The value of the green belt south of Addenbrookes, Cambridge to populations of farmland birds (2015)

Report of a survey of grid square TL4654

John Meed, January 2016

Introduction

For the last four 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.

- Corn bunting (right) and grey partridge declined by 90% between 1970 and 2007 while yellow wagtail declined by three quarters and yellowhammer, linnet and skylark declined by over 50% (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).
- 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 recent *State of Nature* report (4) states that 'farmland butterflies have declined substantially' and 'two thirds of farmland moths and beetles are declining' while 'arable plants are the fastest-declining group of plants'.

Methodology

I monitored the area throughout 2015, 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 two 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 22 and June 17

I carried out 26 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 species recorded on the two transect walks and other visits:

- On the first transect walk: 32 species and 167 individuals
- On the second transect walk: 33 species and 223 individuals
- Across the entire study period a total of 64 species

The 64 species recorded included 17 of the 19 farmland bird indicator species for the Sustainable Development Strategy, of which 14 are breeding (Appendix 5). In total I recorded 12 red list species and 20 amber list species as follows:

Breeding red list species (8)	Breeding amber list species (8)
• 22 pairs of skylarks • 15 pairs of linnets • 13 pairs of grey partridge • 11 pairs of yellowhammers (above) • 3 pairs of corn buntings • 2 pairs of starlings • 2 pairs song thrush • 1 probable pair yellow wagtails Red list visitors include lapwing, herring gull and in winter fieldfare and redwing.	• 10 pairs of whitethroats • 8 pairs of dunnocks • 3 pairs of swallows and 2 pairs each green woodpecker and mistle thrush • 1 pair each of reed buntings, bullfinch, stock dove • Kestrels, swifts and house martins nest nearby and visit regularly Amber list visitors include mallard, red kite, black-headed and lesser black-backed gull and in winter little egret, kingfisher, snipe, golden plover and meadow pipit

Grey partridge

Grey partridge numbers were exceptional throughout the year.

- Autumn counts towards the end of 2014 had shown up to 68 birds present.
- Pairs began to form in late January. At least 13 pairs were present – 3 more than last year.
- Autumn counts in late 2015 showed at least 85 birds present, and probably 93, with 11 coveys and 2 additional pairs.

This was an increase over last year's numbers. Both the pair and autumn counts are exceptional compared to other studies which suggest that the arable farms typical of Cambridgeshire support between 0–5 pairs/km^2 in spring and 0–20 birds/km^2 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/km^2 before management to around 15 pairs/km^2, while autumn densities increased from 8 birds/km^2 before management to around 80 birds/km^2 (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. A mild winter may also help to explain this year's population increase.

Skylark

Skylark populations (right), with at least 22 breeding pairs, are similar to last year (8). Skylark are mainly seen in song flight and so numbers are estimated on singing males observed (greatest on June 16th) and may be an underestimate. This population density is higher than the mean recorded for similar crops in the BTO's skylark survey (9). Winter flocks regularly numbered 30–50 birds, with 100 on December 1st.

Yellowhammer

Yellowhammer populations, at around 11 breeding pairs, are similar to the last two years. This represents around 4 pairs per km of hedgerow, which compares well with populations found by Bradbury et al (10). Densities were highest along the hedges close to Nine Wells. The most birds recorded on one occasion was 9, on March 23rd. Winter flocks were also present consistently with at least 10 birds on December 11th.

Linnet

The **linnet** population increased to at least 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 usually recorded 10–20 birds, across the whole site. In the autumn there were flocks of up to 30 birds.

Corn bunting

Three pairs of **corn bunting** bred; one more than in the previous year. There are just 11,000 birds in the UK; the RSPB's Hope Farm had 2 pairs in 2011 in almost 2km^2 (12). Corn bunting also joined winter mixed flocks.

Yellow wagtail

One pair of **yellow wagtail** (right) was also present, though I did not have definite evidence of successful breeding. The pair that had bred last year close to the new Addenbrookes development did not return.

Other red list species

At least two pairs of **starlings** bred; flocks of 30 were present early in the year and 20 in the autumn. Two pairs of **song thrush** also bred. **Lapwing** continued to feed and display in the area, but probably breed across the railway line. **Herring gull** visit regularly and **fieldfare** and **redwing** in the winter.

