

The State of Oxfordshire's Breeding Birds, and the Impact of Agricultural Intensification

P. R. Barnett

Originally published December 2000

Published online November 2023

Summary

Nationally, agricultural intensification has led to substantial changes in the countryside, with a wide-scale loss in farmland biodiversity; for instance, since the 1970s, farmland bird populations have declined markedly in the UK. This is also the case in Oxfordshire; although the number of breeding species increased in Oxfordshire in the 20th century, several species are declining or extinct. More species associated with farmland are declining compared to other habitat types. Also, more species associated with farmland have become extinct; of 14 species that became extinct in Oxfordshire in the 20th century, 12 occurred on farmland to some extent and seven of these, like the Corncrake *Crex crex*, were farmland specialists. These species are discussed in detail. Farmland species are therefore the highest conservation concern in the county.

Introduction

Farmland, encompassing arable crops, grassland and hedges, is the most extensive land-use type in the UK, and in Oxfordshire occupies about 70% of the county area. The 20th century has seen wide-scale changes in farming practice in the UK, and these, above all, have led to substantial habitat changes in the countryside.

At the start of the 20th century arable farming was in decline in the UK, as farmers were unable to compete with cheaper grain imported from America. The situation worsened in the 1920s and 1930s, and is now referred to as the agricultural depression. During this period a large reduction in the area under arable land occurred, whilst the area under grassland and scrub increased (O'Connor and Shrubbs 1986; Killick *et al.* 1998). However, during the Second World War, it was thought vital that the UK should be self-supporting in its food production so County and District War Committees ordered the ploughing up of grasslands to be converted to arable, as well as providing machinery and fertiliser. Shortly afterwards, the Agricultural Act of 1947 and subsequent European Common Agricultural Policy, which the UK joined in 1973, increased agricultural intensification, through a system of guaranteed prices and capital grants to support farm improvements. Intensification has sought to make the largest proportion of primary productivity available for human consumption, and about 25% more food per capita is produced now compared with 20 years ago (Krebs *et al.* 1999).

The substantial changes that have occurred in the countryside due to intensification, fall roughly into two groups: habitat loss by conversion to agriculture and habitat deterioration. Habitat loss includes the conversion of broad-leaved woodland, heath and scrub to agriculture, and the drainage of wetlands. Key habitat deterioration changes includes hedgerow removal, improvement of pasture, the switch from hay to silage cutting, increase in agrochemical inputs, a loss of under-sown leys and traditional rotations, new crop types and a switch from spring to autumn sowing (Stoate 1996).

These habitat changes are common throughout Oxfordshire and are documented in Fitter (1992) and Killick *et al.* (1998). Essentially, there has been a decrease (after an initial increase) in grassland from 57% of the total area of the county in 1930 to 24% in 1988, whilst the area of arable land has doubled to about 40% (Killick *et al.* 1998). Of the grassland that remains, almost all has been improved, converted to silage, using high nitrogen inputs. Silage is used as a highly nutritious cattle feed, which has increased milk yields. Consequently over 80% of calcareous grassland and 95% of neutral grassland has been lost (Fitter 1992). Another important habitat that has been reduced is hedges. A study in west Oxfordshire showed that 17% of hedges were lost between 1946 and 1986, with 57% of those remaining being intensively managed and considered species-poor (Joyce *et al.* 1988). There is also very little wetland left in the county, though restoration of large areas of wetland by the RSPB, is occurring on Otmoor. Encouragingly similar developments, on a smaller scale, are also happening at Farmoor Reservoir and in the Lower Windrush Valley. By comparison there has been a large increase in areas of standing water in the county this century, due to the creation of gravel pits and reservoirs.

Perhaps not surprisingly, there has been a decline in bird species associated with farmland, which coincides with the timing of intensification (Fuller *et al.* 1995), and it is estimated that ten million individuals of ten farmland bird species have been lost in the last twenty years (Krebs *et al.* 1999). A number of formerly abundant species such as the Song Thrush *Turdus philomelos*, Starling *Sturnus vulgaris* and House Sparrow *Passer domesticus* are declining rapidly, and are consequently of conservation concern (Gibbons *et al.* 1996). In the Banbury area wintering numbers of 13 farmland species, including the latter species, have declined by over 50% between 1975 and 1996 (Easterbrook 1999). The UK government has recognised the significance of these declines, and introduced a composite trend of 139 bird species in its list of 14 headline indicators of sustainable development (Gregory *et al.* 2000). This provides a measure of the quality of the environment by summarising the trends of common breeding birds, and includes summarised information on farmland species (based on 21 species): this shows a steep decrease of about 40% since the mid-1970s (Gregory *et al.* 2000).

The best evidence that these declines have been caused by agricultural intensification comes from detailed studies on the Grey Partridge *Perdix perdix* (Potts 1986), Cirl Bunting *Emberiza cirlus* (Evans 1997), Corncrake *Crex crex* (Tyler *et al.* 1998) and Stone Curlew *Burhinus oedicnemus* (Green *et al.* 2000) where manipulations of farming practice, essentially reversing agricultural changes, have increased local population levels.

Because of the number of changes that have occurred on farmland, there is unlikely to be a general cause, as different species have been affected by different factors. However, some general patterns do emerge. For 15 out of 28 species looked at by Siriwardena *et al.* (1998a), variation in survival appears to have contributed to changes in abundance. On the other hand, for many species, chicks reared per nesting attempt have actually increased during the period of decline (Siriwardena *et al.* 2000), although it is not known if the number of breeding attempts made has declined, which would reduce overall productivity

Here I review the population changes of breeding birds in Oxfordshire during the period 1900 – 2000, in particular since 1970, the period during which intensification

has been the most pronounced. I also review the reasons why species have become extinct as breeding birds in the county.

