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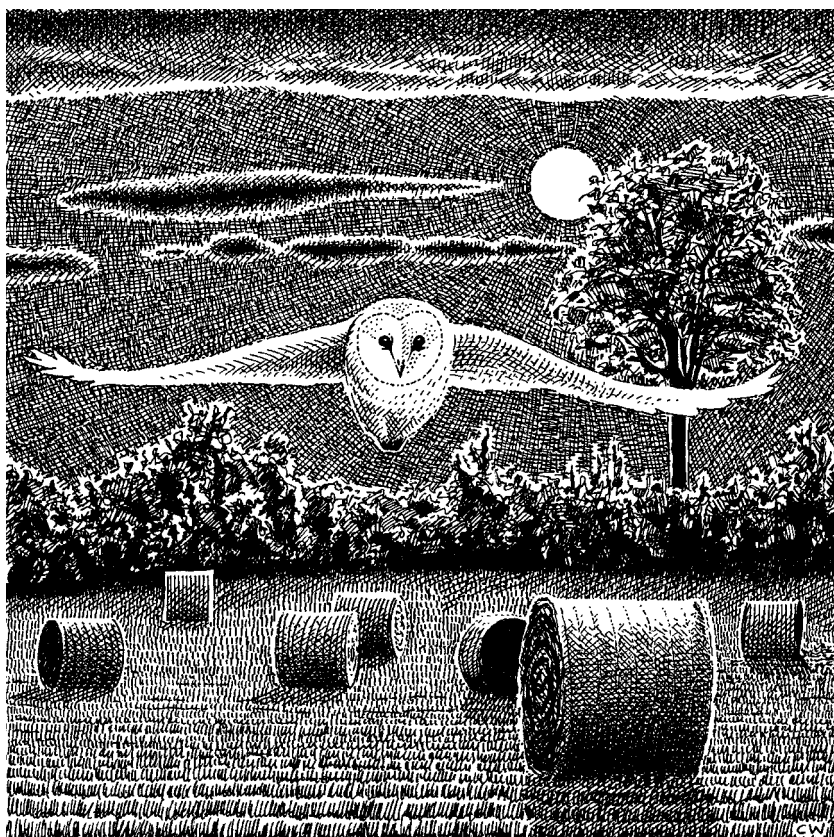
Jeremy D. Wilson, Andrew D. Evans and Philip V. Grice

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# Introduction

## *Bird conservation and agriculture*



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The scope of this volume is the bird life of all the ‘farmed’ lands of Britain. To many this will bring to mind a landscape dominated by a patchwork of enclosed pastures and cultivated fields, bounded by hedgerows, stone walls, ditches or other features, and with scattered trees and patches of woodland. Throughout this book, ‘farmland’ is our shorthand for such enclosed agricultural landscapes. Yet a variety of unenclosed, ‘semi-natural’ habitats such as moorland and lowland heath also owe their existence in large part to the grazing of livestock. Taken together, these farmlands and grazed, semi-natural grasslands and heathlands make up all our agricultural land. Within these habitats, bird communities have evolved in response to the limitations and opportunities of life in ever-changing landscapes shaped by the most fundamental of all human industries – the production of food.

Agricultural land covers over 70% of the land surface of Britain, and its effect is perhaps best appreciated from the air. Early in the gestation of this book, one of us flew from London to Inverness on a cloudless May morning, and the full variety of Britain’s agricultural landscape unfolded below. Initially, large arable fields dominated the scene; mostly the ‘nitrogen green’ of winter cereal and silage grass, but with frequent yellow patches of flowering oilseed rape, earth-brown fields of germinating spring-sown cereals and sugar beet, scattered patches of woodland and clusters of farm buildings. Further north, and the mosaic of fields became more complex; smaller fields with more hedgerow trees and more irregular outlines; pastures were more frequent – difficult to distinguish from cereal, but in some cases obvious by their more complete stock-proof hedgerows. Over the Pennines and the southern uplands of Scotland, both arable land and hedgerows disappeared altogether in many places to be replaced by a pocket-handkerchief landscape of grassland fields in the valleys, giving way to unenclosed sheep-walk, and heather moorland on the high ground. On some moors, geometrical patterns in the upland vegetation marked ‘muir-burns’ where patches of heather have been burned to encourage regeneration for red grouse, and some large areas were covered in stands of dense, dark green conifer plantation. Over the central lowlands of Scotland, the lowland patchwork of grass and arable fields returned briefly – the brown spring-sown fields more in evidence here – before sheep-walk, muir-burned heather moorland and conifer plantations again marked the Scottish highlands. During the final descent, lowland agriculture reappeared, clinging to the coastal fringe around the Cromarty Firth; here there was a diverse mix of grass and arable fields, with turnips and freshly germinating spring barley much in evidence.

