; fledged young
Yellowhammer	14 (11)	Singing males; pairs; nest sites; fledged young
Linnet	17 (15)	Singing males; pairs; nest sites; fledged young
Grey partridge	15 (13)	Courtship behaviour; pairs; fledged young
Corn bunting	6–7 (3)	Singing males; pairs; fledged young
Yellow wagtail	1–2 (1)	Singing males; probable nest sites
Cuckoo	1 (0)	Pair; egg laying
Mistle thrush	2 (2)	Singing males; pairs
Song thrush	2 (2)	Singing males; pairs; fledged young
Starling	2 (2)	Pairs; nest sites; fledged young
Whitethroat	18 (10)	Singing males; pairs; nest sites; fledged young
Dunnock	14 (8)	Singing males; pairs; nest sites; fledged young
Green woodpecker	2 (2)	Pairs
Reed bunting	4+ (1)	Singing males; pairs; nest sites; fledged young
Stock dove	1 (1)	Pair
Swallow	4 (3)	Singing males; pairs; nest sites; fledged young
Bullfinch	1 (1)	Pair
Tawny owl	1 (1)	Calling male

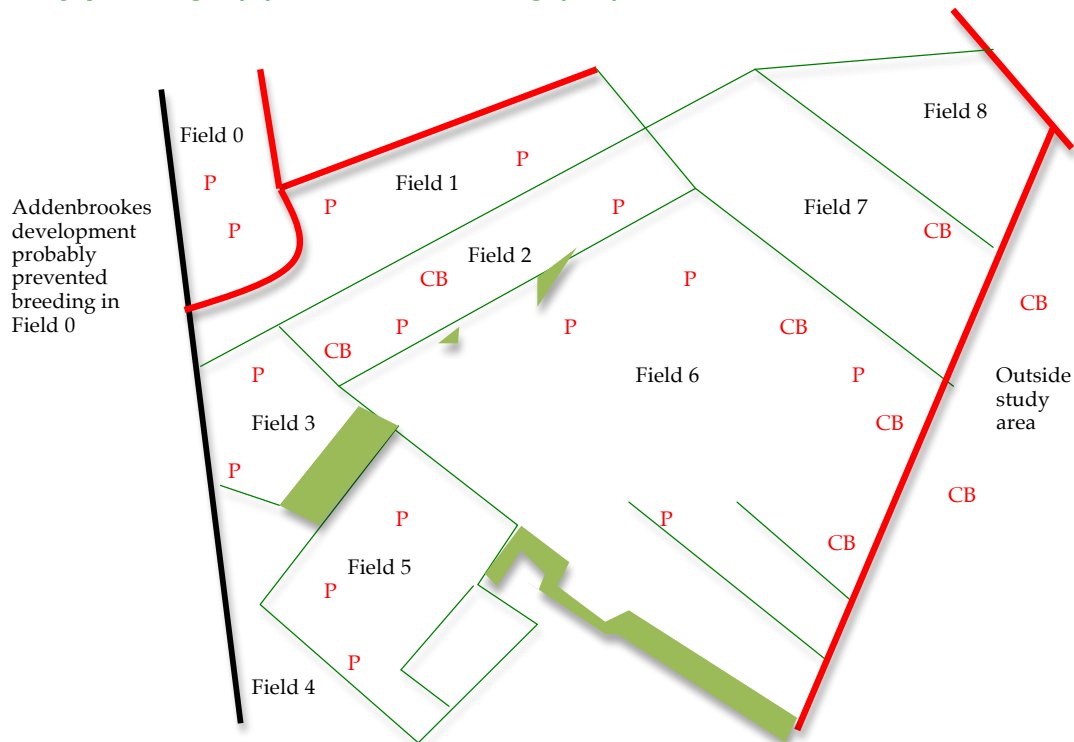
* Figures in brackets show estimates for 2015

For other red and amber species: no breeding signs were observed for **herring gull**, **lapwing**, **black-headed gull**, **kestrel**, **house martin**, **swift**, **mallard**, **marsh harrier** and **mute swan**: these species visit to feed. The **red kite**, **common tern** and **lesser-black-backed gull** were flying over. The **whinchat** and **merlin** and **redstart** were on passage. The **fieldfare**, **redwing**, **little egret**, **kingfisher**, **golden plover**, **great-black-backed gull** and **meadow pipit** were winter visitors, all using the site to feed.