Methods and Sources of Information

Population changes of Oxfordshire breeding birds between 1970 and 1999 were assessed using three main information sources. (1) Data from Common Bird Census (see Marchant *et al.* 1990) sites at Kingston (farm), Kidlington (farm), Little Milton (farm), Sydlings Copse (wood) and Wytham (wood). (2) The Banbury Ornithological Society's Annual Breeding Bird Surveys (Easterbrook 1994). (3) Assessment of recent population changes noted in the *Birds of Oxfordshire* (Brucker *et al.* From this all annual breeding species (proved or probable breeding, 1990-1999 inclusive) were placed in one of three categories: declining (by 10% or more), no evidence of any population change (stable), or increasing (by 10% or more).

Species were also assigned to one of the five main habitat types that occur in the county. These are farmland, woodland, urban, water bodies (all areas of standing water, rivers, streams etc) and wetland (fen, marsh, reed bed etc.). Species were placed in a category on a subjective assessment of the habitat type in which the largest proportion of the population was found, at the start of the period (1970) using, in particular, Radford (1966) and Brucker *et al.* (1992). Species were then classified according to whether they are habitat specialists, in that the majority of the population is found in one habitat type, or generalists (see Siriwardena *et al.* 1998b).

Detailed information on occasional breeding species (species that have not yet become established as breeding birds in Oxfordshire and do not breed annually), and extinct species (species that formerly bred annually, in many cases in good numbers, but no longer breed in the county or only occasionally breed), was extracted from a literature review of published county avifaunas (Aplin 1889; Jourdain 1926; Alexander 1947; Radford 1966; Brucker *et al.* 1992) and county bird reports for Oxfordshire. These have been published annually since 1915 by the OOS, and are cited as OOS and the year covered. Habitat information on occasional breeding species was taken from Gibbons *et al.* (1993).

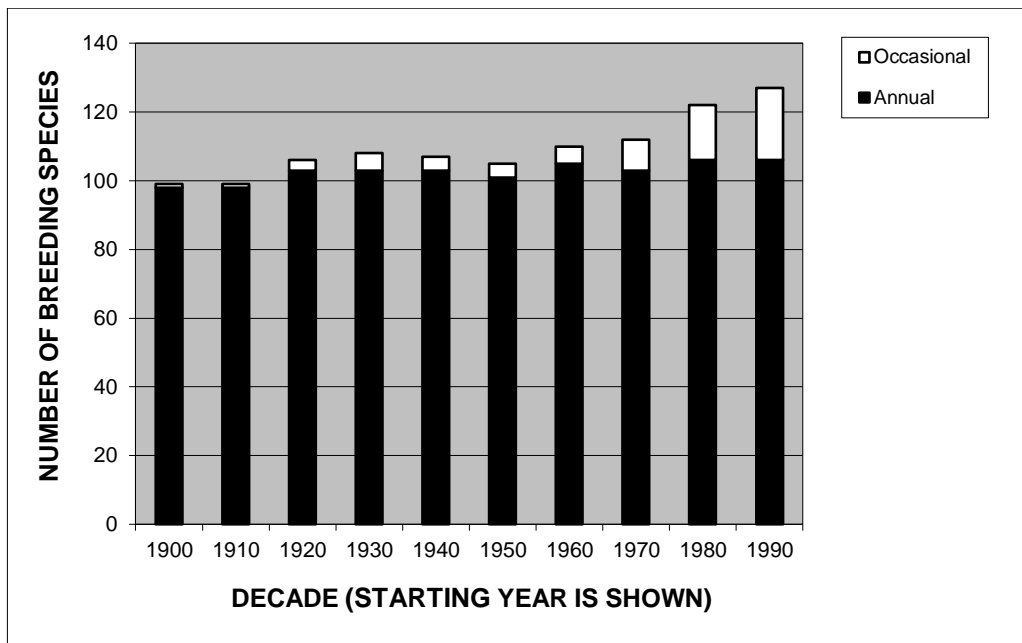
Analysis of Population Changes

In total, 137 species bred or probably bred in Oxfordshire in the 20th century. (Spotted Crake *Porzana porzana*, Oystercatcher *Haematopus ostralegus* and Serin *Serinus serinus* were not confirmed.) At present these currently fit into three categories: (1) 99 annual breeding species (Table 1), (2) 24 occasional breeders (Table 2) and (3) 14 extinct species (Table 3).

Of the 99 species that currently breed annually, 34 species are declining, 30 are stable and 35 are increasing. The most important habitats, numerically, for breeding species are: farmland, woodland and water bodies.

The number of species that bred in the county each decade is shown in Figure 1. The trend is of a gradual increase during the century until a large increase in the 1980s and 1990s. This is perhaps surprising given that a number of species are either extinct or declining in the county. However, species that have become extinct (14) have been more or less offset by colonist species (15), and there has been, in particular recently, an increase in occasional breeding species.

Figure 1. Number of proved or probable breeding bird species in Oxfordshire, in each decade. There has been a recent increase in breeding species, mainly due to an increase in occasional (sporadic) breeders.



Species that have colonised (species that were not breeding at the start of the 20th century but are now regular breeders) are shown in bold in Table 1. This shows that there have been 15 colonists; four, like the Greylag Goose *Anser anser*, are the result of introductions by humans and 10 are water-body specialists, such as the Pochard *Aythya ferina* and Common Tern *Sterna hirundo*. Thus the creation of several gravel pits and reservoirs in Oxfordshire has been partly responsible for the increase in breeding species in the county. Only two colonists can be described as farmland birds, Curlew *Numenius arquata* (first bred in 1925) and Collared Dove *Streptopelia decaocto* (first bred in 1963).

