

The contribution of the UK Biodiversity Action Plan and agri-environment schemes to the conservation of farmland birds in England

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There have been significant declines in the extent and quality of semi-natural agricultural habitats in England since the 1930s. Species occurring both in these habitats and in intensively managed improved farmland have been selected for concerted conservation effort through the UK Biodiversity Action Plan. Agri-environment schemes are seen as one of the main delivery mechanisms for the conservation of these species, through targeting the positive management and re-creation of semi-natural habitats in particular. Examples are given to illustrate the contributions made to the recovery of two rare species associated with lowland farmland (Stone-curlew *Burhinus oedicnemus* and Cirl Bunting *Emberiza cirlus*). Owing to current (March 1999) budgetary restrictions, agri-environment schemes are constrained in their ability to influence management at the scale that would be needed to reverse the population declines in the wider countryside that have been detected for common and widespread species characteristic of lowland farmland. However, where agri-environment schemes have been targeted at a local level, they have been shown to provide an effective mechanism in encouraging an increase in the populations of localised species, in particular.

During the 20th century, agricultural practices in England have gone through a period of rapid intensification. There have been major losses of semi-natural habitat, such as lowland heathland (Farrell 1993) and unimproved grassland (Fuller 1987), and arable and pastoral agricultural systems have been subject to increasing specialisation and intensification (Stoate 1995, 1996). These factors have resulted in much simplified agricultural habitats and landscapes, with significant consequential losses in wildlife, including the populations of a range of farmland birds (O'Connor & Shrubbs 1986, Fuller *et al.* 1995). About half of the 36 species that appear on the 'red list' of *Birds of Conservation Concern* (Gibbons *et al.* 1996) are associated with lowland farmland.

In recognition of this, the fortunes of farmland birds have come to be regarded as a measure of the general state of biodiversity within the countryside. Consequently, the breeding population trend of a suite of farmland birds has been included by the Department of Environment, Transport and the Regions (DETR) in a headline indicator of sustainable development (DETR 1999). The Ministry of

Agriculture, Fisheries and Food (MAFF) is currently consulting on indicators of sustainable agriculture, which include a similar farmland birds indicator. Population indices from farmland Common Birds Census (CBC) plots, which principally reflect changes likely to have occurred over southern and eastern Britain (Marchant *et al.* 1990), have shown that many of the species that feed within open farmland declined dramatically during the late 1970s and early 1980s (Crick *et al.* 1998). Unfortunately, suitable monitoring data are not available to elicit fully the trends in other parts of Britain or for the 1950s and early 1960s, when the post-war effects of mechanisation and fertiliser and herbicide application started to take effect.

Between 1945 and 1995, almost 1 million ha (9.2%) of agricultural land in England was lost to development (MAFF June Agricultural and Horticultural Census). Within the remainder, there have been substantial losses in both the habitat quality and diversity of lowland farmland. Perhaps the most significant change has been the loss of some 92% (6.6 million ha) of unimproved and rough grassland in lowland England and Wales since 1932 (Fuller 1987), although other valuable semi-natural habitats, managed essentially by extensive agriculture, have also been lost through agricultural improvement. Extensive pastoral systems involving hay-making have been superseded by intensive systems, involving the application of high rates of inorganic fertiliser, the establishment of swards dominated by a few grass species and repeated silage cuts from spring onwards. None of these activities favours plant or invertebrate diversity, and cutting may have a direct impact on ground-nesting bird species, best documented in the case of the Corncrake *Crex crex* (e.g. Norris 1947).