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Stone dykes and straggling lines of gorse bushes replaced hedgerows as field boundaries, and the few fields of oilseed rape had yet to flower. In short, from the air (or indeed from the computer screen via Google Earth), agricultural activity of one kind or another is seen to dominate the British countryside. Such is the diversity of the habitats – from arable fields and lowland meadows, to lowland heaths and moorland – that it is very difficult to present a list of ‘birds of agricultural land’. Nonetheless, we have attempted to do so in Appendix 1, to provide the reader with a quick reference guide and to demonstrate the range of bird species that make use of agricultural habitats, and may therefore either benefit or suffer from changes in the way in which land is managed.

By virtue of its dominance, the habitats that agriculture provides (and removes) are of pivotal importance to birds. Some of the breeding and wintering populations are of significance in European and even global contexts. The ‘dull’ farmland that many birdwatchers pass quickly through on their way to watch birds at a local ‘hotspot’ is thus important for this reason alone. However, it is now all too evident that many of the most serious declines in wildlife populations in Britain, and more widely across Europe, have happened, and in many cases continue, in agricultural landscapes. In the lowlands of the south and east of Britain, intensively managed farmland is the sea in which are scattered the islands of scarce, semi-natural habitats that we strive to preserve. Amongst them, hay meadows, lowland heaths and chalk downland are themselves survivors of grazing systems now no longer economically viable. Yet it is in this ‘sea’ of enclosed farmland where current declines of birds and other wildlife are most evident. Elsewhere, this analogy is inappropriate. The long-established, low-intensity pastoral farming systems of the uplands and maritime north and west of Britain have moulded the landscapes and habitats of some of our remotest regions. As a result wildlife communities have arisen that are highly dependent upon the continuation of those systems. Yet wildlife losses have been evident here too. Declines of corncrakes, breeding waders and corn buntings in the crofting lands of the highlands and islands of Scotland are cases in point.

Our perspective is largely contemporary, but we recognise that today’s agricultural land and its bird populations are only the latest stage in the long history of an ever-changing countryside. The production of food has always been essential for the survival and prosperity of individuals, communities and states, and so social structures at all these levels coupled

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with technological advances have all played their roles in determining agricultural activity and, through this, the appearance of our countryside. Our first aim, therefore, is to portray the bird communities which we find on farmed land today, and to place these in historical context. Chapter 1 is a brief overview of this history, concentrating on the dramatic changes to lowland agriculture wrought throughout the twentieth century, to help set the remainder of the book in context. With the historical context in place, we move on to introduce briefly the main agricultural habitats and their birds. Enclosed farmland is dealt with in Chapters 2 and 3, focusing on the open field and the field boundary respectively, whilst Chapter 4 considers the lower-intensity grazed systems of the uplands, downland and heaths.

Second, we seek to understand the patterns of distribution and abundance of the individual species that make up these communities, as a product of the effects of agricultural land-use and practices upon each species' essential resources – food and nest sites. In particular, we concentrate on the dramatic technologically and politically driven increases in productivity of agriculture since the Second World War, and explore how these changes have brought about some of the losses of birds, and other wildlife, that have made biodiversity conservation in agricultural systems a pressing priority. The impacts of agricultural change on populations of birds and other wildlife – for example see New's (2005) *Invertebrate Conservation in Agricultural Ecosystems* in this series – have been the subject of a wealth of detailed research in the last two decades. This has usually been motivated by conservation concern for declining species, but in a few cases by economic concerns over the impacts of a minority of species that have succeeded spectacularly on modern farmland. These relationships are explored in detail in Chapters 5–9. Chapter 5 reviews recent trends in the populations of birds associated with agricultural habitats. This review is only possible because, in Britain, we are fortunate in being able to draw upon the evidence of trends in numbers, range, breeding success and survival rates of many of our bird species. These derive from the surveys and monitoring schemes of the British Trust for Ornithology (BTO) and its skilled volunteers, and the Royal Society for the Protection of Birds (RSPB), both supported by the statutory conservation agencies. Chapter 6 focuses on studies of the strength of association between agricultural and bird population change, including consideration of two cases where recent agricultural intensification has, locally, been reversed. These are the growth of organic farming, and the

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introduction of set-aside of arable fields to curb overproduction of cereal and protein crops. In this chapter we also review evidence of recent change in the fortunes of other wildlife on farmland in order to put bird population change in a broader context. Chapters 7–9 describe the more detailed research on distribution and demography (Chapter 7) and ecology (Chapter 8) of individual bird species, or agricultural processes (Chapter 9) that together have shed light on the mechanisms linking agricultural change to bird population change; the evidence of cause and effect. Chapter 8 focuses entirely on a series of case studies of individual species to illustrate the wealth of understanding that has emerged in recent years.