The number of occasional breeding species has increased markedly since the 1970s, which is, to some extent, due to increased observer coverage. These species, shown in Table 2, are habitat specialists (22 out of 24), of which 7 are woodland specialists and none are farmland specialists. These species are generally scarce nationally, which partly explains why they do not breed regularly in Oxfordshire.

Table 4 shows the main habitats and the population trends of species occurring in these habitats. This shows that there are significant differences between the main habitat types: farmland, woodland and water bodies ($\chi^2 = 18.393$, d.f. = 4, $p < 0.001$). More farmland species are declining and fewer are stable or increasing than would happen by chance. More water-body species are increasing and fewer are declining than would happen by chance and more woodland species are stable, with fewer declining or increasing than would happen by chance. These results are retained when the analysis is constrained to the population trends of habitat specialists (species largely confined to one habitat type) ($\chi^2 = 23.239$, d.f. = 4, $p = 0.0001$).

A disproportionate number of farmland specialists, 71%, are thus declining and only the Red-legged Partridge *Alectoris rufa* is increasing, which is maintained by introductions. Fewer (33%) woodland specialists are declining, though these include

species like the Lesser Spotted Woodpecker *Dendrocopos minor*, which has decreased markedly in the county (Brucker *et al.* 1992). Also a number of declining generalist species, such as Song Thrush and Nightingale *Luscinia megarhynchos* occur in woodland or woodland edge habitats and thus woodland should be an important conservation priority in the county. By comparison 67% of water-body specialists are increasing, a reflection of the increase in gravel pits and reservoirs.

Overall, there is no significant difference in population trends between habitat specialists and habitat generalists ($\chi^2 = 0.119$, d.f. = 4, n.s.). There are also no significant differences in the population trends of migrants and residents ($\chi^2 = 4.430$, d.f. = 2, n.s.). Therefore, these analyses suggest that the population declines are indeed the result of agricultural changes rather than the result of other factors.

The decline of farmland specialists in Oxfordshire agrees with the national trend: between 1968 and 1995, of 42 common farmland birds, 13 farmland specialists declined by an average of 30%, whilst 29 habitat generalists increased by 23% (Siriwardena *et al.* 1998a) in the UK.

Table 1. Current annual breeding bird species in Oxfordshire, and their overall population trends between 1970 and 1999.

T = population trend: ↑ = increasing, by 10% or more, ↓ = decreasing by 10% or more, - = stable. H = main habitat type: F = farmland, W = woodland, WB = water bodies, WE = wetland, U = Urban. S/G = habitat specialist or generalist. OH = other habitats (as above). M = migrant status: M = migrant, R = resident. See Brucker *et al.* (1992) for scientific names. Species in bold are colonists, not breeding at the start of the 20th century.

Species	T	H	S/G	OH	M
Little Grebe	-	WB	S		R
Great Crested Grebe	↑	WB	S		R
Grey Heron	-	WB	S		R
Mute Swan	-	WB	S		R
Canada Goose	↑	WB	S		R
Greylag Goose	↑	WB	S		R
Gadwall	↑	WB	S		R
Mallard	↑	WB	G	F/WE	R
Pochard	↓	WB	S		R
Tufted Duck	↑	WB	S		R
Ruddy Duck	↑	WB	S		R
Red Kite	↑	W	G	F	R
Sparrowhawk	↑	W	G	F/U	R
<i>Buzzard</i>	↑	W	G	F	R
Kestrel	-	F	S		R
Hobby	↑	F	G	W	M
Red-legged Partridge	↑	F	S		R
Grey Partridge	↓	F	S		R
Quail	-	F	S		M
Pheasant	↑	W	G	F	R
Water Rail	-	WE	S		R
Moorhen	↓	F	G	WB/WE	R
Coot	↑	WB	S		R
Little Ringed Plover	↑	WB	S		M

Species	T	H	S/G	O H	M
Ringed Plover	↑	WB	S		R
Lapwing	↓	F	S		R
Snipe	↓	F	G	WE	R
Woodcock	-	W	S		R
Curlew	↓	F	G		R
Redshank	↓	F	G	WE	R
Black-headed Gull	↑	WB	S		R
Common Tern	↑	WB	S		M
Rock Dove	↑	U	G	F	R
Stock Dove	-	F	G	W	R
Woodpigeon	-	F	G	W	R
Collared Dove	↑	F	G	U	R
Turtle Dove	↓	F	S		M
Cuckoo	-	F	G	W	M
Barn Owl	↓	F	S		R
Little Owl	-	F	G	W	R
Tawny Owl	-	W	S		R
Long-eared Owl	-	W	G	F	R
Swift	-	U	G	F	M
Kingfisher	↓	WB	S		R
Green Woodpecker	-	W	S		R
Great Spotted Woodpecker	-	W	S		R
Lesser Spotted Woodpecker	↓	W	S		R
Skylark	↓	F	S		R
Sand Martin	-	WB	S		M
Swallow	↓	F	G	U	M
House Martin	-	U	G	F	M
Meadow Pipit	-	F	S		R
Yellow Wagtail	↓	F	G	WE	M
Grey Wagtail	↓	WB	S		R
Pied Wagtail	-	F	G	WB	R
Wren	-	F	G	W/U	R
Duncock	↓	F	G	W/U	R
Robin	-	F	G	W/U	R
Nightingale	↓	W	G	F	M
Blackbird	↓	F	G	W/U	R
Song Thrush	↓	F	G	W/U	R
Mistle Thrush	↓	F	G	W/U	R
Cetti's Warbler	↑	WB	S		R
Grasshopper Warbler	↓	F	G	WE	M
Sedge Warbler	-	WB	G	FWE	M
Reed Warbler	-	WB	G	WE	M
Lesser Whitethroat	-	F	G	W	M
Whitethroat	-	F	G	W	M
Garden Warbler	-	W	G	F	M
Blackcap	-	W	G	F	M
Chiffchaff	-	W	G	F	M
Willow Warbler	↓	F	G	W	M