Amber list species

For the amber list farmland bird indicator species present:

- **Whitethroat** populations, with 10 breeding pairs, are similar to 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 7, on June 18th.
- Around 8 pairs of **dunnock** bred.
- A single pair of **reed bunting** (right) bred this year, the same as in the previous three years. A pair of **stock dove** also breed.
- **Kestrel** are present and breed nearby.

Other notable amber list breeding species include bullfinch, green woodpecker, mistle thrush 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 300 golden plover. Mallard, red kite, black-headed 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 us to 50 in the autumn) and moorhen. Buzzards bred in the woods on White Hill.

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.

My visits also showed:

- regular counts of 20+ brown hare, a city council 'priority species'; Hutchings and Harris (13) recorded 7.12 hares/km^2 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, furmitory, mallow, poppy, speedwell and viper's bugloss.

Note: a survey commissioned by Cambridge City Council (14) included two small fields in the north of the site. Their findings for these fields were broadly similar to my own.

Conclusions

1 The square kilometre of 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 – further surveys of these species would help to confirm the full environmental richness of the area.

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 the Addenbrooke's and Bell School sites has encroached on the land used by key red list species, especially grey partridge, skylark, yellowhammer (right); yellow wagtail did not breed on this part of the site in 2015 (a loss compared to 2014). To avoid further reductions in these species it will be important to maintain the remaining hedges and margins; it may also be worth implementing additional measures such as skylark plots and increased use of flower and seed mixes.

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 2016

References

1 Defra (2011) *Wildbird Populations in the UK, 1970–2010*, Statistical release 30 November 2011, p.6

2 HMSO (2005) *Securing the Future: Delivering UK Sustainable Development Strategy*, London, The Stationery Office

3 Eaton M A, Brown A F, Noble D G, Musgrove A J, Hearn R, Aebischer N J, Gibbons D W, Evans A and Gregory R D (2009) Birds of Conservation Concern 3: the Population Status of Birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds* 102, pp 296–341

4 *State of Nature* (2013), produced by 25 wildlife organisations and available from www.rspb.org.uk/stateofnature

5 www.bto.org/volunteer-surveys/bbs/research-conservation/methodology

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/km^2 in 2011. The largest UK partridge study, the Sussex Study, recorded under 2 pairs/km^2 with typically 5 birds/km^2 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/km^2 by 2008 with around 20 breeding pairs/km^2 by 2014.)

8 Meed, John (2014) *The value of the green belt south of Cambridge to populations of farmland birds: Report of a survey of grid square TL4654 (2014)*, 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 km^2; for root crops was under 10. The RSPB's Hope Farm skylark density was 6 per km^2 before management and 23 per km^2 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 18 per km^2 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 14 per km^2 after management)

12 RSPB (2012) *Hope Farm: Farming for Food and Wildlife*, RSPB. (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 much 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)

14 Applied Ecology (2014) *Cambridge Farmland Birds*, Applied Ecology Ltd

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 www.johnmeed.net

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 covey Autumn 2015

Yellowhammer south of Addenbrooke's

Appendix 2: Species recorded on visits

This list shows the 64 species recorded during the study, organised in order of are 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	First transect	Second transect	Other visits	Estimated pairs
Corn bunting	1	3	x	3
Fieldfare			x	–
Grey partridge	3		x	13
Herring gull	1		x	–
Lapwing			x	–
Linnet	16	20	x	15
Redwing			x	–
Skylark	12	15	x	22
Song thrush	2	1	x	2
Starling		7	x	2
Yellowhammer	4	5	x	11
Yellow wagtail		1	x	1
Black-headed gull	1		x	–
Bullfinch	3	2	x	1
Dunnock	5	5	x	8
Golden plover			x	–
Green woodpecker	1			2
House martin		15	x	–
Kestrel			x	–
Kingfisher			x	–
Lesser b-b gull			x	–
Little egret			x	–
Mallard	1		x	–
Meadow pipit			x	–
Mistle thrush	1	1	x	2
Red kite			x	–
Reed bunting	0	2	x	1
Snipe			x	–
Stock dove			x	1
Swallow		2	x	3
Swift	1	5	x	–
Whitethroat	3	7	x	10

