BTO RESEARCH REPORT NO. 37

Report to the System Planning Department of the Central Electricity Generating Board

AN ORNITHOLOGICAL SURVEY OF THE KILLINGHOLME AREA

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SUMMARY

1. This report presents the results of breeding and wintering bird surveys carried out in 1987 and 1988 in an area between the villages of East Halton and North Killingholme and the south bank of the Humber Estuary. In addition, published and unpublished information is collated to provide a history of the bird community over the preceding 18 years.

2. The survey area is defined and its major habitat types listed.

3. A background to ornithological evaluation is provided.

4. The breeding bird population was assessed using a standard technique known as the Common Birds Census (CBC).

5. The area covered by the CBC was the total area of land within the CEGB estate along with those parts of the survey area outside the CEGB estate which could be surveyed from public rights-of-way, minus the intertidal area.

6. The pattern of distribution of species and territories among the designated habitat types is presented.

7. The species composition of the breeding bird community in 1987 is described.

8. One nationally rare species was found in 1987. This was the Pochard, which has an estimated national breeding population of 200-400 pairs and is afforded special protection under Schedule 2 - Part 1 of the 1981 Wildlife and Countryside Act.

9. An analysis of the breeding species and territories occurring within each habitat identifies the scrub and wetland of the Killingholme Haven pits as the most important habitat for breeding birds in the survey area.

10. At least 3 species not recorded in the 1987 survey have bred on, or in the close vicinity of, the survey area since 1980. Two of these, Garganey and Black Redstart, are nationally rare breeding species. The third, the Barn Owl, is a nationally declining species. All 3 species are afforded special protection under Schedule 1 - Part 1 of the 1981 Wildlife and Countryside Act.

11. A similar survey of the terrestrial areas was carried out during the 1987/88 winter.

12. Sixty-nine species were recorded wintering in the terrestrial habitats of the survey area implying ornithological importance at a county level.

13. Five species of bird recorded during the winter terrestrial survey (Bearded Tit, Bittern, Long-eared Owl, Snow Bunting and Water Rail) all have a restricted national distribution and are of high conservation importance. In addition six other terrestrial species recorded in winter also have restricted national distribution but are of lower conservation value.

14. Four of the five winter terrestrial species of high conservation importance (Bearded Tit, Bittern, Long-eared Owl and Water Rail) were, in the survey area, confined to Killingholme Haven Pits LNR, indicating the high overall ornithological importance of this area.

15. Scrub was also an important winter habitat for wintering birds, particularly thrushes. The number of species, the density of breeding territories and density of winter registrations were also high in scrub.

16. Historical information indicates that the Killingholme Haven Pits have been important for passage waders and could be again if the sluice was repaired.

17. Information from the Birds of Estuaries Enquiry, a long-term national monitoring scheme run by the British Trust for Ornithology, is used to assess the importance for wintering waterfowl of both the Humber as a whole, and the Killingholme sector of it.

18. In terms of the total populations of wintering waterfowl, the Humber ranks as a site of major international importance.

19. Brent Geese, Shelduck, Dunlin, Knot, Redshank and Sanderling winter in internationally important numbers of the Humber, and Wigeon, Teal, Mallard, Bar-tailed Godwit, Curlew, Golden Plover, Grey Plover, Oystercatcher and Ringed Plover in nationally important numbers.

20. The Killingholme sector is relatively unimportant for waterfowl, supporting under 1% of the total wintering population of the Humber, and under 3% of any one species wintering in nationally or internationally important numbers.

21. The winter survey of the Killingholme inter-tidal areas confirmed the relatively unimportant nature of the Killingholme area for wintering waterfowl.

1. INTRODUCTION

This report presents results from ornithological studies in the Killingholme area, on the south shore of the Humber Estuary (Figure 1) carried out between March 1987 and March 1988. These studies were commissioned by the System Planning Department of the Central Electricity Generating Board (CEGB) and conducted by the British Trust for Ornithology, under the technical supervision of the CEGB's Corporate Environment Unit. The primary aims of this work were: (a) to carry out breeding and over-wintering bird censuses in the agreed survey area (Figure 2); (b) for all species recorded, to provide information on distribution and abundance in relation to habitat; (c) to collate existing published and unpublished information on bird populations within the survey area; and, (d) to identify bird species of special interest, and comment on their importance. The terms of reference for this contract appear in Appendix 1.

A concurrent contract to identify the habitat types of the Killingholme area, and survey their flora and fauna, was carried out by Dr D.W.Shimwell and S.K.Harrand, environmental consultants from the School of Geography, University of Manchester. This contract has culminated in a report to the CEGB to which frequent reference will be made in the following sections.

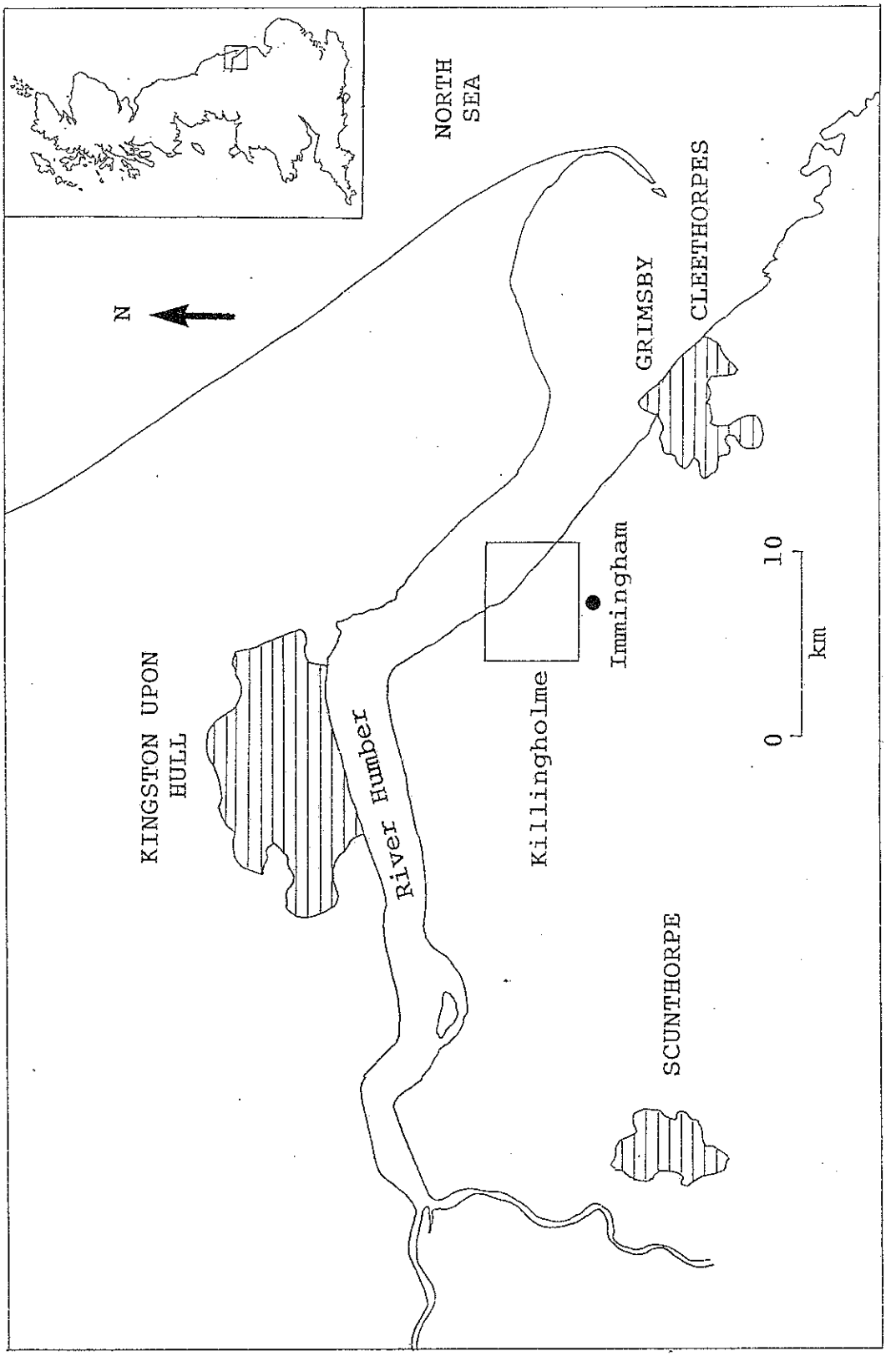

FIGURE 1 The location of the Killingholme study area

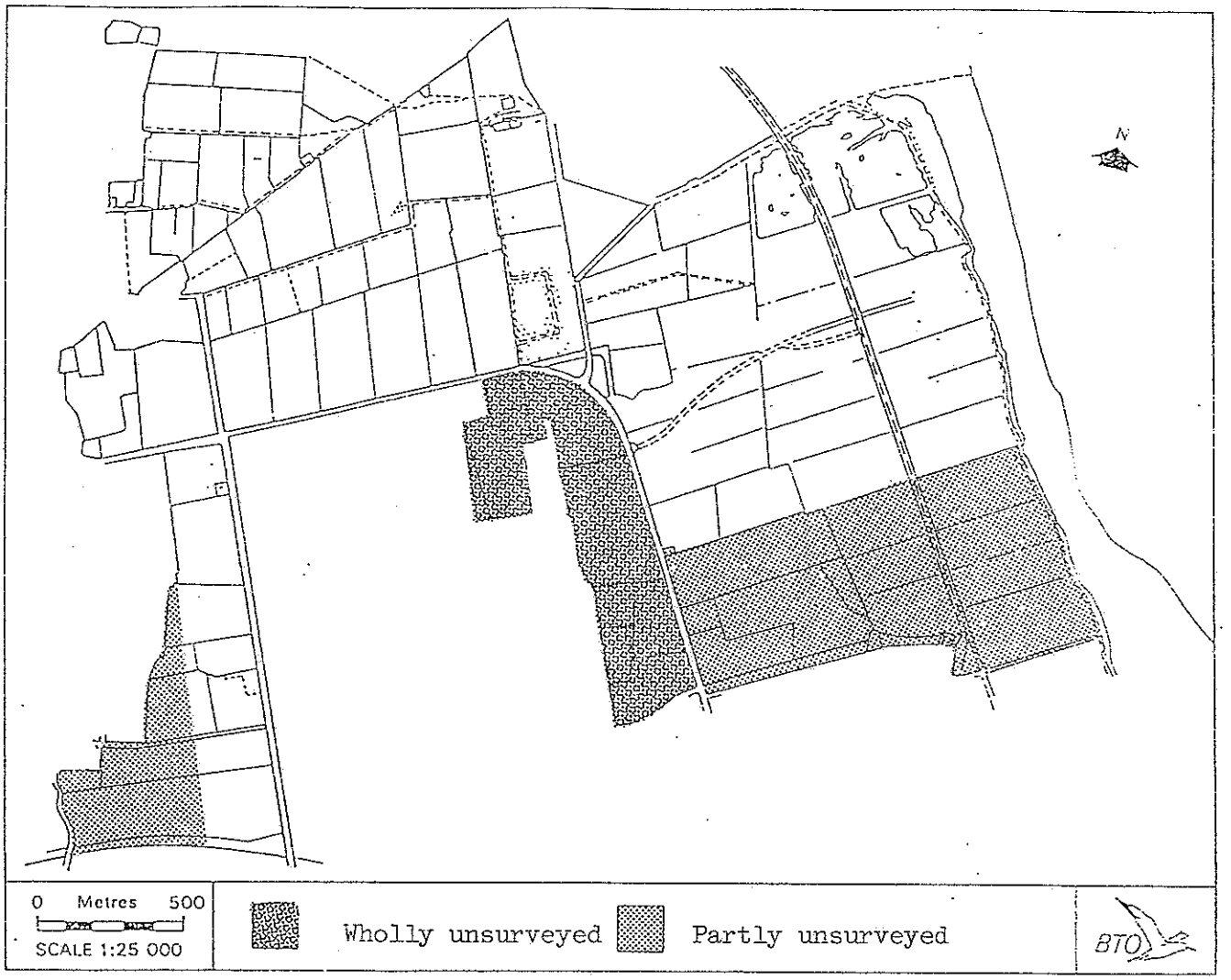

Figure 2. The 1987 Killingholme survey area showing the extent surveyed during the breeding bird survey. (All areas were surveyed in winter).

2.THE SURVEY AREA

The agreed ornithological survey area (Figures 2 and 3) covers 478 ha of non-tidal habitats and 31 ha of Humber tidal mud and saltmarsh. The site is bounded to the north-west by the village of East Halton, to the north-east by the Humber river, to the south-west by the village of North Killingholme and to the south-east by Station Road. Agricultural land, the major habitat present, is predominantly arable, though there are also scattered grasslands, including permanent pastures and unimproved hay meadows. The normal method of enclosure is by Hawthorn or Blackthorn hedging, often combined with a ditch. There has been some hedgerow removal to create larger arable fields in recent decades, and the remaining hedges are often severely trimmed or have gaps. Tall hedges with mature trees, the most valuable to breeding birds, are the least common hedgerow type in the survey area. Such hedges are mainly concentrated in the north-west corner of the site and are completely absent from the eastern section, known as Killingholme Marshes.

There are three blocks of deciduous mixed woodland within the survey area: Chasehill Wood/Fox Covert, to the north of the Chasehill Road/Haven Road junction; Burkinshaw's Covert and adjacent young poplar plantations between Lindsey Oil Refinery and Rosper/Chasehill Roads; and Killingholme Marshes Covert, a small island of woodland in arable farmland between Rosper Road and the estuary. Only the Chasehill Wood/Fox Covert block could be surveyed in the 1987 breeding bird survey because of access difficulties, but all woodlands were surveyed for wintering birds.

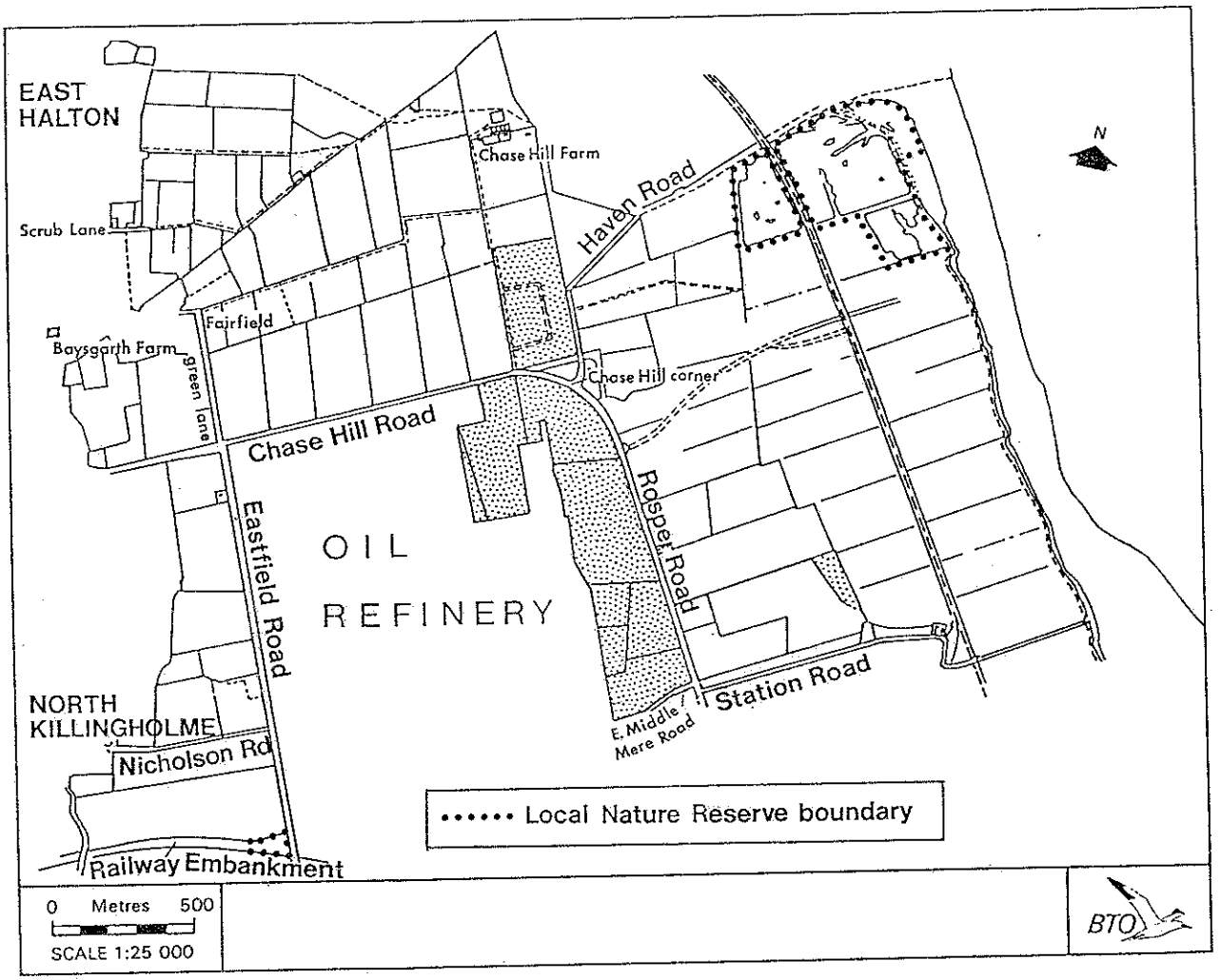

Figure 3. The breeding bird and wintering bird Killingholme survey area with place names mentioned in the text.

The Killingholme Haven Pits is a Lincolnshire and South Humberside Naturalists' Trust (LSHNT) Local Nature Reserve (LNR) and is made up of two large, shallow, saline lagoons, linked to the estuary by a sluice, and a smaller, deeper, less saline pit isolated from the other pits and the estuary, all surrounded by scrub, reed and sedgebeds. By virtue of the wide range of habitats in a small area, this is potentially the most valuable component of the survey area for birds.

Ungrazed developing scrub patches at Chasehill Road/Haven Road junction and at Rosper Road/East Middle Mere Road junction are unmanaged, whereas the larger area of ungrazed scrub along the Eastfield Road railway embankment is managed as a LSHNT local nature reserve. There are two areas of grazed scrub within pastures at Eastfield Road/Nicholson Road junction and Baysgarth Farm Pasture.

To the south of the Killingholme Haven Pits lies an area of which part is used for industrial storage, and the remainder forms a currently unoccupied, flat expanse of chalk and gravel with sparse vegetation cover. The intertidal mudflats are scarcely 100 metres wide at low tide along most of the coastline of the survey area. There is a small area of old saltmarsh and developing saltings stretching southeast from Killingholme Haven. Distribution of bird species is largely determined by the availability of suitable habitats. A detailed description of habitat types identified by the consultant ecologists' botanical survey is contained in Shimwell and Harrand (1988). Figure 4 shows the location of major habitat types within the survey area, and their extent is given in Table 1.

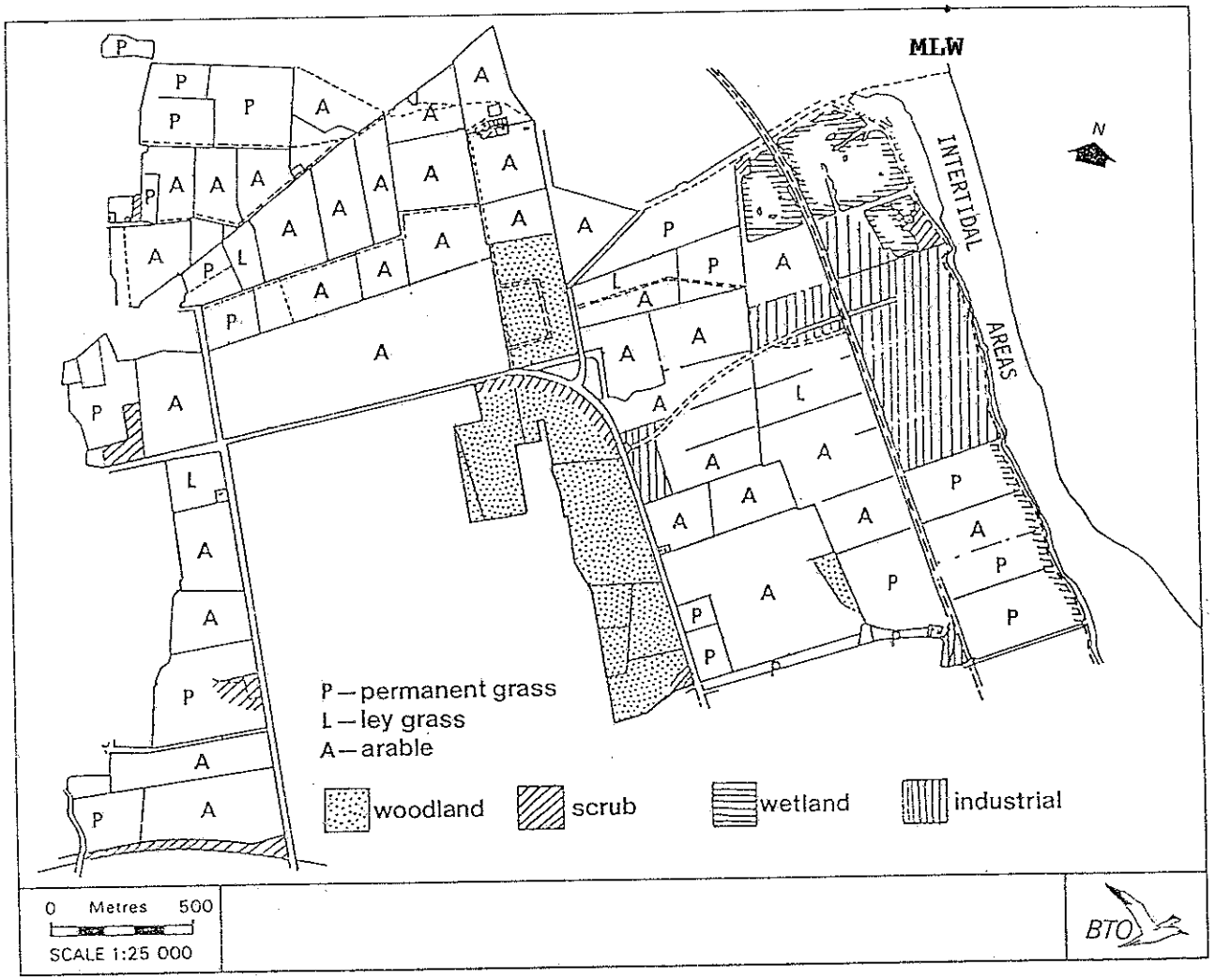

Figure 4. Habitat types in the Killingholme survey area.

TABLE 1 Extent of habitat types in the Killingholme survey area

(From Shimwell & Harrand 1988)

Habitat:	ha	% of survey area
Woodland	38	7
Scrub	9	2
Wetlands	18	4
Open fields	413	81
Intertidal	31	6
TOTAL	509	
Hedgerows	25.75km total length	
	1.28km wetland	
	24.47km open fields	

Division of open field habitat for winter survey

	Area (ha)
Arable land	281
Permanent pasture	83
Ley grassland	10
Industrial/disturbed ground	38
Homestead/stockyard	1

3. A BACKGROUND TO ORNITHOLOGICAL EVALUATION

Ornithological evaluation has a complex history and wide spectrum of methodology. The approach used depends on the objectives of the study and the nature and quality of the information available. Fuller and Langslow (1986) have reviewed the objectives of ornithological evaluation and the appropriate attributes (e.g. species richness, rarity) by which ornithological interest may be judged.

One of the most widely used approaches to ornithological evaluation in recent years has been that of Fuller (1980, 1982), who classified the ornithological interest of more than 3000 sites across Great Britain. Fuller identified three attributes as being equally important for the conservation of bird communities or individual species. He found that most sites were of interest for only one or two of the three attributes. Quantitative criteria were developed to assess the attributes with respect to five levels of conservation importance: (A) international, (B) national, (C) regional, (D) county and (E) local.

(a) Population Size

The general rule for assessing the importance of the population size of a species using a site is that if 1% or more of a defined geographical population depends on the site then it attains an importance value on that geographical scale. This means, for example, that if 1% of the national population of a species is present, then the site is nationally important for that species. This approach has been used in this report. Some species, such as breeding terns or wintering geese, are unpredictable in the way they use sites, so it is necessary to decide how regularly a threshold is reached before a site is classified at that level. This is usually assessed by taking an average value of usage over a five-year period. Chapter 6 covers in more detail the use of

this criterion in relation to overwintering waders and wildfowl.

(b) Diversity

The number of species recorded (species richness) is a simple and effective estimate of diversity, used to measure conservation value separately for (i) passage, (ii) breeding and (iii) wintering birds. Values suggested by Fuller for breeding and wintering communities are as follows.

	Breeding	Wintering
International	-	-
National	85+	115+
Regional	70-84	85-114
County	50-69	55-84
Local	25-49	25-54

One potential bias of the system is that it takes no account of site area, nor of habitat diversity. Hence, large or diverse sites will tend to rank highly. This is not necessarily a drawback, however, because this is precisely why large sites are often to be considered of high conservation value.

(c) Rarity

The number of rare species using a site can be used to indicate conservation value and species with a national breeding population of between 1 and 1,000 pairs are regarded as nationally rare. During the breeding season this is a simple measure to use; however, in winter immigration and emigration of many species means that great care must be taken when deciding whether or not to judge a wintering species as nationally rare.

A value for national frequency can be obtained for both breeding and wintering birds from the Breeding Atlas (Sharrock 1976) and the Winter Bird Atlas (Lack 1986) respectively. The figure relates to the percentage of 10km squares from which the species was recorded during atlas fieldwork. As an arbitrary guideline for identifying species with a potentially limited distribution, all breeding or wintering species having a national frequency of 30% or below have been selected for consideration as being of potential conservation importance.

In this report the importance of the breeding and wintering bird community at Killingholme is assessed by applying the methods developed by Fuller (1980, 1982), and the national frequency criterion, to the information collected over the spring of 1987 and the 1987/88 winter. In addition, past data held by the BTO's Birds of Estuaries Enquiry have been analysed to place the importance of the intertidal habitats of the survey area for overwintering waterfowl in the context of the estuary as a whole. Available local bird records which provided useful contextual information were incorporated where possible, but their non-systematic nature precluded their use for quantitative analysis.

4. THE BREEDING BIRD COMMUNITY OF THE KILLINGHOLME AREA

4.1 Introduction

In 1987, the breeding bird population of the Killingholme survey area was assessed using a standard technique known as the Common Birds Census (CBC) method. This has been used and refined by the British Trust for Ornithology (BTO) since 1962 to monitor population numbers and trends of birds on farmland and woodland (Appendix 10.2). Most birds are territorial in the breeding season, defending an area which contains vital resources, such as food or nest sites, against other individuals. The advantage of using the CBC method is that a set of maps are produced for each species showing the location of each territory-holding bird. These can then be analysed to estimate the density of territories of the different species in the study area, and how each is distributed in relation to the habitat types present.

Historical data available from 1968 are discussed in the light of the 1987 survey. These data are presented in full in Appendix 10.5.

4.2 Methodology

The basis of the CBC approach is the mapping visit, in which all parts of the site are covered thoroughly and all sight and sound contacts with birds are recorded on large-scale maps. Ten complete mapping visits spanning the breeding season, from mid-March to late June, are the preferred number for detection of a high proportion of the territories present. Visits begin after the dawn chorus, when detectability of the birds may change rapidly and cause uneven coverage, and end before the early afternoon, when bird activity is low. Activity and detectability are low on cold, wet and windy days, when surveying should not be carried out.

Once the series of visits is complete, the registrations from each visit map are transferred onto individual species maps, which summarise the information obtained over the season. Each species map can then be analysed following set guidelines to estimate the number and approximate location of territories found.

In analysing the distribution of species and territories by habitat, hedgerows are first considered as integral parts of the open field and wetland habitats. They are then separated out in order that their ornithological importance to these habitats, and the survey area as a whole, can be assessed.

4.3 Background to the 1987 survey

In consequence of the late starting date of the contract, fieldwork commenced in late April, a month after the official start of the CBC survey season. Restrictions on access to parts of the survey area meant that until 8 May the survey area could be observed only from roads and public rights of way. After this date it became possible to cover 79% of the survey area. Seven full visits were made to this between mid-May and mid-July, and in addition three visits were made to areas which could be surveyed from roads and public rights of way in late April and early May. At the end of the survey, 21% of the survey area remained unsurveyed. The habitat most seriously affected by this was woodland, of which Burkinshaw's plantations, Burkinshaw's Covert and Killingholme Marshes Covert (Fig.5) were unsurveyed. These woodlands comprised about 79% of the total woodland within the survey area boundary. The unsurveyed woodland comprised 6.28% of the survey area.

Although short-term CBC surveys are comparably efficient to normal CBC results in assessing breeding bird community structure, they are less efficient for assessing population levels of species (O'Connor 1980). In the case of partly surveyed regions, their areas and territories were included in calculating overall densities and distributions. Inevitably, some territories and species will have gone unrecorded in these regions, so some species' distributions are overly restricted and density estimates for other species may be low, as a result. Therefore, densities of many species must have been underestimated, although to a variable degree, depending on the species. The values given below should therefore be considered as minima.

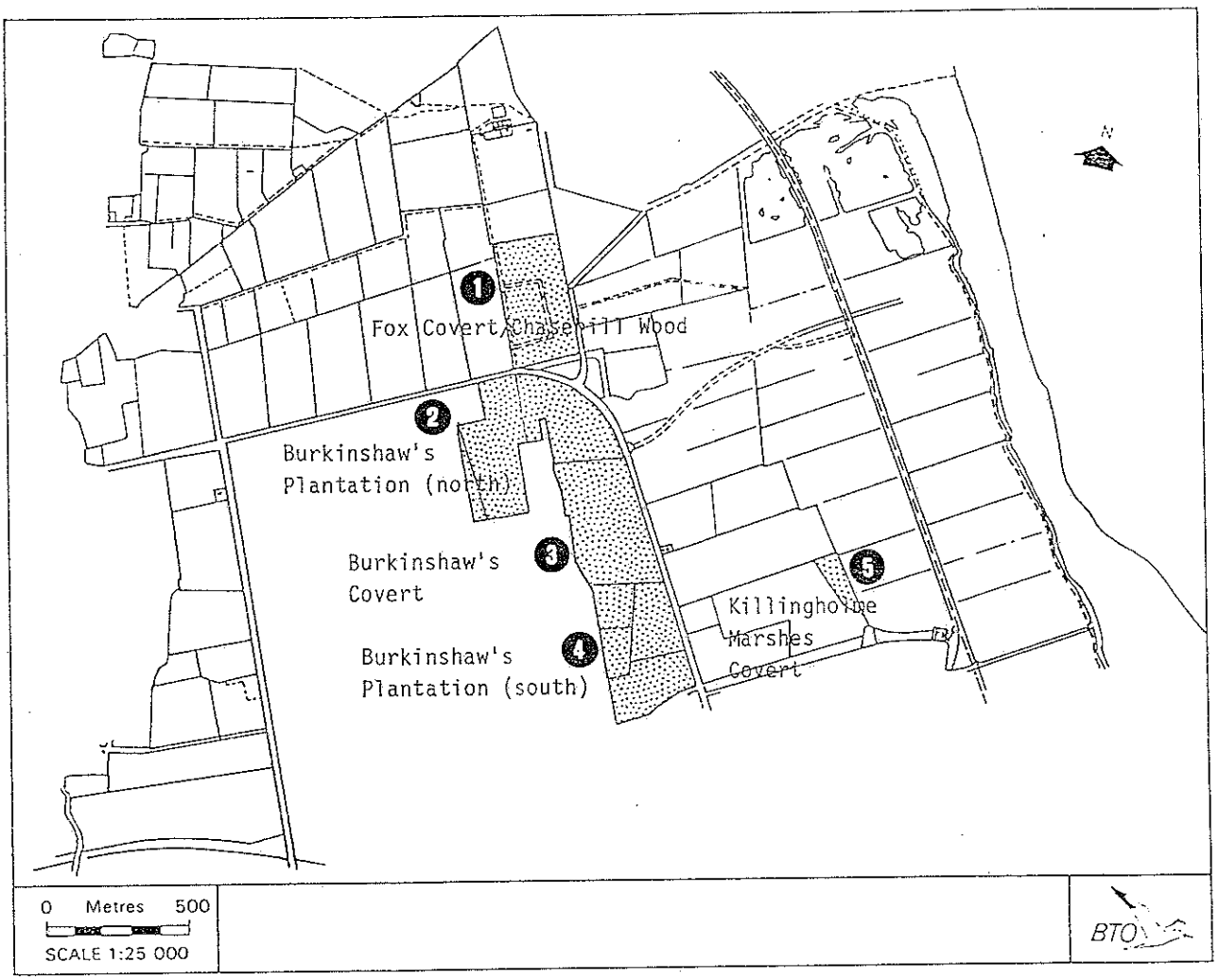

Figure 5. Location of woodlands within the Killingholme survey area.

4.4 Distribution of species and territories by habitat.

Species and territories of breeding birds were assigned to a grid of 159 200m x 200m squares, based on the Ordnance Survey grid, in order to show their patterns of distribution over the survey area (Figures 6 and 7). The distributions revealed are similar, with the largest numbers of both species and territories clearly associated with the areas of woodland surveyed (see Figure 5), the scrub areas, a few relatively bird rich hedgerows and the Killingholme Haven Pits wetlands. Only one species, the Skylark, was widespread on non-hedgerow open field habitat within the survey area.

Table 2 summarizes the distribution of species and territories by habitat types and the percentage of each habitat type surveyed in 1987. In terms of both number of species represented (71% of total) and number of territories found (53%), the open fields within the survey area were most important for birds, followed by scrub (49% and 19% respectively). The woodland supported 41% of species but, due to its small area, only 10% of territories. The wetland was another small habitat, supporting 35% of the species and 18% of the territories. Hedgerows were an important part of the wetland and open field habitats which, when separated out, supported 55% of the species and 38% of the territories within the survey area.

The density of territories per km square is a more comparable measure of ornithological value than the total of territories, and if this value is compared for the various habitats then scrub ranks highest, followed in decreasing order of importance by woodland, wetland, and open fields (Table 2).

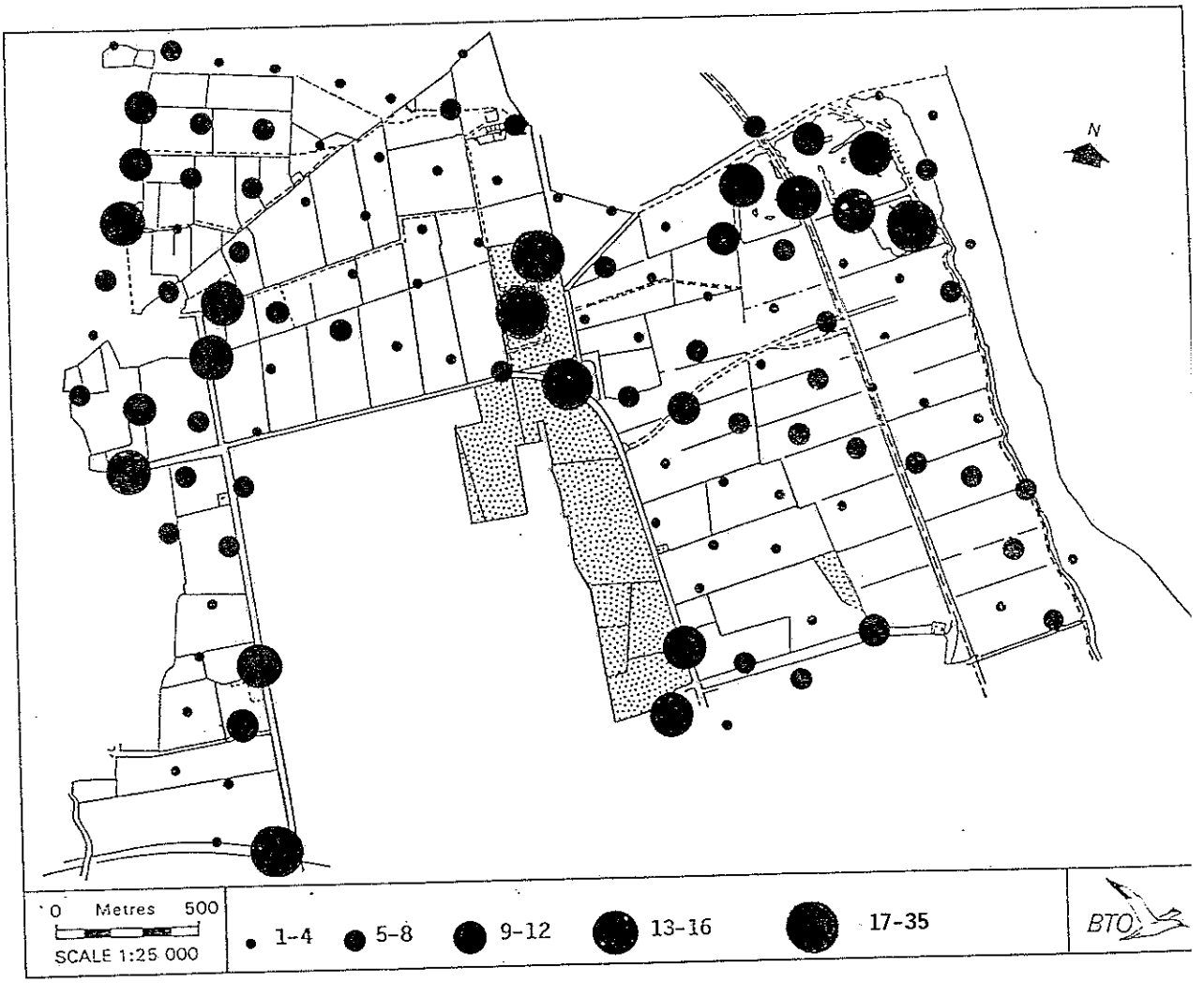

Figure 6. Number of breeding territories in each 200m square of the Killingholme survey area.

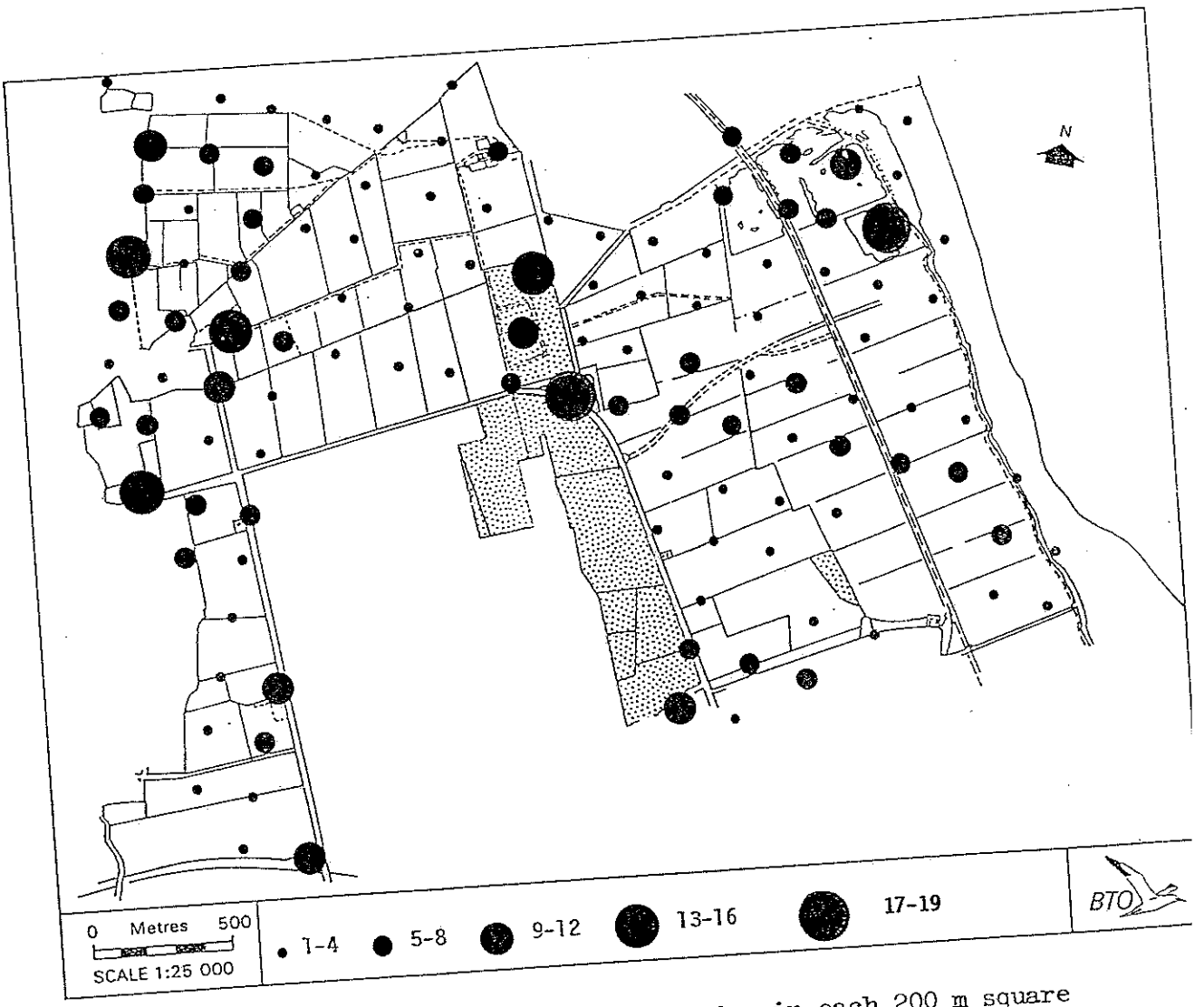

Figure 7. Number of breeding species in each 200 m square of the Killingholme survey area.

TABLE 2. Distribution of breeding birds in the Killingholme survey area by broad habitat type

	Number of species	% total of species	Number of territories	% total of territories	Total area (ha)	Area surveyed	% area surveyed	Density (territories/ha)
Scrub	25	49	134	19	9	7	78	19
Woodland	22	43	73	10	38	8	21	9
Wetland	18	35	131	18	18	18	100	7
Open fields	36	71	384	53	413	343	83	1
TOTAL	51		722		478	376	79	191
					km	km		

192 territories/ha over entire survey area.

Hedgerows	28	55	280	39	25.8	23.0	89	12territories/km

4.5 Species composition of the breeding bird community

The total of 51 breeding species recorded during the breeding bird survey implies ornithological importance at a county level. A pie diagram (Figure 8) has been used to illustrate species composition of the community, ie which species account for most territories in the survey area. Table 3 lists the breeding species found in the survey area, giving their dominance of the community (as a percentage of total territories), and a figure to express their frequency distribution in the British Isles, as described in Chapter 3. The distributions of the breeding territories, of each species, throughout the survey area are illustrated in Appendix 3.

Of the species recorded as holding territories during the survey, Canada Goose (18%), Lesser Whitethroat (28%), Pochard (15%), Red-legged Partridge (24%) and Reed Warbler (20%) have a national frequency distribution of below 30%. Red-legged Partridge and Canada Goose are of low conservation interest, being species introduced for game and ornamental reasons. Reed Warblers are restricted to southern Britain and tend to occur at high densities only in Phragmites beds, which have a patchy national distribution. Similarly, the breeding range of the Lesser Whitethroat is concentrated in the south-east of Britain, and the species is of widespread occurrence in 10 km square local to Killingholme. Neither of these species can be considered as threatened. By contrast, the Pochard is a nationally rare breeding species, with a British breeding population of only 200 - 400 pairs (Yarker and Atkinson-Willes 1971) and is protected under Schedule 1-Part 1 of the 1981 Wildlife and Countryside Act. Pochard is therefore, of considerable conservation importance. No other recorded breeding species are nationally rare.

TABLE 3. Breeding bird community of the Killingholme survey area

	Total territories	Woodland	Scrub	Wetland	Open field	% community	Density (territories/ha)	National frequency
Skylark	72				72	10.0	0.20	98
Yellowhammer	66	1	6		59	9.1	0.18	88
Reed Warbler	53			53		7.3	0.15	20
Sedge Warbler	50		6	37	7	6.9	0.14	76
Dunnock	47		12	2	33	6.5	0.13	93
Blackbird	44	6	9	2	27	6.1	0.12	96
Wren	43	17	8	1	17	6.0	0.12	97
Whitethroat	37		13		24	5.1	0.10	83
Chaffinch	33	7	7		19	4.6	0.09	92
Willow Warbler	28	8	10		10	3.9	0.08	92
Reed Bunting	26		3	15	8	3.6	0.07	89
Blue Tit	18	4	5	1	8	2.5	0.05	90
Great Tit	17	4	2	1	10	2.4	0.05	87
Robin	17	5	6		6	2.4	0.05	93
Linnet	14		6	1	7	2.0	0.04	87
Lesser Whitethroat	13		7	1	5	1.8	0.04	28
Redpoll	10		8		2	1.4	0.03	73
Meadow Pipit	10				10	1.4	0.03	94
Yellow Wagtail	9				9	1.3	0.02	30
Blackcap	8	5	3			1.1	0.02	57
Song Thrush	8	1	3	1	3	1.1	0.02	95
Turtle Dove	8		5	1	2	1.1	0.02	33
Bullfinch	8		4	1	3	1.1	0.02	83
Coot	8			8		1.1	0.02	58
Red-legged Partridge	7				7	1.0	0.02	24
Greenfinch	6		2		4	0.8	0.02	86
Swallow	6				6	0.8	0.02	93
Collared Dove	5		5			0.7	0.01	69
Pheasant	5	2			3	0.7	0.01	80
Magpie	5	1			4	0.7	0.01	75
Grey Partridge	4				4	0.5	0.01	59
Goldfinch	4		1		3	0.5	0.01	78
Tree Sparrow	4	1			3	0.5	0.01	47
Moorhen	3			3		0.4	<0.01	82
Long-tailed Tit	3	1			2	0.4	<0.01	76

TABLE 3 cont"d

Jay	3	3				0.4	<0.01	55
Garden Warbler	3	1	1		1	0.4	<0.01	49
Carrion Crow	3	1			2	0.4	<0.01	98
Stock Dove	2	1			1	0.3	<0.01	65
Mistle Thrush	1		1			0.1	<0.01	88
Treecreeper	1	1				0.1	<0.01	78
Spotted Flycatcher	1				1	0.1	<0.01	86
Grasshopper Warbler	1		1			0.1	<0.01	67
Tawny Owl	1	1				0.1	<0.01	60
Great Spotted Woodpecker	1	1				0.1	<0.01	53
Green Woodpecker	1				1	0.1	<0.01	42
Little Grebe	1			1		0.1	<0.01	49
Pochard	1			1		0.1	<0.01	15
Canada Goose	1			1		0.1	<0.01	18
Willow Tit	1	1				0.1	<0.01	32
Ringed Plover	1				1	0.1	<0.01	32
TOTAL	722	73	134	131	384			

* Density figures have been calculated for the entire area surveyed.

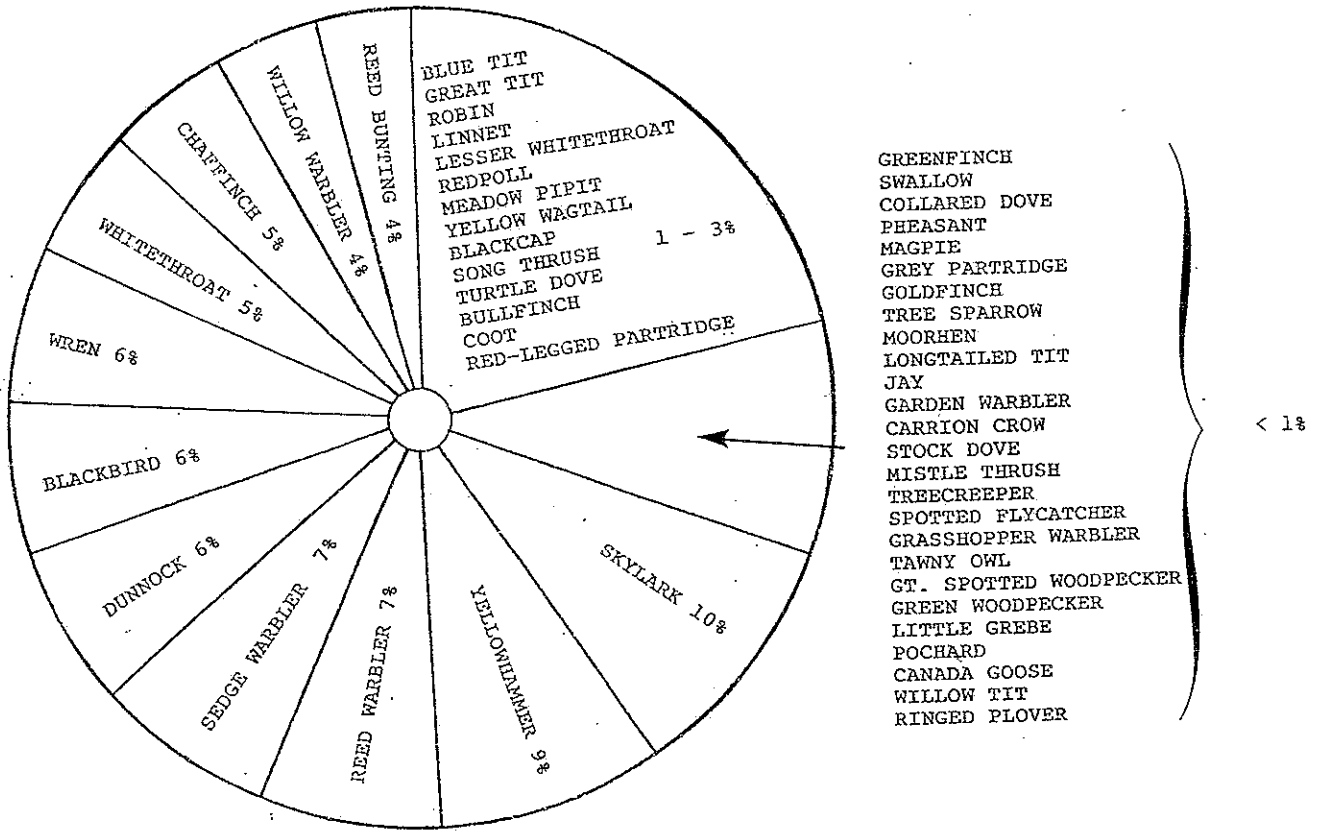

Figure 8. Species dominance of the breeding bird community of Killingholme during 1987.

4.6 Distribution of species within each habitat

Woodland

The five woodland areas (Figure 5) account for 8% of the survey area, but only one of these, Chasehill Wood/Fox Covert was fully surveyed in 1987. Only the roadside edge of Burkinshaw's woodland block could be covered among them. Chasehill Wood is a mixed deciduous woodland which has re-generated naturally from nineteenth century plantations felled during the 1940s. Fox Covert, a continuation of the same woodland block, has a higher canopy, having been planted in 1912. Burkinshaw's Covert is a mixed deciduous woodland of similar recent history to Chasehill Wood, but is currently being thinned and cropped for timber. To the north and south of this woodland are young plantations of hybrid poplars, acting as a screen between the Lindsey Oil Refinery and Rosper Road.

The woodland surveyed in 1987 represented 22% of the total woodland within the survey area, and 2.1% of the total area surveyed. It accounted for 10% of the territories located during the survey, with 22 (43%) of the territorial species represented (Table 3). Only three species, Tawny Owl, Treecreeper and Great Spotted Woodpecker, were recorded exclusively in woodland habitats. It seems unlikely that the breeding bird community of Burkinshaw's Copse differed substantially from the surveyed woodland.

Scrub

There are six scrubland sites within the survey area: Eastfield Road Railway Embankment LNR, Nicholson Road/Eastfield Road junction pasture, Baysgarth Farm Pasture, Chasehill Corner, East Middle Mere Road and parts of the Killingholme Haven Pits LNR. 78% of the scrub within the survey area was surveyed in 1987. This represented 2% of the total area surveyed, and held 19% of the mapped territories, with 25 (49%) of species represented (Table 3). Of these species,

just two, Grasshopper Warbler and Mistle Thrush, were recorded on territory exclusively in scrub habitat.

Wetland

Wetland consists of most of the Killingholme Haven Pits LNR, associated hedgerows and the dyke reedbed, which stretches from the southern end of the LNR to the southern limit of the survey area. It held 18% of the mapped territories and 18 (35%) of the territorial species were represented (Table 3). Of these species, Pochard is worthy of special mention, being a nationally rare breeding species with an estimated national breeding population of about 200-400 pairs, around half of which occur in the eastern coastal counties from Lincolnshire to Kent (Fig.9). The Pochard has not previously been recorded breeding at Killingholme Haven Pits. All five territorial waterfowl species (Canada Goose, Coot, Little Grebe, Moorhen and Pochard) were restricted to this habitat, as was one passerine, the Reed Warbler.

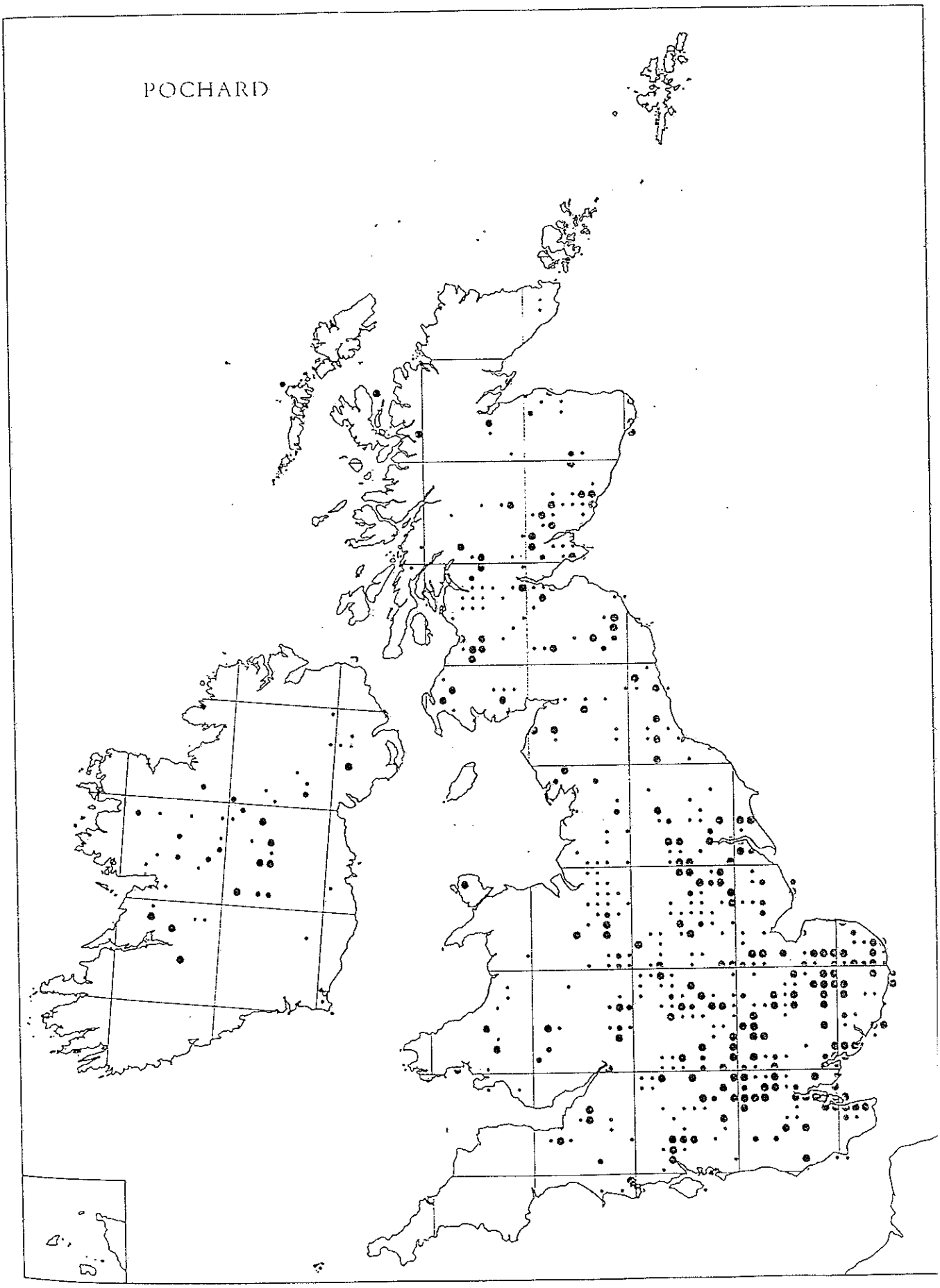

Figure 9. The breeding distribution of Pochard in Britain and Ireland. (Taken from Sharrock 1976).

Open Fields

This broad habitat type incorporates cereal, rape, permanent pasture, ley grass fields, hedgerows and scattered farm buildings. In addition, it includes the open area to the south of the Killingholme Pits LNR, now lightly covered with annual grass and herb species and initially reclaimed by deposition of chalk and gravel infill material. The habitat covers a considerable part of the whole site (86%) and accounted for 91% of the area surveyed in 1987. The large area of open fields in part accounted for the large proportion of territories they contained (53%) and the large number of species (36) they supported (Table 3). Twenty-eight of the 36 species recorded from the open fields were restricted to hedgerows within the habitat and those are discussed in the following section. The remaining eight species (Grey Partridge, Meadow Pipit, Red-legged Partridge, Ringed Plover, Sedge Warbler, Skylark, Swallow and Yellow Wagtail) all held non-hedgerow territories only, and all but Sedge Warbler were recorded exclusively from the open field habitat. All the Sedge Warbler territories in open fields were located in the rape fields north-west of Chasehill Farm. Nine out of ten Meadow Pipit territories were in the eastern section of the survey area, between Rosper Road and the coast, as were six out of nine Yellow Wagtail territories.

Hedgerows

The hedgerows in the survey area (Figure 10) accounted for 39% of mapped territories and 28 (55%) of the territorial species found. Hedgerows formed ornithologically important components of both the open field and wetland habitats. They held 73% of the open field territories and 28 (78%) of the open fields species. Of these species only Reed Bunting was found in both the hedges and the fields. Green Woodpecker and Spotted Flycatcher both had single territories in the survey area, apparently confined to hedgerows in the open field habitat. In the case of Green Woodpecker, however, it is likely that the

territory actually extended well into the fields. In the wetland habitat, hedgerows supported 11% of territories and 61% (11) of the species (Blackbird, Blue Tit, Bullfinch, Dunnock, Great Tit, Lesser Whitethroat, Linnet, Reed Bunting, Song Thrush, Turtle Dove and Wren). None of these species was recorded exclusively from wetland, but all except Reed Bunting were recorded only from the hedgerow component of the wetland habitat.

To identify the hedgerows of importance to birds, the numbers of territories located in each were converted to figures per km and then ranked accordingly (Table 4). Table 5 reveals that there is a broad association between more bird territories and better structured hedges with hedgerow trees. Based on territory density the relative values of the various hedgerows for birds are depicted in Figure 11. The majority of the bird-rich hedgerows enclose permanent pasture fields, particularly in the north-west of the survey area, east of East Halton village. There is also a tendency for hedges that are in proximity to habitats that are more diverse than arable fields to hold more territories.

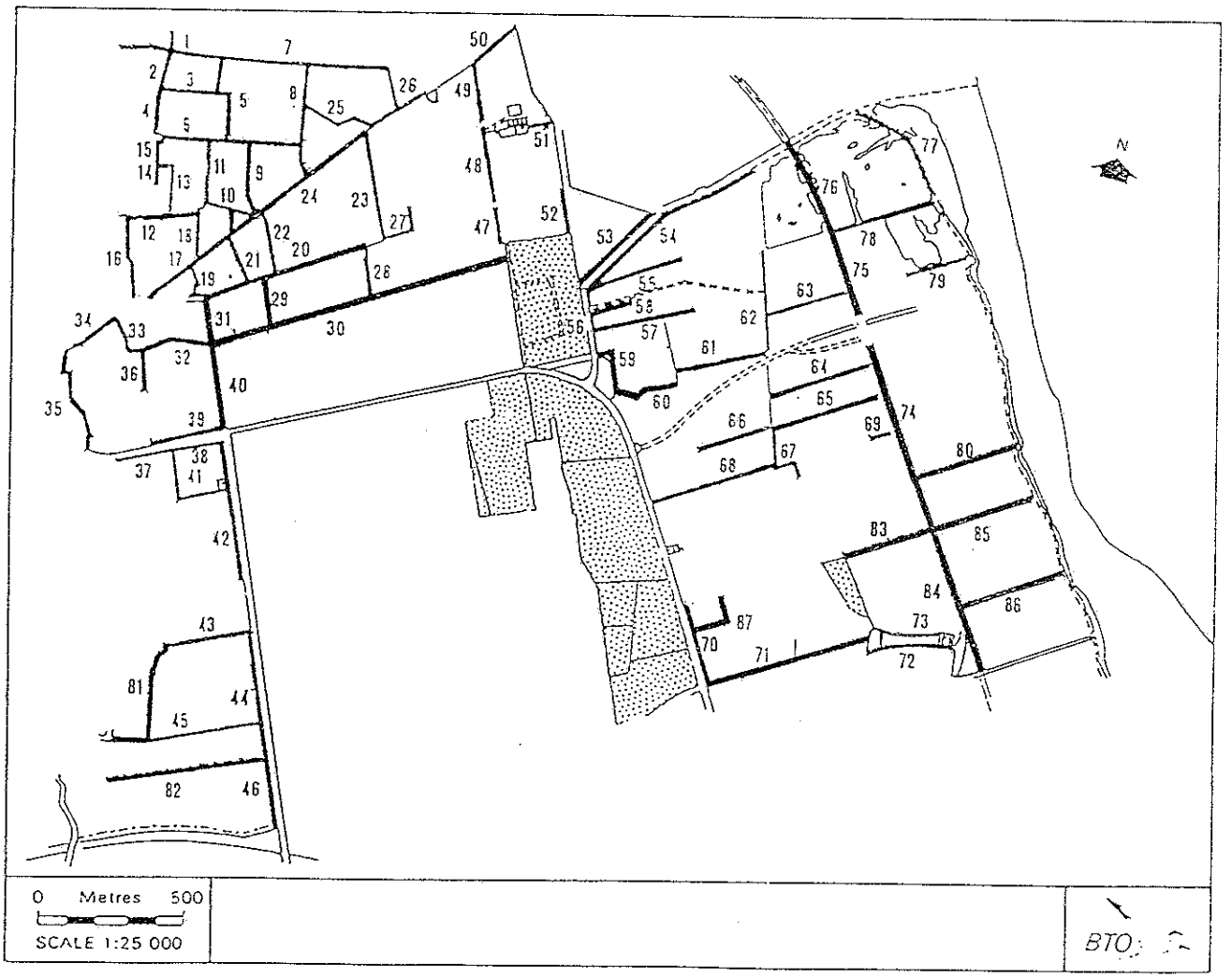

Figure 10 Location of hedgerows in the Killingholme survey area.

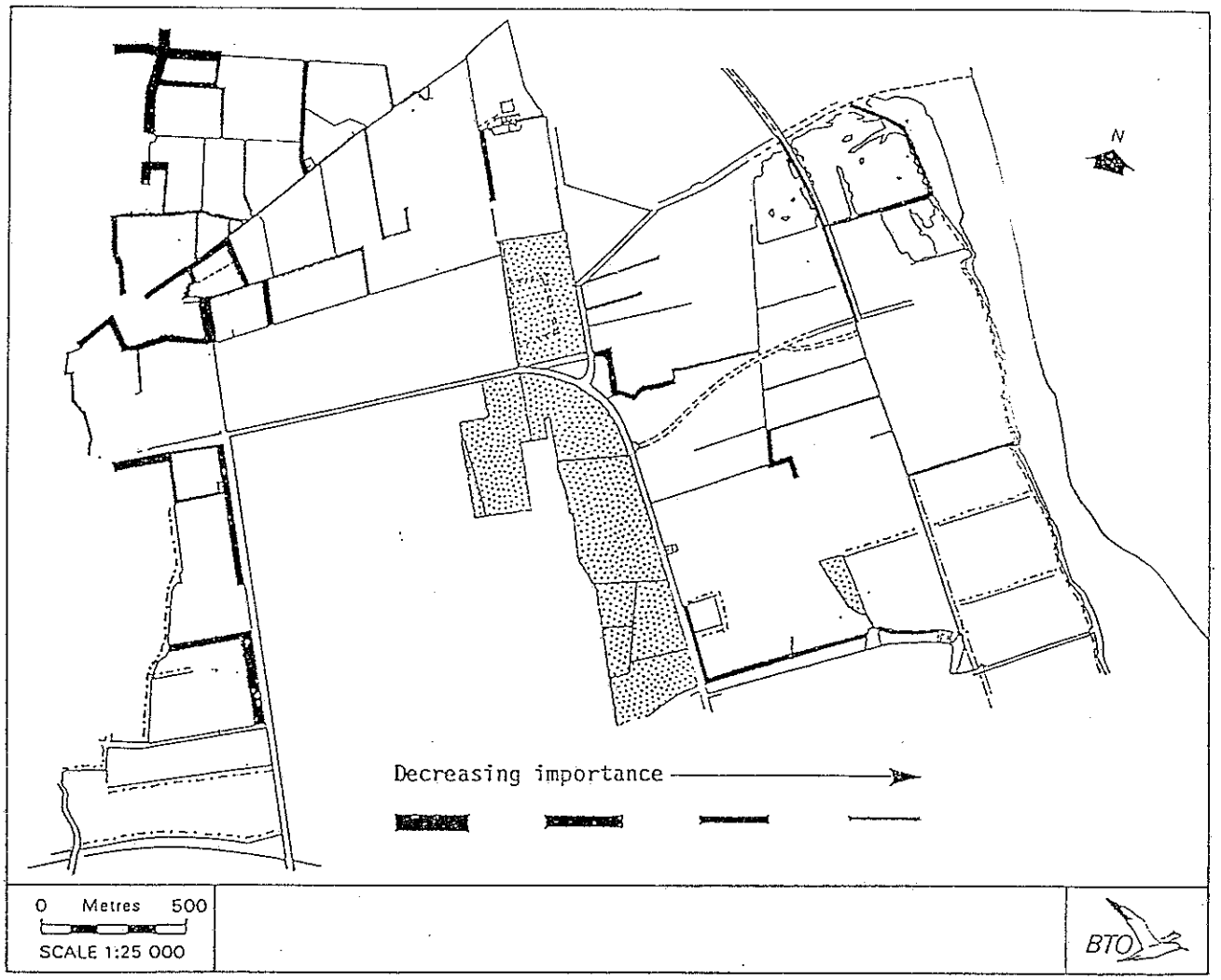

Figure 11. Hedgerow importance for breeding territories in the Killingholme survey area.

TABLE 4 Breeding bird species and territories for each hedge in the 1987 Killingholme survey area.

Hedge Number	Length	Species	Territories	Territories per km
1	325	11	11	34
2	150	5	5	33
3	200	4	4	20
4	100	3	3	30
5	275	2	2	7
6	500	2	2	4
7	550	1	1	2
8	375	6	7	19
9	250	3	3	12
10	150	1	1	7
11	225	1	1	4
12	225	2	2	9
13	175	1	1	6
14	125	5	6	48
15	50	-	-	-
16	250	4	4	16
17	350	8	9	26
18	150	2	2	13
19	100	2	2	20
20	575	6	9	16
21	175	4	4	23
22	225	-	-	-
23	375	2	2	5
24	600	8	8	13
25	250	-	-	-
26	275	3	3	11
27	150	2	2	13
28	150	1	1	7
29	150	3	3	20
30	1000	3	5	5
31	250	12	14	56
32	225	5	5	22
33	175	3	3	17
34	175	3	3	17
35	275	2	2	7
36	150	1	1	7
37	200	3	3	15
38	175	1	1	6
39	250	1	1	4
40	600	3	5	8
41	350	4	4	11
42	475	8	10	21
43	275	5	5	18
44	175	6	6	34
45	900	3	5	6
46	350	-	-	-
47	175	-	-	-
48	250	5	5	20
49	225	1	1	4
50	200	-	-	-

TABLE 4 contd.

Hedge Number	Length	Species	Territories	Territories per km
51	75	1	1	13
52	150	1	1	7
53	350	1	1	3
54	700	3	3	4
55	325	3	3	9
56	225	-	-	-
57	350	1	1	3
58	150	1	1	7
59	325	5	7	22
60	200	3	3	15
61	250	3	3	12
62	350	2	2	3
63	275	1	1	4
64	350	3	4	11
65	375	2	2	5
66	250	1	1	4
67	200	3	3	15
68	425	2	2	5
69	75	-	-	-
70	275	6	6	22
71	1000	6	13	13
72	275	1	1	4
73	300	2	2	7
74	2050	10	16	7
75	525	4	4	8
76	600	7	9	15
77	175	3	3	17
78	175	1	1	6
79	325	1	1	3
80	350	3	3	9

TABLE 5 Habitat characteristics of hedgerows in the killingholme survey area

Hedge Number	Territories per km.	Hedgerow trees	Height 2m+	Height < 2m	Spread 2m+	Spread <2m	Trimmed	Uncut or half cut	Scrub belt	Minimum number of woody species	Gaps >50%	Wet ditch
31	56	+	+		+			+		6		
14	40	+	+					+		3		
44	34	+	+			+		+		4		
1	34	+	+			+		+		5		
2	33	+	+			+				4		
4	30		+			+				3		
17	26	+	+		+			+		6		
21	23	+	+			+		+		3		
32	22	+	+		+			+		4		
70	22		+			+		+		3		
42	21	+		+		+		+		3		
19	20	+	+			+		+		3	+	
3	20		+			+				4		
48	20		+			+		+		2		
59	20		+		+			+		4		
29	20		+			+		+		2		
8	19	+	+			+	+			4		
43	18		+			+		+		3		
33	17	+	+			+		+		4		
34	17			+		+	+			4		
77	18	+	+		+		+			3		+
16	16	+	+			+		+		3		
20	16		+			+		+		3		
37	15	+	+			+		+		4		
60	15			+		+	+			2		+
67	15		+			+		+		3	+	+
76	15		+		+			+		3		+
18	13			+		+		+		3		
24	13		+			+		+		3		
27	13			+		+	+			3		
51	13			+		+	+			3		
71	13		+			+		+		3		
9	12			+		+	+			3		
61	12		+			+		+		2		+
41	11			+		+		+		3		
64	11			+		+		+		2		
26	11			+		+	+			2		
55	9		+			+		+		3		
12	9			+		+	+			5		
80	9		+			+		+		3		
40	8			+		+	+			2		
75	8			+		+			+	2	+	
5	7			+			+	+		3		
35	7			+		+	+			3		
74	7		+			+		+		3		
10	7			+		+	+			2	+	
28	7		+			+		+		3		
36	7	+	+			+		+		4		
52	7			+		+	+			3	+	

Table 5 continued.

Hedge Number	Territories per km.	Hedgerow trees	Height 2m+	Height < 2m	Spread 2m+	Spread < 2m	Trimmed	Uncut or half uncut	Scrub belt	Minimum number of woody species	Gaps > 50%	Wet ditch
58	7			+		+	+			3	+	
73	7		+			+		+		3	+	
13	6			+		+	+			3		
38	6		+			+		+		4		
78	6		+		+			+		3		
45	6			+		+	+			4		
23	5			+		+	+			2		
65	5		+			+		+		3	+	
30	5		+			+		+		4		
68	5		+			+				3	+	+
11	4			+		+	+			3	+	+
49	4			+		+	+			1		
54	4			+		+	+			2		
6	4			+		+	+			3		
39	4			+		+	+			3		
66	4		+			+		+		3	+	
63	4			+		+		+		2	+	+
72	4		+			+		+		*		
62	3			+		+		+		2		+
79	3		+			+		+		3		
53	3			+		+	+			3		
57	3		+			+				3		
7	2			+		+	+			3		
15	0		+			+		+		2		
22	0		+			+		+		3		
25	0			+		+	+			3		
46	0		+			+	+			3		
47	0		+			+	+			2		
50	0			+		+	+			2		
56	0			+		+	+			3		
69	0		+			+		+		2		

4.7 Historical records

Unpublished data from the Lincolnshire Bird Club's Breeding Atlas project for the years 1980-87 list, as 'confirmed' breeding species within the tetrads encompassing the CEGB survey area, three species which were not seen during the 1987 ornithological survey: Barn Owl, Black Redstart, Garganey.

The Barn Owl breeding site was within the survey area, at the disused Chasehill Farm, but this site was not used in 1987. The Barn Owl is not a nationally rare species, but it is given special protection under Schedule 1-Part 1 of the Wildlife & Countryside Act 1981 and is currently undergoing an alarming and widespread decline (Shawyer 1987).

The Black Redstart record refers to a pair which bred inside the Lindsey Oil Refinery site, adjacent to the survey area, until 1985. The species is present in only 2% of 10km squares (Sharrock 1976), is nationally rare under Fuller's criterion (Fuller 1980), and is protected under Schedule 1-Part 1 of the Wildlife and Countryside Act 1981. Between one and five pairs breed in the industrial and dockland areas of South Humberside.

The Garganey record refers to a pair which nested beside Killingholme Haven Pits in 1981. A pair was again present on one day in May 1987, and a pair bred at Rosper Road Pit Local Nature Reserve, one km south of the survey area, in 1987. This is a nationally rare breeding species, occurring in 4% of 10 km squares (Sharrock 1976), and is protected under Schedule 1-Part 1 of the Wildlife and Countryside Act 1981.

There are no breeding species mentioned in other sources which were not seen during the present study. A Lincolnshire and South Humberside Trust for Nature Conservation (L&SHTNC) report on the birds using the Killingholme Haven Pits LNR between 1968 and 1979 identified a total of 40 species recorded as breeding at the site, although only 19 were regarded as annual breeding species. In addition, Pochard and Teal, another wildfowl species, were noted as species likely to have bred, but unconfirmed.

4.8 Conclusion and assessment of ornithological importance

The total number of breeding bird territories recorded in the survey area, excluding both those areas outside of the CEGB Estate, to which access was not possible, and the intertidal flats, was 722 in 376 ha: this gives a density of 1.92 territories/ha for the total area surveyed, which for reasons given in section 4.3 should be regarded as a minimum. Eighty-nine percent of the area surveyed consisted of the open field system which, apart from the hedgerows within it, supported few birds.

On the basis of numbers of territorial species present, habitat types grade in importance from open fields (most important), through scrub and woodland to wetland (least important). On the basis of density of territories per km square habitat types grade in importance from scrub (most important) through woodland and wetland to open fields (least important). For the reasons suggested in section 4.3 it is likely that the territory densities in woodlands are more subject to under-estimation than those of other habitats, however, as scrub is shown to hold over double the above density of territories in woodland the ranking of habitats by territory density is probably real. Hedgerows are not directly comparable, being linear components of other habitats, but supported the majority of birds recorded from open fields and an important proportion of the wetland territories. The wetland and scrub complex of Killingholme Haven

Pits LNR, however, has greater importance than these figures reveal, as it supports a rich community of specialist species. It was the only part of the survey area to hold territorial Grasshopper Warbler, a scrubland specialist species which has declined locally in recent years, and wetland specialist species including the bulk of the Reed and Sedge Warblers as well as five species of waterfowl, one of which, the Pochard, is nationally rare.

Historical information indicates that Garganey, a nationally rare breeding wildfowl species, has also bred at Killingholme Haven Pits LNR in the past and in the local area in 1987. This species is characteristically sporadic in its breeding at any one site so may well be expected to nest at Killingholme again in the future.

5 THE WINTERING TERRESTRIAL BIRD COMMUNITY OF THE KILLINGHOLME AREA

5.1 Introduction

This chapter deals with the wintering bird community of all terrestrial regions of the survey area (Fig. 2). As described in Chapter 3, Fuller (1980) gives qualifying levels for species richness that allow a level of importance, based on the number of wintering bird species, to be assigned to an area. As yet, however, there is no standard method for assessing whether or not an area is important by virtue of the density of wintering birds it supports. Previously published work concerning the density of wintering birds in terrestrial habitats is very sparse, with no useful data available for areas as small and diverse as the Killingholme survey area.

5.2 Methodology

Wintering birds were recorded from the entire survey area (Fig. 2). During the breeding bird survey documented in Chapter 4, registrations of birds from within the survey area were used to assess the number of breeding territories, in accordance with BTO Common Birds Census instructions (Appendix 1). In winter, a large proportion of birds do not hold territory, so a simple estimate based on total registrations must be used instead of total territories.

The CBC technique described in Chapter 4 and in Appendix 1 was modified to provide an estimate of the wintering bird community of the site. In the Winter Bird Atlas (Lack 1986), Britain was split into 10km squares and 'visits to a square over 1 hour duration' were the recording units. Each recording unit was then standardized to a 6 hour visit or 'average day' by calibration against a plot of number of birds against length of visit. In the winter survey, more detail was required than the Winter Atlas technique could provide. The

resolution was improved by analysing each 200m square instead of each 10km square and by employing a thorough mapping session as used by the CBC technique. Two advantages of the mapping session over the timed visit are that it allows the study area to be segmented in any way and it requires no calibration for visit duration. Using the mapping session it was possible to delimit the various habitat types outlined in Chapter 2 in order to compare them ornithologically and illustrate the habitat preferences of each species recorded. This 'winter CBC' technique was employed during ten visits spread over the Nov-March period and was used to calculate species richness and species density estimates for the survey area. Any 200m square not falling completely within the confines of the survey area was standardized by multiplying the number of birds seen by a coefficient for area. For small areas this can result in unrealistic estimation of density, but in general gives the most satisfactory approximation.

5.3 Species composition of the wintering terrestrial bird community

During the winter of 1987/88, 69 species of bird were recorded above the mean high water mark of the survey area (Table 6), implying ornithological importance for the site at a county level (Fuller 1982). The species comprising the terrestrial bird community are represented in the form of a pie diagram in Figure 12.

Table 6 gives the proportion of 10km squares in which each species was recorded in the Winter Atlas (Lack 1986). Eleven species recorded at Killingholme during the 1987/88 winter have restricted winter distributions (present in 30% or less of squares nationally). Of these, Bearded Tit, Bittern, Long-eared Owl, Snow Bunting and Water Rail are all of considerable conservation importance. Snow Bunting has a British winter distribution largely restricted to uplands in Scotland and the whole length of the east coast. Long-eared Owl has a very patchy winter distribution in Britain, with the bulk of the population occurring in eastern England; the dense Hawthorn scrub around the Killingholme Haven Pits, used by the species in 1988, is a typical roosting site for this wintering species. Bearded Tit, Bittern and Water Rail are all uncommon species dependent on wetland habitats such as the Killingholme Haven Pits LNR. The remaining six species have relatively lower conservation importance for the following reasons. Shelduck, Scaup and Rock Pipit are of restricted range due to their dependence on coastal habitats, but are common within this habitat. Glaucous Gull also has a chiefly coastal distribution, with higher numbers present in northern Britain; the only record from the Killingholme survey area was of two birds 'loafing' after a visit to the nearby refuse tip to scavenge. Gadwall has a winter distribution in Britain largely restricted to south and east England, but is now not uncommon in these areas. Red-legged Partridge is restricted to the south-east and is an introduced and regularly re-stocked game bird.

TABLE 6. Species composition, density and national frequency of wintering birds in the Killingholme survey area.