Species	T	H	S/G	OH	M
Goldcrest	-	W	G	F/U	R
Spotted Flycatcher	↓	U	G	F/W	M
Long-tailed Tit	↑	F	G	W/U	R
Marsh Tit	↓	W	S		R
Willow Tit	↓	W	S		R
Coal Tit	↑	W	G	P	R
Blue Tit	-	F	G	W/U	R
Great Tit	-	F	G	W/U	R
Nuthatch	-	W	S		R
Treecreeper	-	W	S		R
Jay	-	W	S		R
Magpie	↑	F	G	W/U	R
Jackdaw	↑	F	G	W/U	R
Rook	-	F	G	W/U	R
Carrion Crow	↑	F	G	W/U	R
Starling	↓	F	S		R
House Sparrow	↓	U	G	F	R
Tree Sparrow	↓	F	S		R
Chaffinch	↑	F	G	W/U	R
Greenfinch	↑	F	G	U	R
Goldfinch	-	F	S		R
Linnet	↓	F	S		R
Bullfinch	↓	F	G	W	R
Hawfinch	↓	W	S		R
Yellowhammer	↓	F	S		R
Reed Bunting	↓	F	G	WB/WE	R
Corn Bunting	↓	F	S		R

Table 2. Occasional breeding bird species in Oxfordshire

H = main habitat type, S/G = habitat specialist or generalist, OH = other habitats and M = migrant status. See Brucker et al. (1992) for scientific names. Refer to Table 1 for code definitions. Habitat information is taken from Gibbons et al. (1993).

Species	H	S/G	OH	M
Egyptian Goose	WB	S		R
Shelduck	WB	S		R
Teal	WE	S		R
Garganey	WE	S		M
Shoveler	WE	S		R
Mandarin	WB	S		R
Montagu's Harrier	F	S		M
Goshawk	W	S		R
Peregrine	U	G	F/W	R
Golden Pheasant	W	S		R
Lady Amherst's Pheasant	W	S		R
Spotted Crake	WE	S		R
Oystercatcher	WB	S		R
Common Sandpiper	WB	S		M
Ring-necked Parakeet	U	S		R
Dipper	WB	S		R
Black Redstart	U	S		R

Firecrest	W	S		R
Pied Flycatcher	W	S		M
Raven	W	G	F/U	R
Siskin	W	S		R
Redpoll	W	S		R
Crossbill	W	S		R
Serin	U	S	F	M

Table 3. Extinct breeding species in Oxfordshire.

H = main habitat type, S/G = habitat specialist or generalist, OH = other habitats and M = migrant status. See Brucker *et al.* (1992) for scientific names. Refer to Table 1 for code definitions.

Species	H	S	OH	M
Corncrake	F	S		M
Stone Curlew	F	S		M
Nightjar	W	G	F	M
Wryneck	F	G	W/U	M
Woodlark	F	G	W	R
Tree Pipit	W	G	F	M
Redstart	F	G	W	M
Whinchat	F	S		M
Stonechat	F	S		R
Wheatear	F	S		M
Marsh Warbler	WB	S		M
Wood Warbler	W	S		M
Red-backed Shrike	F	S		M
Cirl Bunting	F	S		R

Table 4. Main habitat types of Oxfordshire breeding birds, and their population trends.

Habitat	Farmland	Woodland	Urban	Water Bodies	Wetland
Increasing	9	5	1	15	0
Stable	16	12	2	6	1
Declining	24	5	2	3	0

Extinct Species

Of the 14 species that are extinct in Oxfordshire (Table 3), the main habitat type for 10 was farmland and these included 7 farmland specialists. 11 of these species were migrants suggesting that factors outside the UK, as well as agricultural changes may have been critical. However, of the species that have become extinct in Oxfordshire, it is perhaps telling that all seven farmland specialists, such as the Corncrake have done so since the Agricultural Act of 1947. Recently, it has been suggested that these vacant niches will be filled by other species (Sharrock 1999), but there is no evidence of this happening in Oxfordshire.

Corncrake *Crex crex*

In the 19th century the Corncrake, with its distinctive ‘creking’, was formerly “commonly distributed throughout the county”, particularly in the river valleys (Aplin 1889). By the start of the 20th century it was declining so that by 1926 it was “not

plentiful” in Oxfordshire (OOS 1926), though still numerous along river valleys. This was still the case in 1933, when at least 12 were heard along the Thames between Newbridge and Chimney (OOS 1933). In 1947 it was noted that “during the last sixty years numbers have steadily decreased, and it is doubtful whether any now breed in the county” (Alexander 1947); breeding was last confirmed in Oxfordshire in 1953 (OOS 1953). A long-term decline occurred nationally from the mid 1800s, due to earlier and mechanised cutting of hay meadows and, more recently, a switch from hay to silage management (Tyler *et al.* 1998). In Oxfordshire, it was noted that “many nests with eggs and young are cut when mowing in June” (OOS 1920): for instance a nest with eight eggs was mown in a meadow near Aston on 16th July 1924 (OOS 1924). Calling birds have been heard recently (1994 and 1999), reflecting the recent increase in the national population, but there is little hope of the species re-establishing itself as a breeding bird without wide-scale change in grassland management.