The area of tillage in England and Wales has remained about the same since 1945, but this masks significant changes in the relative proportions of crop types. In 1945, the areas of land under barley, wheat and oats each totalled about 0.8 million ha. However, oats subsequently declined to a much reduced area by the 1960s, while from the 1950s the area of barley increased, peaking at about 1.8 million ha in the 1960s and 1970s, before falling to 0.8 million ha again in the 1990s. The area of wheat increased relatively slowly until the 1970s, when it increased rapidly to reach around 1.8 million ha in the 1980s and 1990s (figures from

Table 1. Breeding status and habitat importance of UK Biodiversity Action Plan Priority Species of birds associated with lowland farmland in England. English breeding status is categorised as rare (< 500 pairs), scarce (500–5000 pairs) or common (> 5000 pairs). Habitat codes: H – hedgerows, FM – arable field margins, IA – in-field arable (including short-term ley grassland), S – scrub, UN – unimproved neutral grassland, LH – lowland heathland, IG – improved grassland, CG – calcareous grassland, WP – woodpasture and parkland, AG – dry acid grassland, GM – grazing marsh. Habitats are indicated to be of primary (■) or secondary (▪) importance for the species in England.

Species	Breeding status	Farmland habitat type										
		H	FM	IA	S	UN	LH	IG	CG	WP	AG	GM
Grey Partridge <i>Perdix perdix</i>	Common	■	■	■		▪	▪		▪			▪
Corncrake <i>Crex crex</i>	Rare					■						■
Stone-curlew <i>Burhinus oedicanus</i>	Rare			■			■		■			■
Turtle Dove <i>Streptopelia turtur</i>	Common	■	■	■	■	▪			▪			
Nightjar <i>Caprimulgus europaeus</i>	Scarce						■					▪
Woodlark <i>Lullula arborea</i>	Scarce			▪		■	■					▪
Skylark <i>Alauda arvensis</i>	Common		▪	■		■	▪	▪	▪			▪
Song Thrush <i>Turdus philomelos</i>	Common	■	▪		■	■		▪	▪	▪		
Marsh Warbler <i>Acrocephalus palustris</i>	Rare				■							
Spotted Flycatcher <i>Muscicapa striata</i>	Common	▪										
Red-backed Shrike <i>Lanius collurio</i>	Extinct	▪			■	■	■					▪
Tree Sparrow <i>Passer montanus</i>	Common	■	■	■		▪					▪	
Linnet <i>Carduelis cannabina</i>	Common	■	■	■	■	▪	■		▪			
Bullfinch <i>Pyrrhula pyrrhula</i>	Common	■	▪		■							
Cirl Bunting <i>Emberiza cirlus</i>	Rare	■	■	■	■	■						
Reed Bunting <i>Emberiza schoeniclus</i>	Common	▪	■	▪			▪		▪			■
Corn Bunting <i>Miliaria calandra</i>	Common		■	■		▪						

MAFF June Agricultural and Horticultural Census). The majority of wheat and barley is now autumn-sown rather than spring-sown, and receives inputs of fertilisers and pesticides, which promote crop monocultures.

Thus, while both grassland and arable intensification began in earnest in the 1970s, substantial losses of grassland biodiversity had probably already occurred during the previous 30–40 years.

Some 88% of English farmland (7.6 million ha of tillage and grassland, excluding rough grazings, 1995 MAFF June Agricultural and Horticultural Census) is now managed with regular inputs of fertiliser and/or pesticides, and thus can be regarded as providing limited opportunities for once characteristic species. To address the declines in farmland bird species and to redress some of the habitat loss and degradation caused by agricultural intensification,

the UK Government has developed two key policies to underpin its commitment to biodiversity: the UK Biodiversity Action Plan (BAP) and agri-environment incentive schemes. This paper describes the implementation and relevance to farmland birds of the UK BAP, the development of agri-environment schemes in England by MAFF, and gives examples of the fortunes of two bird species largely dependent on farmland whose population status has been influenced by incentive schemes.

THE UK BIODIVERSITY ACTION PLAN

In response to the 1992 Rio Convention on Biological Diversity, the UK Government instigated its own BAP to provide the principal framework for national nature conservation planning into the next century. The BAP reviewed the UK biodiversity resource, considered the principal issues and proposed a forward programme for action. A key component of this was the establishment of the UK Biodiversity Steering Group, comprising representatives of both governmental and non-governmental organisations.