	Habitat Registrations												
		Open Fields							Wetland				
	Total registrations	Arable	Permanent grassland	Temporary ley	Industrial/ disturbed	Homstead & stockyard	Woodland	Scrub	Wetland	Open Water	& community	Density (birds/ ha/visit)	National frequency
Starling	1064	62	808	0	139	46	0	9	0	0	9.3	0.22	90%
Blackbird	1014	124	297	38	15	19	152	335	34	0	8.9	0.21	94%
Woodpigeon	988	349	51	4	2	0	576	6	0	0	8.6	0.21	86%
House Sparrow	815	184	18	16	94	444	0	59	0	0	7.1	0.17	85%
Bl-Headed Gull	651	371	321	0	0	0	0	0	0	119	5.7	0.14	81%
Rook	577	378	173	0	0	0	0	26	0	0	5.0	0.12	83%
Redwing	559	56	283	1	0	0	3	192	24	0	4.9	0.12	88%
Magpie	439	182	100	20	37	7	50	37	6	0	3.8	0.09	75%
Yellowhammer	436	215	21	8	59	94	4	35	0	0	3.8	0.09	64%
Coot	389	0	0	0	0	0	0	0	0	389	3.4	0.08	53%
Gt. Black-Back Gull	353	215	86	0	0	0	0	0	0	52	3.1	0.07	66%
Blue Tit	335	76	3	2	3	0	138	90	23	0	2.9	0.07	88%
Herring Gull	291	206	50	0	0	0	0	0	0	35	2.5	0.06	79%
Common Gull	271	92	140	0	0	0	0	0	0	39	2.4	0.06	71%
Dunnock	240	56	47	11	4	6	44	67	5	0	2.1	0.05	87%
Fieldfare	223	101	104	0	2	0	1	6	9	0	1.9	0.05	87%
Wren	221	28	47	1	3	4	81	52	5	0	1.9	0.05	93%
Chaffinch	197	29	10	1	4	45	46	30	32	0	1.7	0.04	91%
Great Tit	194	35	24	2	1	0	80	50	2	0	1.7	0.04	84%
Robin	173	20	45	3	2	8	36	56	3	0	1.5	0.04	92%
Skylark	130	86	6	2	36	0	0	0	0	0	1.1	0.03	70%
Lapwing	120	0	120	0	0	0	0	0	0	0	1.0	0.03	79%
Song Thrush	118	30	49	3	1	0	12	19	4	0	1.0	0.02	86%
Jackdaw	112	83	29	0	0	0	0	0	0	0	1.0	0.02	85%
Greenfinch	109	41	14	0	1	1	1	28	14	0	0.9	0.02	75%
Carrion Crow	102	60	24	1	7	0	3	7	0	0	0.9	0.02	64%
Bullfinch	100	13	10	1	1	0	31	44	0	0	0.9	0.02	76%
Red-legged Partridge	86	82	0	1	3	0	0	0	0	0	0.8	0.02	23% *
Moorhen	76	1	56	0	0	0	0	0	19	0	0.7	0.02	70%
Long-tailed Tit	75	0	4	0	0	0	65	6	0	0	0.7	0.02	67%
Tufted Duck	74	0	0	0	0	0	0	0	0	74	0.6	0.02	53%
Reed Bunting	68	14	5	1	12	0	0	9	27	0	0.6	0.01	65%
Goldcrest	61	1	1	1	0	0	37	18	3	0	0.5	0.01	79%
Pochard	52	0	0	0	0	0	0	0	0	52	0.4	0.01	47%

TABLE 6 cont'd

Tree Sparrow	49	4	0	1	0	0	0	44	0	0	0.4	0.01	40%
Mallard	45	0	0	0	0	0	0	0	0	45	0.4	<0.01	81%
Curlew	42	0	18	24	0	0	0	0	0	0	0.4	<0.01	57%
Linnet	42	17	4	0	20	0	0	1	0	0	0.4	<0.01	59%
Teal	33	0	0	0	0	0	0	0	0	33	0.3	<0.01	65%
Willow Tit	31	9	1	1	0	0	18	2	0	0	0.3	<0.01	30% *
Kestrel	28	6	12	0	1	0	7	2	0	0	0.2	<0.01	81%
Pied Wagtail	28	1	0	0	27	0	0	0	0	0	0.2	<0.01	78%
Mute Swan	27	0	0	0	0	0	0	0	0	27	0.2	<0.01	58%
Goldfinch	27	10	13	0	0	0	0	4	0	0	0.2	<0.01	68%
Collared Dove	26	3	4	0	0	6	0	13	0	0	0.2	<0.01	60%
Snipe	25	5	0	0	0	0	0	0	20	0	0.2	<0.01	76%
Mistle Thrush	20	0	14	0	0	0	0	6	0	0	0.2	<0.01	82%
Shelduck	16	0	0	0	0	0	0	0	0	16	0.1	<0.01	29% *
Snow Bunting	15	0	0	0	15	0	0	0	0	0	0.1	<0.01	18% *
Stock Dove	14	14	0	0	0	0	0	0	0	0	0.1	<0.01	50%
Grey Partridge	14	10	3	0	1	0	0	0	0	0	0.1	<0.01	40%
Sparrowhawk	13	7	2	0	0	0	4	0	0	0	0.1	<0.01	71%
Gt. Spotted W'pecker	11	0	0	0	0	0	11	0	0	0	0.1	<0.01	45%
Pheasant	11	6	2	1	0	0	2	0	0	0	0.1	<0.01	73%
Little Grebe	9	0	0	0	0	0	0	0	0	9	<0.1	<0.01	47%
Heron	9	1	1	0	0	0	0	0	7	0	<0.1	<0.01	83%
Coal Tit	8	0	0	0	0	0	8	0	0	0	<0.1	<0.01	79%
Meadow Pipit	7	2	0	0	5	0	0	0	0	0	<0.1	<0.01	84%
Rock Pipit	5	0	0	0	5	0	0	0	0	0	<0.1	<0.01	27% *
Long-eared Owl	3	0	0	0	0	0	0	3	0	0	<0.1	<0.01	9% *
Glaucous Gull	2	0	2	0	0	0	0	0	0	0	<0.1	<0.01	14% *
Beared Tit	2	0	0	0	0	0	0	0	2	0	<0.1	<0.01	3% *
Scaup	2	0	0	0	0	0	0	0	0	2	<0.1	<0.01	12% *
Treecreeper	2	0	0	0	0	0	2	0	0	0	<0.1	<0.01	68%
Gadwall	1	0	0	0	0	0	0	0	0	1	<0.1	<0.01	17% *
Bittern	1	0	0	0	0	0	0	0	1	0	<0.1	<0.01	5% *
Kingfisher	1	0	0	0	0	0	0	0	1	0	<0.1	<0.01	34%
Water Rail	1	0	0	0	0	0	0	0	1	0	<0.1	<0.01	25% *
Tawny Owl	1	0	0	0	0	0	1	0	0	0	<0.1	<0.01	44%
TOTAL	11444	3285	3022	144	500	689	1413	1256	242	893		2.39	

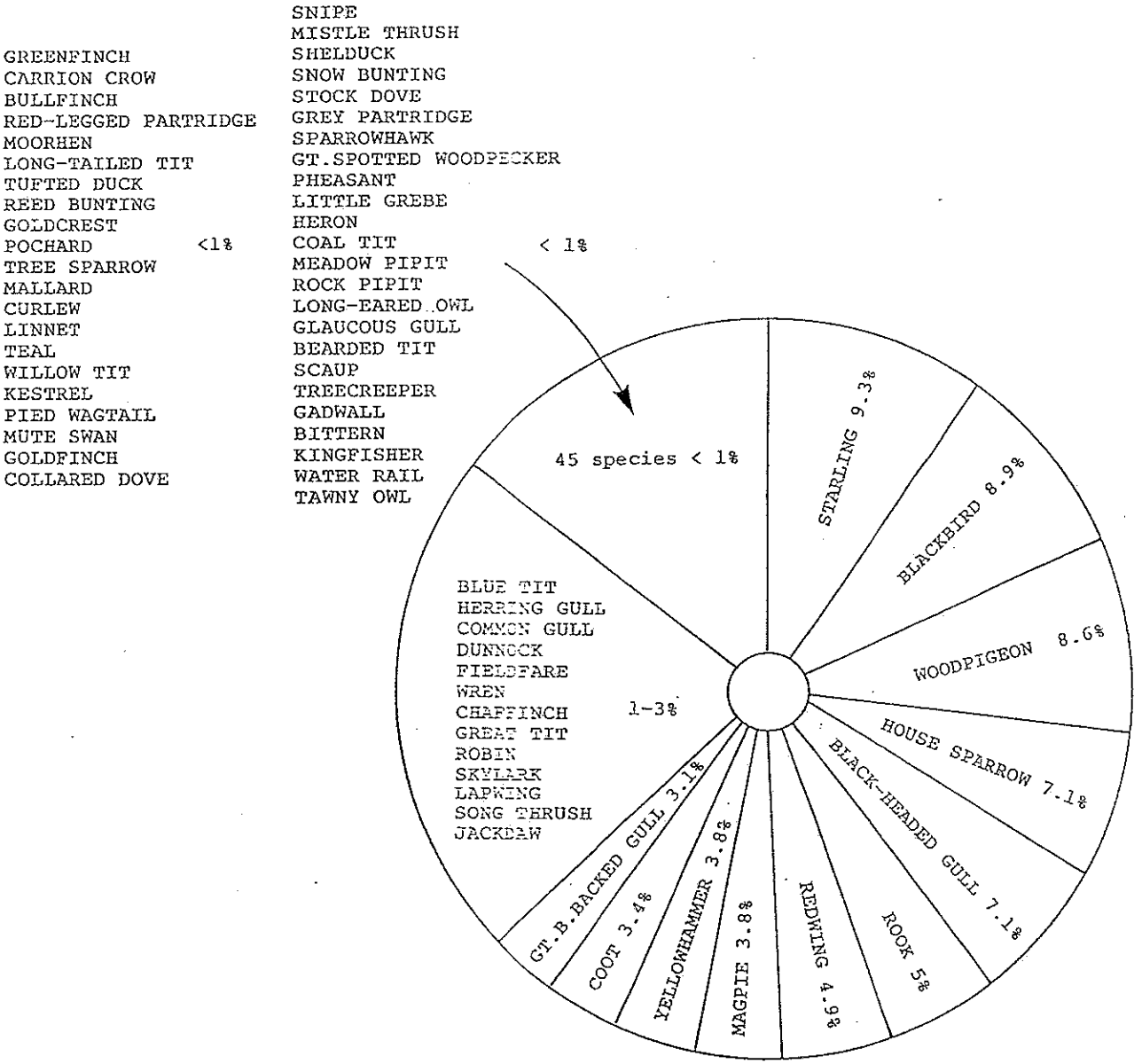

Figure 12. Species composition of the wintering terrestrial bird community at Killingholme

5.4 The density and species richness of winter terrestrial birds.

Following the Ordnance Survey Grid, the study area was divided into one-hundred and fifty-nine 200m squares. Figures 13 and 14 respectively illustrate the species density and richness of wintering birds recorded in each 200m square during the winter of 1987/88. It can be seen from the density figure that 200m squares which included areas of scrub, wetland or woodland in general supported higher densities of birds than the majority of 'open' habitat squares. However, concentrations of gulls and corvids, present because of the nearby refuse tip, led to high density figures at the south-west corner of the site. In the north-west corner, higher densities occurred due to the occasional presence of thrush flocks. The species richness figure clearly shows that woodland, wetland and scrub supported the greatest variety of wintering species, with the 'open' habitats supporting fewer bird species. The particular richness of the Killingholme Haven Pits area is clearly evident. It should be noted that no standardisation for species richness has been made for partly covered 200m squares as the relationship between species richness and area is not simple. This means that the species richness of partly covered boundary squares is likely to be underestimated.

Figures in Appendix 3 illustrate the densities of each of the sixty-nine species recorded over the 1987/88 winter. Each figure is also accompanied by a brief comment on the local and national status of the relevant species.

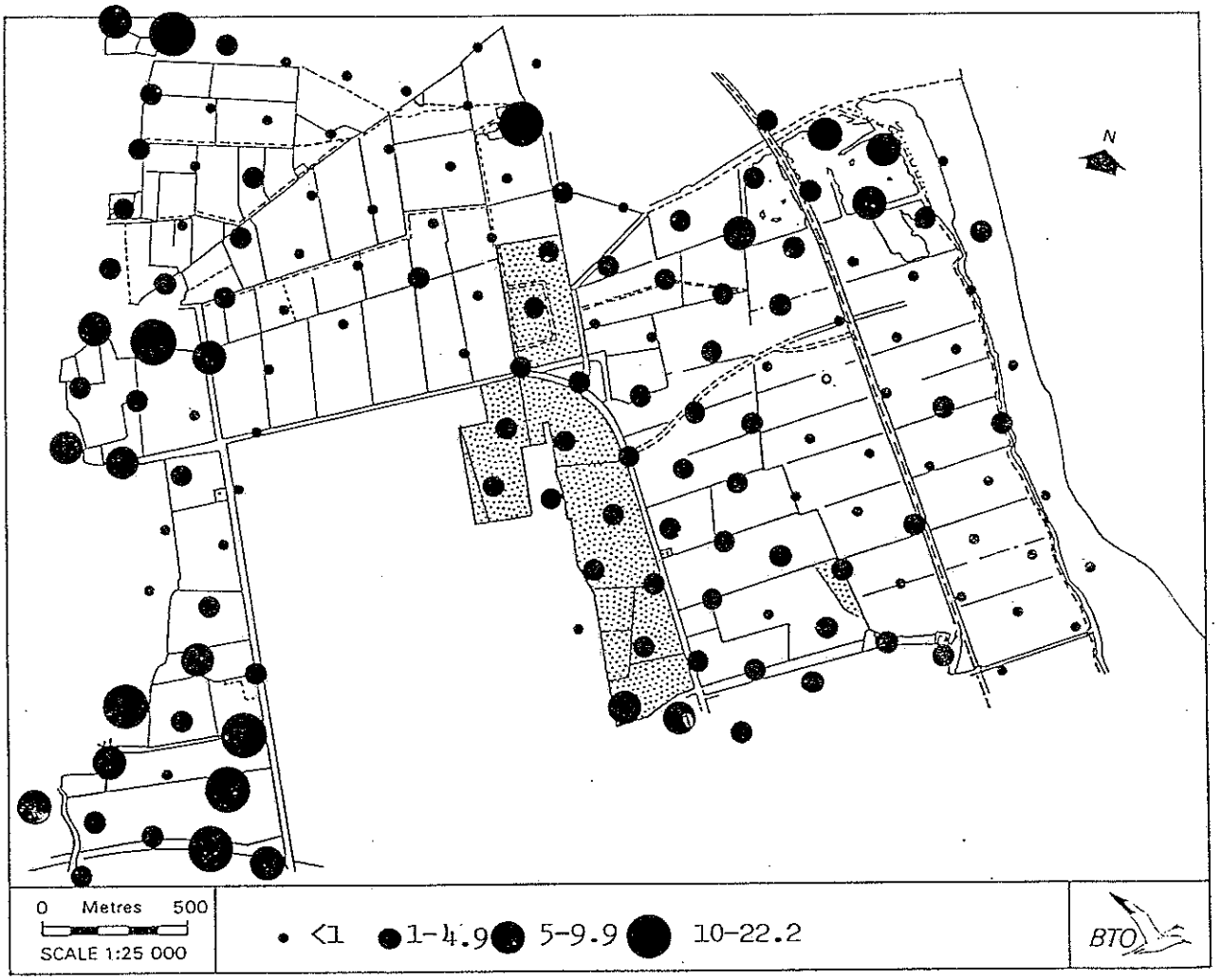

Figure 13. Density (birds/ha/visit) of wintering birds in the Killingholme survey area.

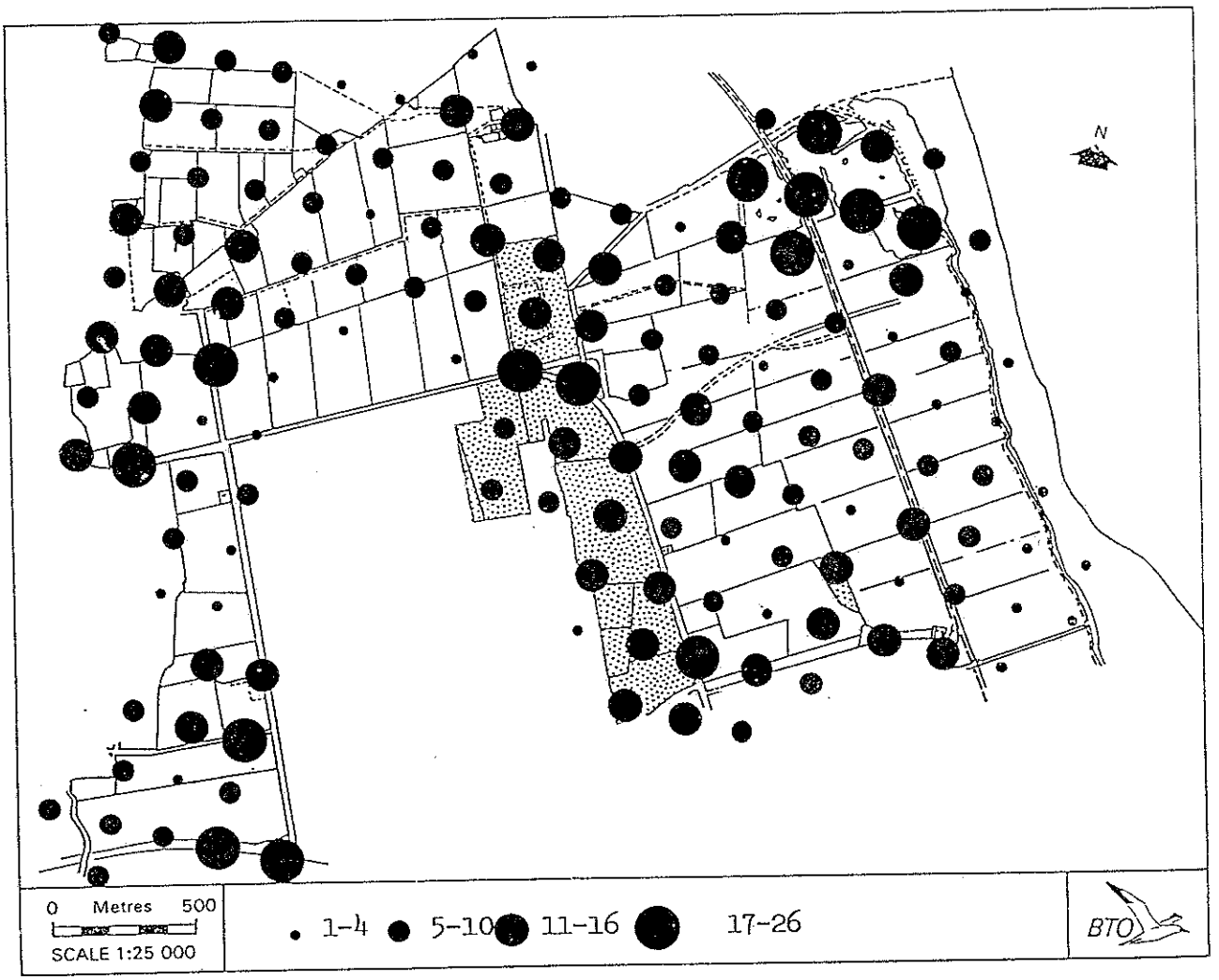

Figure 14. Number of wintering bird species per 200 m square of the Killingholme survey area.

5.5 Analysis of the winter terrestrial bird community by habitat

The survey area was split into similar broad habitat types to the breeding bird survey, except that the open field habitat of the breeding bird survey was sub-divided into five categories for the winter survey: arable land, permanent pasture, temporary ley, homestead and industrial/disturbed ground. During the summer, the number of territories in the non-hedgerow parts of the open field habitat were few and confined to only a small number of species; however, in winter these non-hedgerow areas were used by more birds and differences between the various areas within the habitat were potentially greater. The wetland habitat was also split for the winter survey into wetland marsh and open water. During the summer survey, open water was not used as a breeding habitat for obvious reasons; however, in winter it provided a feeding and roosting area for wildfowl. For each habitat, the number of registrations of each species was calculated (Table 7). The intertidal saltmarsh was not mapped during the terrestrial surveys, but terrestrial birds seen during the inter-tidal waterfowl counts were recorded. During the 1987/88 winter there were 56 registrations from the saltmarsh, comprising 44 Chaffinches, 2 Meadow Pipits, 6 Rock Pipits and 4 Reed Buntings. The saltmarsh was therefore of low importance as a terrestrial bird habitat over the generally mild 1987/88 winter, but could well assume greater importance in severe weather, when influxes of seed-eating birds from the continent are often noticed in eastern Britain.

Open Fields

The open fields habitat covered 81% of the survey area and 67% of the recorded winter bird registrations were made within it. Fifty-one species were recorded (Table 6), of which six were confined to hedgerows within the habitat, 25 species were recorded from both hedgerow and non-hedgerow components, and 20 were seen only in the non-hedgerow areas. Sixteen species were restricted to the open fields habitat (Black-headed Gull, Common Gull, Curlew, Glaucous Gull, Great Black-backed Gull, Grey Partridge, Herring Gull, Jackdaw, Lapwing, Meadow Pipit, Pied Wagtail, Red-legged Partridge, Rock Pipit, Skylark, Snow Bunting and Stock Dove). All of the above species were recorded only from the non-hedgerow areas, apart from Grey Partridge which was recorded from both hedgerow and non-hedgerow components. All of the gull species mentioned above and also Starlings and members of the crow family tended to congregate in the open fields after feeding on the adjacent Eastfield Road rubbish tip. Of the species recorded from the open field habitats only Snow Bunting can be considered as of high conservation importance.

Arable

The arable fields amounted to 280.6 ha (58.7% of the survey area), and supported 28.7% of the winter bird community. Forty-two species were recorded, giving this habitat, along with permanent grassland, the highest number of wintering species (Table 6). Of the species recorded in arable land, none were unique to this habitat, 18 were recorded only on the fields (Black-headed Gull, Common Gull, Goldfinch, Great Black-backed Gull, Grey Partridge, Heron, Herring Gull, Jackdaw, Kestrel, Linnet, Mallard, Meadow Pipit, Pheasant, Pied Wagtail, Red-legged Partridge, Skylark, Snipe and Stock Dove), 19 species were present in both arable fields and their hedgerows (Blackbird, Blue Tit, Carrion Crow, Chaffinch, Collared Dove, Dunnock, Fieldfare, Greenfinch, House Sparrow, Magpie, Redwing, Reed Bunting, Robin, Song Thrush, Sparrowhawk, Starling, Wood Pigeon,

Wren and Yellowhammer) and five species were found only in the hedgerows of this habitat (Bullfinch, Goldcrest, Great Tit, Tree Sparrow and Willow Tit).

Permanent Grassland

Permanent grasslands accounted for 17.4% (82.9ha) of the total survey area, and supported 26.4% of the winter bird community. A total of 42 species were recorded in this habitat, representing 60.9% of the species recorded during the winter survey (Table 6). Twelve species were recorded on permanent grass fields but not in adjacent hedgerows (Black-headed Gull, Common Gull, Curlew, Glaucous Gull, Great Black-backed Gull, Heron, Herring Gull, Jackdaw, Lapwing, Mistle Thrush, Moorhen and Skylark), 16 species were present both in permanent grass fields and their adjacent hedges (Blackbird, Carrion Crow, Fieldfare, Goldfinch, House Sparrow, Kestrel, Magpie, Pheasant, Redwing, Robin, Rook, Song Thrush, Starling, Wood Pigeon, Wren and Yellowhammer), and 14 species were present only in hedgerows and not in adjacent pastures (Blue Tit, Bullfinch, Chaffinch, Collared Dove, Dunnock, Goldcrest, Great Tit, Greenfinch, Grey Partridge, Linnet, Long-tailed Tit, Reed Bunting, Sparrowhawk and Willow Tit).

Two species occurred, within the survey area, exclusively on the non-hedgerow component of permanent grassland; Glaucous Gull and Lapwing.

TABLE 7. Habitat Types: The density, species richness and total number of winter birds supported.

HABITAT	Area(Ha)	No of species	Total Regist's	Density (birds/ha/visit)	% Area	% Regist's
OPEN FIELDS						
Arable	280.6	42	3285	1.2	58.7	28.7
Permanent Pasture	82.9	42	3022	3.6	17.4	26.4
Temporary Ley	9.8	23	144	1.8	2.1	1.3
Industrial /Disturbed	38.6	27	500	1.3	8.1	4.4
Stockyard /Homestead	0.9	11	689	76.5	0.2	6.0
WOODLAND	38.2	26	1413	3.7	8.0	12.3
SCRUB	8.5	30	1256	14.8	1.8	11.0
WETLAND						
Wetland	12.0	21	242	2.0	2.5	2.1
Open Water	6.2	14	893	14.4	1.3	7.8
TOTAL	477.7	69	11444	2.4		

Temporary Ley Grassland

The 9.8ha of ley grassland, representing 2.1% of the survey area, supported 1.3% of the winter bird community. Twenty-three species were recorded in this habitat (Table 6), of which four, (Curlew, Pheasant, Red-legged Partridge and Skylark) were present on ley grass fields but not in their adjacent hedgerows. Three species, (Blackbird, Magpie, amd Wood Pigeon) were recorded both on ley grass fields and adjacent hedgerows, and 16 species, (Blue Tit, Bullfinch, Carrion Crow, Chaffinch, Dunnock, Goldcrest, Great Tit, House Sparrow, Redwing, Reed Bunting, Robin, Song Thrush, Tree Sparrow, Willow Tit, Wren and Yellowhammer) were recorded in hedgerows but not in adjacent ley grass fields. No species were recorded exclusively in this habitat.

Industrial and Disturbed Ground

The 38.6ha of industrial and disturbed ground, representing 8.1% of the survey area, supported 4.4% of the winter bird community. Twenty-seven speices occurred in this habitat, of which 11 (Carrion Crow, Greenfinch, Grey Partridge, Kestrel, Meadow Pipit, Pied Wagtail, Red-legged Partridge, Rock Pipit, Skylark, Snow Bunting and Starling) were recorded only away from the habitat's hedgerows. A further five species were recorded using both open areas and hedgerows within the habitat: House Sparrow, Linnet, Magpie, Reed Bunting and Yellowhammer. The remaining 11 species were present only in hedgerows: Blackbird, Blue Tit, Bullfinch, Chaffinch, Dunnock, Fieldfare, Great Tit, Robin, Song Thrush, Wood Pigeon and Wren.

Two species, Rock Pipit and Snow Bunting, were recorded exclusively within this habitat during the terrestrial survey, although Rock Pipit was also recorded from the intertidal saltmarsh during the waterfowl survey.

Homestead and stockyard

The small areas making up this habitat, totalling 0.9ha (0.2% of the survey area) supported 6.0% of the winter bird community. The eleven species involved were: Blackbird, Chaffinch, Collared Dove, Dunnock, Greenfinch, House Sparrow, Magpie, Robin, Starling, Wren and Yellowhammer. Three of these species, Chaffinch, House Sparrow and Yellowhammer, accounted for 82% of all registrations in this habitat, with House Sparrow alone accounting for 62.5%.

No species were recorded exclusively from this habitat.

SCRUB

Scrub represented 1.8% (8.5ha) of the total survey area and supported 11% (1256 registrations) of the winter bird community. A total of 30 species were recorded in scrub, representing 43.5% of the species recorded in winter (Table 6).

The density of birds was higher in scrub than in any other terrestrial habitat (excluding Homestead and stockyard, where flocks of seed-eating birds occured in a very small area). In particular, scrub adjacent to permanent pasture proved very attractive to flocks of Redwing, a winter visitor, and Blackbirds also occurred at their highest density here. Indeed, registrations of the five thrush species (Blackbird, Fieldfare, Mistle Thrush, Redwing and Song Thrush) from scrub amounted to 558, representing 44.4% of total scrub registrations so the habitat was of major importance to this group.

Only one species, Long-eared Owl, was recorded exclusively in scrubland, and this species undoubtedly included surrounding agricultural land in its nocturnal hunting area.

WOODLAND

The woodlands in the survey area accounted for 8.0% (38.2ha) of the total survey area and supported 12.3% (1413) of the winter bird community. A total of 26 species, representing 37.7% of the species recorded on the site, were recorded in woodland (Table 7). The winter occurence of four species, (Coal Tit, Great Spotted Woodpecker, Tawny Owl and Treecreeper) was restricted to woodland within the survey area.

A breakdown of the woodlands into five blocks is given in Table 8, accompanied by ranges of importance for species density and richness. For winter birds it appears that Fox Covert and Chasehill Wood are of most value ornithologically, with the northern Burkinshaw's plantation of young poplars and Burkinshaw's Covert of least importance. Felling of timber continued over a large area of Burkinshaw's Covert throughout much of the winter, leaving a large area ready for re-planting. This section of woodlands could become more valuable in the future, especially if planted with local native tree species.

All the woodlands supported a greater proportion of the total winter bird community than would be expected on the basis of their areas. Densities of birds were, however, much lower than in scrub. Of the species occurring in both woodland and scrub, three (Long-tailed Tit, Willow Tit, and Woodpigeon) occurred at higher density in woodland, whereas the remaining 17 species were present at higher density in scrub. In particular, Redwing and Blackbird occurred at only <0.1 and 0.4 birds/ha respectively in woodland, as against 2.3 and 3.9 birds/ha in scrub.

TABLE 8. The density and species richness of wintering birds in the individual woodlands of the Killingholme area.

	Area(ha)	No. of species	No. of Reg's	Density (birds/ha /visit)	% Area	% Reg's
Fox Covert/Chasehill Wood	9.2	22	356	3.5	1.9	3.1
Burkinshaw's Plantation (North)	10.4	15	325	3.1	2.2	2.8
Burkinshaw's Covert	8.0	14	232	2.9	1.7	2.0
Burkinshaw's Plantation (South)	9.4	17	434	4.6	2.0	3.8
Killingholme Marshes Covert	1.2	12	64	5.3	0.2	0.6
TOTAL	38.2	26	1413	3.7	8.0	12.3

Density Rankings

Killingholme Marshes Covert-- Burkinshaw's Plantation (South)-- Fox Covert and Chasehill Wood-- Burkinshaw's Plantation (North)-- Burkinshaw's Covert.

Diversity Rankings

Fox Covert and Chasehill Wood-- Burkinshaw's Plantation (South)-- Burkinshaw's Plantation (North)-- Burkinshaw's Covert-- Killingholme Marshes Covert.

Combined Density and Diversity Rankings

Fox Covert and Chasehill Wood/Burkinshaw's Plantation (South)-- Killingholme Marshes Covert-- Burkinshaw's Plantation (North)-- Burkinshaw's Covert.

WETLAND

Wetland

The 12.0ha of wetland and adjacent hedgerows, representing 2.5% of the survey area, supported 2.1% of the winter bird community. Twenty-one species were represented, but of these only eight occurred in the marsh areas, the remaining 13 being confined to the hedgerows within this habitat. The eight "true" wetland species were: Bearded Tit, Bittern, Heron, Kingfisher, Moorhen, Reed Bunting, Snipe and Water Rail, The 13 "associated" wetland species restricted to adjacent hadgerows, were: Blackbird, Blue Tit, Chaffinch, Dunnock, Fieldfare, Goldcrest, Great Tit, Greenfinch, Magpie, Redwing, Robin, Song Thrush and Wren.

Four species were recorded within the survey area exclusively from the Killingholme Haven Pits wetlands: Bearded Tit, Bittern, Kingfisher and Water Rail. Apart from Kingfisher, all have restricted national distributions and are thus of conservation importance. Kingfishers have recently suffered a considerable decline in breeding numbers nationally and, although they do not breed at Killingholme, the winter records in the survey area are likely to be of British breeding birds. The prsence of Kingfishers is therefore also of conservation importance.

Open Water

The open water of Killingholme Haven Pits accounted for 6.2ha (1.3%) of the survey area, and supported 7.8% of the winter bird community. The 14 species present were: Black-headed Gull, Common Gull, Coot, Gadwall, Great Black-backed Gull, Herring Gull, Little Grebe, Mallard, Mute Swan, Pochard, Scaup, Shelduck, Teal and Tufted Duck. The four gull species accounted for 27.9% (249 registrations) of the total open water registrations, and a single waterfowl species, Coot, accounted for 43.7% (390 registrations). With the exception of Mallard, all wildfowl species were recorded exclusively in this habitat.

HEDGEROWS

In order to illustrate the importance of hedgerows to wintering birds, bird numbers/km hedgerow/visit were calcuted for all 87 hedgerows (Figure. 10) within the survey area. Results are given in Table 9. Differences in the densities of wintering birds supported by each hedgerow could be associated with either hedgerow structure itself or with the habitats on each side of the hedgerow. Table 10 presents a list of hedgerows, ranked in accordance with the density of winter birds each supported, accompanied by hedgerow characteristics. Although there is a tendency for taller, thicker hedges with hedgerow trees to support more birds, this correlation is less obvious in winter than was the case for breeding birds. Given the greater mobility, and flocking behaviour, of birds during winter months, it is perhaps not surprising that some low, thin and trimmed hedges were placed in the upper half of the density (birds/km/visit) rankings. For example, hedgerow 81, despite its low, thin and gapped characteristics, was ranked third, largely due to its use by Starlings and corvids attracted by the presence of both adjacent permanent grassland and the nearby refuse tip.

Table 11 links hedgerows to surrounding habitat and illustrates the importance of the hedgerows to each habtiat type. Considering the density (birds/km/visit) of birds in individual hedgerows with regard to adjacent habitats, it is clear that hedgerows adjacent to permanent grassland generally supported more birds than did hedgerows bordering only ley grassland or arable land.

TABLE 9. Hedgerows of the Killingholme area and the winter birds they support.

Hedge Number	Length (m)	Winter Bird Spp.	No of Regist.	Density (birds/ha/visit)
1	325	12	98	30.2
2	150	11	50	33.3
3	200	4	15	7.5
4	100	7	21	21.0
5	275	7	30	10.9
6	500	6	20	4.0
7	550	7	19	3.6
8	375	7	15	4.0
9	250	0	0	0
10	150	4	6	4.0
11	225	2	3	1.3
12	225	3	4	1.8
13	175	4	12	6.8
14	125	4	11	8.8
15	50	0	0	0
16	250	8	41	16.4
17	350	13	51	14.6
18	150	3	3	2.0
19	100	0	0	0
20	525	7	25	4.7
21	175	9	28	16.0
22	225	4	13	5.8
23	375	1	1	0.3
24	60	9	27	4.5
25	250	0	0	0
26	275	4	12	4.8
27	150	5	10	6.7
28	150	4	4	2.7
29	150	7	13	8.7
30	1000	13	101	10.1
31	250	11	40	16.0
32	225	11	39	17.3
33	175	11	99	56.5
34	175	1	3	1.7
35	275	5	15	5.5
36	150	4	6	4.0
37	200	1	2	1.0
38	175	4	25	14.3
39	250	1	1	0.4
40	600	1	1	0.2
41	350	6	21	6.0
42	475	3	5	1.0
43	275	13	246	89.5
44	175	8	68	38.8
45	900	6	17	1.9
46	350	0	0	0
47	150	1	1	0.6
48	250	7	17	6.8
49	225	3	5	2.8
50	200	1	1	0.5
51	75	1	10	13.3
52	150	0	0	0

TABLE 9 (cont'd)

53	350	2	2	0.6
54	700	6	19	2.7
55	325	9	29	8.9
56	225	0	0	0
57	350	0	0	0
58	150	2	3	2.0
59	325	11	44	13.6
60	200	3	4	2.0
61	250	4	37	14.8
62	350	3	5	1.4
63	275	2	5	1.8
64	350	5	16	5.6
65	375	9	29	7.7
66	250	2	8	3.2
67	200	2	8	9.5
68	425	5	46	10.8
69	75	2	3	4.0
70	275	12	42	15.3
71	1000	11	60	6.0
72	275	4	18	6.6
73	300	11	45	15.0
74	2050	12	41	2.0
75	525	7	19	3.6
76	600	11	56	9.3
77	175	10	76	43.4
78	175	8	46	26.3
79	325	6	17	5.2
80	350	8	20	5.7
81	300	7	167	55.6
82	600	3	18	3.0
83	275	7	24	8.7
84	1400	12	69	4.9
85	350	6	23	6.6
86	350	5	12	3.4
87	125	6	20	16.0

HEDGEROW DENSITY RANKINGS

43,33,81,77,44,2,1,78,4,32,16,31/21/87,70,73,61,17,38,59,51,
5,68,30,67,76,55,14,29/83,65,3,13/48,27,72/85,41/71,22,80,64,
35,79,84,26,20,24,10/36/69/8/6,7/75,86,66,82,28/54,49,18/5/60
/74,45,12/63,34,62,11,37/42,47/53,50,39,23,40,9/15/19/25/46
/52/56/57.

HEDGEROWS DIVERSITY RANKINGS

17/30/43,1/70/74/84,2/31/32/33/59/71/73/76.77,21/24/55/65,16
/44/78/80,4/5/7/8/20/29/48/75/81/83,6/41/45/54/79/85/87,27/35
/64/67/68/86,3/10/13/14/22/26/28/36/38/61/72,12/18/42/49/60/62/
82,11/53/58/63/66/69,23/34/37/39/40/47/50/51,9/15/19/25/46/52
/56/57.

TABLE 10. Hedgerow winter bird numbers at Killingholme in relation to hedgerow characteristics.

Hedge number	Total winter registrations	Hedgerow trees	Height 2m+	Height < 2m	Spread 2m+	Spread < 2m	Trimmed	Uncut or half cut	Minimum number of woody plant species	Gaps > 50%	Wet ditch
43	89.5		+			+		+	3		
33	56.5	+	+			+		+	4		
81	55.6	+		+		+	+		3	+	
77	43.4	+	+		+			+	3		+
44	38.8	+	+			+		+	4		
2	33.3	+	+			+		+	4		
1	30.2	+	+			+		+	5		
78	26.3		+		+			+	3		+
4	21.0		+			+		+	3		
32	17.3	+	+		+			+	4		
16	16.4	+	+			+		+	3		
31	16.0	+	+		+			+	6		
21	16.0	+	+		+			+	3		
87	16.0	+	+		+			+	4		
70	15.3		+			+		+	3		
73	15.0		+			+		+	3	+	
61	14.8		+			+		+	2		+
17	14.6	+	+		+			+	6		+
38	14.3		+			+		+	4		
59	13.6		+		+			+	4		
51	13.3			+		+	+		3		
5	10.9			+		+	+		3		
68	10.8		+			+			3	+	+
30	10.1		+			+		+	4		
67	9.5		+			+		+	3	+	+
76	9.3		+		+			+	3		+
55	8.9		+			+	+		3		+
14	8.8	+	+			+		+	3		
29	8.7		+			+		+	2		
83	8.7		+			+	+		3		
65	7.7		+			+		+	3	+	
3	7.5		+			+			4		
13	6.8	+		+		+	+		3		
48	6.8		+				+	+	2		+
27	6.7			+		+	+		3		+
72	6.6		+			+		+	2		
85	6.6		+			+		+	3		
41	6.0			+		+		+	3		
71	6.0		+			+		+	3		
22	5.8		+			+		+	3		
80	5.7		+			+		+	3		

TABLE 10 cont'd

64	5.6			+		+		+		2		
30	5.5			+		+	+			3		
79	5.2		+			+		+		3		
84	4.9		+			+		+		4		
26	4.8			+		+	+			2		
20	4.7			+		+	+			3		+
24	4.5		+			+		+		3		+
10	4.0			+		+	+			2	+	
36	4.0	+	+			+		+		4		
69	4.0		+			+		+		2		
8	4.0	+	+			+	+			4		
6	4.0			+		+	+			3		
7	3.6			+		+	+			3		
75	3.6			+		+		+	+	2	+	
86	3.4		+			+		+		2		
66	3.2		+			+		+		3		
82	3.0			+		+	+			2		
28	2.7		+			+		+		3		
54	2.7			+		+	+			2		
49	2.2			+		+	+			2		
18	2.0			+		+	+			3		
58	2.0			+		+	+			3	+	
60	2.0			+		+	+			2		+
74	2.0		+			+		+		3		
45	1.9			+			+	+		4		
12	1.8			+		+	+			5		+
63	1.8			+		+		+		2	+	+
34	1.7			+		+	+			4		
62	1.4			+		+		+		2		+
11	1.3			+		+	+			3	+	+
37	1.0	+	+			+		+		4		
42	1.0	+		+			+	+		3		+
47	0.6		+			+	+			2		
53	0.6			+		+	+			3		
50	0.5			+		+	+			2		
39	0.4			+		+	+			3		
23	0.3			+		+	+			2		
40	0.2			+		+	+			2		
9	0.0			+		+				3		
15	0.0		+			+		+		2		
19	0.0	+	+			+		+		3	+	
25	0.0			+		+	+			3		
46	0.0		+			+	+			3		
52	0.0			+		+	+			3	+	
56	0.0			+		+	+			3		
57	0.0		+			+				3		

5.6 Historical records of wintering terrestrial birds in the survey area

The only useful terrestrial winter records from previous years that concern the survey area relate to the Killingholme Haven Pits LNR. Since the establishment of this local nature reserve, the amount and quality of bird data collected by L&SHTNC have varied along with the changes in reserve management personnel. In an attempt to provide as full a picture of the site's ornithological status as possible, data from the L&SHTNC files, Lincolnshire Bird Reports and a private study have been combined below.

During autumn 1977 and spring 1978, a private wader ringing programme was conducted on the pits area. No detailed records of numbers of birds present in autumn 1977 were kept, but regular counts were made in April 1978. A report to the CEGB on this study (Pepler 1978) stated that the Pits supported a population of up to 750 waders at times during autumn passage. The main species involved was Dunlin, with up to 650 birds using the area as both a feeding and high-tide roosting site. Peak numbers of Dunlin were present in late September, steadily declining subsequently until the water level was allowed to rise in late November, making the area no longer suitable for waders. Redshank numbers reached 100 during spring passage, with "slightly lower" numbers during the autumn.

Although total numbers of waders other than Dunlin and Redshank normally amounted to less than 50 birds, these included a further 19 species in autumn: Common Sandpiper, Curlew, Curlew Sandpiper, Green Sandpiper, Greenshank, Grey Plover, Knot, Lapwing, Little Ringed Plover, Little Stint, Oystercatcher, Ringed Plover, Ruff, Sanderling, Snipe, Spotted Redshank, Turnstone, Whimbrel and Wood Sandpiper. Of these Culew Sandpiper, Little Stint, Spotted Redshank and Wood

Sandpiper are notably uncommon nationally as migrants. The site is therefore of local importance for waders on passage.

Fifteen counts were made between 7 and 30 April 1978, during which time 15 species of wader were observed. Again, the bulk of the birds present were Dunlin and Redshank, with maxima of 239 and 100 birds respectively. Ruff peaked at 28 birds, with the remaining species all recorded occasionally in single figure numbers. These latter included Avocet and Purple Sandpiper, both nationally uncommon migrants not recorded from the Pits in autumn.

An L&SHTNC report for the Killingholme Haven Pits area, covering the years 1968-1979, recorded six species of wildfowl (Goldeneye, Mallard, Pochard, Shelduck, Tufted Duck and Wigeon) as regular for all or part of the winter period, with another three species (Gadwall, Pintail and Teal) regular visitors during spring and autumn passage. Another eight wildfowl species were recorded as irregular, scarce or rare visitors to the site: Bewick's Swan, Brent Goose, Canada Goose, Common Scoter, Eider, Goosander, Greylag Goose and Red-breasted Merganser. The report's statements on the status of waders confirm the impression given by Pepler's study (see above) but, as might be expected given that it covers a ten-year period, it lists an even larger total (28) of wader species. Table 12 shows autumn maxima at the site for the most recent five year period, 1983-87, compiled from Lincolnshire Bird Reports and data supplied by the L&SHTNC honarary reserve manager.

TABLE 11. The relationship between hedgerows at Killingholme, their surrounding habitats and the winter bird community.

	Arable	Temporary Ley	Permanent Grassland	Wetland	Industrial Disturbed
Area (ha)	280.6	9.8	82.9	12.0	38.6
Total Registrations	3285	114	3022	242	500
Hedgerow Registrations	787	93	1179	187	50
% of Registrations in Hedgerows	23.9	81.6	39.0	77.3	10.0
Density (birds/ha /visit)	1.2	1.7	3.6	2.0	1.3
Total No. of species	42	24	42	21	27
No. of species outside Hedgerows	37	7	28	8	13
No. of species in Hedgerows	24	19	30	14	16
% species outside Hedgerows	88.1	29.2	66.6	38.0	52.0
% species in Hedgerows	57.1	79.1	71.4	66.6	68.0

HEDGE CODE NUMBERs*

Arable Hedgerows

(7),(8),9,10,11,12,15,16,(17),18,20,(21),(22),23,24,26,27,28,
(29),30,32,34,(36),39,40,(41),42,(43),46,47,48,49,50,51,52,53,
57,58,59,60,61,(63),(64),(65),66,67,68,69,(71),(74),(82),(85),
(86).

Ley Grassland Hedgerows

(21),(22),38,(41),(55),(64),65.

Permanent Grassland Hedgerows

1,2,3,4,5,6,(7),(8),14,(17),19,(29),(30),31,33,35,(36),(43),
44,45,54,(55),62,70,(71),(72),73,80,81,(82),83,84,(85),(86),87.

Wetland Hedgerows

76,77,78,(79).

Industrial/Disturbed Ground Hedgerows

(63),(72),(74),75,(79),(80).

* Bracketed numbers refer to hedgerows bordering more than one habitat type, for which total registration were divided between relevant habitats.

TABLE 12 AUTUMN PASSAGE MAXIMA OF WADERS (JULY-OCTOBER) DURING THE FIVE YEAR PERIOD 1983-87

	1983	1984	1985	1986	1987	83-87 Av.
Oystercatcher	?	?	?	5	0	2
Turnstone	?	?	?	2	0	1
Lapwing	?	?	?	300	10	155
Ringed Plover	?	?	?	150	4	77
Little Ringed Plover	?	?	?	0	1	<1
Snipe	?	?	?	15	9	12
Curlew	?	?	?	2	1	1
Whimbrel	?	?	?	1	2	1
Black-tailed Godwit	3	7	1	1	0	2
Green Sandpiper	?	?	?	2	5	3
Wood Sandpiper	1	0	0	0	1	<1
Common Sandpiper	?	?	?	2	12	7
Redshank	?	?	?	100	36	68
Spotted Redshank	11	9	10	5	2	7
Greenshank	15	12	?	1	5	8
Little Stint	3	2	0	0	0	1
Dunlin	?	?	?	40	12	26
Curlew Sandpiper	8	3	20	1	5	7
Sanderling	0	0	0	1	0	<1
Ruff	31	30	?	6	2	17

5.7 Conclusions

A total of 69 species were recorded from the terrestrial areas of the survey area, implying ornithological importance at a county level. Eleven species have restricted national winter distributions, of which five (Bearded Tit, Bittern, Long-eared Owl, Snow Bunting and Water Rail) are of considerable conservation importance. Bearded Tit, Bittern and Water Rail are all wetland species confined within the survey area to Killingholme Haven Pits, and the Long-eared Owl roosted in the scrub within the Killingholme Haven Pits LNR, indicating the high ornithological importance of this area.

The relative importance of nine habitats (arable, permanent grassland, ley grassland, industrial and disturbed ground, homestead and stockyard, woodland, scrub, wetland and open water) was evaluated in terms of densities of birds supported and diversity of species present. The availability of artificially high food supplies within the homestead and stockyard habitat attracted comparatively high numbers of small seed-eating passerines to this small habitat (0.2 ha), leading to a higher density estimate (birds/ha/visit) than for the other habitats. Of the remaining eight habitats, scrub appeared most important, followed by open water, woodland, permanent grassland, wetland (including adjacent hedgerows) and ley grassland, with industrial/disturbed ground and arable areas being of least ornithological interest.

The large areas of permanent grassland and arable farmland, including their associated hedgerows, held the most species, followed by scrub, woodland, industrial/disturbed ground, ley grassland wetland and open water, with homestead and stockyard supporting the lowest diversity of species. Scrubland areas were ornithologically rich, with scrub adjacent to permanent pasture proving particularly attractive to thrushes.

Historical records concerning the Killingholme Haven Pits LNR indicate that up to 1979 the area supported many waders on both autumn and spring passage. The commoner passage species were Dunlin and Redshank which occured in quite large numbers but many of the more uncommon species were also represented in low numbers. Recent information is not available for the area, however water levels are now high throughout the year due to the disrepair of the sluice so it is unlikely that many passage waders find the area suitable in its present condition.

6.THE VALUE OF THE KILLINGHOLME INTER-TIDAL HABITATS FOR WINTERING WATERFOWL

6.1 Evaluation of the conservation importance of wetlands for birds

The criteria used to assess the importance of a site for waterfowl (waders and wildfowl) are based on the numbers of birds present. A site is regarded as internationally important if it regularly supports 1% of the individuals in a biogeographical population of a species or sub-species of waterfowl (Atkinson-Willes et al. 1982). In addition any site which regularly supports more than 20,000 waterfowl qualifies as internationally important by virtue of absolute numbers (Salmon et al. 1987). In Britain, a wetland is regarded as nationally important if it regularly holds at least 1% of the estimated British population of any species or sub-species of wader or wildfowl. Prater (1981) further suggested that sites holding 10,000 or more waders of all species should qualify as nationally important in terms of total numbers. In this context "regularly" normally means that the averaged peak count for the five most recent years exceeds the appropriate qualifying level. Qualifying levels for wildfowl and wader species for international and national categories of importance are given in Appendix 4.

6.2 The status of intertidal habitats in the survey area

None of the intertidal habitat of the survey area is protected by statutory designations, and no detailed ornithological studies have previously been carried out on it. Some 80-90m of mudflats are exposed at normal low tides along most of the 1.9km coastal strip of the survey area, widening to some 200 m at the extreme southern end. A small (c. 5.5 ha) saltmarsh is located at the north end, adjacent to Killingholme Haven. Invertebrate life appears to be sparse (Shimwell and Harrand 1988), and as a result the importance of the mudflats as feeding grounds for waders and wildfowl might be expected to be low. The nearest site on the south bank of the estuary where detailed ornithological censusing has been performed is Pyewipe mudflats. These are situated some 6 km to the south of Killingholme and stretch for a further 6 km between the southern end of the Immingham Docks estate and the west wall of Grimsby Royal Dock. This area is designated as an SSSI and was studied between January 1981 and March 1982 (Shepherd *et al.* 1982) and again in December 1984 and January 1985 (Shepherd 1985). The major 1981-2 survey revealed the site to hold large populations of Dunlin, Redshank, Curlew and Shelduck. Up to date overviews of the Humber estuarine environment are contained in Jones (1988), Edwards (1988) and the Shell report "The Humber Estuary: Environmental Background".

6.3 Sources of data for the present study

This analysis uses information collected by the Birds of Estuaries Enquiry (BoEE), a national programme started by the Briish Trust for Ornithology in 1969 to monitor population trends in estuarine birds and the 1987/88 winter survey of the Killingholme area.

The BoEE involves simultaneous monthly counts of waders and wildfowl made on spring tides around the entire British coastline. Counts are made when most birds are congregated at high tide roosts, and inferences on the use of areas by feeding birds cannot be drawn. The BoEE splits the humber into 32 counting sectors (Figure 14.) of which Killingholme is one. A more complete description of the BoEE is contained in Salmon et al (1987).

The importance of the Killingholme area outside of the high tide period is largely unknown, so the winter survey was designed to fill this gap by providing waterfowl count data for Killingholme for all stages of the tidal cycle. It should be noted that the BoEE Killingholme counting sector includes the Killingholme Haven Pits LNR so this area is covered here, despite its previous treatment in the terrestrial survey section. Between November 1987 and March 1988 waterfowl counts were made of the inter-tidal parts of the survey area and of Killingholme Pits (Appendix 10.7). All waterfowl species recorded were mapped and the results are presented in Appendix 10.3 and Section 6.5.

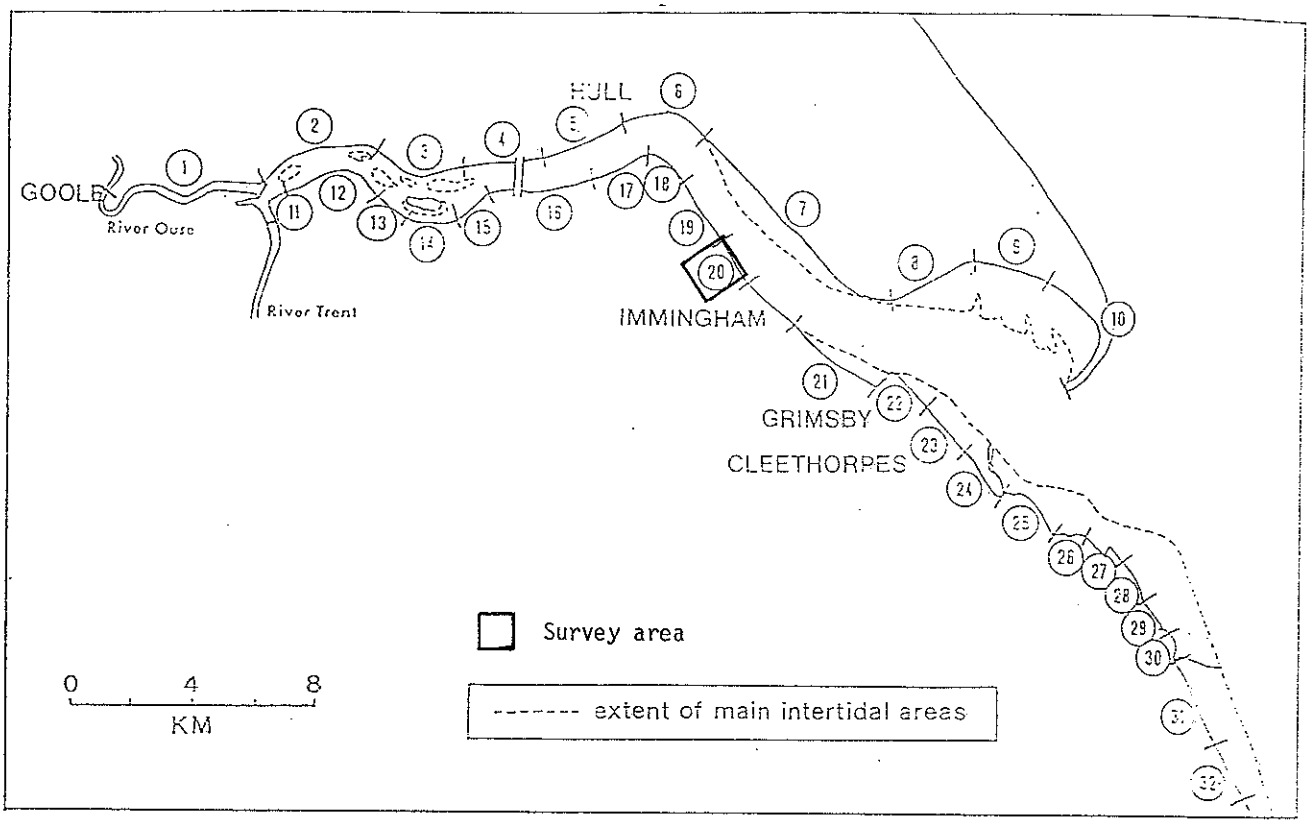

Figure 15. BoEE counting sectors into which the Humber estuary is split.

1. Goole - Faxfleet
2. Faxfleet - Brough Haven
3. Brough Haven - North Ferriby
4. North Ferriby - Hessle Haven
5. Hessel Haven - River Hull
6. River Hull - Paull
7. Paull - Stone Creek
8. Stone Creek - Patrington Haven
9. Patrington Haven - Easington
10. Easington - Spurn Point
11. Alkborough Flats
12. Whitton - Winteringham
13. Winteringham Haven and W. end Read's Island
14. Read's Island (south and east)
15. South Ferriby - Chowder Ness
16. Barton - New Holland
17. New Holland - Goxhill
18. Goxhill Marsh
19. Killingholme
20. Pyewipe - Grimsby Docks
21. Grimsby Docks - North Clee
22. Cleethorpes
23. Humberston Fitties - Tetney Haven
24. Tetney Haven - Horseshoe Point
25. Horseshoe Point - Grainthorpe Haven
26. Grainthorpe Haven - Somercotes Haven
27. Somercotes Haven - Coastguard Station, Donna Nook
28. Coastguard Station - Merriken's Pullover
29. Merriken's Pullover - Sea Lan, Saltfleet
30. Sea Lane, Saltfleet - Saltfleet Haven
31. Saltfleetby - Theddlethorpe NNR, north
32. Saltfleetby - Theddlethorpe NNR, south

6.4 The importance of the Humber Estuary to wintering waterfowl

Recent average peak winter counts for the Humber Estuary reveal that it holds just over 83,000 wintering waders and 15,500 wildfowl (Salmon et al. 1987). This combined total of just under 100,000 waterfowl far exceeds the current criterion of 20,000 required for a wetland site to be recognised as of international importance in terms of total numbers of birds regularly using it. Indeed, under the separate total numbers criteria previously in operation for waders (20,000) and wildfowl (10,000), the Humber ranked as of international importance in terms of both. Overall, the Humber is one of top five estuarine sites for wintering waders in the United Kingdom and ranks among the top 25 sites, both coastal and inland, for wildfowl (Salmon et al. 1987). It has been identified by the Nature Conservancy Council as eligible for designation under the Ramsar Convention and as a Special Protection Area under the EEC Directive.

Considered at the species level, four species of wader are known to winter regularly in internationally important numbers (Dunlin, Knot, Redshank and Sanderling) and an additional six in nationally important numbers (Bar-tailed Godwit, Curlew, Golden Plover, Grey Plover, Oystercatcher, Ringed Plover) (Table 13). Because of the Humber's size and complexity, notably its very extensive saltmarsh areas, obtaining complete coverage of the waders for the Birds of Estuaries Enquiry has traditionally been difficult, and the rankings given above should be viewed as conservative. In particular, it should be noted that the recorded Ringed Plover and Grey Plover populations fall only slightly below their respective levels of international importance. Turnstone numbers on the Humber fall only just short of their qualifying levels for both national and international importance which are very similar. Based on data obtained over the past five years, the Humber is the most important estuarine site in the United Kingdom for wintering Golden Plover, the second most important for

wintering Sanderling, and the third most important for wintering Knot (Salmon et al. 1987).

It has recently become apparent that the Humber is also a site of exceptional importance for Sanderling migrating through Britain in spring en route to their arctic breeding grounds. At this time of year, this species tends to occur in high numbers at a very few sites, almost all of which are in north-west England. However, whereas Prater (1981) considered that on the east coast only the Wash had an important spring passage, Goodall (1984) shows that peaks of over 2,000 Sanderling may occur on the Humber in May.

Table 14 indicates that among wildfowl, two species winter regularly in internationally important numbers (Dark-bellied Brent Geese and Shelduck) and another three species in nationally important numbers (Mallard, Teal and Wigeon). Including the months of September and October in the assessment, as is normal for wildfowl (Salmon et al. 1987), promotes Teal to international importance (average peak count of 2514 birds) but leaves the national and international rankings of all other species unaltered. Based on the past five years' data, the Humber is the most important site in the United Kingdom for Mallard (Salmon et al. 1987).

TABLE 13 The national/international importance of the Humber for wintering waders from 1982/83-1986/87

	AVERAGE PEAK COUNT (NOV-MAR)	% OF BRITISH POPULATION	% OF EUROPEAN POPULATION
Oystercatcher	3507	1.3	0.5
Lapwing	4727	0.5	0.2
Ringed Plover	372	1.6	0.9
Grey Plover	601	2.9	0.8
Golden Plover	5003	2.5	0.5
Turnstone	388	0.9	0.8
Common Snipe	200	-9.0	0.0
Jack Snipe	1	-9.0	-9.0
Curlew	1466	1.6	0.5
Black-tailed Godwit	6	0.1	0.0
Bar-tailed Godwit	1137	1.9	0.2
Common Sandpiper	0	0.0	0.0
Redshank	2806	3.7	1.4
Spotted Redshank	1	0.5	0.0
Knot	29185	13.3	8.3
Dunlin	22929	5.3	1.1
Sanderling	449	3.2	3.0
Ruff	15	1.0	0.0

NB. A % value of -9 indicates no qualifying criteria available for this species.
Where 1% of the British wintering population is les than 50 birds, 50 is used as a minimum qualifying level for national importance.

TABLE 14 NATIONAL INTERNATIONAL IMPORTANCE OF HUMBER FOR WINTERING WILDFOWL 1983/84 - 1986/87

	(Nov-Mar) Av. peak	% British pop.	% European pop.
Mallard	5766	1.2	0.3
Teal	1235	1.2	0.6
Wigeon	3526	1.8	0.7
Shelduck	3226	4.3	2.6
Dark-bellied Brent	2422	2.7	1.9
Pintail	99	0.4	0.1
Goldeneye	65	0.4	0.0
Scaup	44	1.1	0.0
Pinkfoot	413	0.4	0.4
Gadwall	6	0.1	0.0
Shoveler	15	0.2	0.0
Pochard	194	0.3	0.0
Tufted Duck	134	0.2	0.0
Eider	45	0.1	0.0
Goosander	25	0.5	0.0
Common Scoter	45	0.1	0.0
Mute Swan	50	0.3	0.0
Whooper Swan	9	0.2	0.1
Canada Goose	31	-9.0	-9.0
Greylag	28	0.0	0.0
Coot	226	-9.0	-9.0
Great-crested Grebe	6	-9.0	-9.0

Oystercatcher, Grey Plover, Golden Plover, Golden Plover, Black tailed godwit, Bar-tailed godwit, Knot, Sanderling and Ruff were all regularly recorded during BoEE counts on the estuary but were not represented at Killingholme during 1982-87.

NB. A % value of -9 indicates no qualifying criteria available for this species.
Where 1% of the British wintering population is les than 50 birds, 50 is used as a minimum qualifying level for national importance.

6.5 The importance of the Killingholme sector of the Humber Estuary

BoEE COUNTS

The intertidal and adjacent wetland habitats encompassed by the survey area form the Killingholme sector, one of 28 BoEE counting sectors making up the Humber Estuary site. In the context of the Humber as a whole, the Killingholme sector is relatively unimportant, supporting on average well under 1% of the total wintering waterfowl population. Considering all species attaining international or national importance on the Humber, a maximum of only 2.7% of any one of them (Ringed Plover) is on average present in the Killingholme sector (Table 15). The only species for which Killingholme supports 10% or more of the recorded Humber totals are Mute Swan and Snipe, and for both of these it is probable that the great majority of individuals recorded were in fact present on the Killingholme Pits LNR. Average and peak monthly counts of all waterfowl species using the Killingholme sector in winter are shown in Table 16. Oystercatcher, Grey Plover, Golden Plover, Golden Plover, Black tailed Godwit, Bar-tailed Godwit, Knot, Sanderling and Ruff were all regularly recorded during BoEE counts on the estuary but were not represented at Killingholme during 1982-87.

Table 15. The proportion of the Humber wintering watefowl populations recorded at Killingholme (1982/83 - 1986/87)

	Av. peak count at Killingholme	% of total Humber count
Wildfowl		
Mallard	3	<1%
Teal	4	<1%
Shoveler	1	6.6
Pochard	2	1.0
Goldeneye	<1	<1%
Shelduck	12	<1%
Mute Swan	25	50.0
Waders		
Lapwing	79	1.7%
Ringed Plover	10	2.7%
Turnstone	<1	<1%
Snipe	20	10.0
Curlew	3	<1%
Redshank	28	1.0%
Dunlin	98	<1%

Oystercatcher, Grey Plover, Golden Plover, Golden Plover, Black tailed godwit, Bar-tailed godwit, Knot, Sanderling and Ruff were all regularly recorded during BoEE counts on the estuary but were not represented at Killingholme during 1982-87.

Table 16 Average and peak monthly counts of waterfowl at Killingholme over the five year period July 1982 - June 1987.

	NOVEMBER		DECEMBER		JANUARY		FEBRUARY		MARCH	
	Average	Peak	Average	Peak	Average	Peak	Average	Peak	Average	Peak
WILDFOWL										
Mallard	4	11	0	0	1	3	3	7	3	
Teal	3	6	2	5	11	23	1	2	7	
Shoveler	0	0	0	0	2	5	1	2	0	
Pochard	0	0	2	5	0	0	0	0	5	
Goldeneye	0	0	0	0	0	0	<1	1	0	
Shelduck	6	14	1	4	4	5	2	3	30	
Mute Swan	26	47	23	47	13	22	3	3	8	
WADERS										
Lapwing	68	124	30	65	84	134	3	6	100	
Ringed Plover			8	25	3	9	2	5	15	
Turnstone			<1	1	0	0	0	0	0	
Snipe	25	60	0	0	25	60	1	1	1	
Curlew	1	3	0	0	3	9	1	3	1	
Redshank	25	43	10	23	19	24	31	56	31	
Dunlin	56	106	19	50	113	225	71	129	297	
NUMBER OF COUNTS	3		3		3		2		1	

THE 1987/88 WINTER SURVEY

Inter-tidal areas

Wildfowl

No use was made by wildfowl of the intertidal area, either at low or high tide, during the winter survey period, with the exception of a single record of two Shelducks feeding on the exposed mudflats on 29 January.

Waders

Only small numbers of eight wader species were recorded on the intertidal area during the course of the winter survey. The species involved were: Curlew, Dunlin, Jack Snipe, Lapwing, Redshank, Ringed Plover, Snipe and Turnstone. Of these, only Redshank and Turnstone were present on all visits. The summed peak counts of all wader species during the winter survey period amounted to only 213 birds. Peak counts for each species/visit are given in Table 17.

Killingholme Haven Pits LNR

Wildfowl

A total of ten species of wildfowl were recorded during the winter survey, as listed in the terrestrial survey chapter (page 65) . Only one of these species, Coot, was present on all visit dates. The summed totals of all wildfowl present per visit ranged between 39 and 87 birds. The summed peak counts of all wildfowl species during the winter survey period amounted to 130 birds.

Waders

Only one species of wader, Snipe, was recorded within the Pits LNR during the winter survey period. Numbers were low, ranging from 1 to 7 birds. Peak counts for each species/visit are given in Table 17.

TABLE 17. Waterfowl counts at Killingholme during the winter survey (Nov 1987 to March 1988).

Inter-tidal areas

Visit Number	1	2	3	4	5	6	7	8	9	10	11	12	PEAK
Curlew	10	9	8	7	5	11	0	4	2	4	3	4	11
Dunlin	7	7	9	58	10	9	0	59	50	5	35	15	59
Jack Snipe	0	0	0	0	0	0	0	0	0	0	0	1	1
Lapwing	46	0	11	23	0	31	5	0	0	4	0	0	0
Redshank	2	18	24	27	27	25	1	56	28	50	24	37	56
Ringed Plover	0	1	0	1	2	0	0	24	25	4	6	15	25
Shelduck	0	0	0	0	0	0	0	1	0	0	1	0	1
Snipe	0	0	0	0	0	0	0	1	0	0	1	0	1
Turnstone	4	3	3	3	3	3	12	5	9	2	4	5	12
TOTAL													213

Killingholme Haven Pits

Visit Number	1	2	3	4	5	6	7	8	9	10	PEAK
Coot	38	47	53	46	35	47	50	32	21	21	53
Gadwall	1	0	0	0	0	0	0	0	0	0	1
Little Grebe	1	1	0	1	1	1	1	0	1	2	2
Mallard	2	3	2	3	0	2	4	11	4	7	11
Mute Swan	5	4	2	2	0	2	2	7	3	1	7
Pochard	0	2	1	1	0	0	4	14	18	12	18
Scaup	0	0	1	0	0	0	1	1	0	0	1
Shelduck	0	0	0	0	0	1	6	6	2	2	6
Snipe	7	2	2	1	1	0	1	0	1	6	7
Teal	5	2	0	2	3	0	7	4	1	9	9
Tufted Duck	0	0	3	5	0	13	12	12	6	22	22
TOTAL											137

COMBINED TOTAL 350

7. CONCLUSIONS

The ornithological interest of the Killingholme survey area was assessed on a quantitative basis by using the Common Birds Census technique for breeding birds and a modification of the technique in the winter. The 51 breeding bird species implies ornithological importance at a county level (Fuller 1980). The relative importance of five defined habitats,(woodland, scrub, hedgerows, open fields and wetland) was evaluated in terms of the breeding bird species and numbers of territories present. In terms of breeding densities of territories supported, scrub was most important, followed by woodland; however only 22% of woodland within the survey area could be surveyed due to access restrictions, as opposed to 83% of scrub. Only one nationally rare breeding species, the Pochard, was recorded in the breeding bird survey; this was present on wetland, as was another nationally rare species known to have bred within the survey area since 1980, the Garganey. Areas of particular conservation importance for their bird fauna were, in particular, the wetland, scrub and surrounding hedgerows of Killingholme Haven Pits LNR, and also the hedgerows in the general area to the east of East Halton village. These are both also highlighted by Shimwell and Harrand (1988) among the areas they identified as of conservation importance on general ecological grounds. To the limited extent it could be surveyed, the woodland bird community appeared typical of the region.

During the 1987/88 winter, 11 species having limited national distribution were recorded from the terrestrial areas, of which five are of conservation importance. Four of these (Bearded Tit, Bittern, Long-eared Owl and Water Rail) were found exclusively in the wetland/open water habitat of Killingholme Haven Pits LNR. The fifth, Snow Bunting was recorded from the industrial/disturbed ground during the only harsh weather of the survey. In terms of the density of winter bird registrations, homestead/stockyard was the most important habitat,

as a result of the large numbers of seed-eating birds that fed there. However, the majority of seed-eating birds recorded were House Sparrows, a species of low conservation importance, so the habitat is certainly not as important ornithologically as appears from the density estimates alone. Of the other habitats, scrub had the highest density of winter bird registrations, followed by open water and wetland, while arable land and industrial/disturbed ground had the lowest densities. In contrast arable land and permanent pasture supported the most species-rich winter bird communities and homestead/stockyard was the least species-rich habitat. In total, 69 species of bird were recorded wintering in the terrestrial areas of the survey area, and 75 species were recorded from the entire survey area, both values implying ornithological importance at a county level (Fuller 1982).

The survey of the inter-tidal areas indicated that at no stage of the tide did they support large numbers of any waterfowl species. It can therefore be concluded that for both breeding and wintering birds Killingholme Haven Pits LNR is the most important part of the survey area and that the scrub areas of the survey area are also ornithologically important. The industrial/disturbed ground supported a number of ground feeding species in winter such as Yellowhammer, Meadow Pipit, Reed Bunting and Snow Bunting which is of considerable conservation importance. The numbers of all of the above mentioned species might be expected to increase in harsher winters so increasing the value of this habitat considerably.

8. ACKNOWLEDGEMENTS

We wish to thank the following people for their help in providing information, advice and support relevant to this report: S Crooks (Lincolnshire and South Humber Trust for Nature Conservation), Dr R J Fuller (British Trust for Ornithology), Dr S Hill (Central Electricity Generating Board), Mrs J Mewis (BTO), Dr M Mitchell (CEGB), Mrs E G Murray (BTO), Dr M Moser (BTO), Dr R Prys-Jones (BTO), A Robson (CEGB), D G Salmon (Wildfowl Trust) and J Walton (LSHTNC).

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10. APPENDICES

10.1 Terms of Reference for the Fawley baseline ornithological survey

1. Collate information on the breeding and overwintering bird populations within the preliminary survey area defined by the CEGB (see figure 2) by examination of published and unpublished material and consultation with local specialists.

2. On the basis of information gathered in the above exercise consult with the CEGB on the definition of the final survey area.

3. Carry out a breeding and overwintering bird census, as judged necessary and agreed with the CEGB, in the survey area using British Trust for Ornithology or agreed methods.

4. From 3 above, identify all bird species, their distribution within the survey area and provide a species list with an agreed indication of species abundance within each plant community.

5. From 3 and 4 above identify bird species and related areas of special interest, giving reasons and comment on their local, regional, national and international significance using criteria agreed with the CEGB.

6. Produce a fully illustated and referenced report in a format agreed with the CEGB.

10.2 BTO Common Birds Census Instructions

A copy of the British Trust for Ornithology's Common Birds Census instructions were inserted within the back cover of this report when it was issued.

10.3 SPECIES ACCOUNTS FROM THE 1987 BREEDING SURVEY

10.3.1 Introduction

The national beeding density estimates quoted below are taken from the most recent evaluation of the status of British breeding birds (Hudson and Marchant 1984). In that review, CBC data from 1982 were used to produce density estimates for the different habitats on census plots. Reliable figures could not be provided for species in which territory size was greater than plot size, so density estimates are only given below for the passerines (song-birds). The "Breeding Atlas" refers to the British Trust for Ornithology's Atlas of Breeding Birds in Britain and Ireland (Sharrock 1976) which charted the distribution of bird populations nationwide between 1968 and 1972. Figures quoted from this for the national population levels of species should be regarded as an indication of relative abundance, not a definitive total.

All population estimates given in the individual accounts are taken from Sharrock (1976) or Hudson and Marchant (1984) and are not referenced separately.

National wintering status is taken from The Winter Atlas (Lack 1986) which is also not referenced in the species accounts.

Migrant and vagrant species recorded during the course of the survey are described briefly.

KEY FOR BREEDING DISTRIBUTION FIGURES

1 Territory

2-3 Territories

>3 Territories

KEY FOR WINTER DISTRIBUTION FIGURES

<0.1 Birds/ha/visit per 200m square

0.1-0.4

0.5-0.9

>1.0

10 visits between mid November and mid March.

BAR-TAILED GODWIT

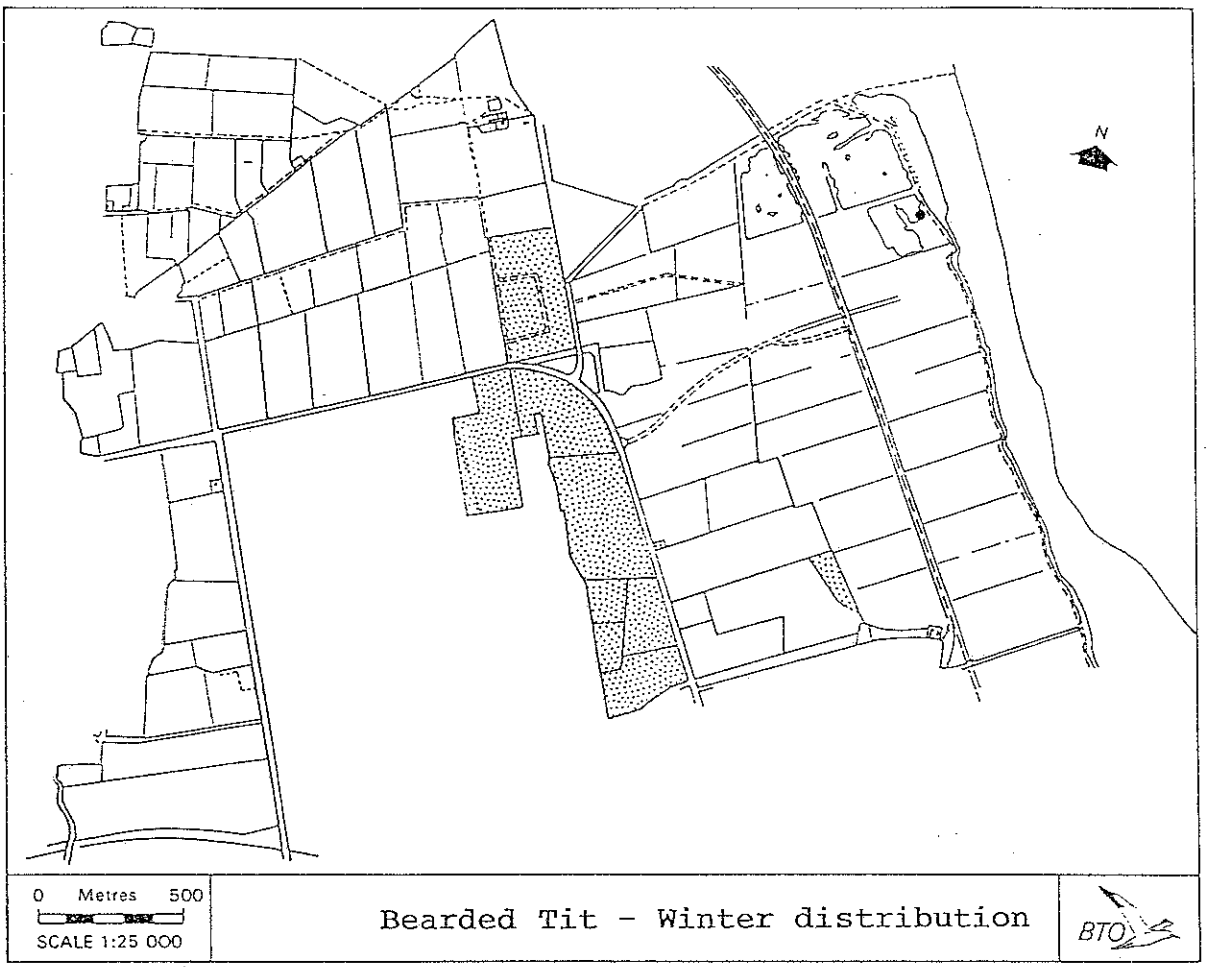
Is a winter visitor to Britain found commonly in most coastal areas. Bar-tailed Godwits prefer sandier areas of the inter-tidal zone where they feed on bivalves.

A single bird on the intertidal area in late April was the only record for the survey area and almost certainly represented a passage bird returning to breeding grounds in the high artic.

BEARDED TIT

Bearded Tits occur almost exclusively in reedbeds in both summer and winter, and their British winter distribution reflects this, with most of the population being in south-east England, particularly the coastal marshes of East Anglia, Kent and the south coast. The recent mid-winter population in Britain has been estimated as 3,000-5,000 birds. Numbers can be sharply reduced in prolonged periods of cold weather, but population recovery is fast. Post-breeding movements occur in September and October, leading to a more widely dispersed winter distribution.

The winter survey at Killingholme produced a single record of 2 Bearded Tits in the reedbed of the small pit within the Killingholme Haven Pits LNR, in March. These birds may have been part of the small population that breeds between Blacktoft Sands and Barrow Haven, in the extensive reedbeds of the inner Humber.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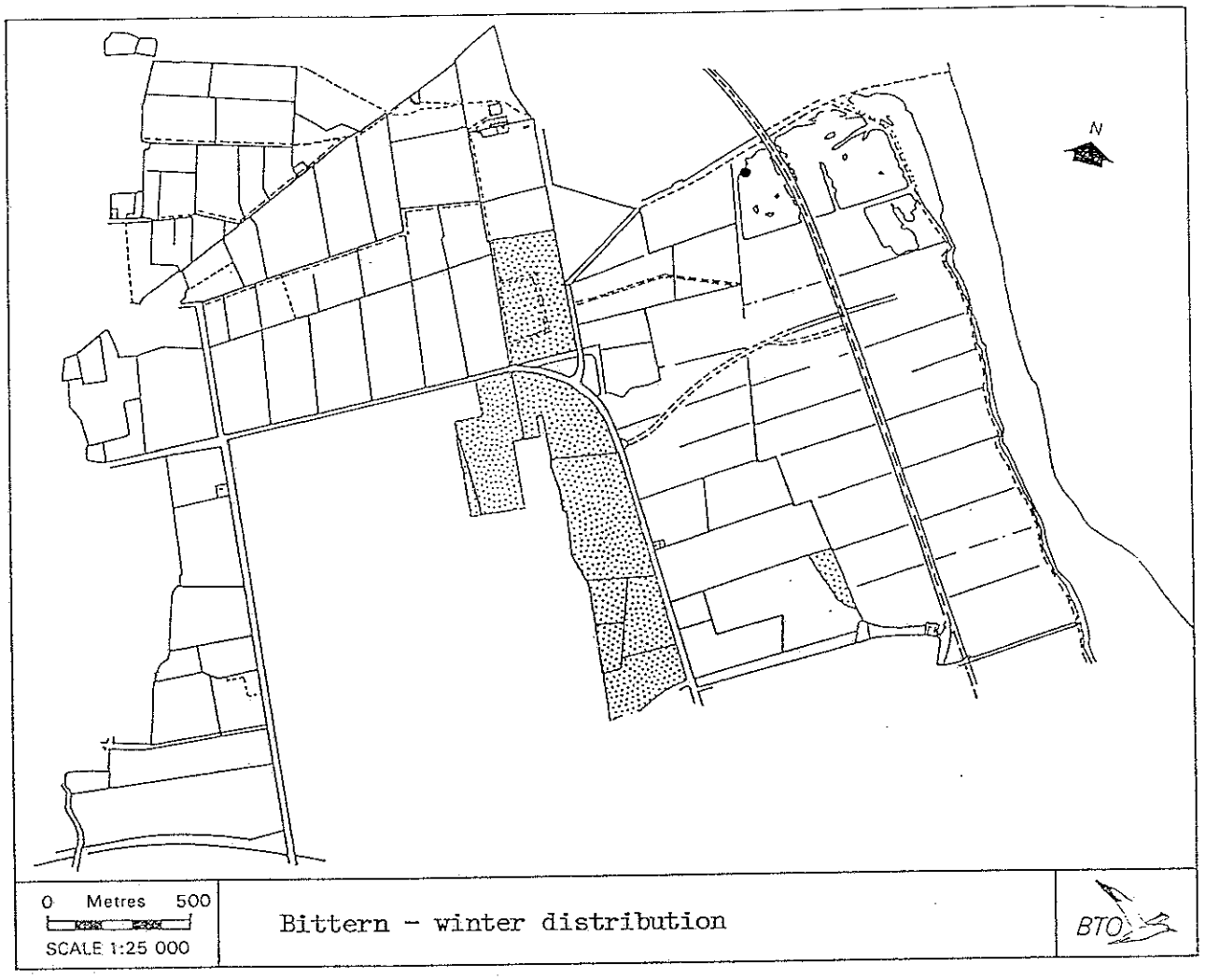
Bearded Tit - Winter distribution
BTO

Figure 16

BITTERN

Although a full census of Bitterns wintering in Britain has not been attempted, the total winter population is likely to be between 50 and 150 birds, depending on the severity of the weather (J.C. Day, in Lack 1986). Bibby (1981) showed that the bulk of the winter records came from south-east England. Fieldwork for the Winter Atlas confirmed this, but showed further concentrations on the Humber, the Severn and the coast of south Wales. Bibby suggested that most of these wintering Bitterns are immigrants from mainland Europe. The Bittern was lost as a breeding species on the south bank of the Humber in the late 1970's or early 1980's, although 'booming' birds were present in the breeding season until 1982.