Stone Curlew *Burhinus oedicnemus*

The Stone Curlew population declined in the 19th century in Oxfordshire, so that by the end of the century it was “of very local distribution” (Aplin 1889). Formerly, it had been more widespread in areas of “sheep country, heaths, and open stony ground” (Aplin 1889) but many of these areas, like the Burford Downs, had been deserted as they were “entirely under the plough” (Aplin 1889). At the start of the 20th century, it was still breeding in small numbers on the Chilterns and Berkshire Downs but “in decreasing numbers” (OOS 1926). Large autumn flocks were still often seen, including 60-80 in 1941 and 60 in 1946. In 1956, a “marked decrease” (OOS 1956) occurred on the Chilterns, which Radford (1966) attributed to the cultivation and ploughing-up of the chalk grassland, though loss of rabbit grazing due to myxomatosis, resulting in an increase in scrub was also a factor. The largest autumn flock recorded in the 1950s was 36 and, since 1962, the largest flock recorded has been 11. In 1982, it was noted that “agricultural ‘improvements’ threaten the future” of the species (OOS 1982) and it last bred on the Chilterns in 1985. A few pairs still breed on the Berkshire Downs, but the Stone Curlew has not bred in Oxfordshire since 1996. The loss of mixed farming, semi-natural grassland and spring-sown crops are key factors behind the steep long-term decline in the UK (Green *et al.* 2000).

Nightjar *Caprimulgus europaeus*

The Nightjar was “not at all common” at the end of the 19th century (Aplin 1889). It would have been more numerous before most of the lowland heath was ploughed, of which only 2.5ha now remain in the county. However, it was more common on the Chilterns and at a handful of sites near Oxford, including Shotover and Bagley Wood, where its nocturnal churring could be heard (Aplin 1889). Its status remained largely unchanged throughout the first half of the 20th century: the 1934 OOS survey found 12-13 pairs within six miles of Oxford (OOS 1934) and, in July 1944, 12 males were heard on the Swyncombe Downs (OOS 1944). However, by the early 1960s, the population had suffered a steep decline and there were none on the Chilterns in either 1960 or 1961, though breeding did occur on the Berkshire Downs until 1966 and on the Chilterns until 1976 (Brucker *et al.* 1992). The decline is attributed to the loss, or change in management of its habitat (Brucker *et al.* 1992, Morris *et al.* 1994), which, in the 20th century, was downland and open woodland in Oxfordshire. The Nightjar now occurs as a rare passage migrant, although a recent increase in the UK population may mean that species will again be heard churring in suitable areas.

Wryneck *Jynx torquilla*

In the mid 19th century, the Wryneck was “very common about Oxford” (Aplin 1889), it was also common nationally and in some areas was the commonest woodpecker. However, it was in decline by the end of the 19th century, when Aplin noted that its “present rarity is remarkable” (Aplin 1892). By 1931, the species was confined to the south-east of the county, mainly in the Caversham area and the Wryneck last bred in Oxfordshire at this locality in 1955 (Brucker *et al.* 1992). A long-term decline began nationally in the mid 1800s and this species is virtually extinct in the UK. Peal (1968) attributed this to the loss and reduced quality of grassland, resulting in a reduced ant population: a key food source.

Woodlark *Lullula arborea*

The Woodlark was “extremely local” and reliably recorded only on the Chilterns at the end of the 19th century (Aplin 1889). The population increased from the 1920s onwards, in particular from the late 1930s and 1940s, when there were at least 12 pairs on the Chilterns and several new localities were colonised, including Bladon Heath, Wytham, the Berkshire Downs, Shotover and Boars Hill (Brucker *et al.* 1992). After the mid 1950s, a dramatic decline occurred, so that by 1960 the species was confined to the Chilterns and Berkshire Downs, and the last confirmed breeding occurred on the Chilterns in 1966 (OOS 1966). The causes of the initial increase are poorly understood, though the subsequent decline in downland areas is thought to have been caused by agricultural changes (mainly loss of suitable grassland) and myxomatosis; this led to reduced grazing by rabbits, causing the preferred short grassland to be lost (Sitters *et al.* 1996). Since 1972, there have been only three records, in 1985, 1993 and 1994. The species is now increasing nationally and may return.

Tree Pipit *Anthus trivialis*

The Tree Pipit is the most recent species to have become extinct as a breeding species in Oxfordshire: the last proved breeding occurred in 1992 and it is now a scarce passage migrant (OOS 1998). Tree Pipits were fairly local and “thinly distributed preferring grasslands, hillsides and glades, to arable” where the species performed its “parachuting” display flight (Jourdain 1926). They became more widespread in the 1950s and 1960s, probably as a result of habitat changes associated with reduced grazing by rabbits due to myxomatosis (Gosler 1990; Brucker *et al.* 1992). After this, a decline began: in the Oxfordshire part of the BOS area, where there were 43 males in 1968, there were none in 1989 (Easterbrook 1994). A national decline has occurred since the 1940s: about half the population is found in woodland and the other half on grassland, where agricultural changes have led to habitat loss (Marchant *et al.* 1990).

Redstart *Phoenicurus phoenicurus*

At the end of the 19th century, the Redstart was a common breeding bird in Oxfordshire (Aplin 1889). The species suffered a temporary decline in the 1920s and 1930s, but an OOS survey in 1963 located at least 75 pairs in Oxfordshire, with 42 pairs on farmland (nesting in pollarded riverside willows) and 33 pairs in woodland (OOS 1963). In the Banbury area, it was noted that the “immediate general habitat” was pasture, grazed by domestic stock (OOS 1963). The species was still common at the start of the 1970s: in 1972, there were 15 males in Wytham and 12 males along the Thames between Waterperry and Shabbington (OOS 1972). However, in 1975,

there were “very few records” (OOS 1975) and, in 1985, there were no breeding records at all. Breeding has been confirmed only twice since. The Redstart has declined in lowland England in recent years; the causes are unknown, although changes in agriculture are probably implicated (Gibbons *et al.* 1993). The widespread switch from hay to silage grassland management since 1970 may have affected the bird’s invertebrate food supply. However, this does not explain why they have been lost from woodlands.