The Biodiversity Steering Group produced a report in 1995 (DoE 1995), which was subsequently endorsed by the Government. The recommendations included the development of individual action plans for key habitats and species that were identified as high or medium priorities for conservation action by a partnership of relevant organisations. Broadly, these plans set out to evaluate the current status of the resource and the factors causing losses or declines, to assess current actions, to set objectives and targets, and to propose a plan of action, identifying specific statutory organisations to take responsibility for specific actions. These actions cover policy and legislative requirements, site/species management issues, advisory roles, research and monitoring requirements, and publicity. Action plans have been produced for 45 'Priority Habitats' and 388 'Priority Species', including 26 bird species (DoE 1995, UK Biodiversity Group 1998).

The Priority Habitats were chosen on the basis of several criteria: their rarity or vulnerability, the function that they perform, their importance to Priority Species, and the UK's international obligations. Habitat Action Plans have been produced for farmland habitats such as Lowland Meadows, Lowland Calcareous Grassland, Upland Hay Meadows, Lowland Heathland, Cereal Field Margins and Ancient and Species-rich Hedgerows. Priority Species were selected on the basis of global threat or at least 25% decline in population size or range in the UK in the last 25 years. Of these, 17 bird species are considered to be associated with lowland farmland habitats in England. These are

listed in Table 1, together with a summary of their population status and the lowland farmland habitats upon which they are wholly or partly dependent. All of these species qualified for consideration as Priority Species on the basis of a recent steep decline in their UK population. In-field arable habitats are considered to be of primary importance to eight of these species, arable field margins, hedgerows and scrub to seven each and lowland heathland to five.

One of the most important aspects of the species plans is the identification of time-specific biological targets, which are agreed by all the relevant BAP partners. Where possible, these are quantified in terms of the desired size or range of the species population at given time intervals (5, 10 or 20 years) from the start of the plan. However, typically this is only appropriate for those rare or scarce species for which there is very good population information (for examples, see the Stone-curlew and Cirl Bunting case studies, Aebischer *et al.* 2000). For the common but declining species, a desired population *trend* is specified, which usually involves halting the decline within 5 years and seeking to increase or recover the population subsequently (in the case of Red-backed Shrike *Lanius collurio*, the target is to re-establish the species). The progress achieved towards the targets forms an important part of the action plan review process. The areas of action identified for these lowland farmland birds are given in Table 2.

DEVELOPMENT OF AGRI-ENVIRONMENT POLICIES

The Agriculture Act (1986) paved the way for the establishment of the Environmentally Sensitive Area (ESA) scheme in 1987 (MAFF 1989). This was the first nationally available 'agri-environment' measure offering incentives to land managers to adopt sympathetic management practices, with payment rates calculated on the basis of the income forgone. Under the measures accompanying the 1992 Common Agricultural Policy reform, Member States were required to establish environmental land management schemes, with 50% European Union (EU) funding. In the UK, this led to an extension of the agri-environment programme, including the introduction of some new schemes. Those of most relevance to farmland birds were the Countryside Stewardship (CS) scheme, Habitat scheme, Organic Aid scheme (replaced by the Organic Farming scheme in 1999) and Arable Stewardship pilot scheme.

The two main English agri-environment schemes, the ESA and CS schemes, are based upon several common themes: they are targeted, either at specific areas of high environmental value, or at priority habitats or landscape

Table 2. Actions identified for UK Biodiversity Action Plan farmland bird Priority Species. Actions refer to: influencing international policy (IP), typically for the protection of migratory species; agriculture policy in the wider countryside (WC); site-based conservation management (CM), for localised species when a large proportion of the population inhabits semi-natural habitats and for rare and localised farmland species; species management (SM) to improve breeding productivity; autecological research (AR) to identify remedial measures, particularly where the causes of population declines are not fully understood; monitoring (M) of all species to assess progress towards targets; and dissemination (D) of information, to ensure that land managers and the public have a clear understanding of the conservation needs of the species. Actions are categorised as being of major (■) or subsidiary (▪) importance.