Species	First transect	Second transect	Other visits	Estimated pairs
Blackbird	6	9	x	7
Blackcap	1	5	x	5
Blue tit	5	16	x	6
Buzzard			x	1
Canada goose	3		x	–
Carrion crow	2	4	x	Not counted
Chaffinch	6	4	x	6
Chiffchaff	4	1	x	3
Collared dove			x	–
Common gull			x	–
Cormorant			x	–
Goldfinch	0	2	x	2
Gt-sp woodpecker			x	1
Great tit	4	5	x	6
Greenfinch	1	4	x	4
Grey heron			x	–
Jackdaw	1	1	x	Not counted
Jay			x	1
Lesser whitethroat			x	2
Long-tailed tit	4	8	x	4
Magpie	1	6	x	Not counted
Moorhen			x	1
Mute swan			x	–
Pheasant	2	1	x	1+
Pied wagtail			x	1+
R-L partridge			x	2+
Robin	13	6	x	10
Rook	22	0	x	Not counted
Sedge warbler			x	–
Sparrowhawk			x	–
Wood pigeon	27	52	x	Not counted
Wren	10	6	x	10

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	22 (21)	Singing males; pairs; fledged young
Yellowhammer	11 (9)	Singing males; pairs; nest sites; fledged young
Linnet	15 (8)	Singing males; pairs; nest sites; fledged young
Grey partridge	13 (10)	Singing males; pairs; fledged young
Corn bunting	3 (2)	Singing male; pair; probable nest site
Yellow wagtail	1 (2)	Singing male
Song thrush	2 (2)	Singing male; pairs
Starling	2 (1)	Pairs; nest sites; fledged young
Whitethroat	10 (10)	Singing males; pairs; nest sites; fledged young
Dunnock	8 (6)	Singing males; pairs; nest sites; fledged young
Green woodpecker	2 (2)	Pairs
Reed bunting	1 (1)	Singing male; pair
Stock dove	1 (1)	Pair
Swallow	3 (2)	Singing males; pairs; nest sites; fledged young
Bullfinch	1 (1)	Pair; fledged young
Mistle thrush	2 (2)	Singing male; pairs