Whinchat *Saxicola rubetra*

The Whinchat was, a fairly common breeder in the county, being “very common in some seasons” in the 19th century (Aplin 1889). It was found in a variety of habitats including downland, low-lying meadows, railway cuttings and roadside verges. It was still fairly common until the 1960s (OOS 1932; OOS 1960), when Radford (1966) found it to be “becoming rare” and predicted that “the ploughing up of their breeding areas - already much restricted - may lead to the loss of the Whinchat.” For example, a site near Kidlington that held 3-4 pairs was ploughed up in 1953 (OOS 1953). However, there were still several pairs left at the start of the 1970s: for instance, 12 pairs at two sites near Banbury in 1969 (OOS 1969), but since 1974 regular breeding has ceased, though one or two pairs still breed occasionally on the Berkshire Downs, most recently in 1997. This species has declined nationally since the Second World War, particularly in lowland England. Whinchats prefer rough grassland, and much of this habitat has been lost as the result of agricultural intensification (Marchant *et al.* 1990). The extinction in Oxfordshire coincides, like the Redstart, with the switch from hay to silage, which may have caused a reduction in its invertebrate food supply.

Stonechat *Saxicola torquata*

The Stonechat was “very local” at the end of the 19th century (Aplin 1889), although it was “numerous” on the Chilterns; as it was found to be during the OOS survey of 1932 (OOS 1932). Here it nested in gorse and juniper bushes, which were increasingly lost as much of the area was ploughed. It last nested on the Chilterns in 1949, and in 1966 it was described as a “former resident” (Radford 1966). Between 1949 and 1978, there were occasional breeding records, but there has been no evidence of breeding since (Brucker *et al.* 1992). This species has declined nationally and again this has been linked to habitat loss as a result of agriculture intensification and urban development since the Second World War (Marchant *et al.* 1990).

Wheatear *Oenanthe oenanthe*

Though never a common breeder in Oxfordshire, a pair of Wheatears bred as close to Oxford as Marston Ferry between 1877 and 1880 (Aplin 1889). It was reasonably common on the Chilterns and the Berkshire Downs and bred regularly at Cumnor in the early part of the 20th century (Jourdain 1926, OOS 1931). In 1936 it was “decreasing on the Chilterns” (OOS 1936) and since 1952 breeding has occurred on only a few occasions, with none since the Oxfordshire Atlas (1985-1988, Brucker *et al.* 1992). A national decline has occurred since the Second World War, as suitable breeding areas, particularly chalk grassland, have been ploughed up or afforested (Marchant *et al.* 1990). The agricultural depression and loss of rabbit grazing, which led to an increase in scrub, were also factors.

Marsh Warbler *Acrocephalus palustris*

Marsh Warblers first bred in Oxfordshire, near Kingham in 1890 (a record from Broughton Grange in 1886 was considered suspect by Jourdain (1926)), where up to three pairs nested until 1904, when the osier bed was cut (Warde Fowler 1913). Breeding was not confirmed again until 1920, but in 1926 the unique mimicry song was heard “near Oxford and at several localities on the Isis and in the Kennet valley” (Jourdain 1926), indicating that they had been overlooked. It nested on occasions up to 1947, but apart from a breeding record in 1960, this species now occurs only as a very rare spring migrant (Brucker *et al.* 1992). Nationally, a decline began around the 1940s in the West Midlands heartland (Kelsey *et al.* 1989). The causes are poorly understood, though the initial decline may have been caused by habitat loss, which partly resulted from agricultural changes: for instance, the loss of osier beds and herb-rich vegetation adjacent to rivers (Kelsey *et al.* 1989). External factors have also probably been involved, such as isolation from the continental population (Kelsey *et al.* 1989).

Wood Warbler *Phylloscopus sibilatrix*

At the end of the 19th century the Wood Warbler was “extremely local in distribution”, though a “great many pairs” were found at Nuneham Park (Aplin 1889). However, by 1933, it was “unusually scarce near Oxford” (OOS 1933), though it continued to be encountered during the summer months in the Chiltern beech woods. Since 1981 regular breeding has ceased, and it last bred in 1993, when three males held territory in Wytham (OOS 1993). This species is not declining nationally, though some midland counties also suffered losses. The causes are not understood (Gibbons *et al.* 1993).

Red-backed Shrike *Lanius collurio*

The Red-backed Shrike was “rather a rare bird except in the neighbourhood of Oxford and perhaps in the extreme south of the county” at the end of the 19th century (Aplin 1889). The species was doing well at the start of the 20th century: it increased in the Kingham area (Aplin 1907) and in 1920 it was present in “quite unusual numbers” in the Oxford district (OOS 1920). Subsequently, a decline occurred: in 1928 and 1937, absences from “several regular haunts near Oxford”, such as Wolvercote, were noted (OOS 1927; OOS 1937). The species was still locally common up to the mid 1950s: Boars Hill held four to five pairs between 1941 and 1950, and it even bred within Oxford (at Headington and Bullingdon Bog) until 1955 (OOS 1955). There was then a marked decline, so that only three pairs were recorded in 1960, at traditional sites, which by 1964 had been abandoned (OOS 1960; 1964). The species last bred in Oxfordshire in 1967 and since then there have only been three records: in 1978, 1983 and 1993. This species is now virtually extinct in the UK. Agricultural intensification leading to a loss of traditionally managed pasture (reduced invertebrates) and scrub (nesting habitat) is thought to be at least partly responsible for the decline (Vanhinsbergh 2000). A long-term decline has also occurred in NW Europe, which may also be linked to, unknown, external factors.

