POPULATION ESTIMATES FOR BRITISH BREEDING BIRDS

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A report from the British Trust for Ornithology to the Nature Conservancy Council in respect of certain work done under Contract No. HF3/03/192.

January 1984

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INTRODUCTION

The Trust's Atlas of Breeding Birds in Britain and Ireland (Sharrock 1976) included for most species an estimate of the size of the breeding population. The present report is the response to a request from the Chief Scientist Team, Nature Conservancy Council, for an updating of these breeding population figures together with key references to recent population and ecological studies of the individual species.

The population estimates given in the Breeding Atlas (as it will be termed hereafter) varied greatly in their reliability. Small or localised populations could be assessed with a high degree of accuracy, while other species had been the subjects of special surveys. However, estimates for common and widespread species were at best orders of abundance. Some were extrapolated from sample densities derived from the Common Birds Census (CBC), while others were largely guesswork based on subjective opinion of how many pairs there were likely to be in a typical 10 x 10 km square. In offering such estimates, Sharrock (1976) sought to provide an indication of the relative abundance of widely-distributed species. It was never intended that such figures should be regarded as definitive, and it is therefore regrettable that they have been treated as such by some subsequent authors.

In the present report we have updated the census figures for species with small and localised populations, and for others which have been the subjects of special surveys (mainly by the BTO). We have also revised order-of-magnitude figures for those species for which the CBC provides usable density estimates. There are, however,

a number of species for which reliable post-Breeding Atlas density data are not available; in such cases we have not been willing to substitute guesswork for absent data. It was fortunate that the Breeding Atlas coincided with special surveys of seabirds (Operation Seafarer: Cramp et al 1974) and of waterfowl (Wildfowl Trust: Yarker and Atkinson-Willes 1971). These have not been repeated, and for most of the species concerned there has not been any subsequent BTO involvement. Much the same applies to some species of breeding waders, for which we have assessed densities in one particular habitat (damp lowland meadows: Smith 1983) but not those of the numerically more important coastal and upland populations.

In assessing the total populations of abundant species, using CBC data, we recognised four broad habitat divisions: agricultural land, rough grazing, woodland, and other (mainly urban). For agricultural land and woodland, for which CBC data are representative of at least a large part of Britain, a mean density was calculated for each species. In doing so, corrections for edge effects (IBCC 1969, Marchant 1981) were made according to our present somewhat subjective estimates of these errors, which vary considerably between species. CBC data are limited for rough grazing and 'other' habitats, so densities in those areas were estimated by comparison with those calculated for agricultural land and woodland. The resulting four density figures were then multiplied by the areas of habitat available, the latter taken from MAFF (1980), Agricultural Statistics, United Kingdom 1976-1977, and from Forestry Commission (1983), Facts and Figures (annual statistical leaflet). The CBC data used were the latest available, those for 1982. For some resident species, populations were then

at a reduced level due to the severe 1981/82 winter. Where necessary, the implications are referred to in the systematic list of species which follows. In general, CBC does not produce reliable density figures for species in which territory size can exceed plot size. Hence we have restricted extrapolations based on CBC to those species for which we feel confidence in the results, ie. the passerines. For these, data are presented in a tabular manner so that it can be seen how the order-of-abundance estimates are derived.

The scarcer British breeding species are monitored on an annual basis by the Rare Breeding Birds Panel. This is a voluntary body on which the BTO, RSPB and NCC are represented. Its functions are to provide a secure, centralised archive for sensitive information, to provide general summaries in a manner which does not infringe any confidentiality over localities, and to ensure that data are available on which conservation strategies for rare species can be developed when needed. The Panel publishes annual reports in the journal British Birds. Species covered by the Panel are so indicated in the systematic list.

References in this report to 10-km^2 always refer to 10 x 10 km squares of the National Grid, as used in the Breeding Atlas (Sharrock 1976).

There is one final point we wish to emphasise. The Breeding Atlas population figures were for Britain and Ireland combined. However, for the obvious practical reasons it has been necessary to restrict this report to Britain only. This difference in scope should be borne in mind when comparing figures given here with those in the Breeding Atlas.

SYSTEMATIC LIST OF SPECIES

BLACK-THROATED DIVER *Gavia arctica*

No census has been made since the Breeding Atlas, which estimated 150 pairs, all in Scotland. Subsequent work has been confined to monitoring breeding success of subsamples.

See Bundy (1979) for breeding success in relation to loch size and disturbance, and Merrie (1978) for feeding habitat.

RED-THROATED DIVER *Gavia stellata*

Revised population figures are available for the archipelagos only (Gomersall *et al* 1984): 40-45 pairs in the Outer Hebrides, 70-80 pairs in Orkney, and about 700 pairs in Shetland where a modern increase is suspected. With this big upward revision of the Shetland total, the British (ie. Scottish) population probably lies between 1,000 - 1,500 pairs.

Scottish breeding observations are given by Bundy (1976, 1978) and Booth (1982), while Merrie (1978) discusses feeding habitat.

LITTLE GREBE *Tachybaptus ruficollis*

There are no recent density data which can legitimately be used for estimating population level. WBS data confirm a great irregularity in distribution, with 0-19 pairs per 10 km of linear waterway (Marchant and Hyde 1980). Vinnicombe (1982) found up to 50% fluctuations between years on a major reservoir, with water level being the controlling factor. Taking these irregularities into consideration, the British population is likely to be within the lower half of the range given in the Breeding Atlas (9,000 - 18,000 pairs).

GREAT CRESTED GREBE Podiceps cristatus

The last census was that of 1975 (Hughes et al 1979), when it was found that numbers had increased by about 50% since the previous full census of ten years before. The 1975 totals were 6,094 adults counted and 6,800 estimated. The increase had not been uniform over the country; indeed, declines were detected in five English, one Welsh and five Scottish counties. Though an increased tendency towards nesting on rivers had been reported (Youngman 1977, Harvey 1979), only 3% of birds were using this habitat in 1975 (Hughes et al 1979).

RED-NECKED GREBE Podiceps grisegena

Rare Breeding Birds Panel species. There is no confirmed British breeding record as yet. Copulation and nest building were seen at one site in 1980 (Sharrock et al 1982), but only a single bird re-appeared there in 1981.

SLAVONIAN GREBE Podiceps auritus

Rare Breeding Birds Panel species. The small Scottish population shows a continuing trend towards increase, from 48-51 pairs in 1972 to 70-80 pairs (52-58 per annum proved breeding) during the years 1979-81 (Sharrock et al 1983).

BLACK-NECKED GREBE Podiceps nigricollis

Rare Breeding Birds Panel species. The position of this grebe remains precarious, with only three regular breeding sites in the northern half of Britain. Under 20 pairs in total are located in most years, and these include some probable non-breeders. A total of 21 pairs (11 proved breeding) were found in 1980, but only 9 pairs (3 proved breeding) in 1981 (Sharrock et al 1983).

FULMAR Fulmarus glacialis

Recent monitoring of sample seabird sites (Stowe 1982, Wanless et al 1982) confirms that the Fulmar increase is continuing, at a rate variously assessed at between 4-7% per annum. Hence the British (only) population must by now exceed 400,000 pairs, with the proviso that an uncertain proportion of occupied sites in the samples will relate to prospecting pre-breeders. Anderson (1982) has described the establishment of an atypical colony on sand dunes in Aberdeenshire. See also Dunnet et al (1979).

MANX SHEARWATER Puffinus puffinus

Combining the 1969-70 Operation Seafarer estimates (Cramp et al 1974) with some later figures given in the Breeding Atlas, a minimum British total of 240,000 pairs was indicated. Scotland held over 106,000 pairs (and this perhaps a considerable underestimate), while Wales and south-west England held over 133,000 pairs. Irish numbers may be as large or even larger. No later survey has been attempted; nocturnal, hole-nesting petrels are notoriously difficult to census.

STORM PETREL Hydrobates pelagicus

This is an almost impossible species to census, and the use of capture-recapture techniques at individual colonies is bedevilled by the presence of visiting pre-breeders (Cramp et al 1974, Love 1978). Operation Seafarer did not commit itself to figures, though the view was expressed that the Irish population was considerably larger than that of Britain (Cramp et al 1974). There must be some tens of thousands of pairs in Britain alone (Sharrock 1976).

LEACH'S PETREL *Oceanodroma leucorhoa*

The British population, which is restricted to a few northern and western islands of Scotland, must comprise several thousand pairs (Sharrock 1976). No reliable figures are available. Another small colony has been found recently in Shetland (Fowler and Butler 1982).

GANNET *Sula bassana*

The long-term increase continues, with two new colonies (Foula, Fair Isle) founded in the 1970s. However, the St Kilda figure has to be revised downwards, following more accurate survey. The 13 British gannetries (Ireland and Channel Islands excluded) now hold a minimum of 120,000 pairs, as follows.

Site	Pairs/nests	Year assessed	Reference
Hermaness	8,794	1982	Shetland Bird Rept.
Noss	5,500	1977	Nelson (1978)
Foula	15	1980	Furness (1981)
Fair Isle	172	1982	Fair Isle B.O. Rept.
Sule Stack	4,018	1969	Nelson (1978)
Flannans	17	1973	ditto
Sula Sgeir	9,000	1972	ditto
St Kilda	40,000	1979-80	Murray (1981), Wanless and Wood (1982)
Ailsa Craig	20,800	1982	Murray and Wanless (1983)
Scar Rocks	482	1974	Nelson (1978)
Grassholm	20,370	1975	Cullen and Pratt (1976)
Bempton	312	1981	Yorkshire Bird Rept.
Bass Rock	13,500	1977	Nelson (1978)

CORMORANT Phalacrocorax carbo

No survey has been made since that by Operation Seafarer (1969-70 Then, there were 3,671 pairs in Scotland, 1,116 pairs in England and 1,420 pairs in Wales (total 6,207 pairs), plus 1,865 pairs in Ireland (Cramp et al 1974). Regional bird reports since have mentioned local increases and decreases, the former including the establishment of a tree-nesting colony in Essex. There is no basis for suspecting any major overall change since 1970.

SHAG Phalacrocorax aristotelis

Operation Seafarer accounted for 25,209 pairs in Scotland, 2,670 pairs in England and 567 pairs in Wales (total 28,446 pairs), plus 2,610 pairs in Ireland (Cramp et al 1974). There has not been a national survey since, though no major overall change is suspected. North Sea populations suffer occasionally from paralytic shellfish poisoning (Armstrong et al 1978), but losses at affected colonies are soon made up by recruitment of young birds, including immigration (Galbraith 1981).

BITTERN Botaurus stellaris

Rare Breeding Birds Panel species. Day and Wilson (1978) drew attention to a decline in the number of booming Bitterns in England and Wales, from 78-83 in 1954 to 45-47 in 1976. The corresponding figure has varied between 47-51 over the last four years for which figures are available (1978-81).

Day (1981) has since reviewed the European status of the Bittern, setting Britain in its international perspective, while Bibby (1981) has assessed British winter status. Bibby and Lunn (1982) considered distribution in relation to reed-bed availabili in England and Wales.

LITTLE BITTERN *Ixobrychus minutus*

Rare Breeding Birds Panel species. There has never been a confirmed instance of breeding within Britain. However, this has been suspected from time to time, most recently in June 1981 when a female with brood patch was found dead in Cambridgeshire (Sharrock *et al* 1983).

GREY HERON *Ardea cinerea*

The long-running BTO Heron Census monitors numbers in England and Wales, but not in Scotland where fieldworkers are fewer. Indeed, 286 previously unrecorded (but small) heronries were located in Scotland during the Breeding Atlas survey. Population size fluctuates markedly according to winter weather conditions, as shown by 50 years of Heron Census data. Mead *et al* (1979) and North (1979) used these and ringing recoveries to assess hard weather mortality in relation to age classes. Probably there are in the order of 6,500 pairs in Britain in normal years, but up to 45% fewer or 32% more after very cold winters or a series of mild ones respectively (Reynolds 1979).