A single bird was present in the Killingholme Haven pits LNR reedbeds in March 1988. This seems likely to have been a migrant stopping off at Killingholme before returning to mainland European breeding areas. A similar record occurred in March 1987, involving 2 birds at the same site (J. Walton, pers.comm.).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Bittern - winter distribution
BTO

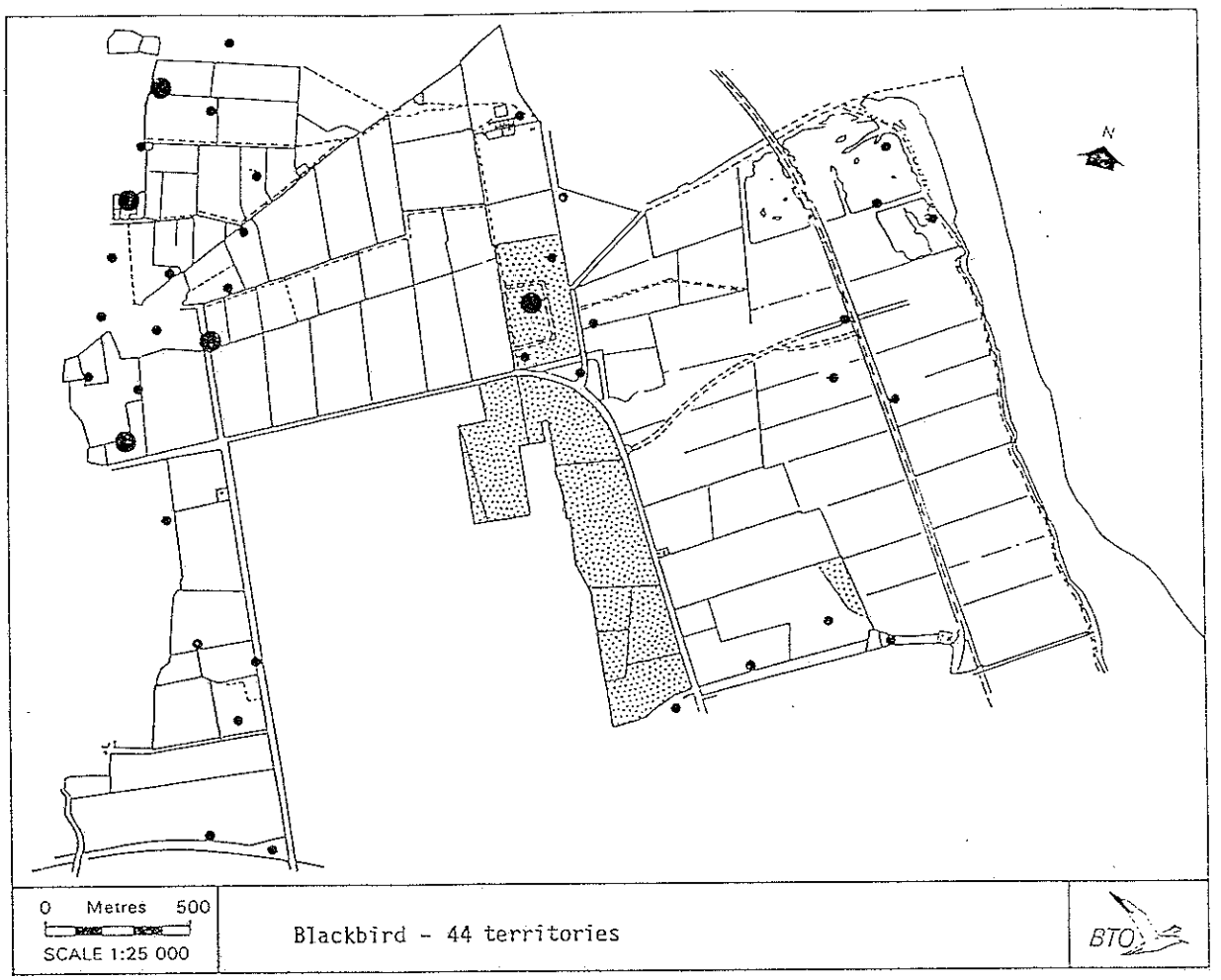
Figure 17

BLACKBIRD

Territories: 44

One of the commonest breeding birds in Britain, the Blackbird is found in a wide range of habitats, including farmland, woodland, hedgerows and suburban gardens. Densities vary from 22 pairs/square km on farmland to 53 in woodland, and the total British breeding population could be five million pairs. In winter, the Blackbirds from northern Britain tend to move into Ireland but most other British and Irish birds are resident. Northern European birds regularly winter in the British Isles and wander widely in loose flocks with other thrushes.

Blackbirds were widely distributed across the survey area in both summer and winter, with breeding concentrations in areas with mature hedges, scrub and woodland. In winter Blackbirds were recorded in all terrestrial habitat types, but the largest numbers were found in scrubland, particularly those areas with adjacent permanent grassland.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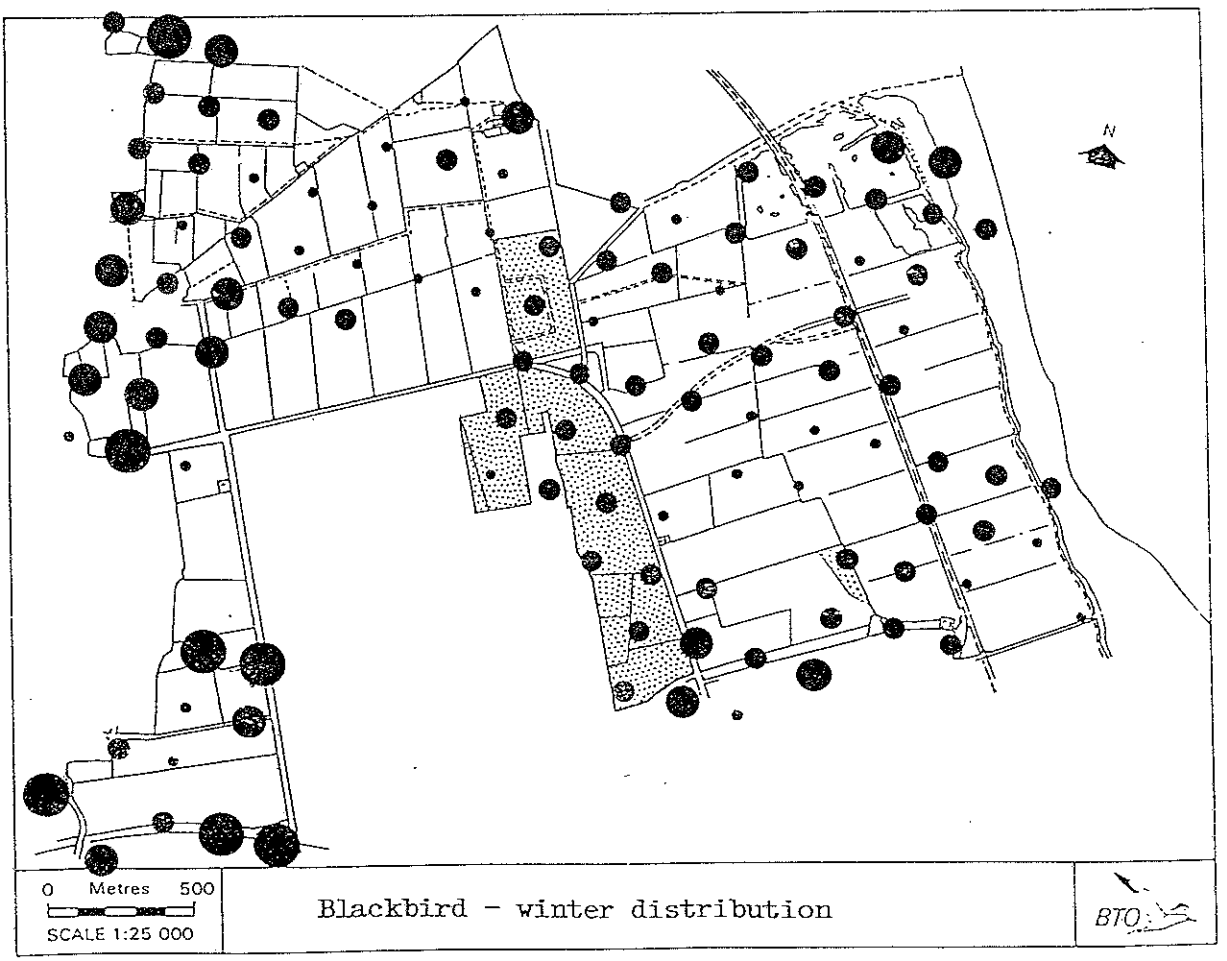
Blackbird - 44 territories
BTO

Figure 18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Blackbird - winter distribution
BTO

BLACKCAP

Territories: 8

A summer migrant that prefers mature deciduous or mixed woodland with a well developed shrub layer, but also nests in overgrown coppice, tall hedgerows, scrub and garden shrubberies. The British summer population is about 800,000 pairs, with densities of 18 pairs/square km in woodland. Small numbers are increasingly remaining over-winter.

At Killingholme, Blackcaps held territories in woodland and tall scrub only.

BLACK-HEADED GULL

Black-headed gulls winter widely over the south of the British Isles, and breed on all coasts. Recently, inland breeding has also become widespread in all areas of the British Isles apart from the south of England.

At Killingholme, Black-headed Gulls occurred in winter on arable and permanent grassland fields, as well as on the open water of Killingholme Haven Pits LNR. By far the largest concentrations occurred on fields west of Eastfield Road, as a result of the nearby public refuse tip. In summer, a few birds were often present on the industrial/disturbed ground, inter-tidal areas and the Killingholme Pits LNR, but no signs of breeding were seen.

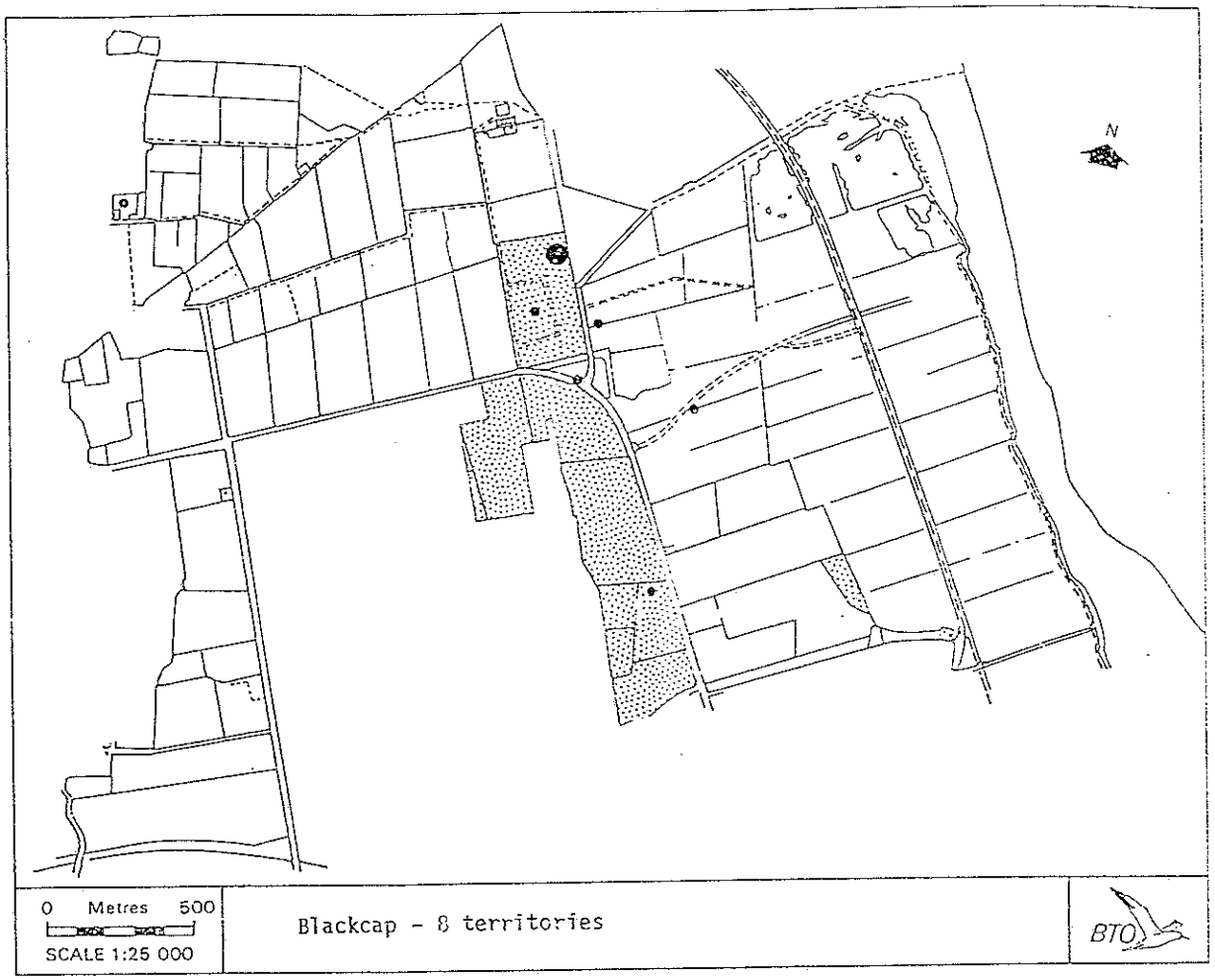


Figure 20

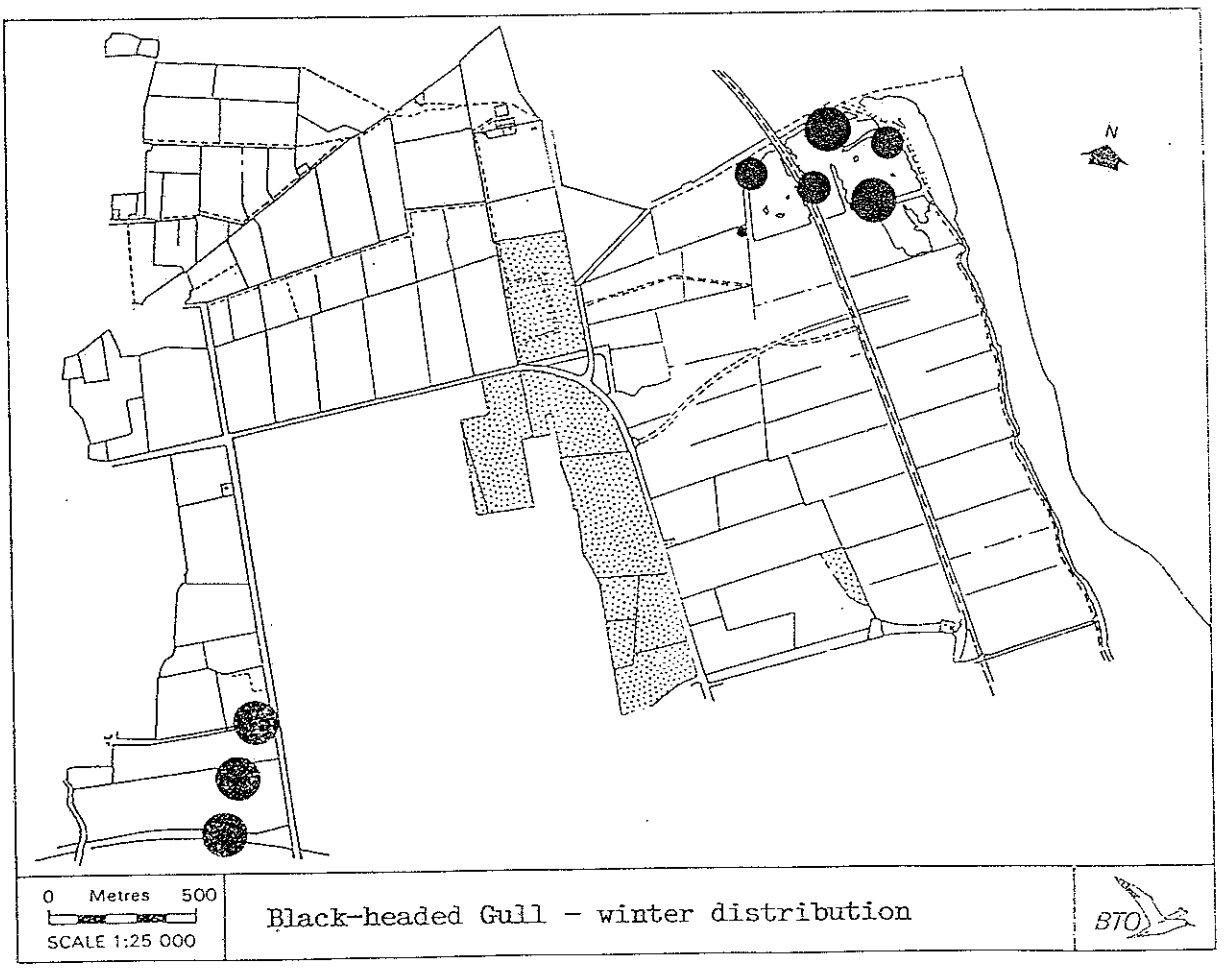
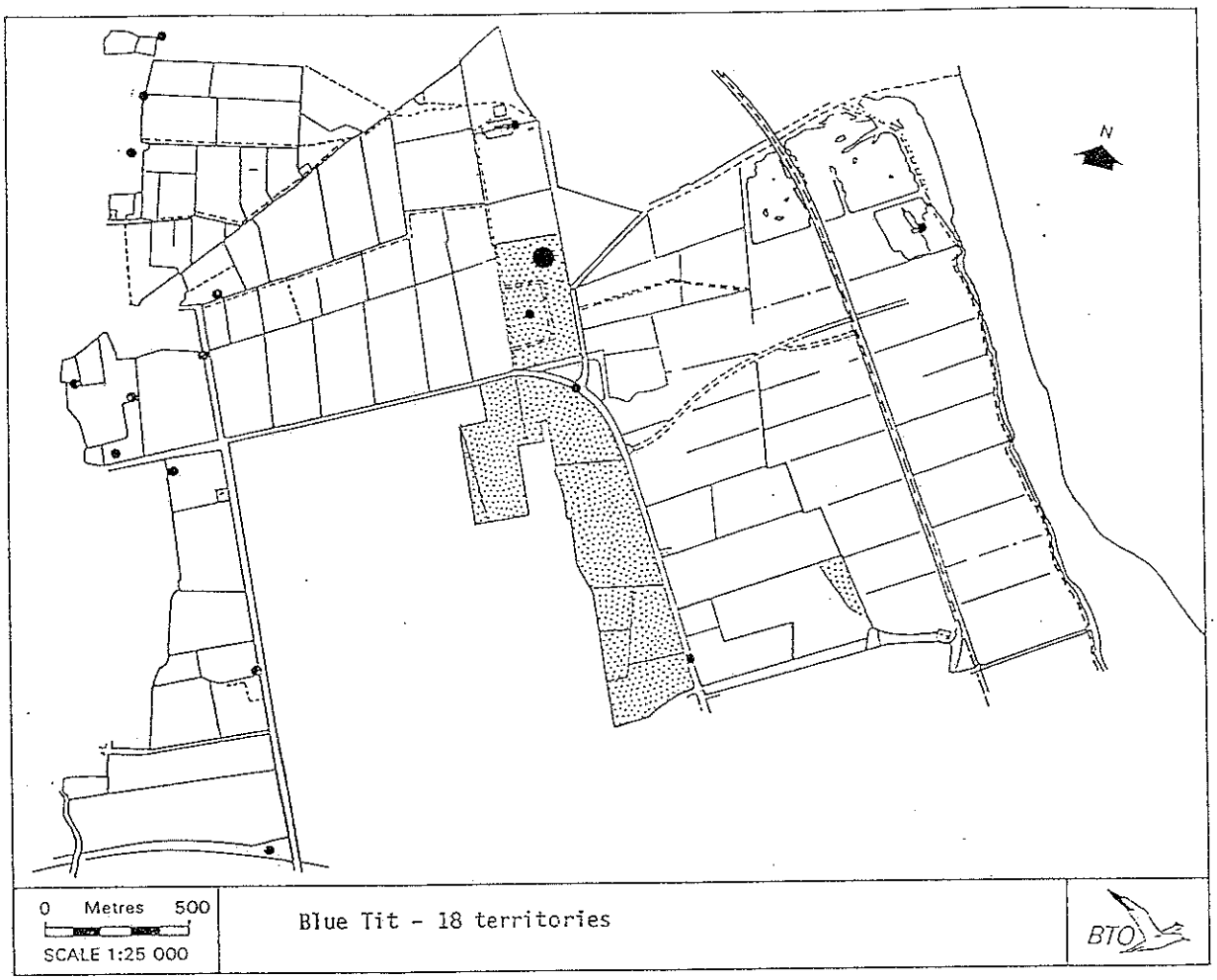


Figure 21

BLUE TIT

Blue Tits are the most widely distributed and numerous tit in the British Isles in both summer and winter. The Blue Tit is sedentary and its favoured habitat is mature oak and beech woodland, but it occurs wherever there is tree cover and in winter is the commonest species to frequent garden feeding stations. During the breeding season, Blue Tits are territorial but in winter they form mixed species flocks that range widely in search of food. Breeding densities in 1982 ranged from 12 pairs/square km on farmland to 49 in woodland, which indicated a British population of about 3.5 million pairs.

At Killingholme Blue Tits were recorded breeding and wintering in woodland, scrub and hedgerows, although low hedgerows in arable areas were in general not used in summer and little used in winter.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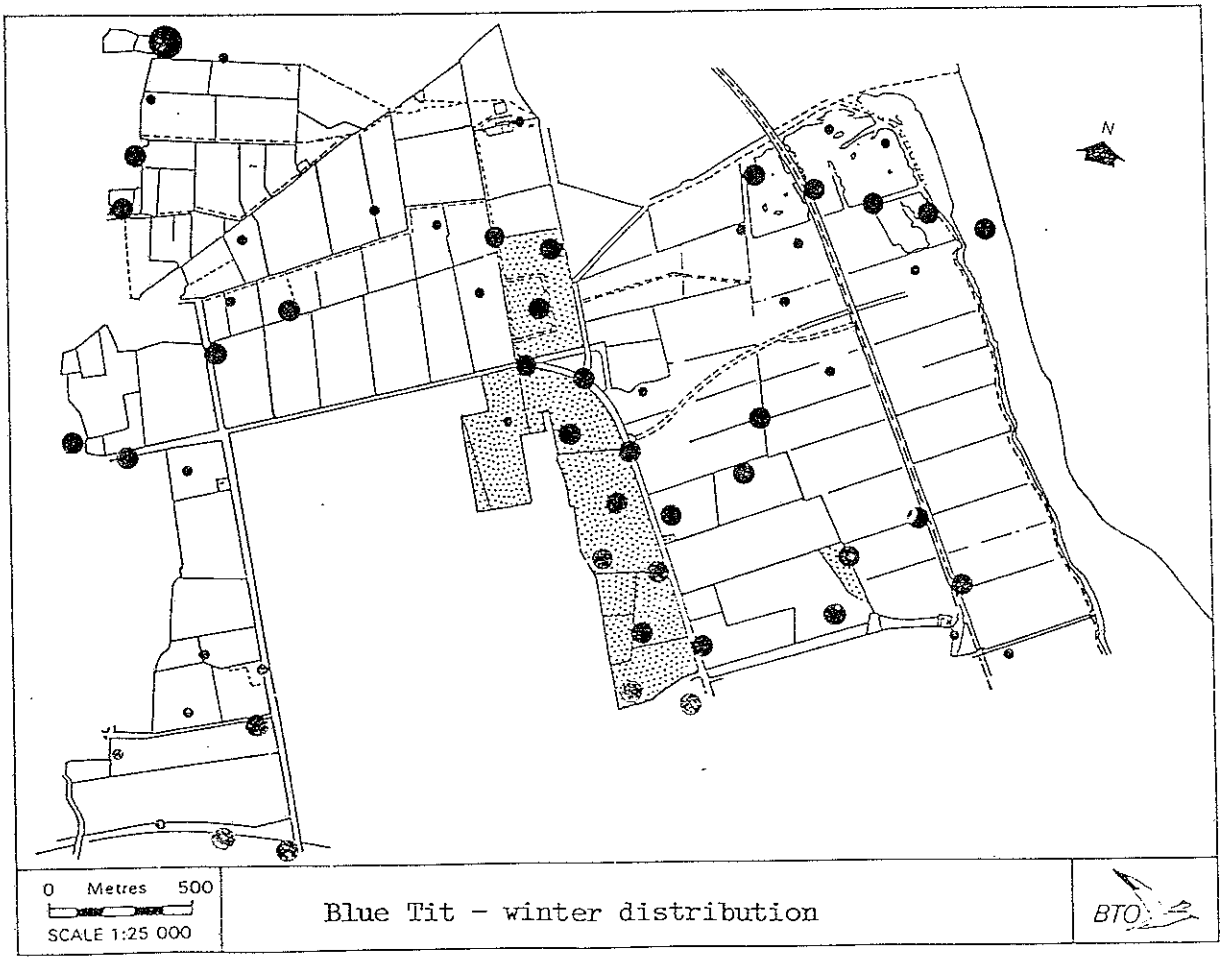
Blue Tit - 18 territories
BTO

Figure 22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Blue Tit - winter distribution
BTO

BULLFINCH

Territories: 8

An attractive finch found throughout the year wherever there is woodland or scrub cover. Hedgerow loss may be the cause of a continuous decline on farmland Common Birds Census plots since the early 1970s, though woodland numbers have remained high. The British breeding population is now believed to be around 300,000 pairs, and densities range from 1 pair/square km on farmland to 6 in woodland.

Breeding territories were scattered across the survey area in association with scrub and mature hedges. Similar habitats were used during the winter, although hedgerows were then less popular and woodland was frequented more.

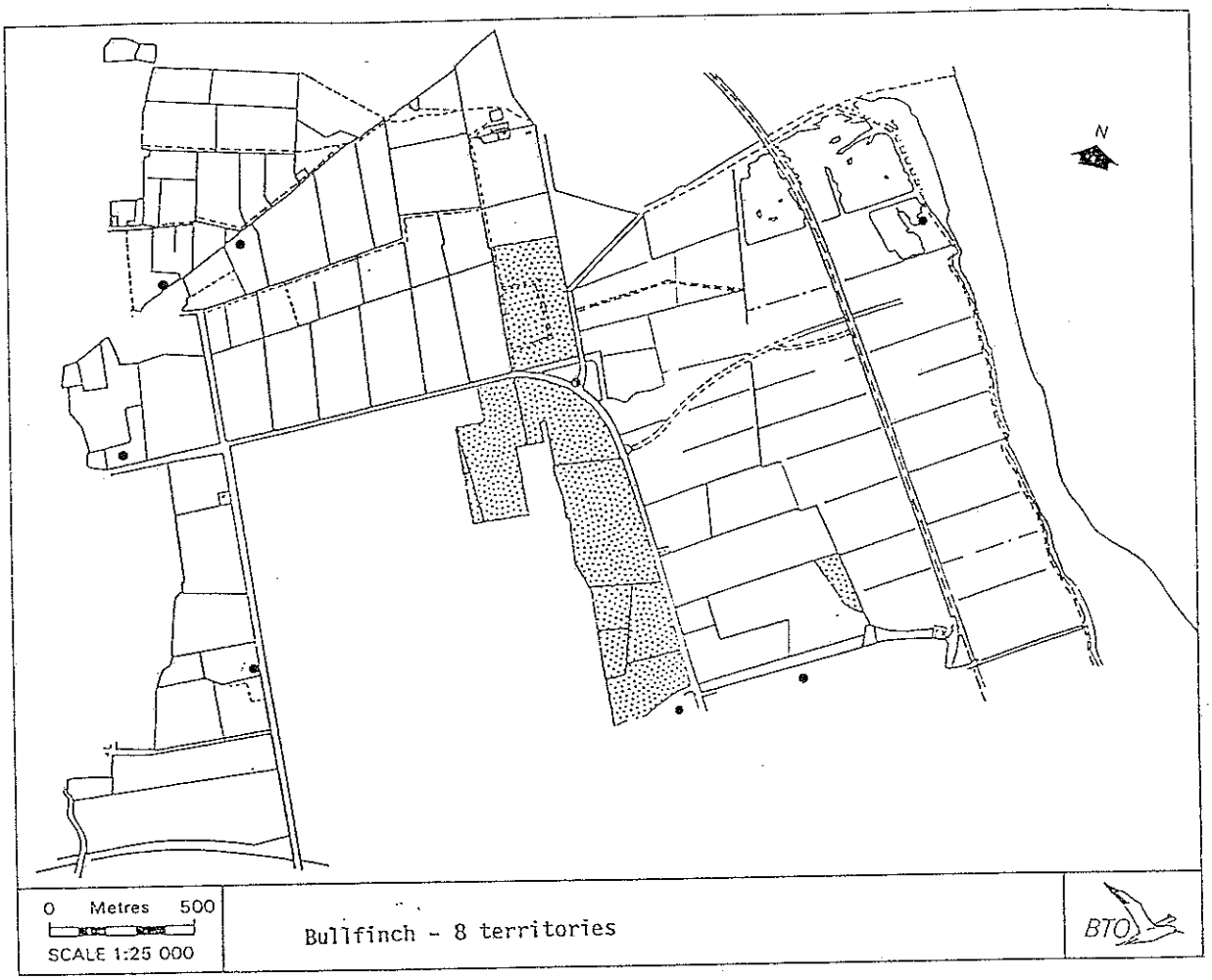


Figure 24

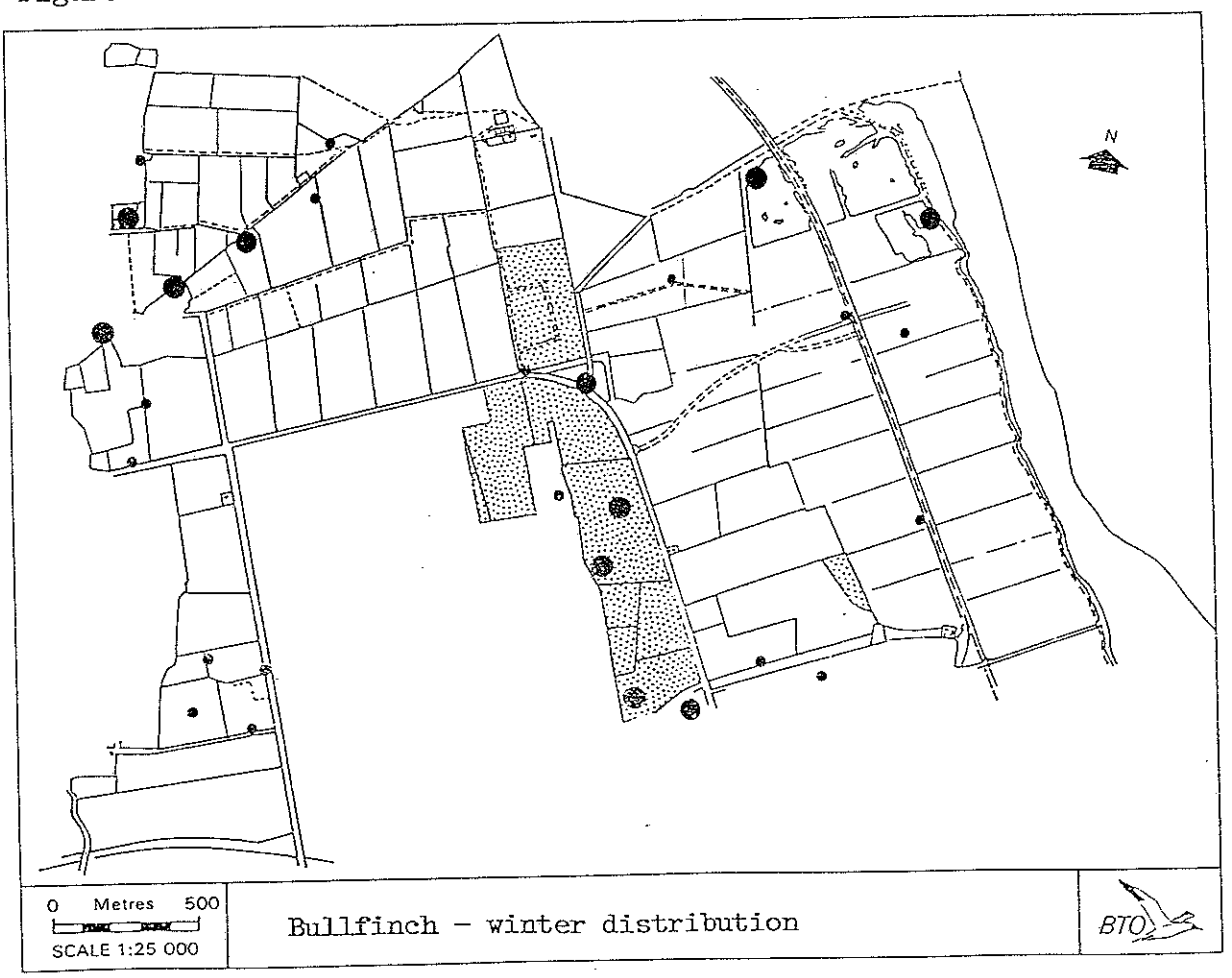


Figure 25

CANADA GOOSE

Territories: 1

Introduced as an ornamental bird in the 18th century, the Canada Goose is now well-distributed across Britain. Between 1968 and 1976 the population increased by 8% per annum, a rate which was maintained up to 1982 when 21,730 birds were recorded in the National Wildfowl Count. Nests are usually close to water, often on islands and protected by dense vegetation.

One pair nested in 1987 by the large north-western pit within the Killingholme Haven Pits LNR but there were no winter records.

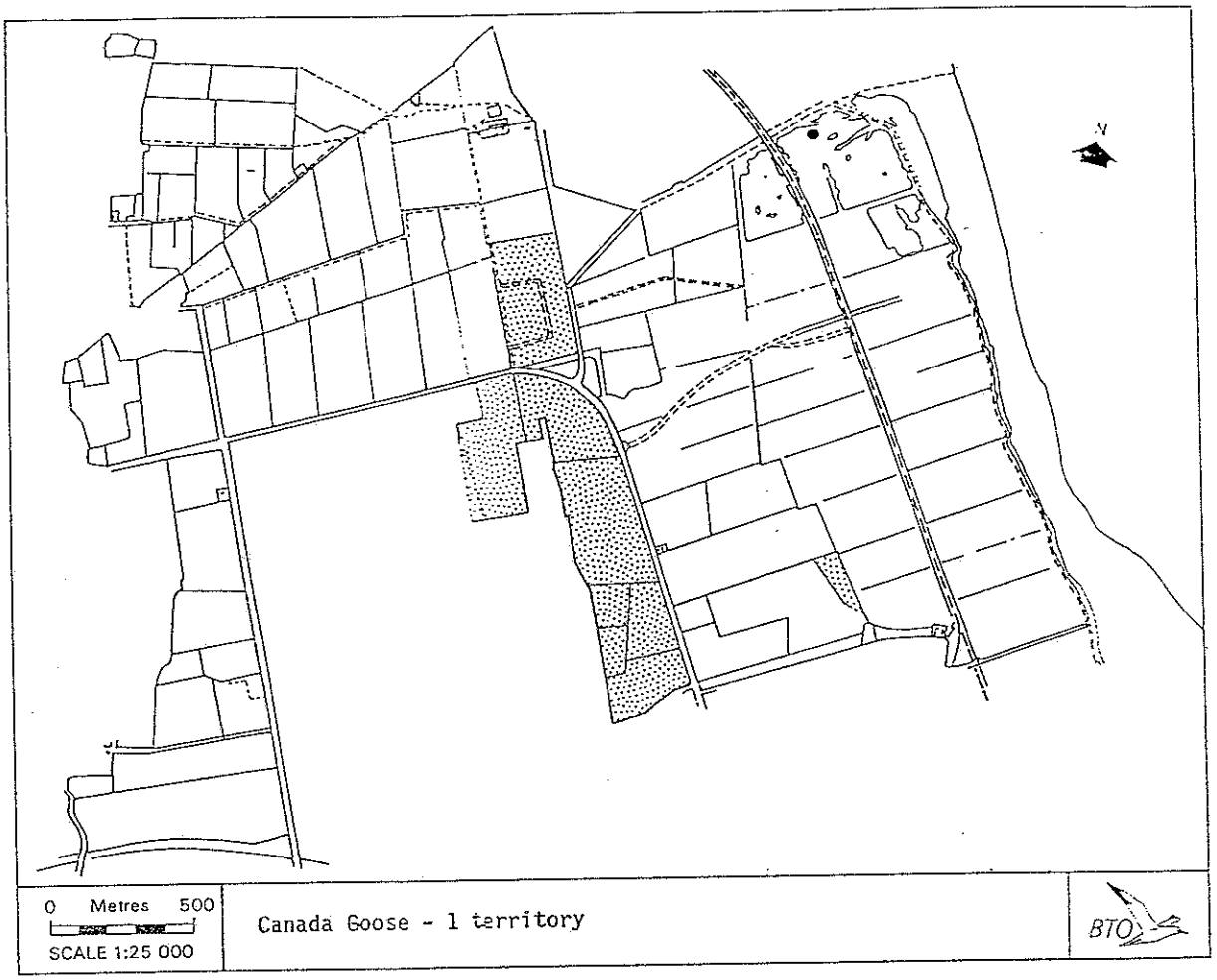


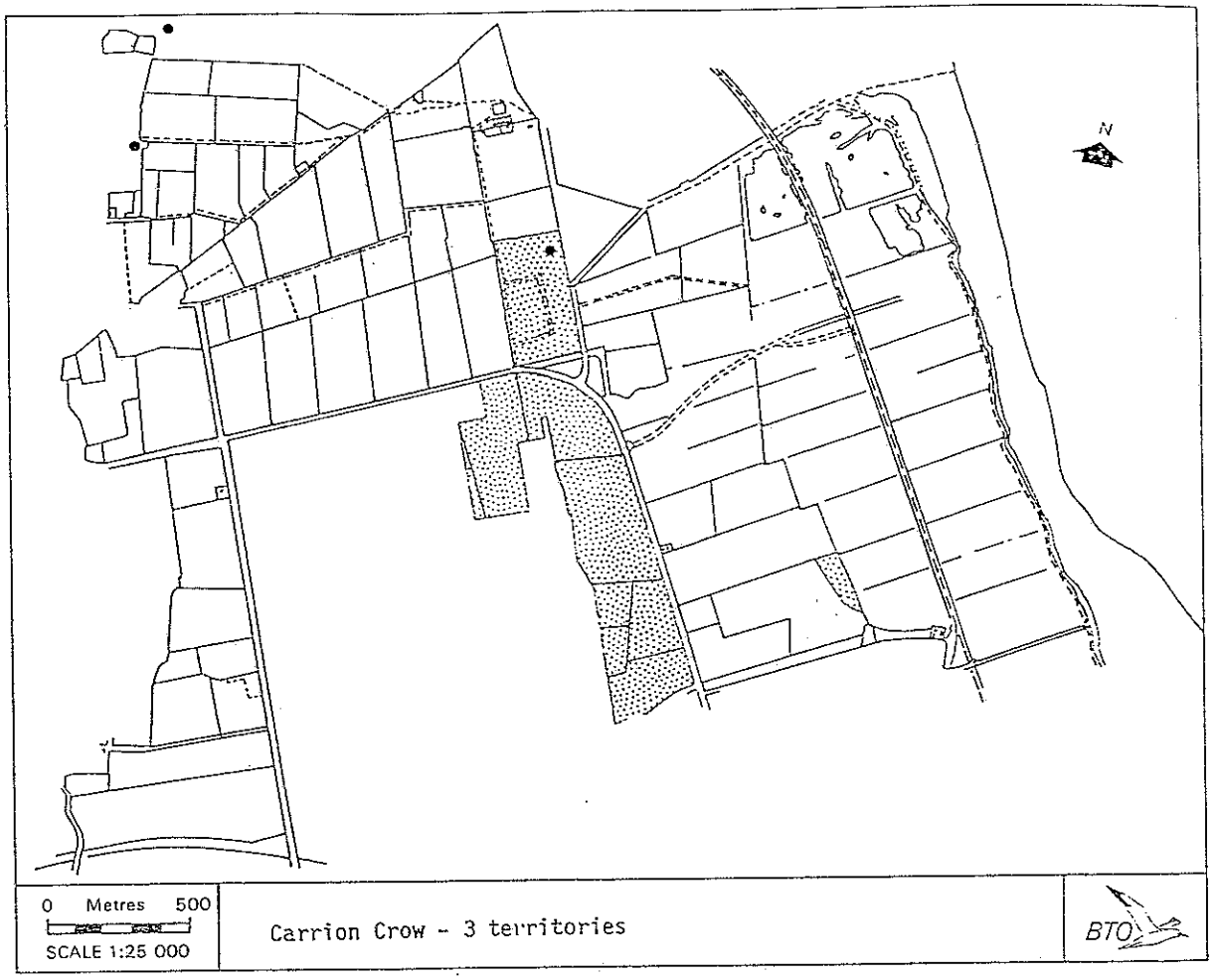
Figure 26

CARRION CROW

Territories: 3

The most widespread member of the crow family in Britain, breeding and wintering in all types of open country from farmland to city parks. The solitary nests are usually sited high in trees, but artificial structures such as electricity pylons may be utilised. A total population of about 1,000,000 was estimated at the time of the Breeding Atlas, and the CBC indices have continued to climb over the last decade.

One occupied nest was found in Fox Covert and two more in tall hedgerow standards in the north-western corner of the survey area. In winter, Carrion Crows were widespread over the Killingholme survey area and recorded from all terrestrail habitat types. A single Hooded Crow, Corvus corone cornix, was seen on several occasions between November and February. This sub-species occupies the same niche as the Carrion Crow in north western parts of the British Isles, where it is sedentary, and in northern Europe. Some European Hooded Crows regularly winter in eastern England, accounting for the single bird at Killingholme.



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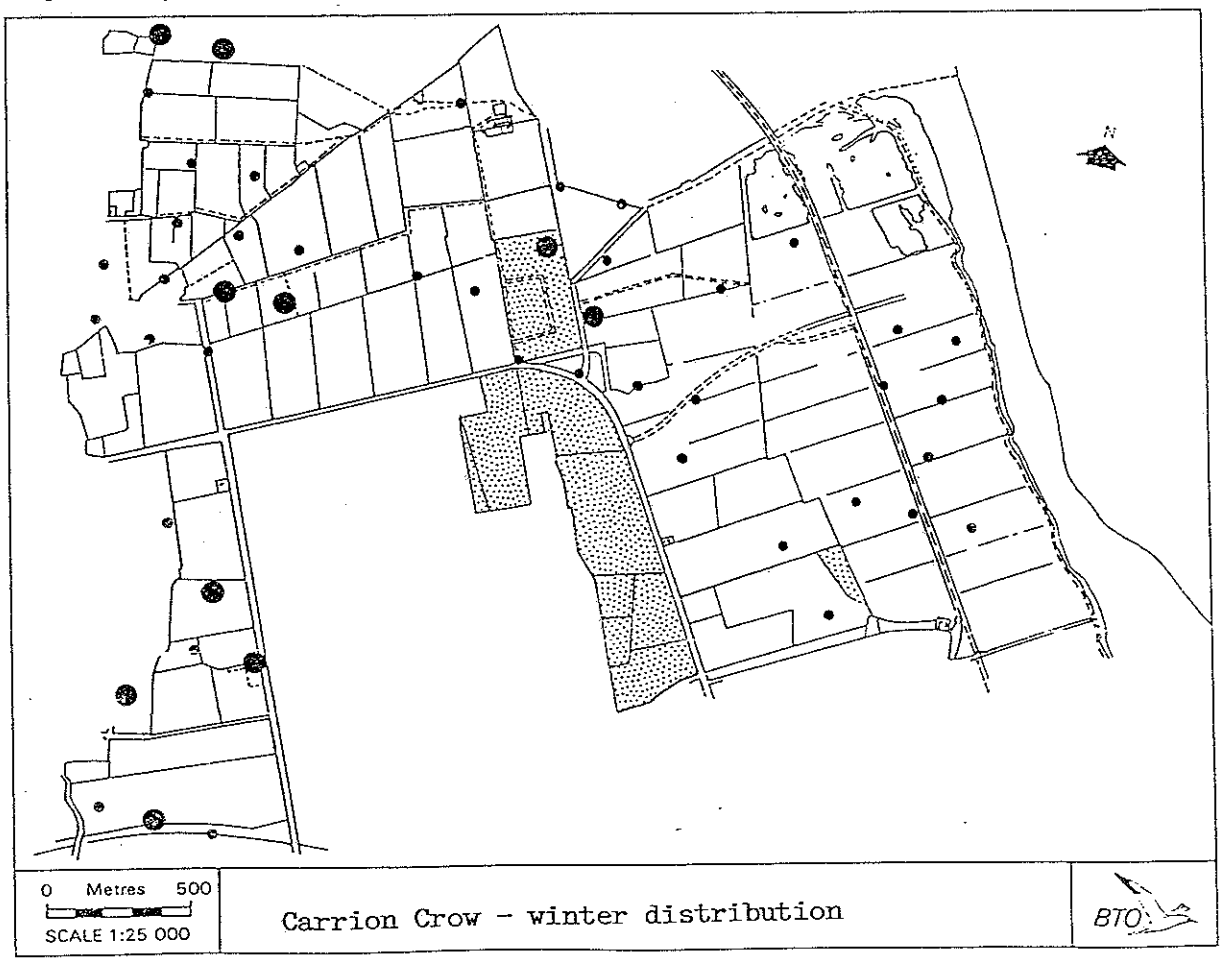


Figure 28

CHAFFINCH

Territories: 33

Chaffinches commonly breed in farmland hedgerows, scrub, gardens and parks, but highest densities are found in mature broadleaved woodland. The most recent estimate of breeding density is 21 pairs/square km on farmland and 59 in woodland. This suggests a British population of 5 million pairs. In winter, Chaffinches are found in all areas of the British Isles and are estimated to be Britain and Ireland's second most numerous wintering species. Most British birds are sedentary but northern European birds regularly move into the east of Britain to winter.

At Killingholme territories were mainly asociated with woodland, scrub and hedgerows with standards, but some were found in mature hedges lacking standards. In winter, Chaffinches were recorded in all terrestrial habitat types, but artificially high food supplies around Chasehill Farm stockyard led to highest densities in that area. Elsewhere, Chaffinches were widely, though thinly, distributed over woodland and scrub areas, with occasional record from hedgerows.

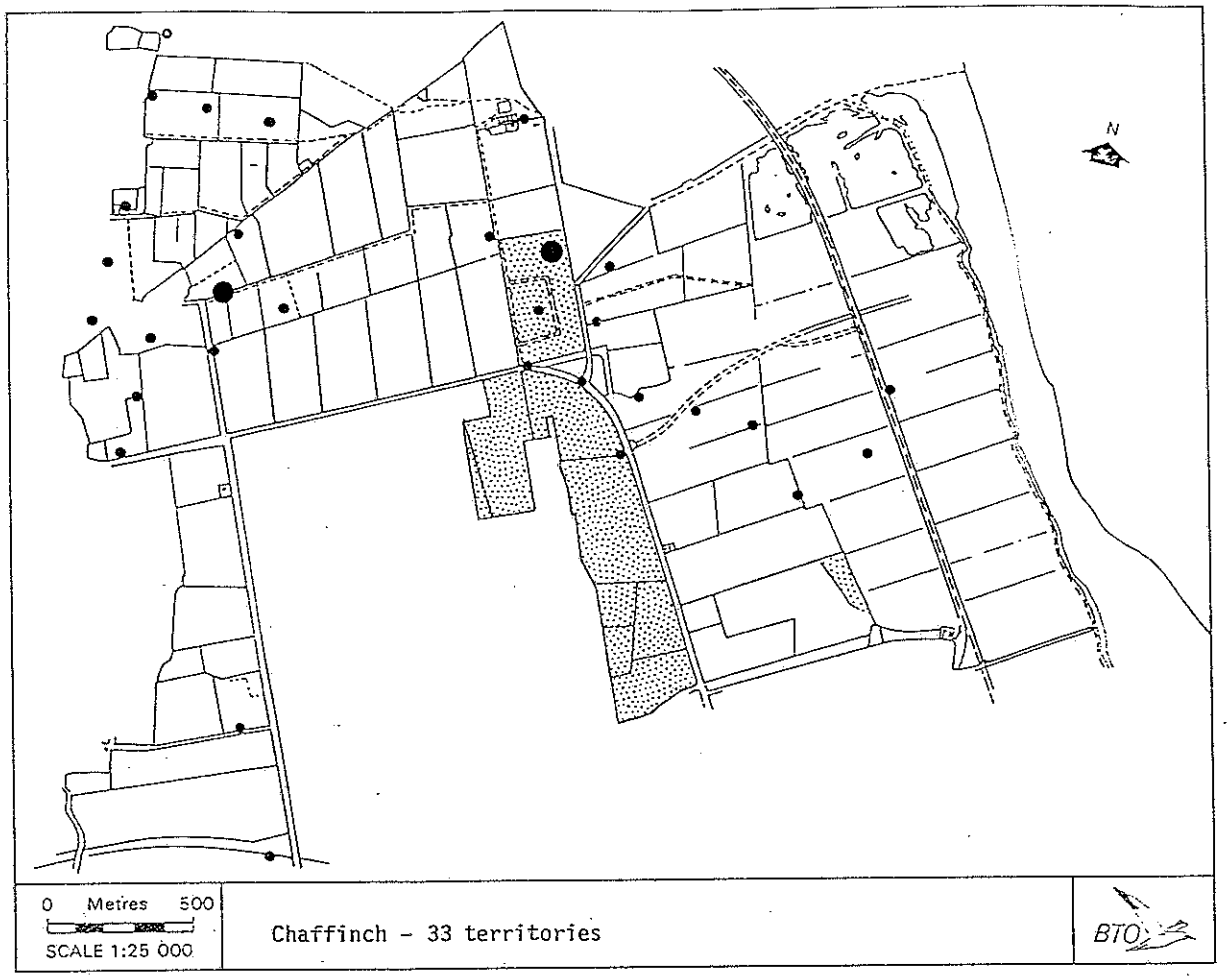


Figure 29

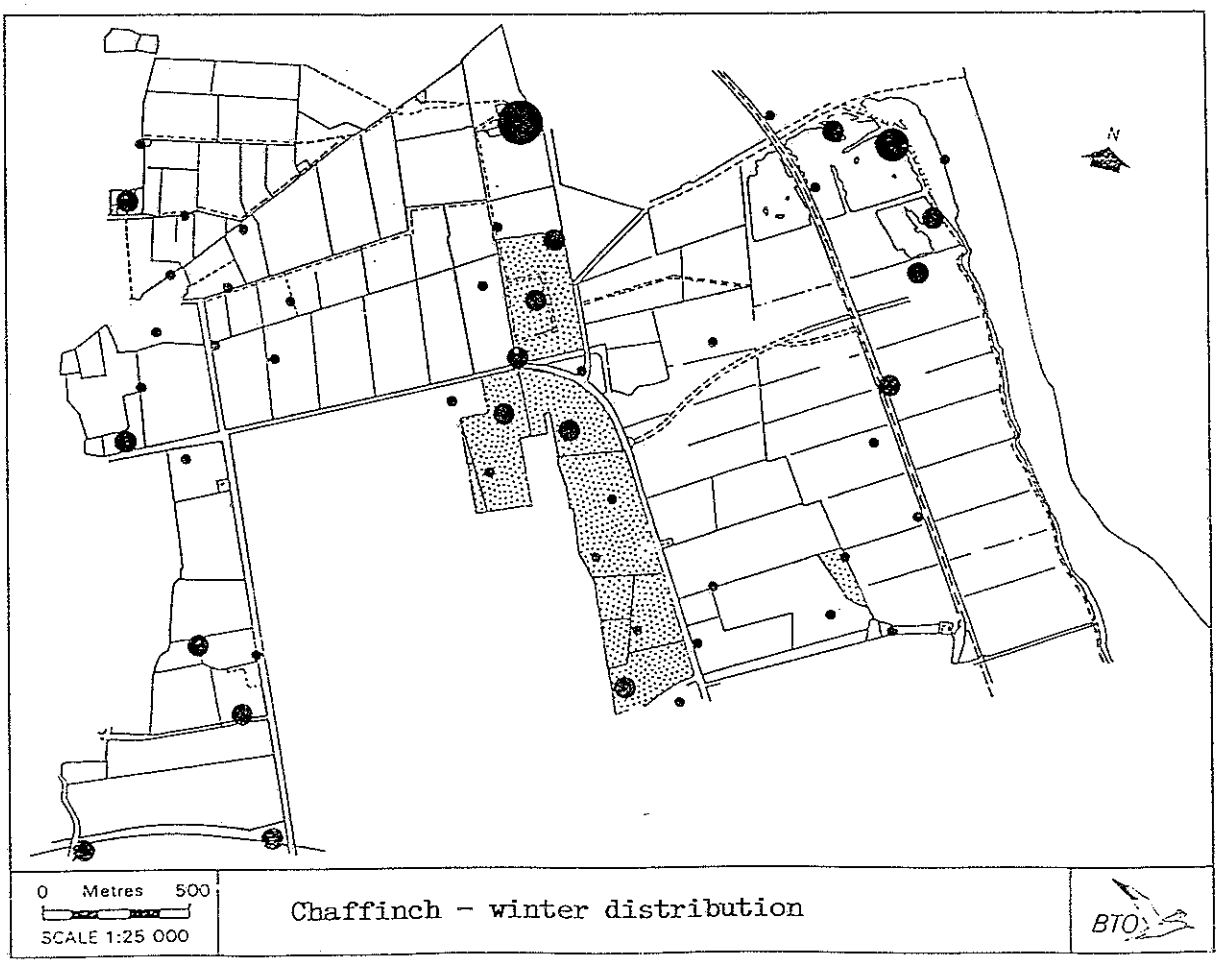
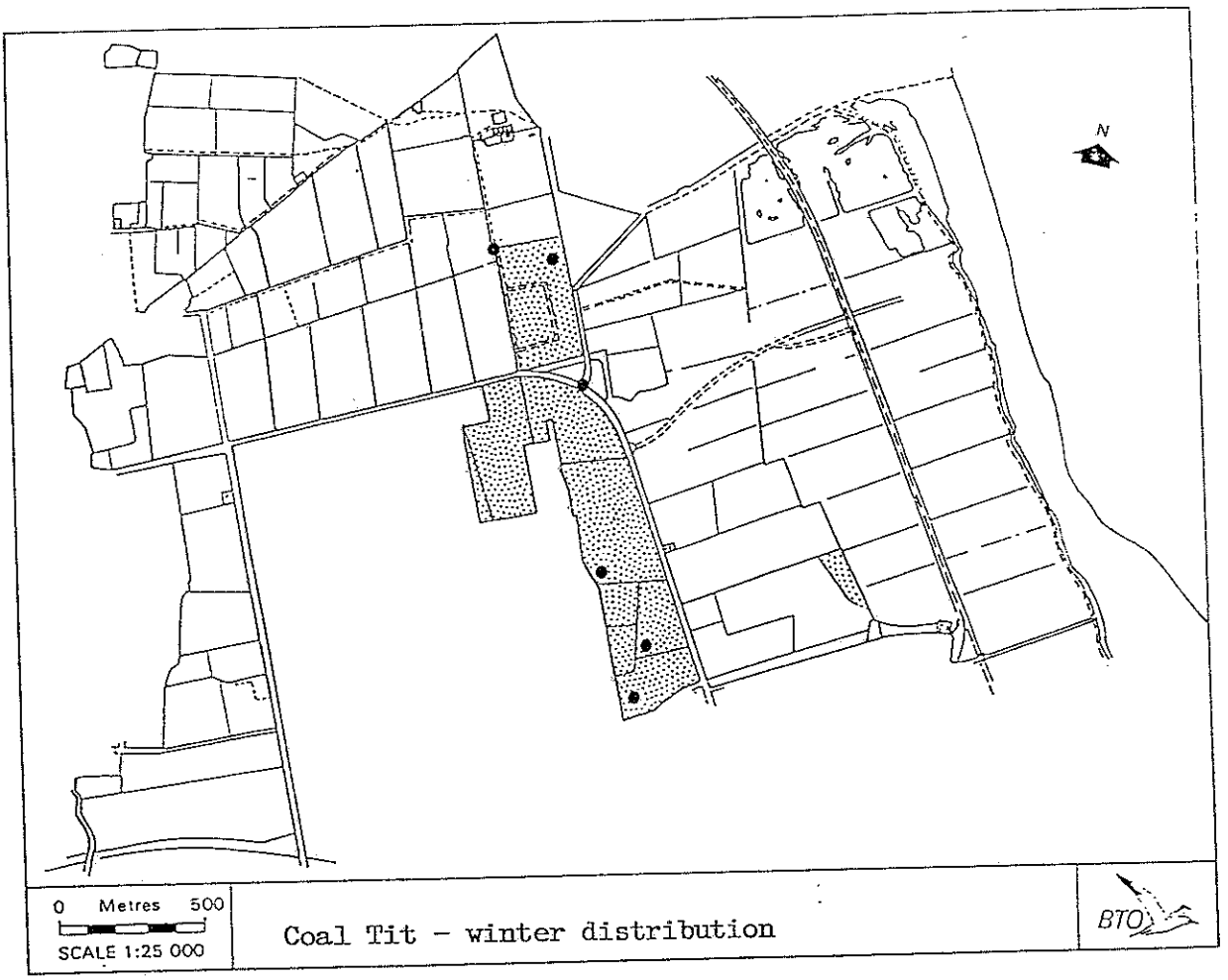


Figure 30

COAL TIT

Nationally, Coal Tits prefer coniferous woodland but can be found in both summer and winter in all well-forested areas. Like other tits, Coal Tits join mixed-species flocks in winter in search of food.

During the 1987-88 winter survey, there were eight registrations of Coal Tits at Killingholme, all from woodlands. The species may well have bred in the survey area and been missed due to access restrictions.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Coal Tit - winter distribution
BTO

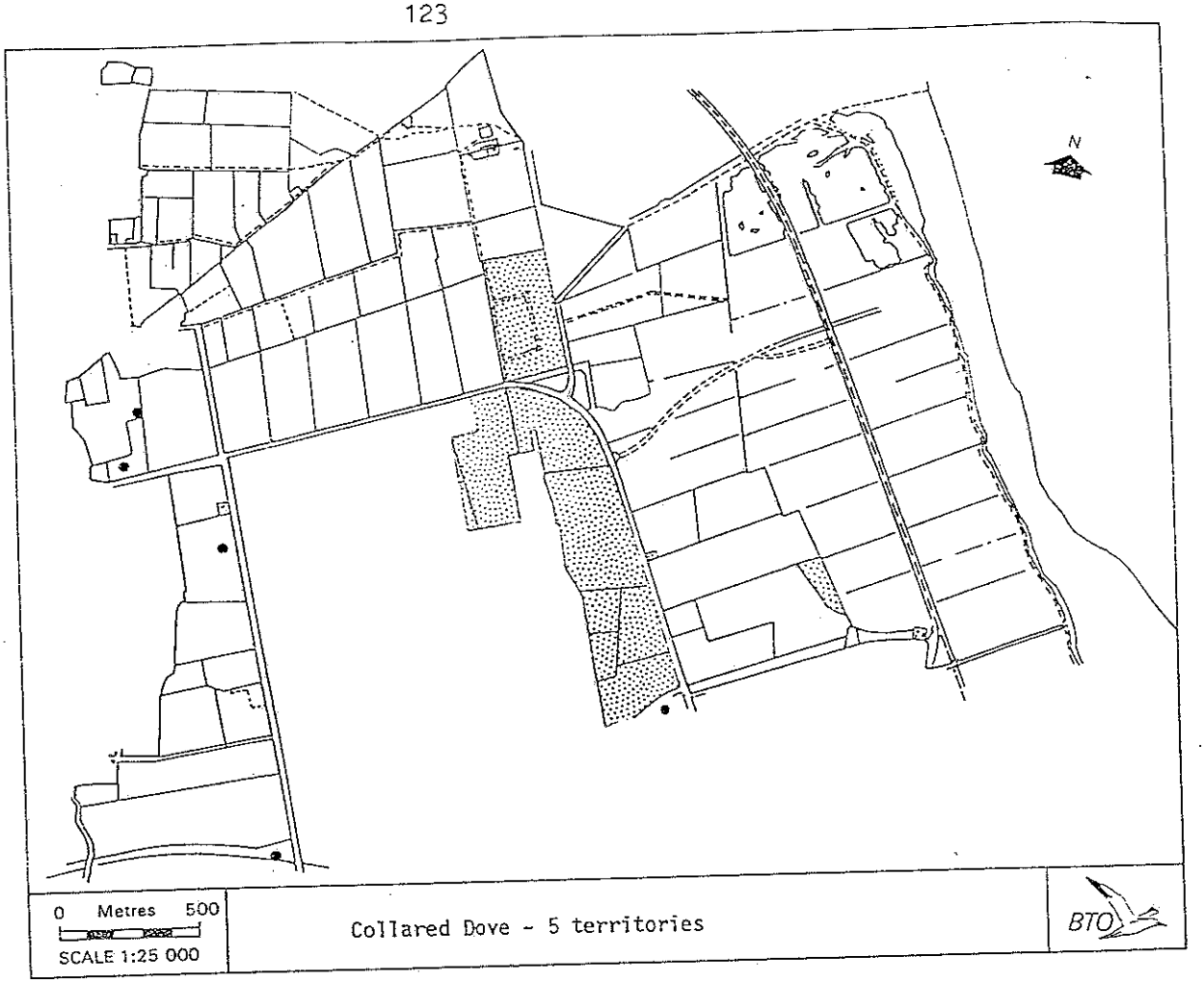
Figure 31

COLLARED DOVE

Territories: 5

Following their initial colonisation of Britain in 1955, Collared Doves spread rapidly across the country and are now a familiar presence around human settlements, especially where discarded grain is available. The Breeding Atlas estimate of 30,000 to 40,000 pairs has not been revised, but CBC indices have risen steadily. Collared Doves are sedentary, but more noticeably associated with habitations in winter.

In the survey area, territories were confined to scrub. In winter, the only parts of the survey area in which Collared Doves were fairly regular were the Chasehill Farm stockyard and the edges of East Halton village. Both of these areas provided artificially high food supplies.



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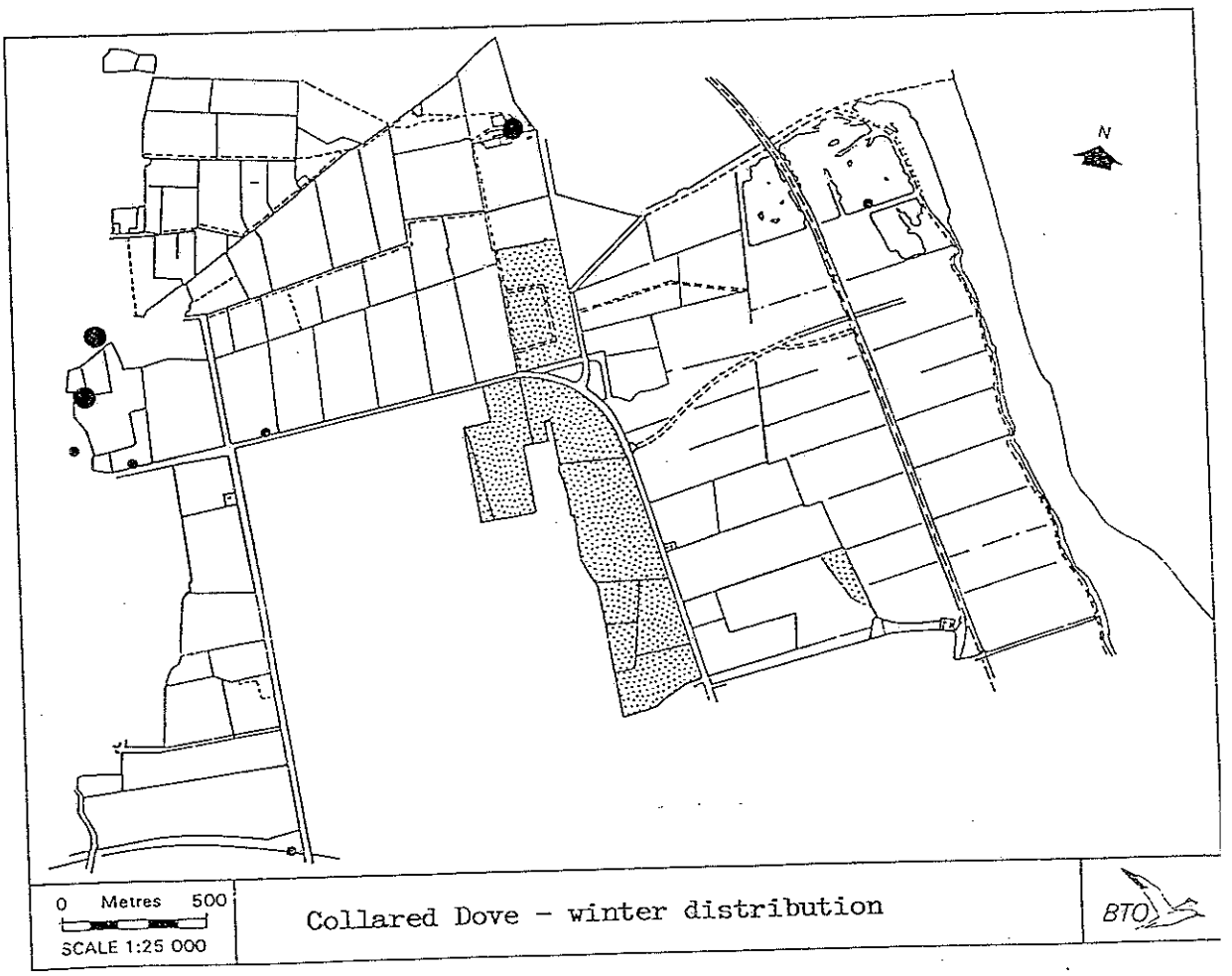


Figure 33

COMMON GULL

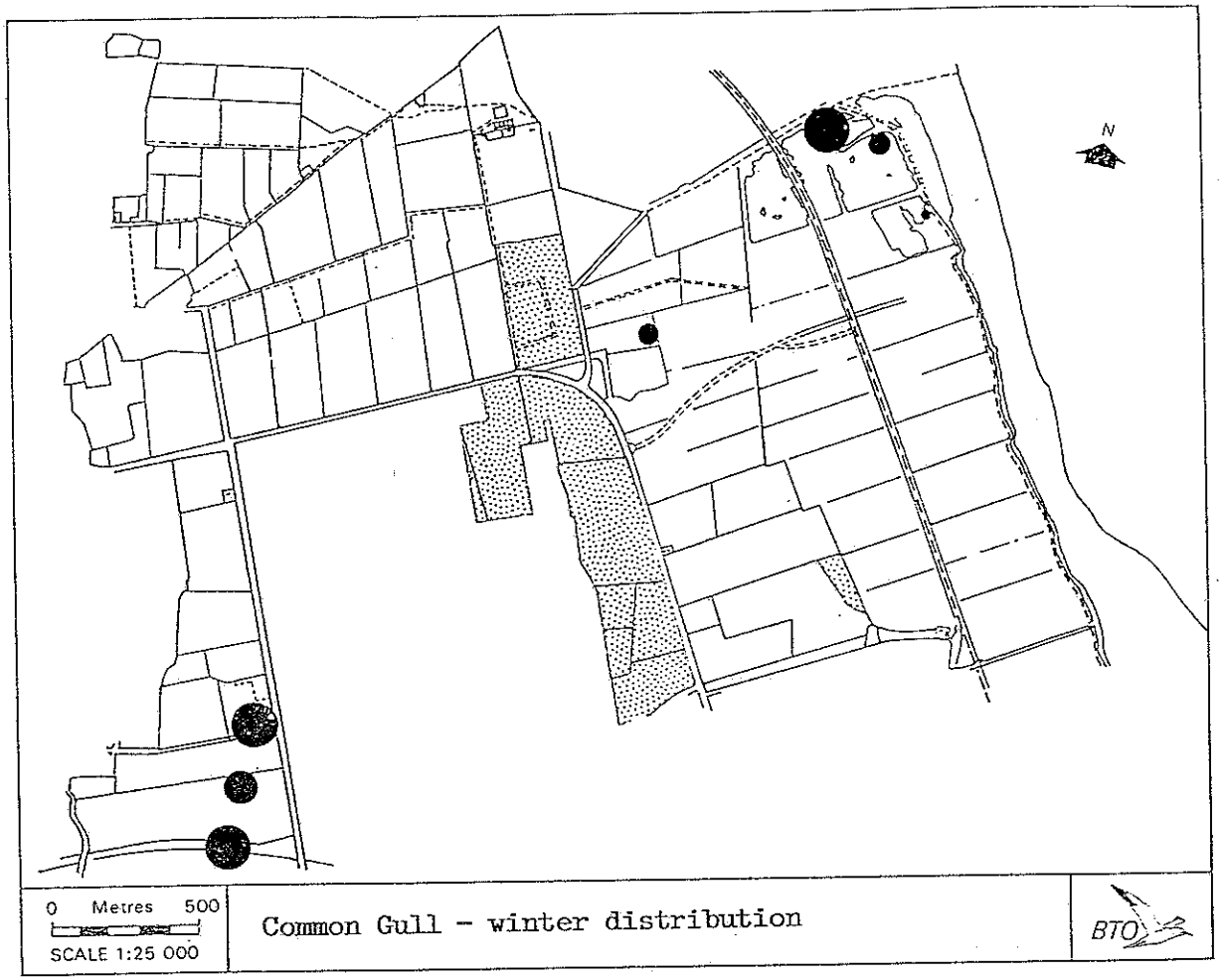
In the British Isles, Common Gulls breed all over Scotland and north-west Ireland. Birds winter on all coasts and to a lesser extent in inland areas.

Common Gulls were recorded on arable and permanent grassland fields, and on open water at Killingholme Haven Pits during the 1987-88 winter survey. The highest winter numbers occurred on fields next to Eastfield Road, due to the proximity of the public refuse tip south of the survey area. In summer they were on the industrial/disturbed ground, Killingholme Haven Pits LNR and the inter-tidal areas. No breeding took place.

COMMON SANDPIPER

A migrant breeding bird, typical of upland rivers, streams and lakes in Britain. The nearest breeding sites to Killingholme are probably in the Pennines.

There were three records of Common Sandpiper during the course of the summer survey: two on the Killingholme Haven Pits LNR and one on the intertidal area.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Common Gull - winter distribution
BTO

Figure 34

COOT

Territories: 8

Coots breed in a narrower range of freshwater habitats than Moorhens, requiring fairly shallow water in which to feed, and water to act as a barrier to terrestrial predators seeking nests. The Breeding Atlas estimated a population of 50,000 to 100,000 pairs. In winter, Coot tend to vacate the smaller breeding waters in favour of larger expanses of water.

Eight territories were sited around the Killingholme Haven Pits LNR, and in winter the Coot was the most abundant waterfowl species on the Killingholme Haven Pits. Numbers ranged from 21-53 birds, and the species was present on all three pits during every visit, though most of the population was regularly recorded around the spit in the north-western corner of the largest pit. There are no documented counts of Coot on the site in recent winters, but the Lincolnshire Bird Reports give isolated counts of 250 in January 1980, 130 in December 1980 and 142 in February 1982. The highest count for the site was of 254 birds, in February 1979 at a time when very severe weather had increased the Coot population of the Humber, presumably due to the freezing of many inland waters. Numbers present in the 1987/88 winter may have been slightly lower than average, due to the mild weather conditions prevailing.

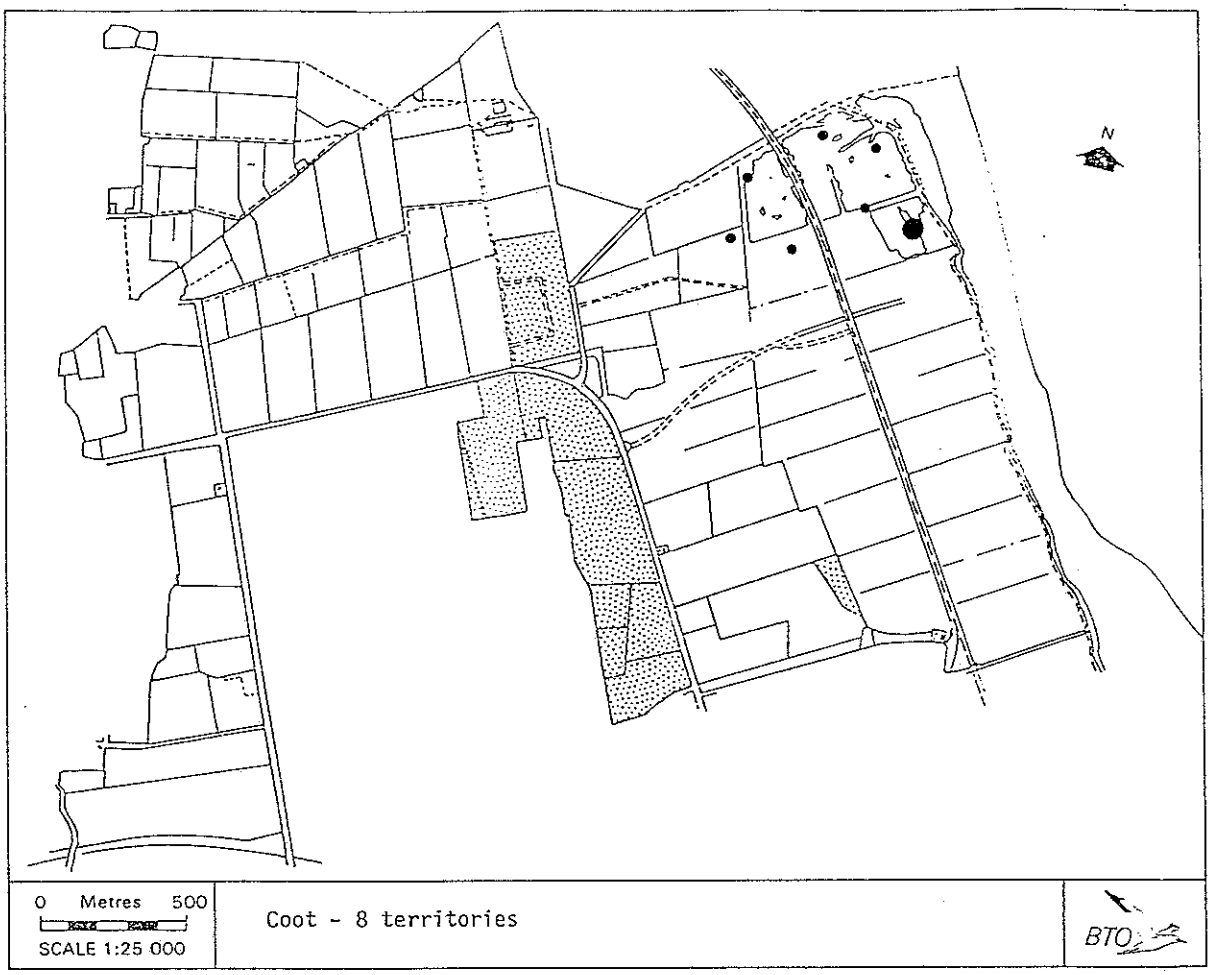
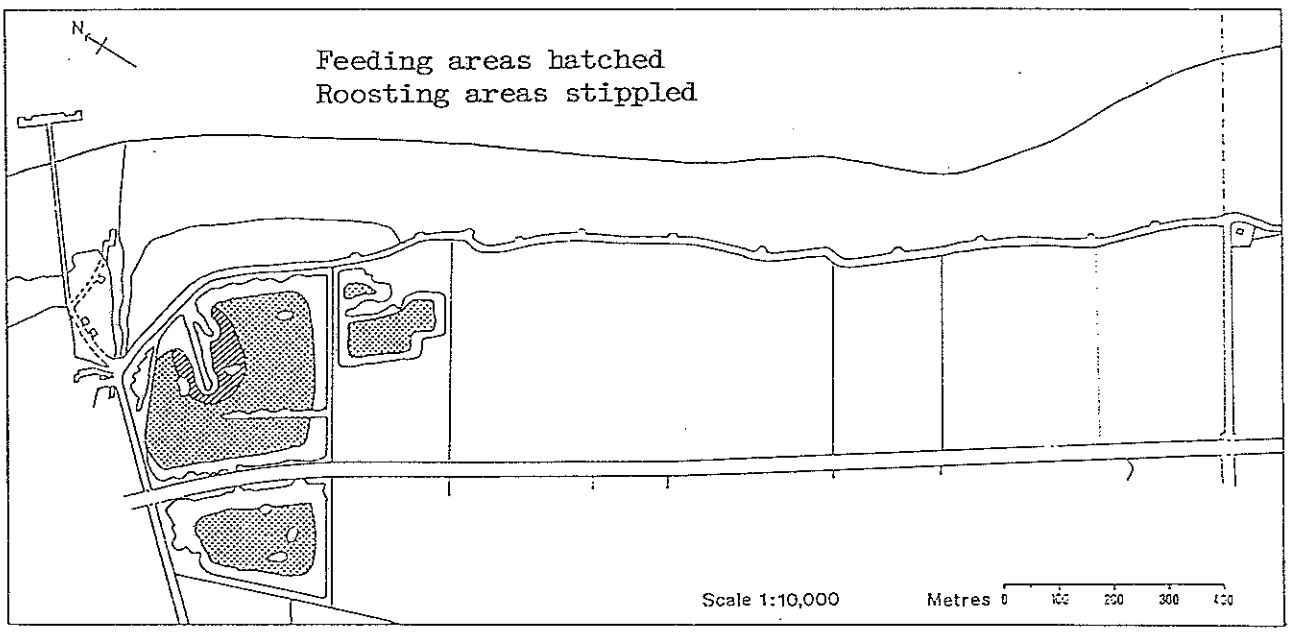


Figure 35



Coot - winter distribution

Figure 36

CUCKOO

One of the most obvious summer migrants, its familiar song is an immediate clue to its presence, but confirmation of breeding and accurate estimates of numbers are more difficult to obtain. The CBC farmland index has risen over the last decade, but the national population may remain within the Breeding Atlas range of 17,500 to 35,000 pairs, at a density of 5-10 pairs/square km.