Cirl Bunting *Emberiza cirlus*

In the late 19th century the Cirl Bunting was a fairly local species, the stronghold being on the Chilterns, where it was relatively common (Aplin 1889). They were still common in these areas in the 1930's: for instance several were singing from juniper

bushes on Ewelme Down in May 1931 (OOS 1931), and three pairs were present in a strip, about half a mile long, at the base of the Chilterns in May 1937 (OOS 1937). However, a decline occurred from at least the 1960s onwards; in 1960, it was described as being “very local” (OOS 1960) and the species last bred on the Berkshire Downs at the start of the 1970s and on the Chilterns in 1979 (Brucker *et al.* 1992). This species has not been recorded in Oxfordshire since 1991. A dramatic decline occurred nationally from the 1950s, and the species is now mainly confined to Devon. Loss of stubble fields (a vital food resource) in the winter and of grass margins around crops (which provide insects for chicks) in the summer are critical causes of the decline (Evans 1997).

Prospects

The main habitat for a number of declining bird species in the county is farmland, and this was also the case for the majority of the extinct species. Furthermore all the available evidence suggests that these declines are the result of changes in agricultural practice, rather than any other factor. This has parallels with changes that have occurred in the flora of Oxfordshire. Although the number of plant species has increased in Oxfordshire, mainly due to introductions, changes in farming practice have reduced the ranges and abundance of most species, and only a small number, herbicide-tolerant weeds like Cleavers *Galium aparine*, have benefited (Killick *et al.* 1998). For instance, the blue flower of the Corncockle *Lychnis githaga* was once a common sight in Oxfordshire, but is now virtually extinct as a wild species in the UK, due, amongst other things, to better seed-cleaning techniques.

Clearly wide-scale policy changes, within the economical and practical constraints of modern farming, are required to reverse these changes and conserve farmland biodiversity. At present, there are three agricultural schemes that are likely to benefit farmland wildlife on a national scale. The first of these, set-aside, was introduced in 1992 after a major reform of the European Common Agricultural Policy (CAP). Although this was introduced to reduce the financial burden provided by surpluses, set-aside can have a number of wildlife benefits: for instance by planting of ‘Wild Bird Cover,’ and leaving stubbles, which are favoured by seed-eating birds, unploughed in the winter. However set-aside is likely to decrease in the long term. The other national policies, Environmentally Sensitive Areas (ESA) and the Countryside Stewardship Scheme, offer longer-term potential for wildlife benefits, by paying farmers to preserve traditional landscape features. For example, much of the low intensity farming on Otmoor is supported by the ESA. Agenda 2000 is a recent major reform of the CAP, and further extends the environmental emphasis of the CAP. It provides incentives for lower-intensity farming, for example by making payments relating to area rather than number of livestock (Bignal 1999), which should prove beneficial to wildlife.

Organic farming has been shown to have some biodiversity benefits (see Krebs *et al.* 1999), and may prove to have substantial benefits as it is less intensive than conventional farming. Synthetic pesticides are not used, there is greater habitat heterogeneity due to mixed farming, hedges tend to be larger, and spring cereals are grown. Although organic farming is still uncommon in the UK, the Government has allocated £140m to assist conversion from conventional production over the next six years under the Organic Farming Scheme, as well as increasing the amount of money available for organic research and development.

Until recently farmland ecology was a neglected area, but there is now a substantial amount of research being conducted, which will help develop techniques for improving biodiversity on conventional farms, as well as monitoring the benefits of agri-environment schemes. At Loddington, a 333ha farm in Leicestershire, the Game Conservancy Trust has shown that wildlife and economical conventional farming can co-exist. Here they have developed the use of a variety of management techniques such as ‘conservation headlands’. These use only selective herbicides, and no insecticides are used in the outer 6m of the crop. The use of techniques like this has increased numbers of species like the Song Thrush and the Brown Hare *Lepus europaeus* on the farm (Boatman and Stoate 1999). How costly these practices are, and hence how viable to other farmers, depends on the structure of the CAP.

About 100 years ago, Aplin published a series of observations on the birds of Oxfordshire, mainly in the Kingham area, in the *Zoologist* (1892-1914), indicating how common farmland species once were. For instance, on 31 December 1903, he noted, “I have seldom seen so many small birds frequenting the stubbles as one sees now. Larks, Starlings, Tree-Sparrows, Greenfinches and a good many Linnets” (Aplin 1905). It remains to be seen whether current agri-environment policies have sufficient benefits to reverse the declines and restore the populations of farmland birds to their former level. If not, more species, such as Tree Sparrow, will surely become extinct in Oxfordshire.

Acknowledgements

I thank Peter Abbott, Peter Pool and Catherine Ross for supplying data from CBC sites. Comments from Richard Bradbury, John Brucker, Rob Fuller, Andrew Gosler, Mark Whittingham, Mike Wilson and Jeremy Wilson improved an earlier draft of this paper.

P. R. Barnett. Edward Grey Institute of Field Ornithology, Department of Zoology, Oxford University, Oxford OX1 3PS.
Philip.Barnett@zoo.ox.ac.uk

References

- Alexander, W. B. 1947. *A Revised List of the Birds of Oxfordshire*. OOS, Oxford.
- Aplin, O.V. 1892. Supplementary notes on the Birds of Oxfordshire. *The Zoologist*, 16 (third series): 251.
- Aplin, O.V. 1889. *The Birds of Oxfordshire*. Clarendon Press, Oxford.
- Aplin, O.V. 1905. Notes on the ornithology of Oxfordshire, 1903. *The Zoologist*, 9 (fourth series): 461.
- Aplin, O.V. 1907. Notes on the ornithology of Oxfordshire, 1905 -1906. *The Zoologist*, 11(fourth series): 334.
- Bignal, E. 1999. Agenda 2000 The Common Agricultural Policy reform proposals. *British Wildlife*, 10: 172-179.
- Boatman N, Stoate C 1999 Arable farming and wildlife- can they co-exist. *British Wildlife*, 10: 260-267.
- Brucker, J.W., Gosler, A.G., Heryet, A.R. 1992. *Birds of Oxfordshire*. Pisces Publications, Oxford .