MUTE SWAN *Cygnus olor*

A BTO survey in 1978 indicated a population of about 18,400 birds: 6,230 breeding adults and 12,150 non-breeders. Overall, numbers had fallen between 8-15% since the last full census in 1955 (Ogilvie 1981). Serious declines were apparent in the English Midlands and the Thames basin (associated with increased boat traffic and/or lead poisoning), but numbers had increased locally in some other parts of the country. A repeat survey was made in 1983, but results are not yet available. Long-term population work

in particular areas has been reported on by Coleman and Minton (1979), Hardman and Cooper (1980), Bacon (1980), and Perrins and Ogilvie (1981).

WHOOPER SWAN Cygnus cygnus

Rare Breeding Birds Panel species. Single pairs of Whooper Swans nest in Scotland at irregular intervals, instances in 1978 and 1979 being the only ones known during the last 30 years.

GREYLAG GOOSE Anser anser

The wild population of the Outer Hebrides numbered about 140 pairs in the 1970s (Hopkins and Coxon 1979), and a subsequent increase is suspected. No figures for wild birds in the north-west Highlands or for the much larger numbers of feral birds elsewhere have been published since Sharrock (1976), who estimated 700-800 pairs in all.

CANADA GOOSE Branta canadensis

The introduced British population rose from 10,500 birds in 1968 to 19,400 birds in 1976, an average increase of 8% per annum (Ogilvie 1977), but the relative sizes of the breeding and non-breeding classes were not given. A total of 21,370 birds was found in the September 1982 national wildfowl count, 8.8% higher than the corresponding figure for September 1981 (Salmon 1983). These wildfowl counts do not cover all Canada Goose waters, and a continued 8% p.a. increase would have taken the species to 28,000 - 30,000 birds by now.

Mortality rates are discussed by Thomas (1977), and Garnett (1980) described the development of a moorland breeding population in North Yorkshire.

EGYPTIAN GOOSE Alopochen aegyptiacus

The Norfolk feral population totalled 300-400 birds in the 1960s and 1970s (Sharrock 1976). Subsequent flock count figures in the Norfolk Bird Report, including one of 200 birds at Holkham in July 1979, indicate a population level similar to or perhaps slightly up on that assessed previously. A small-scale spread into Suffolk continues.

SHELDUCK Tadorna tadorna

The Breeding Atlas estimate of ca.12,000 pairs was extrapolated from late winter wildfowl counts of 50,000 birds (including immatures). Since then the late winter population has risen to ca.60,000 (Salmon 1983) which, if age ratios have remained comparable, would indicate a breeding population of nearer 15,000 pairs now. Following on from this overall increase in population size, new British moulting sites have been discovered on the Firth of Forth (Bryant 1978, Pienkowski and Evans 1979), the Wash (Bryant 1981) and the Humber (Tasker 1982). Population dynamics are discussed, and previous literature reviewed, in a monograph by Patterson (1982).

MANDARIN Aix galericulata

No new census data are available since Sharrock (1976), who estimated the British population at 300-400 pairs. Surrey and contiguous parts of Sussex, Buckinghamshire and Berkshire still comprise the main region for this feral population.

WIGEON Anas penelope

No new census data are available since the estimates of 350 pairs (Yarker and Atkinson-Willes 1971) and 300-500 pairs (Sharrock 1976).

GADWALL Anas strepera

No new census data are available since Parslow (1973) and Sharrock (1976) estimated the British population at 260 pairs.

TEAL Anas crecca

Sharrock (1976) estimated 3,500 - 6,000 pairs in Britain and Ireland together. No new data are available.

MALLARD Anas platyrhynchos

No new census data are available since the estimates of 40,000 pairs in Britain (Atkinson-Willes 1970) and 70,000 - 150,000 pairs in Britain and Ireland together (Sharrock 1976). The CBC farmland index has fluctuated somewhat, though the latest value (207 in 1982) was close to that of 1974 (204). However, farmland is not a key habitat for the species.

PINTAIL Anas acuta

Rare Breeding Birds Panel species. This remains one of the scarcest British breeding ducks, the number of pairs or presumed pairs located each year having varied between 16-41 over the years 1975-81 (Sharrock et al 1983). The highest figure was in 1979; no other year has produced evidence for more than 30 pairs. Occupied sites have been widely scattered, from Scottish islands to East Anglia.

GARGANEY Anas querquedula

Rare Breeding Birds Panel species. A possible 54 pairs were reported in 1980 and a possible 49 pairs in 1981, but some of these birds may actually have been lingering migrants (Sharrock et al 1982, 1983). Evidently British breeding numbers are even smaller than had been thought. Sites involved are widely scattered and inconstant between years.

SHOVELER Anas clypeata

No new census data are available since the estimates of 500 pairs in Britain (Yarker and Atkinson-Willes 1971) and 1,000 pairs in Britain and Ireland together (Sharrock 1976). Numbers are known to have dropped, following reclamation, in one key area, the North Kent Marshes (Williams et al 1983), but it is not known what impact this has had on the national population level.

POCHARD Aythya ferina

No new census data are available since the estimates of 200 pairs in Britain (Yarker and Atkinson-Willes 1971) and 200-400 pairs in Britain and Ireland together (Sharrock 1976). Numbers have fallen recently in one key area, the North Kent Marshes (see under Shoveler).

TUFTED DUCK Aythya fuligula

No new census data are available since the estimates of 1,500-2,000 pairs in Britain (Yarker and Atkinson-Willes 1971) and 4,000 - 5,000 pairs in Britain and Ireland together (Sharrock 1976).

SCAUP Aythya marila

Rare Breeding Birds Panel species. The Scaup breeds only irregularly in Britain (mainly Scotland). Single broods seen in Orkney in 1973 and 1978 are the only confirmed instances in the last twelve years.

EIDER Somateria mollissima

In recent years there has been an obvious fall in the sizes of autumn-winter flocks in Shetland (Shetland Bird Reports), but national wildfowl counts show that winter numbers in eastern Scotland and north-eastern England are stable, or even increasing at some sites (Salmon 1983). The British breeding population may still be within the 15,000 - 25,000 pairs range suggested in the Breeding Atlas, though a proper assessment of numbers in western Scotland is still needed.

COMMON SCOTER Melanitta nigra

Rare Breeding Birds Panel species. The Breeding Atlas estimated 30-50 pairs in Scotland; recent annual figures have been in the lower part of that range, though coverage has been less complete in post-Atlas years. However, at the main Irish site (in Co. Fermanagh) the numbers present have certainly fallen: from 140-150 pairs in the late 1960s to 87 pairs in 1980 and 63 pairs in 1981 (Sharrock et al 1983).

GOLDENEYE Bucephala clangula

Rare Breeding Birds Panel species. A post-1970 colonisation of the Scottish Highlands continues, aided by the provision of nest boxes (Dennis and Dow 1984). In 1981, 41 clutches were laid (all but one in nest boxes) and 286 young were hatched.

RED-BREASTED MERGANSER Mergus serrator

No new census data are available since the estimates of 1,000-2,000 pairs in Britain (Atkinson-Willes 1970) and 2,000-3,000 pairs in Britain and Ireland together (Sharrock 1976).

GOOSANDER Mergus merganser

Surveys by Meek and Little (1977) and Lovegrove (1978) indicated a British population of 925-1,250 pairs, at the bottom end of the 1,000-2,000 pairs range offered by the Breeding Atlas. The revised total allowed for 735-950 pairs in Scotland, 180-290 pairs in northern England, and ca.10 pairs in Wales.

RUDDY DUCK Oxyura jamaicensis

Despite temporary cold-weather setbacks, the feral British population has increased four-fold over the last seven years, from 350 birds in winter 1975/76 to ca.1,400 in winter 1982/83 (Salmon 1983). On the basis of the 1975 ratio of pairs:winter total (Hudson 1976) the 1982/83 figure probably represents some 200-250 breeding pairs. The English Midlands still hold the largest breeding concentration, but there are now scattered pairs as far north as Fife and eastwards to Essex. The effects of cold weather on dispersal and mortality are discussed by Vinicombe and Chandler (1982).

HONEY BUZZARD Pernis apivorus

Rare Breeding Birds Panel species. The British population remains small and vulnerable, and secrecy over some key areas makes it impossible to assess exactly the population size. Possibly there are as few as 10-12 pairs in all (RSPB 1983).

RED KITE *Milvus milvus*

Rare Breeding Birds Panel species. A slow recovery continues, though breeding is still confined to mid-Wales. In April 1981 the population numbered *ca*.120 birds, from which 31-32 pairs laid eggs and fledged a total of 21 young (Sharrock *et al* 1983). Welsh population dynamics are discussed by Davis and Newton (1981), and biology in relation to land use changes by Newton *et al* (1981).

WHITE-TAILED EAGLE *Haliaeetus albicilla*

The NCC re-introduction experiment in the Inner Hebrides (Love 1983) led to the first instance of egg laying in 1983.

MARSH HARRIER *Circus aeruginosus*

Rare Breeding Birds Panel species. The precarious state of the English Marsh Harrier population has improved somewhat, there having been 22 known nests in 1980, 20 in 1981 and 23 in 1982 (Sharrock *et al* 1983, RSPB 1983). Low though these totals are, they are probably the best achieved this century.

HEN HARRIER *Circus cyaneus*

It is believed that Hen Harriers are increasing and spreading in north-western England, the Isle of Man, and in parts of Scotland, and are holding their own in Wales. However, some declines have been reported, including in the Orkney stronghold, while the Irish population has fallen from 250-300 pairs in the mid-1970s to *ca*.70 pairs now. British breeding numbers are possibly in the order of 400 pairs (RSPB 1983). Watson (1977) has written a monograph on this species, and Picozzi (1978) provided an assessment of predator-prey relationships on a Scottish grouse moor.

MONTAGU'S HARRIER *Circus pygargus*

Rare Breeding Birds Panel species. This remains the rarest British diurnal raptor. After declining through the 1960s and beyond, without any known nesting attempts in 1974 or 1975, there have been 1-3 nests each year from 1976-1982 (Sharrock *et al* 1983, RSPB 1983).

GOSHAWK *Accipiter gentilis*

Rare Breeding Birds Panel species. The present feral population numbered about 60 known pairs in 1980. Increase and expansion were rapid during the 1970s, but now at much reduced rates. With raptor import restrictions, fewer Goshawks are being released or are escaping, while reproductive output has fallen due to nest robbery. Status assessments, on which the foregoing is based, are given by Marquiss and Newton (1982) and RSPB (1983), while Kenward (1979) has studied winter food and predation in lowland Britain.

SPARROWHAWK *Accipiter nisus*

Recovery continues from the low point reached during the pesticide era, and Sparrowhawks are returning to agricultural and other lowland regions from which they disappeared then (Marchant 1980). The Breeding Atlas suggested that numbers might have risen by 1972 to 10,000-20,000 pairs. It seems likely that the population is still within that range (RSPB 1983), though now well within the upper half of it. ITE/NCC studies include breeding in different environments (Newton 1976), spacing of territories (Newton *et al* 1977), breeding success in relation to pesticides and female age (Newton *et al* 1979), and fidelity to area and mate (Newton and Marquiss 1982).

BUZZARD Buteo buteo

Tubbs (1974) estimated the population at 8,000-10,000 pairs. The BTO organised a survey of this species in 1983, but results are not yet available. Dispersal and causes of death in Scotland are discussed by Picozzi and Weir (1976) and Weir and Picozzi (1983

GOLDEN EAGLE Aquila chrysaetos

A joint RSPB/NCC survey in 1982 found just over 400 pairs occupying home ranges, plus a further 100 home ranges (known from previous years) in which at least one bird was present. This was above previous population estimates. Occupancy in 1982 was highest over the central and western Highlands, lowest in grouse moor areas of eastern Scotland. Only preliminary details have yet been released (RSPB 1983).

OSPREY Pandion haliaetus

Rare Breeding Birds Panel species. Scottish Ospreys have maintained their slow but steady rate of increase; in 1982, 30 pairs reared a total of 45 young (RSPB 1983).