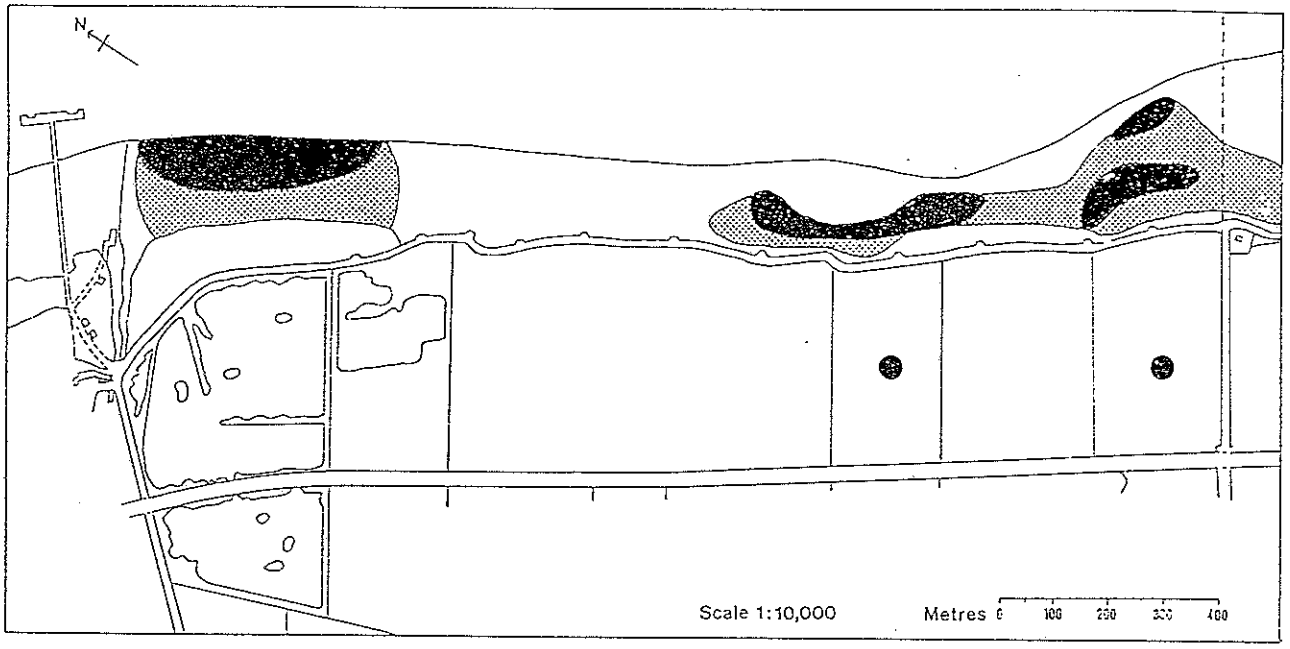
Cuckoos were recorded on several dates during the summer survey, but insufficient registrations were obtained to establish definite territory clusters.

CURLEW

Curlew breed on upland and lowland moors, wet pastures, bogs and, sometimes, arable fields throughout the British Isles. No breeding occurred at Killingholme but single passage birds were recorded feeding on pastures east of East Halton village in April and May. They winter widely around the British Isles, predominantly in coastal habitats.

A flock of 12-17 birds was recorded feeding on permanent and ley grassland at Killingholme Marshes during November and December 1987. This flock was not seen to use the intertidal area; and when disturbed from their chosen field they would move to another nearby pasture rather than to the shore.

Birds were normally present on the intertidal flats in numbers ranging between 2 and 11 birds. There are no previous data concerning numbers of Curlew using the Killingholme intertidal flats. On two dates, in November and January, the pastures adjacent to the sea wall were used as a high tide roost site by Curlew which had been feeding on the intertidal flats, but usually birds left the survey area to roost. The BoEE peak winter counts for Killingholme over the previous five winters indicate that an average of 3 Curlew were present at the site, with peak counts for single winters ranging from 0-9 birds. The summed peak totals of inland-feeding and intertidal populations amount to 28 birds, representing 1.9% of the average, peak winter count for the Humber.



Curlew - Intertidal distribution
Low tide feeding areas Black
Ebb/flood tide feeding areas stippled
Dots - high tide roost sites
Figure 37

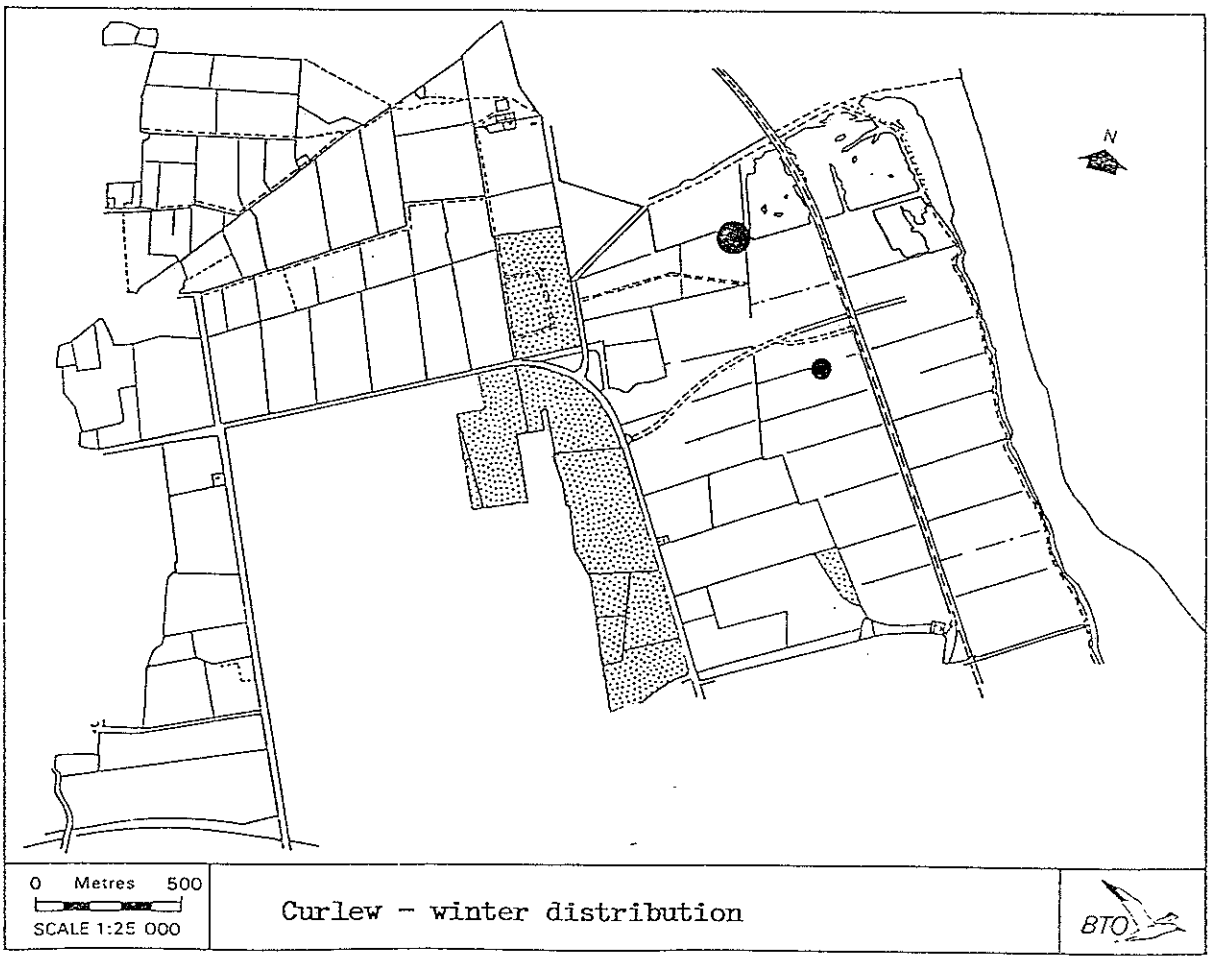


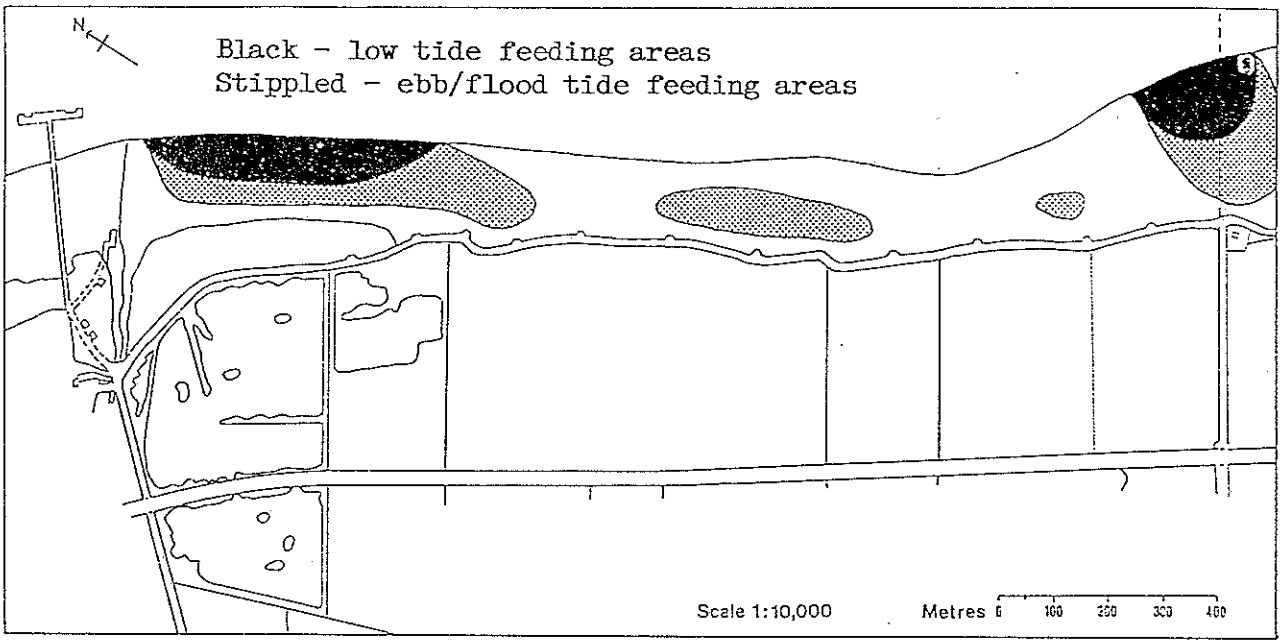
Figure 38

DUNLIN

In winter, the British breeding population of Dunlin moves south to the coast of west Africa. The Dunlin wintering around the shores of the British Isles are visitors, mainly from the USSR and Scandinavia. Distinct breeding populations tend to remain together through the winter and tend to be faithful to wintering grounds unless the weather is severe.

Dunlin were recorded only during the winter survey exclusively from the inter-tidal areas. They were observed feeding on the mudflats on 11 out of 12 visits and counts ranged from 5-59 birds. The peak count represented 0.26% of the average BoEE peak winter count for the Humber for the previous five winters. There are no previous data relating to numbers of Dunlin using the intertidal flats of the survey area during the winter.

On all visits, the site was abandoned by Dunlin over the high tide period, birds flying down-river towards Pyewipe. BoEE count data for Killingholme indicate that an average of 98 Dunlin were present over the high-tide period. That average is high as a result of large numbers present up to 1984/5. It may be that Dunlin abandoned the site as a roosting area after the 1984/5 winter due to the breakdown of the sluice controlling water-levels within the Killingholme Haven Pits LNR and the encroachment of reeds and long grass on islands within the pits which were previously managed to maintain short turf suitable for roosting waders (J. Walton, pers comm).



Dunlin Winter Distribution

Figure 39

DUNNOCK

Territories: 47

A sedentary bird of dense vegetation, most frequently found in hedgerows and woodland edges where secondary growth flourishes. It has also successfully invaded urban habitats such as gardens, churchyards, parks and waste ground. National breeding density estimates average 25 pairs/square km in woodland and 9 on farmland, suggesting a national population of over 2 million pairs. In winter, Dunnocks hold loose, overlapping, individual territories that quickly breakdown during harsh weather.

Territories were found throughout the survey area, even in severely trimmed hedgerows and winter records were similarly widespread. Birds wintered in all terrestrial habitat types, but highest densities occurred in scrub and woodland. Hedges bordering permanent pasture, to the north-west west of the survey area, apparently supported more Dunnocks than hedgerows elsewhere.

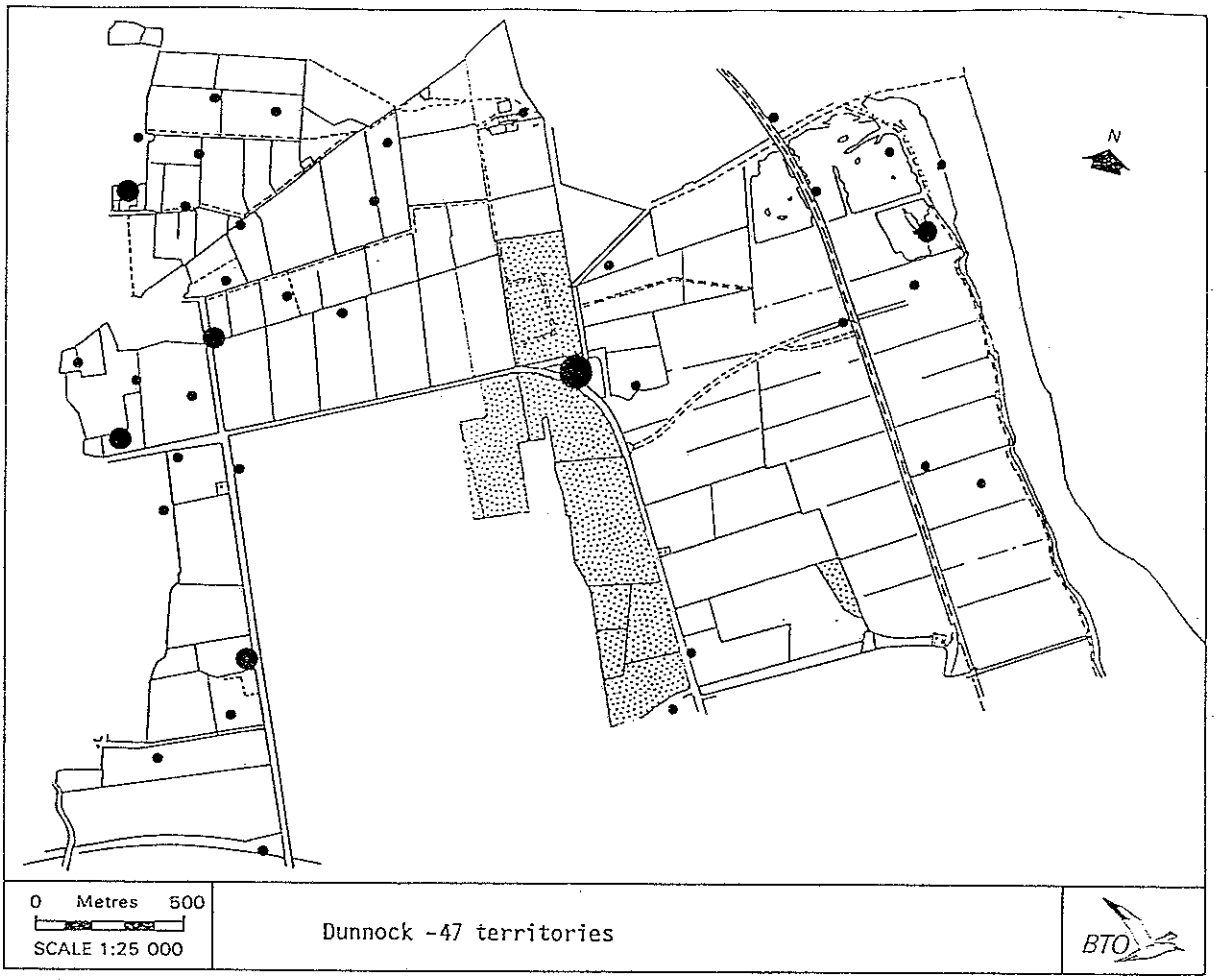


Figure 40

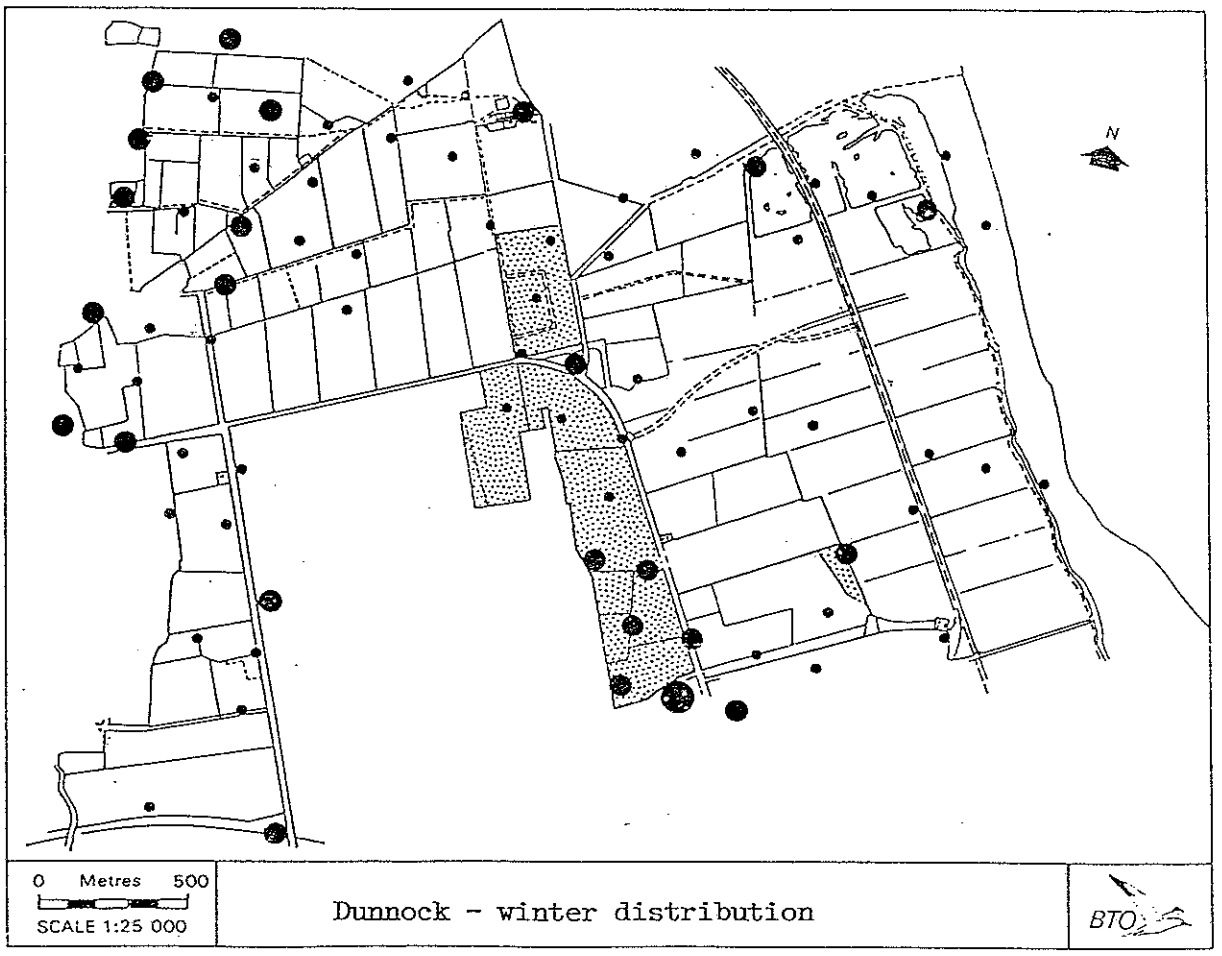


Figure 41

FIELDFARE

Fieldfares are winter visitors to the British Isles, leaving breeding grounds in Scandinavia on depletion of the Rowan berry crop. Throughout the winter, birds tend to be gregarious with other thrushes and highly mobile in their search for food. Winter movements are predominantly southwards and in response to harsh weather, so a slow progression through Europe is noticeable in most winters.

During November and December, flocks of up to 60 Fieldfares were present around permanent pastures and hedgerows in the north-west of the survey area. After December, there were only irregular records, with no further flocks until 30 birds were recorded on permanent pasture south of Killingholme Haven Pits in March.

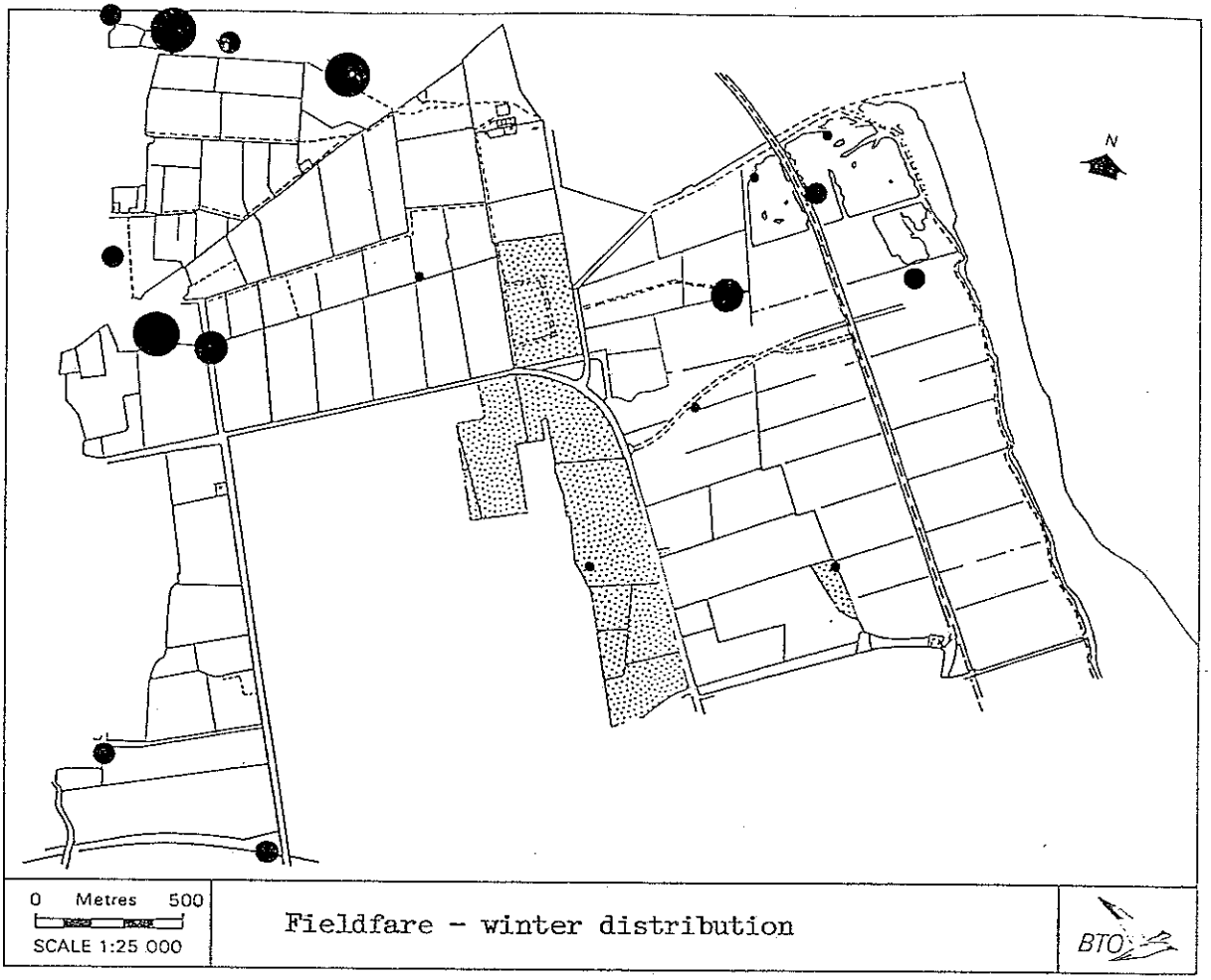
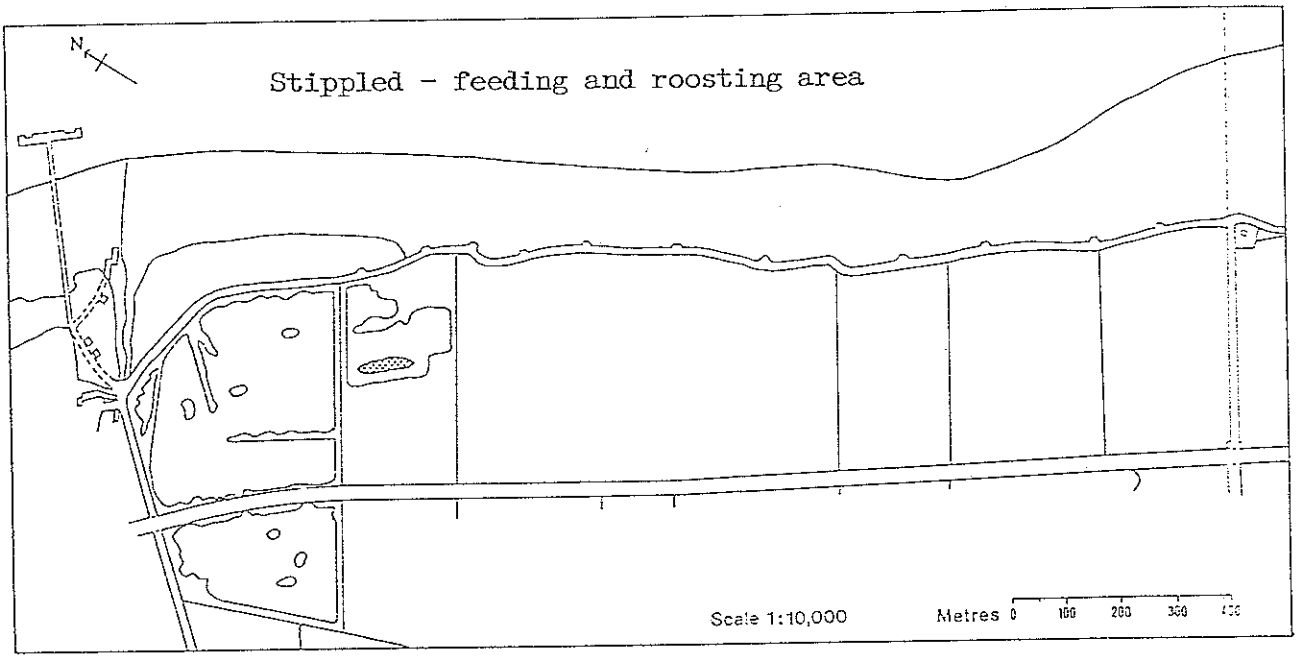

N
0 Metres 500
SCALE 1:25 000
Fieldfare - winter distribution
BTO

Figure 42

GADWALL

Gadwall are widely distributed over south-east Britain. Their breeding population is largely sedentary, with perhaps 20-25% emigrating in winter, to be replaced by a small influx from Iceland, and north-central Europe. The species shows a preference for shallow lakes, where its food (aquatic plants) is readily available. The British winter population probably exeeds 4,000.

During the 1987-88 winter survey, a single Gadwall was recorded on 17 November on the small south-eastern pit of the Killingholme Haven Pits. Recent Lincolnshire Bird Reports indicate that the species is widespread in small numbers, usually 1-5 birds, on waters in Lincolnshire and South Humberside.



Gadwall - winter distribution

Figure 43

GARDEN WARBLER

Territories: 3

Like Blackcaps, Garden Warblers are summer migrants found in deciduous woodland with a dense scrub layer, but they are more likely to be found away from mature trees and will nest in scrub, Rhododendron thickets, young forestry plantations and garden shrubberies. Woodland density averages 7 pairs/square km and the total population is believed to be more than 200,000 pairs.

Single territories were found in Chasehill Wood, scrub at the south-western end of Burkinshaw's plantation, and at the northern end of Green Lane.

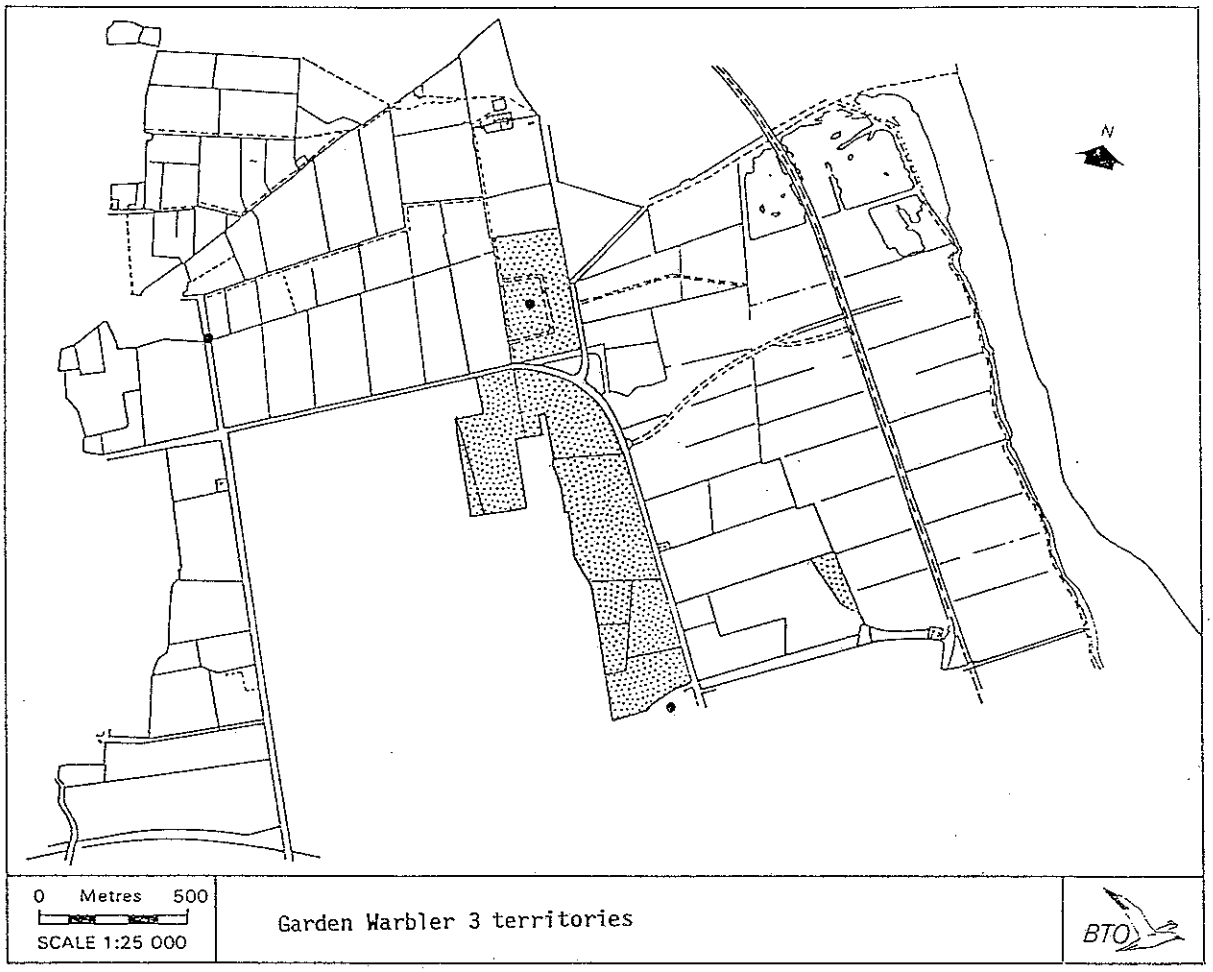

N
0 Metres 500
SCALE 1:25 000
Garden Warbler 3 territories
BTO

Figure 44

GLAUCOUS GULL

The Glaucous Gull breeds on coasts from the high Arctic to the sub-Arctic. Little is known about the origins of the birds wintering in Britain, whose winter distribution is largely coastal and with a northerly bias; inland records are almost invariably connected with the presence of reservoirs and/or refuse tips. The British winter population usually ranges from under 200 to 500, but sometimes is larger.

The only record at Killingholme during the 1987-88 winter was of 2 birds on permanent grassland with a mixed flock of other gull species, all attracted by the Eastfield Road refuse tip. This is a typical record of the species in south Humberside.

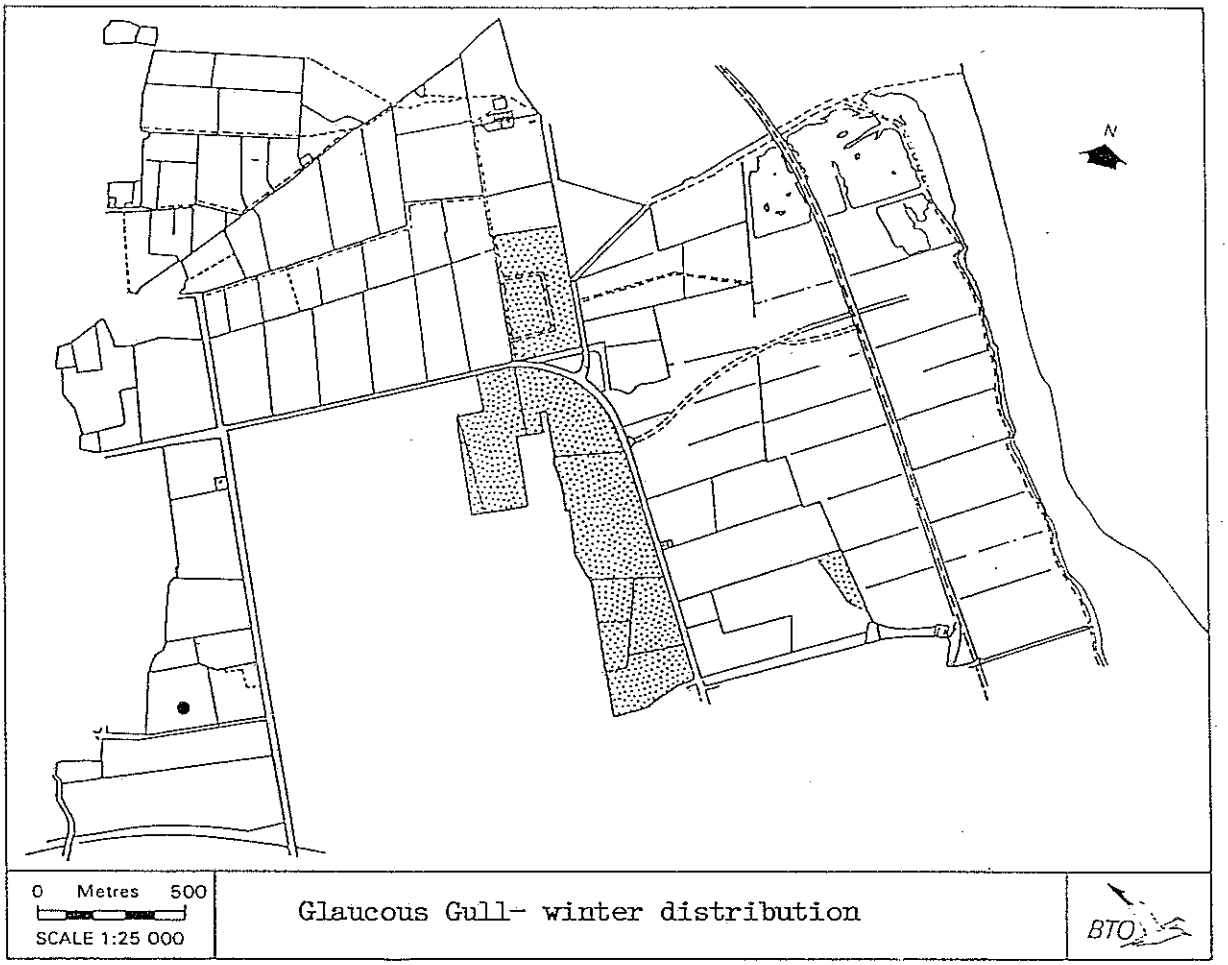

N
0 Metres 500
SCALE 1:25 000
Glaucous Gull- winter distribution
BTO

Figure 45

GOLDCREST

Despite their small size, British and Irish Goldcrests remain on their breeding territories throughout the winter, even in the harshest weather. Winter does, however, force Goldcrests to use a wider variety of habitats than in summer, and birds are often seen feeding in association with tit flocks. The British Isles also receives a winter influx of northern European birds that swells numbers present considerably.

During the 1987/88 winter, Goldcrests occurred at Killingholme most frequently in woodland and scrub, with occasional records from hedgerows.

GOLDEN ORIOLE

Golden Orioles are summer migrants which are at the edge of their breeding range in Britain. Nesting is irregular and confined to very few localities.

A bird recorded once in Chasehill Wood in early May was almost certainly a passage vagrant.

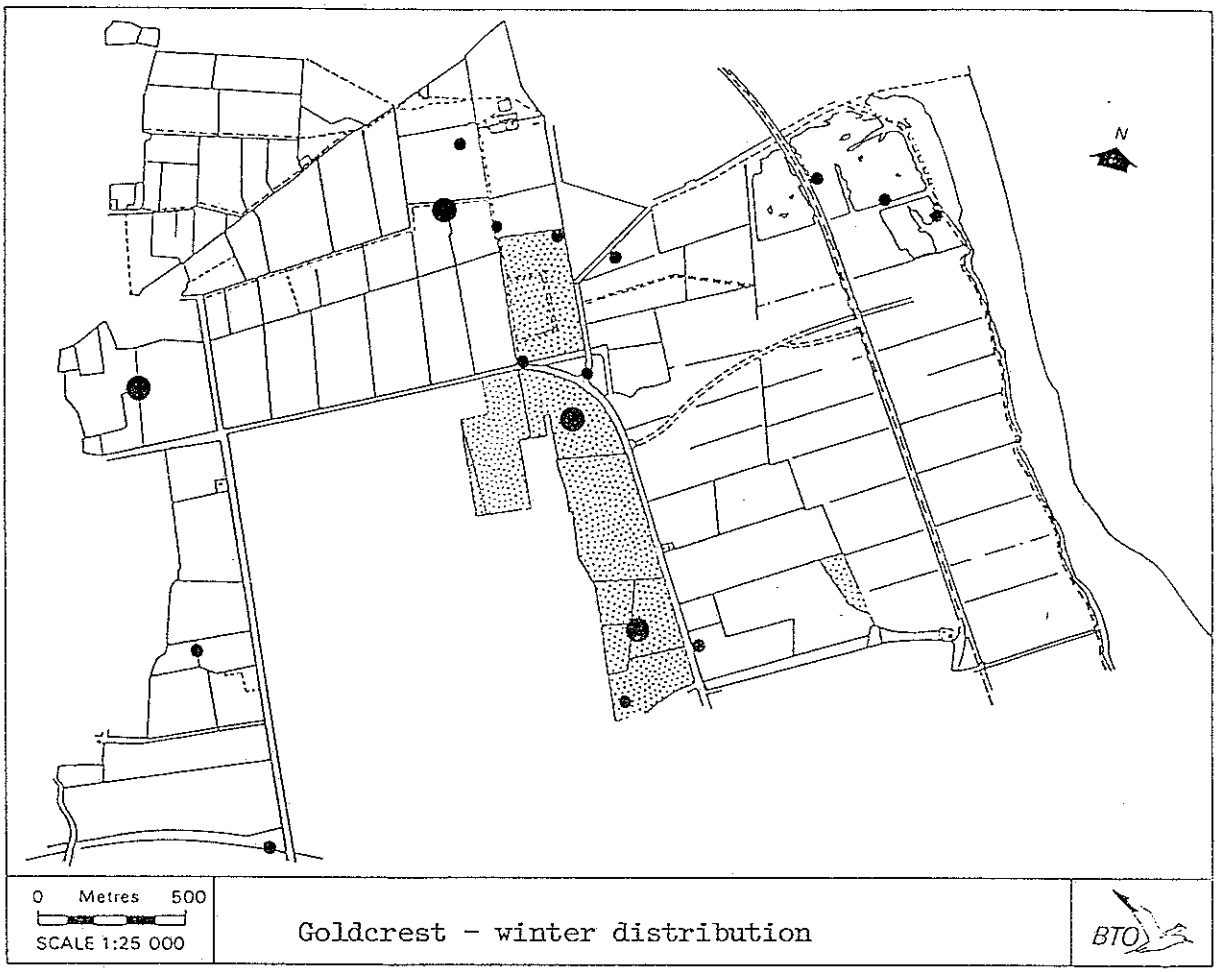

N
0 Metres 500
SCALE 1:25 000
Goldcrest - winter distribution
BTO

Figure 46

GOLDFINCH

Territories: 4

Patches of thistles and other weeds, together with tall trees set in open ground, are typical elements of Goldfinch breeding territories. Pairs are found on farmland, parks, open scrub, coastal dunes and saltmarshes, providing there are suitable trees for nesting. Farmland breeding densities average 2 pairs/square km, although CBC index values have fluctuated over the last decade, and the total population is believed to be around 300,000 pairs. In winter, Goldfinches are still found all over the British Isles, but numbers are lower as a result of many birds, particularly females, moving south.

In the survey area, Goldfinch territories were restricted to hedges with standards and tall scrub. During the 1987/88 winter, Goldfinches were recorded only infrequently, in parties of four or more at scattered sites.

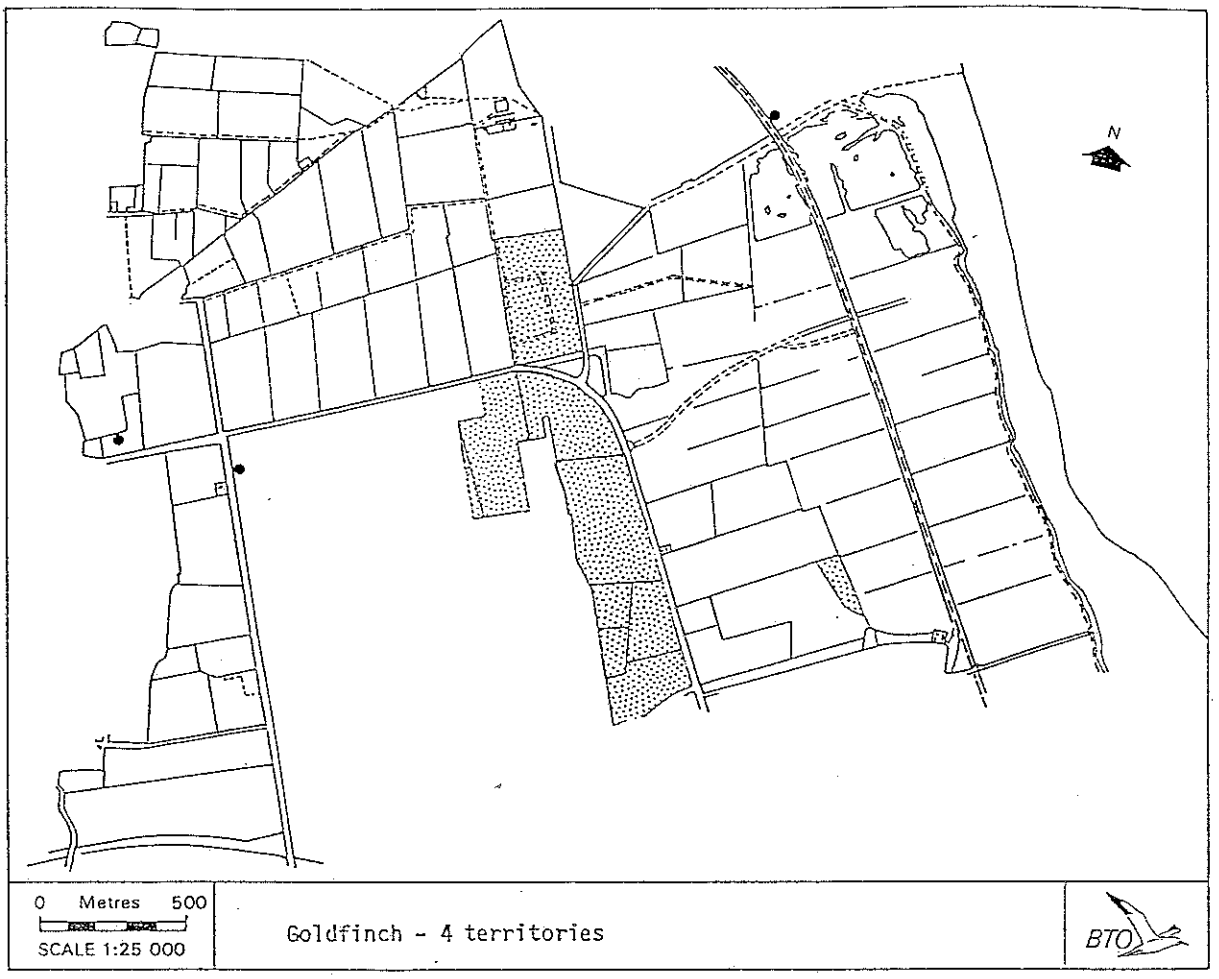


Figure 47

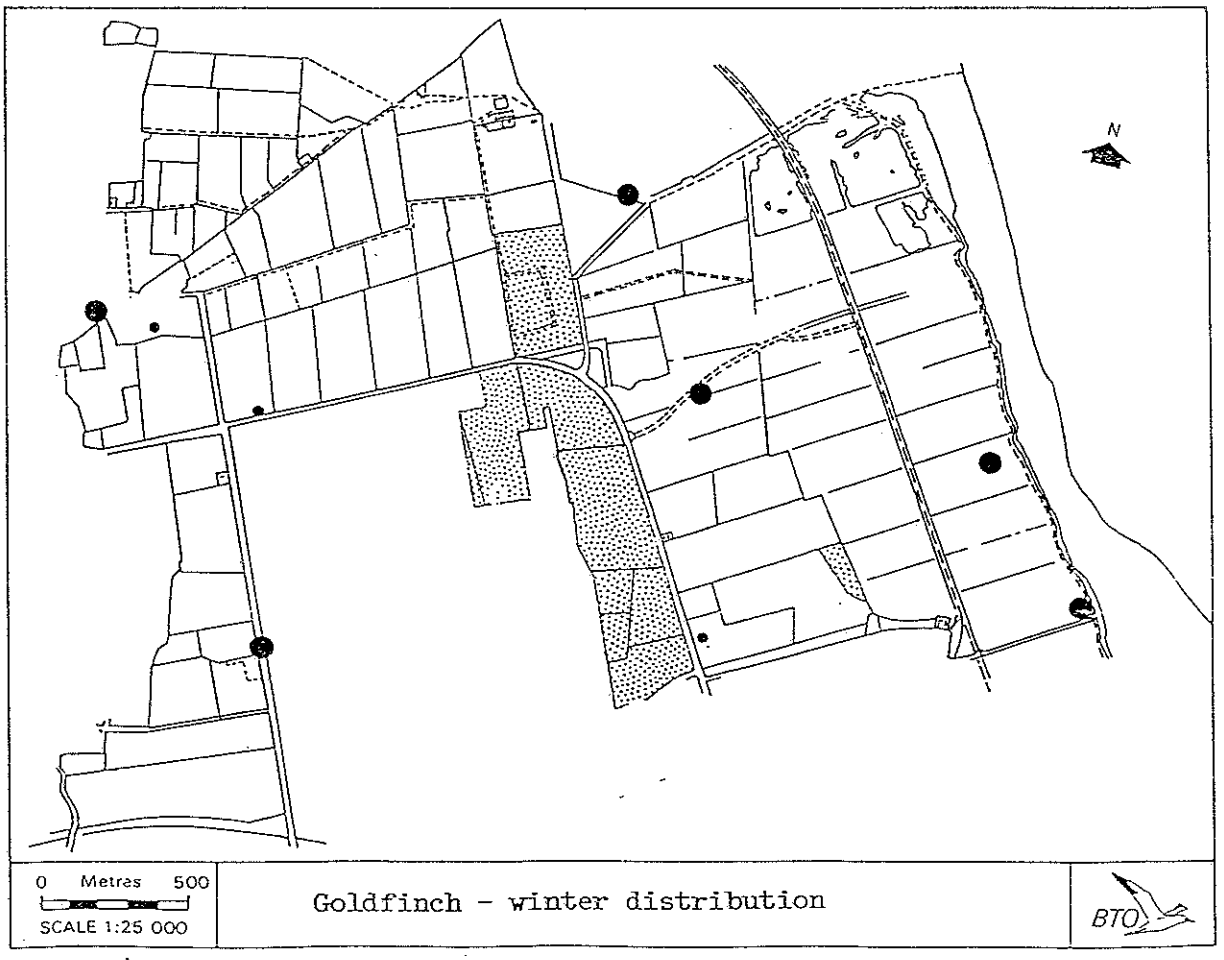


Figure 48

GRASSHOPPER WARBLER

Territories: 1

Though once linked with wetland margins, this species has in fact always occurred in dry habitats with tangled vegetation being found on downland, heaths and in young conifer plantations. Records of migrants recorded at coastal bird observatories indicate that national numbers seem to have halved since the Breeding Atlas estimate of around 25,000 pairs.

One territory was located in the survey area in 1987, between the seawall and southern pit on the Killingholme Haven Pits LNR.

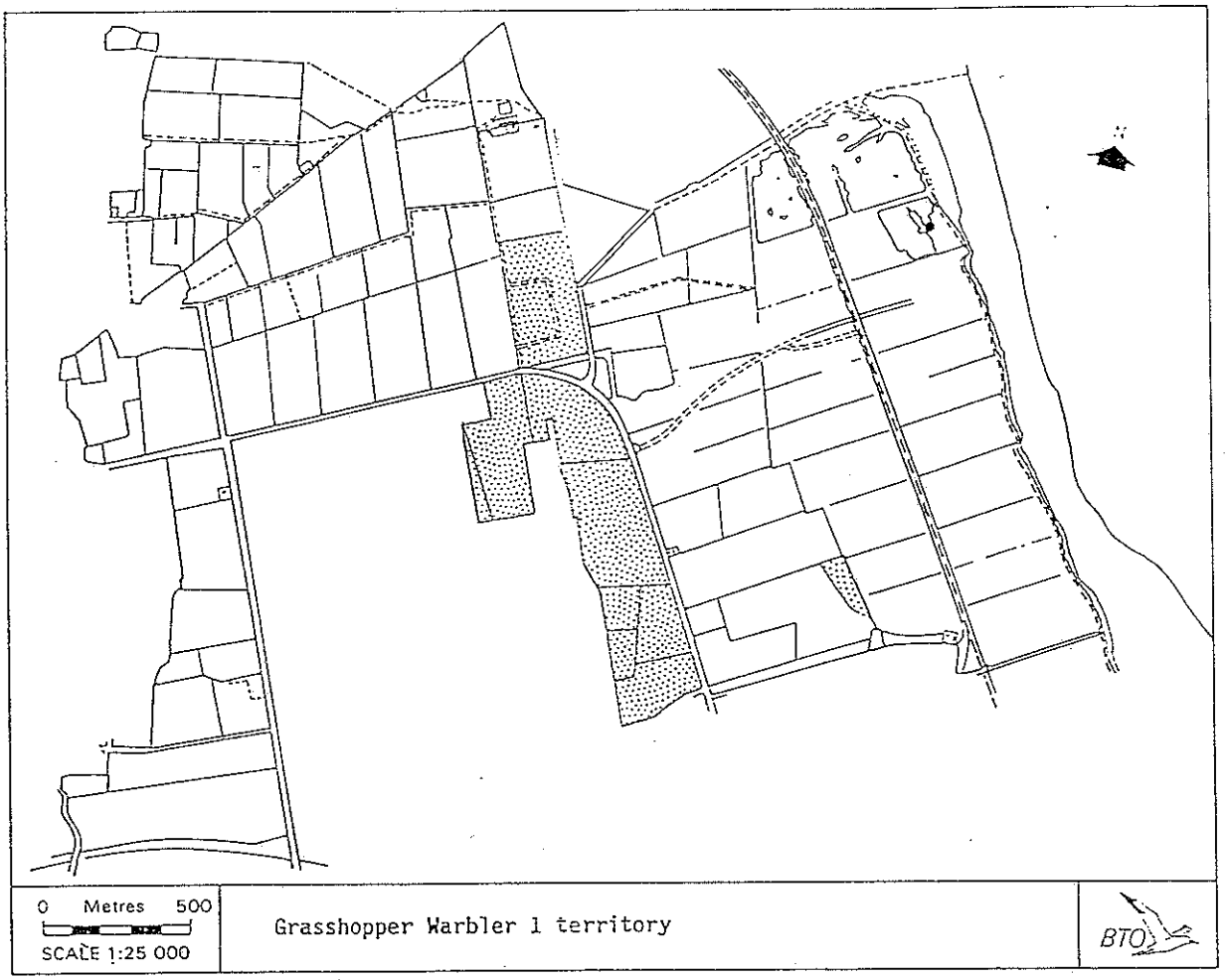

0 Metres 500
SCALE 1:25 000
Grasshopper Warbler 1 territory
BTO

Figure 49

GREAT BLACK-BACKED GULL

The Great Black-backed Gull is largely confined, as a breeding species to western coasts of the British Isles, but during winter it occurs in large numbers along all coasts and, to a lesser extent, in inland areas of England and lowland Scotland. Ringing recoveries indicate that the eastely component of the British winter population originates from breeding areas along the Norwegian coast, whereas the British breeding birds are largely sedentary in the west. Since many immigrant Great Black-backed Gulls spend much time feeding out at sea, and numbers present on the east coast vary considerably from day to day, there is no estimated winter population figure available.

The winter distribution of this species at Killingholme was similar to that of the other gull species, with largest numbers being found on the fields west of Eastfield Road near the refuse tip. Others used the open water of Killingholme Haven Pits. In summer, a few non-breeding birds were recorded with other gulls on the pits, industrial ground, grassland and inter-tidal areas.

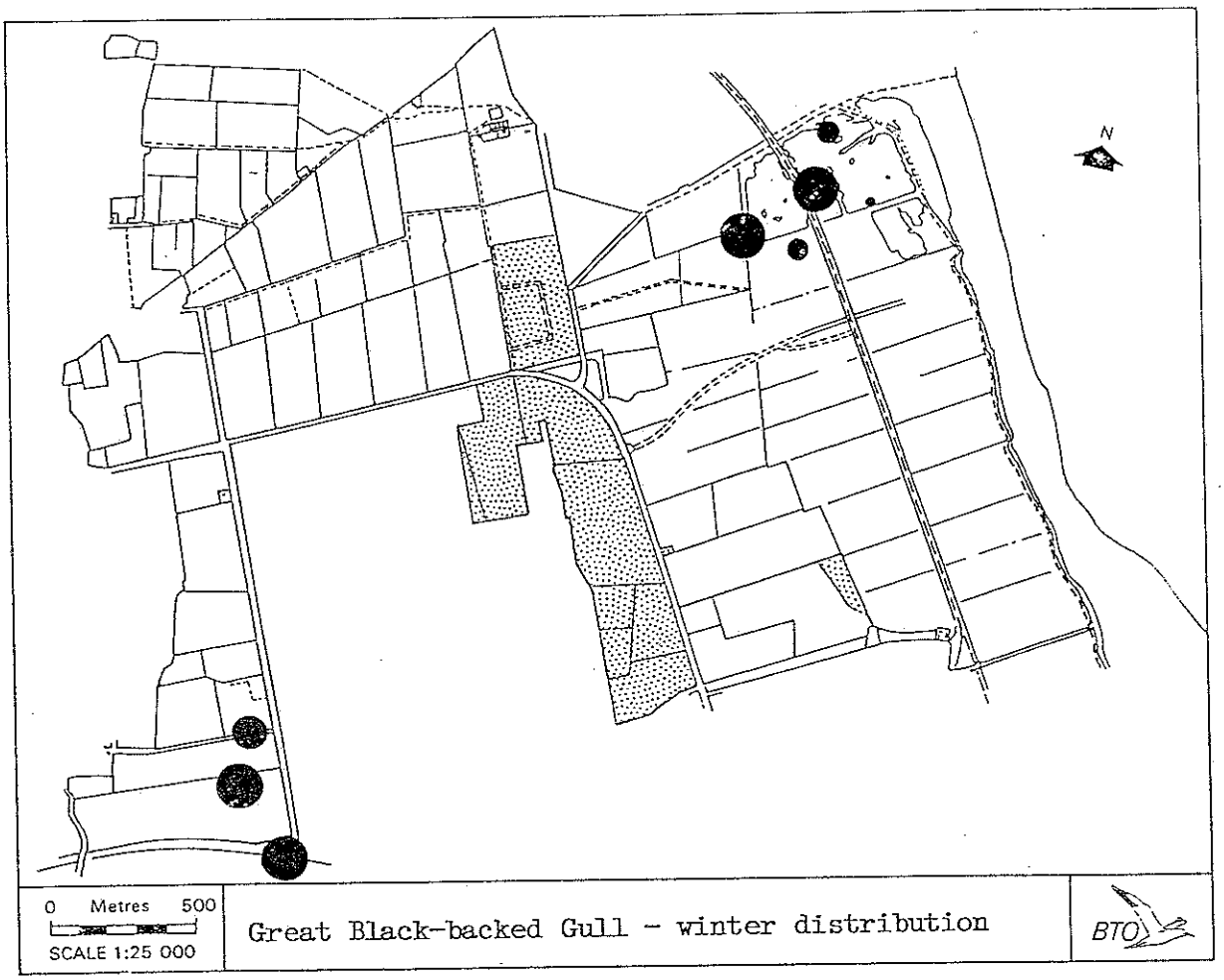

N
0 Metres 500
SCALE 1:25 000
Great Black-backed Gull - winter distribution
BTO

Figure 50

GREAT CRESTED GREBE

A resident species breedsing almost exclusively in larger, shallow lakes. A population of 6,800 adults was estimated in 1975 (quoted in Hudson and Marchant 1984), but numbers have risen sharply in the years since.

One bird was recorded in April and two adults arrived on the Killingholme Haven Pits in mid June and were still present at the end of the breeding bird survey. No breeding took place.

GREAT SPOTTED WOODPECKER

Territories: 1

This is more of a woodland species than the Green Woodpecker, breeding in deciduous and coniferous woodland but tending to avoid isolated trees and woodland clumps. Numbers have gradually increased since the mid-1970s, but the population still appears to be within the range of 30,000-40,000 pairs estimated in the Breeding Atlas. Great Spotted Woodpeckers are sedentary and are not found in Ireland. In winter, a wider range of habitats is used for foraging but pairs normally remain close to their breeding territories.

One territory was centered around the Fox Covert/Chasehill Wood woodland complex, and in winter all records were thought to apply to two individuals using the same area.

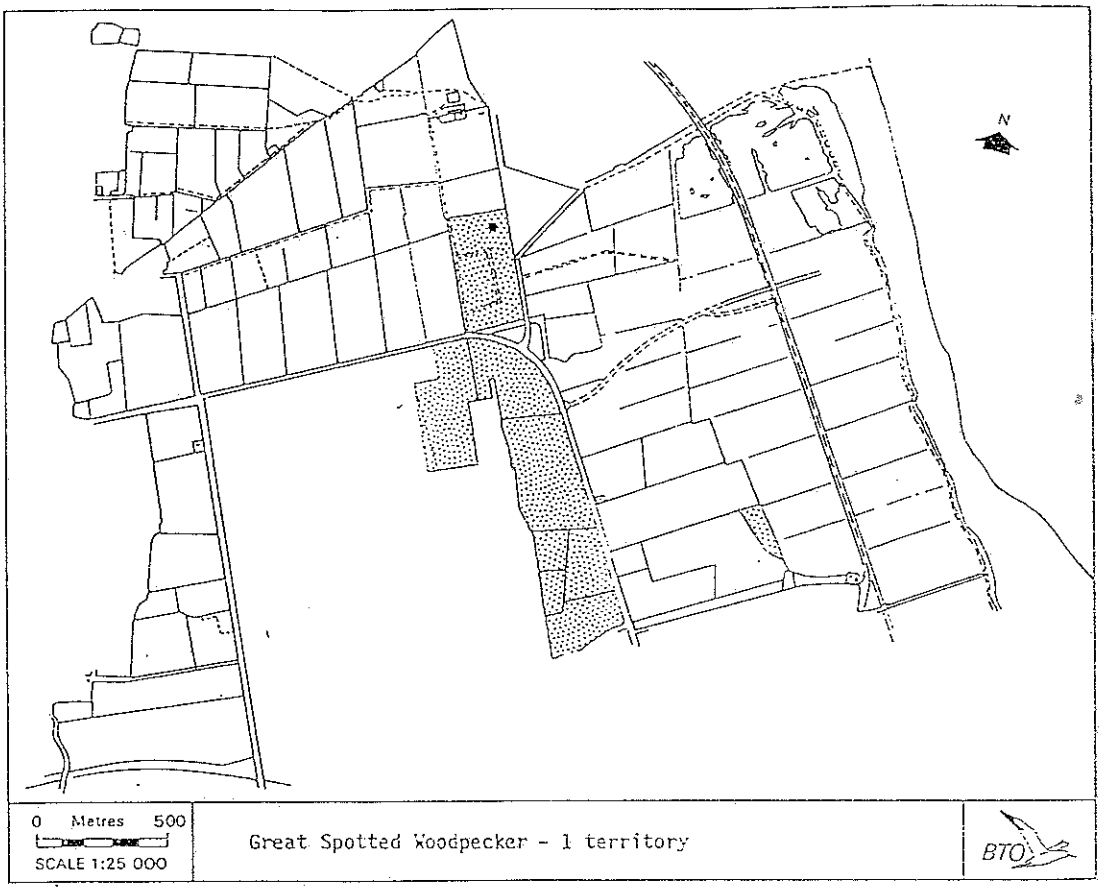


Figure 51

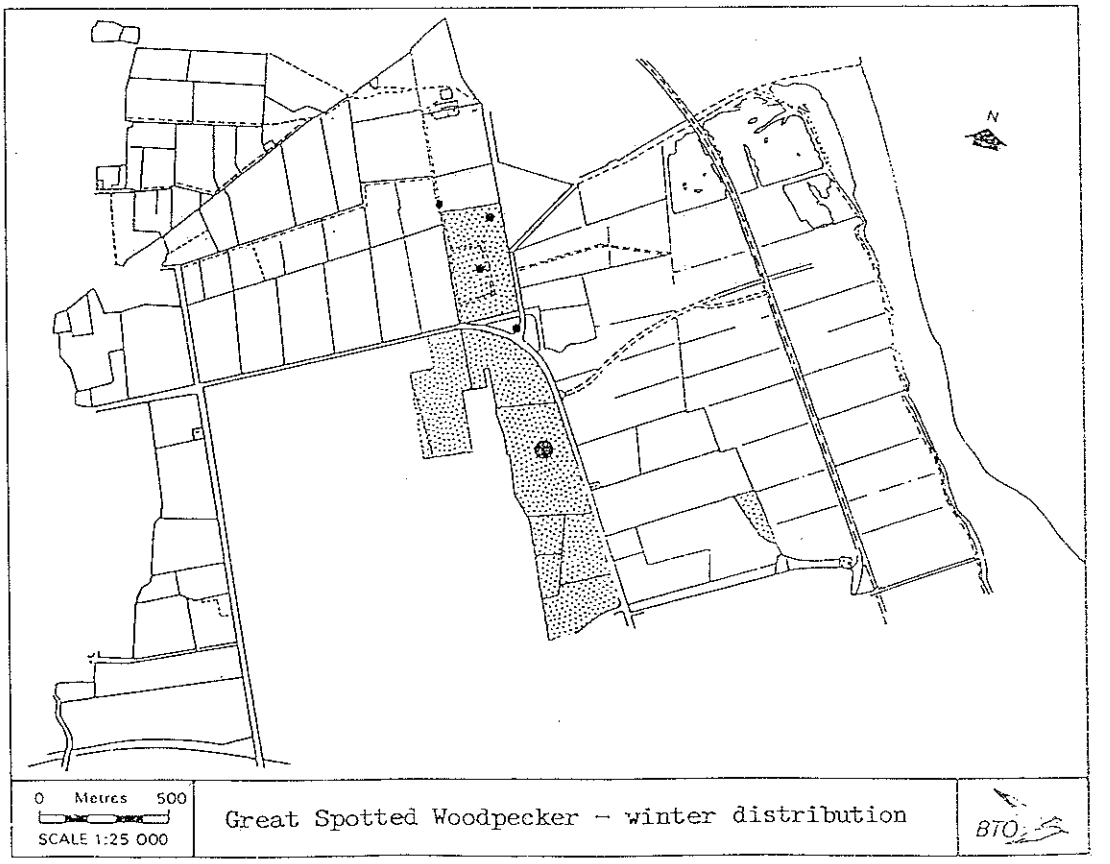


Figure 52

GREAT TIT

Territories: 17

Breeding Great Tits are strongly associated with deciduous woodland, where the highest densities of 32 pairs/square km have been found, but they also occur in coniferous woodland. A total British population, of 2 million pairs was estimated from the 1982 CBC data. In winter, adult female and juvenile birds form flocks; adult males tend to defend the breeding territories in mild weather, only joining the flocks in harsh weather. Beech mast comprises the major winter food but gardens are widely used as Beech mast is depleted.

Territories were widespread in the survey area, but usually absent from hedgerows lacking mature trees. In winter, Great Tits were widespread in woodland, scrub and hedgerows.

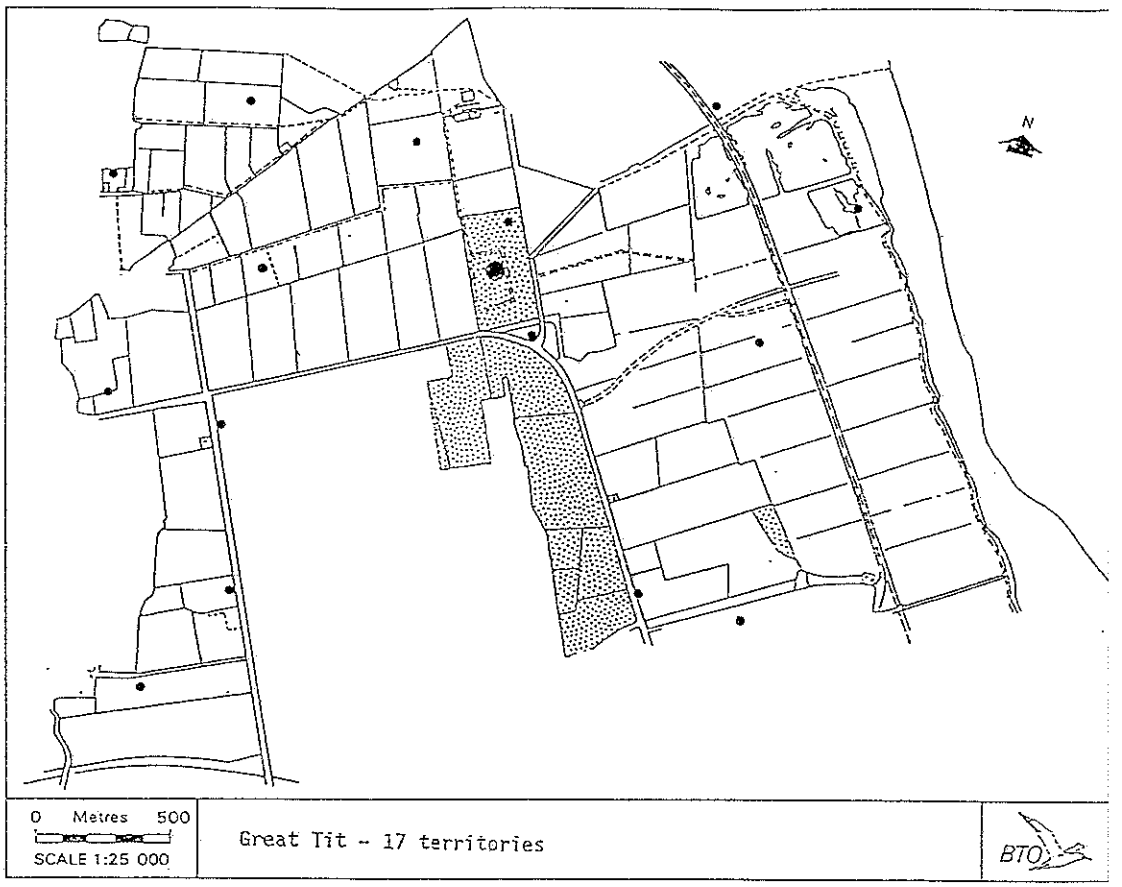


Figure 53.

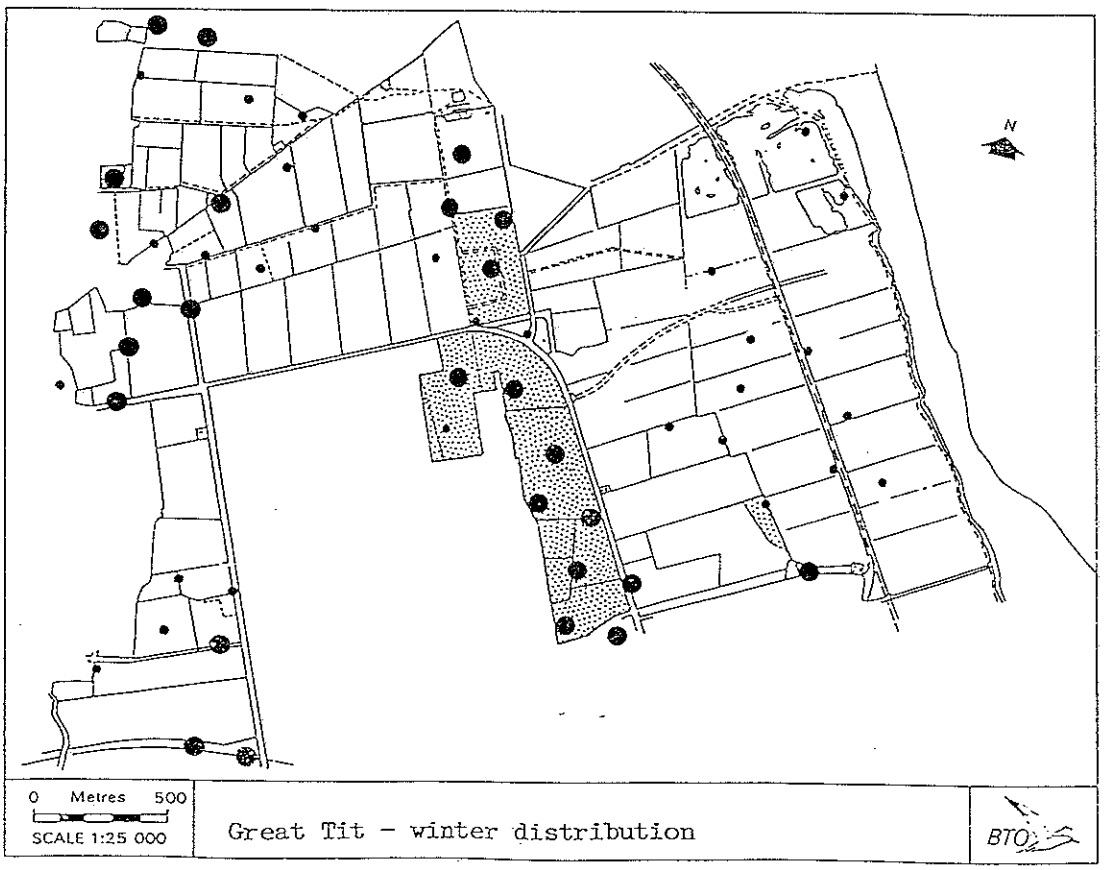


Figure 54

GREENFINCH

Territories: 6

Greenfinches nest in loose colonies in gardens, parks, farmland hedgerows and, particularly, patches of scrub. Densities of 4 pairs/square km on farmland and 6 in woodland suggest a total national population of 800,000 pairs. In winter, Greenfinches are widespread in the British Isles, feeding and roosting in flocks. There is some winter movement south-west by British birds and a little immigration, all movements becoming more pronounced in spells of harsh weather.

At Killingholme, Greenfinch territories were mainly restricted to the tall scrub and mature hedges in the north-west corner of the site. During the 1987-88 winter survey, records were of single birds or parties of less than 10 birds, with the exception of one flock of 30 feeding on recently ploughed arable land. Scrub and the permanent pasture hedgerows in the west of the survey area were the favoured habitats in winter.

GREENSHANK

In Britain, this attractive wader breeds in small numbers only in the flow country of north western Scotland. A small wintering population occurs coastally in Ireland and the west of Britain.

One spring passage bird flying west over Killingholme Haven Pits and adjoining fields was the only record.

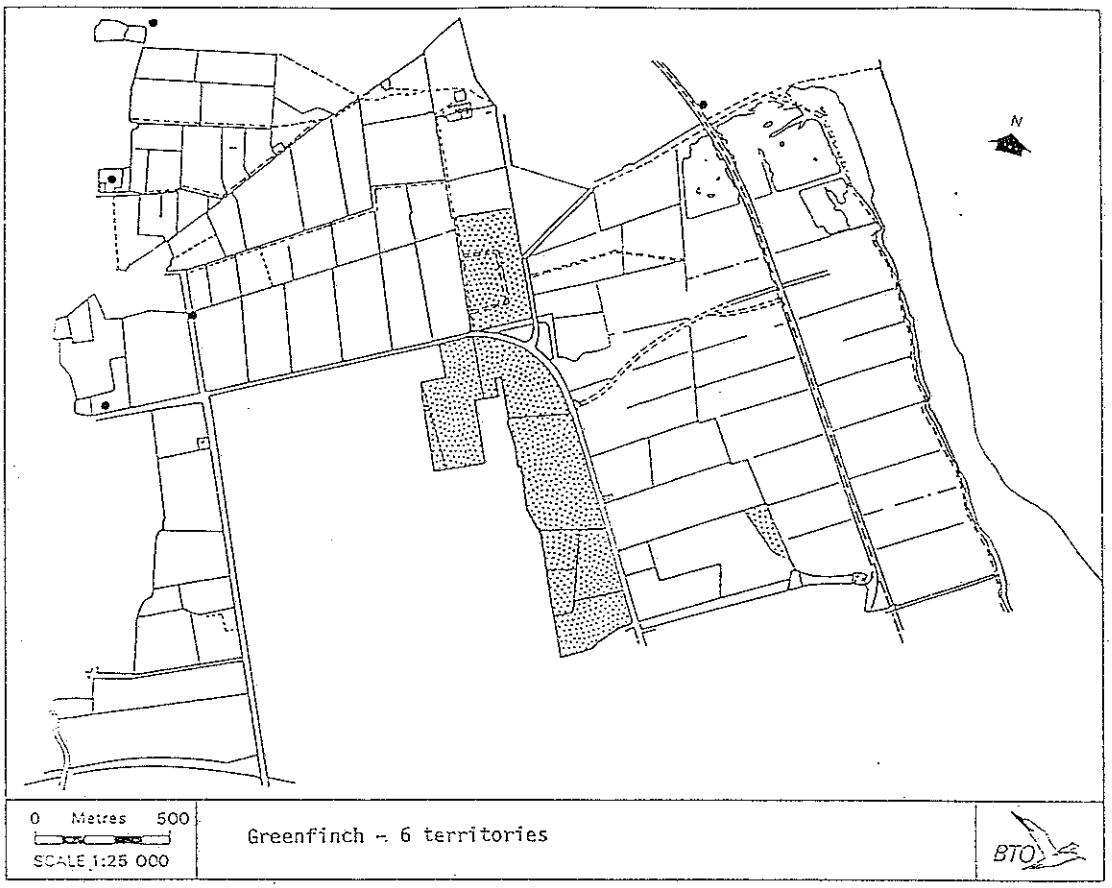


Figure 55

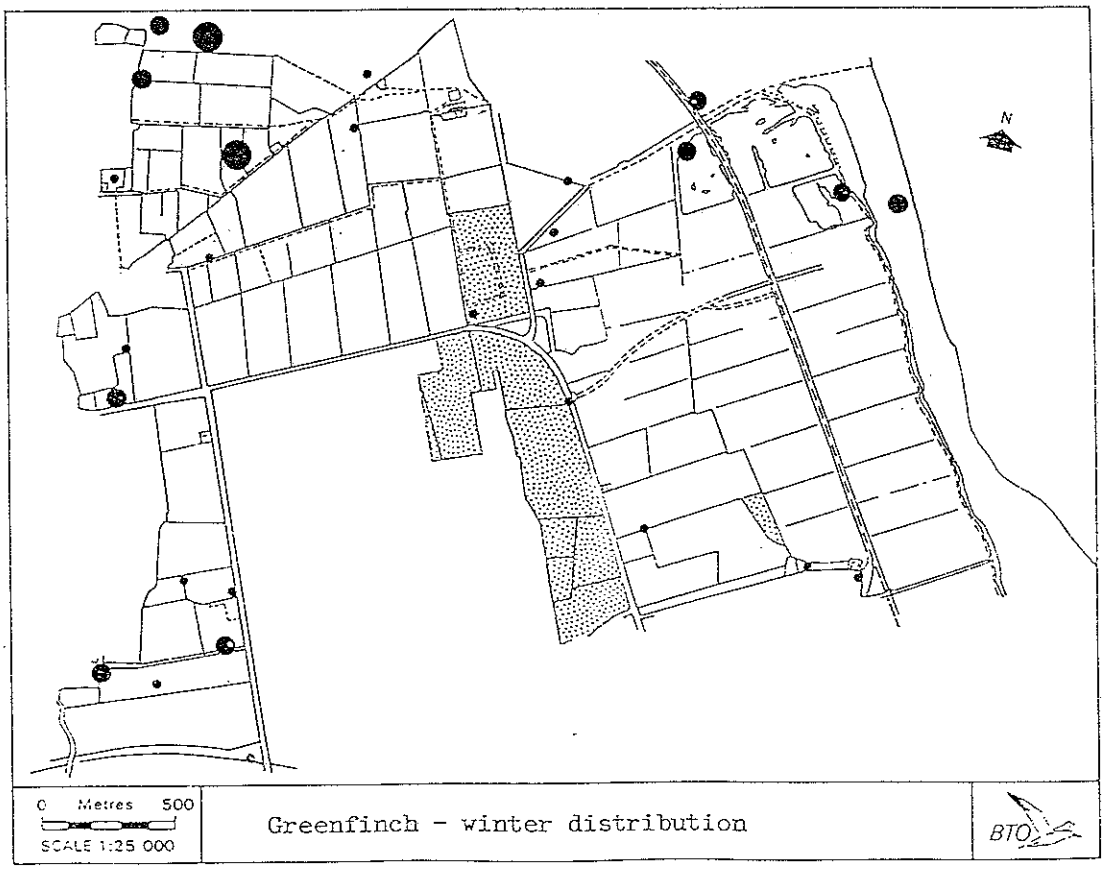


Figure 56

GREEN WOODPECKER

Territories: 1

This is the largest of the three woodpeckers breeding in Britain and typically occurs in open landscapes containing woodland. Mature trees are used for nesting, but unlike other woodpeckers this species often feeds on the ground. The large size of territories makes it a difficult species to monitor on CBC plots. A density of less than 10 pairs/square km is suspected, which would indicate a total population of 10,000 to 15,000 pairs. The species remains sedentary in winter.

A single territory overlapped the extreme north-western corner of the survey area. The species was not noted in winter.

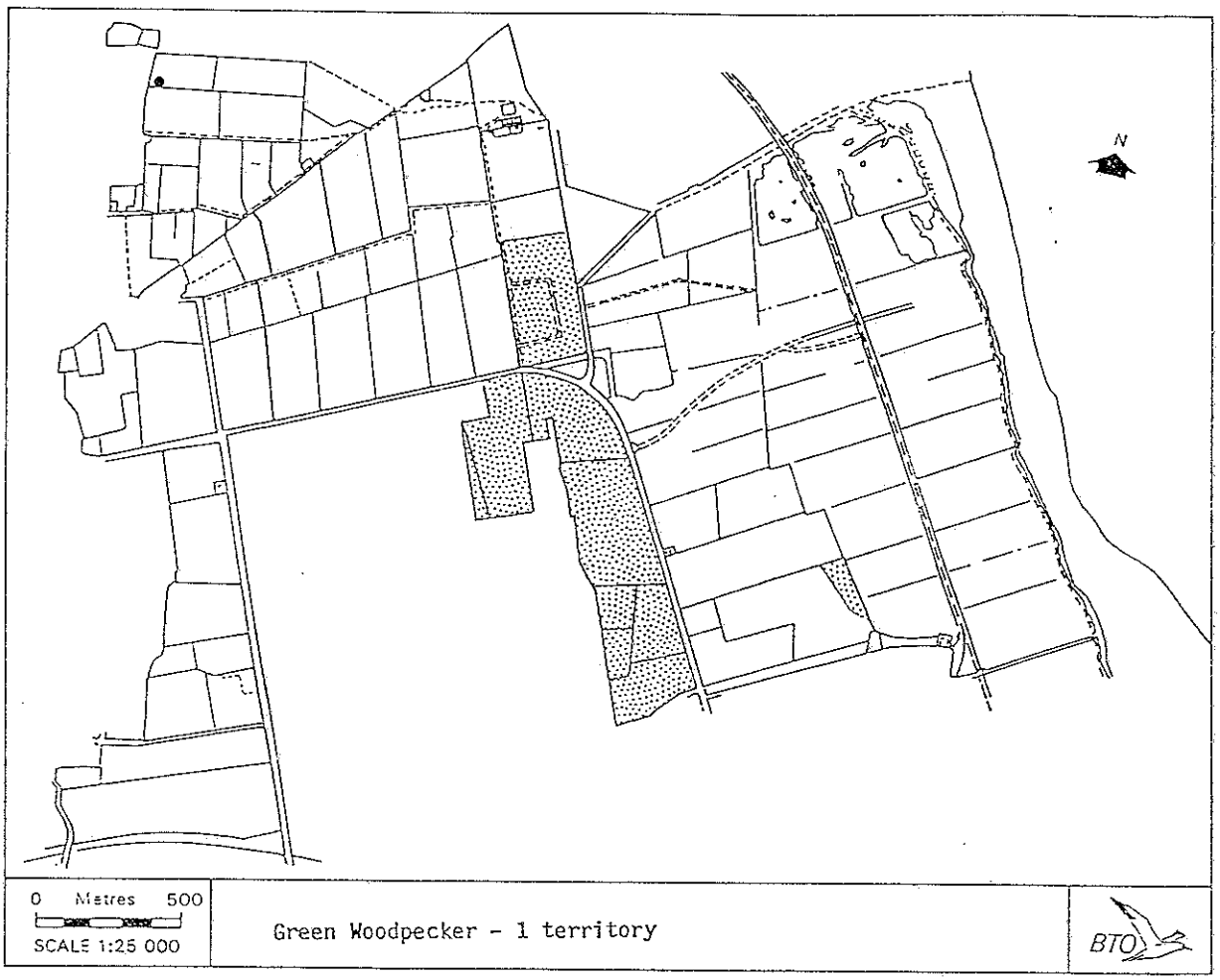

N
0 Metres 500
SCALE 1:25 000
Green Woodpecker - 1 territory
BTO

Figure 57

GREY HERON

A species monitored for more than 50 years by the BTO, the Heron population numbered 10,160 breeding pairs in Britain in 1985, the highest total recorded. In winter, Grey Herons are widely distributed throughout the British Isles, where any unfrozen wetland is utilised as a source for a wide variety of prey.