Thirdly, we review what some have called the ‘agri-environment era’; that period since the late 1980s when increasing recognition of the environmental damage wrought by intensive agriculture, coupled with overproduction of foodstuffs in European markets, led to gradual redirection of agricultural subsidy from production to the delivery of environmental goods, including wildlife. Partly because of the huge research effort to understand the relationship between agricultural change and decline of bird populations, halting and reversing those declines has been a key aim of many agri-environment schemes and the land management options that they fund. Chapter 10 shows how this improved understanding of relationships between agricultural practice and bird populations, coupled with progressive ‘greening’ of the Common Agricultural Policy (CAP), and the development of agri-environment schemes has already helped to reverse some of the losses. This chapter concludes by looking to the future. What are the prospects for a more general reversal in the fortunes of populations of birds and other wildlife in habitats increasingly moulded by the effects of European and even global agricultural and wider environmental policies? Will the conservation of rural landscapes and wildlife continue to play an ever more central role in the formulation of agricultural policy, or will these policies revert to the economics of supply and demand as the pressures from global markets and human population growth increase? How can our increasing understanding of the ecology of birds in agricultural habitats help us to find practicable measures to create a countryside which reconciles the need both to produce adequate, high-quality food, profitably, and to maintain landscapes rich in wildlife? We also identify some of the remaining gaps in our knowledge of the ecology of individual bird species, effects of agricultural practices and ecological processes affecting bird populations

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## 6 · Introduction

on agricultural land. For example, how might inevitable global climate change over the next century determine the farming systems that can be practised and the types of crop grown in Britain, and hence the opportunities for wildlife? What might be the impacts of novel technologies such as genetic modification of crops? What might be the challenges and opportunities for bird conservation in managing agricultural land to minimise pollution, conserve soil carbon and water, or provide recreational access?



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# 1 · *The history of agriculture and birds in Britain*



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## 8 · The history of agriculture and birds in Britain

In this chapter we briefly reprise the long-term history of farmland in Britain up to the Second World War and then look in more detail at the sweeping changes since then. There are several excellent accounts of the history of farming in Britain (Symon 1959; Mellanby 1981; Briggs & Courtenay 1985; O'Connor & Shrubb 1986; Rackham 1986; Grigg 1989; Stoate 1995, 1996; Shrubb 2003) and much of the information presented here is summarised from these. In particular, Mike Shrubb's (2003) *Birds, Scythes and Combines* is a detailed and absorbing review of the changing relationships between birds and farming since the mid eighteenth century, written by a farmer with a lifelong interest in birds and bird conservation. Here we attempt no more than an overview of the most important changes from the perspective of bird populations.

### Pre-eighteenth century

When Neolithic man colonised Britain around 3000 BC the lowland landscape was certainly more dominated by deciduous woodland than today. The conventional view is of grassland restricted to temporary open areas where forest cover had been destroyed (for example due to fire or tree-fall), though with considerable areas of bog and marshland, especially in floodplains and low-lying coastal areas. However, Vera (2000) has suggested an alternative vision of a shifting mosaic of woodland, scrub and grassland maintained by wild herbivores such as deer, moose, wild boar and the ancestors of now-domesticated cattle and horses. Whichever of these perspectives is closer to the truth, Neolithic settlers brought with them knowledge of arable agriculture and started to clear areas of woodland and scrub in order to grow cereals. Cattle and sheep were also grazed, particularly on the chalk and limestone areas such as Salisbury Plain, the South Downs and the Cotswolds. Successive invasions throughout the Bronze and Iron Ages brought increasingly sophisticated methods of cultivation and an increase in the population, so that by the time of the Roman occupation of AD 43 it numbered around 500 000. In this sense, agriculture can be seen as beginning to replace natural disturbances such as wild grazing, fire, wind and flood in creating open habitats and early successional conditions (Sutherland 2004).