KESTREL Falco tinnunculus

Local surveys have claimed densities of between 3-40 pairs/10-km^2. The wide range suggests poor precision for many of them, and over most of the country there are probably 10-30 pairs/10-km^2, depending on nest-site availability (RSPB 1983, Village 1984). We feel that 15-20 pairs/10-km^2 is realistic, in which case the British population is in the order of 30,000-40,000 pairs. This is considerable less than the total suggested by Sharrock (1976). O'Connor (1982) has discussed habitat usage in relation to breeding density.

MERLIN Falco columbarius

The British population was variously estimated in the 1970s at between 500-800 pairs, but numbers must now be considerably less than this in view of continued declines in many areas. Thus Newton et al (1981) described the species' virtual disappearance from the Peak District, while the Welsh population fell from perhaps 150 pairs in the 1970s (Williams 1981) to 38 known pairs in 1982 (Roberts and Green 1983). The RSPB has initiated a Merlin research project which will include an assessment of current status.

HOBBY Falco subbuteo

Rare Breeding Birds Panel species. The annual reports of the Panel suggest a population of 100-180 pairs, but this is now thought to be unrealistically low. Traditional sites on southern heathlands are well known, but scattered pairs on farmland are easily overlooked. A recent survey indicated 2 pairs/100 km^2 on farmland in southern England, and on that basis the English population of this elusive species might well be nearer 500 pairs (RSPB 1983). For a review of breeding biology, see Fiuczynski and Nethersole-Thompson (1980).

PEREGRINE Falco peregrinus

The British population has recovered substantially from the catastrophic crash of the late 1950s. A 1981 census revealed about 730 pairs (including an estimate for a small number of known but unvisited territories), plus a further 80 territories occupied by apparent single birds. These figures indicate a population level at about 90% of that estimated for the 1930s (Ratcliffe 1984). A similar recovery in Ireland has been documented by Norriss and Wilson (1983). Previous literature is reviewed in a monograph by Ratcliffe (1980).

RED GROUSE Lagopus lagopus

Sharrock (1976) suggested that the British and Irish population would not exceed 500,000 pairs; we cannot offer an updated figure. Yalden (1979) estimated 10,000 pairs for the Peak District; loss of heather there and in north-eastern England will have affected the grouse carrying capacity of those moors (Hewson 1977, Anderson and Yalden 1981). Shooting bag data submitted to the Game Conservancy suggest that Red Grouse go through irregular cycles of abundance, averaging 4.8 years, though such 'quasi-cycles' are more apparent in the figures for some moors than for others (Hudson and Tapper 1980). Such Game Conservancy bag data (expressed as birds shot per km^2) indicate average numbers in northern England, but below average over Scotland, during the five years 1977-1981 (Rands and Tapper 1983).

PTARMIGAN Lagopus mutus

Sharrock (1976) suggested that the Scottish population might reach 10,000 pairs in peak years. We are unable to update the estimate.

BLACK GROUSE Tetrao tetrix

The Breeding Atlas suggested that the British population was in the order of 10,000-50,000 pairs; we cannot offer an updated figure. It is to be expected that in afforested areas such as central Wales, the Pennines and southern uplands of Scotland, numbers will vary considerably according to the ages of conifer plantations. Afforestation can be beneficial in its early stages, but grouse numbers decline by the time conifer plantations are 20 years old (Sharrock 1976). The spring population of the Peak District is now reduced to 130-150 birds, following decline with habitat changes (Lovenbury et al 1978).

CAPERCAILLIE Tetrao urogallus

Parslow (1973) placed this species in the range 1,000-10,000 pairs. In practice 'pair' is an inappropriate unit of measurement in this polygynous species (as also is the Black Grouse), and Sharrock (1976) was commendably cautious in not offering a population estimate.

RED-LEGGED PARTRIDGE Alectoris rufa

The Breeding Atlas suggested a British population in the order of 100,000-200,000 pairs. We cannot offer an updated figure, and feel that any estimate is distorted by artificial stocking. The CBC farmland index fluctuated between values of 83 and 127 over the years 1970-1975, and stood at 126 in 1982.

GREY PARTRIDGE Perdix perdix

Sharrock (1976) suggested that the British and Irish population might reach or exceed 500,000 pairs. We cannot offer an updated figure, but the trend is certainly downwards. The CBC farmland index fluctuated between values of 75 and 108 over the years 1970-1975, but by 1982 had fallen to 49. This suggests that the British population has been halved since the mid-1970s. It is believed that a decline in productivity has been responsible. A healthy population requires a chick survival rate of over 40%, but by 1981 chick survival had fallen to an average 25% (Potts 1982). There was some improvement in 1982, in northern and western Britain at least, though chick survival remained below 40% over much of eastern England (Potts 1983). Reduced densities of Grey Partridges are reflected in shooting bag figures; over the five years 1977-1981 below average numbers were shot in all regions except Wales and north-western England (Rands and Tapper 1983).

QUAIL Coturnix coturnix

Since Quail numbers vary so much from year to year, there is not a measurable 'British population'. The Breeding Atlas had confirmed or probable breeding in 328 10-km^2, but this owed much to an exceptional influx in one of the four years. In most years there may be fewer that 100 pairs.

PHEASANT Phasianus colchicus

Sharrock (1976) thought that there might be up to 500,000 pairs in Britain and Ireland together. We are unable to update this, and question whether estimation is practical in view of the widespread practice of artificial stocking.

GOLDEN PHEASANT Chrysolophus pictus

The feral populations of Galloway and the East Anglian Brecks continue to maintain themselves, but we are unable to update the Breeding Atlas estimate of 500-1,000 pairs.

LADY AMHERST'S PHEASANT Chrysolophus amherstiae

The feral population of Bedfordshire and the eastern Chilterns still persists. Sharrock (1976) suggested that there might be 100-200 pairs in all. We have no later figure, but believe that some decline followed the cold winters of 1978/79 and 1981/82.

SPOTTED CRAKE Porzana porzana

Rare Breeding Birds Panel species. In the five years 1977-81, 4-9 calling males were reported per summer (Sharrock et al 1983). Localities have been widespread and inconstant between years, from East Anglia to the Outer Hebrides.

CORNCRAKE Crex crex

A joint BTO/SOC survey in 1978-79 located 700-712 calling birds, and estimated the British total at a maximum of 750 (Cadbury 1980). The largest regional totals were for Orkney (102-104), Inner Hebrides (235-242) and Outer Hebrides (260), and only 12 were heard outside Scotland. Clearly, the north-westwards contraction of the breeding range is continuing, as is also the case in Ireland where 1,200-1,500 were estimated in 1978 (O'Meara 1979).

WATER RAIL Rallus aquaticus

This is an impossible species to census, even on a local basis. The figure given by Sharrock (1976) of 2,000-4,000 pairs in Britain and Ireland was largely guesswork. We are unable to improve upon it.

MOORHEN Gallinula chloropus

Sharrock (1976) offered an estimate of 300,000 pairs for Britain and Ireland together, based on CBC farmland densities. However, we are doubtful whether the CBC can provide meaningful density figures for this species. The farmland index changed little through the 1970s, but showed small falls in 1979 and 1982 following cold winters. Such short-term fluctuations aside, population levels are not thought to be changing.

COOT Fulica atra

No new figures are available since Sharrock (1976) suggested 50,000 - 100,000 pairs for Britain and Ireland together.

OYSTERCATCHER Haematopus ostralegus

Too little new data are available to attempt revision of the previous estimates of 19,000-30,000 pairs (Dare 1966) and over 30,000 pairs (Sharrock 1976).

AVOCET Recurvirostra avosetta

Rare Breeding Birds Panel species. In 1981 breeding occurred at five East Anglian sites, with a total of 201-203 pairs which reared 155 young. Both figures were the best this century (Sharrock et al 1983). Population dynamics in England are discussed by Cadbury and Olney (1978).

STONE-CURLEW Burhinus oedicnemus

Rare Breeding Birds Panel species. A long-term contraction of the English breeding range is continuing; two counties (Kent and Bedfordshire) have been deserted since the Breeding Atlas. Numbers are difficult to assess because of the species' nocturnal habits, but there are perhaps 100 pairs in Dorset/Wiltshire/Hampshire, and perhaps 200 pairs in East Anglia/Cambridgeshire/Hertfordshire (Mead 1982). With under 10 pairs remaining in peripheral sites (Sussex, Oxfordshire/Berkshire) a British population in the order of 300 pairs is indicated. Westwood (1983) has provided a breeding study from Norfolk.

LITTLE RINGED PLOVER Charadrius dubius

From initial colonisation in 1938 the species increased to ca.470 pairs by 1973 (Parrinder and Parrinder 1975). The average annual rate of increase (initially 14.4%) fell to 10.6% between 1962-73, and further curtailment must be expected since suitable habitat is limited. The BTO organised a survey in 1983, but results are not yet available.

RINGED PLOVER Charadrius hiaticula

Prater (1976) estimated the British breeding population at 5,800 pairs in 1973-74. Since then, higher numbers than given by Prater have been found in parts of Scotland (notably in the Outer Hebrides) but coastal pairs in England and Wales have continued to suffer from recreational pressure on beaches. The BTO organised a survey in 1983, but results are not yet available. Briggs (1983) discussed differences in breeding season and success between coastal versus inland pairs in north-western England.

KENTISH PLOVER Charadrius alexandrinus

Rare Breeding Birds Panel species. Regular breeding in Britain (south-eastern England only) ceased in 1956. The only subsequent records concern a displaying and nest-scraping pair in Norfolk in 1978 (driven away by Ringed Plovers) and a pair which bred in Lincolnshire in 1979.

DOTTEREL Charadrius morinellus

Rare Breeding Birds Panel species. There has been some recent increase in the Scottish Highlands population, probably with 100-150 pairs in peak years during the 1970s (Nethersole-Thompson, in Cramp and Simmons 1983).

GOLDEN PLOVER Pluvialis apricaria

The Breeding Atlas published an estimate of 30,010 pairs: 600 pairs in Ireland, 8,110 in England and Wales, and 21,300 in Scotland. We cannot update these figures. Bell (1979) gave a figure of 1.3 pairs/km^2 for one restricted area of the Yorkshire Pennines, and for Caithness Reed et al (1983) estimated 1,441 pairs in 1979 and 1,638 pairs in 1980. Thomas et al (1983) have reported on a breeding study in central Wales.

LAPWING Vanellus vanellus

Sharrock (1976) suggested a population of over 200,000 pairs for Britain and Ireland together. We are unable to offer a revision. The CBC national farmland index for England has remained fairly stable, but this masks pronounced regional differences. Since 1970 the index value for farmland in southern and eastern England has halved, while the corresponding value for farmland in northern and western England has risen sharply. Probably this is due to altered agricultural practices, for Lapwings prefer bare ground in spring and so avoid areas where the crop regime has been changed to autumn sowing (Smith 1983). Galbraith and Furness (1983) showed how densities varied with habitat on Scottish agricultural land, from 102.9 pairs/km^2 on arable to 0.5 pair/km^2 on dry pasture. Hence simple extrapolations aimed at producing a national estimate would be misleading.

TEMMINCK'S STINT Calidris temminckii

Rare Breeding Birds Panel species. Summer sightings in suitable habitat suggest up to six pairs present in recent years, though hitherto only one or two nests or broods have been seen per season (Sharrock et al 1983). Localities remain confidential, though it is understood that all recent records are from Scotland.

PURPLE SANDPIPER Calidris maritima

Rare Breeding Birds Panel species. The species has bred at one Scottish site since 1978, with 1-3 nests or broods seen per year (Dennis 1983). These are the first known instances of breeding in Britain.

DUNLIN *Calidris alpina*

The highest densities and concentrations of breeding Dunlin in Britain are to be found in the Outer Hebrides, with over 2,000 pairs there (Green 1983). Until there are more data on Scottish mainland densities (see Reed *et al* 1983 for Caithness) one cannot say more than that British numbers are probably at least in the upper part of the 4,000-8,000 pairs range given in the Breeding Atlas. A Welsh breeding study is reported on by Thomas *et al* (198

RUFF *Philomachus pugnax*

Rare Breeding Birds Panel species. The Ruff seems now to be re-established as a British breeding bird, though the population is small and scattered (Outer Hebrides to Kent). Some 12-22 females are noted in suitable habitat each summer (27 in 1975), though no more than four nests or broods have been found in any one season (Sharrock *et al* 1983).