- Chamberlain, D. E., Fuller, R. J., Bunce, R. G. H., Duckworth, J. C. and Shrubbs, M. 2000. Changes in the abundance of farmland birds in relation to the timing of agricultural intensification in England and Wales. *Journal of Applied Ecology*, 37: 771-778.
- Easterbrook, T. G. 1994. *The New Birds of the Banbury Area*. BOS, Banbury.
- Easterbrook, T. G. 1999. Population trends of wintering birds around Banbury, Oxfordshire, 1975-96. *Bird Study*, 46: 16-24.
- Evans, A. D. 1997. The importance of mixed farming to seed-eating birds in the UK. In *Farming and Birds in Europe* (eds. Pain, D. J. & Penkowski, M. W.), pp. 331-357. Academic Press, London.
- Fitter, R. S. R. 1992. Bird Habitats in Oxfordshire. In *Birds of Oxfordshire* (Brucker JW, Gosler AG, Heryet AR), pp. 16-29. Pisces Publications, Oxford.
- Fuller, R. J., Gregory, R. D., Gibbons, D. W., Marchant J. H., Wilson, J. D., Baillie, S. R., Carter, N. 1995. Population declines and range contractions among lowland farmland birds in Britain. *Conservation Biology*, 9: 1425-1441.
- Gibbons, D. W., Reid, J. B., Chapman, R. A. (eds.) 1993. *The Atlas of Breeding Birds in Britain and Ireland: 1988-1991*. T. & A. D. Poyser, Calton.
- Gibbons, D. W., Avery, M., Baillie, S. R., Gregory, R., Kirby, J., Porter, R., Tucker, G., Williams, G. 1996. Bird Species of Conservation Concern in the United Kingdom, Channel Islands and the Isle of Man: revising the Red Data List. *RSPB Conservation Review*, 10: 7-18.
- Gosler, A. G. 1990. The birds of Wytham - an historical survey. *Fritillary*, 1: 29 –74.
- Green, R. E., Tyler, G. A., Bowden, C. G. R. 2000. Habitat selection, ranging behaviour and diet of the stone curlew (*Burhinus oedicephalus*) in southern England. *Journal of Zoology*, 250: 161 –183.
- Gregory, R. D., Noble, D. G., Campbell, L. H., Gibbons, D. W. 2000. *The State of the UK's Birds 1999*. RSPB and BTO, Sandy.
- Jourdain, F. C. R. 1926. The Birds of Oxfordshire. In *The Natural History of the Oxford District* (ed. Walker, JJ). Oxford University Press, London.
- Joyce, B., Williams, Woods, A. 1988. Hedgerows: still cause for a concern. *RSPB Conservation Review*, 2: 34-37.
- Kelsey, M. G., Green, G. H., Garnett, M. C., Hayman, P. V. 1989. Marsh Warblers in Britain. *British Birds*, 82: 239-256.
- Killick, H. J., Perry, A. R., Woodell, S. R. J. 1998. *The Flora of Oxfordshire*. Pisces Publications, Newbury.
- Krebs, J. R., Wilson, J. D., Bradbury, R. B., Siriwardena, G. M. 1999. The second Silent Spring? *Nature*, 400: 611-612.
- O'Connor, R. J., Shrubbs, M. 1986. *Farming and Birds*. Cambridge University Press, Cambridge.
- Marchant, J. H., Hudson, R., Carter, S. P., Whittington, P. A. 1990. *Population trends in British breeding birds*. BTO, Tring.

- Morris, A., Burges, D., Fuller, R. J., Evans, A. D., Smith, K. W. 1994. The status and distribution of Nightjars *Caprimulgus europaeus* in Britain in 1992. A report to the British Trust for Ornithology. *Bird Study*, 41: 181-191.
- Peal, R. E. F. 1968. The distribution of the Wryneck in the British Isles. *Bird Study*, 10: 112-132.
- Potts, G. R. 1986. *The Partridge. Pesticides, Predation and Conservation*. Collins, London.
- Radford, M. C. 1966. *The Birds of Berkshire and Oxfordshire*. Longmans, London.
- Sharrock, J. T. R. 1999. Panic ye not. *British Birds*, 92: 442-444.
- Siriwardena, G. M., Baillie, S. R., Buckland, S. T., Fewster, R.M., Marchant, J. H., Wilson, J. D. 1998a. Trends in the abundance of farmland birds: a quantitative comparison of smoothed common birds census indices. *Journal of Applied Ecology*, 35: 24-43.
- Siriwardena, G. M., Baillie, S. R., Wilson, J. D. 1998b. Variation in the survival rates of some British passerines with respect to their population trends on farmland. *Bird Study*, 45: 276-296.
- Siriwardena, G. M., Baillie, S. R., Crick, H. Q. P., Wilson, J. D. 2000. The importance of variation in the breeding performance of seed-eating birds in determining their population trends on farmland. *Journal of Applied Ecology*, 37: 128-148.
- Sitters, H. P., Fuller, R. J., Hoblyn, R. A., Wright, M. T., Cowie, N., Bowden, C. G. R. 1996. The Woodlark *Lullula arborea* in Britain: population trends, distribution and habitat occupancy. *Bird Study*, 43: 172-187.
- Stoate, C. 1996. The changing face of lowland farming and wildlife Part 2:1945-1995. *British Wildlife*, 7: 162-172.
- Tyler, G. A., Green, R. E., Casey, C. 1998. Survival and behaviour of Corncrake *Crex crex* chicks during the mowing of agricultural grassland. *Bird Study*, 45: 35-50.
- Vanhinsbergh, D 2000 The butcher bird – lost but not forgotten. *BTO News*, 226: 14-15.
- Warde Fowler, W. 1913. *Kingham, old and new*. Oxford University Press, London.