It is interesting to note that even at this early stage agriculture was so successful that production more than met the needs of the local community and grain was exported to what is now France. Development



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## Pre-eighteenth century · 9

continued slowly over the next millennium, although the introduction by the Saxons of the heavy plough, drawn by oxen was a notable technological advance. From the Norman invasion to the Black Death (1348) the population increased fairly rapidly, and with it the area of land under arable production to almost 4 million hectares. This approaches two-thirds of the total area of land in cultivation today, but between a third and a half of this was left fallow each year to help restore soil fertility and yields were only about a tenth of those achieved in modern times (Mellanby 1981; O'Connor & Shrubbs 1986).

During this period open-field agriculture dominated the landscape in many areas. Villages had blocks of land for common grazing, for hay as winter feed and either two or three for growing crops: winter cereal, spring cereal and fallow in the case of the three-field system (O'Connor & Shrubbs 1986). As the human population increased, so did pressure on the remaining woodland, and many new, hedged fields (*assarts*) were created (Muir & Muir 1987). Most of these were in private, rather than communal, ownership. Whilst widespread, the open-field system was by no means universal (Briggs & Courtenay 1985). In parts of the south-east and south-west, land had often been enclosed directly from woodland, and pastoralism dominated. On exposed hills, especially chalk downland, fields were cropped for a few years before being allowed to revert to grassland. In the uplands, on poor soils, and almost universally in Scotland, the infield–outfield system was adopted; the outfield, often higher on the hill, being given over to rough grazing, whilst the lower infield was cropped annually and fertilised. This was a key difference from the three-field system in that it involved no fallowing, and thus no opportunity to clean the land and prepare it fully for a return to cropping. As a consequence of the continuous cropping of the infield (often on a three-year rotation of *bere* – a variety of barley – followed by two successive annual crops of oats), land often became exhausted and overrun with weeds (Symon 1959).

The Black Death precipitated a relatively sudden change in the farmed landscape as the human population declined, perhaps by as much as a half. Villages became depopulated and large areas of land previously in arable production were abandoned and became overgrown with scrub. The removal of the population pressure meant that *assarting* ceased, but it also meant a shortage of labour and this, coupled with increasing wool prices, meant that many landowners found it more profitable to turn the entire estate over to sheep farming. This created a requirement for more hedgerow and resulted in evictions of villagers and often the annexing of

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## 10 · The history of agriculture and birds in Britain

land previously in common ownership (Muir & Muir 1987). By the early eighteenth century, it is therefore likely that the agricultural countryside was very diverse, with an intimate mixing of areas characterised by small, enclosed fields, hedgerows, patches of woodland and scattered farmsteads and hamlets – the Ancient Countryside of Rackham (1986) – with the open-field landscape in areas best suited to arable agriculture (Grigg 1989; Shrubbs 2003). In Scotland, religious and political conflict had held agricultural progress back, and in Symon's (1959) view little had changed between mediaeval times and the end of the seventeenth century. As he put it, 'so long as Scottish farmers were content to work undrained, unenclosed, weed-ridden, over-acid and exhausted lands with inefficient tools . . . progress was out of the question'.

Throughout all these landscapes there remained large areas of what we would now term semi-natural habitat; marshes, fens, downs, heaths and rough grassland, collectively referred to as 'waste' (without the modern, pejorative connotations of that term), and all subject to extensive management under systems of common rights. Such land tended to remain wherever soils were too infertile or difficult to drain to permit cultivation and provided grazing land as well as a source of fuel (e.g. gorse, turf, wood, peat), bedding (e.g. bracken) and thatch (e.g. reed and sedges).

The bird communities of these landscapes are poorly known except from the often anecdotal accounts of early avifaunas. However, Mike Shrubbs's (2003) analysis makes three important points. First, seed resources, and hence seed-eating birds, must have been very abundant indeed in the weedy arable and grassland systems where cultivation and fallowing were common but effective weed control absent. For example, in a letter to Pennant in 1768, Gilbert White in his *Natural History of Selborne* (1789) comments that 'towards Christmas vast flocks of chaffinches have appeared in the fields' and also that 'we have, in the winter, vast flocks of the common linnets – more, I think, than can be bred in any one district'. Second, the large areas of fallow present in the three-field system would have allowed excellent nesting opportunities for ground-nesting species such as lapwings, stone curlews, skylarks, corncrakes and quail. Third, the large areas of semi-natural habitat meant that species that are now either rare or simply no longer found in the lowland agricultural landscape were then widespread. These include hen and Montagu's harrier, stone curlew, quail, black grouse, great bustard, wheatear and whinchat, as well as still-familiar farmland species such as stock dove and linnet which were seemingly then more widespread in such habitats than on land brought under cultivation (Fig. 1.1).