COMMON SNIPE *Gallinago gallinago*

The Breeding Atlas figure of 80,000 - 110,000 pairs for Britain and Ireland (based on 30-40 pairs/10-km^2) is now thought too high. Though densities of that order occur (eg. Reed *et al* 1983 for Caithness), upland densities are normally lower, especially in England and Wales. Moreover, numbers have declined with habitat loss in lowlands. In 1982 only 1,979 drumming birds were located in 251 occupied 10-km^2 (mean 8 birds) in England and Wales, compared with 724 occupied lowland squares there in 1968-72 (Smith 1983). A range of 5,000-10,000 pairs would be more realistic now for England and Wales (Smith 1983) and, despite uncertainty over the Scottish population size, it seems doubtful whether a British figure would reach even the Breeding Atlas minimum.

WOODCOCK Scolopax rusticola

Sharrock (1976) guessed that Britain and Ireland together held 10,000-45,000 'pairs'. No updated figure can be offered. Recent research has shown that published density figures are unreliable, due to a successively polygynous mating system and because displaying males do not have an exclusive territory (they will rode over a number of separate woodlands), some rode much more than others, and displaying birds are unpaired anyway (Hirons 1982).

BLACK-TAILED GODWIT Limosa limosa

Rare Breeding Birds Panel species. Though re-established as a breeding bird, numbers fluctuate annually, with water level at key sites being a major factor. In 1976, the best year to date, 87 pairs were located of which 72 were proved breeding; but in 1981 the figures were 26 and 22 pairs respectively, the lowest for 20 years (Sharrock et al 1983).

WHIMBREL Numenius phaeopus

Recent counts of 65 pairs on Unst (Bundy 1978) and 58 pairs on Fetlar (Scottish Bird Rept. 1978) indicate that the Shetland population is at the very least maintaining its 1970 level (when 150 pairs were estimated). With perhaps five pairs in Orkney and a similar number elsewhere in Scotland, the British population is of the order of 160+ pairs.

CURLEW Numenius arquata

Sharrock (1976) offered an estimate of 40,000-70,000 pairs for Britain and Ireland together. This was based on an assumed average of 15-25 pairs/10-km^2, which we suspect was over-optimistic. We are unable to offer a revised figure, however, since there is an inadequate geographical spread to recent sample density estimates.

REDSHANK Tringa totanus

Sharrock (1976) offered an estimate of 38,000-48,000 pairs for Britain and Ireland together. We are unable to improve upon this. Smith (1983) has reported on the status of Redshanks breeding in lowland damp meadows in England and Wales, but this is not a prime habitat for the species.

GREENSHANK Tringa nebularia

Nethersole-Thompson and Nethersole-Thompson (1979) estimated the Scottish population at 800-900 pairs, but pointed out that in any one region numbers were liable to fluctuate markedly between years. Thus Reed et al (1983) estimated 196 and 287 pairs in two consecutive years in Caithness. Since the Nethersole-Thompsons had allowed only 25 pairs for that county, it is probable that Scotland holds at least 1,000 pairs in good years.

WOOD SANDPIPER Tringa glareola

Rare Breeding Birds Panel species. A very small and fluctuating population now exists in Scotland. The best of recent years was 1980, with 12 pairs located and seven of them proved breeding; but only 3-4 pairs were found in 1981 (Sharrock et al 1983; Scottish Bird Rept. 1981).

COMMON SANDPIPER *Actitis hypoleucos*

An estimate of 190-200 pairs in the Peak District (Holland *et al* 1982) is consistent with the Breeding Atlas range of 10-30 pairs/10-km^2. Yet the latter is still too wide a limit, and based on too little sampling, to be confident about the size of the British population, to which Sharrock (1976) attributed an upper limit of 50,000 pairs. Densities vary greatly with river gradient (Marchant and Hyde 1980, Cramp and Simmons 1983), and have reached 27.2 pairs/10 km of linear waterway in WBS data.

TURNSTONE *Arenaria interpres*

Rare Breeding Birds Panel species. Breeding in Britain has yet to be confirmed. However, it has been suspected from time to time, notably in Sutherland in 1976 when an unidentified wader chick was found near an agitated adult Turnstone.

RED-NECKED PHALAROPE *Phalaropus lobatus*

Rare Breeding Birds Panel species. The population is small, numbering 30-40 pairs in most years. More than two-thirds of these are now in Shetland, the remainder in the Outer Hebrides, with only sporadic breeding elsewhere in Scotland (Sharrock *et al* 1983).

GREAT SKUA *Stercorarius skua*

The last full census was in 1974-75, when there were at least 5,451 pairs in Shetland, 482 in Orkney, 24 in the Outer Hebrides, and 12-13 pairs on the Scottish mainland (Everett 1982). The minimum total of 5,970 pairs is a substantial increase over the Operation Seafarer estimate of 3,172 pairs. However, the latter was certainly incomplete, so that realistic rate-of-growth estimates cannot be given. There were about 6,000 pairs in 1977, including 525 pairs in Orkney (Furness 1977b). Over the last ten years the species has continued to spread outside the Shetland stronghold, eg. 28 pairs on Handa (Sutherland) in 1981 (Scottish Bird Rept.). Census methodology is discussed by Furness (1982).

ARCTIC SKUA *Stercorarius parasiticus*

A 1974-75 survey (Everett 1982) produced an estimate of 2,450-2,500 pairs: Shetland, 1,631+ (true total probably nearer 1,700); Orkney, 716; Outer Hebrides, 37; and Scottish mainland, 57. This represented a substantial increase over the Operation Seafarer total of 1,086 pairs, which is assumed to have been incomplete. However, increase with range expansion is certainly occurring. Reed *et al* (1983) found 46-47 pairs in 1979 in Caithness, where only 28 pairs had been located in 1974, and additional sites have been found recently in the Outer Hebrides (Scottish Bird Rept. 1981). Interactions between the two skua species are discussed by Furness (1977).

MEDITERRANEAN GULL Larus melanocephalus

Rare Breeding Birds Panel species. This is an incipient colonist, with 1-3 pairs proved breeding in most years 1976-81 (1978 excepted); Hampshire and Kent have been the counties involved (Sharrock et al 1983). Some additional instances of hybridisation with Black-headed Gull were found during the same period.

LITTLE GULL Larus minutus

Rare Breeding Birds Panel species. The changing status of this species is discussed by Hutchinson and Neath (1978). The numbers of passage migrants and winter visitors have increased very considerably during the last two decades, and there have also been three isolated nesting records: in 1975 (Ouse Washes) and 1978 (Norfolk and North Yorkshire).

BLACK-HEADED GULL Larus ridibundus

There has not been a census of colonies since that of 1973, when there were 100,000 - 110,000 pairs in England and Wales, a doubling of numbers in 15 years (Gribble 1976). Other regions have not been censused, but Sharrock (1976) suggested that there were 150,000 - 300,000 pairs in Britain and Ireland together. Various comments in regional bird reports suggest that the upward trend is being maintained.

COMMON GULL Larus canus

Sharrock (1976) suggested a British and Irish population in the order of 50,000 pairs. No subsequent data are available.

GREAT BLACK-BACKED GULL Larus marinus

Operation Seafarer (1969-70) produced an estimate of 22,000 pairs for Britain, about 16,000 of them being in Scotland (Cramp et al 1974). There has not been a large-scale survey since, so no updated figure can be given. It is suspected that the long-term upward trend is continuing, as Harris (1976) showed was the case in Shetland. Though Mudge and Ferns (1982) reported an 8% drop between 1975 and 1980 in inner Bristol Channel numbers, this may have been a local effect of summer outbreaks of botulism.

LESSER BLACK-BACKED GULL Larus fuscus

Operation Seafarer (1969-70) estimated 45,000 coastal breeding pairs in Britain, but there has never been a full survey of inland colonies. Numbers increased overall into the 1960s at least, in line with the populations of other large gulls, and this despite regional declines in Scotland. Present trends are unclear. The largest British inland colony, in the Lancashire Pennines, increased from 1,000 pairs in 1956 to about 16,000 pairs by the mid-1960s, and seemed to stabilise at that level until a culling programme was begun (Duncan 1981, Wanless and Langslow 1983). Another inland colony, Flanders Moss in Stirlingshire, rose from 500 pairs in 1974 to over 1,000 pairs in 1981 (Sandeman 1982). Yet Mudge and Ferns (1982) reported a 30% fall in numbers in the inner Bristol Channel which may, however, have been a local phenomenon. Sharrock (1976) did not offer a national figure, which in the early 1970s must have well exceeded 70,000 pairs. We cannot give a current estimate.

HERRING GULL Larus argentatus

Operation Seafarer (1969-70) estimated the coastal population of Britain at 278,000 pairs (Cramp et al 1974). Numbers have increased dramatically this century, by an average 12-13% per annum since at least 1930, or a doubling of population size every six years (Chabrzyk and Coulson 1976). This has included an expansion of roof-top nesting in coastal towns, by 17% p.a. between 1969-76 (Monaghan and Coulson 1977, Monaghan 1979), and spread inland into colonies of Lesser Black-backed Gulls (eg. Duncan 1981, Wanless and Langslow 1983). Coastal surveys of Yorkshire and Cleveland in the 1970s found that pairs in natural cliff sites had increased by an average 3% p.a., though roof-top nesters by 22% p.a. (Leach et al 1980). It would be surprising if there were not now in excess of 300,000 pairs in Britain, despite local culling programmes, but it is impossible to guess at an upper limit. A 67% fall in numbers, 1975-80, in the inner Bristol Channel was probably a local effect of summer outbreaks of botulism (Mudge and Ferns 1982). Indeed, botulism may prove to be a factor that will limit further excessive increases in gull numbers (Bourne 1983).

KITTIWAKE Rissa tridactyla

This species has been monitored through BTO surveys conducted in 1959, 1969 and 1979. A spectacular increase of 3-4% per annum up to 1969, a doubling of population size each ten years, resulted in there being an estimated 427,000 pairs in Britain (plus 43,000 pairs in Ireland) that year. However, the 1979 survey found significant changes in trends (Coulson 1983). Numbers had continued to rise markedly in the North Sea, had fallen overall on Atlantic coasts, and were more or less stable in the Northern Isles. The national rate of expansion had fallen to 1-2% per annum. There were 113,000 pairs in England and Wales in 1979, but only sample counts in Scotland, where the population may now

be approaching 400,000 pairs following East Coast increases. Hence a British population in the order of 500,000 pairs is indicated. Galbraith (1983) has discussed the feeding ecology of breeding Kittiwakes.

SANDWICH TERN Sterna sandvicensis

A 1979 survey revealed 2,066 pairs in Scotland, 10,347 in England and 446 pairs in Wales (Thomas 1982). The total of 12,859 pairs for Britain compares with only 2,605 pairs for Ireland. North Sea coasts emerge as being especially important for this species, with (in 1979) 5,800 pairs or 45% of the British total in Norfolk and 3,334 pairs (26%) in Northumberland. Overall, the population had increased by about 30% during the decade up to 1979, when the nine largest colonies held about 90% of pairs. But the once-famous Ravenglass colony had become extinct.

ROSEATE TERN Sterna dougallii

The latest published figures are those for 1979 (Thomas 1982), when there were 40-50 pairs in Scotland, 87+ in England, and 189 in Wales (all in Anglesey). The total of 316-326 pairs was only one-third of that for Ireland (659 pairs located). Taking the two countries together, the majority of Roseate Terns (88%) were on Irish Sea coasts, the remainder in the Firth of Forth and Northumberland. Unquestionably, this is the scarcest and most localised of sea terns breeding in Britain.