Species	Actions						
	IP	WC	CM	SM	AR	M	D
Grey Partridge		■			▪	■	■
Corncrake		■	■	■	▪	■	■
Stone-curlew	■	■	■	■	▪	■	■
Turtle Dove	■	■	▪		■	■	■
Nightjar		▪	■		▪	■	■
Woodlark		▪	■		▪	■	■
Skylark		■			■	■	■
Song Thrush	■	■			■	■	■
Marsh Warbler			■	■	■	■	■
Spotted Flycatcher				▪	■	■	▪
Red-backed Shrike				■		■	▪
Tree Sparrow		■	▪		■	■	■
Linnet		■			■	■	■
Bullfinch		■			■	■	■
Cirl Bunting		■	■	■	▪	■	■
Reed Bunting		■			■	■	■
Corn Bunting		■			■	■	■

types; they are voluntary, with management agreements usually lasting for 10 years; payments are made annually; and specific capital payments are available, aimed at enhancing the condition of specific landscape or habitat features (such as hedgerows).

ESAs are designated with the aim of maintaining and enhancing the landscape, wildlife and historic value of discrete areas of national environmental significance, through encouraging beneficial agricultural practices. Twenty-two ESAs have been designated in four tranches, in 1987, 1988, 1993 and 1994, covering some 13% of England. They include both whole-farm and part-farm schemes, the latter where environmentally important farmland is distinct from the remaining improved land. By February 1999, there were 9,377 ESA agreements, covering about 475,000 ha. The range of semi-natural habitat types that are targeted through agreements includes lowland neutral, calcareous and dry acid grasslands, upland hay meadows and calcareous grassland, coastal and floodplain grazing marsh, lowland heathland, upland heathland, cereal field margins and ancient and species-

rich hedgerows. Agreement holders have to follow standard management prescriptions, but these can be varied to benefit specified BAP Priority Species.

The CS scheme was launched in 1991 by the Countryside Commission as a pilot scheme, with the aim of improving the natural beauty and diversity of the countryside. MAFF took over the scheme in 1996, when it was expanded to form the main agri-environment scheme outside ESAs. Although not focused on discrete areas, CS is targeted nationally at key landscapes, with priority areas identified at a county level. The national targets include the management and, in some cases, restoration and creation of grassland, old orchards, fen, reedbed, carr, sand dunes, saltmarsh, lowland heath and upland moorland. The scheme is run on a competitive basis, with applications scored against a set of environmental criteria. These criteria now include the presence of BAP Priority Habitats and Species, and the opportunities for habitat enhancement or increasing populations. The applications that provide the best environmental value for money are offered management agreements each year. Agreements are based

on a suite of standard management prescriptions, but there is some room for tailoring management to achieve specific objectives. In particular, so-called 'special projects' have been developed where the requirements to meet specific objectives exceed conventional prescriptions. By February 1999, there were 8,594 agreements under the scheme, covering some 149,000 ha.

The Arable Stewardship pilot scheme was launched in 1998, as a free-standing three-year pilot scheme within CS. Two discrete areas are targeted, one in East Anglia and one in the West Midlands. The scheme has been designed as a package to benefit arable biodiversity, with five main options addressing in-field and field margin habitats. These options are overwintered stubbles (which may be followed by summer fallow or spring cereals), undersown spring cereals, "conservation headlands" and margins or strips of grass or wildlife seed mixtures. After the first year of the scheme, 2,572 ha were under agreement, distributed roughly equally between the two pilot areas.

Within the two principal agri-environment schemes, resources have tended to be targeted at offering incentives for maintaining or enhancing the management of surviving semi-natural habitats. However, in those ESAs where arable cultivation is a significant activity, a range of arable options has been offered, including overwintered stubbles (Breckland, South Downs, West Penwith and, from 1999, Cotswold Hills), 'conservation headlands' (Breckland, Clun, South Downs and South Wessex Downs) and field margins (Breckland, Broads and West Penwith). A total of 3,978 ha is under agreement in such options.