One to four birds were regularly recorded at the Killingholme Haven Pits throughout the summer survey period, and were seen flying between the pits and the nearest heronry at Thornton Abbey Wood, outside the survey area. Grey Herons were also recorded regularly at Killingholme Haven Pits during the winter, though no more than 2 were present at a time. There were just two other winter records, one of a bird on Baysgarth Farm Pasture, and the other of a bird in a ditch on Killingholme Marshes.

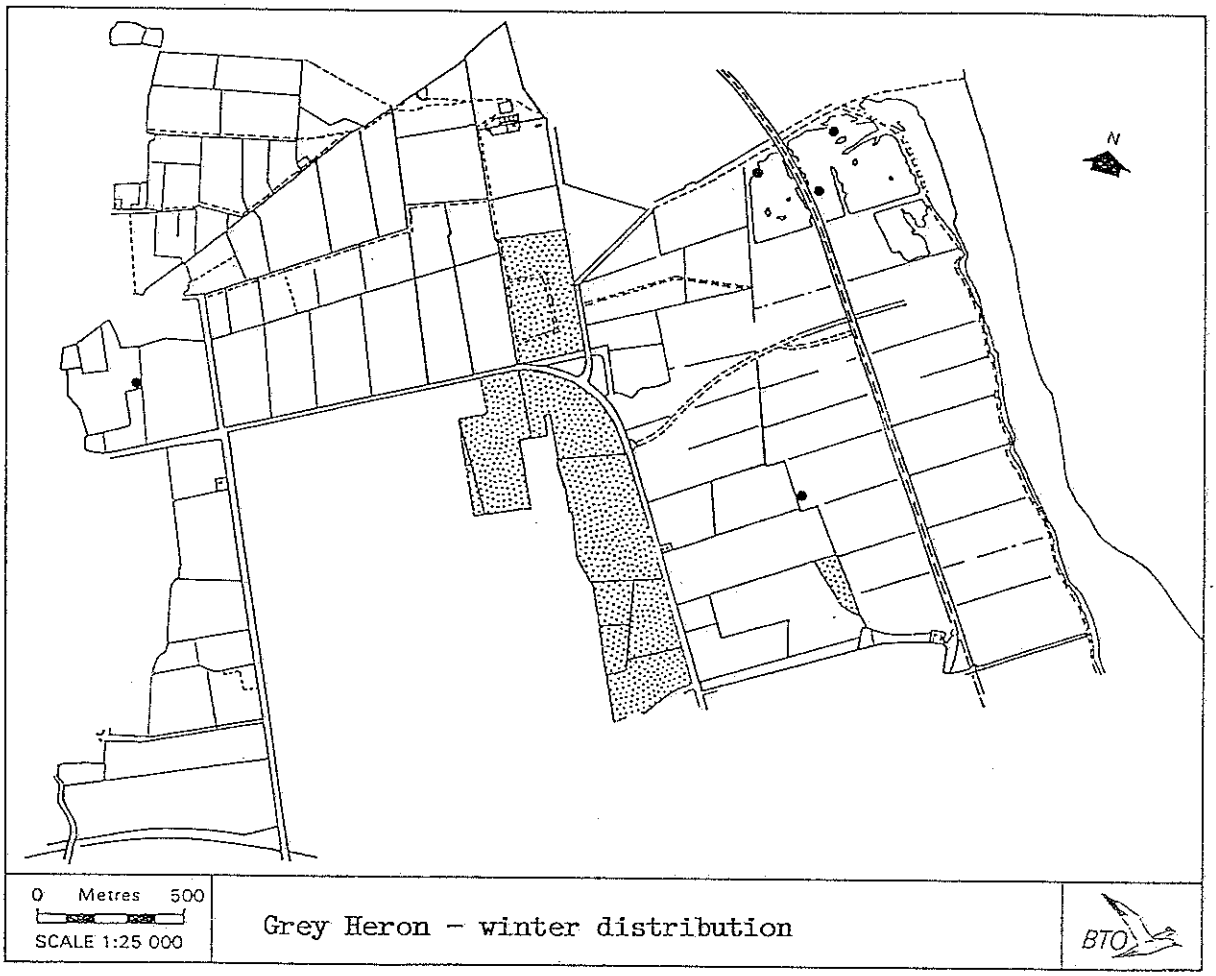

N
0 Metres 500
SCALE 1:25 000
Grey Heron - winter distribution
BTO

Figure 58

GREY PARTRIDGE

Number of territories: 4

Grey Partridges are widely distributed in England, but absent form large areas of Wales and Scotland. In all parts of their range, Grey Partridges are almost totally sedentary and confined to farmland. They have declined considerably in numbers, probably because modernisation of agricultural practices, increased use of pesticides, and a series of late cold springs have depressed the insect food supply available for chicks. By 1981, the CBC index suggested a population around 500,000 pairs, half that of the mid-1970s.

In the survey area, four breeding territories were located on rough pasture. Throughout the winter, Grey Partridges were found scattered widely over permanent grassland and arable fields, though they were absent from arable areas of Killingholme Marshes.

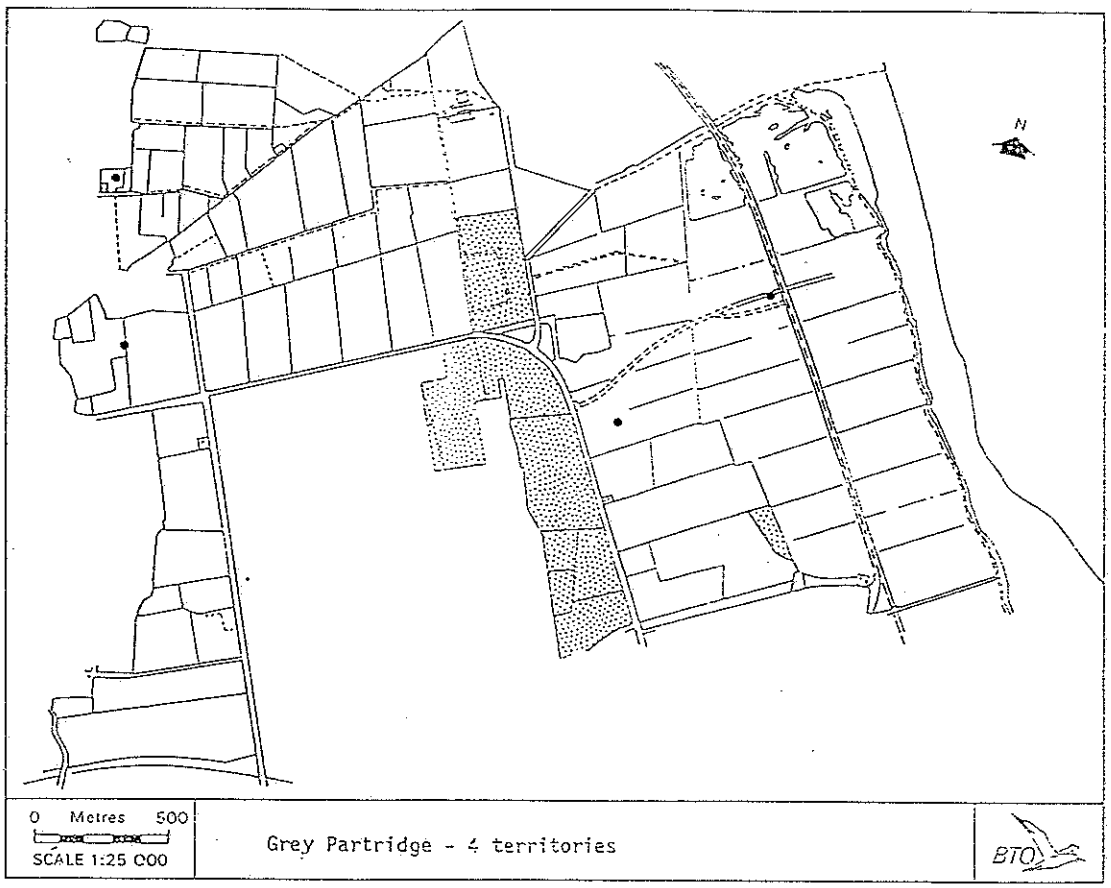


Figure 59

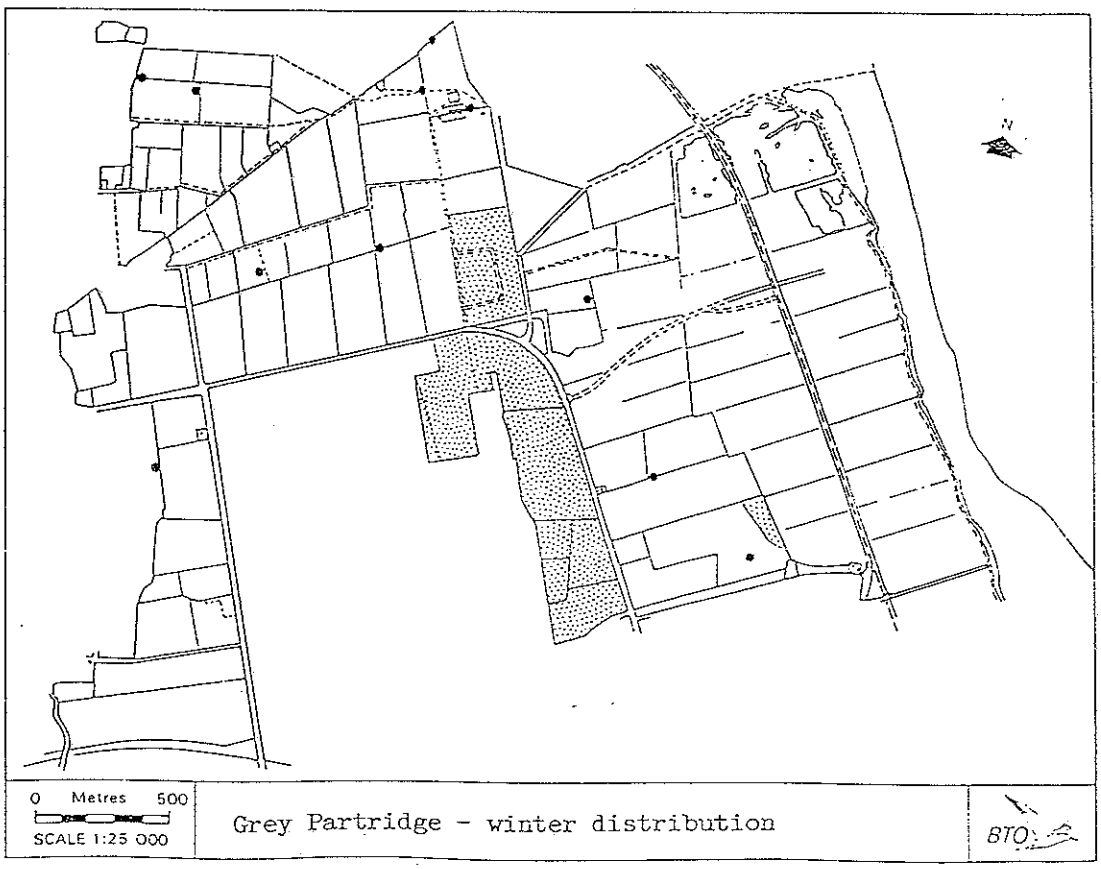


Figure 60

HERRING GULL

Although primarily a coastal breeding bird, the Herring Gull is widespread in Britain during the winter, being absent only from a few highland areas. Like its congeners, it regularly scavenges for food at inland refuse tips. The winter population of Britain and Ireland is perhaps in the region of half a million birds.

The winter distribution of Herring Gulls over the Killingholme survey area was similar to other gull species. Most records were of birds on fields west of Eastfield Road, near the refuse tip, with other birds using the Killingholme Haven Pits. In summer a few non-breeding birds were recorded from the pits, grassland areas,inter-tidal areas and industrial ground.

HOUSE MARTIN

House Martins are summer migrants which associate closely with man, most nests being sited under the eaves of houses. A population of 300,000 - 600,000 pairs was estimated in the Breeding Atlas, but they are not monitored by the BTO and no more recent data are available.

This aerial species cannot be assessed by CBC techniques, but birds were frequently seen feeding over the pits. Birds nested in the industrial area outside the survey area boundary, but evidence of breeding within was not found.

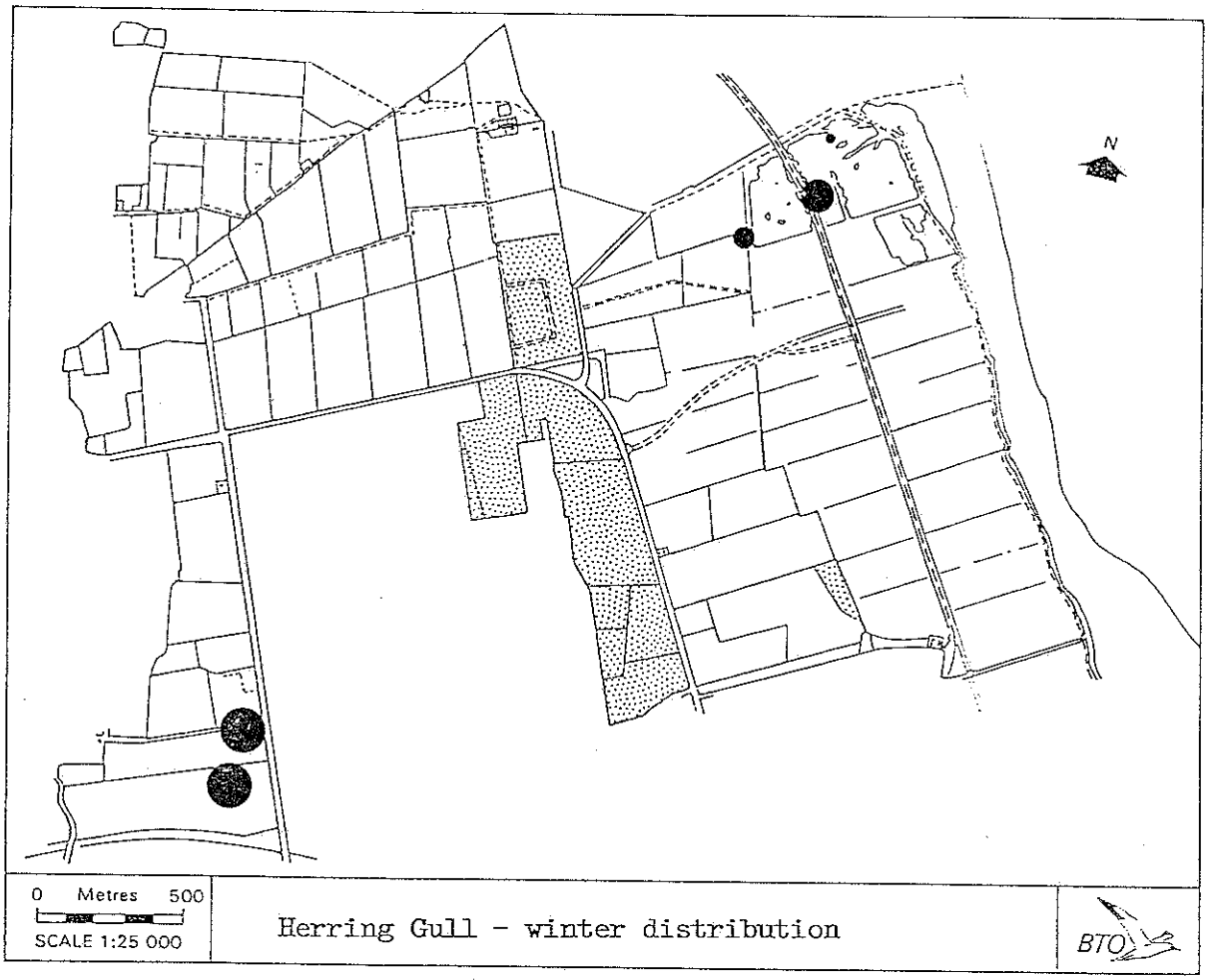

N
0 Metres 500
SCALE 1:25 000
Herring Gull - winter distribution
BTO

Figure 61

HOUSE SPARROW

This abundant species, commensal with man, was estimated to have a combined British and Irish breeding population of 3.5 to 7 million pairs in the early 1970s (Sharrock 1976). House Sparrows are extremely sedentary and in winter their commensal behaviour becomes even more pronounced.

In the survey area, House Sparrows were present all summer around farm outbuildings. Some birds undoubtedly bred, but an assessment of breeding numbers was not possible because of influxes of birds into the survey area from the adjoining industrial compounds and also because the species is not censused by the CBC technique. The majority of winter records came from the vicinity of human settlement and/or stockyards.

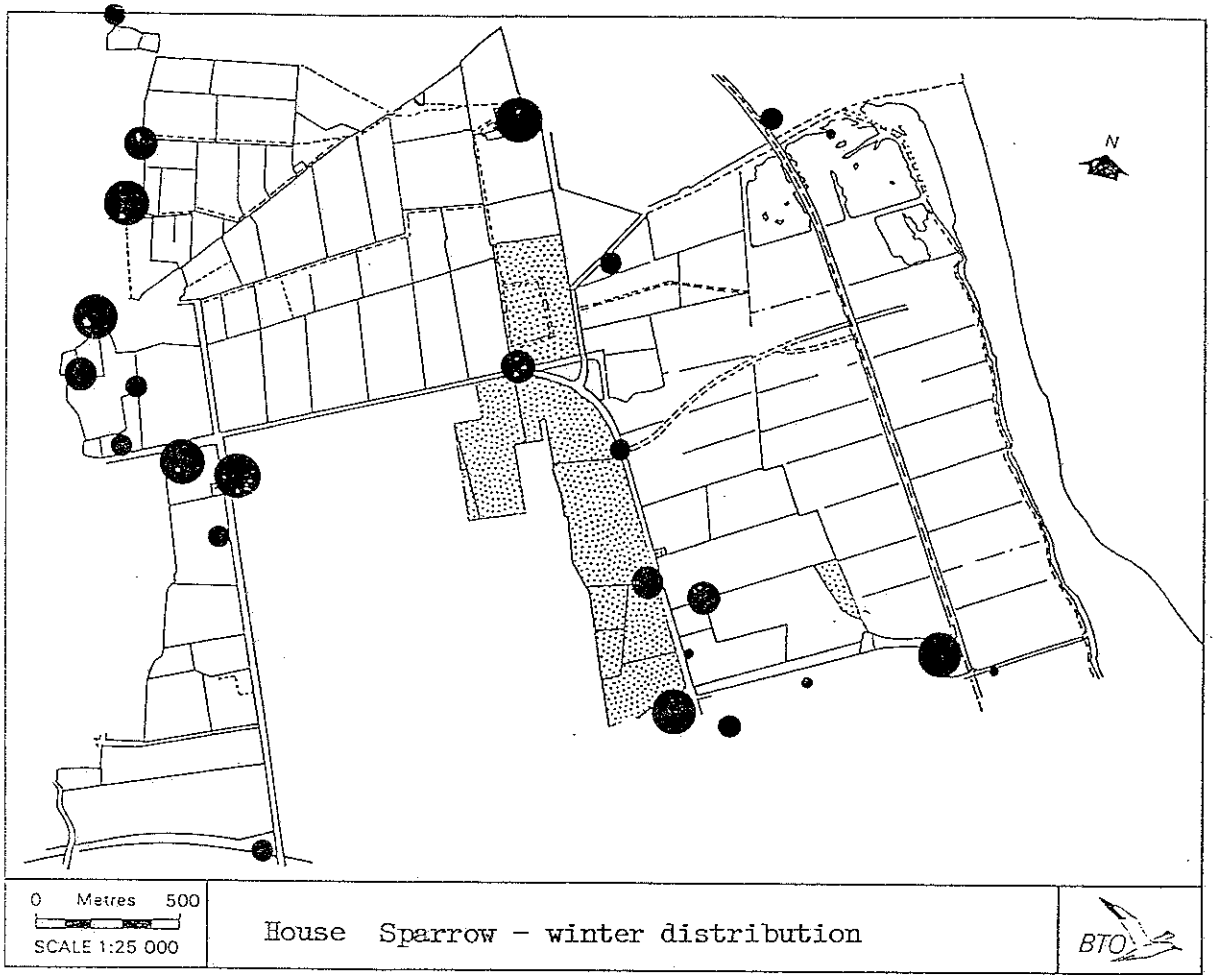

N
0 Metres 500
SCALE 1:25 000
House Sparrow - winter distribution
BTO

Figure 62

JACKDAW

This gregarious species nests colonially in a variety of situations. Holes in trees, crevices in cliffs and a variety of cavities in artificial structures are used. The total population for Britain and Ireland was believed to be about 500,000 pairs in the early 1970s, but the CBC farmland index has risen since then. Wintering birds tend to flock with Rooks and move south and west from breeding areas. The movement results in a lowering of numbers in the north of the British Isles and, aided by European immigration, a rise in the numbers in the south.

Birds occasionally flew over the survey area in the summer, while moving to and from the Killingholme rubbish tip; however, no breeding was recorded. In winter, the major concentrations of records were to the west of Eastfield Road, and relate to Jackdaws in mixed flocks with Rooks.

JACK SNIPE

Nationally Jack Snipe are a scarce winter visitor of restricted national distribution that occur in a variety of coastal and inland wetland areas.

A single Jack Snipe, flushed from the high saltmarsh in March, was the only record from the survey area. Records for the site of this scarce species from 1982-86 (Lincolnshire Bird Reports) involved similar single birds in late winter and early spring in three years and one autumn record.

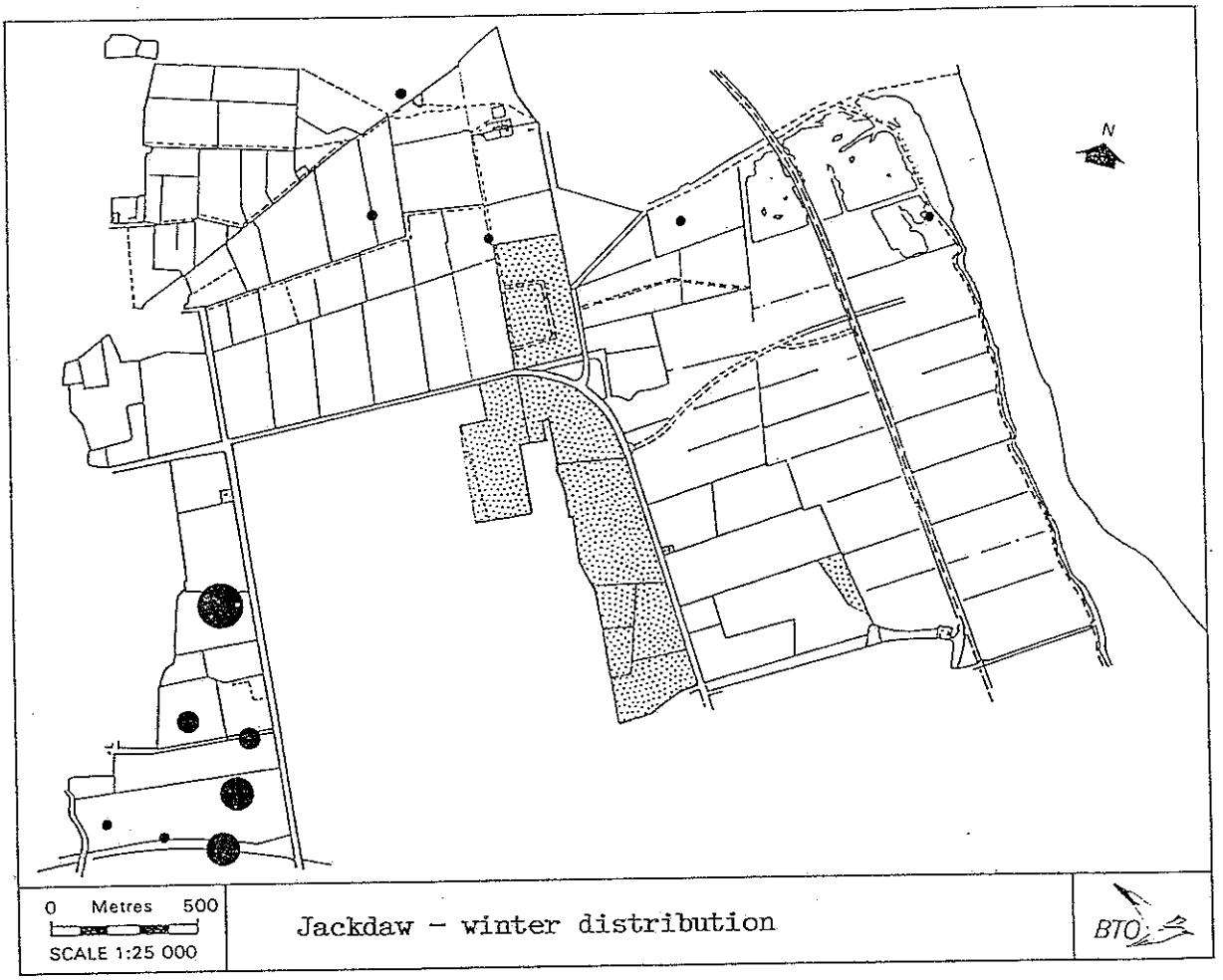

N
0 Metres 500
SCALE 1:25 000
Jackdaw - winter distribution
BTO

Figure 63

JAY

Territories: 3

The Jay is the most arboreal member of the crow family and, combined with its secretive behaviour, this makes it a difficult bird to observe in the breeding season. It is resident in a range of woodland types, apparently favouring coppice with standards, and is especially characteristic of oak woodlands where it aids tree regeneration by burying acorns as a winter food cache. Densities of 5.9 pairs per km/square in woodland in 1982 suggested a population of around 200,000 pairs, though this extrapolation may be inflated due to the species's scarcity over a large area of Scotland.

Three territories were found in the central woodland block, but feeding parties of 2-4 birds recorded in the hedgerows of Killingholme Marshes in late June/early July were seen flying back to the unsurveyed Burkinshaw's Covert. There were no winter records.

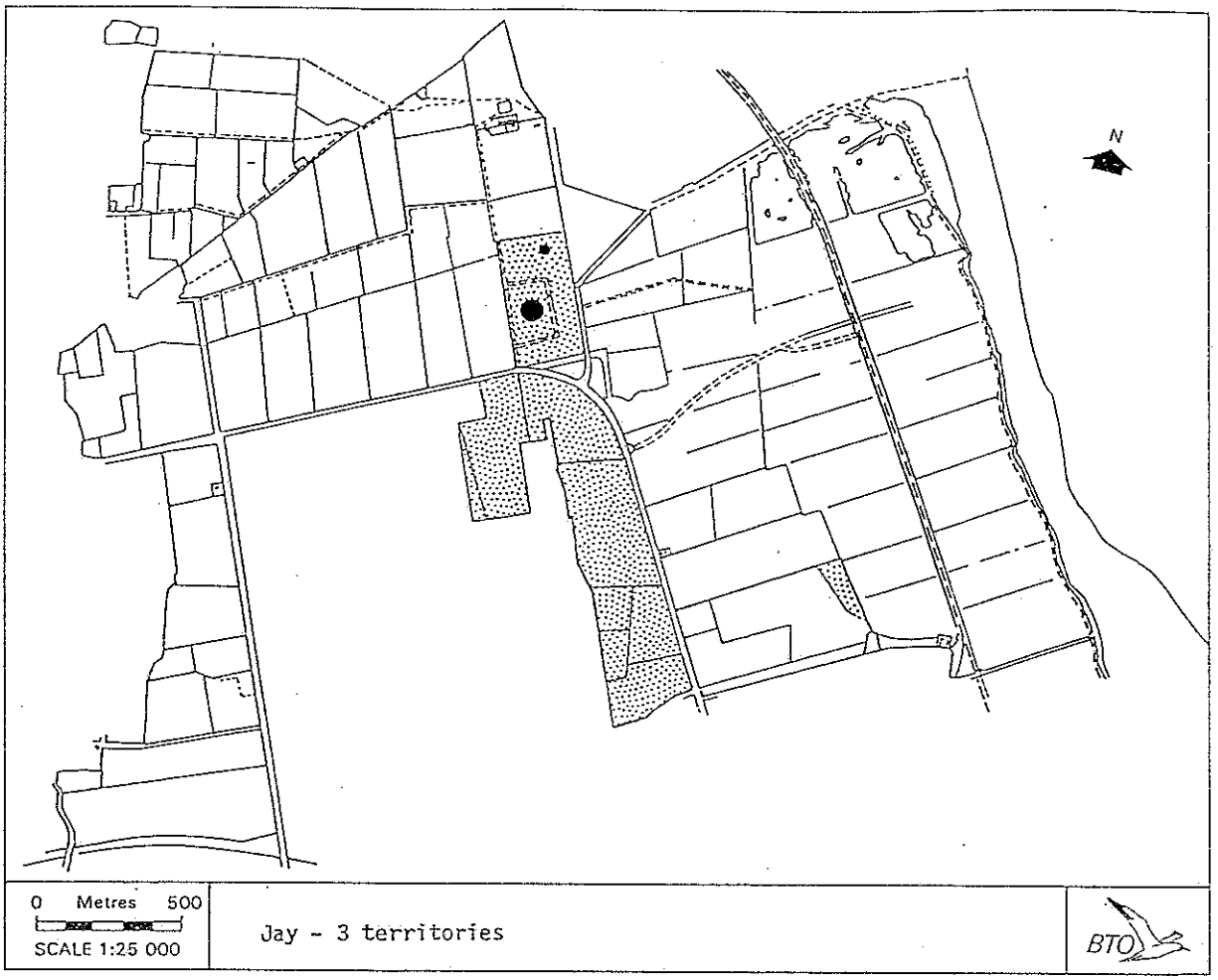


Figure 64

KESTREL

The most adaptable and numerous bird of prey in Britain, often found nesting in urban settings. Kestrels are most likely to be seen hovering while scanning the ground for prey, typically Short-tailed Voles, small birds and beetles. A British and Irish breeding population of 30,000 to 40,000 pairs is predicted from an estimated density of 15-20 pairs/square km. In winter, birds are widespread as in summer but tend to concentrate in the south-east.

In summer, birds were regularly seen hunting over the survey area, but no nest was found. Over the 1987/88 winter, 1-2 Kestrels were recorded in the survey area during each visit, mainly in open habitats but one bird hunted over the young poplar plantation in Burkinshaw's Plantation (South).

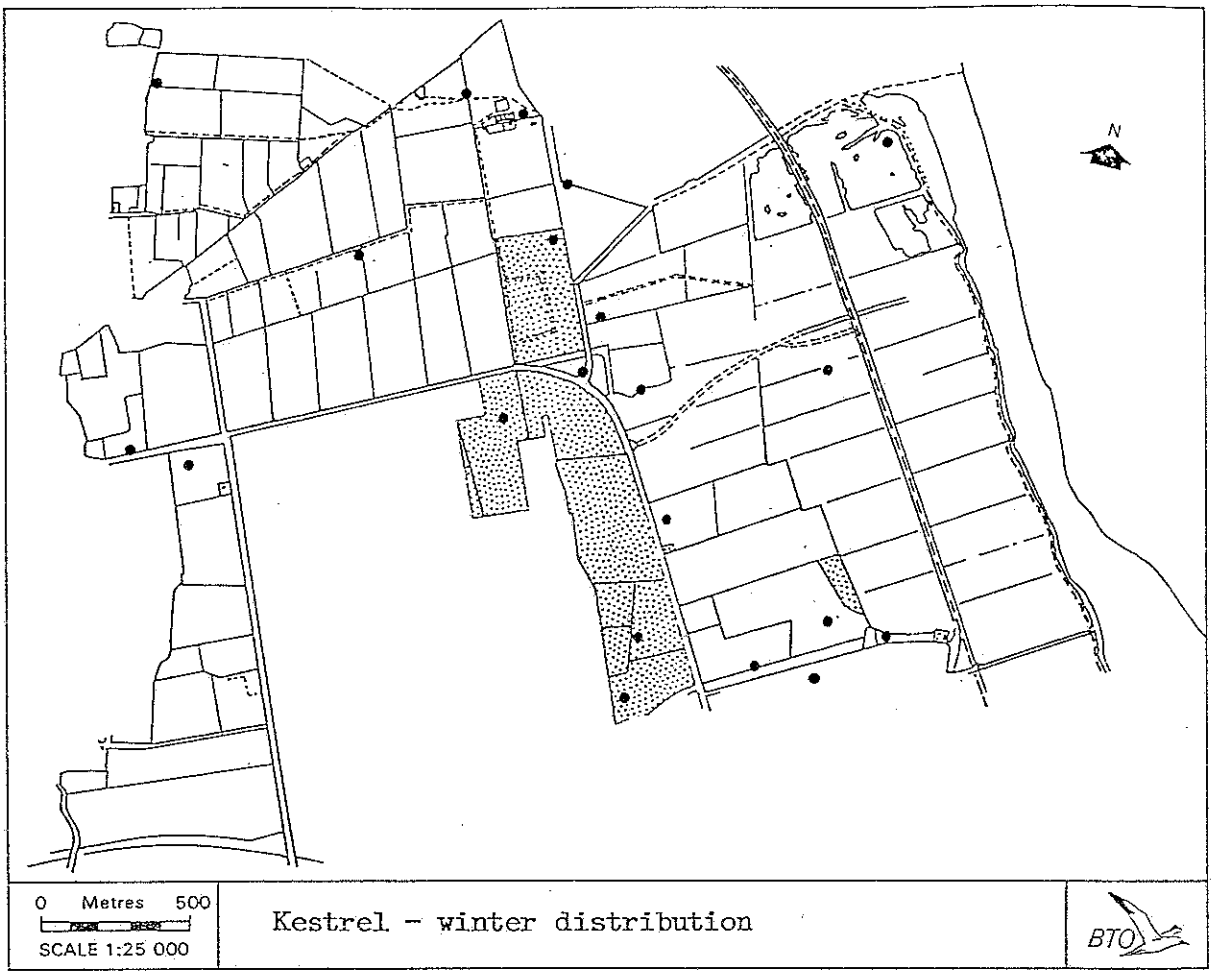
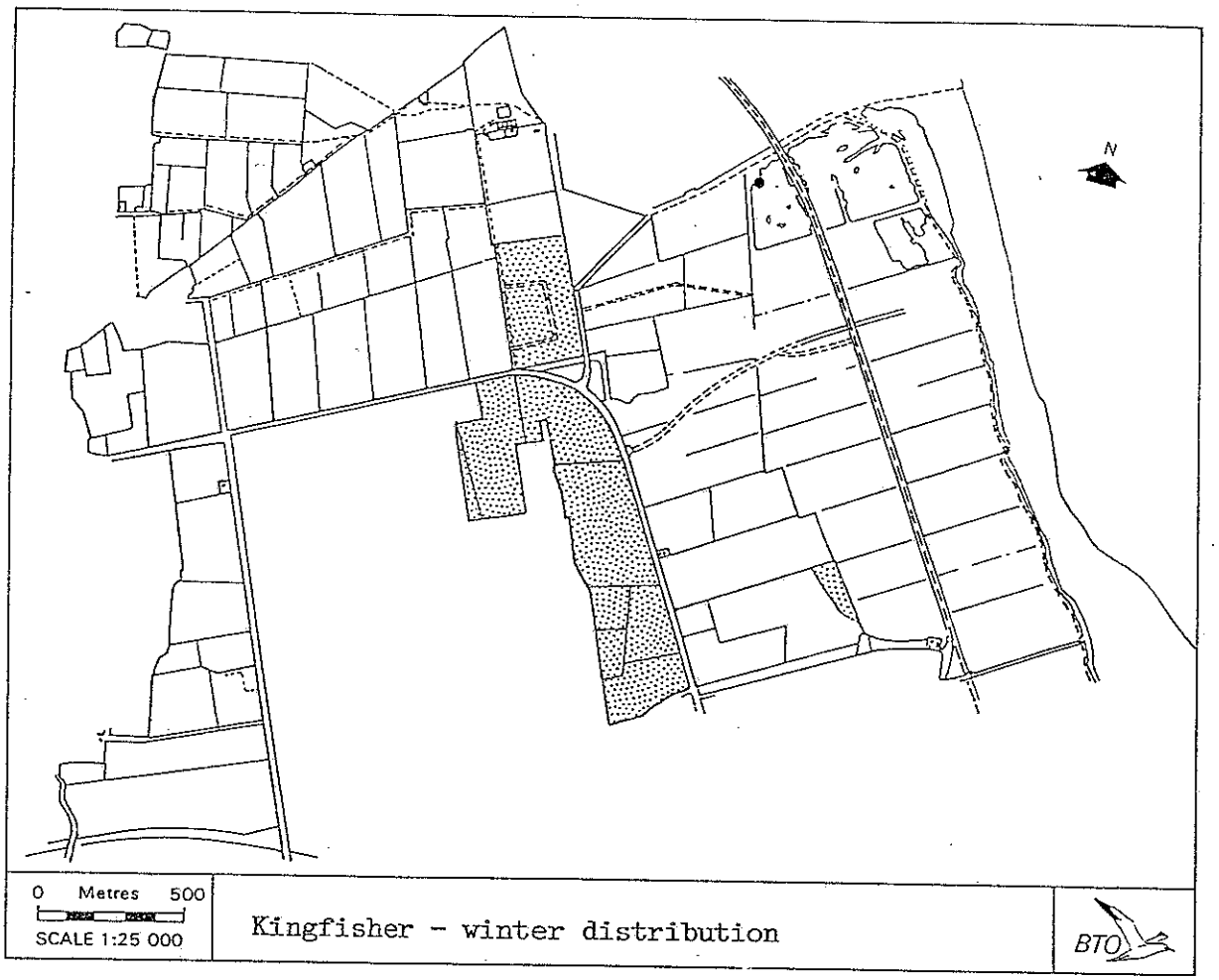

N
0 Metres 500
SCALE 1:25 000
Kestrel - winter distribution
BTO

Figure 65

KINGFISHER

Due to its feeding technique of plunge diving, the Kingfisher needs access to relatively still water, which enables it to see its prey. Consequently the highest density of Kingfishers in Britain is recorded on the slow-flowing waters of the English, Irish and Welsh lowlands. In addition to movements of juveniles away from breeding territories in autumn, movements to the coast occur in cold weather. The British winter population has been estimated at 9,000-15,000 birds, based on a suggested breeding population of 5,000-9,000 pairs.

There was just a single record in March 1988 at Killingholme Haven Pits LNR.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0 Metres 500
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Kingfisher - winter distribution
BTO

Figure 66

LAPWING

Lapwings breed on lowland pastures, open waste ground and marginal upland habitats, and require adjacent areas of relatively short vegetation for feeding. In winter, Lapwings are widely distributed over the British Isles, but concentrate in lowland areas of England and around the coasts. Large scale movements may ocur in response to cold weather.

A few non-breeding birds, present on the intertidal areas of the survey area from late June, comprised the only summer records. Surprisingly, the only terrestrial winter records involved a flock of 120 in late January, on permanent grassland adjacent to Killingholme Haven Pits. This flock represented the peak winter count of Lapwings for the winter survey. On exposed mudflats wintering Lapwings were recorded on 6 out of 12 survey visits. The number per visit ranged between 4 and 46 birds. The survey peak count of 120 represented 2.5% of the average peak Humber winter count. During the course of the winter study, Lapwings always left Killingholme over the high tide period, flying either down river or (noted just once) across to the north bank. This contrasts with the BoEE data for Killingholme, which show an average peak winter count of 79 Lapwings for the previous five winters, however, as with Dunlin, the average is influenced by larger numbers up to 1984/5 with none counted in the 1986/7 winter. Loss of roosting areas within the pits LNR may well explain the apparent abandonment of the site at high tide.

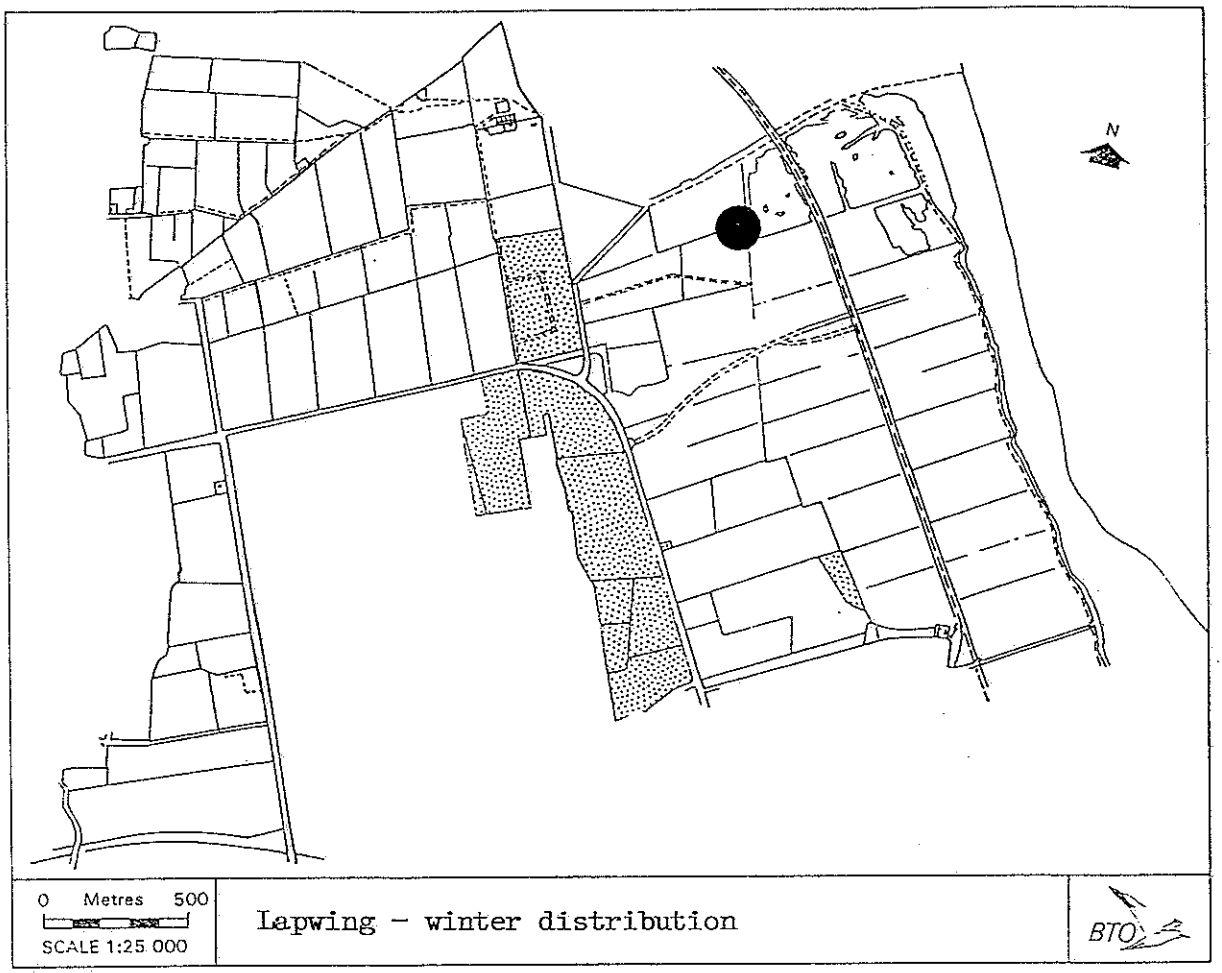
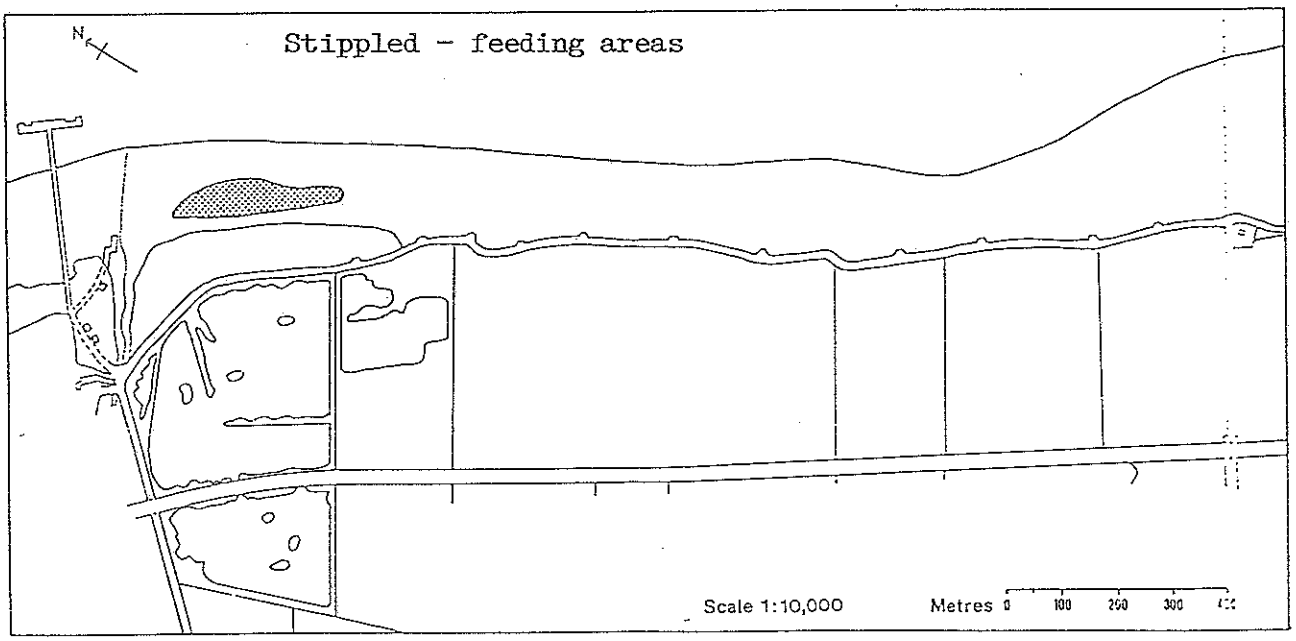


Figure 67



Lapwing - winter intertidal distribution

Figure 68

LESSER WHITETHROAT

Territories: 13

This secretive summer migrant haunts tall, dense, thorn hedgerows on farmland across lowland Britain. Confirmation of breeding is more easily obtained later in the season when pairs become more noisy and conspicuous as the young are about to fledge. The population is believed to be at least 80,000 pairs.

Territories were thinly distributed across the survey area in scrub and tall hedgerows.

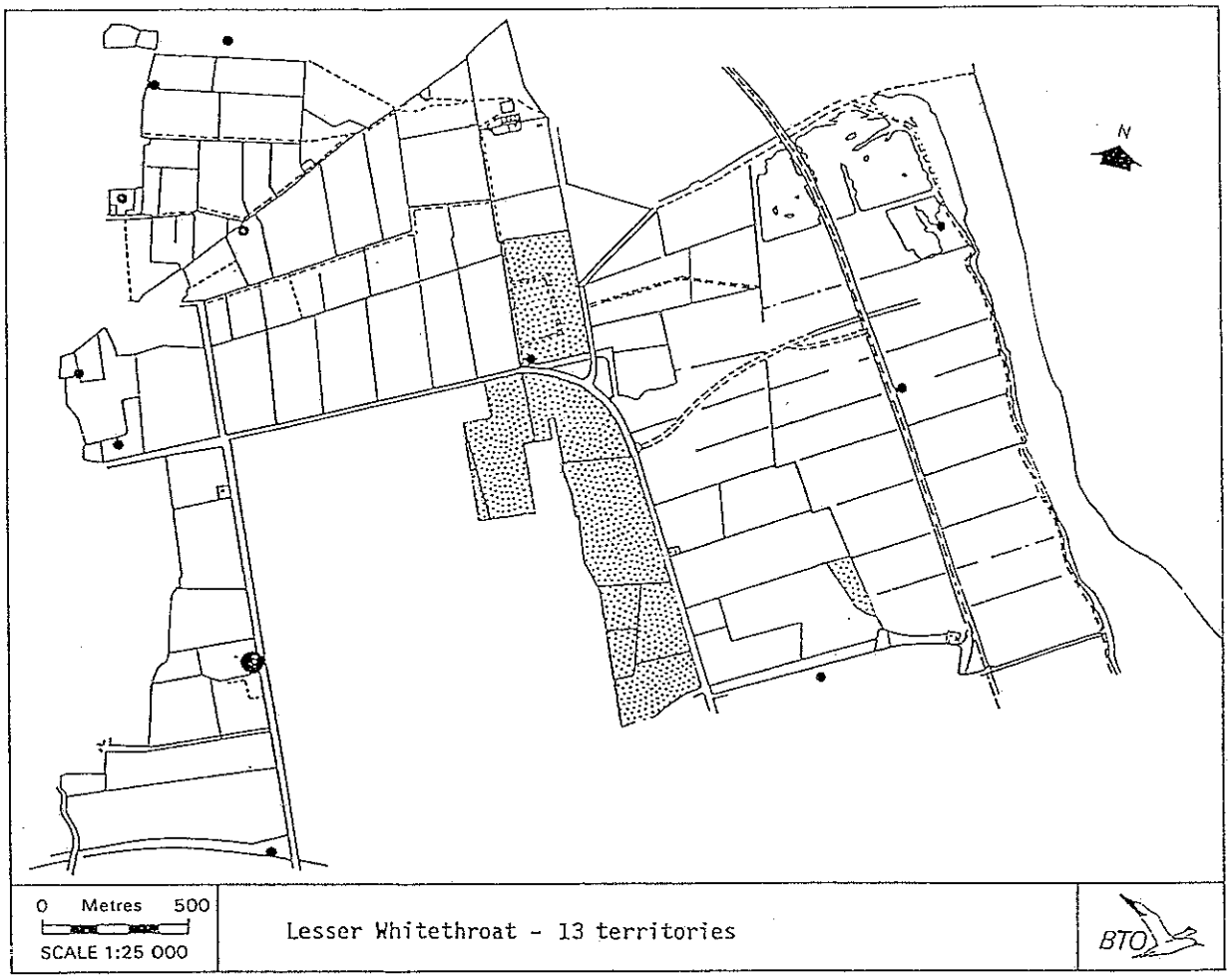

N
0 Metres 500
SCALE 1:25 000
Lesser Whitethroat - 13 territories
BTO

Figure 69

LINNET

Territories: 14

Nationally, small nesting colonies occur in a variety of open habitats, including heaths, downs, farmland, gardens and coastal scrub. Weed seeds are the most important part of the Linnet's diet, and modern farming techniques are increasingly detrimental to the species. Densities on farmland and woodland are similar, averaging 3-4 pairs/square km, which would give a British population of 700,000 to 800,000 pairs. In winter, local birds often form large flocks, spread out at low density.

A breeding colony was present in the scrub and hedgerows of the Eastfield Road railway embankment whereas other territories were widely scattered. Linnets were infrequently recorded at Killingholme during the winter survey. No large flocks were present, although 16 birds were recorded on the disturbed ground of the Nirex compound bedside Rosper Road. Other records were from scrub, arable fields and hedgerows.

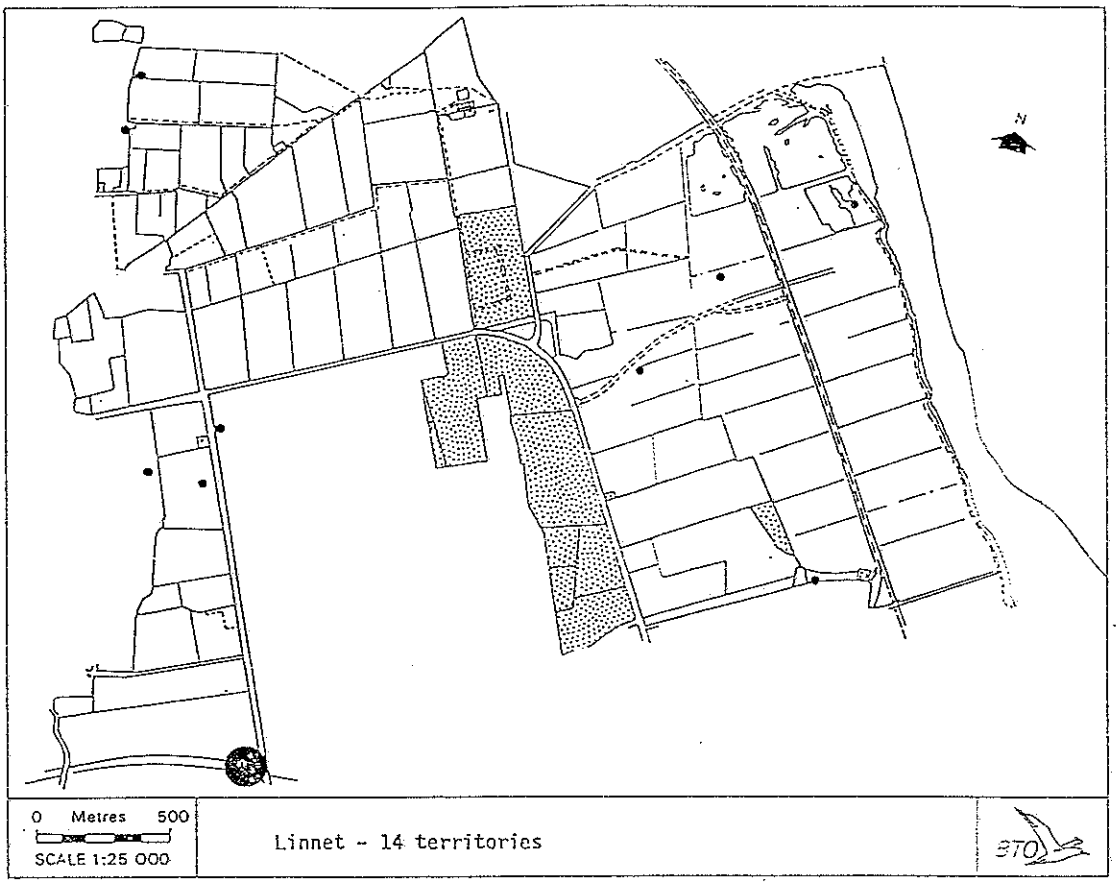


Figure 70

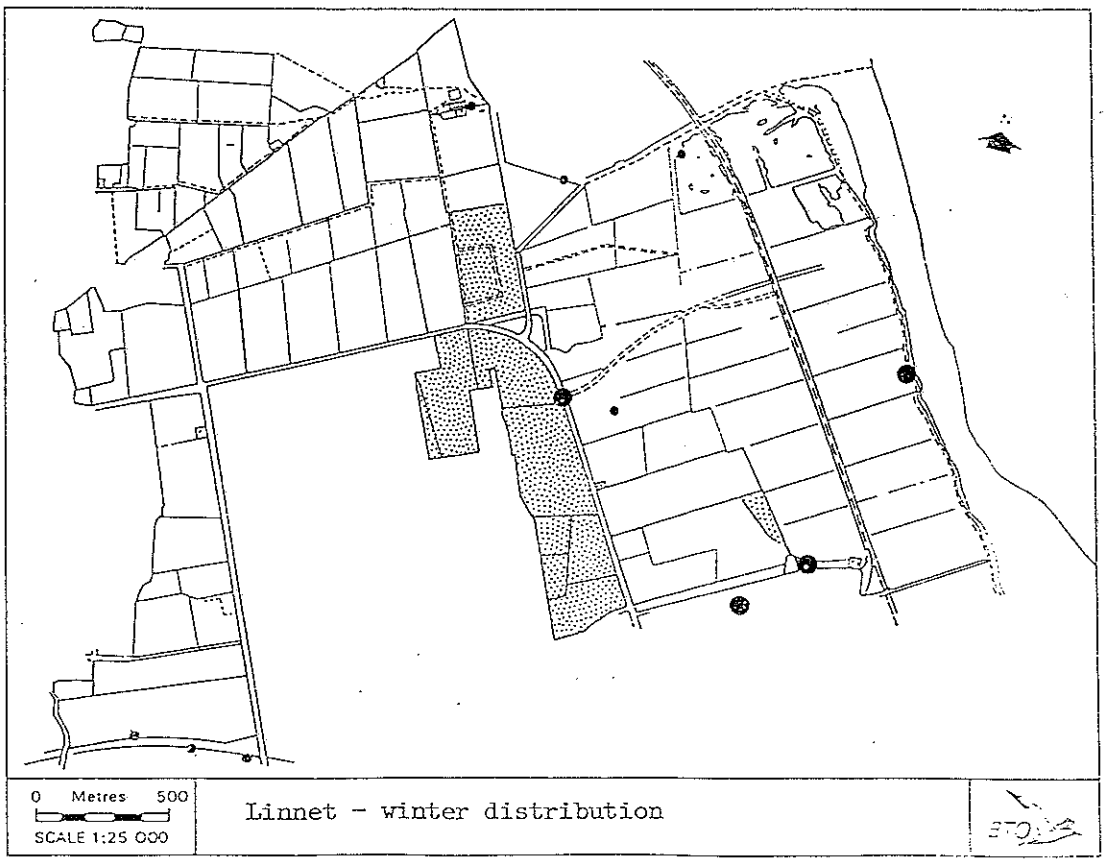


Figure 71

LITTLE GREBE

Territories: 1

Little Grebes are more widespread and numerous than other members of the grebe family in Britain, their main requirement being the availability of luxurient vegetation on the bottom of ponds and lakes and a dense growth of emergent plants. The national breeding population is now believed to be in the lower half of the range of 9,000-18,000 given in the Breeding Atlas. In winter, most birds are sedentary but there is a small scale movement into coastal areas.

One breeding territory was found on the southern pit of the Killingholme Haven Pits, where 1-2 birds were also present on 8 out of 10 winter visits. On the two winter visits in which birds were not recorded, they were probably present but overlooked as a result of their habit of swimming close to, or just within the cover, of reedbeds. Until March a single bird was recorded then a second bird appeared for the remaining visits.

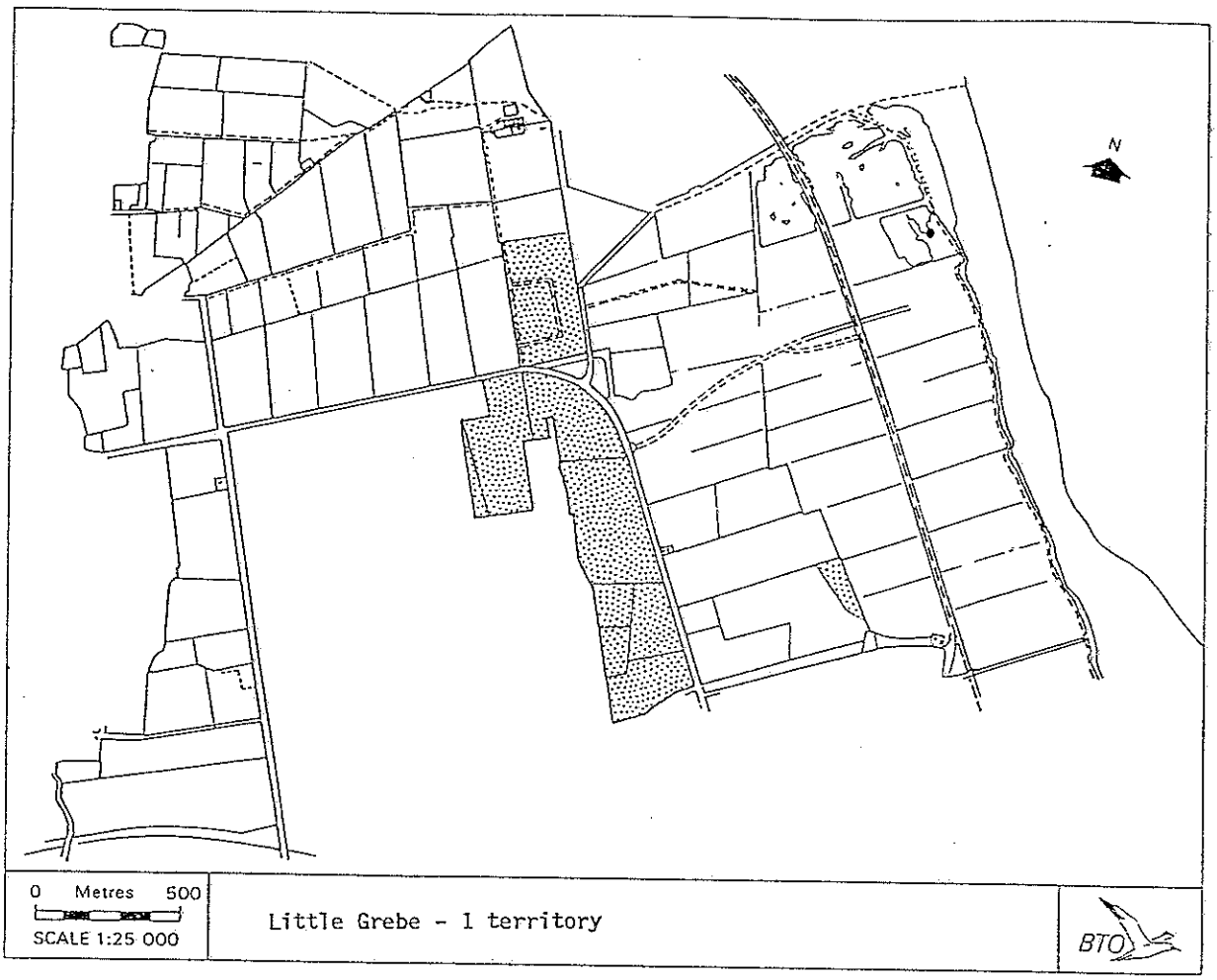
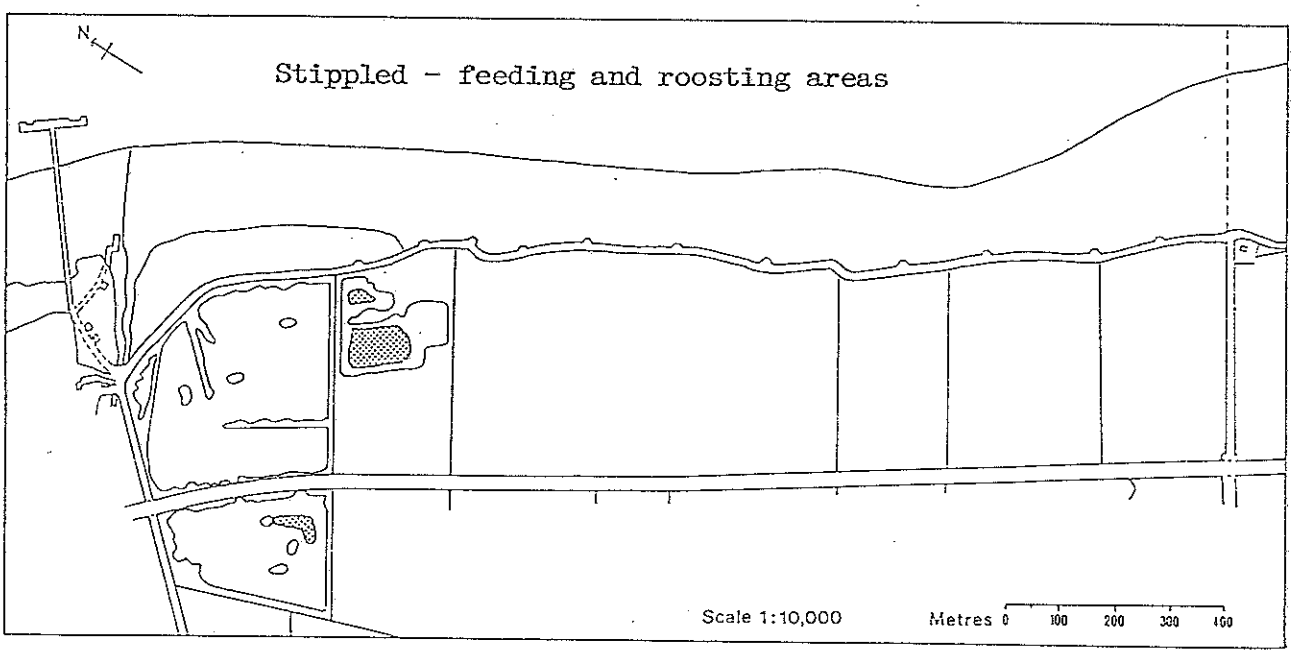


Figure 72



Little Grebe - winter distribution

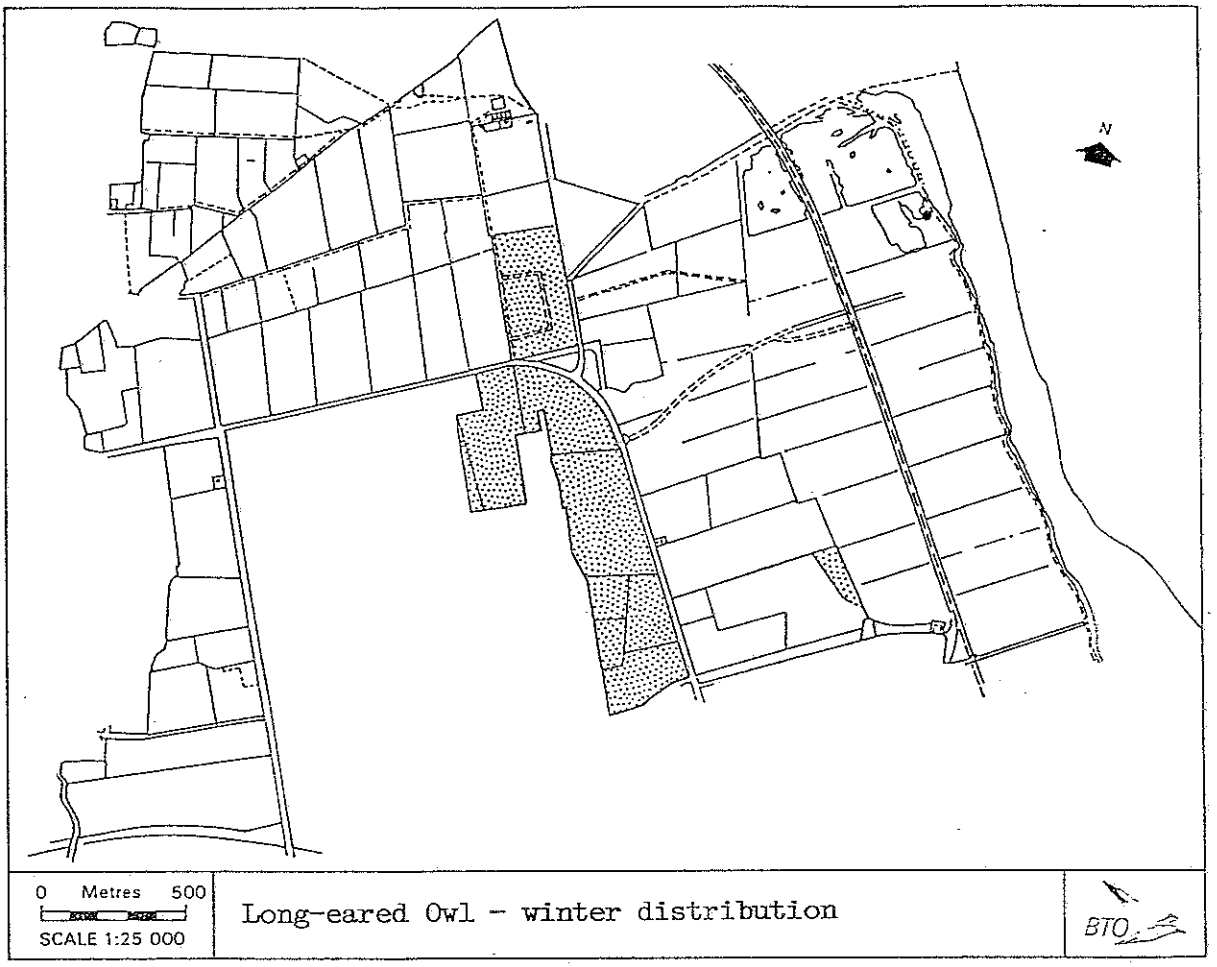
Figure 73

LITTLE RINGED PLOVER

Little Ringed Plovers are breeding visitors which colonised Britain in 1938. The majority of breeding sites are on gravel pits. A BTO national survey located 608 pairs in 1984, a 30% increase since the previous census in 1973.
A single bird was recorded at the end of the breeding bird survey, flying over Rosper Road and Burkinshaw's Covert towards the oil refinery. A pair bred in 1987, just outside the survey area boundary, on a gravel patch in the industrial compound north of Haven Road.

LONG-EARED OWL

British wintering numbers of Long-eared Owls are hard to assess, due both to the difficulty in detecting a nocturnal species that roosts in dense cover and the variable influx of winter immigrants from mainland Europe; a figure of 10,000-35,000 birds has been suggested. The bulk of the winter population appears to occur in the eastern half of Britain, but even there distribution is patchy, local and concentrated in coastal areas. The British breeding population is widely distributed over the British Isles at low density and is estimated at between 3,000 and 10,000 pairs.
The area of coastal scrub within the Killingholme Haven Pits LNR held a single Long-eared Owl in February and early March, 1988. This represents a typical winter record from a typical habitat.


N
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SCALE 1:25 000
Long-eared Owl - winter distribution
BTO

Figure 74

LONG-TAILED TIT

Territories: 3

A small insectivorous species often noted in family parties and found in a variety of woodland types in addition to its favoured habitat of dense hedgerows and scrub. The intricate moss and feather nests can be built early in March and detected long before the trees come into leaf. Farmland and woodland densities of 1 and 4 pairs/square km respectively imply a national population of 200,000 territories. In winter, local birds form small flocks that defend a flock territory and roost communally.

One breeding territory was found in woodland and two in mature hedges in the northern half of the survey area. In the 1987/88 winter, Long-tailed Tits were largely restricted to woodland and scrub areas, with the majority of records from the Burkinshaw's woodlands.

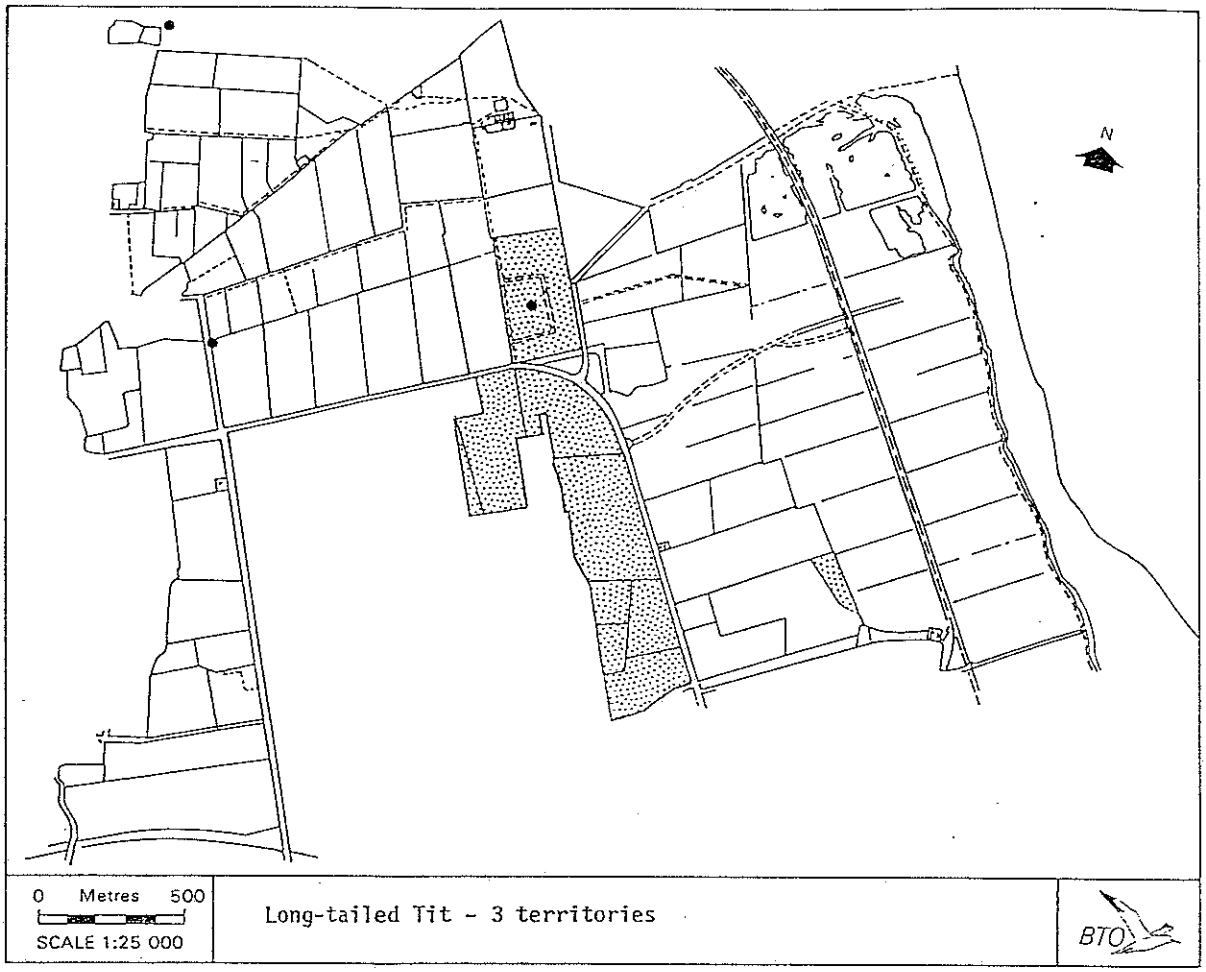


Figure 75

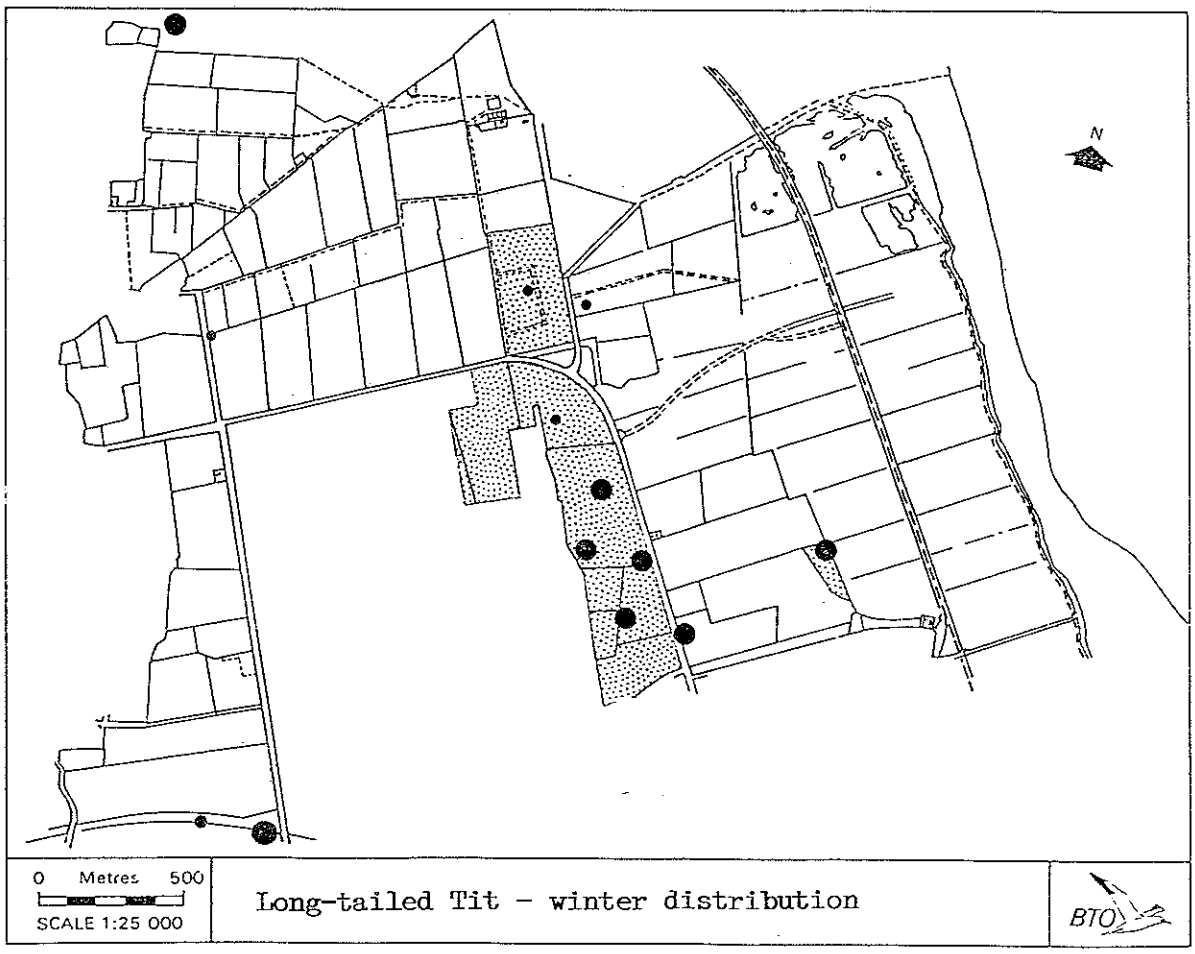


Figure 76

MAGPIE

Territories: 5

A conspicuous and highly successful member of the crow family found in all types of habitat providing tree or bush cover. Poorly-managed farmland, woodland edges and town parks are preferred habitats, but the expansion of the species' range into more open countryside and surburban areas continues. The Breeding Atlas estimate of 250,000 pairs in Britain and Ireland has not been updated, but woodland and farmland CBC indices have continued to climb over the last decade. Magpies are sedentary with breeding pairs defending territories throughout the winter; however first-year birds undergo a post-fledging dispersion and often form roaming winter flocks.

The CBC indicated that five territories were present in the survey area. Within the territories one nest was found in woodland and four in hawthorn/blackthorn hedges in the northern half of the survey area. In winter, Magpies were widespread and recorded in all habitat types.