COMMON TERN Sterna hirundo

In 1979, 7,935+ pairs were located in Britain and 1,700+ pairs in Ireland (Thomas 1982). The combined total of 9,635 pairs compares unfavourably with the 1969-70 estimate of 15,000 pairs (Cramp et al 1974), but Operation Seafarer coverage was the more complete, while inland sites were not assessed in 1979. A sample of 31 coastal colonies covered well in 1969-70 and 1979 showed little change (8,413 and 8,521 pairs respectively) (Thomas 1982), so the Breeding Atlas figure of 15,000-20,000 pairs, about 75% of them in Britain, may still be valid.

ARCTIC TERN Sterna paradisaea

A comprehensive survey of the Shetland and Orkney colonies in 1980 produced estimates of 32,000 and 33,000 pairs respectively (Bullock and Gomersall 1981). In 1979 there were about 6,000 pairs elsewhere in Scotland, 3,500 in England and 671 pairs in Wales (Thomas 1982). Hence the British total (about 75,000 pairs) is considerably larger than previously thought, due to more thorough assessment of numbers in the Northern Isles. The subject of fluctuating numbers at individual colonies is discussed by Bullock and Gomersall (1981).

LITTLE TERN Sterna minuta

Due to recreational pressures on potential breeding beaches and consequential increased dependence on protected sites, the fortunes of this species have been monitored since 1967. Allowing for some gaps in coverage in recent years (eg. the Outer Hebrides), the 1979 population was estimated at 300 pairs in Scotland, 1,600 in England, 75 in Wales, and perhaps 100-200 pairs in Ireland. The estimated total of around 2,100 pairs represented a 15% increase over the previous decade (Thomas 1982). Conservation problems

associated with this species are discussed by Knight and Haddon (1982, 1983), and a breeding study in eastern Scotland is reported on by Atkinson (1982).

BLACK TERN Chlidonias niger

Rare Breeding Birds Panel species. Black Terns nest only occasionally in Britain. Single pairs did so in 1975 (Ouse Washes) and 1978 (Nottinghamshire), these being the only such records during the last twelve years.

RAZORBILL Alca torda

Operation Seafarer (1969-70) estimated 96,000 pairs in Britain and 48,000 pairs in Ireland, but recognised that these were only order-of-abundance figures due to the practical difficulties of censusing the species (Cramp et al 1974). The significance of colony attendance counts has since been discussed by Lloyd (1975). Recent monitoring of sample sites (Stowe 1982; see also Wanless et al 1982 for Orkney) has indicated an overall increase in Scotland and north-eastern England, with little change elsewhere. Probably the British population now exceeds 100,000 pairs.

GUILLEMOT Uria aalge

The Operation Seafarer order-of-abundance estimates for this species were 498,000 pairs in Britain and 79,000 pairs in Ireland. The practical problems of counting large colonies and interpreting variations in cliff attendance counts of adults and pre-breeders are considerable, and have been discussed by Birkhead (1978) among others. Recent monitoring of sample sites (Stowe 1982, Wanless et al 1982) has suggested that (as in Razorbill) numbers are increasing in Scotland and north-eastern England but showing little change elsewhere. However, Harris and

Galbraith (1983) and Harris et al (1983) showed that caution is needed before making generalised statements based on small numbers of sample plots. The current British population may exceed 500,000 pairs, but upper limits cannot be estimated without increased sampling using standardised methodology.

BLACK GUILLEMOT Cepphus grylle

No national survey has been undertaken since Operation Seafarer, while subsequent fieldwork has thrown doubt on the reliability of the Seafarer estimate of 8,340 pairs. The latter was based on counts of birds rather than nests. These will have included non-breeders, and an Orkney study (Ramsay 1976) found that peak attendance counts averaged six birds per occupied nest. Not all Seafarer counts would have been made at peak attendance times, and a best guess is that Operation Seafarer data represented something in the order of 4,000 pairs (Ramsay 1976), of which about 90% were in Britain.

PUFFIN Fratercula arctica

Operation Seafarer produced admittedly very rough estimates of 460,000 pairs in Britain plus 30,000 pairs in Ireland, and drew attention to serious declines believed to have occurred (Cramp et al 1974). Harris (1976) emphasised the unreliability of many earlier estimates, due to the inconsistent use as counting unit of total birds, birds ashore, extrapolation to pairs, or burrow counts. His re-assessments for the mid-1970s were ca.500,000 pairs in Scotland, ca.15,000 pairs in England, and 8,000-10,000 pairs in Wales. Overall decline had ceased, and away from

peripheral areas colonies were stable or increasing. Subsequent monitoring at selected Scottish colonies (Harris and Murray 1981) found that this was still the case up to 1980. The Puffin population between the Moray Firth and Yorkshire increased by 9% per annum between 1969-80 (Harris and Galbraith 1983). Harris (1980) has discussed breeding performance in relation to nest density and other factors.

ROCK DOVE/FERAL PIGEON Columba livia

Sharrock (1976) offered a guess that the total population might be in excess of 100,000 pairs. However, the position still remains that no reliable density data are available.

STOCK DOVE Columba oenas

Population levels fell substantially during the 1950s, probably due to pesticide usage since the decline was steeper on agricultural land than in other habitats. The CBC index has shown that a recovery dating from the early 1960s continued up to 1980, since when the population level has stabilised. Hence numbers may now be close to pre-crash levels within the main part of the species' range (southern and eastern Britain), despite the reduced availability of elm trees as nest sites due to Dutch elm disease (O'Connor and Mead 1981, Osborne 1982). Sharrock (1976) suggested a British and Irish population of 100,000+ pairs in 1972. With further increase since then, it may be that the British total alone is in that order of magnitude.

WOODPIGEON Columba palumbus

Sharrock (1976) thought it possible that the combined British and Irish population was in the order of 3-5 million pairs. We have misgivings whether the density figures used in the Breeding Atlas would apply nationally, but have no fresh data. The species is not monitored by the CBC because of the late breeding season of many pairs. Shooting figures collected by the Game Conservancy have shown an overall reduction in bag sizes since 1973, though regional variation was considerable (Rands and Tapper 1983).

COLLARED DOVE Streptopelia decaocto

The CBC index has risen steadily, to a value of 457 by 1982; the rise was steepest in the period to 1976, having flattened out since then. However, the CBC does not cover primary Collared Dove habitat; it is recording overspill rather than reflecting national growth rate. Britain alone must now hold more than the Breeding Atlas estimate of 30,000-40,000 pairs, but no revised upper limit can be offered. Coombs et al (1981) provided an ecological study made in English urban areas.

TURTLE DOVE Streptopelia turtur

The CBC indices for 1982 (farmland 103, special 139) were comparable to the values for the early 1970s (1972: 105 and 123 respectively). From this it may be inferred that population level has not varied much from that indicated in the Breeding Atlas (over 100,000 pairs).

CUCKOO Cuculus canorus

Cuckoos appear to have increased on farmland, the 1982 index value of 172 comparing with 105-111 during 1970-72. The woodland index has shown less change: 110 in 1982, 103-112 during 1970-72. Density data cannot be calculated from CBC returns since territory sizes will often exceed plot sizes. The current population may still be within the Breeding Atlas range of 17,500-35,000 pairs, for our own fieldwork suggests that 5-10 pairs/10-km^2 remains a reasonable figure.

RING-NECKED PARAKEET Psittacula krameri

This is an introduced species which was added to the British List only in 1983. This feral population is found mainly in suburban areas, especially those of Greater London, and is thought to total 500-1,000 individuals (B.Hawkes and BOU Records Committee, in litt.).

BARN OWL Tyto alba

Sharrock (1976) suggested a British and Irish total of 4,500-9,000 pairs. This is one of several species predicted to suffer through nest-site loss following Dutch elm disease (Osborne 1982), and subjective assessment of county bird club records indicates continuing decline, exacerbated by recent cold winters (Bunn et al 1982). No results have yet been released from the 1983 survey initiated by the Hawk Trust.

SNOWY OWL Nyctea scandiaca

Rare Breeding Birds Panel species. Nesting took place annually on Fetlar (Shetland) from 1967-1975, after which the male disappeared. Unmated females are still present on the island, and infertile eggs have been laid in some years.

LITTLE OWL *Athene noctua*

Territory size can exceed CBC plot size in this species, so that reliable density data cannot be derived from that source. CBC index values indicate that Little Owls increased somewhat during the late 1970s but were then affected adversely by the 1981/82 cold winter. The population may still lie within the range of 7,000-14,000 pairs suggested by the Breeding Atlas.

TAWNY OWL *Strix aluco*

The CBC index remained more or less stable during the 1970s, and showed only a slight fall after the 1981/82 cold winter. Sharrock (1976) suggested that there might be 50,000 - 100,000 pairs in Britain, and this may still apply.

LONG-EARED OWL *Asio otus*

Sharrock (1976) suggested a population level between 3,000-10,000 pairs for Britain and Ireland together. We have no data with which to update this figure. Glue (1977) has described the species' breeding biology, and Village (1981) has discussed reaction to fluctuations in prey numbers.

SHORT-EARED OWL *Asio flammeus*

Sharrock (1976) suggested a British population of *ca*.1,000 pairs. No revised figure is available.

SWIFT *Apus apus*

This is an almost impossible species to census. The figure suggested in the Breeding Atlas (100,000 pairs) was based more on guesswork than estimation, and we are unable to improve on it.

NIGHTJAR Caprimulgus europaeus

A nocturnal BTO survey of singing males, during summer 1981, produced a total of 1,784 birds; even allowing for incomplete coverage in a few areas, the total could not have exceeded 2,100 males (Gribble 1983). On comparison with the Breeding Atlas distribution it was evident that range contraction had occurred, with withdrawal from the west and north so that few remained in Wales or Scotland. The highest densities in 1981 were in the East Anglian Brecks, and in the southern counties of Devon to Sussex with a northward extension into Surrey. Nightjars were known to be undergoing a long-term decline in Britain. Probably climatic factors are involved (in addition to habitat changes), especially since Berry and Bibby (1981) showed that the frequency of second broods had fallen in comparison with a study made in the same region 50 years earlier.

KINGFISHER Alcedo atthis

The Kingfisher was hard hit by the cold winters of 1978/79 and 1981/82; the 1982 WBS index value was 29 relative to 100 in 1974 (Taylor and Marchant 1983). While the 1982 population was probably reduced to about one-third of that indicated in the Breeding Atlas (5,000-9,000 pairs for Britain and Ireland together), this is a species which is able to recover well after two or three successive mild winters. Morgan and Glue (1977) provided a breeding study.

HOOPOE Upupa epops

Rare Breeding Birds Panel species. Hoopoes nest only occasionally in Britain (usually in southern England). There have been six such instances in the last twelve years, in 1971 (one pair), 1976 (one pair) and 1977 (four pairs). The latter was unprecedented for the number of pairs in a single year.

WRYNECK Jynx torquilla

Rare Breeding Birds Panel species. Though formerly widely distributed in England and Wales, a long-term decline is now in its final stages. After progressive contraction into south-eastern England, the population has now virtually died out. Moreover, an incipient colonisation of the Scottish Highlands (presumably from Scandinavia) in the late 1960s and 1970s seems to have faltered. In 1981, for the first time ever, there was no confirmed nesting anywhere in Britain, though single birds or pairs were seen at two unnamed sites (Sharrock et al 1983).

GREEN WOODPECKER Picus viridis

CBC data cannot provide density estimates for woodpeckers, since territory size can exceed plot size. Sharrock (1976) estimated 15,000-30,000 pairs, on a basis of 10-20 pairs/10-km^2. We are now of the opinion that the species normally occurs at or below 10 pairs/10-km^2, so that a range of 10,000-15,000 pairs would be more realistic.

GREAT SPOTTED WOODPECKER Dendrocopos major

This species has continued a modest increase; CBC woodland index values were 181 in 1974 and 245 in 1982. Nevertheless we suspect that, allowing for lower densities in the north, the Breeding Atlas range of 30,000-40,000 pairs is still in the right order of magnitude.

LESSER SPOTTED WOODPECKER Dendrocopos minor

This species is not monitored by the CBC. Its population level has certainly fallen back after a temporary increase at the height of Dutch elm disease infestation (Osborne 1982), and must now be at the lower end of the 5,000-10,000 pairs range that was given in the Breeding Atlas.