Nationally within CS, a grass margin option is available for arable land, where agreement holders are encouraged to manage a 2-m or 6-m grass margin and, where appropriate, the adjoining strip of crop as a "conservation headland". Currently 3,171 ha of field margin strips are under such agreement, equating to a length of some 9,500 km. In addition, new options available under CS from 1999 include the establishment, within intensive grassland, of extensively-managed grass margins and buffer strips that may improve nesting and feeding conditions for breeding birds, *inter alia*.

Thus, both mainstream CS and ESA management agreements, together with CS special projects and Arable Stewardship, have made substantial contributions towards the BAP targets for a variety of semi-natural habitats and hence birds of conservation concern. Two case studies of rare species that have benefited from concerted conservation effort and from agri-environment schemes are described below. These concentrate on the role of agri-environment schemes; further details of the conservation action for these species are given in Aebischer *et al.* (2000).

CASE STUDIES: TWO BAP SPECIES

Stone-curlew

The Stone-curlew requires sparsely vegetated ground on which to nest and forage, and hence occurs mostly in areas with sandy or stony soils. Its numbers and range have been declining for decades. There may have been 1000–2000 pairs in the late 1930s (Sharrock 1976), but this had fallen to 200–400 pairs in the late 1960s (Parslow 1973). Subsequently, numbers stabilised at about 160 pairs in the mid-1980s (Green 1988) in two core areas, the Brecklands of East Anglia and the downland of Wessex, with small remnant populations just surviving in other parts of East Anglia and central southern England. The population is split between suitable arable land, typically in spring-sown crops, and semi-natural habitats in these areas (i.e. Breckland heathland and Wessex calcareous grassland), although arable land supports much lower breeding densities. The causes of decline include the loss of semi-natural habitats through conversion to intensive agriculture and forestry, successional change following outbreaks of myxomatosis in the 1950s, the loss of mixed farming due to specialisation, a decline in spring-sown arable cropping, and reduced breeding success as a result of increasingly mechanised agricultural operations.

The Stone-curlew BAP (DoE 1995) sets a broad objective of halting the decline and restoring some of the lost population. A specific target was set of increasing the number of UK breeding pairs to 200 by year 2000, and to 300 by 2010. Other objectives included encouraging the re-colonisation of the former range and increasing the number of pairs breeding on semi-natural habitats. Agri-environment schemes were identified as the key policy instrument for delivering these objectives, being central to three of the four policy actions listed. In particular, CS and the Breckland and South Wessex Downs ESAs were identified as offering opportunities to help meet the objectives for this species. Various organisations were identified to undertake actions related to site protection and management, species management, advice, research, monitoring and publicity.

The breeding population has increased steadily during the 1990s. In 1998, fieldworkers from the Royal Society for the Protection of Birds (RSPB) detected 215 territories, an increase from 167–169 in 1991, so the year 2000 BAP target has been achieved two years ahead of the target date. In Breckland, numbers increased from 87 pairs in 1991 to 142 pairs in 1998, by which time 3,210 ha of heathland had come under ESA agreement. The proportion of the Breckland population breeding on ESA agreement land has increased from 18% in 1991 to 29% in 1998, when 41 pairs made their first breeding attempt on such land.

In the same period the Wessex population has remained stable at around 66 pairs. Here, potential feeding sites for

Stone-curlew occur on chalk downland in the South Wessex Downs ESA, although none currently breeds there. In addition, limited use has been made of cultivated blocks of former set-aside land under MAFF's Habitat scheme (in addition to the wider use of similar blocks within existing set-aside, cultivated with MAFF agreement). From 1998, a CS special project for Stone-curlew and associated arable wildlife has been available, using fallow blocks within arable fields; these agreements are likely to become increasingly important. Out of 11 Habitat scheme and CS sites in Wessex, two were occupied in 1998.