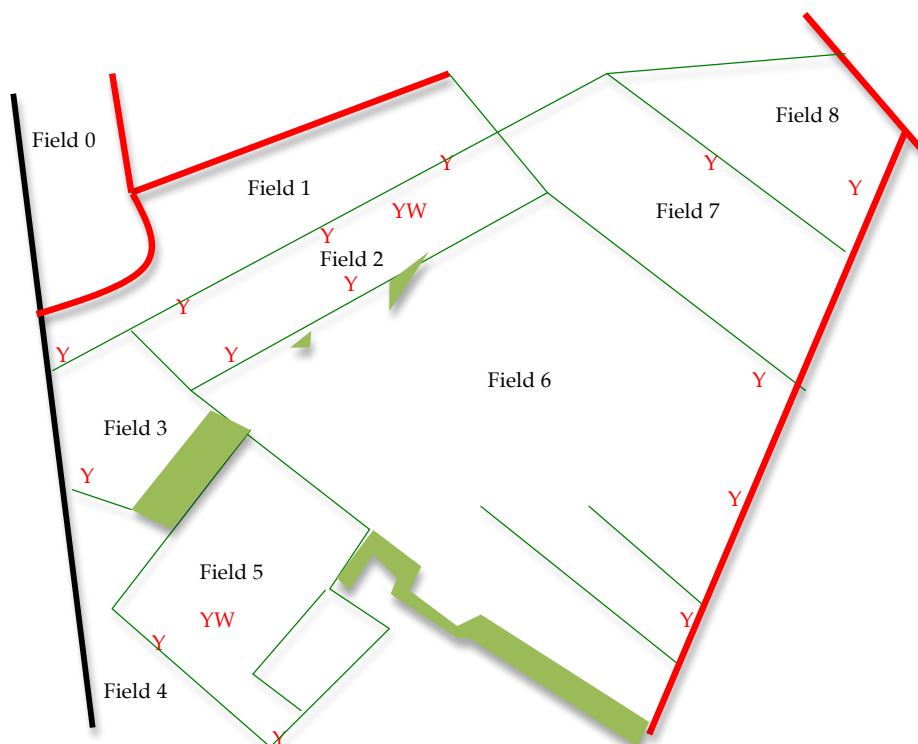
Appendix 4: Maps showing breeding pairs

These maps show estimated breeding pairs in 2016 of the 10 red- or amber-listed farmland bird indicator species breeding in the one kilometre square:

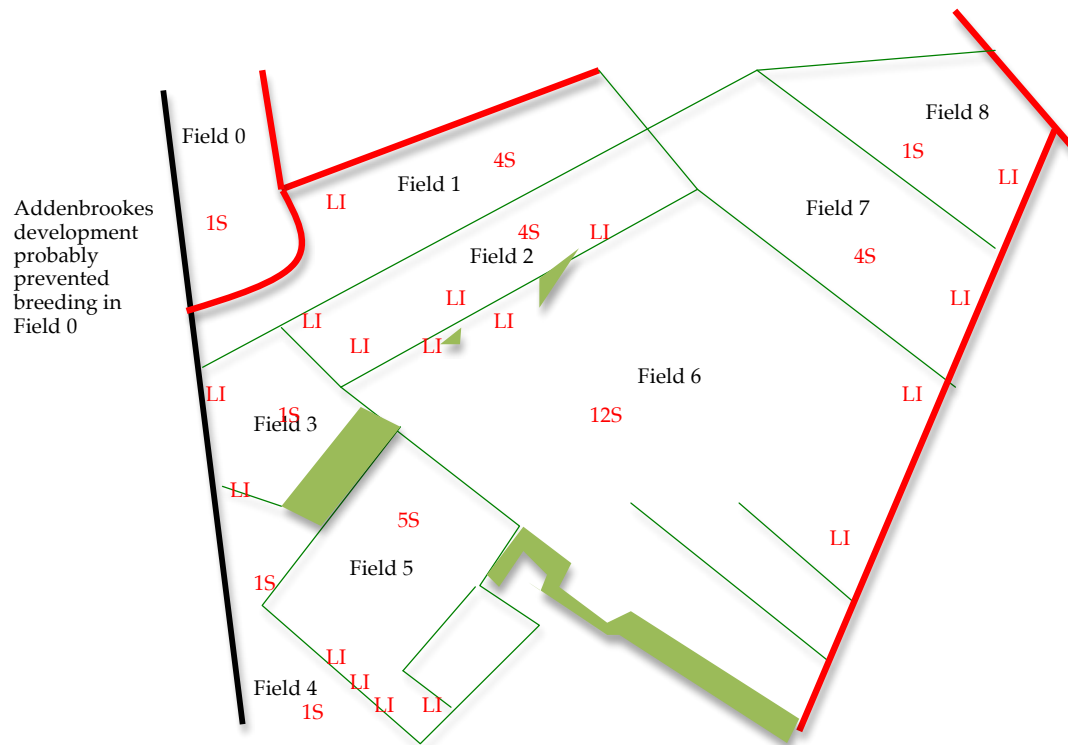
Grey partridge (P) and corn bunting (CB)