WOOD LARK Lullula arborea

The population level in England and Wales reached a high point in the early 1950s, but declined thereafter. The Breeding Atlas estimated 200-450 pairs during 1968-72. At the present time the main area for Wood Larks is Surrey-Hampshire, where there were at least 300 pairs in 1981 (county bird reports). There is no recent census for Dorset, while Devon-Cornwall (together) and East Anglia probably hold fewer than 50 pairs each. Since the species has virtually disappeared from Kent, Sussex, Wiltshire and Somerset, a British total of 400-500 pairs is indicated. The decline has halted, and there has been a recent suggestion from Surrey that numbers may slowly be rising again.

SKYLARK *Alauda arvensis*

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	10.9	(12.0)	0.7	(2.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no.territories	1,262,798	(755,028)	14,525	(56,036)

Hence a British population of at least 2 million pairs is indicated, despite a steady decline in CBC farmland index values from a high point in the late 1960s. Green (1978) has assessed diet on farmland.

SHORE LARK *Eremophila alpestris*

Rare Breeding Birds Panel species. Single pair(s) nested in Scotland in 1973 and 1977, but not since. These are the only British breeding records.

SAND MARTIN *Riparia riparia*

The Breeding Atlas commented on a major reduction in population level between the 1968 and 1969 breeding seasons, probably brought about by drought in the species' Sahel wintering area. Cowley (1979) showed that numbers decreased further between 1969 and 1970, and thereafter fluctuated around the 1970 level; in 1978 numbers were about one-third those of 1968. If the Atlas estimate of "approaching 1,000,000 pairs" was correct for the pre-crash period, then present numbers might be in the order of 300,000+ pairs. However, this is a notoriously difficult species to count, even on a sample basis, since colony sites are impermanent and hole counts not always reliable (Cowley 1979), while some birds will change colony between first and second broods within a season (Cowley 1983).

SWALLOW Hirundo rustica

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	2.9	(1.5)	0.6	(5.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	335,974	(94,379)	12,450	(140,090)

These estimates imply a British population towards the upper end of the 500,000 - 600,000 pairs range. A breeding study in Scotland has been described by McGinn and Clark (1978) and McGinn (1979).

HOUSE MARTIN Delichon urbica

This species is not monitored by the BTO, and no new density data are available. Sharrock (1976) suggested a British and Irish population of 300,000 - 600,000 pairs, though on the basis of limited sampling.

Clark and McNeil (1980) investigated the incidence of cliff-nesting in Britain. Newman (1977) reported on the sensitivity of House Martins to fluoride emissions, and Turner (1982) assessed the impact of moderate levels of pollution on aerial-feeding birds in general.

TREE PIPIT Anthus trivialis

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	0.4	-	2.7	-
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	46,341	-	56,025	-

Hence the British breeding population probably number around 100,000 pairs, at the top of the range suggested by the Breeding Atlas. Rose (1982) compared the breeding ecologies of the three British breeding pipits.

MEADOW PIPIT Anthus pratensis

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	1.6	(15.0)	0.7	(2.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no.territories	185,365	(943,785)	14,525	(56,036)

These figures imply a British population of 1-1½ million pairs, considerably below the Breeding Atlas estimate of over 3 million pairs for Britain and Ireland together. It seems likely that CBC data do not adequately reflect the higher densities of upland areas. Seel and Walton (1979) stressed the problems of censusing this species; they found an average density over four years of 48 pairs/km^2 in their North Wales study area.

ROCK PIPIT Anthus spinoletta

Sharrock (1976) suggested that the British and Irish population exceeded 50,000 pairs. No new data are available for this essentially coastal species.

YELLOW WAGTAIL Motacilla flava

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	1.0	(0.5)	-	(1.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no.territories	115,853	(31,460)	-	(28,018)

These figures suggest a British total in the region of 175,000 pairs, considerably higher than any previous estimate. Possibly the BTO sample plots contained above-average densities, due to the scarcity of Yellow Wagtails in western and northern parts of the

country. Nevertheless, the Breeding Atlas estimate of 25,000 pairs was probably unrealistically low, when considered in relation to the numbers of migrants which pass through English coastal counties (eg. Buckland and Hereward 1982).

GREY WAGTAIL Motacilla cinerea

Sharrock (1976) suggested a British and Irish population of 25,000-50,000 pairs in the mid-1970s. It is not yet possible to derive meaningful density data from the WBS, due to the linear nature of plots. Grey Wagtails suffered badly in the cold winters of 1978/79 and 1981/82, the 1982 index value being only 39 (relative to datum year 1974). Mortality and movements in Britain are discussed by Tyler (1979).

PIED WAGTAIL Motacilla alba

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	1.4	(1.4)	0.4	(2.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no.territories	162,194	(88,087)	8,300	(56,036)

Hence the British population can be estimated at over 300,000 pairs, despite heavy mortality in the 1978/79 and 1981/82 cold winters (Cawthorne and Marchant 1980, Marchant 1983).

DIPPER Cinclus cinclus

Sharrock (1976) suggested a British and Irish population of ca.30,000 pairs in the mid-1970s. The present position is similar to that for Grey Wagtail (see above), though the Dipper declined less in recent cold winters, its 1982 WBS index value being 86 (Taylor and Marchant 1983). Mortality and dispersal in Britain are discussed by Galbraith and Tyler (1982).

WREN Troglodytes troglodytes

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	11.6	(6.0)	57.5	(15.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no.territories	1,343,895	(377,514)	1,193,125	(420,270

These 1982 densities indicate a British population then of 3-3½ million pairs. CBC indices show that densities were relatively low that year, following the 1978/79 and 1981/82 cold winters. In normal years population size is likely to be at least one-third larger. A study of breeding ecology in Britain has been provided by Garson (1980).

DUNNOCK Prunella modularis

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	9.4	(2.0)	25.2	(15.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no.territories	1,089,018	(125,838)	522,900	(420,270)

Hence a British population of a little over 2 million territories is indicated. Densities were lowered in 1982, following a cold winter which hit hardest at ground-feeding species; reductions of 26% on farmland and 18% in woodland were recorded by the CBC (Marchant 1983).

The type of social organisation shown by Dunnocks (Birkhead 1981, Snow 1983) necessitates use of territories rather than pairs as the basic unit.

ROBIN Erithacus rubecula

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	12.7	(2.0)	66.9	(20.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no.territories	1,471,333	(125,838)	1,388,175	(560,360)

These figures indicate a British population of at least 3½ million pairs.

NIGHTINGALE Luscinia megarhynchos

BTO surveys of singing males were carried out in 1976 (Hudson 1979) and 1980 (Davis 1982); these produced counts of 3,230 and 4,770 birds respectively. This is known to be a species in which there are considerable annual differences in the strength of spring arrivals, with (eg.) very good years in 1970 and 1980 but poor ones in 1971 and 1976. There has been a long-term contraction of range in Britain, so that much the largest numbers are now to be found in southern and south-eastern counties of England. Such contraction must have involved a reduction in population size also, but at the present time numbers probably fluctuate between the 1976 and 1980 extremes. Certainly the Breeding Atlas estimate of 10,000 pairs was wildly optimistic. Some parameters of breeding biology were measured by Morgan (1982).

BLACK REDSTART Phoenicurus ochruros

A BTO survey in 1977 produced a total of 104 singing males: 61 paired and breeding, 18 paired but not proved breeding, and 25 not known to have been paired (Morgan and Glue 1981). The small British population fluctuates somewhat, between 50 and 100+ males, and 1977 was a peak year for the number of pairs proved breeding. Industrialised and other urban areas in south-eastern England and the English Midlands remain the main regions for this species.

REDSTART Phoenicurus phoenicurus

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	0.3	(0.3)	3.7	(0.3)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	34,756	(18,876)	76,775	(8,405)

The indicated total of about 140,000 pairs is higher than that suggested in the Breeding Atlas (45,000-90,000 pairs), but CBC index values have shown an upward trend over the last decade (50 in 1972, 78 in 1982).

WHINCHAT Saxicola rubetra

Sharrock (1976) suggested 20,000-40,000 pairs for Britain and Ireland together. We have no basis for revising the estimate. Fuller and Glue (1977) have made a comparative breeding study of Whinchat and Stonechat.

STONECHAT Saxicola torquata

Sharrock (1976) estimated the British and Irish population at 30,000-60,000 pairs in the mid-1970s, when numbers were high following a series of mild winters. We have no recent numerical data, but the species is known to have suffered to an unquantified extent in two recent cold winters.

WHEATEAR Oenanthe oenanthe

Sharrock (1976) suggested a British and Irish population in the order of 80,000 pairs. The species is not monitored by the BTO, and we have no basis for updating this figure. However, it is suspected that Wheatears have been declining nationally since the early 1960s (Spencer and Hudson 1979).

RING OUSEL Turdus torquatus

Sharrock (1976) suggested a British and Irish population level of 8,000-16,000 pairs. We have no later information. For both Wheatear and Ring Ousel, upland densities have been inadequately sampled as yet.

BLACKBIRD Turdus merula

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	21.7	(5.0)	53.1	(30.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no.territories	2,514,010	(314,595)	1,101,825	(840,540)

These figures imply a British population in the order of 4½-5 million pairs. Osborne and Osborne (1980) compared nest site characteristics with breeding success, and Batten (1978) discussed causes of mortality in Blackbirds.

FIELDFARE Turdus pilaris

Rare Breeding Birds Panel species. Fieldfares have bred in Britain since 1967, though colonisation has not yet been consolidated. Peak numbers were found in 1975-76 (10 and 12 pairs) but only 4-6 pairs in subsequent years and only one proved breeding in 1981 (Sharrock et al 1983, Scottish Bird Reports). The history of breeding in the Peak District is summarised by Frost and Shooter (1983). Most recent pairs have been in Scotland.

SONG THRUSH Turdus philomelos

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	5.6	(1.0)	19.2	(15.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	648,777	(62,919)	398,400	(420,270

These figures indicate a population in the order of 1½ million pairs in 1982, after numbers had been reduced by two cold winters. The 1982 CBC index values were 65 on farmland and 57 in woodland. Sharrock (1976) suggested 3½ million pairs in the mid-1970s, for Britain and Ireland together, after a succession of mild winters.

REDWING Turdus iliacus

Rare Breeding Birds Panel species. Almost certainly the Breeding Atlas estimate of 300 pairs was over-optimistic. If not, then the attempted colonisation (mainly in Scotland) since the mid-1960s must be waning. In the best post-Atlas year (1975) there were 53 known pairs or singing males, with breeding proved for 13 of them. In 1981, however, under 30 pairs or singing males were reported (Sharrock et al 1983, Scottish Bird Reports).

MISTLE THRUSH Turdus viscivorus

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	1.2	(0.6)	3.4	(1.7)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	139,024	(37,751)	70,550	(47,631)

Hence a British population in the order of 300,000 pairs is indicated.

CETTI'S WARBLER Cettia cetti

Rare Breeding Birds Panel species. Numbers have risen steadily since the first evidence of breeding in 1972. Counts of singing males reached 174 in 1978, 163 in 1979 (after a cold winter), and 198 in 1980. Only 162 were reported in 1981, though these included the best-yet figure of 56 proved breeding. Possibly the 'decrease' was an artefact of reduced observer interest in the main areas, where the species no longer has novelty value (Sharrock et al 1983). As yet, the species occurs mainly in coastal counties of southern and south-eastern England. Bibby (1982) has provided a breeding study from Dorset.

GRASSHOPPER WARBLER Locustella naevia

Riddiford (1983) reported marked changes in numbers of migrants passing through coastal bird observatories. Spring data expressed as an index (100 in 1964) rose to 278 in 1969 (and to an exceptional 468 in 1970), then fell steadily to a minimum of 52 in 1976 before rising again to a value of 146 in 1981. Limited data available from breeding areas indicated that the trends were genuine. Hence numbers may now be halved from those of the Breeding Atlas period, for which Sharrock (1976) suggested 25,000+ pairs.