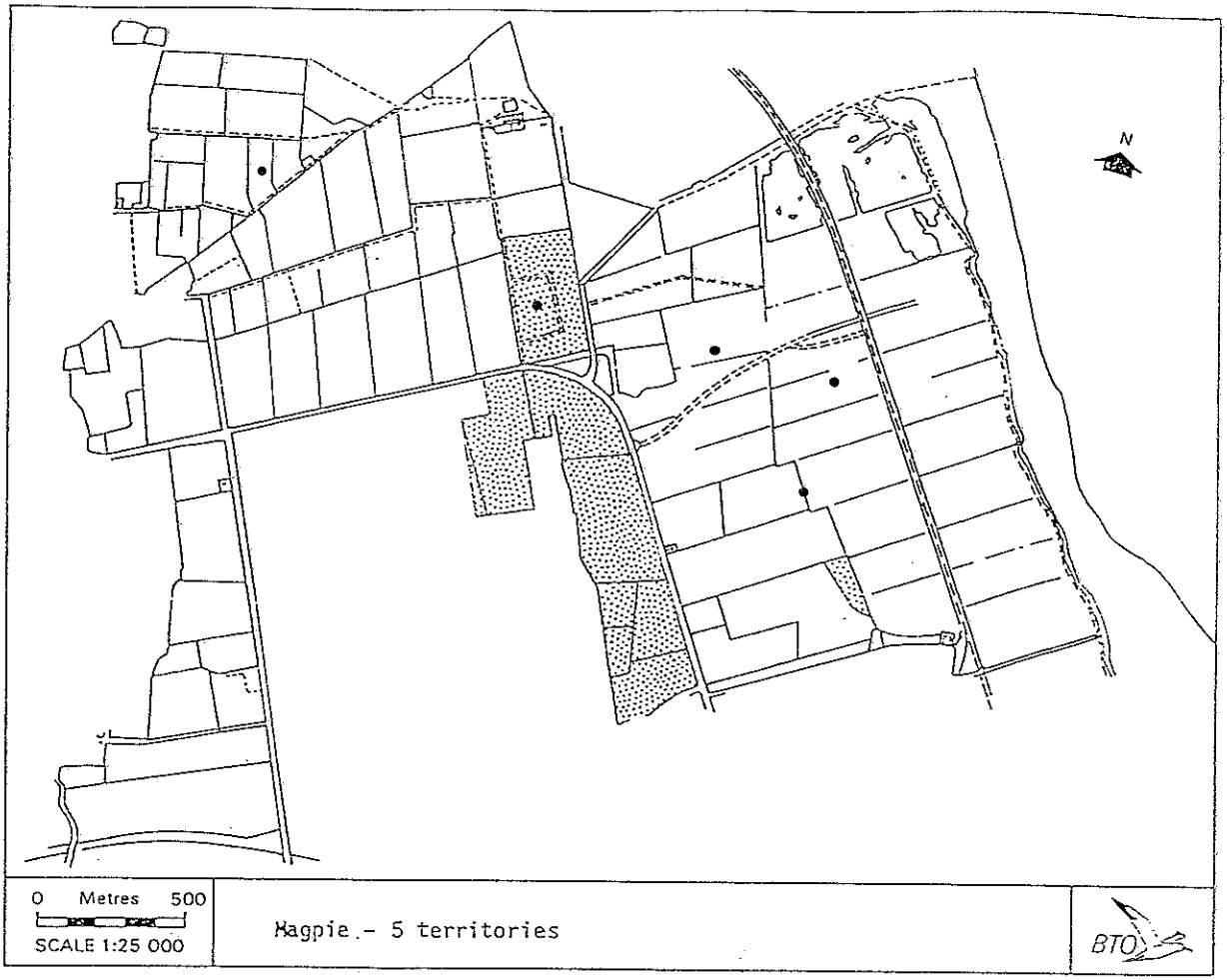


Figure 77

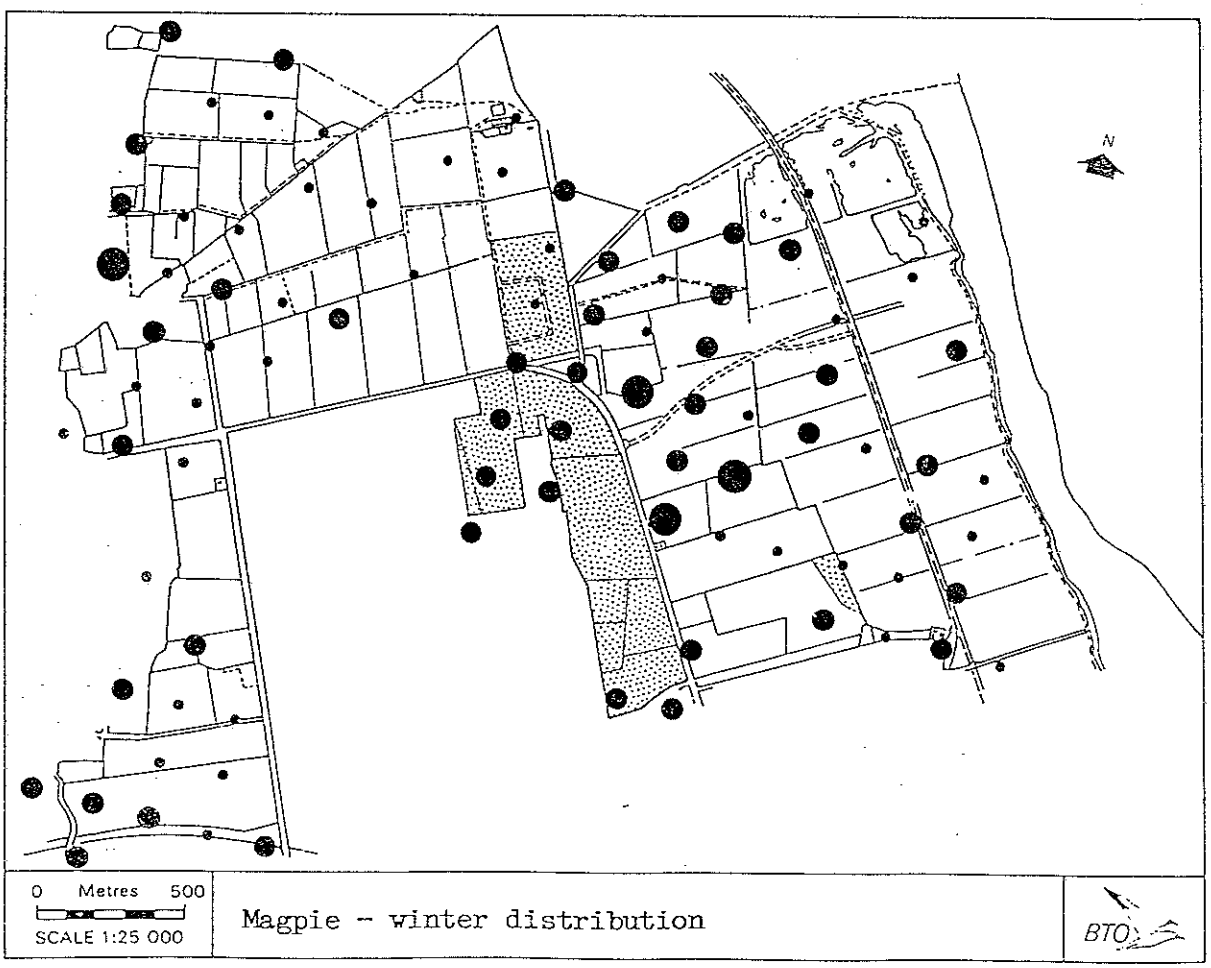


Figure 78

MALLARD

Britain and Ireland's most common and widely distributed breeding duck will nest in freshwater or brackish habitats ranging from small pools to large reservoirs. Nests are often in thick undergrowth, but may be placed inside tree stumps, on pollarded willows, on artificial structures or in exposed situations on the ground. The British and Irish breeding population, estimated at 40,000 pairs, is largely sedentary, but winter numbers are swollen by immigrants from Scandinavia and Iceland. Any damp area of the British Isles is likely to support Mallard at some time during the winter.

Single birds were recorded on Killingholme Haven Pits in summer, but there was no evidence of breeding. All winter records were from the open water of the Killingholme Haven Pits, except for one record from a permanent pasture ditch near the Pits. Only low numbers were present (2-11) in the 1987/88 winter, but birds were recorded on 9 out of 10 visits. The majority of winter records were from the south-western pit, with just 1-2 birds occasionally present on the north-eastern pit. The frequent absence from the north-eatern pit may have been due to wildfowling activities. At the beginning of the shooting season, in September, the LSHTNC reserve manager encountered unauthorised shooting both from within the LNR and from the adjacent saltmarsh. Fifty Mallard present on the north-eastern pit on the day prior to the start of shooting had all deserted the site that following day (J. Walton, pers. comm). The peak survey count of 11 repesented <1% of the average, November-March, peak count for the Humber for the previous five winters. Numbers recorded during the winter survey were similar to the recent BoEE counts for Killingholme.

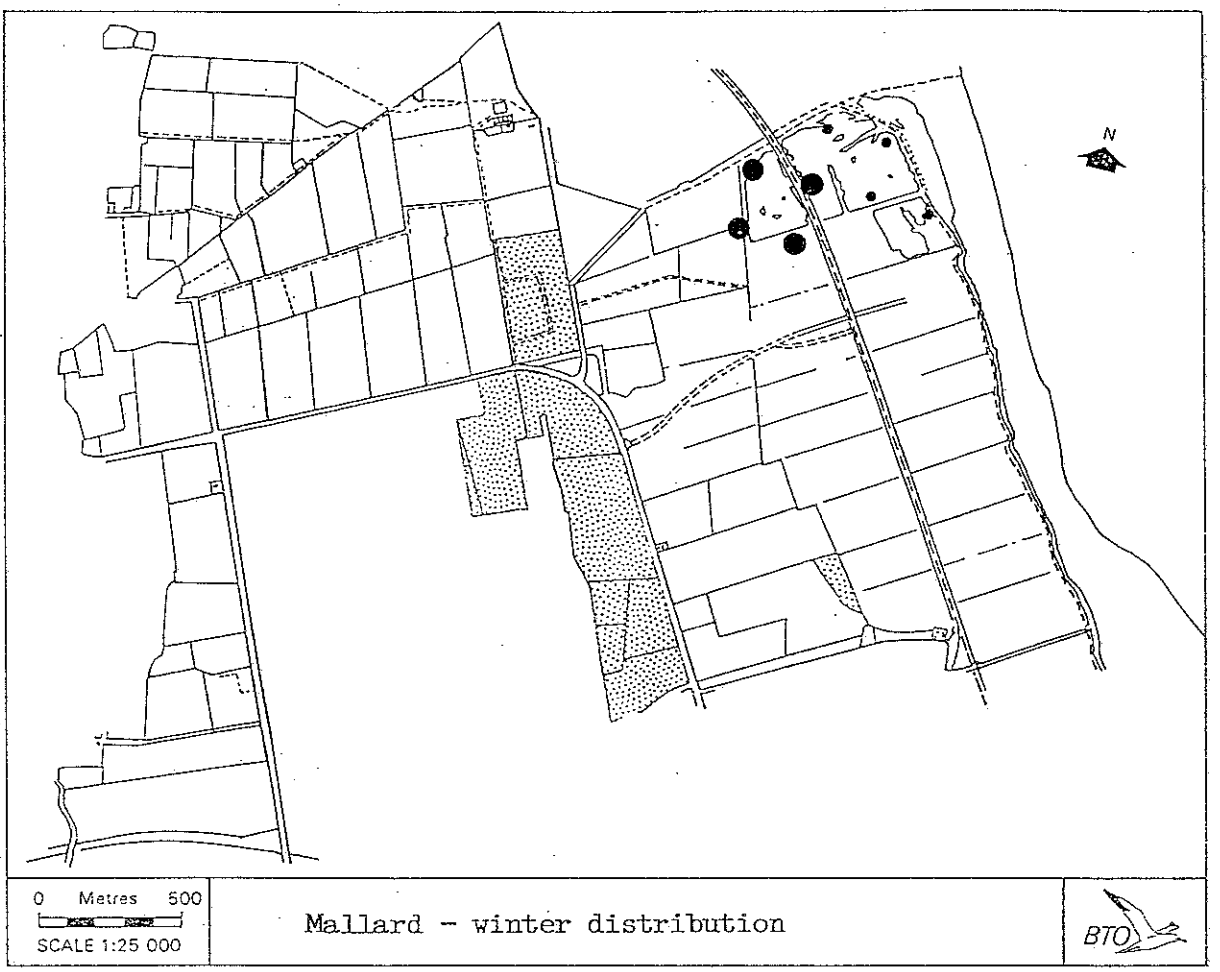
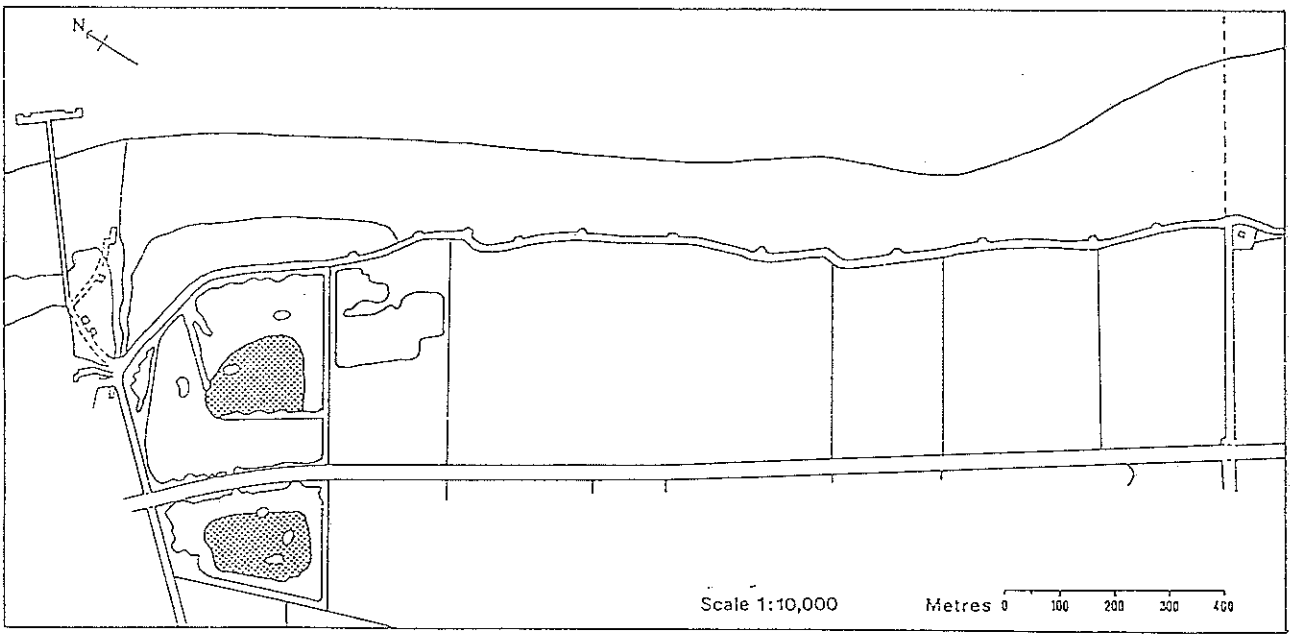


Figure 79



Mallard winter distribution on Killingholme Haven Pits LNR

Figure 80

MEADOW PIPIT

Territories: 10

Meadow Pipits are birds of open country that feed on insects obtained mostly from the ground. Rough grasslands, heaths, moors, farmland and coastal dune systems are preferred habitats for breeding. Meadow Pipits achieve their highest density on rough grazing, averaging 15 pairs/square km, and the national population may be in the range of 1 to 1.5 million pairs. In winter, Meadow Pipits undertake complex poorly understood movements; ringing recoveries suggest that the British and Irish population move south and are replaced by birds from northern Europe.

Most breeding territories were concentrated in the Killingholme Marshes fields, but two were present on the high saltmarsh south of Killingholme Haven. Winter registrations of Meadow Pipit at Killingholme were infrequent and concentrated in the Killingholme Haven Pits area in mid-winter and on the disturbed ground near Rosper Road in late winter.

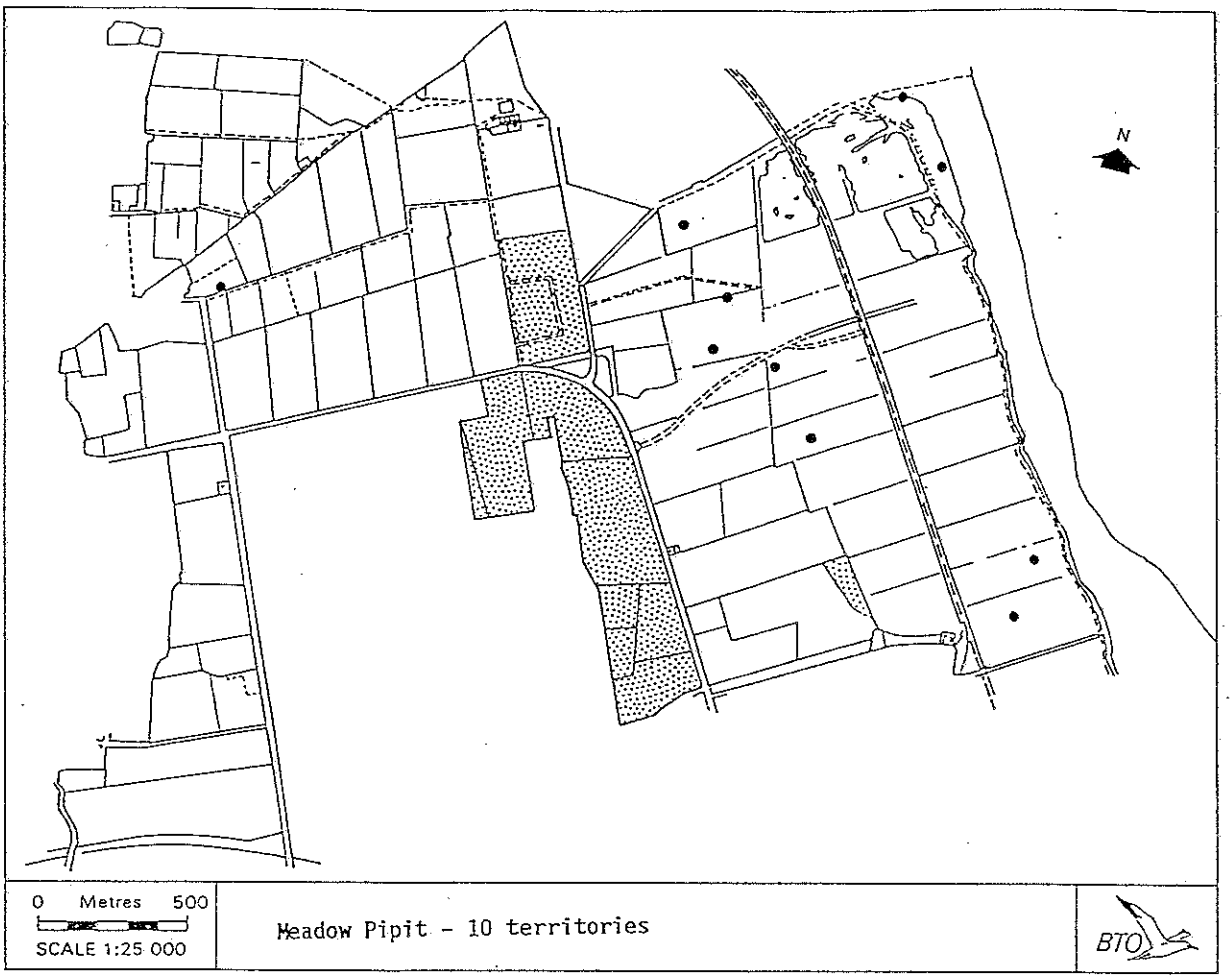


Figure 81

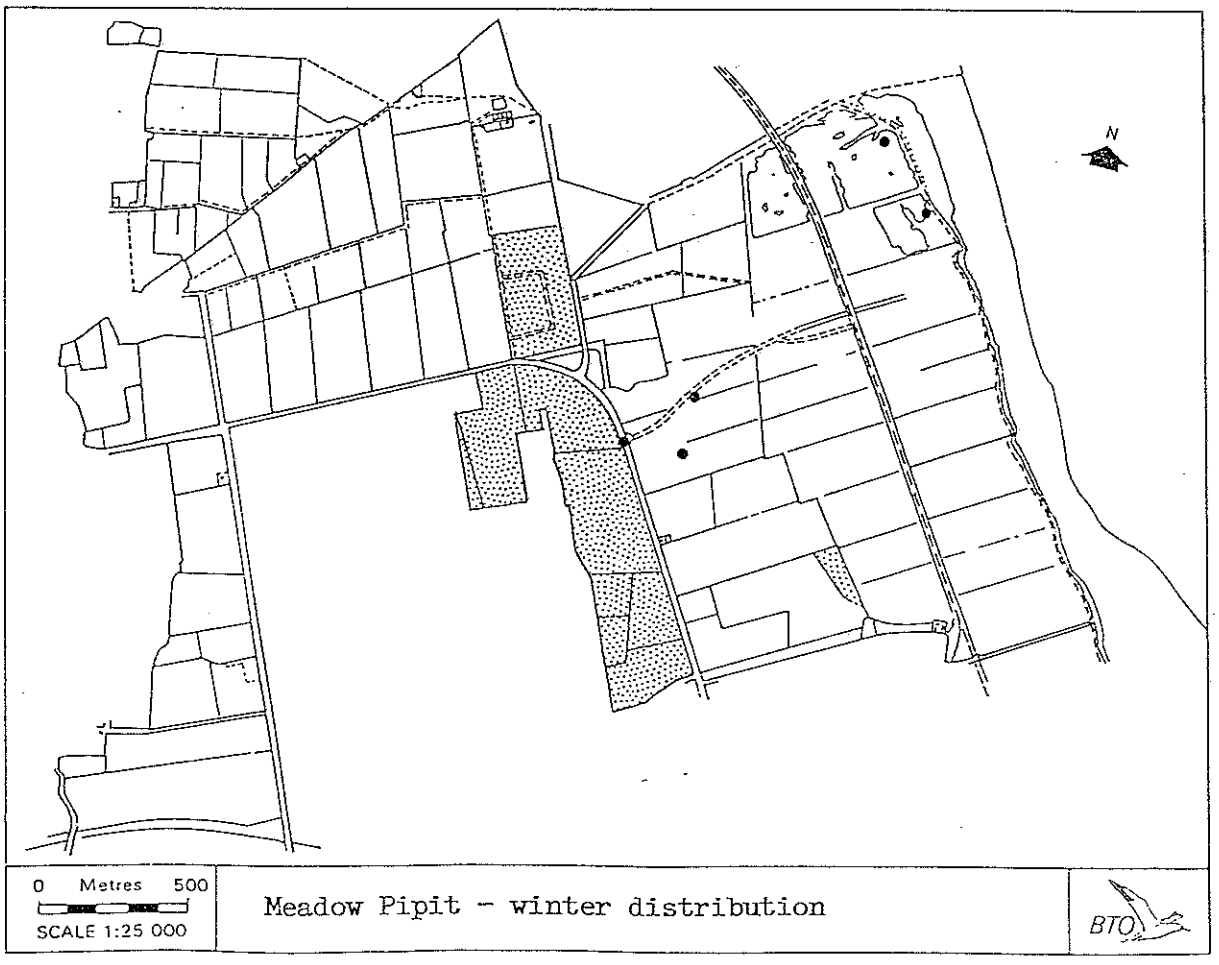


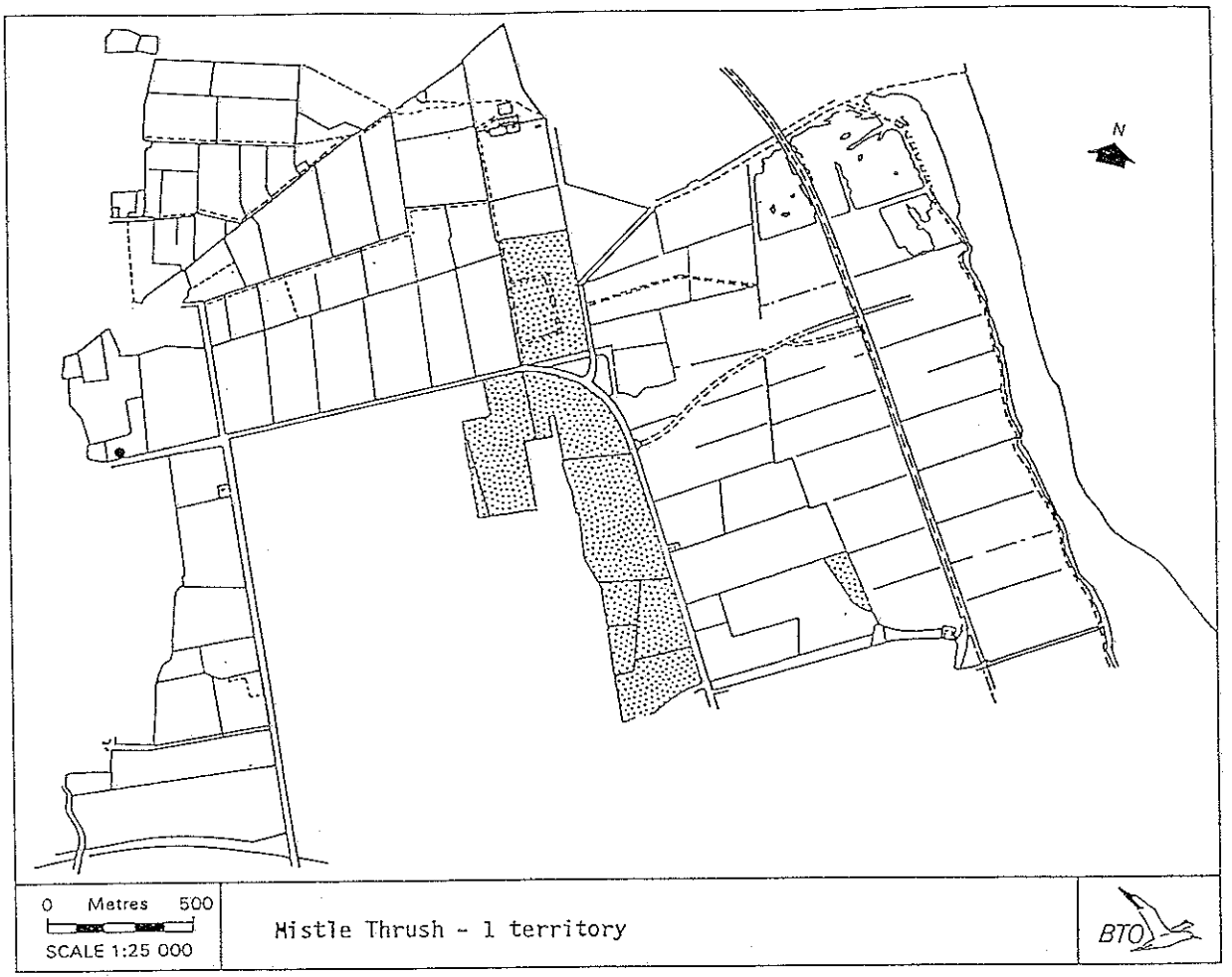
Figure 82

MISTLE THRUSH

Territories: 1

Mistle Thrushes are widespread in open country with scattered trees, and are a common resident of the farmland mosaic of open fields and hedgerows with standards. Parks and other urban green spaces also provide suitable habitat. The estimated density for farmland is 1 pair/square km compared with 3 in woodland, indicating a British population of 300,000 pairs. Mistle Thrushes from northern Britain tend to winter in Ireland and a few first-year birds winter in France, but other birds are generally sedentary and immigration is limited.

One breeding territory overlapped part of the north-western corner of the survey area. In winter, Mistle Thrushes were recorded only from the same area around Baysgarth Farm pasture and adjacent scrub.


N
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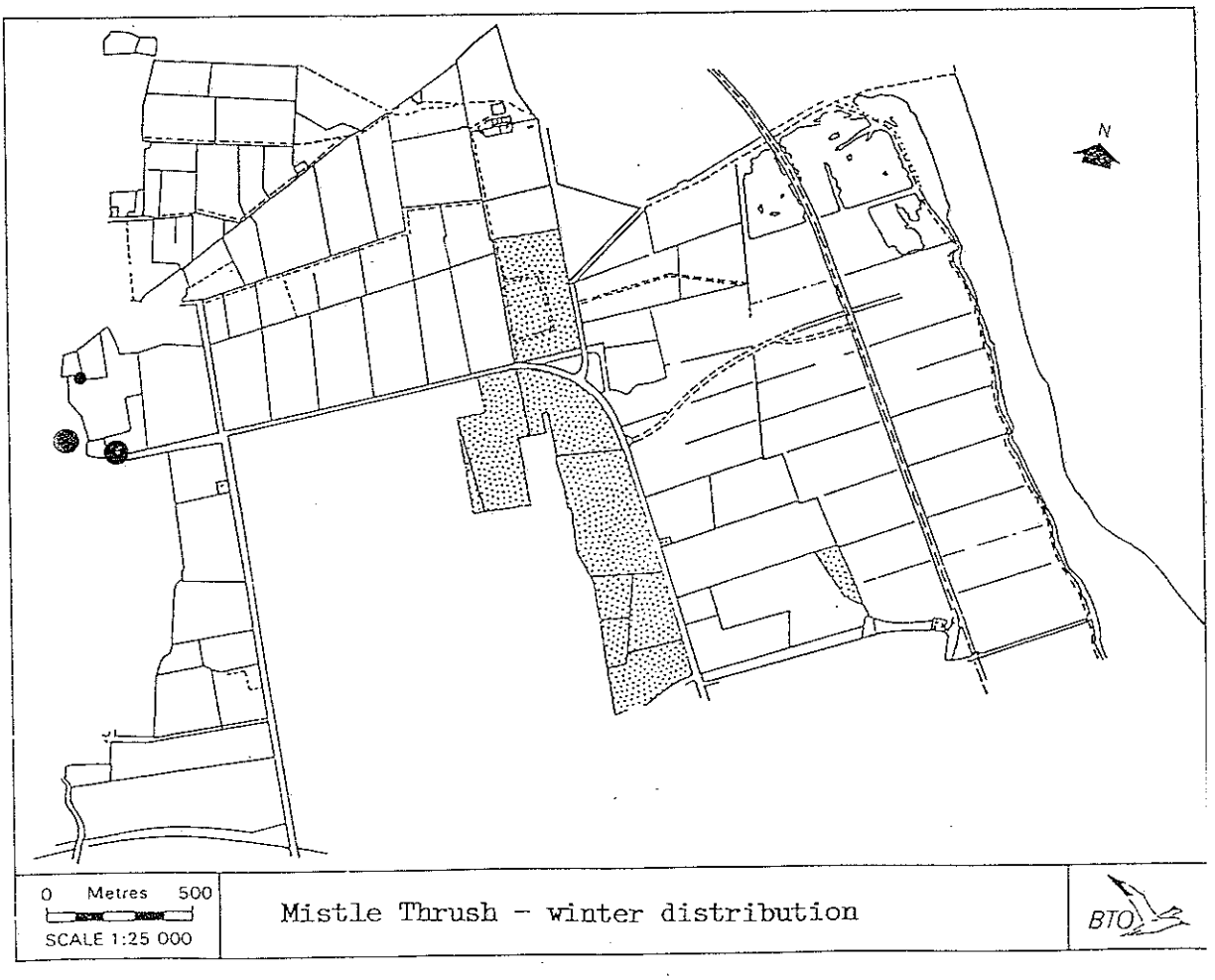
Mistle Thrush - 1 territory
BTO

Figure 83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Mistle Thrush - winter distribution
BTO

MOORHEN

Territories: 3

In both summer and winter, this skulking bird can inhabit virtually any patch of freshwater habitat from damp field corners and narrow ditches to canals and large lakes. National population size is uncertain, but in 1986 the mean number of territories per 10 km of waterway in south and south-west England was 17.7 (S. Carter pers. comm. - BTO Waterways Bird Survey data).

Three breeding territories were sited around the Killingholme Haven Pits LNR. In winter, records were largely restricted to the Killingholme Pits and surrounds, the exceptions being a single record from a ditch in arable land west of Chasehill Farm and two records from permanent pasture north of Station Road.

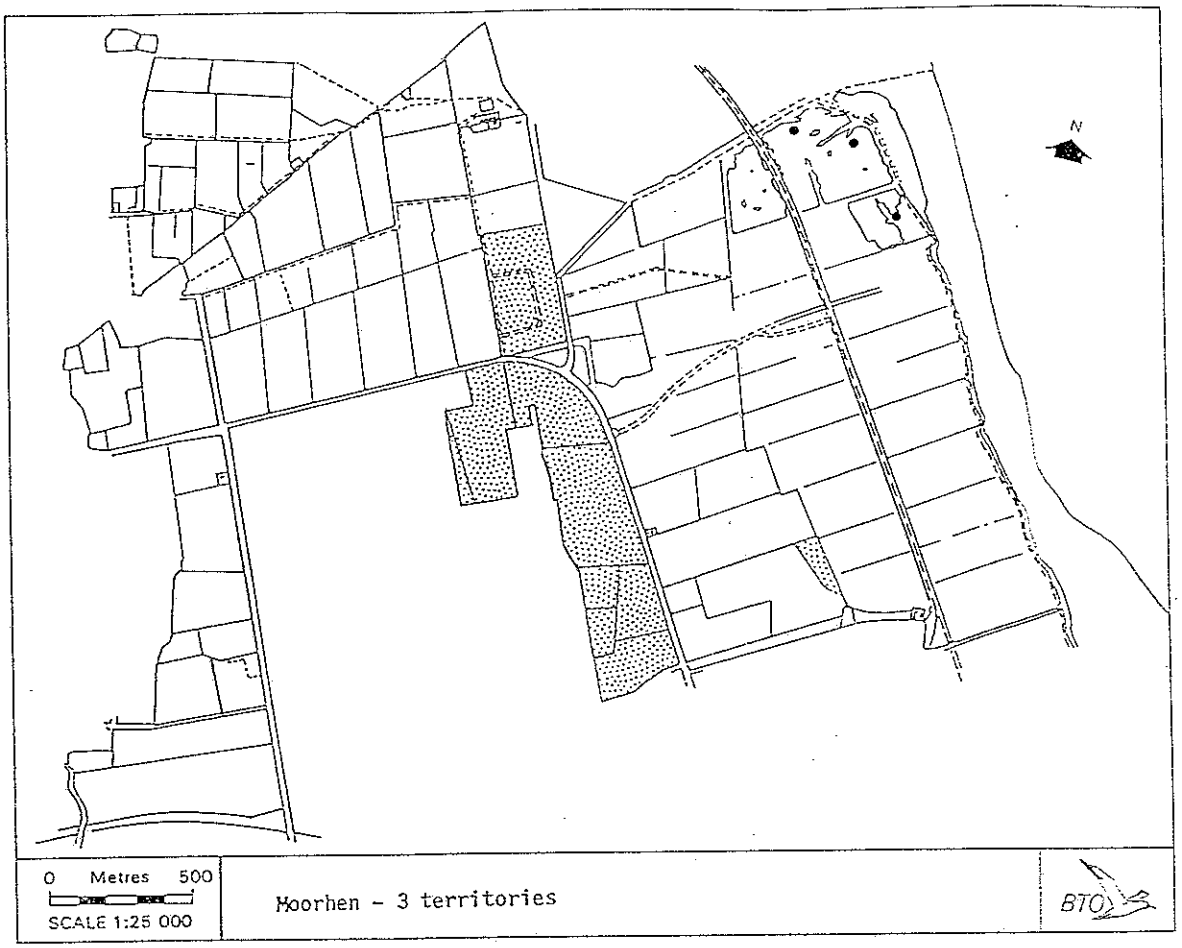


Figure 85

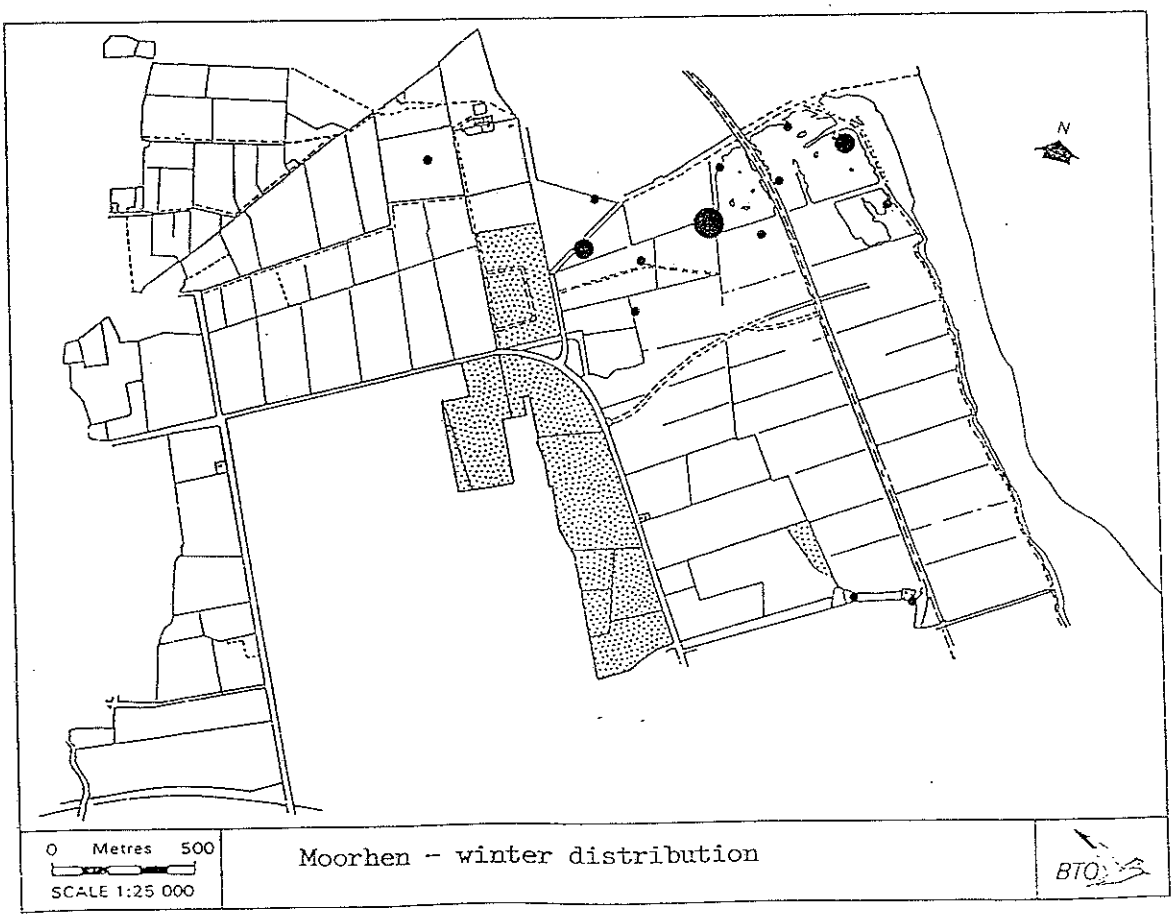
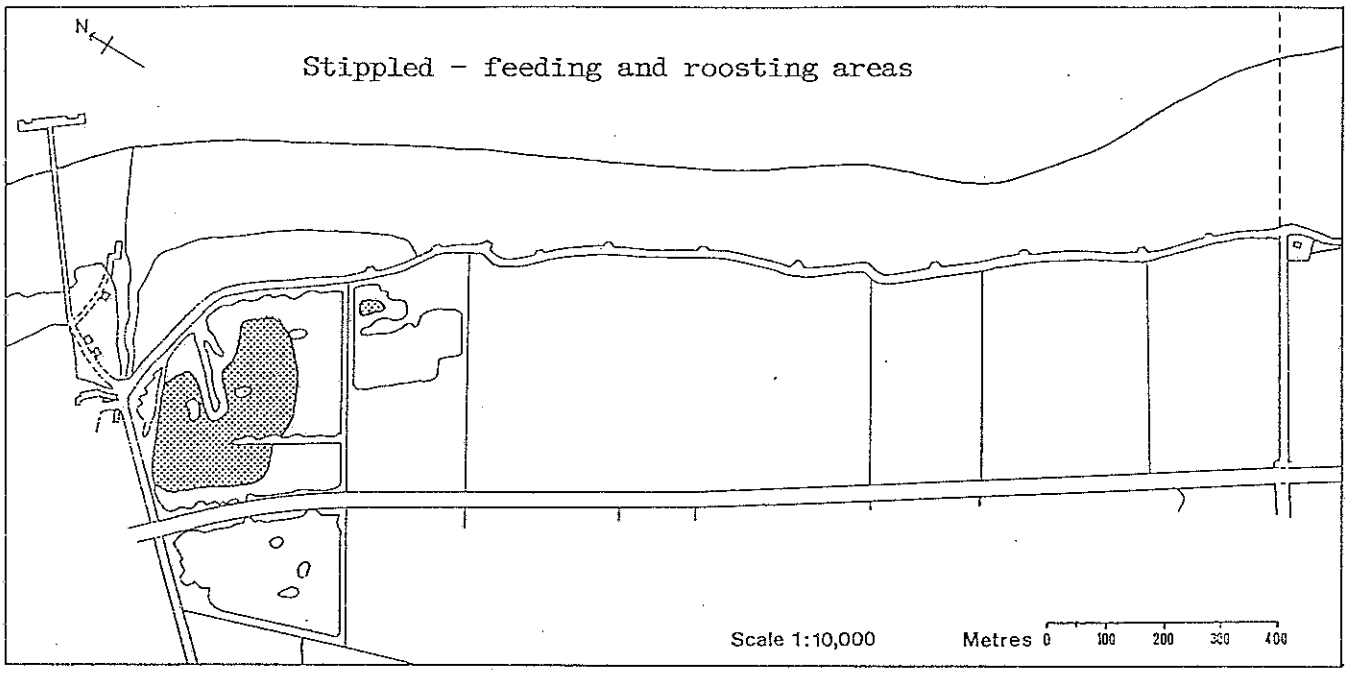


Figure 86

MUTE SWAN

The Mute Swan is resident throughout Britain. Favoured habitats are slow-flowing rivers, canals, pools, gravel pits, lakes, reservoirs and even the upper reaches of estuaries. A BTO survey in 1978 indicated a population of about 18,400 birds, including 12.150 non-breeders. British breeding and wintering distributions are almost indentical and the British winter population is likely to be just under 20,000.

Two non-breeding birds were present on the Killingholme Haven pits from early July onwards, and 1-7 birds were recorded during the winter on 9 out of 10 visits. Except for one bird on the small south-eastern pit all were on the north-eastern pit. The survey peak count of 7 represented 14% of the average peak Humber count for the previous five winters. Peak BoEE counts for Killingholme during the previous five winters ranged from 11 to 47 birds averaging 25 (50% of the Humber average).



Mute Swan - winter distribution

Figure 87

OYSTERCATCHER

This spectacular wader is predominantly a coastal species, nesting on rocky, sandy or shingle shorelines, saltmarshes and coastal grasslands. Disturbance caused by coastal developments and tourism probably accounts for local declines across the species' range in southern Britain, though there has been a noticeable expansion in range and numbers in the north (Sharrock 1976). The Breeding Atlas estimate of 19,000 to 30,000 pairs remains unrevised.

Two birds, occasionally recorded on the intertidal part of the survey area, attempted to breed just outside the survey area in an industrial compound north of Haven Road. There were no winter records.

PHEASANT

Territories: 5

A conspicuous bird of wooded agricultural landscapes, benefitting from game management aimed at maximising numbers on estates. The Breeding Atlas estimate of 500,000 pairs is questionable in view of the 15 million captive-reared birds released each autumn. Pheasants are generally sedentary.

Five breeding territories were located on field/hedgerow and field/woodland margins in the survey area, but there were only occasional records of Pheasants in open habitats at Killingholme during the 1987-88 winter.

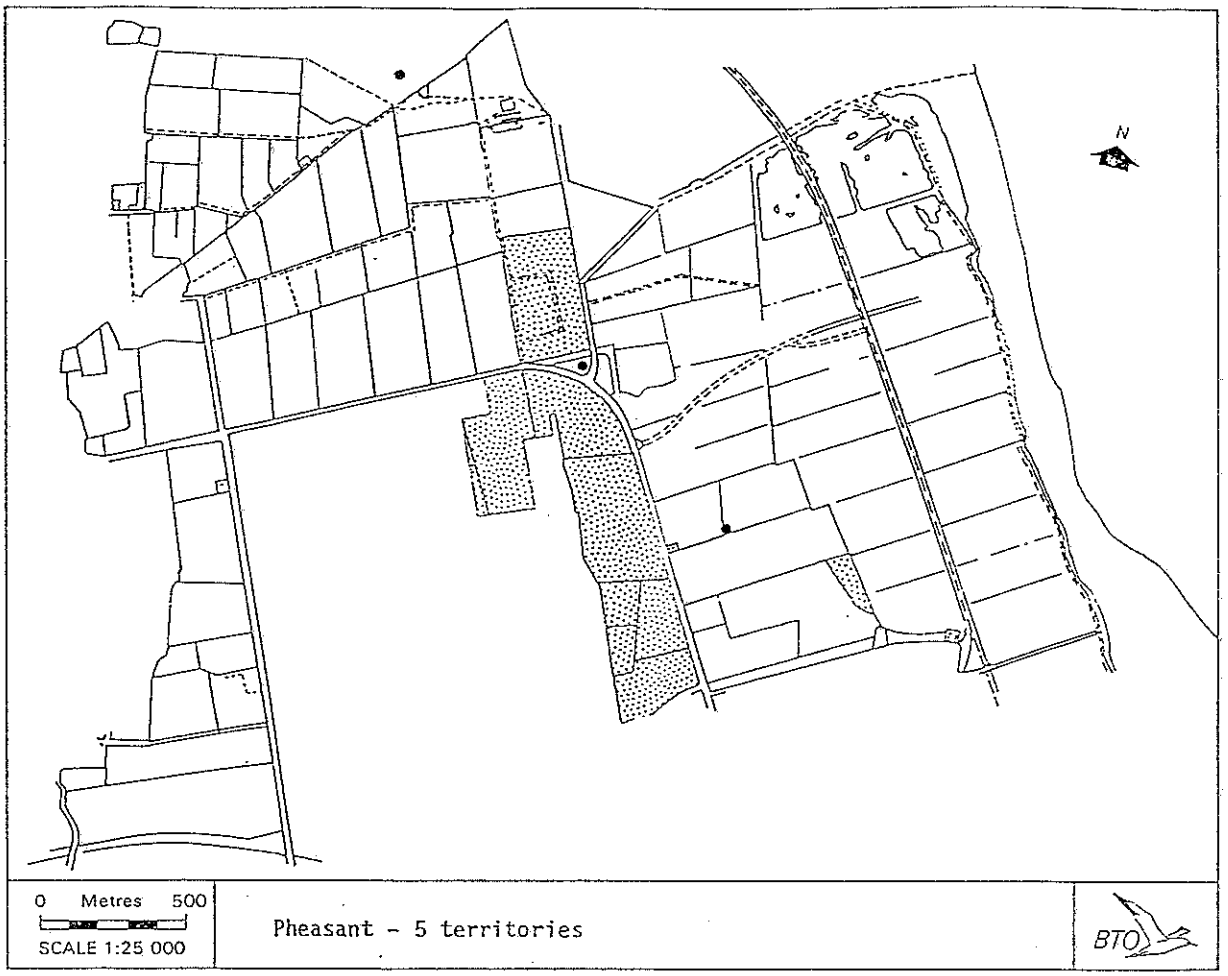


Figure 88

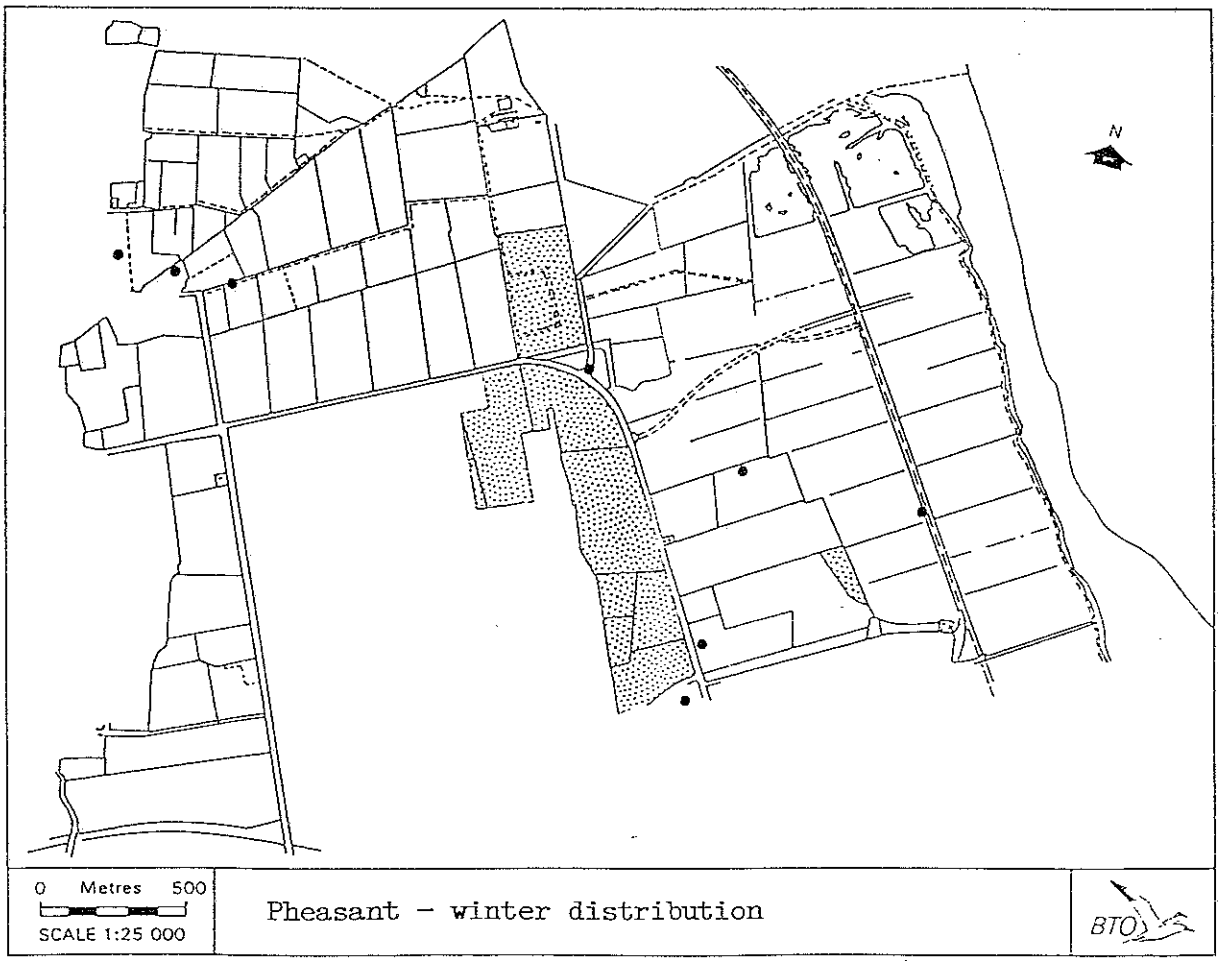
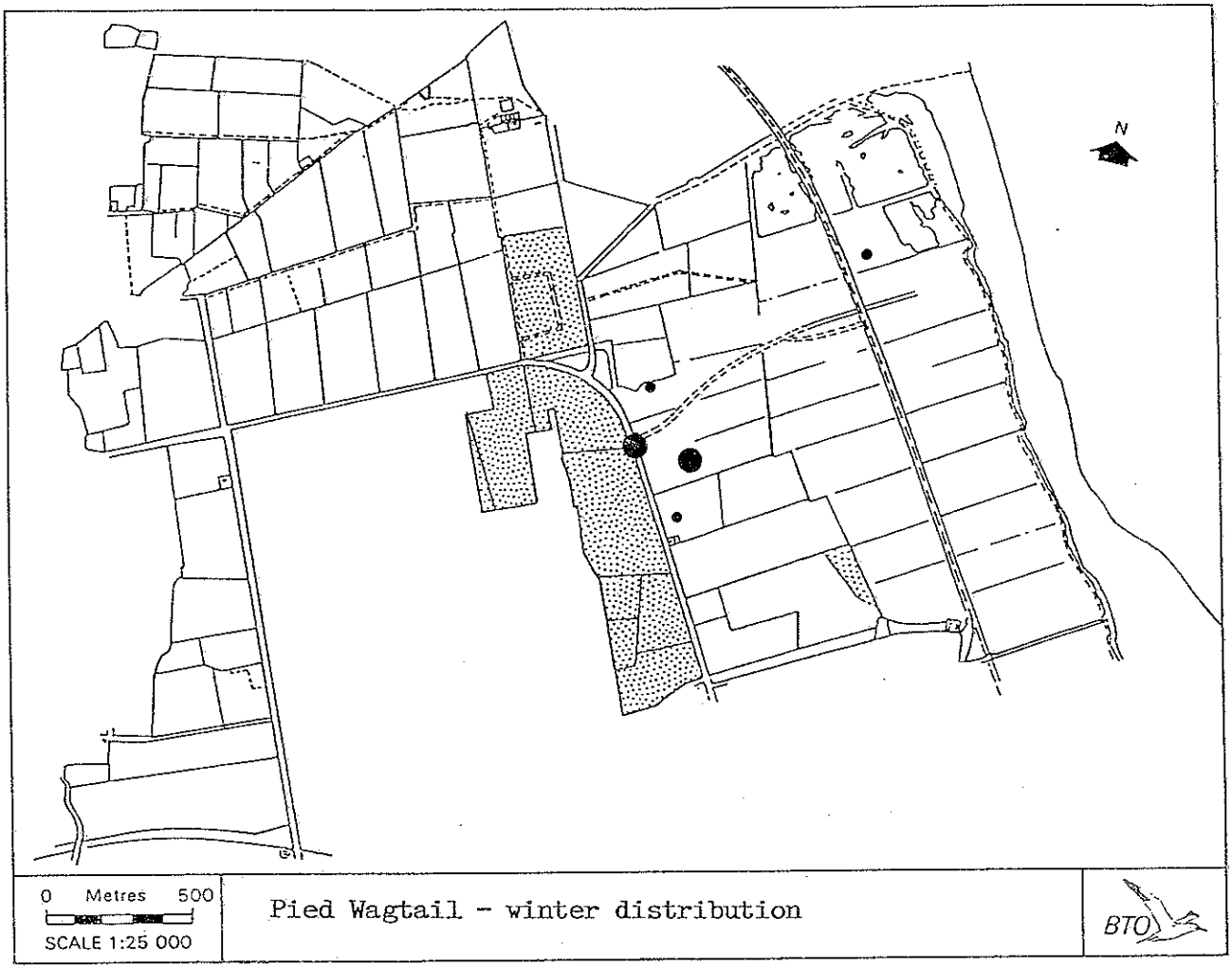


Figure 89

PIED WAGTAIL

Pied Wagtails are often seen in built-up areas searching for insects on roads, but they also occupy most habitats apart from woods, mountains and moorlands. Numbers may have fallen in lowland Britain as farm ponds were filled during the move to intensive farming. The birds breeding in the north of the British Isles move south for the winter and overall the species is a partial migrant.

There were only three summer records in the survey area, two involving birds flying into the neighbouring industrial sites and the third of a bird recorded on the seawall in April. Winter records were also occasional, in open habitats. The species was most regular around the disturbed ground of the Nirex compound beside Rosper Road, with 10 present here in late February. All other records were of single birds.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Pied Wagtail - winter distribution
BTO

Figure 90

POCHARD

Territories: 1

A scarce and local breeding bird, the Pochard is found nesting in dense emergent vegetation fringing large pools and slow-flowing streams. No new national census data have become available since fieldwork for the Breeding Atlas suggested a total population of only 200-400 pairs. The Pochard is a widespread species in Britain during the winter months, showing a preference for fertile lowland lakes, reservoirs and gravel pits, where it feeds on submerged vegetation. There has been a considerable increase in the number of Pochards wintering in Britain over recent decades and the population is now believed to be around 50,000 birds.

One breeding pair was present in 1987, on the southern pit of the Killingholme Haven Pits LNR. The Pochard was the only nationally rare breeding bird recorded at Killingholme. In winter, Pochards were restricted to the small south-eastern pit of the Killingholme Haven Pits LNR, where up to 18 birds associated with Tufted Duck. The peak count of 18 represented 9.3% of the average peak Humber count for the previous five winters. No more than 4 Pochard were present until early February, then 12-18 until the end of the survey.

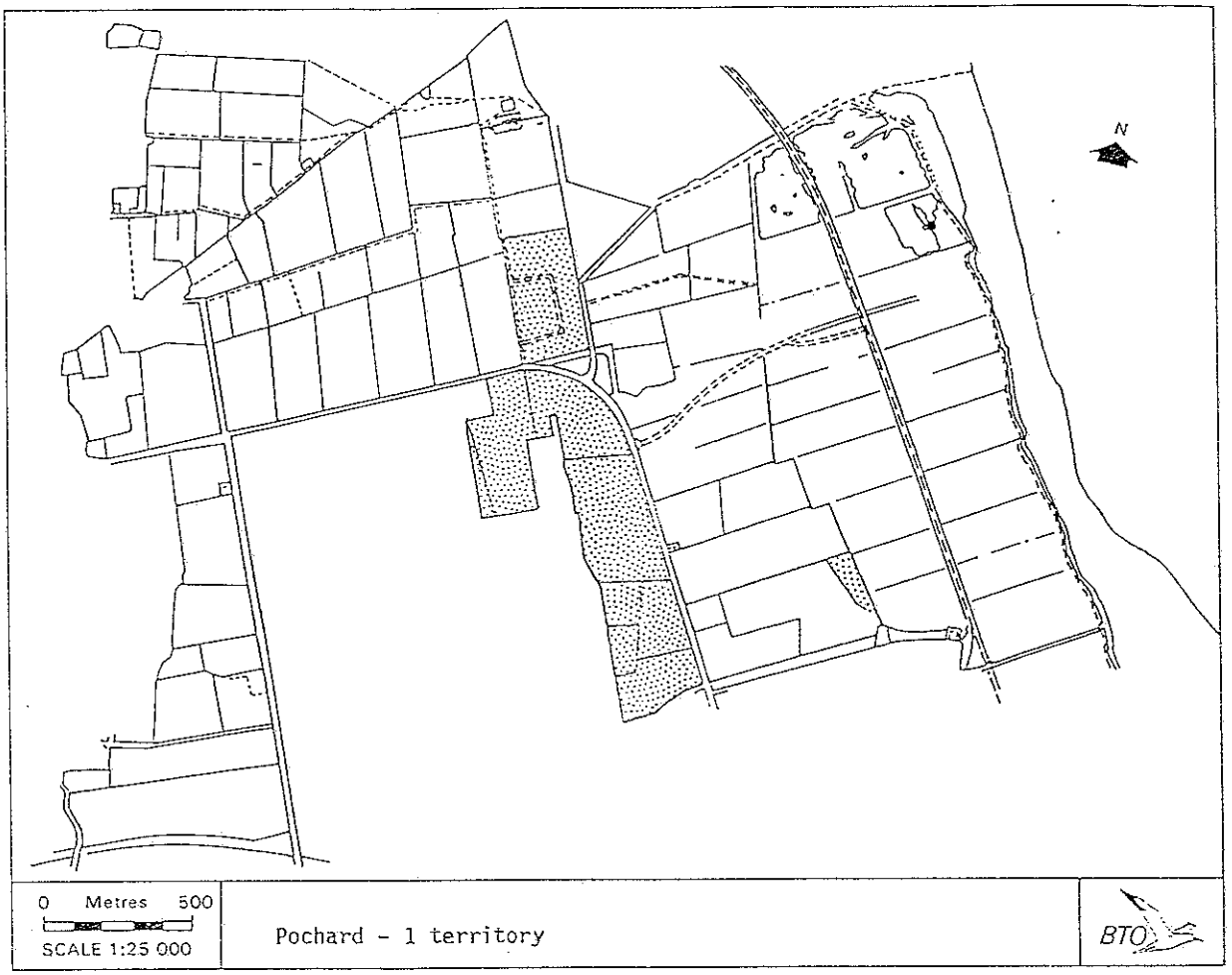
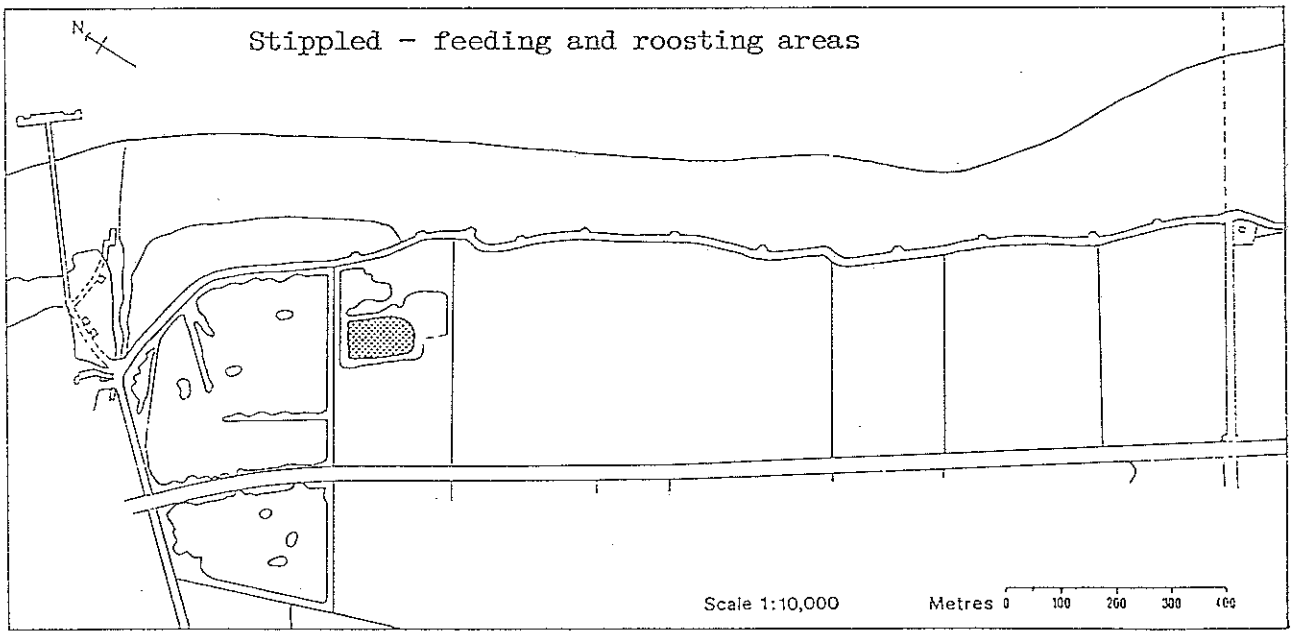


Figure 91



Pochard - winter distribution

Figure 92

RED-LEGGED PARTRIDGE

Territories: 7

The highest densities of this introduced sedentary gamebird occur on farmland, but heaths, downland, dune systems and open woodland with wide rides are also suitable habitats. A British population of up to 200,000 pairs was estimated in the Breeding Atlas, but artificial stocking precludes an accurate picture. In both summer and winter, birds are restricted to the south-east where, despite the release of 800,000 birds yearly, numbers are declining.

Territories were widely scattered around the survey area in field margins, and wintering Red-legged Partridges were found on arable fields of Killingholme Marshes and similar fields north of Fox Covert.

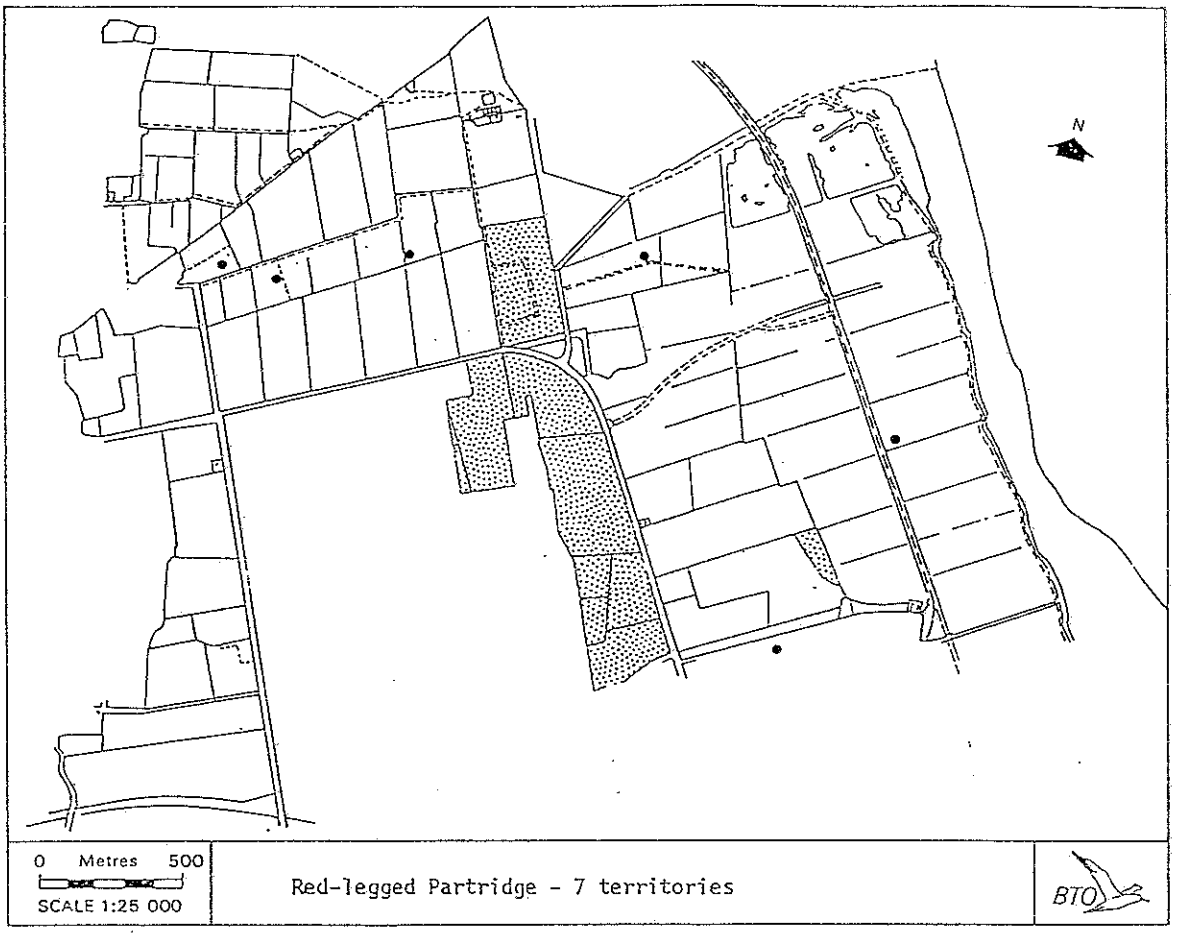


Figure 93

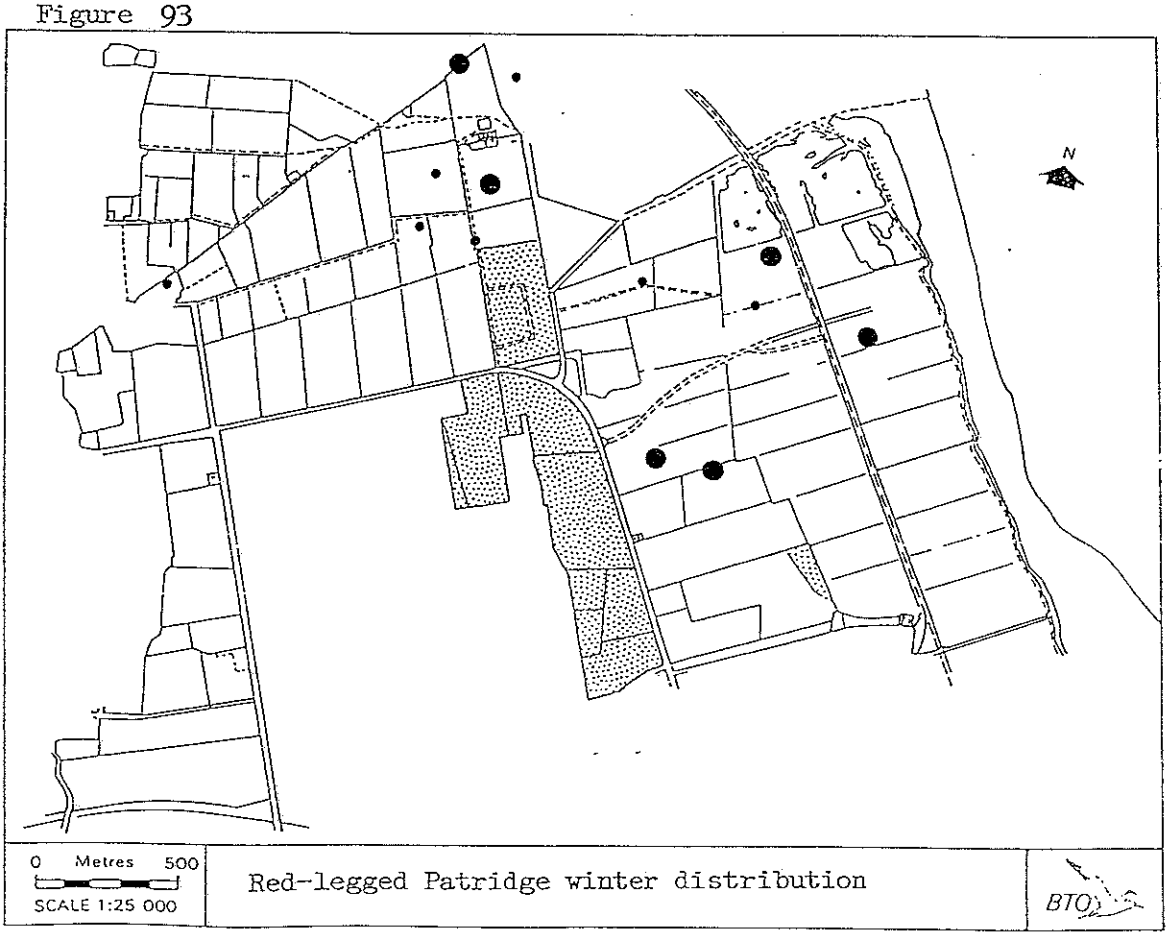


Figure 94

REDPOLL

Territories: 10

Redpolls increased their range in the early 1970s as a result of the planting of conifers on upland moors and lowland heaths. 1982 densities of 0.2 pairs/km square on farmland and 3.7 in woodland suggest a population of 140,000-150,000 pairs, half the figure stated in the Breeding Atlas. In winter, Redpolls move south, many birds leaving Britain.

Most territories were in scrub on the the survey area, but two were found around hawthorn hedgerows. There were no winter records from the survey area.

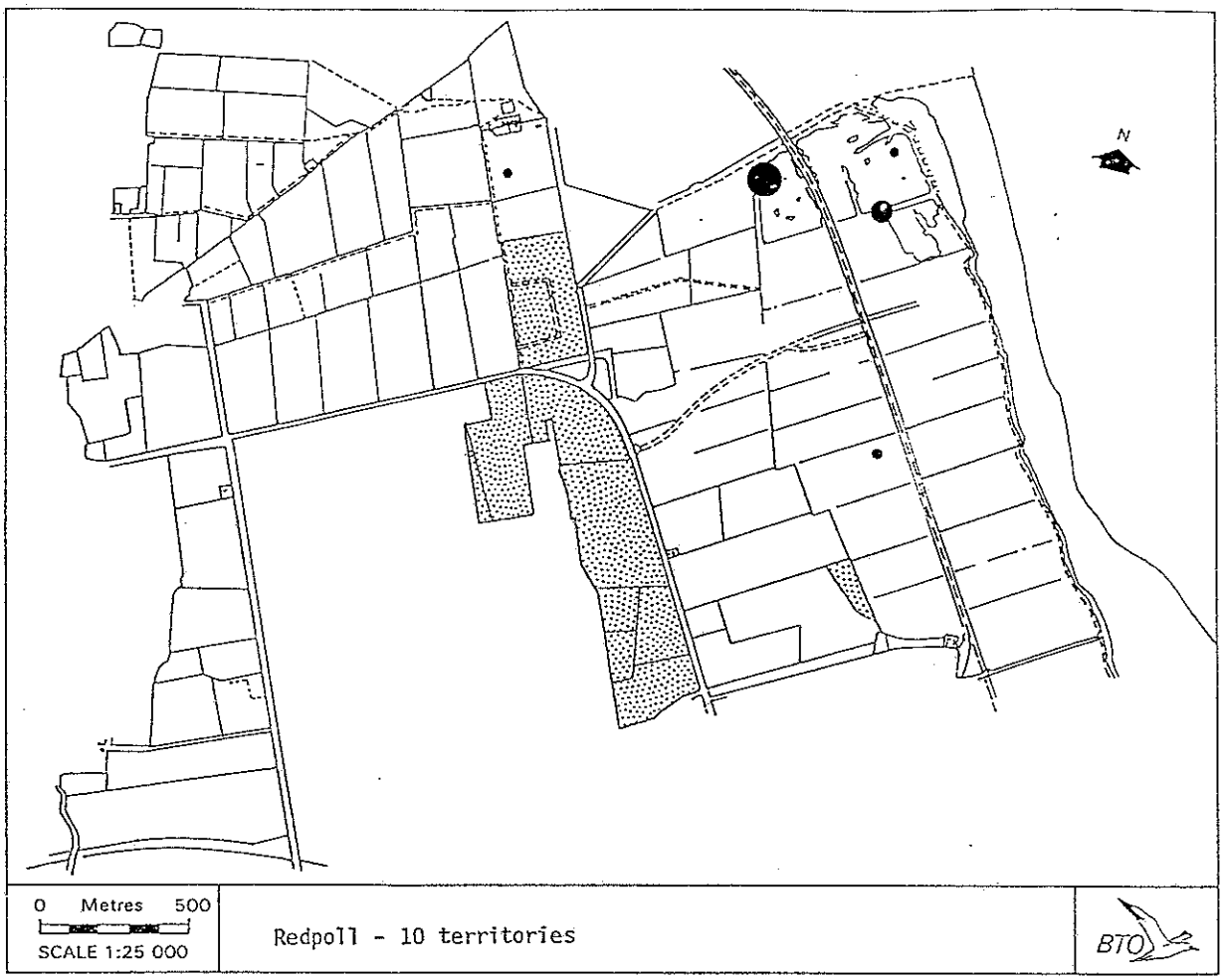
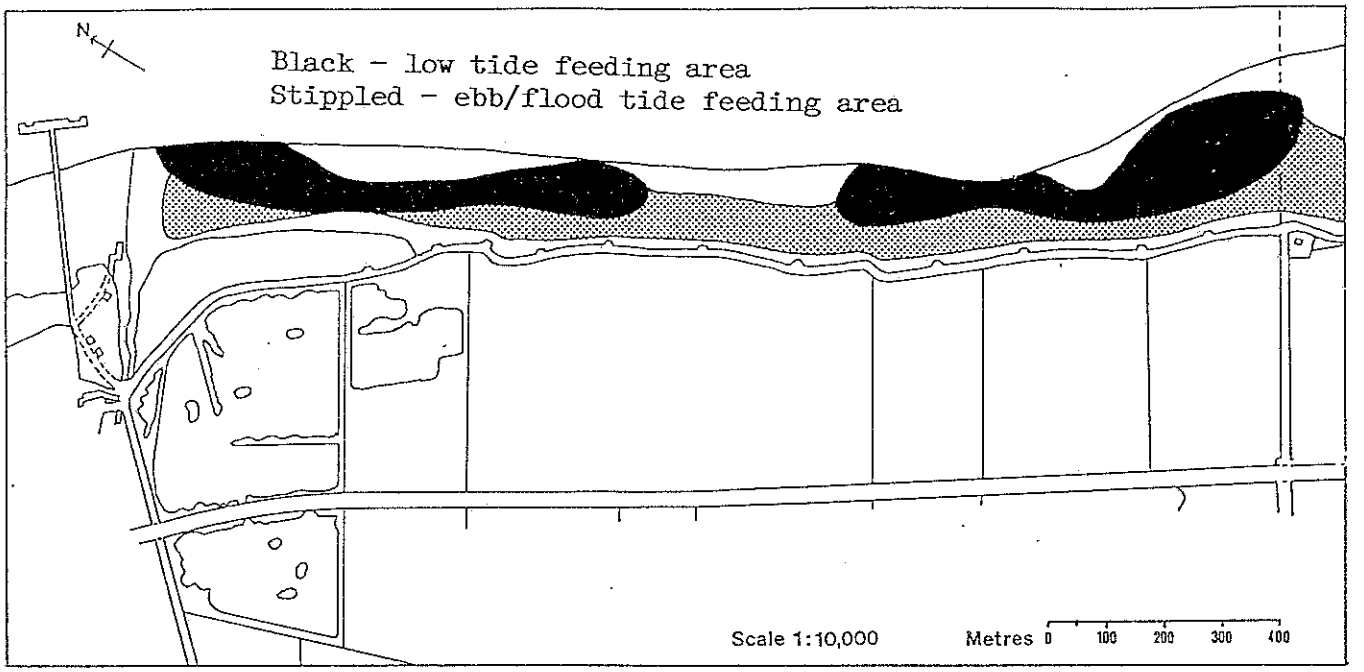


Figure 95

REDSHANK

A breeding wader often associated with marginal farmed habitats such as damp rough grassland, the Redshank also nests on saltmarshes and the upland fringe. Loss of suitable wet meadows, as part of agricultural intensification, has led to a serious decline in numbers in recent decades. The Breeding Atlas estimate of 38,000 to 48,000 pairs has not been revised.

Redshank were only recorded during the breeding bird survey as a spring passage migrant, but were recorded from the intertidal areas on all winter visits. Winter numbers ranged from 1-56 birds, and the peak represented 2.0% of the average peak Humber count for the previous five winters. Redshank abandoned the intertidal flats at Killingholme over the high tide period, flying down river past Immingham Docks towards Pyewipe. A single bird roosting on the seaward slope of the seawall was the only high tide record during this study. BoEE data for the site, indicate that an average of 28 Redshank were present at high tide, over the previous five years. As with Dunlin and Lapwing, it is possible that previous roosting areas within the Killingholme Haven Pits LNR have been lost due to continuous high water levels and growth of tall vegetation on islands.



Redshank - winter distribution

Figure 96

REDWING

Redwings are winter visitors from northern Europe that flock with other thrushes and wander throughout the British Isles in search of food. Harsh weather invokes southerly movements and, unlike other thrushes, a movement into woodlands.

Redwing records at Killingholme, were concentrated in scrubland, adjacent to permanent grassland and associated hedgerows.

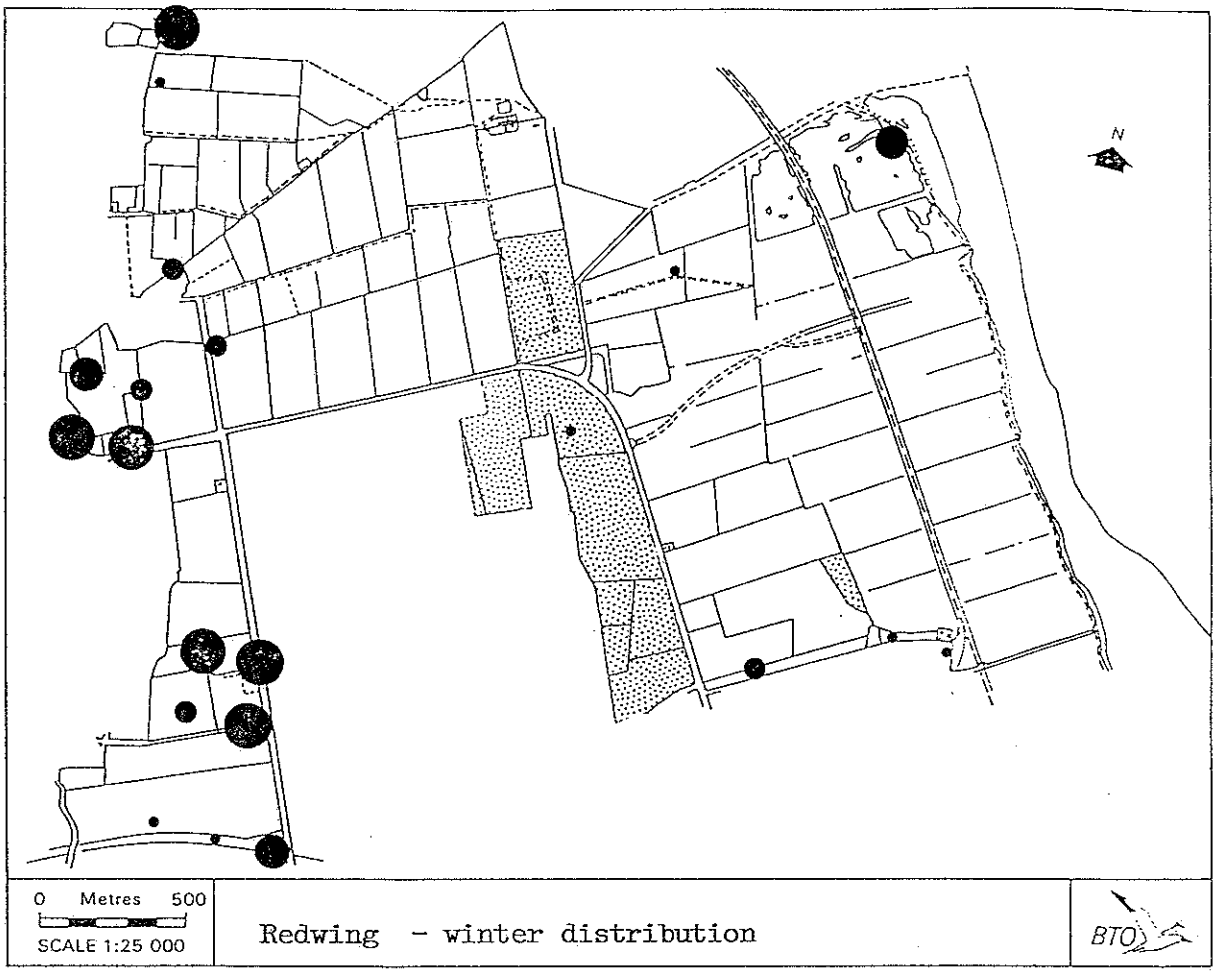

N
0 Metres 500
SCALE 1:25 000
Redwing - winter distribution
BTO

Figure 97

REED BUNTING

Territories: 26

Once considered typical of wetlands, the Reed Bunting may be found in a range of other habitats, including farm hedgerows, downland scrub, young conifer plantations and stabilised sand dunes. Farmland and rough grazing densities are identical at 2 pairs/square km and the total British population approaches 400,000 pairs. In winter, feeding flocks may form, and although most birds are sedentary there is a movement of predominantly female birds into the south-west.