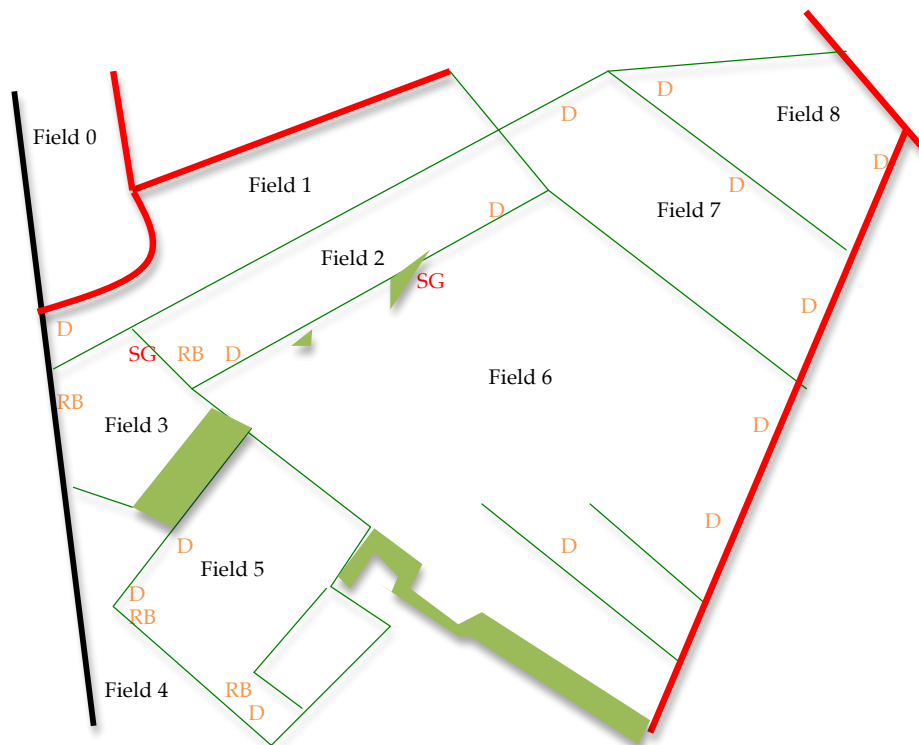
Yellowhammer (Y) and yellow wagtail (YW)



Linnet (LI) and skylark (S)



Whitethroat (WH), dunnock (D), reed bunting (RB) and starling (SG)



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 1970-2013:

Species	Present?	Breeding?	Per cent change*
Turtle dove	–	–	-97%
Grey partridge	☒	☒	-92%
Corn bunting	☒	☒	-90%
Tree sparrow	–	–	-90%
Starling	☒	☒	-81%
Yellow wagtail	☒	☒	-67%
Linnet	☒	☒	-60%
Skylark	☒	☒	-60%
Yellowhammer	☒	☒	-55%
Kestrel	☒	–	-52%
Reed bunting	☒	☒	-38%
Greenfinch	☒	☒	-33%
Whitethroat	☒	☒	+12%
Stock dove	☒	☒	+102%
Goldfinch	☒	☒	+146%
Woodpigeon	☒	☒	+126%
Jackdaw	☒	☒	+146%
Rook	☒	–	n/a

Skylark is also a priority species in Policy 70 of the Cambridge Local Plan

• Source: Hayhow D B, Bond A L, Eaton M A, Grice P V, Hall C, Hall J, Harris S J, Hearn R D, Holt C A, Noble D G, Stroud D A and Wotton S (2015) *The state of the UK's birds 2015*. RSPB, BTO, WWT, JNCC, NE, NIEA, NRW and SNH

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 johnmeed.net/nine-wells/