SAVI'S WARBLER Locustella luscinioides

Rare Breeding Birds Panel species. A recolonisation has been in progress since about 1960, mainly affecting coastal counties of southern and south-eastern England. Between 26-30 singing males were reported each year 1977-1980, though only 15 in 1981 (Sharrock et al 1983). Doubtless some of these were unmated or still on passage; no more than six pairs have been proved breeding in any one year.

SEDGE WARBLER Acrocephalus schoenobaenus

Sharrock (1976) suggested a British and Irish population in the order of 300,000 pairs, following a Sahel drought-related crash in the late 1960s. CBC index values for the species remain at low levels, fluctuating around 60. It is a difficult species to census reliably (Bell et al 1968), and we are unable to offer an updated population figure. Bibby (1978) has made a comparative breeding study of Sedge and Reed Warblers.

REED WARBLER Acrocephalus scirpaceus

This also is a notoriously difficult species to census reliably, and its numbers at any one site seem to correlate better with perimeter length than with area of a reed bed (Milsom 1982). Sharrock (1976) suggested a population in the order of 40,000-80,000 pairs, below Sedge Warbler numbers because the present species has a much more restricted distribution (southern half of Britain only). The Reed Warbler is not monitored by the BTO, and w are unable to offer an updated figure.

MARSH WARBLER Acrocephalus palustris

Rare Breeding Birds Panel species. The main stronghold in Worcestershire held 50-60 pairs in 1977 (the latest figure available), and there are probably under 20 pairs in total elsewhere in England (Sharrock et al 1983). Hence the population cannot exceed the Breeding Atlas upper limit of 80 pairs.

DARTFORD WARBLER Sylvia undata

Rare Breeding Birds Panel species. It was last censused fully in 1974-75, at a time when numbers were high after a series of mild winters. There were then ca.250 pairs in the New Forest stronghold plus at least 310 pairs elsewhere in southern England, totalling ca.560 pairs (Bibby and Tubbs 1975, RBBP). Since then numbers have fallen in Dorset due to habitat loss, and more generally from recent cold winters. The New Forest population fell to ca.70 pairs in 1979. There is no later New Forest figure, but in 1981 some 100-120 pairs were known elsewhere (Sharrock et al 1983). Bibby has provided a breeding study (1979a) and discussed mortality and movements in Britain (1979b).

WHITETHROAT Sylvia communis

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	2.3	(1.0)	3.9	(1.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	266,462	(62,919)	80,925	(28,018)

Hence a total in the lower part of the range 400,000 - 500,000 pairs is indicated. The population level remains low, after the 1968-69 crash. CBC indices fluctuate around values of 25-30 for farmland and 40-45 for woodland. Mason (1976) made a comparative study of the breeding biology of the more common British Sylvia warblers.

LESSER WHITETHROAT Sylvia curruca

Estimation of the type used above suggested a total of at least 80,000 pairs, rather higher than the range of 25,000-50,000 pairs indicated in the Breeding Atlas. Certainly there are now parts of England where this and the preceding species occur in about equal proportions. However, the low densities of Lesser Whitethroats in all habitat divisions, coupled with the known scarcity of the species in northern and western Britain, do not permit too much confidence to be placed in the figures available so far. The species' peripheral status in south-east Scotland was assessed by Prato (1980).

GARDEN WARBLER Sylvia borin

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	0.6	-	6.5	(1.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no.territories	69,512	-	134,875	(28,018)

These figures lead to an estimate of over 200,000 pairs, or double the upper limit offered in the Breeding Atlas. There has been a modest increase in the CBC woodland index since the mid-1970s, with values of 63 in 1975 and 113 in 1982.

BLACKCAP Sylvia atricapilla

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	3.2	-	18.4	(3.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	370,730	-	381,800	(84,054)

These figures indicate a population of at least 800,000 pairs, appreciably higher than the 200,000+ pairs suggested in the Breeding Atlas. The species is known to have been increasing steadily over the last decade, with 1982 CBC index values reaching 225 on farmland and 125 in woodland. Moreover, Langslow (1978) drew attention to increases in the numbers of birds passing through coastal bird observatories.

WOOD WARBLER Phylloscopus sibilatrix

It is suspected that the Breeding Atlas estimate (30,000-60,000 pairs) is too high. Assumed densities of 25-50 pairs/10-km^2 may well apply to western oakwoods, but elsewhere there is a high frequency of squares containing few Wood Warblers. Possibly 10,000-20,000 pairs would be more realistic. In view of the prevailing uncertainty, the BTO is to organise a survey of the species' British status in 1984.

CHIFFCHAFF Phylloscopus collybita

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	1.5	-	13.0	(1.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	173,780	-	269,750	(28,018)

These density figures suggest a British population at the upper end of the 400,000 - 500,000 pairs range. This is appreciably higher than the Breeding Atlas estimate (300,000 pairs, including Ireland), despite a fall in CBC index values over the last decade.

WILLOW WARBLER Phylloscopus trochilus

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	8.0	(4.0)	56.3	(10.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	926,824	(251,676)	1,168,225	(280,180)

These figures imply a British population of at least 2½ million pairs, in good agreement with the Breeding Atlas estimate (which figure included Ireland).

GOLDCREST Regulus regulus

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	0.9	-	11.5	(6.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	104,268	-	238,625	(168,108)

These figures imply a 1982 British population towards the lower end of the 500,000 - 600,000 pairs range, or about one-third the level suggested by the Breeding Atlas. Numbers were certainly high in the mid-1970s when, following a series of mild winters, the CBC woodland index reached 385 (1975). However, Goldcrests were hard-hit by the cold winter of 1978/79 (1979 index value of 108) and to a much lesser extent in 1981/82 when arboreal residents suffered less than ground-feeders (Marchant 1983).

FIRECREST Regulus ignicapillus

Rare Breeding Birds Panel species. The Firecrest has been colonising Britain (mainly southern England) since the early 1960s. The numbers of occupied sites known and singing males counted fluctuate considerably from year to year. Peak figures were achieved in 1975 (32 and 123) and 1981 (35 and 102), but in 1978 only 7 and 11 respectively were known (Sharrock et al 1983). Probably it is still true that this species is much overlooked, though fluctuations in one key area (Buckinghamshire) are genuine. Cases of hybridisation with Goldcrest were reported by Cobb (1976) and Thorpe (1983).

SPOTTED FLYCATCHER *Muscicapa striata*

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	1.0	(0.5)	3.4	(4.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	115,853	(31,460)	70,550	(112,072)

The resulting estimate of at least 300,000 pairs is distinctly higher than that given in the Breeding Atlas (100,000 - 200,000 pairs, including Ireland), despite a fall in CBC indices since the mid-1970s. The effects of weather parameters on breeding are described by O'Connor and Morgan (1982).

PIED FLYCATCHER *Ficedula hypoleuca*

No new data are available. We are of the opinion that the estimate in the Breeding Atlas of 20,000 pairs is much too low, possibly by a factor or two or three. It did not give proper weight to the high population levels created in some regions (especially Wales) by large-scale provision of nest boxes.

BEARDED TIT *Panurus biarmicus*

The last full census in 1974 accounted for *ca*.600 pairs, with new breeding sites established as far north as Lancashire and Yorkshire and west into Wales (O'Sullivan 1976). Numbers continued to increase up to 1978, though figures are available from peripheral counties only. Further growth was checked by the cold winter of 1978/79, though this did not cause any serious decline (Bibby and Lunn 1982). No current census figure is available. Bearded Tit ecology has been discussed by Bibby (1981, 1983).

LONG-TAILED TIT *Aegithalos caudatus*

	Agricultural land	Rough grazing	Woodland	Othe
Estimated density/km^2	0.5	(0.3)	3.6	(2.0
Area of habitat (km^2)	115,853	62,919	20,750	28,01
Implied no. territories	57,927	(18,876)	74,700	(56,03

These figures imply a population of around 200,000 territories, slightly higher than the Breeding Atlas estimate despite moderate declines known to have occurred in the 1978/79 and 1981/82 cold winters.

MARSH TIT *Parus palustris*

	Agricultural land	Rough grazing	Woodland	Othe
Estimated density/km^2	0.4	-	4.0	(0.5
Area of habitat (km^2)	115,853	62,919	20,750	28,01
Implied no. territories	46,341	-	83,000	(14,00

These figures indicate a population in the order of 140,000 - 150,000 pairs, at the top end of the range suggested in the Breeding Atlas.

WILLOW TIT *Parus montanus*

Sharrock (1976) offered an estimate of 50,000-100,000 pairs. The species is not monitored by the BTO, so we cannot offer an updated figure.

CRESTED TIT *Parus cristatus*

The size of the Scottish population was assessed in 1979-80, using 5-km^2 units and applying sample density figures per woodland type to each of the 78 occupied squares. The method produced an estimate of 885 pairs, and it was thought that the population probably fluctuated around 900 pairs according to the severity of the preceding winter (Cook 1982). Knox (1983) has since confirmed that the species occurs only irregularly on Deeside.

COAL TIT *Parus ater*

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	0.7	-	12.7	(4.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	81,097	-	263,525	(112,072)

These figures indicate a population in the upper half of the 400,000 - 500,000 pairs range. This is only half the figure suggested in the Breeding Atlas, and it seems likely that BTO data under-represent the high densities which occur in conifer afforestations.

BLUE TIT *Parus caeruleus*

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	11.8	(3.0)	48.8	(30.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	1,367,065	(188,757)	1,012,600	(840,540)

These densities indicate a British population approaching 3½ million pairs, which is consistent with the Breeding Atlas estimate.

GREAT TIT *Parus major*

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	6.9	(2.0)	31.9	(15.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	799,386	(125,838)	661,925	(420,270

These densities suggest a British population in the order of 2 million pairs.

NUTHATCH *Sitta europaea*

Density estimates (pairs/km^2) derived from BTO data are 0.6 for agricultural land, 5.1 for woodland and 1.0 for 'other'. Simple extrapolations of the type used above lead to a total of over 200,000 pairs for Nuthatch, which is far too high a figure (the Breeding Atlas offered an estimate of 20,000+ pairs). Since this species is well represented only in the southern half of Britain, use of national habitat availability figures will give a misleading result. However, the British total must now be considerably higher than it was at the time of Atlas fieldwork, for CBC woodland index values have doubled from 75 in 1974 to 142 in 1982. This is a species which has been predicted to benefit in the short term from the aftermath of Dutch elm disease (Osborne 1982).

TREECREEPER Certhia familiaris

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	0.7	-	5.4	(1.5)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	81,097	-	112,050	(42,027)

This indication of a population level in the lower part of the 200,000 - 300,000 pairs range is consistent with the Breeding Atlas estimate, which was for a similar order of abundance for Britain and Ireland combined. Numbers will have been on the low side in 1982, for the CBC woodland index indicates that 1978/79 cold weather losses have not yet been repaired.

GOLDEN ORIOLE Oriolus oriolus

Rare Breeding Birds Panel species. The present colonisation of southern and south-eastern England dates from the mid-1960s. In the last five years for which figures are available (1977-1981), 13-17 sites were occupied annually by a possible 21-30 pairs (Sharrock et al 1983).

RED-BACKED SHRIKE Lanius collurio

Rare Breeding Birds Panel species. The downward trend of this once-widespread species is continuing. A 1977-79 presence in Scotland failed to result in a colonisation there. Hence this shrike remains restricted to south-eastern England (principally East Anglia), where there were a possible 31 pairs in 1980 and 39 pairs in 1981 (Sharrock et al 1983).

MAGPIE *Pica pica*

CBC returns do not provide reliable density data, due to the problem of territory *versus* plot size. However, both indices have risen steadily since the early 1970s; 1971 values were 85 for farmland and 104 for woodland, but in 1982 were 137 and 284 respectively. Moreover, the species is continuing to penetrate suburban and even urban districts (eg. Tatner 1982 *a*, *b*). Sharrock (1976) suggested that Britain and Ireland together held in excess of 250,000 pairs, but it is impossible to offer an updated figure

JAY *Garrulus glandarius*

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	0.5	(0.1)	5.9	(1.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	57,927	(6,292)	122,425	(28,018)

These figures suggest a population of at least 200,000 pairs, or double that indicated in the Breeding Atlas. It seems likely that the mean density figures used are on the high side due to the species' scarcity over much of Scotland. Over the last 15 years the CBC woodland index has remained stable at around datum year level, though the farmland index has risen from values of 76-84 in the mid-1970s to 102 in 1982.