Cirl Bunting

The Cirl Bunting is closely associated with traditional mixed farming and was found across much of southern Britain in the last century (Evans 1997). In 1938 it was still fairly widely distributed, but declined after the war with notable gaps appearing in its range. After 1970, the population crashed rapidly: a 1989 survey found only 118 pairs, almost all in south Devon (Evans 1992). Among the causes of decline identified, those attributable to agricultural intensification include loss of winter seed food (due to declines in winter stubbles, stockyards and threshing yards) and loss of invertebrate food for chicks (due to increasingly intensive grassland management practices). Following the results of the 1989 survey and a subsequent RSPB research programme, steps were taken by the RSPB, English Nature (EN) and other partner organisations to promote favourable land management, and numbers began to increase in response.

The short-term objective of the Cirl Bunting BAP (UK Biodiversity Steering Group 1998) is to maintain this upturn in the species' fortunes, increase the distribution within the current range and increase the population to 550 territories by the year 2003. Agri-environment measures are seen as a key mechanism for achieving these targets, through encouraging agricultural practices that ensure an adequate supply of food throughout the year. Therefore, CS has targeted agreements with potential to benefit Cirl Bunting in Devon and Cornwall, in particular through a 'special project' developed in partnership with the recovery project implemented by the RSPB and EN. The CS special project payments promote the cropping of spring cereals and overwintered stubbles, and also targets conventional scheme options for extensively managed grassland, field margins, hedgerows and old orchards.

In 1992, the population was estimated at 320 territories, increasing to 453 by 1998 (Wotton *et al.* 2000). Of the latter total, 107 (24%) were associated with CS agreement land. Cirl Bunting numbers in tetrads (2x2-km squares based on the Ordnance Survey national grid) containing agreement land had increased by 70%, compared with only 2% in those tetrads without (RSPB unpubl.). The BAP tasks MAFF to achieve a minimum of 25 new agreements per

year during 1998–2000 to secure favourable management for Cirl Buntings in South Devon. However, as well as favouring Cirl Buntings, the agri-environment options adopted to secure these gains almost certainly favour a range of other farmland birds, together with arable plants and invertebrates, giving all-round benefits for biodiversity.

DISCUSSION

In England, the Government's commitment to agri-environment schemes pre-dates both the Biodiversity Convention and the EU requirement to establish environmental land management schemes, thus demonstrating its commitment to the important role of low-input farming practices in maintaining farmland biodiversity. The key ESA and CS schemes were thus well established before the UK BAP was published, albeit focusing more on the much depleted and degraded semi-natural habitats rather than the wider countryside. However, these schemes subsequently offered a ready-made framework for incorporation into Action Plans as a mechanism for achieving some of the targets.

The Biodiversity Action Plan represents an agreed process recognised by all key players, and identifies and targets necessary actions for the conservation of Priority Species, including a suite of threatened birds of lowland farmland. Progress with achieving BAP targets, in particular those for the widely, but increasingly thinly, distributed farmland bird species, such as Grey Partridge *Perdix perdix*, Skylark *Alauda arvensis*, Corn Bunting *Miliaria calandra* and Tree Sparrow *Passer montanus*, may be viewed as a reflection of the general quality of the countryside. Thus, a suite of farmland bird species for which good population trend data exist has been chosen as a headline indicator for sustainable development. The inclusion of this indicator will raise the profile of farmland biodiversity, through increased monitoring and reporting activities.

Management agreements for the two main English agri-environment schemes cover some 625,000 ha (6.7% of agricultural land). With their current budgetary restrictions (£79 million provisional spend in England in 1998-99), agri-environment schemes alone cannot be expected to return populations of birds of the wider countryside to their former levels. However, substantial numbers of the still-common Priority Species inhabit semi-natural agricultural habitats. Both these and rarer species are well addressed by MAFF's agri-environment schemes, which undoubtedly have the potential to make major contributions to the delivery of BAP targets. The responses of the Stone-curlew and Cirl Bunting to the implementation of specific agricultural measures designed to increase their populations clearly demonstrate the effectiveness of such

measures at a local level. The challenge for the future is to provide a means within the agricultural support mechanism that reverses the downward trends in the populations of the more common and widely dispersed farmland birds, which are a key measure of the health of the countryside.

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