Most breeding territories in the survey area were clustered around the fields and hedgerows of Killingholme Marshes, east of Rosper Road, and also in the Killingholme Haven Pits LNR. Winter records came from similar areas but fewer birds were present on the Killingholme Marshes; up to 4 birds were recorded with Yellowhammers around the disturbed ground of the Nirex compound, beside Rosper Road.

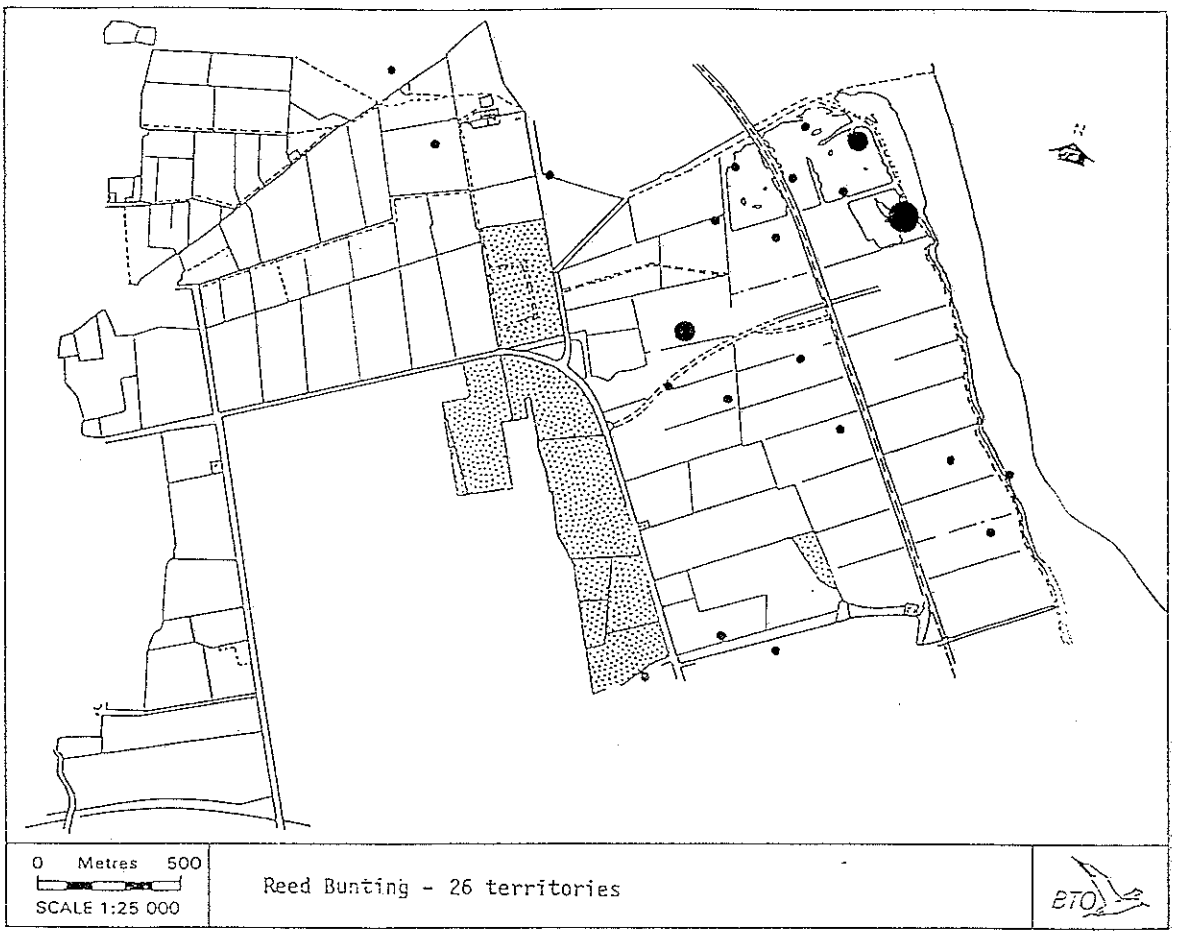


Figure 98

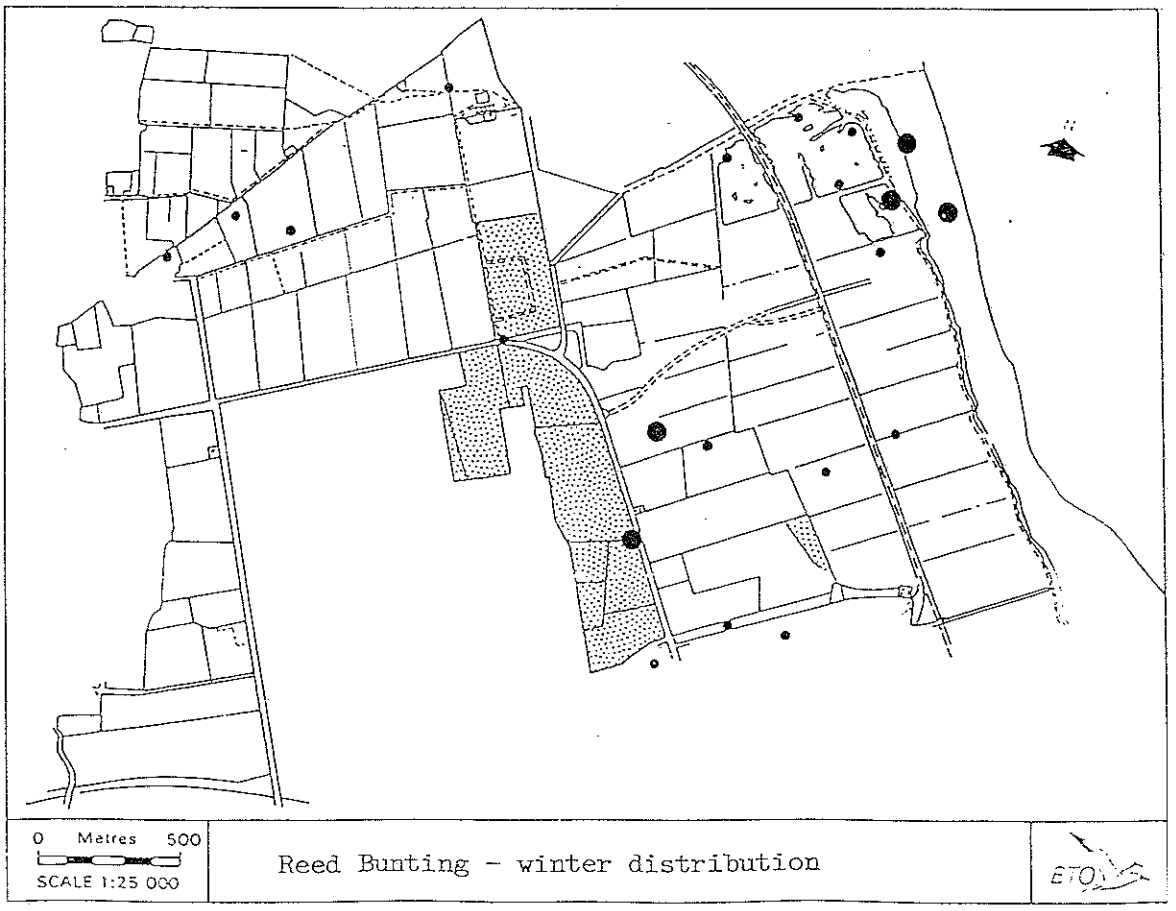


Figure 99

REED WARBLER

Territories: 53

The Reed Warbler is a summer visitor, mainly associated with dense reedbeds, though it may be found in other marginal habitats such as willowherb and Meadowsweet clumps. In well-developed reed stands there may be more than 10 pairs/hectare, but concentrations are difficult to census accurately. The Breeding Atlas estimate of 40,000 to 80,000 pairs nationally has not been updated.

Apart from a minority of territories present in the reed-fringed margins of the dyke running alongside the seawall, the population's stronghold in the survey area, was the Killingholme Haven Pits LNR.

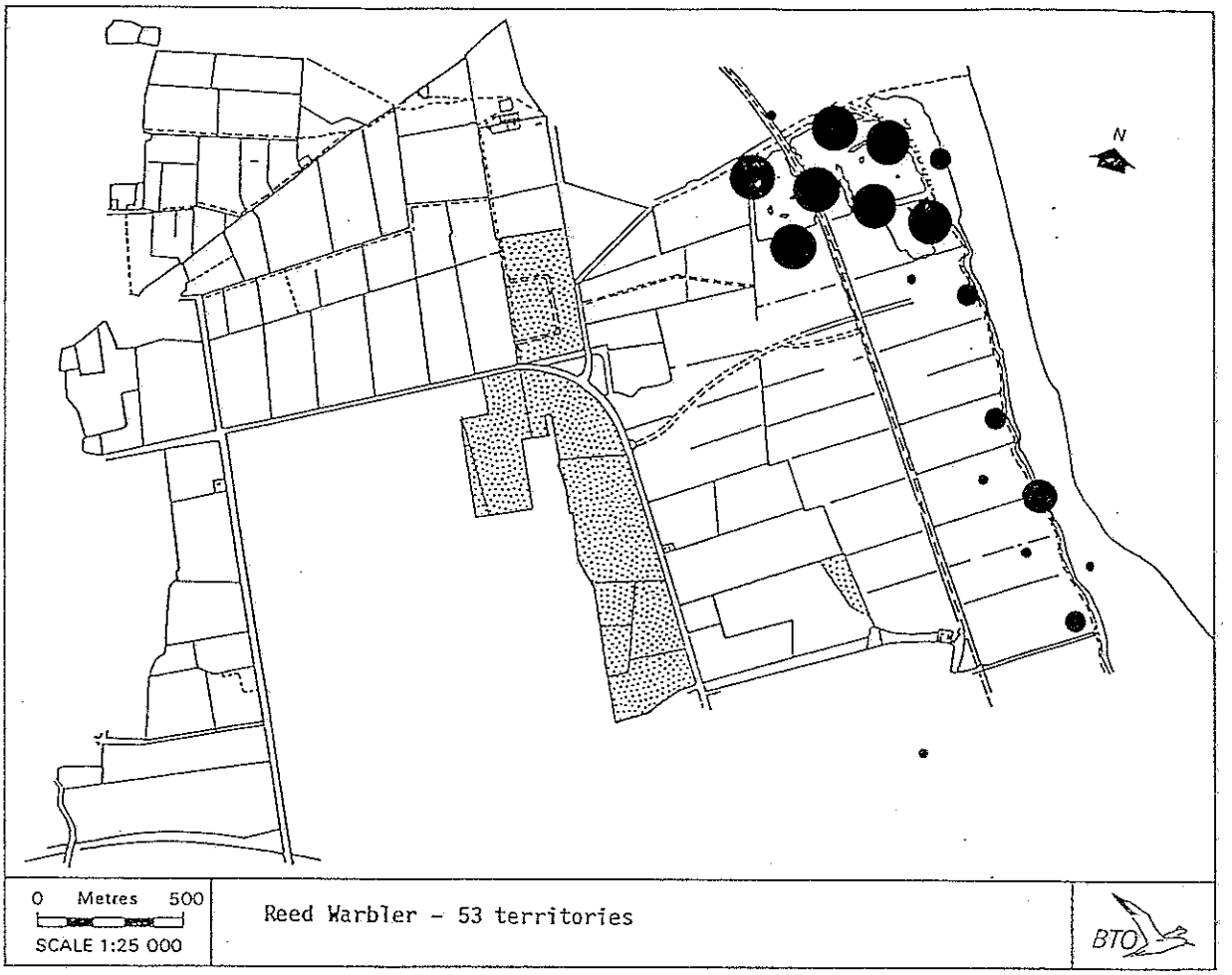


Figure 100

RINGED PLOVER

Territories: 1

Britain and Ireland lie on the south-western edge of this species' breeding range. Most pairs are found along the coast, and the majority of nests are on sand or shingle. Industrial complexes which contain extensive pebble beds now provide useful additional nesting habitat. In winter, immigrant Ringed Plovers enter Britain and large numbers winter on most coastal areasof the British Isles.

A pair nested on chalk and gravel rubble dumped to the south of the pits. In winter, Ringed Plovers were recorded only on the intertidal areas of the survey area on 8 out of 12 visits. Numbers ranged from 1-25 birds. The survey peak represented 6.7% of the average peak Humber count for the previous five winters. No more than 2 Ringed Plovers were present until February when an influx of 25 birds occurred. After the influx counts ranged from 4-15 birds. Ringed Plovers fed on the intertidal areas where rubble was scattered over the flats. . Ringed Plover always abandoned the site over the high tide period, flying down river past Immingham Docks. BoEE data for Killingholme, over the five winter period mentioned above, give an average peak count of 10 Ringed Plover present at the high tide period. This figure is derived from isolated peaks of 25 in 1983/4 and 15 in 1984/5 and is, therefore, not totally reliable.

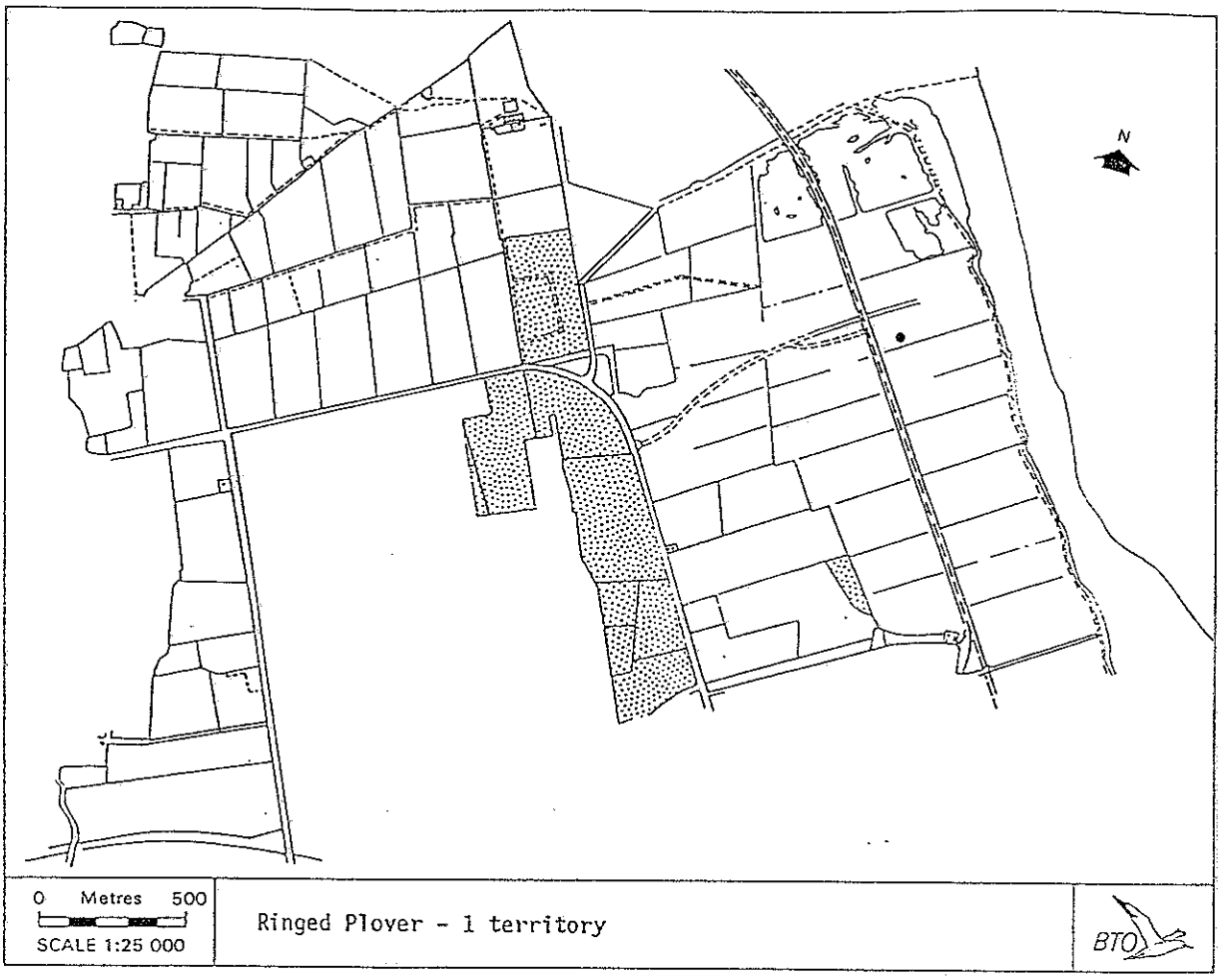
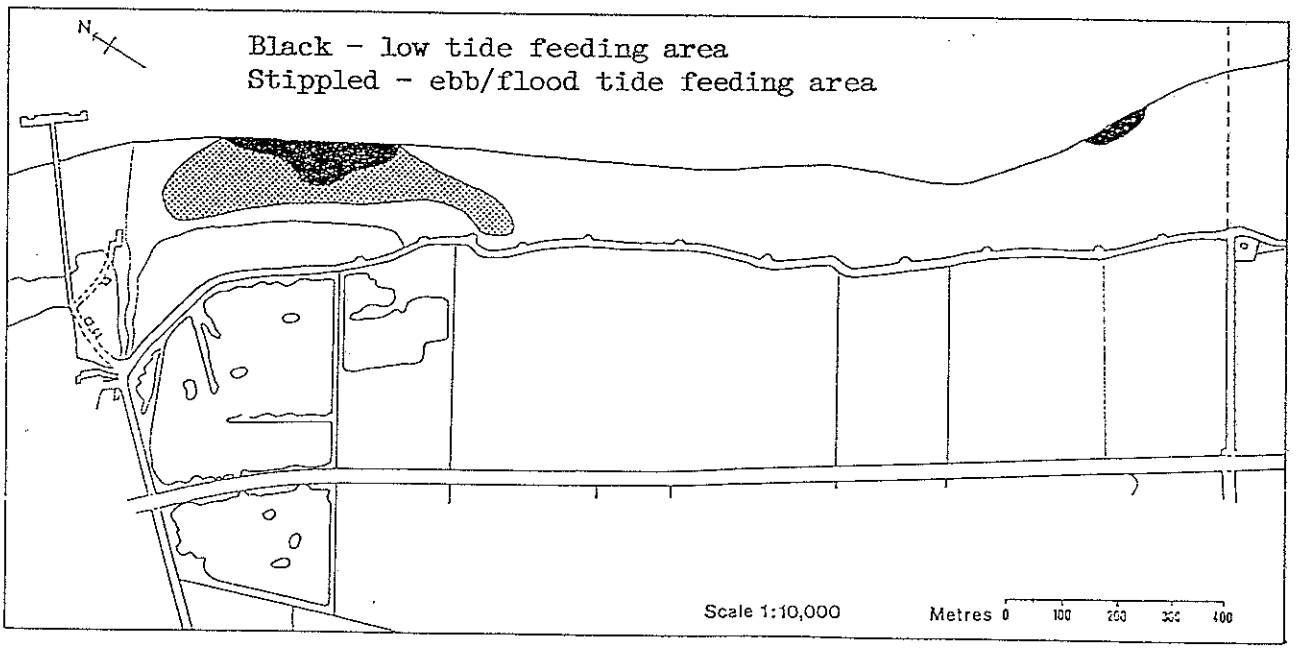


Figure 101



Ringed Plover - winter distribution

Figure 102

ROBIN

Territories: 40

One of the most widely distributed birds in Britain, and often the dominant species in woods which have a history of coppice management. The population density on farmland averages 13 pairs/square km, much lower than the average of 67 for woodland. Robins are relatively sedentary, but breeding pairs split up in winter and birds hold individual territories, resulting in a more even distribution than in summer.

In the survey area, breeding and wintering birds were found in woodland, scrub, and hedgerows with standard trees.

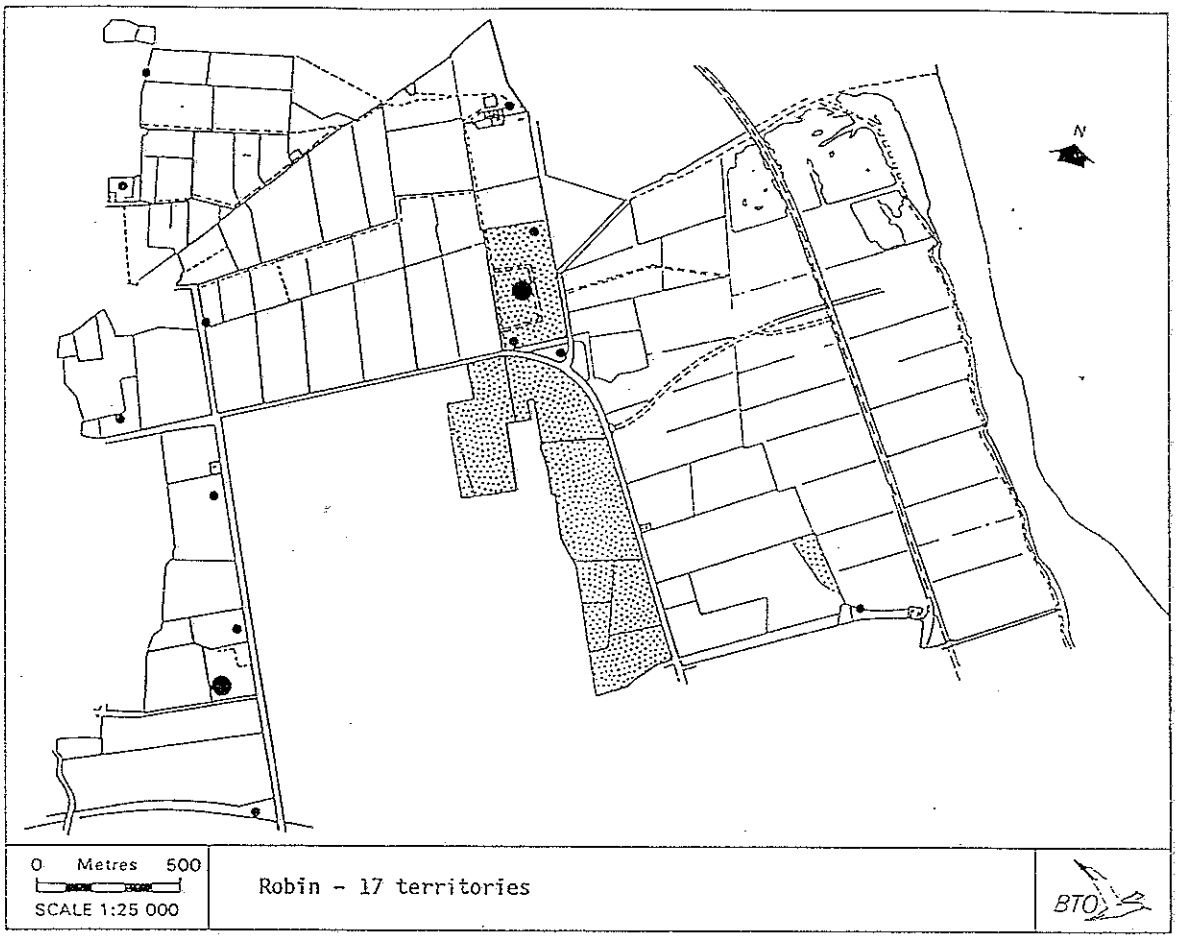


Figure 103

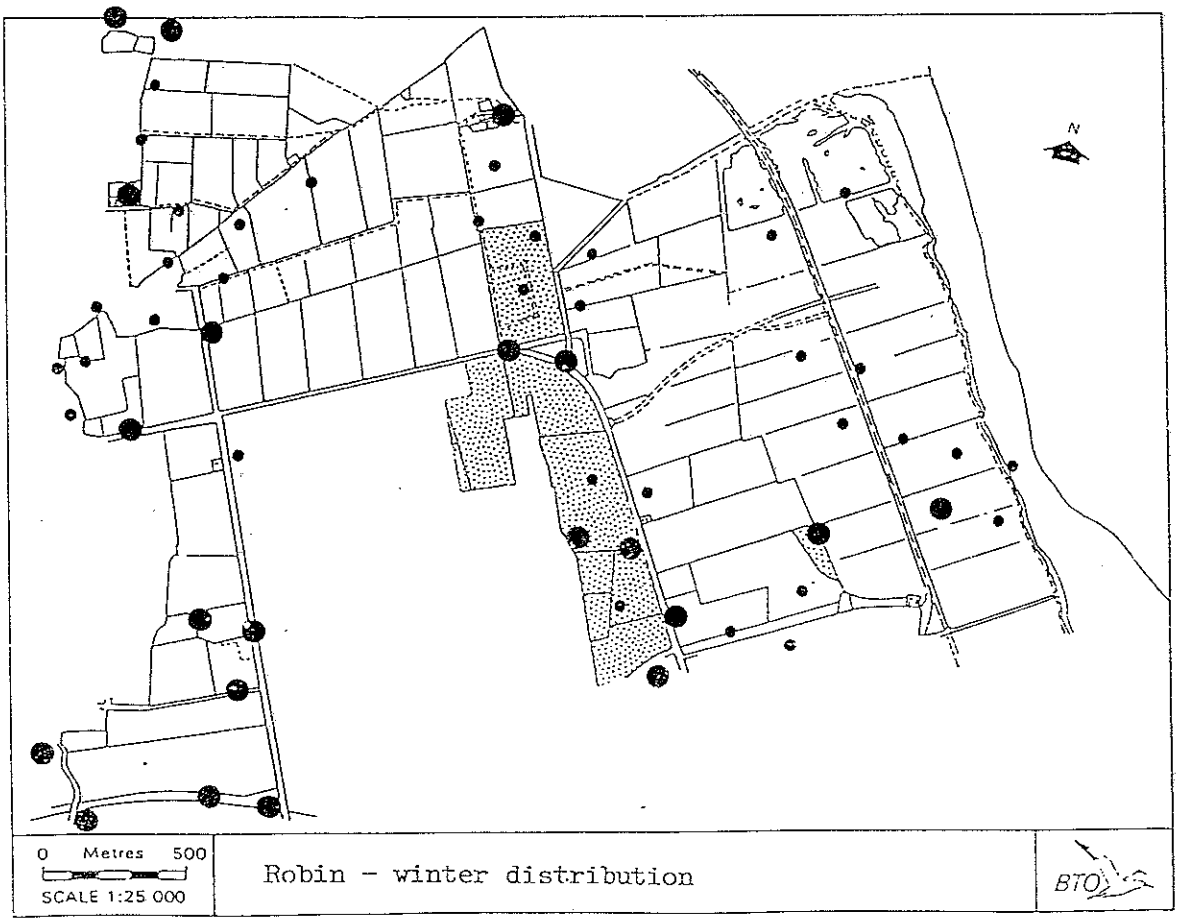


Figure 104

ROCK PIPIT

Rock Pipits breed on the rocky shores of the British Isles, dispersing to all parts of the coast during winter. Winter numbers are usually supplemented by a few immigrants but the British and Irish birds are relatively sedentary.

Single Rock Pipits were occasionally recorded at Killingholme during the winter survey on man-made ground close to the shore.

ROOK

Rooks are colonial birds, common in tree-clad, farmed landscapes. The nests are built early in the year before trees come into leaf, and this is the best time to census this species. Over the past decade the British population has risen to around 805,000 nests. Rooks are resident, but winter feeding flocks forage over large areas, often flying over 20km to reach traditional roosting sites.

Birds from a rookery outside the western boundary flew over the survey area to use the Killingholme rubbish tip. In winter, birds feeding on the tip congregated in fields west of Eastfield Road.

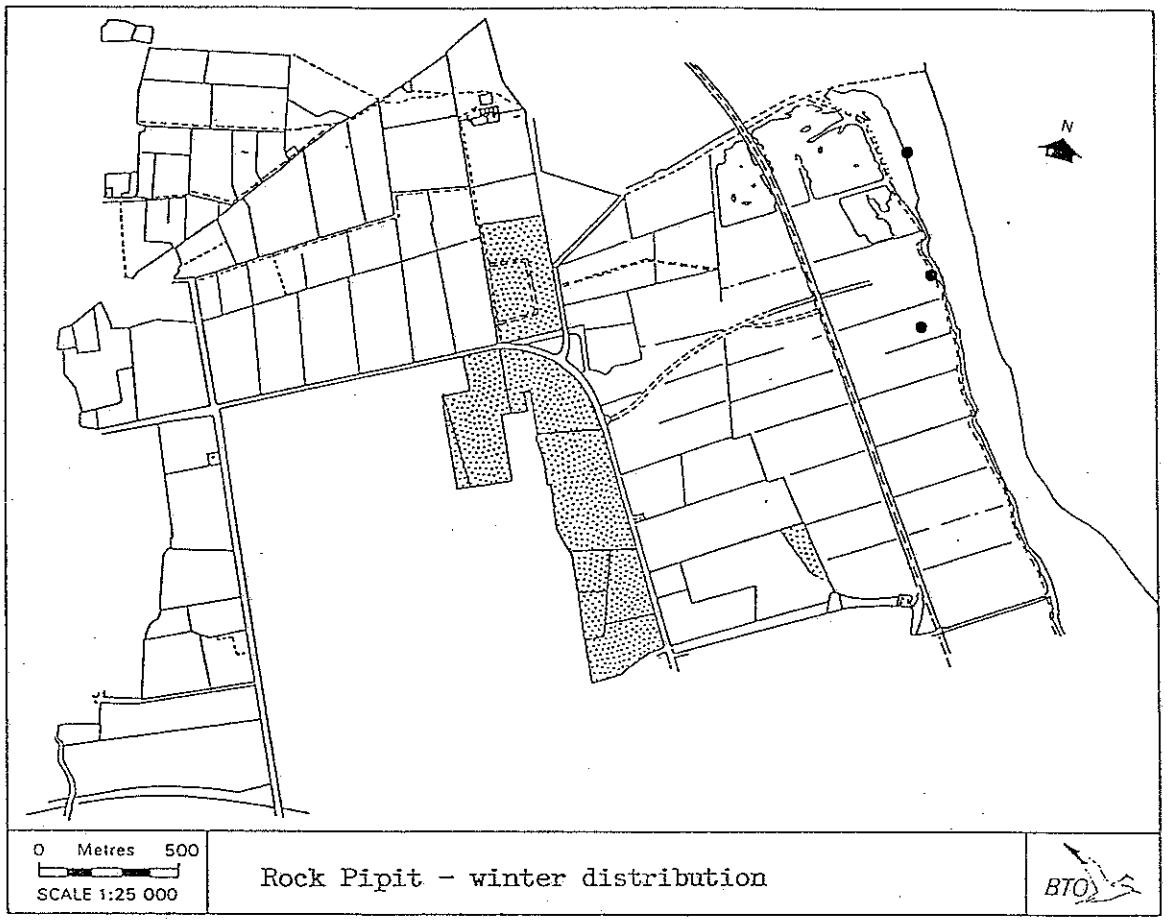


Figure 105

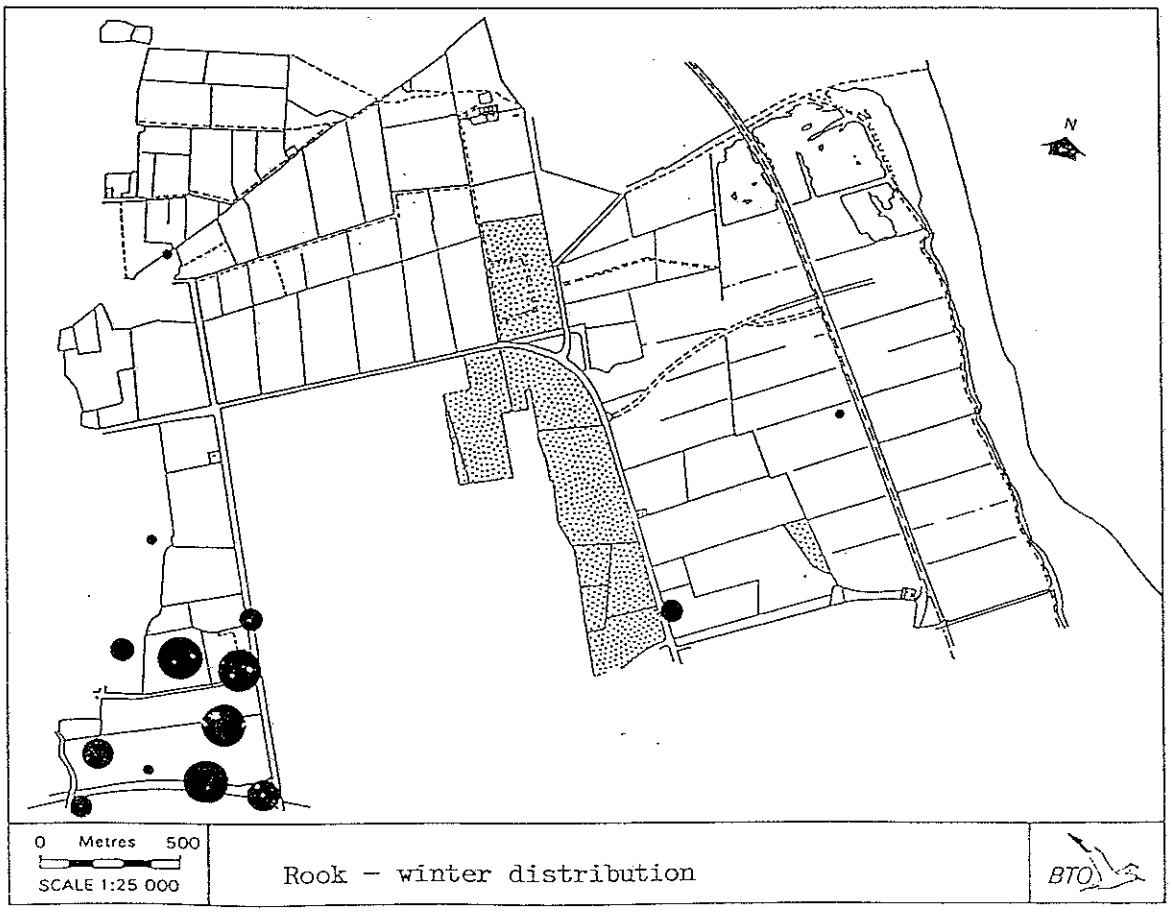


Figure 106

SAND MARTIN

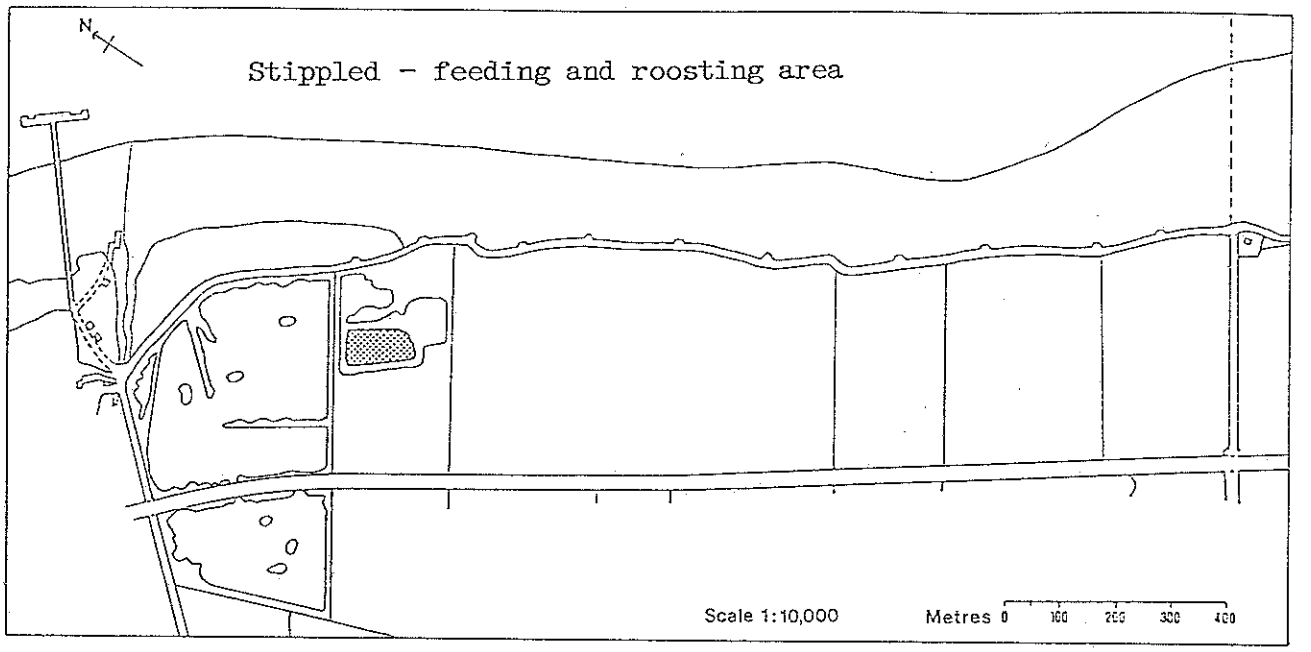
Sand Martins are summer visitors which nest colonially in burrows in vertical, sandy banks. Numbers have fallen dramatically since the Breeding Atlas estimates of a population of about one million pairs, and may total only around 300,000 today.

Birds were occasionally recorded over the pits in April and May, but no breeding colony was present in the survey area.

SCAUP

The British winter population of Scaup is chiefly coastal, with a significant proportion of the population occurring at traditional sites on estuaries and relatively enclosed coastal waters. Sewage outfalls are particularly favoured. The total winter population is currently believed to be between 5,000 and 10,000.

At Killingholme, a single female was recorded intermittently after late December associating with Tufted Duck and Pochard. Lincolnshire Bird Reports for the years 1982 to 1986 record only a single Scaup at Killingholme during the 1985/6 winter. The 1987/88 bird was also recorded at East Halton Pit, 1.5 km north-east of the survey area (J. Mawer pers.comm). Winter numbers of Scaup, on the Humber, vary considerably, with highest numbers normally present during periods of severe weather.



Scaup - winter distribution

Figure 107

SEDGE WARBLER

Territories: 50

Although they will nest in the wetter areas of reedbeds, Sedge Warblers are more frequently associated with the drier margins and are increasingly found in young forestry plantations and dense crops such as oilseed rape. Up to six pairs/ha of this summer visitor, may be recorded in rich habitats, although accurate census results can be difficult to obtain. An update on the Breeding Atlas estimate of 300,000 pairs is not available, but CBC indices continue to fluctuate at low levels following a population crash in the late 1960s.

The distribution within the survey area was similar to that of the Reed Warbler. The main concentration was around the wetlands and scrub of the Killingholme Haven Pits LNR, but some territories were recorded along the dyke between the seawall and fields at the south-east of the site and in scrub and oil-seed rape fields.

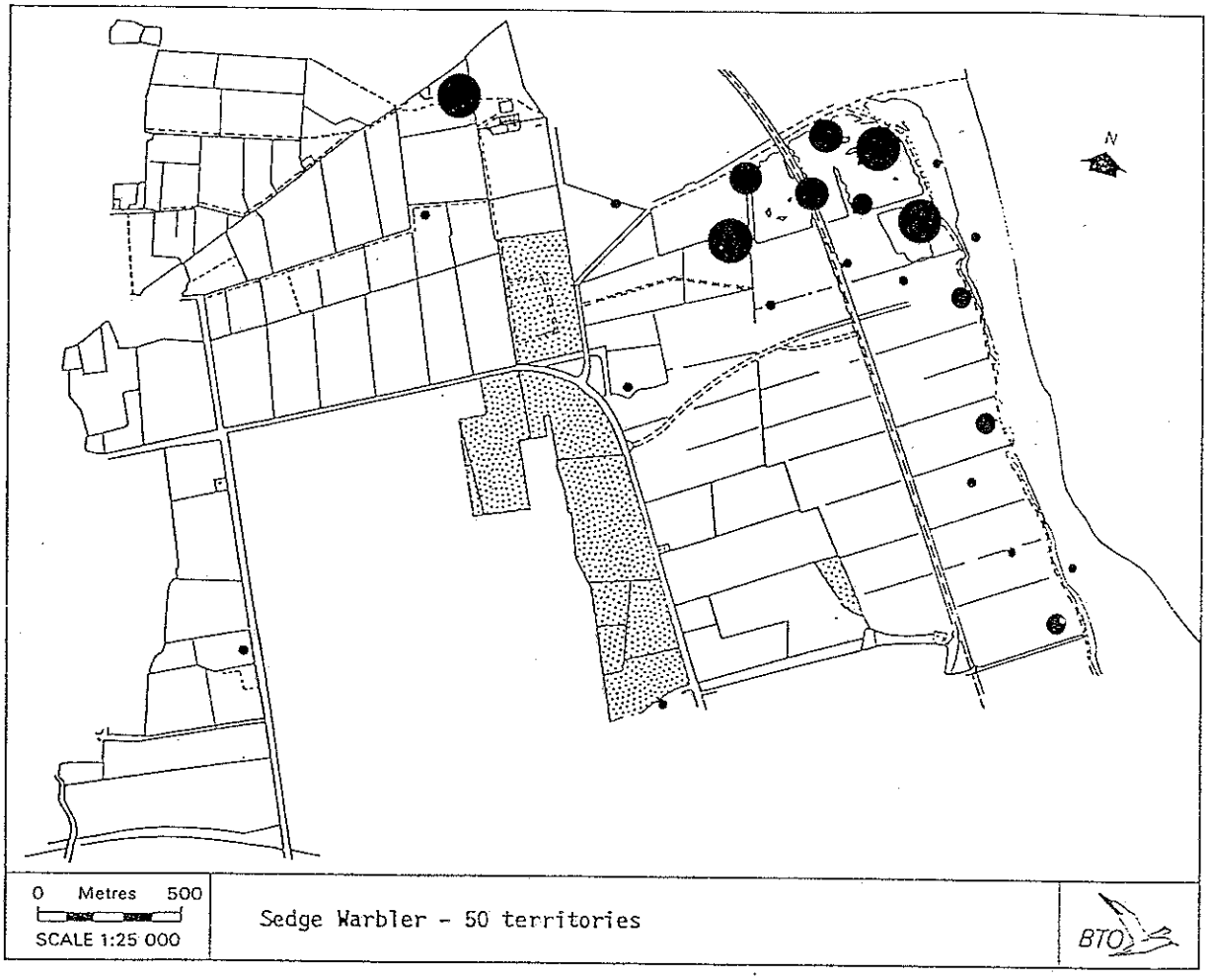

N
0 Metres 500
SCALE 1:25 000
Sedge Warbler - 50 territories
BTO

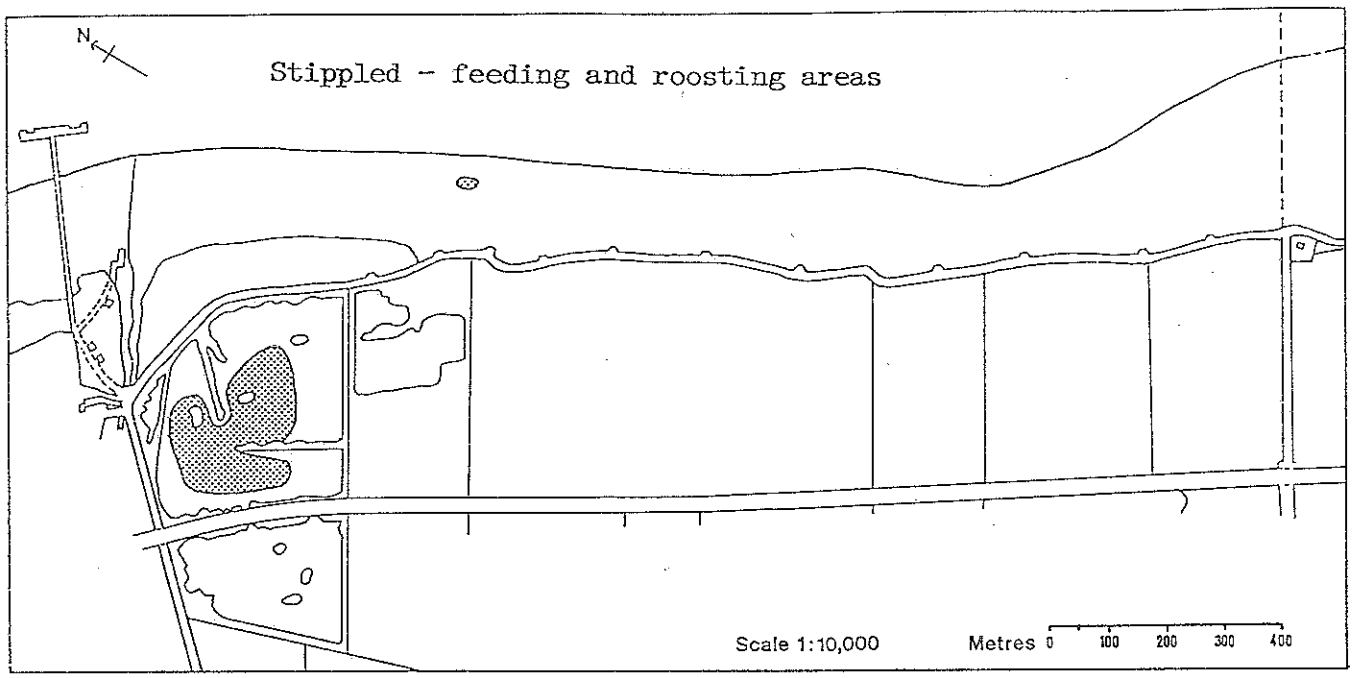
Figure 108

SHELDUCK

Shelduck prefer to nest in sheltered estuaries where they excavate nest burrows in fringing sand dunes or grazing marshes. Birds do not breed until two years old; consequently summer populations contain a high proportion of non-breeders. Population estimates are based on wildfowl counts made at the end of the winter, and these imply a breeding population of almost 15,000 pairs. The British winter distribution of Shelduck is chiefly coastal, with most birds occurring on the muddier estuaries. In recent winters, 60,000-65,000 Shelduck have been counted in mid-winter in Britain.

Groups of up to five birds were seen regularly on the intertidal area and the pits throughout the summer survey period, but no territorial pairs were found within the survey area. Three unfledged young were seen just outside the survey area, on the pit bordering the north side of Haven Road.

Shelduck were recorded on the Killingholme Haven Pits on all winter visits after late January, in numbers ranging from 1 to 6 birds. The survey peak count of 6 birds represents <1% of the average, peak Humber count for the previous five years. On one winter visit, two birds were seen to fly from the pits onto the inter-tidal area where they fed briefly before returning to the pits. This was the only record of Shelduck on the inter-tidal areas in winter.



Shelduck - winter distribution

Figure 109

SKYLARK

Territories: 72

Skylarks are birds of open countryside that prefer larger fields, but nest in a wide range of open habitats; their main need is for short vegetation in which to feed. The Breeding Atlas recorded the Skylark as the most widely distributed British breeding species, occurring in more 10 km squares than any other bird. Density estimates for farmland and rough grazing are similar at 11 and 12 pairs/square km respectively with a total population in the order of 2 million pairs. In winter birds tend to vacate the northern and western areas of the British Isles and concentrate in the south and east, where they are joined by a few continental birds.

This species bred in fields across the entire survey area. It was scarce in the early winter, with only occasional records before Februaury, but then became gradually more widespread, presumably as a result of birds returning to breeding areas. Small numbers were regular throughout the winter on the disturbed ground south of the Killingholme Haven pits.

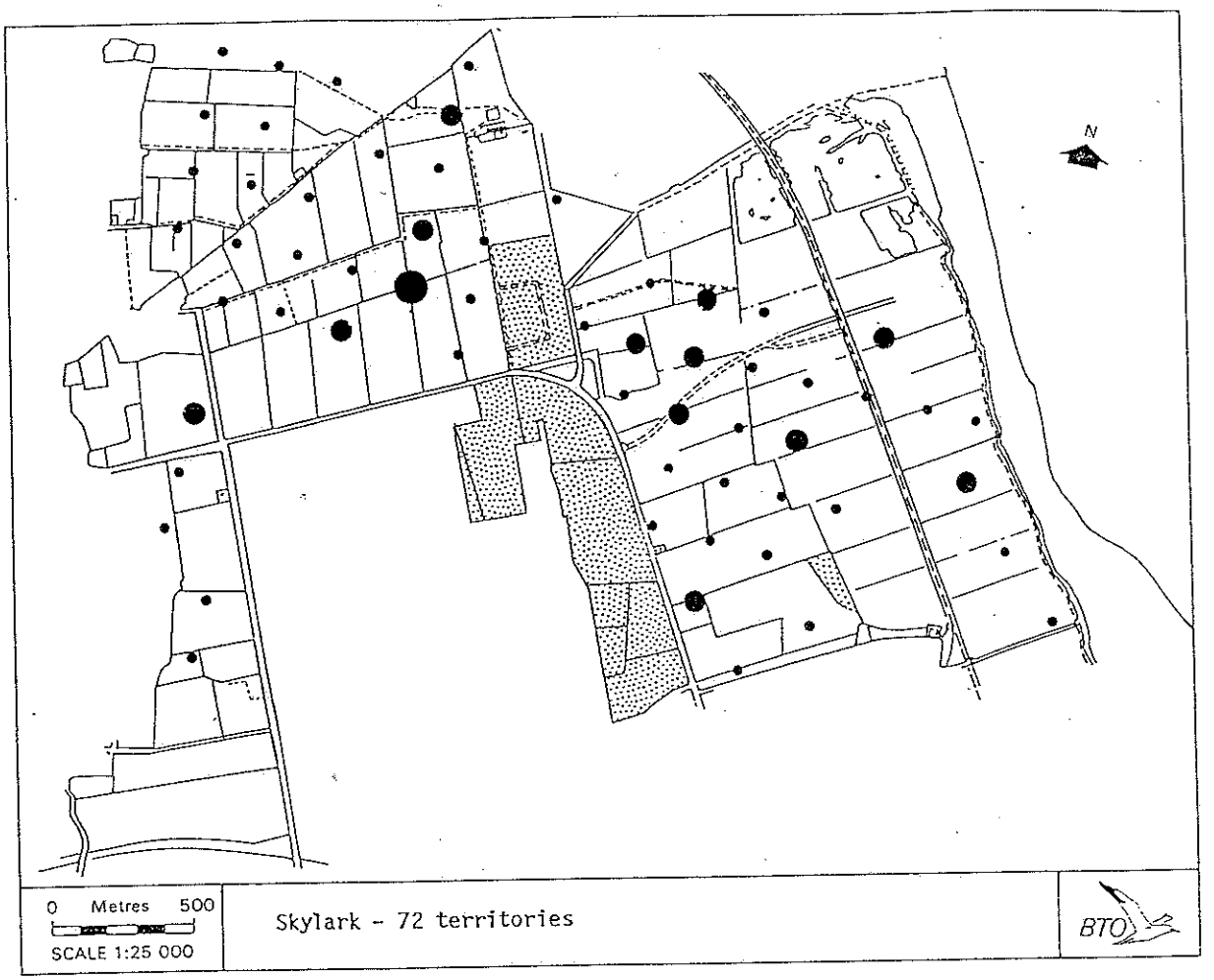


Figure 110

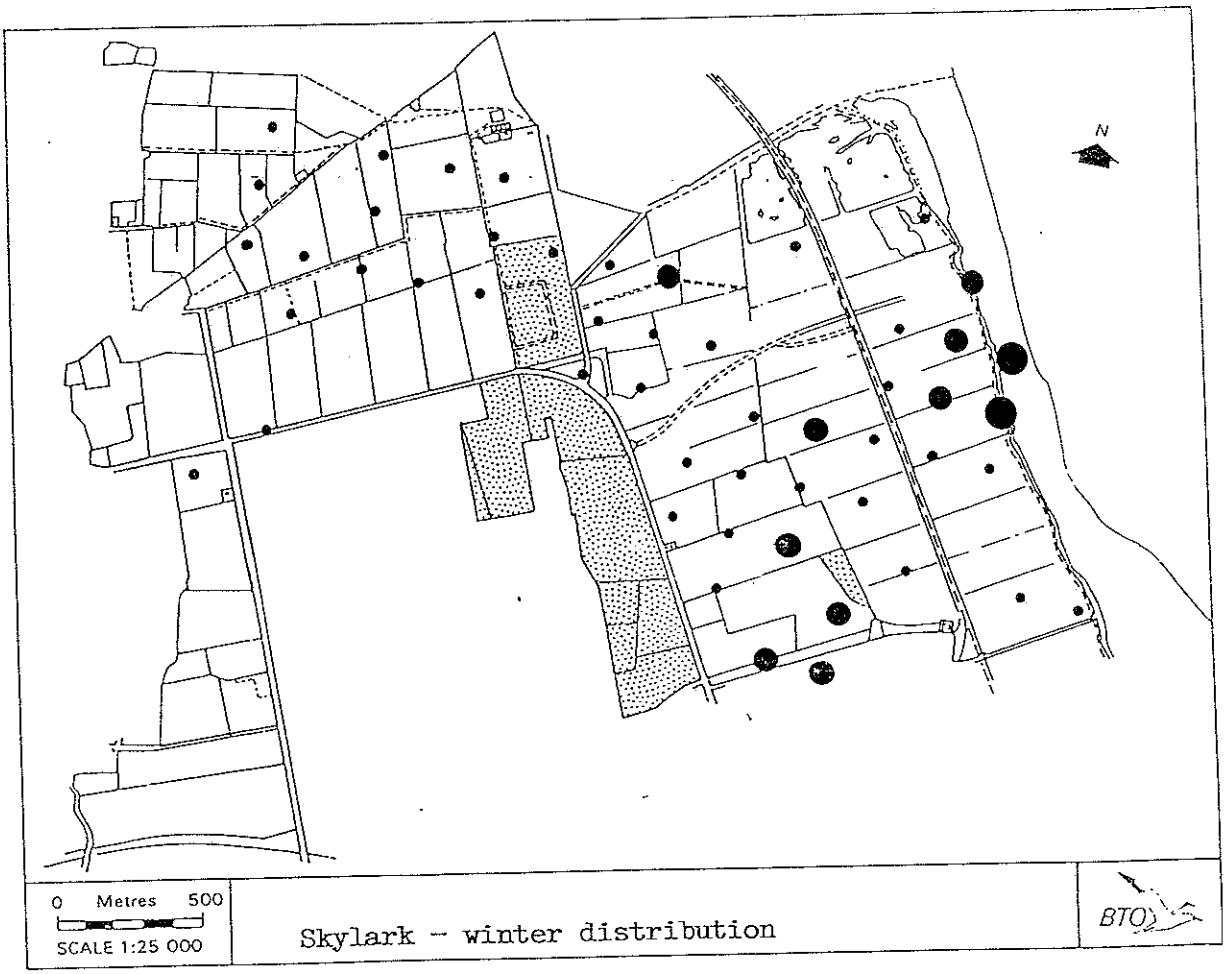


Figure 111

SNIPE

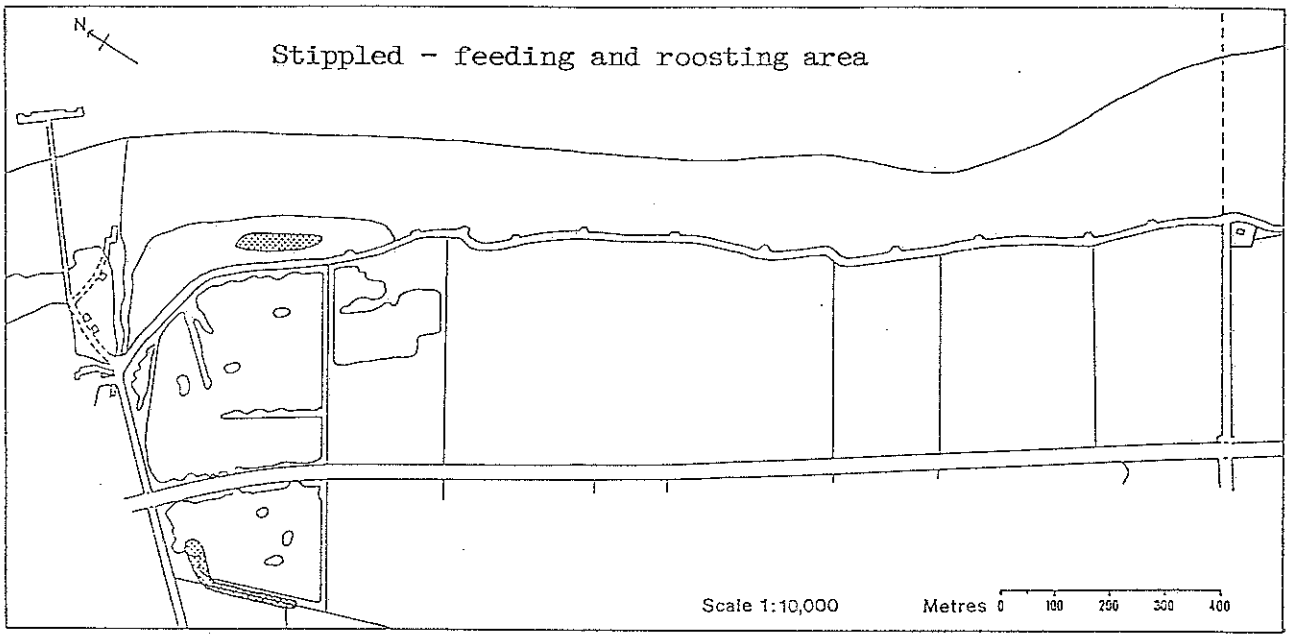
Most Snipe breed in the northern and western parts of the British Isles, but winter predominantly in the lowlands of the south and east. Winter numbers are much higher than summer numbers as a result of large scale immigration from the Baltic countries.

There were no summer records of Snipe and apart from two records from a flooded ploughed field just west of the Pits and two records from the saltmarsh, Snipe were recorded only from the Killingholme Haven Pits. Normally, 1-2 birds were present, and the survey peak of 7 represents 3.5% of the average peak Humber count for the previous five winters. The BoEE average peak winter count for Killingholme for the five winter period 1982/3 to 1986/7 is 20 birds. Peak counts for single winters ranged from 0 to 60 birds. The species is generally much under-recorded because of its cryptic nature.

SNOW BUNTING

The Snow Bunting has a circumpolar breeding distribution, with a very small breeding population present in the Scottish Highlands. Numbers arriving to winter in Britain can vary greatly from year to year but probably average 10,000-15,000 birds.

A single flock of 15 birds was recorded on the disturbed ground south of the Killingholme Haven Pits, during the only snowfall of the winter in early March.



Snipe - winter distribution

Figure 112

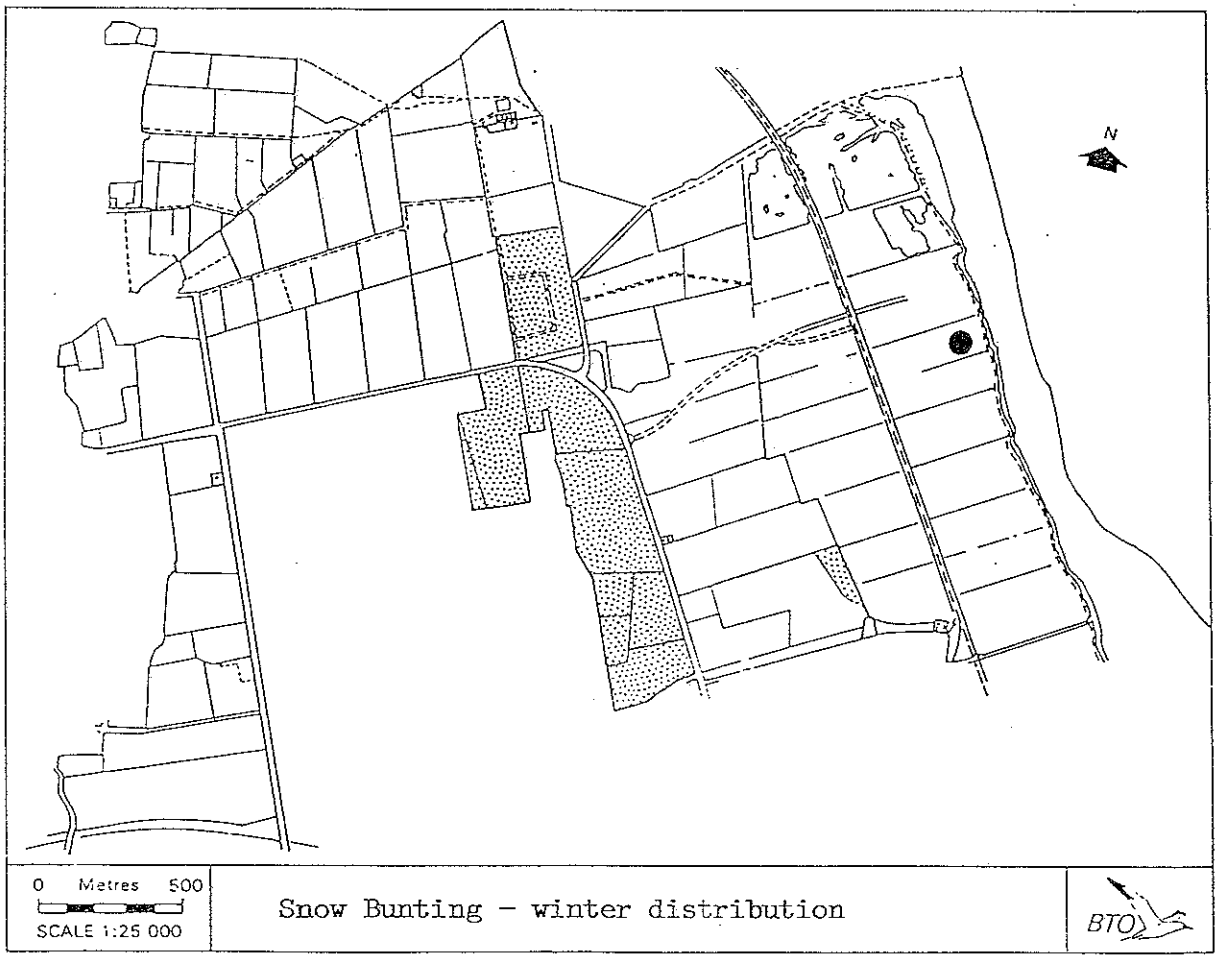


Figure 113

SONG THRUSH

Territories: 8

A woodland species that nests in any area with trees or bushes, the Song Thrush is common in woodland edges, hedgerows, gardens and parks. The British population is estimated at 1.5 million pairs, and farmland and woodland densities average 6 and 19 pairs/square km respectively. In winter a proportion of the Song Thrushes breeding in Britain and Ireland move south into France and Spain, and the remaining birds are joined by immigrants from northern Europe. All the birds wintering in the British Isles are sensitive to cold snaps, which cause large scale southerly movements.

Breeding territories and winter records were widely distributed across the survey area in woodland, scrub and hedgerows. In winter, areas of permanent pasture and associated hedgerows were preferred, and scrub adjacent to these areas in the north-west of the survey area held the highest numbers. Arable areas with low hedgerows were little used.

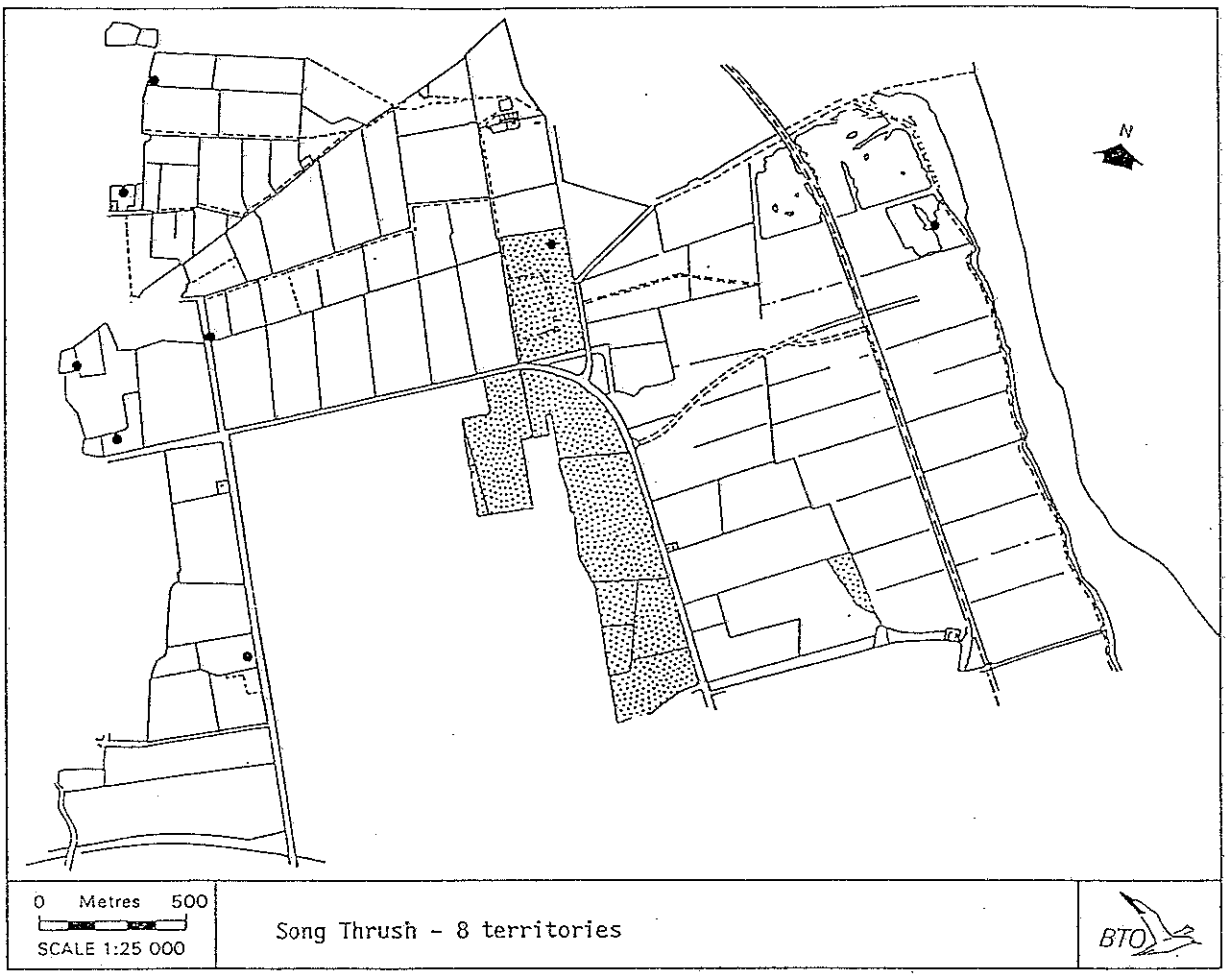


Figure 114

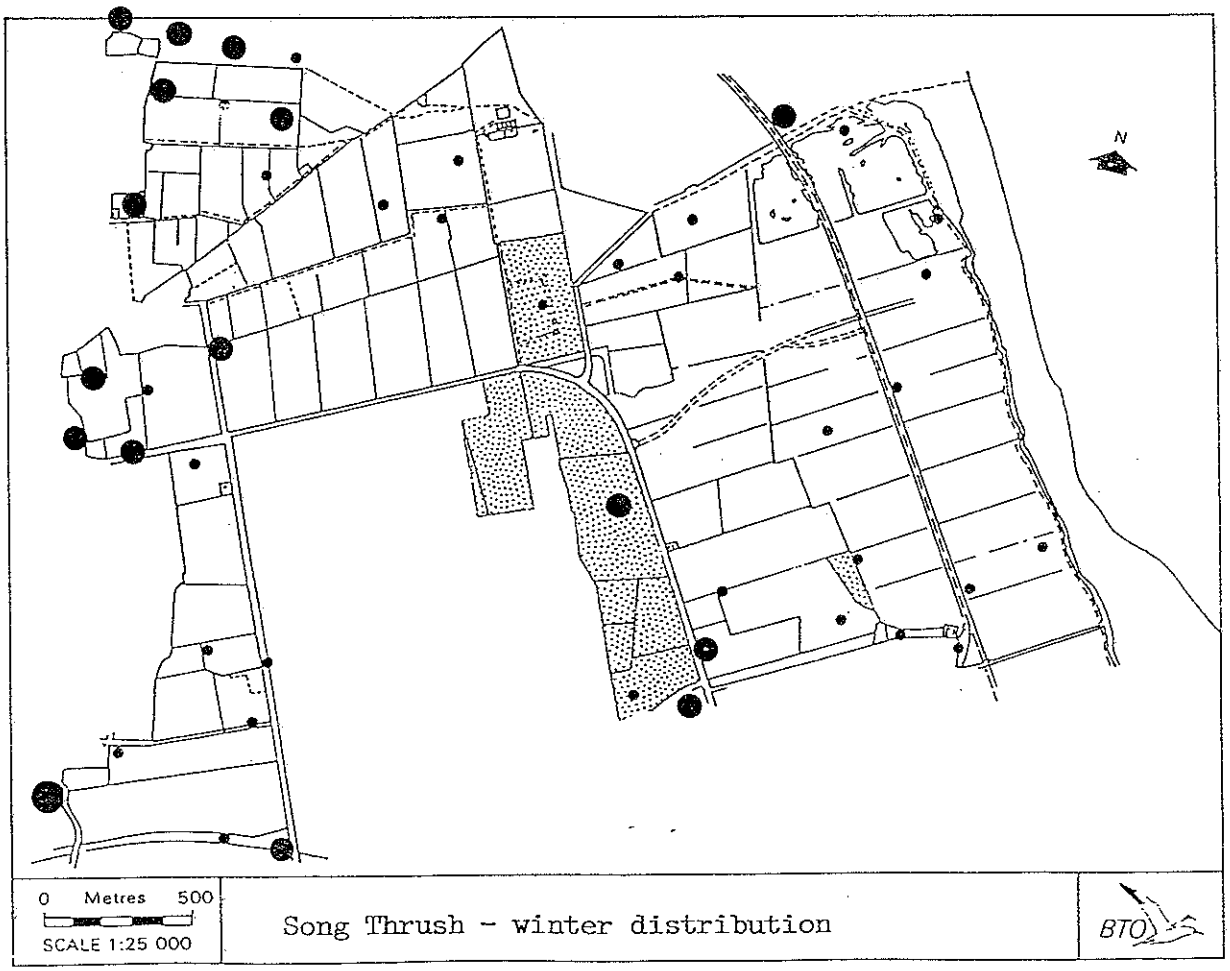


Figure 115

SPARROWHAWK

A marked national population decline of this woodland raptor was triggered in the 1950s through indiscrimate use of pesticides, particularly chlorinated hydrocarbons. Since the 1970s, the population has been recovering. Birds are now found most frequently in coniferous or mixed woodland over most of the British Isles. In winter, birds hunt over larger areas but adults remain close to their breeding areas. First-year birds, however, undergo a post-fledging dispersion that can involve long-distance movements.

A single female was present in the survey area in April and early May, but there were no further breeding survey records. In winter, birds were again seen regularly over the survey area suggesting they may have bred in the vicinity. Breeding has not, however, been confirmed in the county bird atlas tetrads overlapping the survey area.

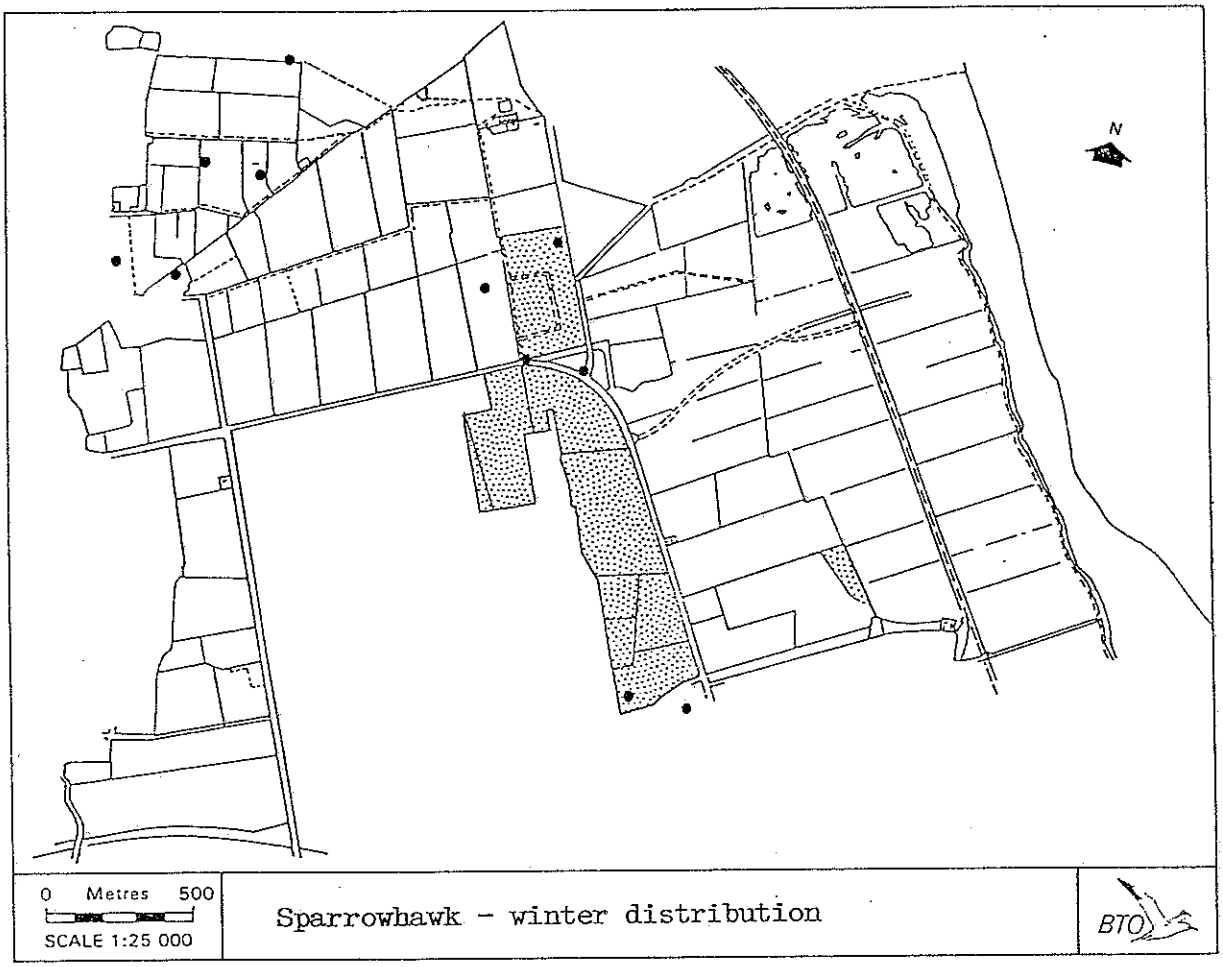

N
0 Metres 500
SCALE 1:25 000
Sparrowhawk - winter distribution
BTO

Figure 116

SPOTTED FLYCATCHER

Territories: 1

A summer visitor to woodland edges and forest glades, the Spotted Flycatcher is now often also found in man-made habitats such as wooded farmland, orchards, gardens, churchyards and parks. Woodland and farmland densities of 3.4 and 1.0 pairs per km square respectively indicated a population of 300,000 pairs in 1982.

One territory was found in an area of hedges with mature trees bordering the north end of Green Lane.

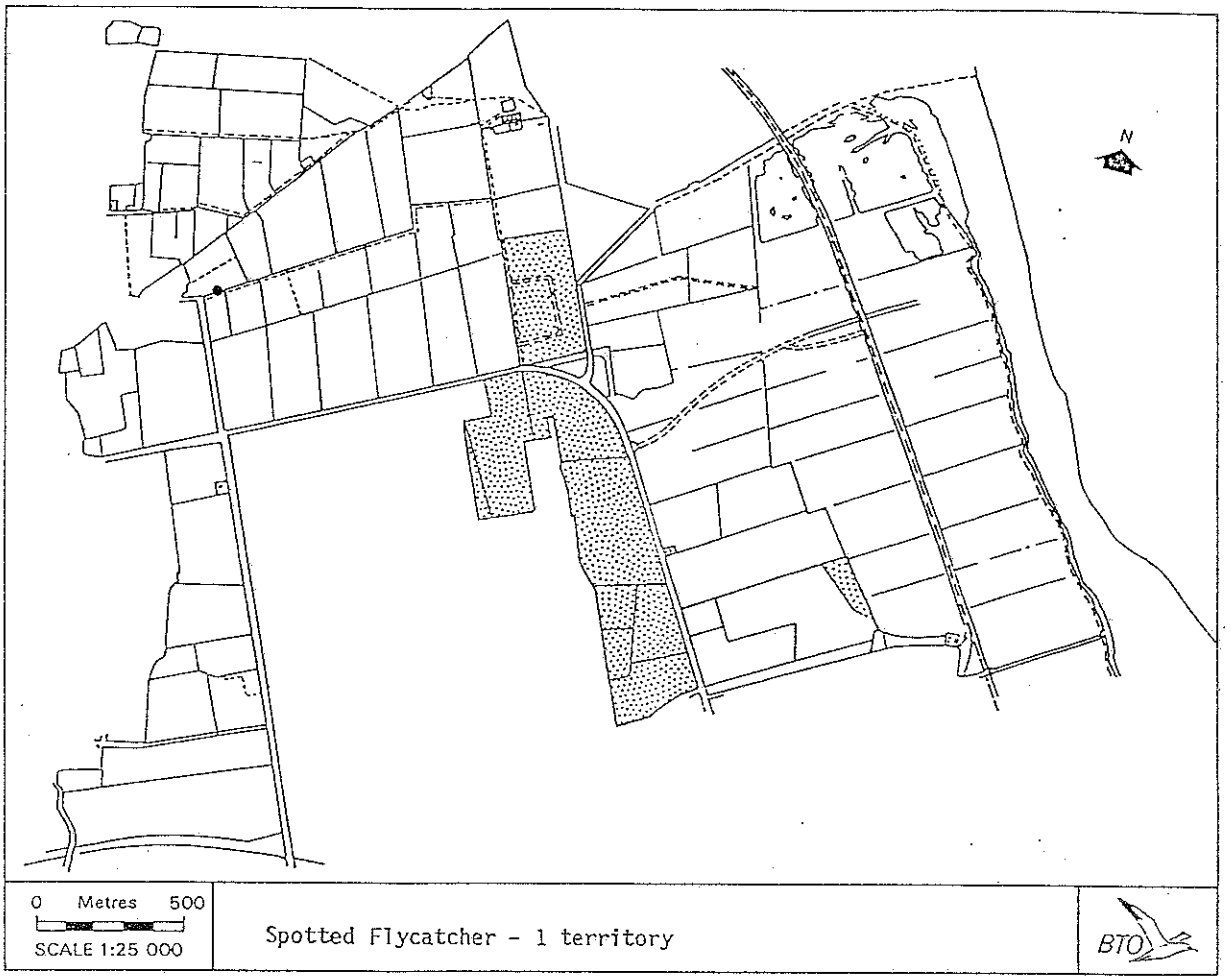

N
0 Metres 500
SCALE 1:25 000
Spotted Flycatcher - 1 territory
BTO

Figure 117

STARLING

A hole-nesting species which has successfully exploited virtually all available habitats in Britain. Their semi-colonial nesting habitats in built-up areas makes it difficult to census Starlings using the CBC technique. The Breeding Atlas estimated the national population at 4-7 million pairs. British and Irish Starlings are relatively sedentary, but in winter large numbers of continental birds enter the British Isles.