CHOUGH Pyrrhocorax pyrrhocorax

The status and distribution of the Chough were re-assessed by an RSPB/BTO/IWC survey in 1982 (Bullock et al 1983, Warnes 1983). The totals found were as follows.

Area	No. of breeding pairs	No. of non-breeding birds
West Scotland	61-72	46-64
Isle of Man	49-60	61-65
Wales	139-142	103-106
BRITISH TOTALS	249-274	210-235
Ireland	656-685	615-623

These numbers compare favourably with those of the last (1963) survey, when 700-800 breeding pairs were estimated for Britain and Ireland. Clearly, a decline reported earlier this century has been arrested, or even reversed locally as in North Wales and southern Ireland. The 1982 breeding distribution was almost exactly as shown in the Breeding Atlas, with 86% of pairs in coastal sites and significant numbers inland only in North Wales and Co.Kerry.

JACKDAW Corvus monedula

Sharrock (1976) suggested a British and Irish population in the order of 500,000 pairs. There are inadequate data on which to base a revision. However, the CBC farmland index has risen, with values of 80-100 in the early 1970s and of 167 in 1982.

ROOK Corvus frugilegus

The BTO carried out surveys of British Rook population levels in 1945-46 and 1975 (Ca tle 1977, Sage and Vernon 1978). Numbers of nests found were as follows.

	England	Scotland	Wales	Total
1945-46	923,750	391,000	98,250	1,413,000
1975	511,200	248,750	38,900	798,850
% decrease	44.6	36.4	60.4	43.5

A sample repeat survey was conducted in 1980. The formal report is not yet prepared, but the organiser has reported a 6.8% overall increase between 1975-1980. If general, the British population will have risen to about 805,000 nests. Preliminary 1980 results indicate that declines have continued in the English Midlands and south-eastern counties, but are more than compensated for by increases in western and northern regions.

CARRION/HOODED CROW Corvus corone

The Breeding Atlas suggested a British and Irish population in the order of 1 million pairs, which was possibly on the high side for the mid-1970s. No updated figure can be offered. However, CBC results show an upward trend being maintained: farmland index values were 159 in 1975 and 198 in 1982, and the corresponding woodland values were 164 and 233.

Hewson and Leitch (1982) discussed the spacing and density of Hooded Crow nests in an area of Argyll.

RAVEN *Corvus corax*

Sharrock (1976) assumed an average density of 3 pairs/10-km^2, and extrapolations from this suggested totals of *ca*.1,000 pairs in Ireland and *ca*.4,000 pairs in Britain. No updated figures can be offered, but there is no doubt that the overall trend is downwards. Numbers appear to be fairly stable in the Northern Isles (eg. Booth 1979) and in Cumbria and Snowdonia (Marquiss *et al* 1978, Mearns 1983), but in some other parts of mainland Britain numbers have fallen with improved stock management and with changed land use from sheep grazing to conifer plantation. In mid-Wales the decline amounted to 9% between 1975-1979 (Newton *et al* 1982), and in southern Scotland and Northumbria numbers of occupied territories fell by 70% inland and 65% on coasts between the 1950s and 1981 (Mearns 1983).

STARLING *Sturnus vulgaris*

Sharrock (1976) suggested that the British and Irish population probably lay between 4-7 million pairs. Due to high densities occurring in urban and suburban areas, this is a particularly difficult species to assess quantitatively. No updated figure can be offered.

HOUSE SPARROW *Passer domesticus*

The same difficulties apply to this species as to Starling (above). Sharrock (1976) suggested that Britain and Ireland together held 3½-7 million pairs.

TREE SPARROW *Passer montanus*

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	1.8	-	1.2	(0.4)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	208,535	-	24,900	(11,207)

These figures lead to an estimate of 250,000 pairs, in good agreement with the Breeding Atlas figure (bearing in mind that the species is scarce and localised in Ireland). Nevertheless, the Atlas figure must have been too low for the mid-1970s, for the CBC farmland index stood at 94 in 1974 and 1975 but had fallen to a value of 49 by 1982.

CHAFFINCH *Fringilla coelebs*

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	20.8	(10.0)	58.2	(30.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	2,409,742	(629,190)	1,207,650	(840,540)

Hence a British population in the order of 5 million pairs is indicated. The CBC indices have been stable since the mid-1970s.

BRAMBLING *Fringilla montifringilla*

Rare Breeding Birds Panel species. So far as is known, Brambling have nested in Britain on three occasions only: 1920 (Sutherland), 1979 (Grampian) and 1982 (Inverness-shire) (Buckland and Knox 1980, Bucknall 1983). The two recent records correspond with an increased incidence of summering, mainly in Scotland, over the last 12-15 years.

SERIN Serinus serinus

Rare Breeding Birds Panel species. The long-forecast colonisation of southern England (Sharrock 1976) still has not materialised, but in 1981 three or four pairs were seen in Devon and two of them were proved to have bred (Sharrock et al 1983).

GREENFINCH Carduelis chloris

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	4.3	(0.5)	6.3	(5.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	498,168	(31,460)	130,725	(140,090)

These densities indicate a population in the order of 800,000 pairs. Sharrock (1976) suggested an order of 1-2 million pairs for Britain and Ireland together, but that is now thought to have been on the high side since 300-600 pairs/10-km^2 seems unlikely to apply to many western and northern counties. Neither CBC index has shown much change since the mid-1970s.

GOLDFINCH Carduelis carduelis

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	1.9	(0.9)	1.0	(1.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	220,121	(56,627)	20,750	(28,018)

This implies a British population of over 300,000 pairs, similar to the estimate given by Sharrock (1976) for Britain and Ireland together. CBC indices have fluctuated over the last decade, though the values for 1982 were similar to those for the early 1970s.

SISKIN Carduelis spinus

Following increases with afforestation, especially since about 1960, the Breeding Atlas suggested that the British and Irish population had risen to 20,000-40,000 pairs. The species is not monitored by the BTO, so no updated figure can be given.

LINNET Cardŭelis cannabina

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	3.6	(3.5)	3.3	(1.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	417,071	(220,217)	68,475	(28,018)

This suggestion of a British population towards the middle of the range 700,000 - 800,000 pairs is reasonably consistent with the Breeding Atlas estimate of 800,000 - 1,600,000 pairs for Britain and Ireland together. The new figure, based on 1982 CBC returns, is lower, but the CBC indices have shown a downward trend since the mid-1970s. For example, the farmland values were 80-86 between 1973-76, but 52 in 1982.

TWITE Carduelis flavirostris

Sharrock (1976) suggested that the British and Irish population might be in the order of 20,000-40,000 pairs. The species is not monitored by the BTO, and we cannot provide an updated figure.

REDPOLL Carduelis flammea

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	0.2	(0.2)	3.7	(1.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	23,170	(12,583)	76,775	(28,018)

These densities imply a British population of between 140,000-150,000 pairs, or only half that suggested by Sharrock (1976) for Britain and Ireland together. Redpolls increased considerably during the 1970s (1977 index value of 416) but fell thereafter (1982 index value of 217). Probably this accounts for most of the variation between the two estimates.

SCOTTISH CROSSBILL Loxia scotica

The Scottish Crossbill has only recently been elevated to species rank, and the two were not separated in the Breeding Atlas. Nethersole-Thompson (1975) emphasised how numbers will fluctuate in the Highlands, according to cone crops. He considered that there may have been 100 pairs or fewer during poor years in the 1960s, but 300 or more pairs during 1970-74. No later figure is available

COMMON CROSSBILL Loxia curvirostra

Sharrock (1976) estimated about 5,000 pairs (including Scottish Crossbills) in the mid-1970s. In the absence of any major irruption into Britain since then, numbers are almost certainly now below the Breeding Atlas figure. No new estimate can be offered, however.

BULLFINCH Pyrrhula pyrrhula

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	1.0	(0.5)	5.5	(2.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	115,853	(31,460)	114,125	(56,036)

Such figures indicate a British population of between 300,000-350,000 pairs, which is only half the number suggested in the Breeding Atlas. The decrease is believed to be real. 1975 CBC index values were 108 for farmland and 138 for woodland, but these values were only 35 and 77 respectively in 1982. Summers (1979) discussed Bullfinch dispersal in relation to fruit bud damage.

HAWFINCH Coccothraustes coccothraustes

Sharrock (1976) considered the British population to be in the order of 5,000-10,000 pairs. The species is not monitored by the BTO, and no updated figure can be given.

LAPLAND BUNTING Calcarius lapponicus

Rare Breeding Birds Panel species. Breeding occurred in Scotland, for the first time ever, in the four consecutive years of 1977-1980. There were maxima of 16 males in 1977 and 14 in 1979 (probably not all of them were paired); but only a single bird was seen in 1981 (Cumming 1979, Sharrock et al 1983).

SNOW BUNTING Plectrophenax nivalis

Rare Breeding Birds Panel species. Despite an increased incidence of summering on Scottish mountains over the last two decades, the breeding 'population' remains small and unstable, and includes individuals resembling both the Scandinavian and Icelandic types (Nethersole-Thompson 1976). Over the years 1977-1981 the number of possible pairs varied between 6-21, with 2-7 pairs per annum proved breeding (Sharrock et al 1983).

YELLOWHAMMER Emberiza citrinella

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	8.2	(5.0)	8.1	(1.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	949,994	(314,595)	168,075	(28,018)

The indicated British total, in the order of 1½ million pairs, is rather higher than that offered in the Breeding Atlas for Britain and Ireland together (1 million pairs). Morgan and O'Connor (1980) assessed the components of farmland which are of most importance to the species, and O'Connor (1980) addressed the wider question of population regulation in Britain.

CIRL BUNTING Emberiza cirlus

Rare Breeding Birds Panel species. Cirl Buntings are in long-term decline in Britain, and have become increasingly restricted to southern (especially south-western) counties. Sharrock (1976) suggested a minimum of 350 pairs during 1968-72. Sitters (1982) made assessments for 1973-76 and 1980, and a BTO survey was held in 1982 (results in preparation). Counts of pairs and territorial males were as follows:

Region	1973-76	1980	1982
West Midlands	1	0	0
Chilterns	10-19	1-3	3-4
Wiltshire/Avon/Somerset	21-28	10-16	17-21
Surrey/Sussex to Dorset	19-32	11-19	1-3
Devon	140-150	(140-150)	110-120
Cornwall	15-18	6-8	7-9
TOTALS	206-248	168-196	138-157

REED BUNTING Emberiza schoeniclus

	Agricultural land	Rough grazing	Woodland	Other
Estimated density/km^2	2.0	(2.0)	0.4	(1.0)
Area of habitat (km^2)	115,853	62,919	20,750	28,018
Implied no. territories	231,706	(125,838)	8,300	(28,018)

The indicated British total of approaching 400,000 pairs is in reasonable agreement with the Breeding Atlas total of at least 600,000 pairs for Britain and Ireland together. Nevertheless, the latter should probably have been higher, since population level on farmland was then higher than it is at present. The CBC index value of 180 in 1975 may be compared with the 1982 value of only 57.

CORN BUNTING *Miliaria calandra*

This species is monitored only by CBC data for agricultural land, where the estimated average density (after allowance for edge effect) is 1.1 pairs/km^2. An extrapolation to a British total of 120,000-130,000 pairs is four times greater than the estimate offered by Sharrock (1976). Clearly, simple extrapolation from CBC density data leads to an exaggerated total, due to the somewhat patchy distribution of Corn Buntings. Nevertheless, the Breeding Atlas figure (30,000 pairs) was probably too low. The CBC farmland index has shown a steady downward trend (the 1982 value was 55) from a high point in the early 1970s.

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