* Figures in brackets show estimates for 2014

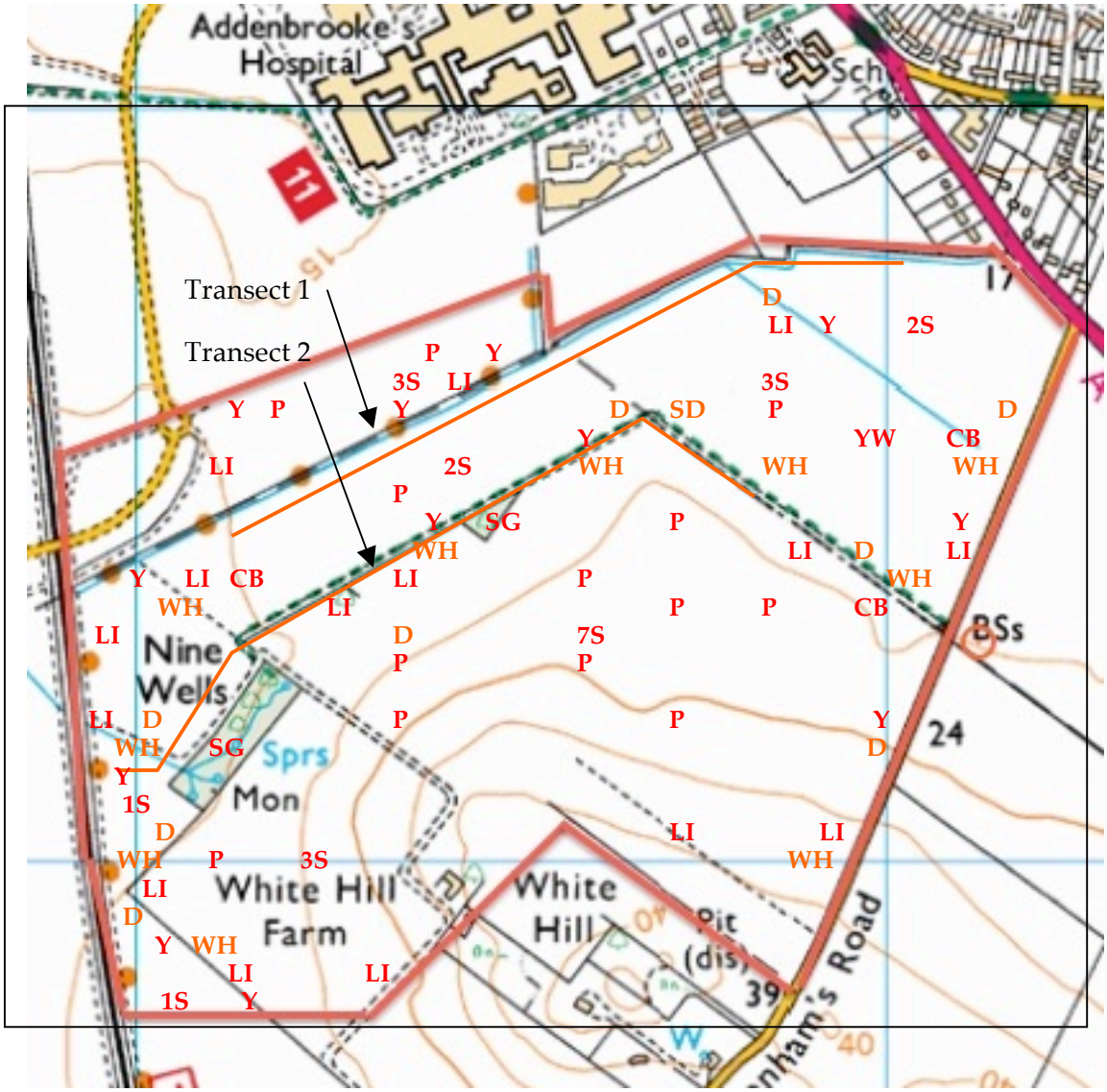
For other red and amber species: no breeding signs were observed for herring gull, lapwing, black-headed gull, kestrel, house martin, swift and mallard: these species visit regularly to feed. The red kite and lesser-black-backed gull were flying over. The fieldfare, redwing, little egret, kingfisher, golden plover, snipe and meadow pipit were winter visitors.

Appendix 4: Map showing breeding pairs

This map shows estimated breeding pairs in 2015 of the 10 red- or amber-listed farmland bird indicator species breeding in the one kilometre square:

- Dunnock (D)
- Grey partridge (P)
- Linnet (LI)
- Reed bunting (RB)
- Starling (SG)
- Stock dove (SD)
- Skylark (S)
- Whitethroat (WH)
- Yellowhammer (Y)
- Yellow wagtail (YW)

Note that where birds are recorded in close proximity males were recorded to be present at the same time.



Appendix 5: Farmland bird indicator species

This table shows the 19 species on the UK Farmland Bird Indicator; the per cent change shows their population trends for the period 1970-2007:

Species	Present?	Breeding?	Per cent change
Tree sparrow	–	–	-94%
Corn bunting	☒	☒	-90%
Turtle dove	–	–	-89%
Grey partridge	☒	☒	-87%
Yellow wagtail	☒	☒	-73%
Starling	☒	☒	-68%
Linnet	☒	☒	-58%
Lapwing	☒	–	-58%
Yellowhammer	☒	☒	-54%
Skylark *	☒	☒	-51%
Kestrel	☒	–	-35%
Reed bunting	☒	☒	-27%
Whitethroat	☒	☒	+5%
Greenfinch	☒	☒	+23%
Rook	☒	–	+41%
Stock dove	☒	☒	+55%
Goldfinch	☒	☒	+64%
Woodpigeon	☒	☒	+125%
Jackdaw	☒	☒	+136%

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

(www.rspb.org.uk/ourwork/farming/whyfarming/whyfarming/fbi/index.aspx)