During the summer, Starlings were frequently seen in small numbers on the edge of the industrial area, but breeding was not proved. In winter, most Starling records were of flocks on permanent pastures and their associated hedgerows, or on disturbed ground.

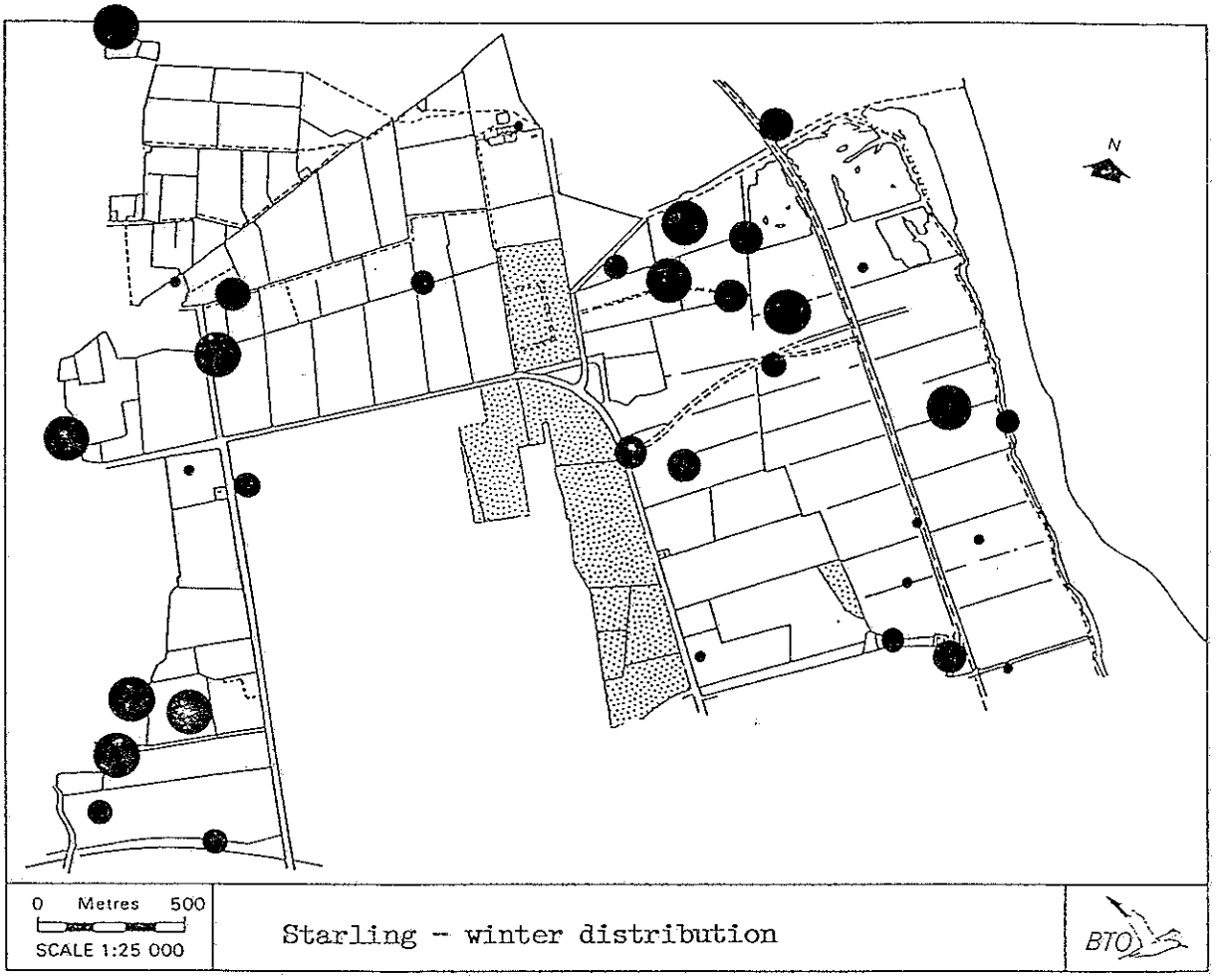

N
0 Metres 500
SCALE 1:25 000
Starling - winter distribution
BTO

Figure 118

STOCK DOVE

Territories: 2

Stock Doves most commonly occur in farmland with old trees and parkland. The population has recovered since a crash in the 1950s, probably caused by heavy pesticide usage, and there may now be in the order of 100,000 pairs in Britain. Both the breeding and wintering distributions of Stock Doves tend to be concentrated in England and the south-east of Ireland.

One territory was located in woodland and another in a hedgerow with mature trees. All winter records were of 1-2 birds on arable fields, sometimes associating with Woodpigeons.

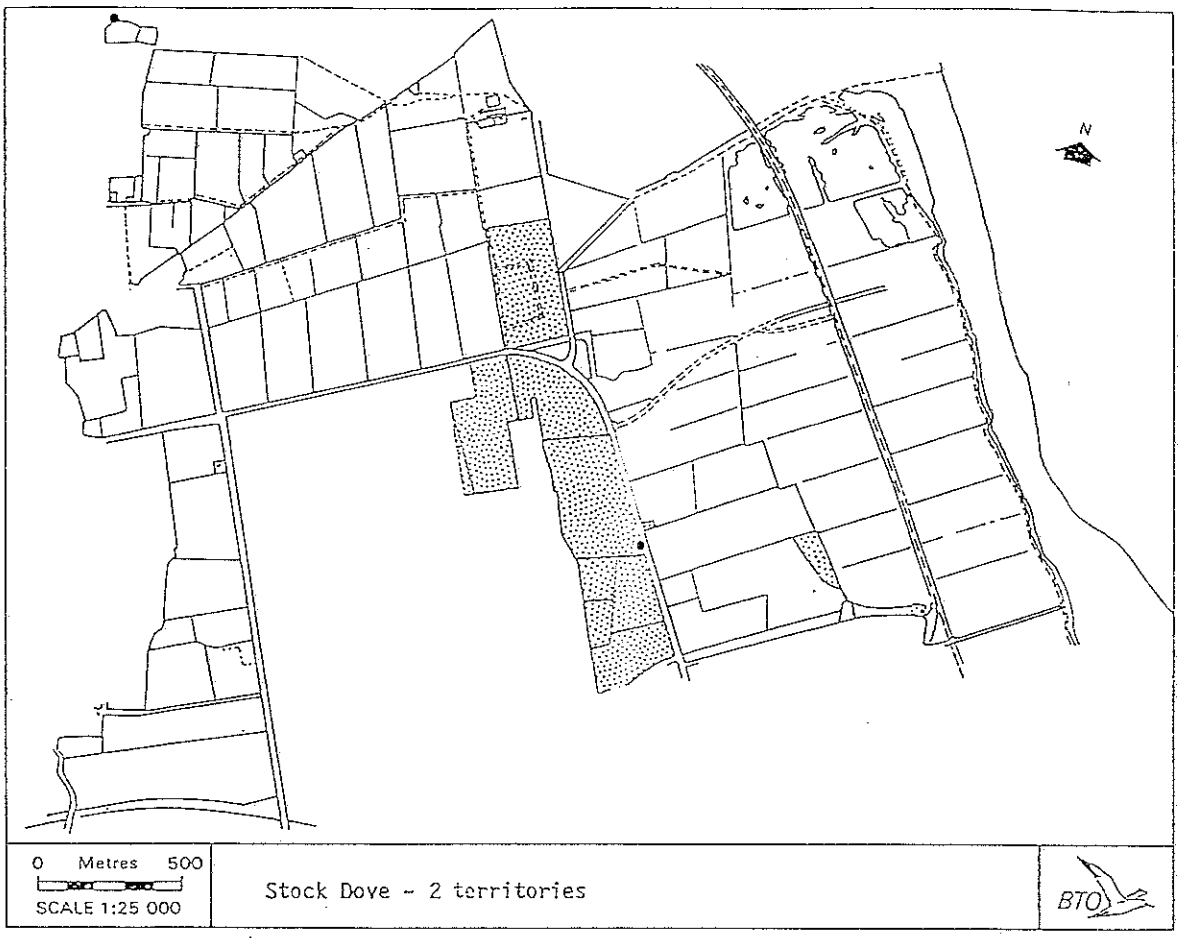


Figure 119

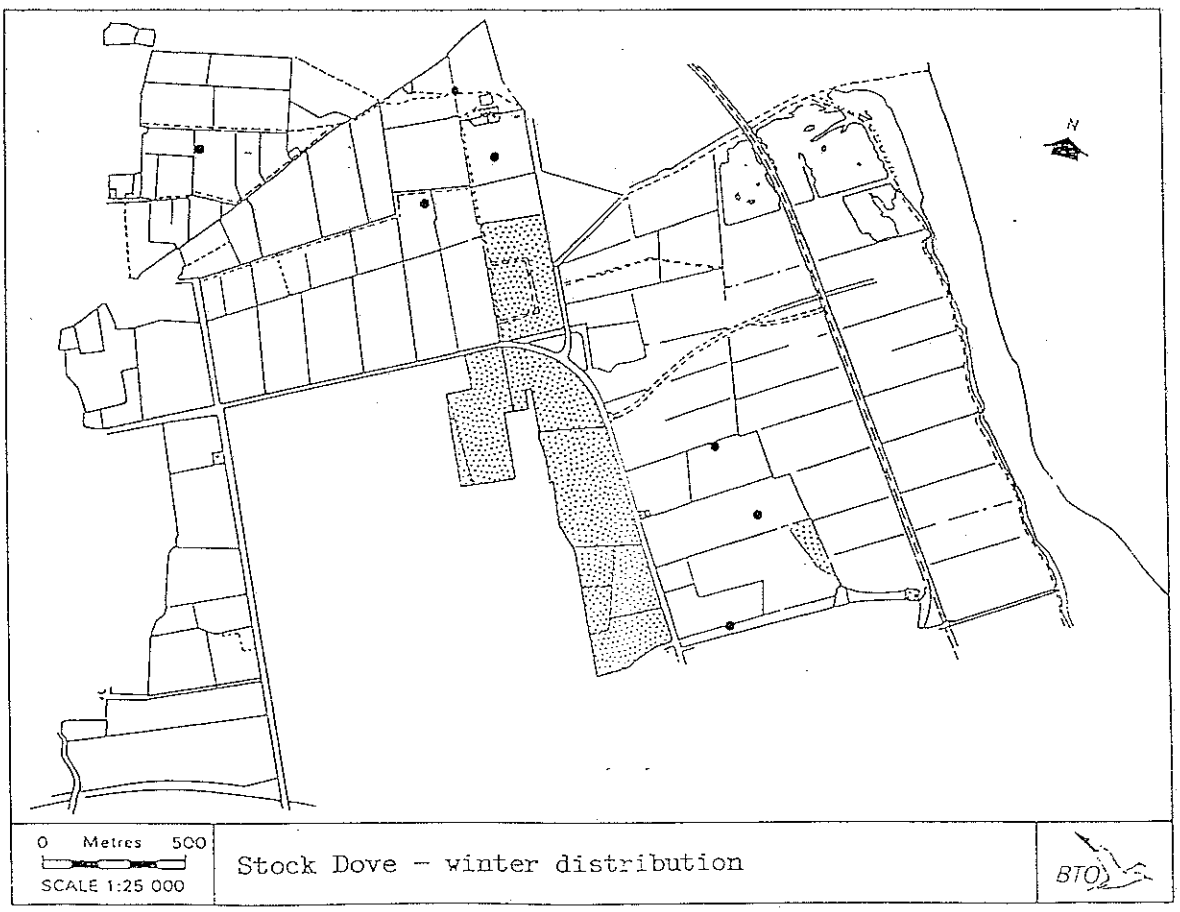


Figure 120

SWALLOW

Nests: 6

Swallows are a summer visitor which occurs widely throughout Britain. Nests are almost invariably sited inside buildings, particularly barns and outhouses. Densities are highest on agricultural land at 2.9 territories/square km, suggesting a total population of 500,000 - 600,000 pairs in Britain.

It has been found that nest counts are a better estimate of the breeding population than the CBC technique. All the nests in the survey area were sited in outbuildings.

SWIFT

These migrant aerial insectivores almost always nest under the eves of houses or in crevices of older buildings.

Birds were regularly seen feeding over Killingholme Haven Pits during the breeding survey, but no breeding colony was situated within the survey area.

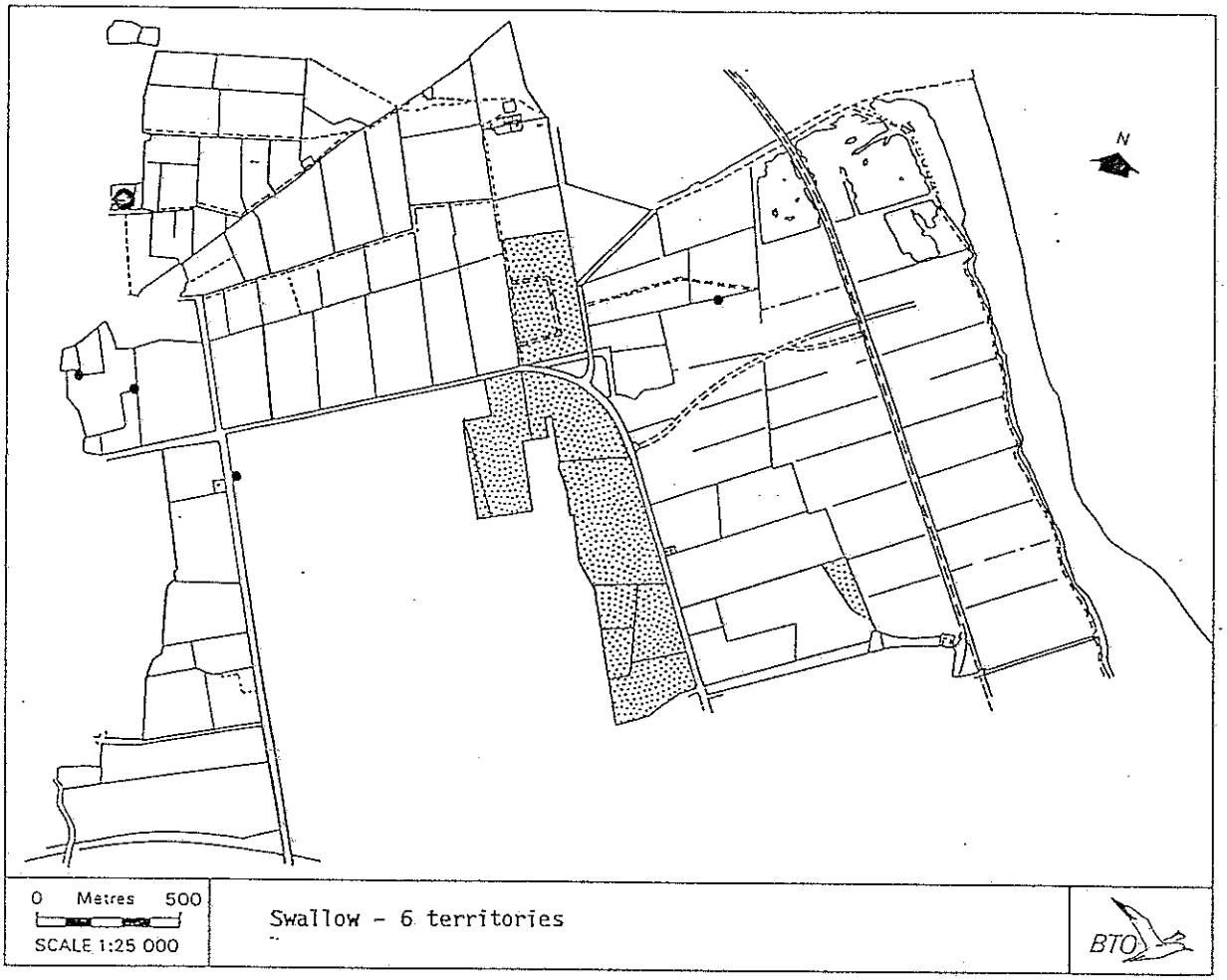


Figure 121

TAWNY OWL

Territories: 1

This nocturnal predator is mainly a bird of deciduous or mixed woodland, but is also found in wooded farmland, parks, churchyards and gardens. It is a highly territorial species throughout the year and nests in late March, earlier than other British owls.

Fox Covert was the only location identified as holding a breeding territory, and the only winter record of a Tawny Owl was in the adjacent Chasehill Wood.

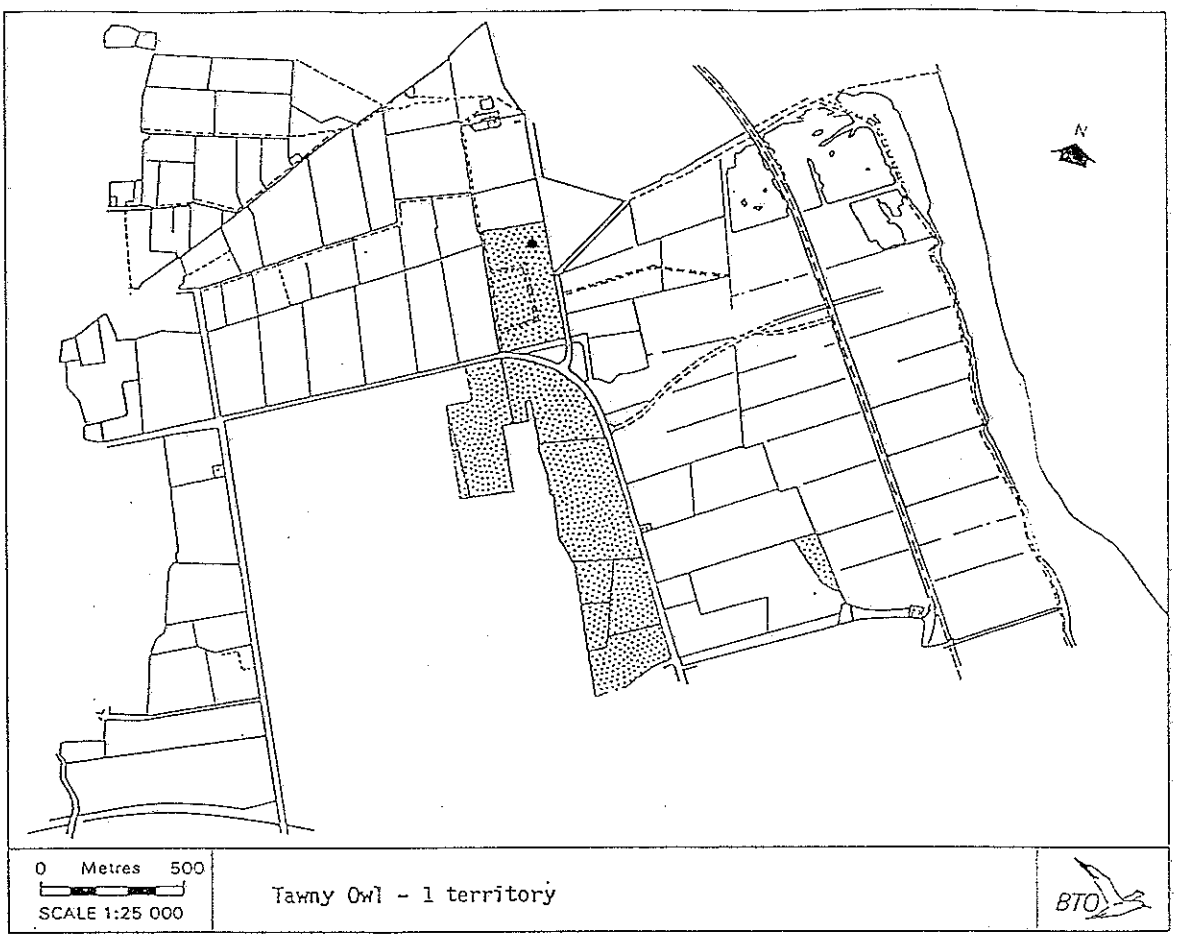


Figure 122

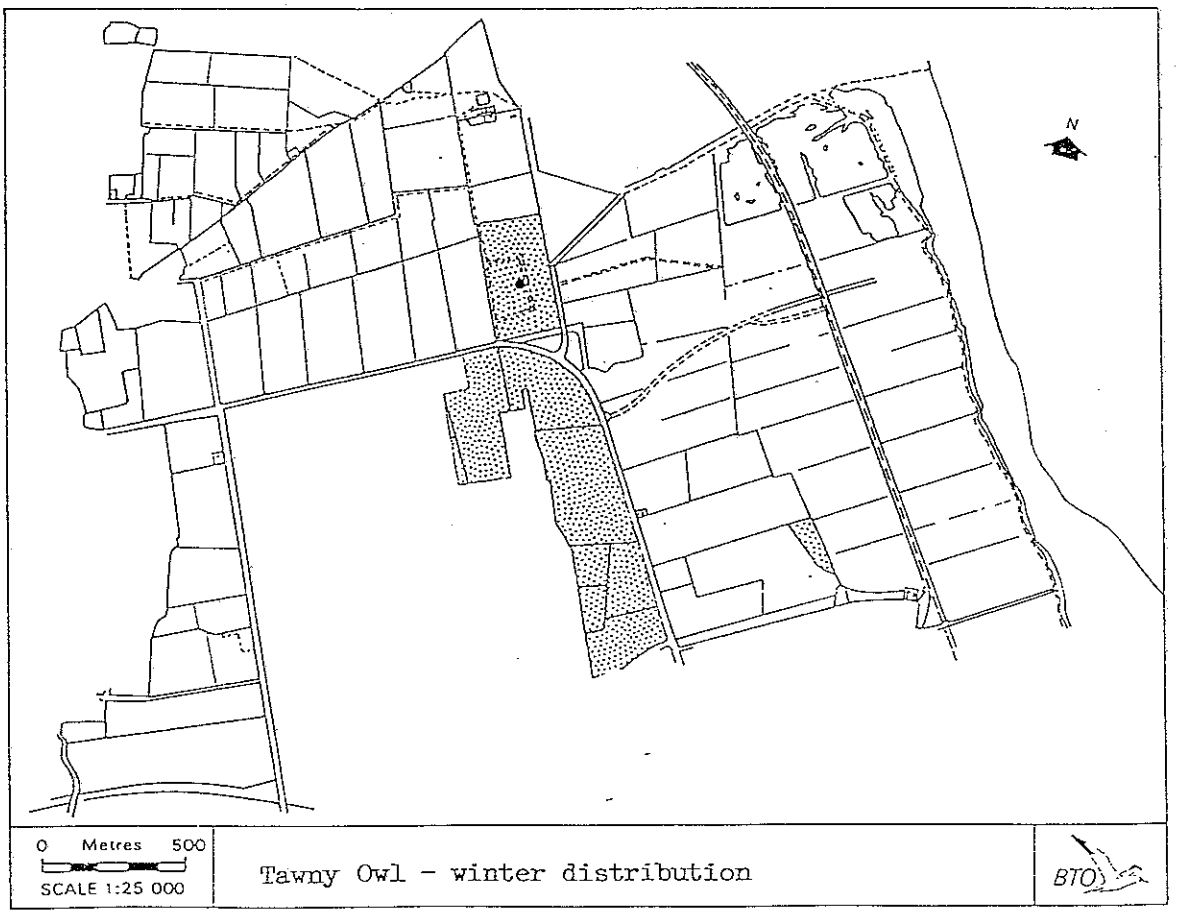
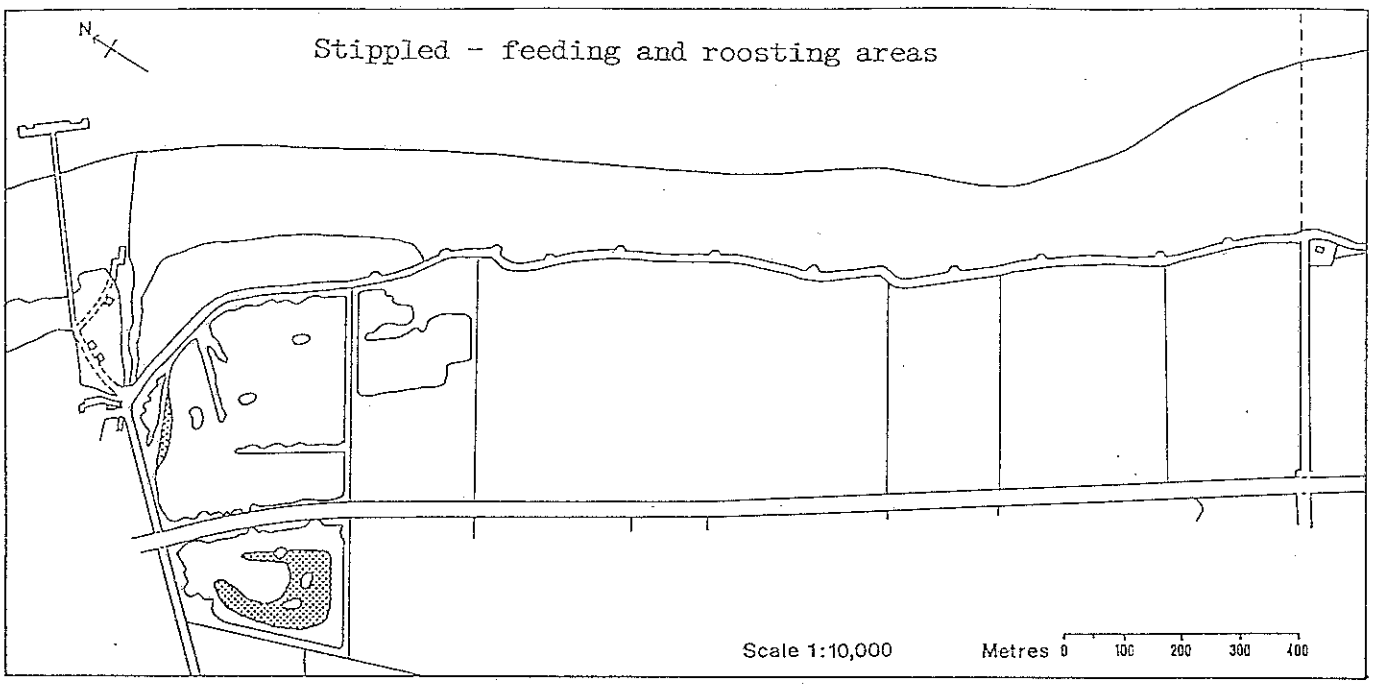


Figure 123

TEAL

Teal winter all over the British Isles, though at low densities in the north. The British breeding population is concentrated in the north, but moves to the south during winter. Winter numbers are bolstered by immigrants from northern Europe, forming a highly mobile wintering population that responds quickly to harsh weather by moving south and west.

Teal were recorded on 9 out of 10 winter visits to the Killingholme Haven Pits. Numbers ranged from 1 to 9 birds and the peak count represented <1% of the average peak count for the Humber for the previous five winters. The numbers of Teal recorded during this study were similar to those from BoEE counts of the site over the previous five winter period. With the exception of one record, of five birds on the large north-western pit, all records were of birds using the north-eastern pit.



Teal - winter distribution

Figure 124

TREECREEPER

Territories: 1

A typical species of mature deciduous or mixed woodland, Treecreepers can be found in farmland, parks or gardens if large trees are present. Woodland densities are highest at 5 pairs per km square, and the population may now be around 200,000 to 300,000 pairs. Treecreepers are sedentary and often found in association with tit flocks during the winter.

One breeding territory was found in Fox Covert. In winter, Treecreepers were only recorded twice, again from Fox Covert.

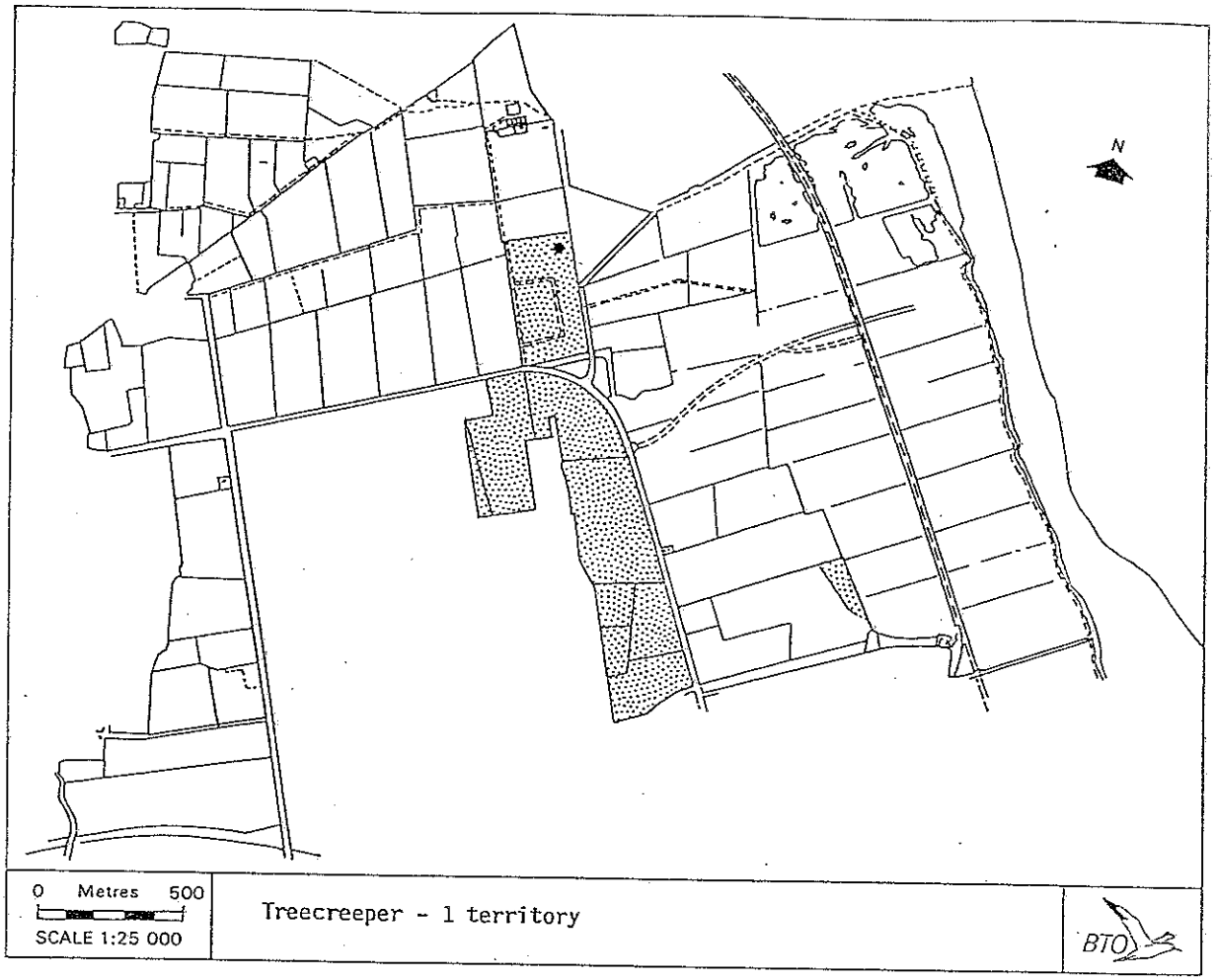


Figure 125

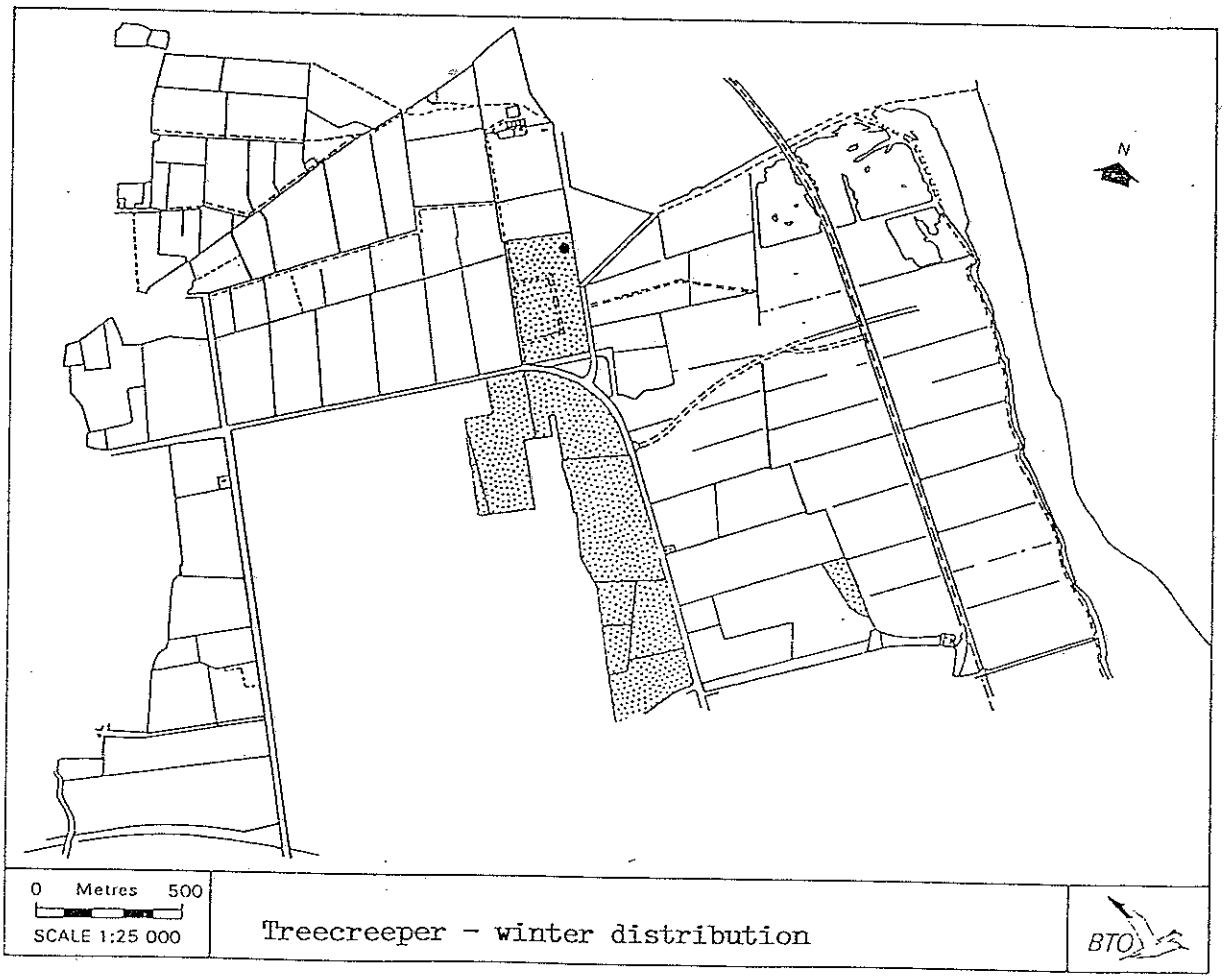


Figure 126

TREE SPARROW

Territories: 4

Tree Sparrows are widely distributed but easily overlooked as a result of their secrecy and wariness; most nest in holes in wooded areas or on suitable sites on cliffs or buildings. Densities on farmland and woodland are similar at 1.8 and 1.2 pairs per km square respectively, giving an estimated national population of 250,000 pairs. A British winter population of 80,000 birds suggested by the Winter Atlas in 1986 clearly indicates the decline of this species in recent years.

Territories were found in the hedgerows of Killingholme Marshes and along the edge of Fox Covert, but in winter there were only infrequent records from two locations; Eastfield Road railway embankment scrub, and hedgerows and disturbed ground on Killingholme marshes.

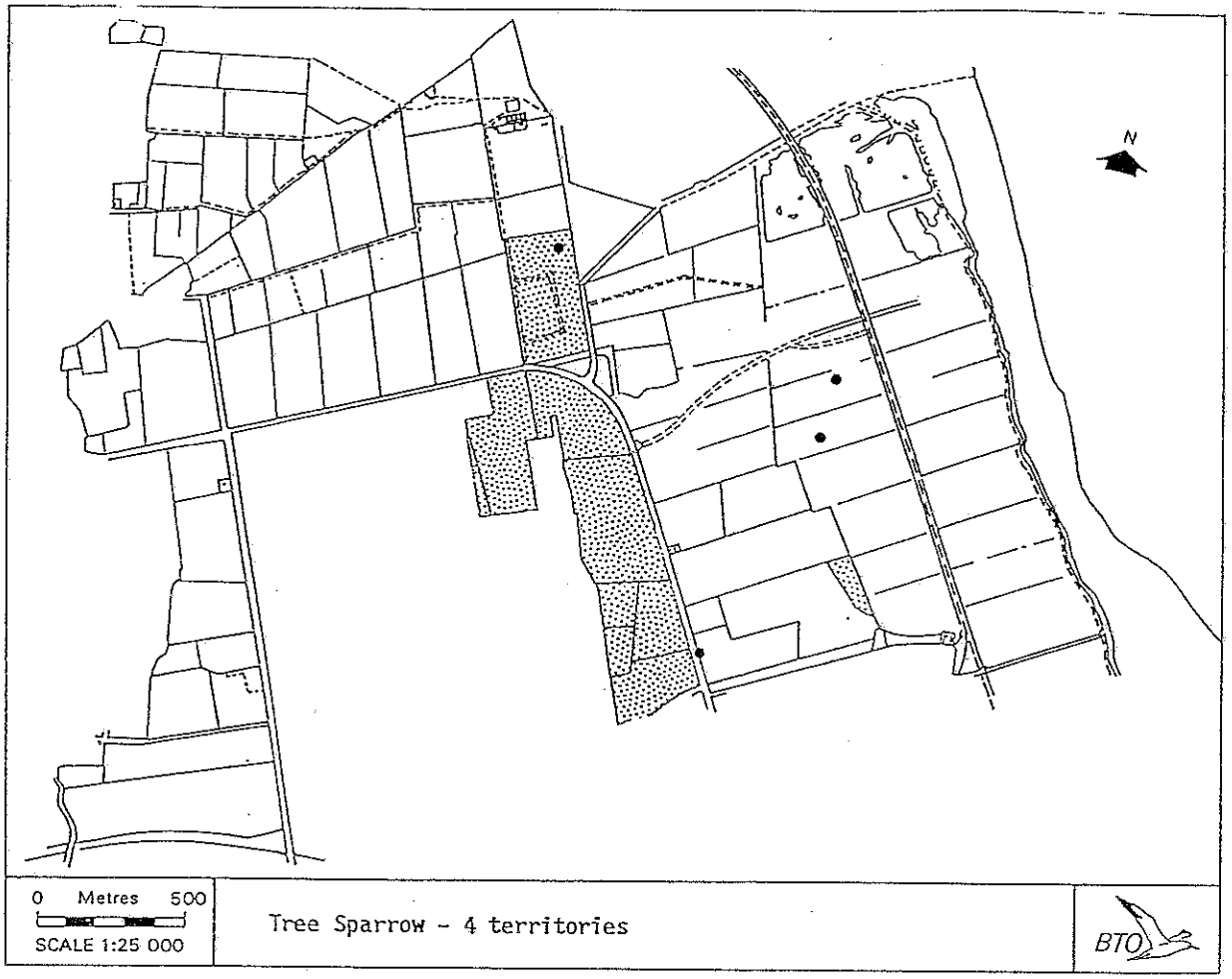


Figure 127

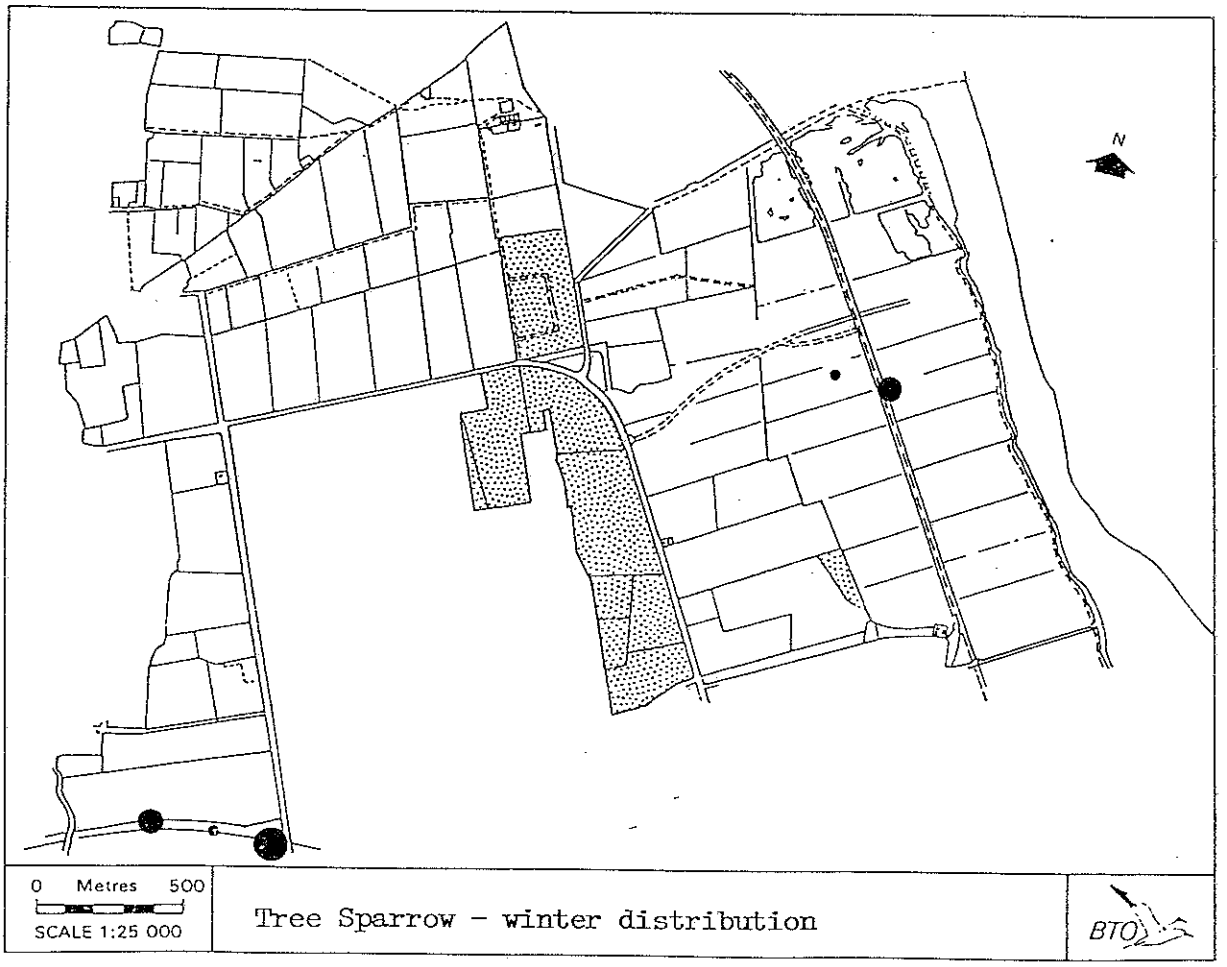
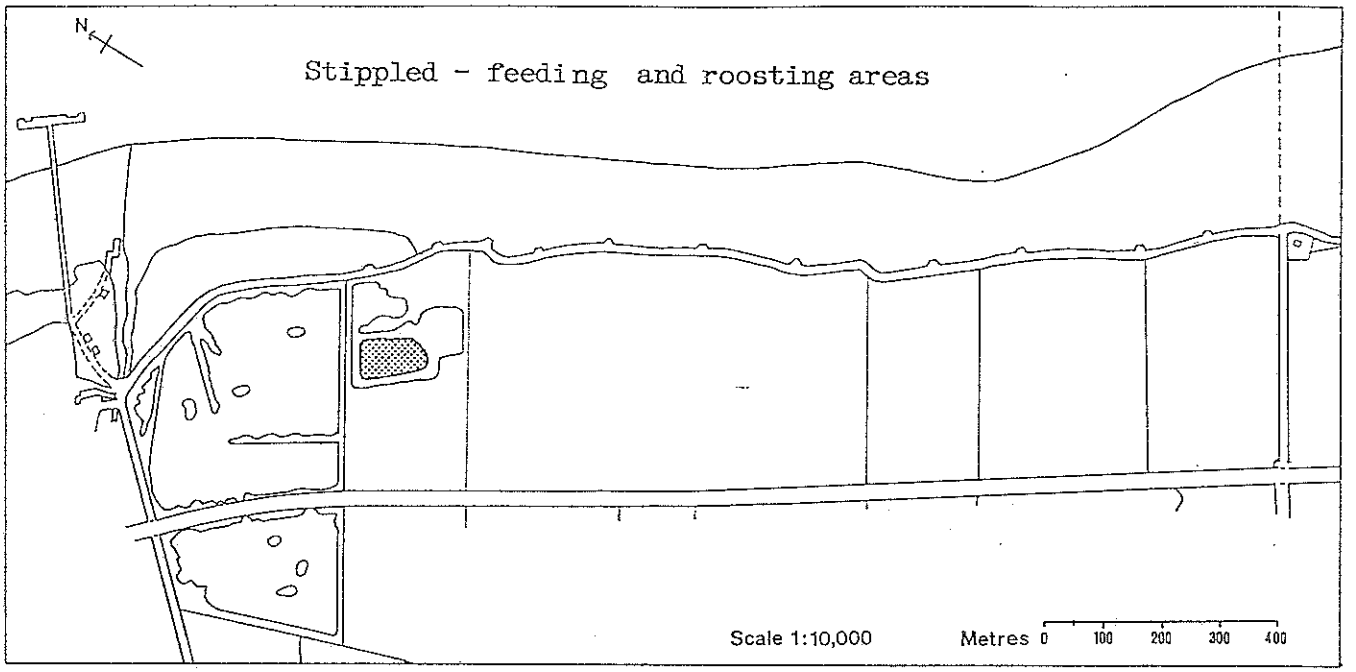


Figure 128

TUFTED DUCK

One of the most successful breeding wildfowl in the British Isles, with an estimated population of 4,000 to 5,000 pairs in the mid-1970s (Sharrock 1976). Larger deep bodies of water are favoured, but, as the population expands, shallower areas are being colonised. In winter, the Tufted Duck is a widespread species in Britain, with a similar distribution to its congener, the Pochard, with which it often associates on lowland lakes, reservoirs and gravel pits. Numbers wintering in Britain have increased enormously during the last 100 years. The British wintering population is currently thought to be just over 60,000 birds.

Groups of 7-13 birds were seen regularly on Killingholme Haven Pits throughout the summer survey period, but evidence of breeding was not discovered. In winter, Tufted Ducks were recorded on 7 out of 10 visits to the Killingholme Haven Pits LNR, exclusively from the small, south-eastern pit where up to 22 birds were present. The peak count represents 16% of the average peak Humber count for the previous five winters. Surprisingly, the species was not recorded at Killingholme during BoEE counts made during that five year period.



Tufted Duck - winter distribution

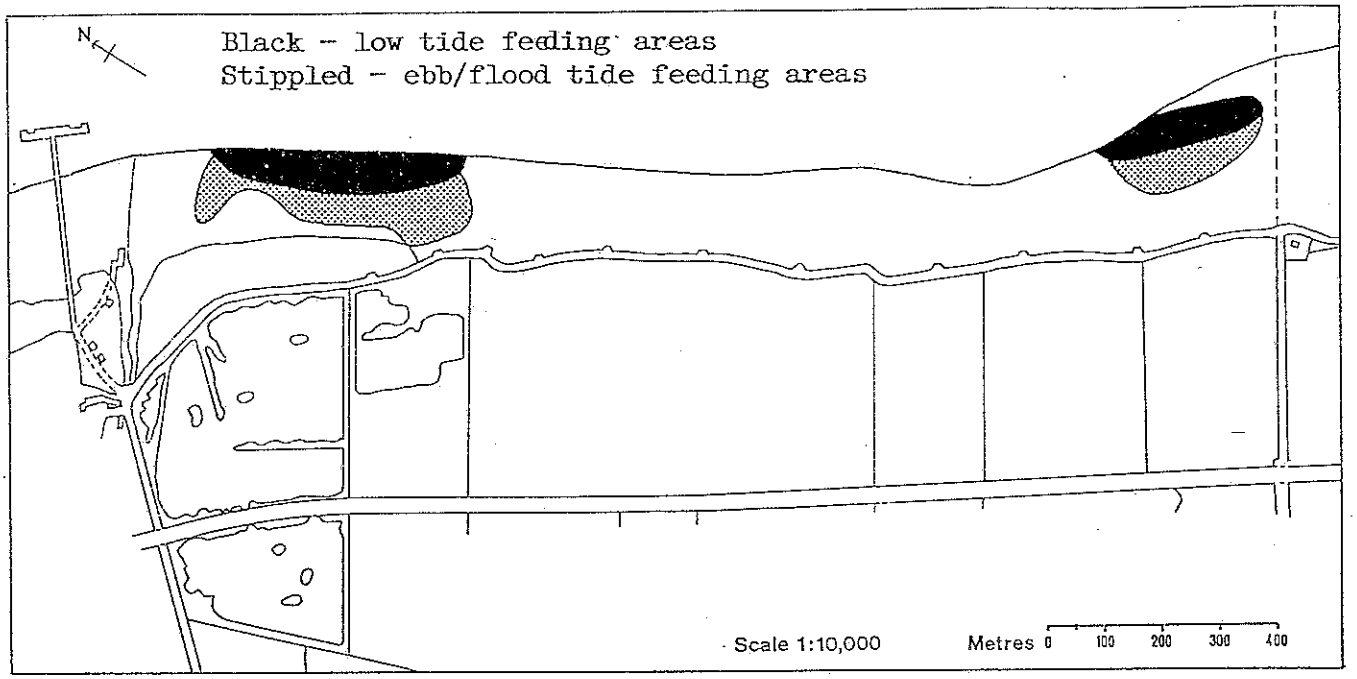
Figure 129

TURNSTONE

Turnstone are winter visitors to all coasts of the British Isles, but prefer the rocky shores. They feed at both low and high tide in small flocks that show considerable site fidelity. The British wintering population consists mainly of birds which breed in Canada and Greenland.

Turnstone were recorded from the intertidal areas on all winter visits in numbers ranging from 2-12 birds. The survey peak represented 3.1% of the average peak Humber count for the five winter period 1982/3 to 1986/7. The inter-tidal flats of the survey area were always abandoned by Turnstone over the high tide period, birds flying down river towards Pyewipe. BoEE counts of the site during the above-mentioned five winter period also show the species to be absent at high tide.

The two sections of flats used by Turnstone at Killingholme were both areas in which rock rubble (used in the construction of the sea defences) had been scattered over the surface.



Turnstone - winter distribution

Figure 130

TURTLE DOVE

Territories: 8

This summer migrant dove is strongly associated with arable agriculture and is found over a large part of lowland Britain. Similar Common Birds Census indices in the early 1970s and 1980s indicate a population little changed since the Breeding Atlas estimate of over 100,000 pairs.

Birds were found nesting in scrub and dense hedgerows.

WATER RAIL

Water Rails are relatively sedentary in the British Isles, being confined to wetland habitats in both summer and winter. The apparent scarcity of Water Rails is in part due to the inaccessibility of wet reed-bed habitats and the extremely secretive nature of the bird, combining to cause under-recording during censuses.

There was only one record of Water Rail at Killingholme: a single bird was seen beside the small, south-eastern pit of the Killingholme Haven Pits LNR during the winter survey.

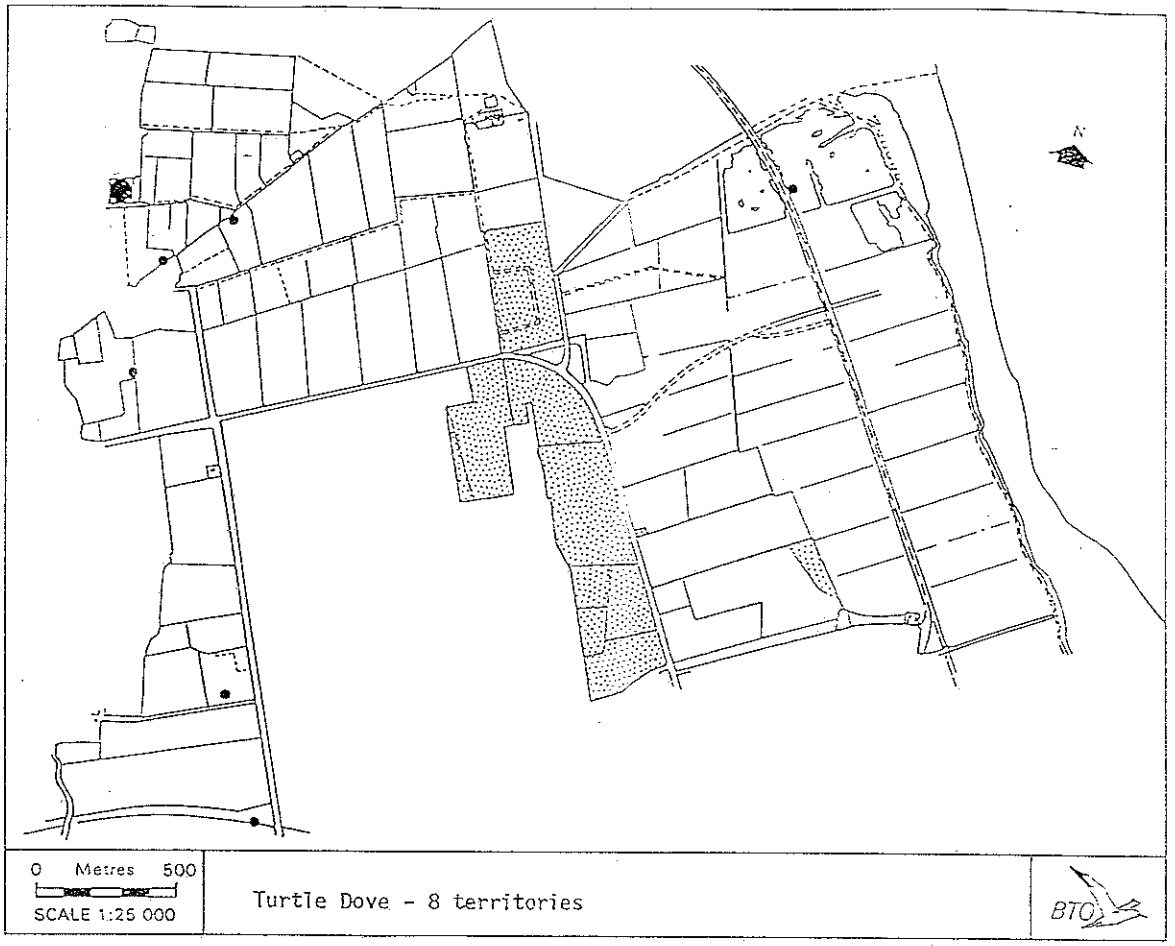


Figure 131

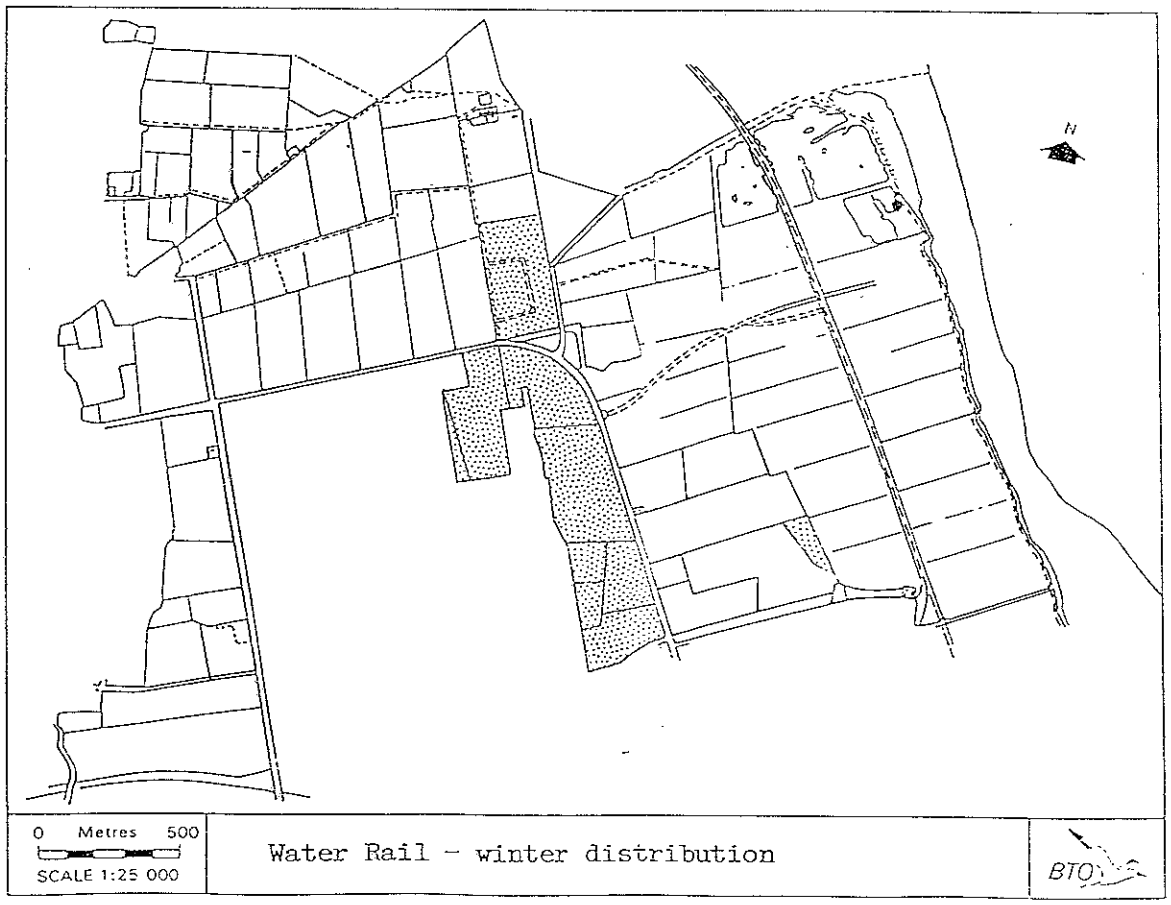


Figure 132

WHEATEAR

A characteristic summer member of the upland bird community, pairs are sometimes found in the lowlands where suitable heaths and chalk downlands exist.

A single Wheatear recorded on the seawall in early May, was certainly a spring passage bird.

WHIMBREL

A boreal breeding species whose range just includes north-western Scotland.

One vagrant bird was recorded in late June.

WHITETHROAT

Territories: 37

A scrub-haunting summer migrant characteristic of heaths, thickets, hedgerows and woodland edges. The British population remains at a low level (400,000 to 500,000 pairs) following a dramatic crash in 1969 precipitated by severe drought conditions in the West African Sahel, through which it has to pass on migration. Woodland population densities average 4 pairs/square km, compared with 2 on farmland.

Territories were widely scattered in scrub and hedgerows, including low trimmed hedges.

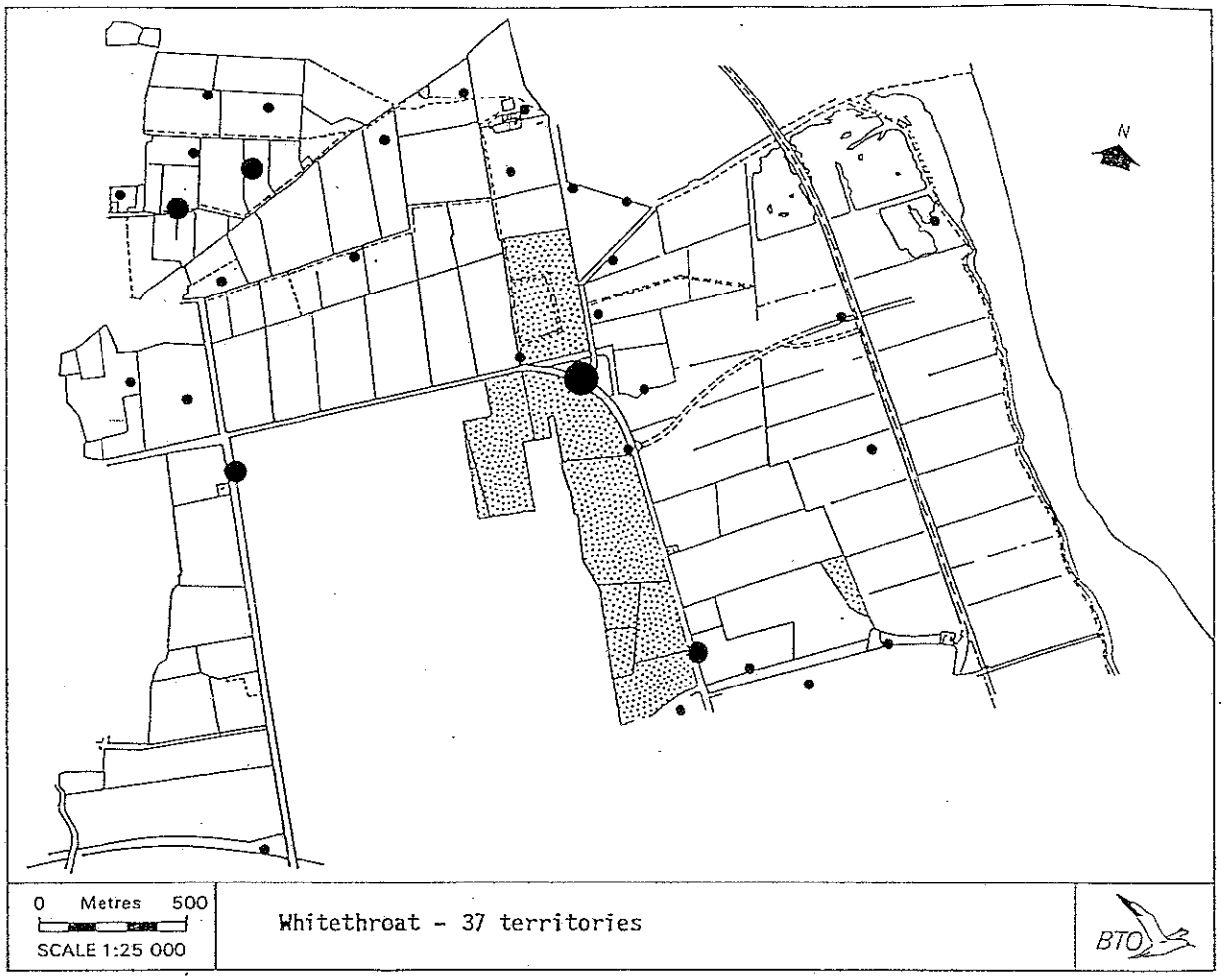


Figure 133

WILLOW TIT

Number of territories: 1

Willow Tits are sedentary and have a strong affinity for damp Alder and Birch woodland in river valleys, where nest holes are excavated in rotten tree stumps and branches. Other favoured habitats are Willow thickets and margins of overgrown flooded gravel pits. The Breeding Atlas estimate of 50,000-100,000 pairs has not been updated, because the CBC programme does not monitor this species adequately.

One territory was found in Chasehill Wood, but late spring records from Killingholme Marshes suggest possible breeding in the unsurveyed Burkinshaw's Covert and Killingholme Marshes Covert. In winter, most birds were in woodland, with scattered records from hedgerows and scrub.

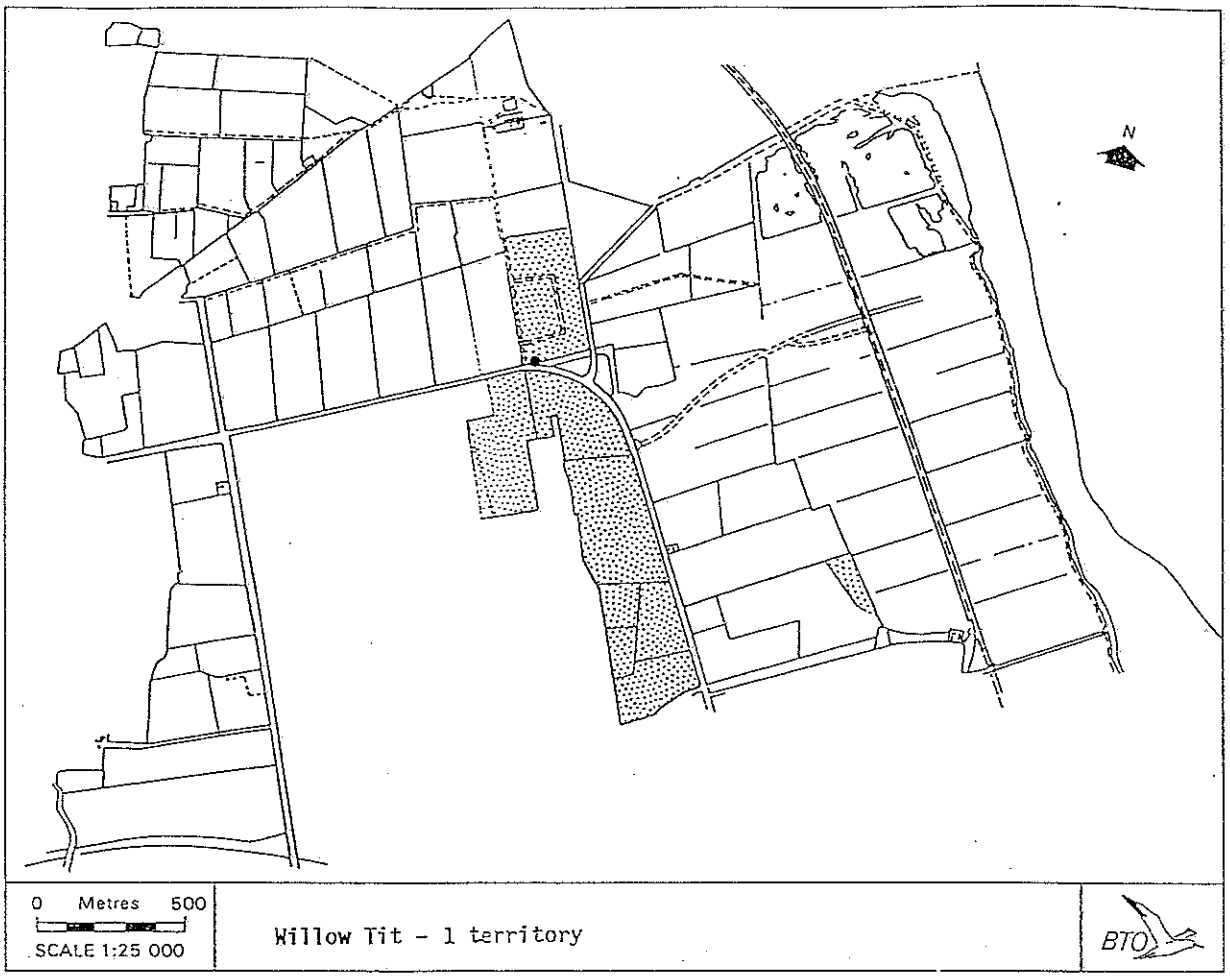


Figure 134

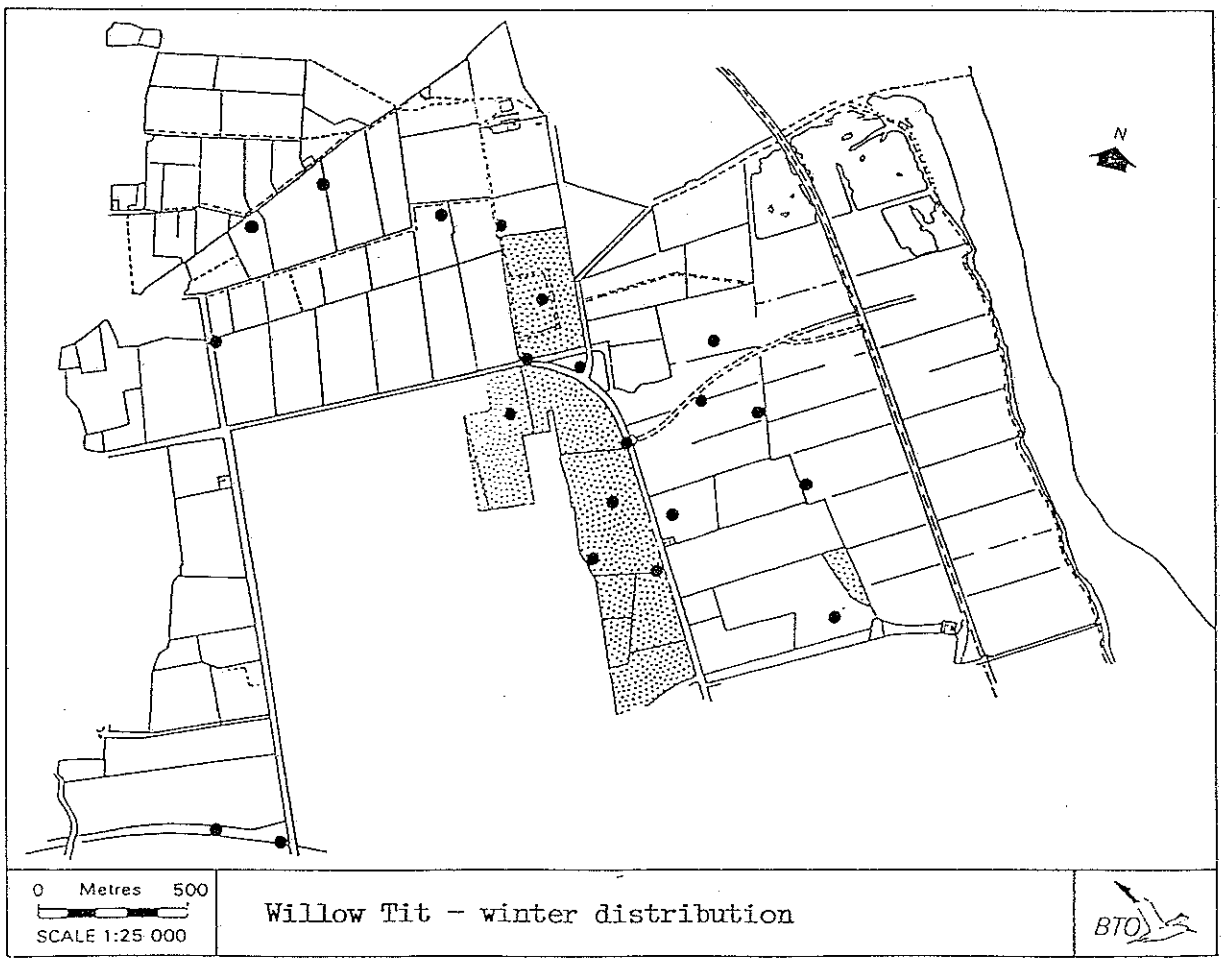


Figure 135

WILLOW WARBLER

Territories: 28

This is the most abundant and widely distributed of Britain's migrant warblers, with a national population of at least 2.5 million pairs. Nests are placed in scrub and the younger stages of woodland, and even in dense forests where the canopy is broken and trees are regenerating. Willow Warblers attain their highest density in woodland, averaging 56 pairs/square km, whereas the average for farmland is 8.

Territories were widely distributed across the survey area wherever there was hedgerow, scrub or woodland.

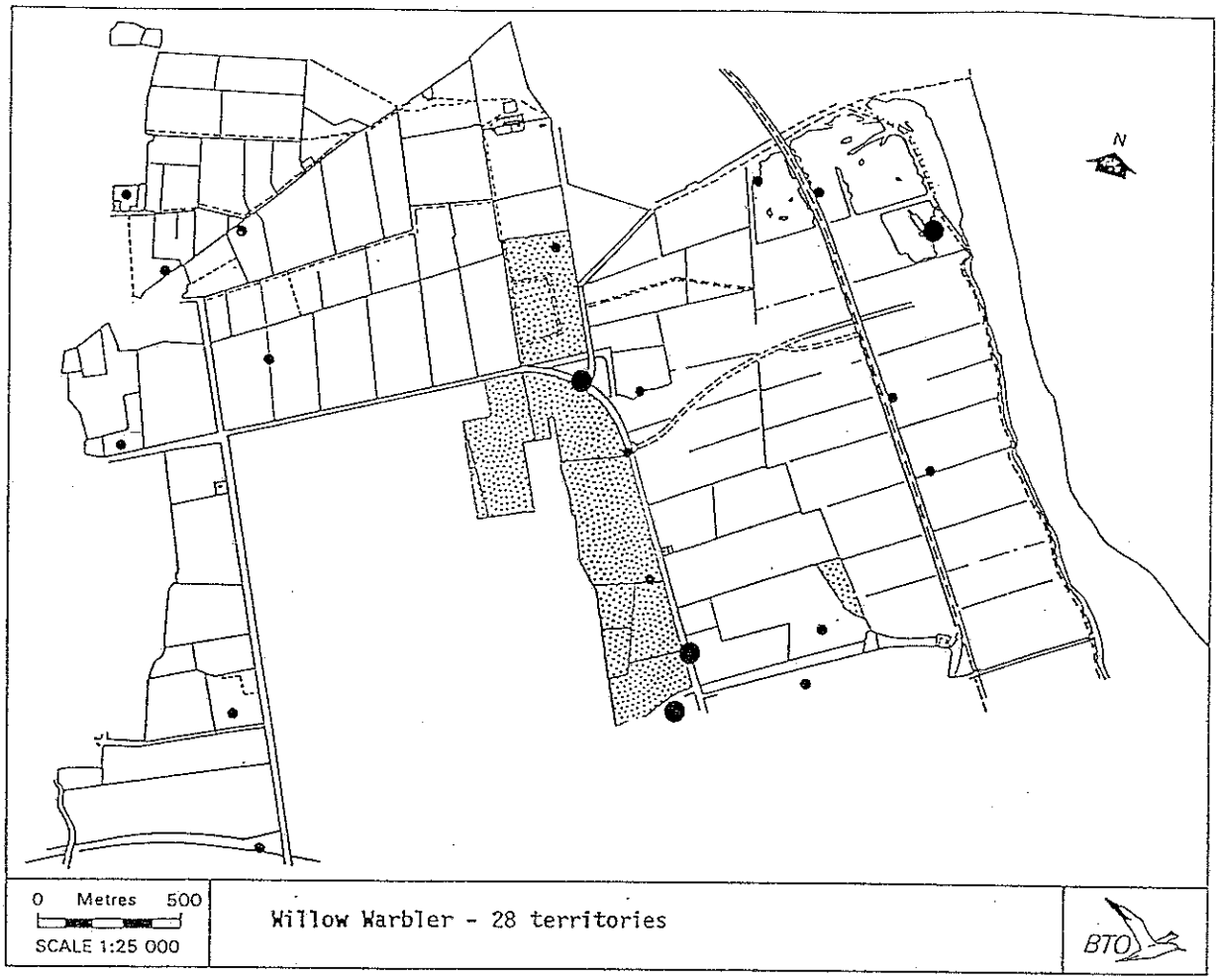

N
0 Metres 500
SCALE 1:25 000
Willow Warbler - 28 territories
BTO

Figure 136

WOOD PIGEON

A common farmland species usually nesting in woodland, but also in isolated trees, hedgerows or occasionally on the ground. The British population is 3-5 million pairs. Most clutches are laid late in the year between July and September, and this species is not monitored effectively by the Common Birds Census. In winter, numbers decrease in the northern and western regions of the British Isles but increase in the south-east, especially in harsh weather when immigrants from Europe enter Britain.

This species was common in the survey area, but the number of breeding territories could not be estimated for the reason given above. In winter, the majority of records came from woodlands and arable fields on Killingholme Marshes, though the species was also present in taller hedgerows to the west of the survey area.

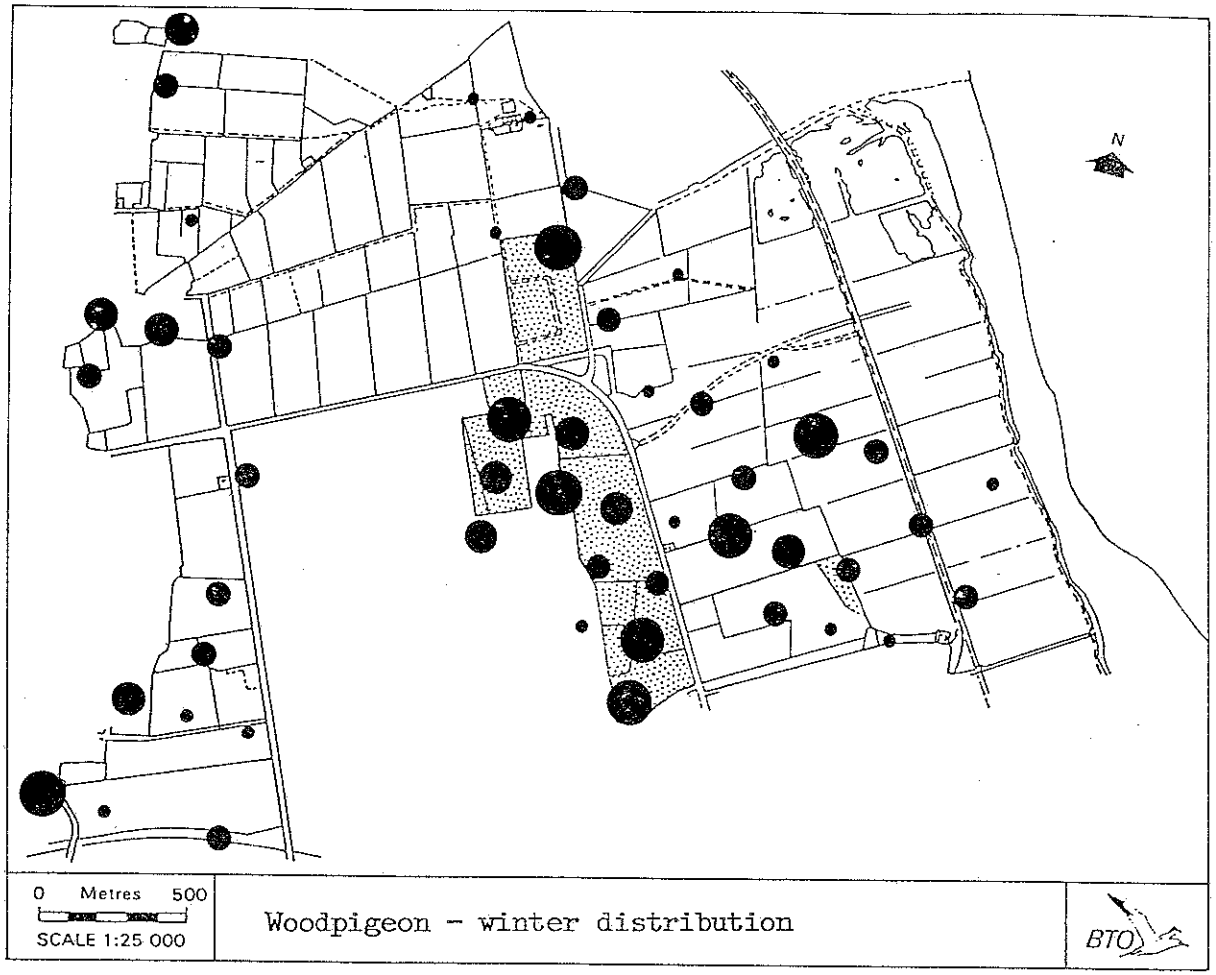

N
0 Metres 500
SCALE 1:25 000
Woodpigeon - winter distribution
BTO

Figure 137

WREN

Territories: 43

This highly adaptable bird prefers to nest in woodland, but pairs are found in almost every habitat available, from rocky shorelines to montane boulder fields. It may be the most numerous nesting bird in Britain, and its sensitivity to severe cold in winter is matched by the ability of the population to recover rapidly. A British population of 3-3.5 million pairs was estimated using the 1982 Common Birds Census data, when densities of 11 and 58 pairs/square km were recorded in farmland and woodland respectively. Wren are resident, but in winter numbers decrease in exposed areas and increase in the sheltered lowlands and the warmer south.

Breeding territories were found in woodland, scrub and tall hedgerows throughout the survey area, and similar areas were occupied in the winter.

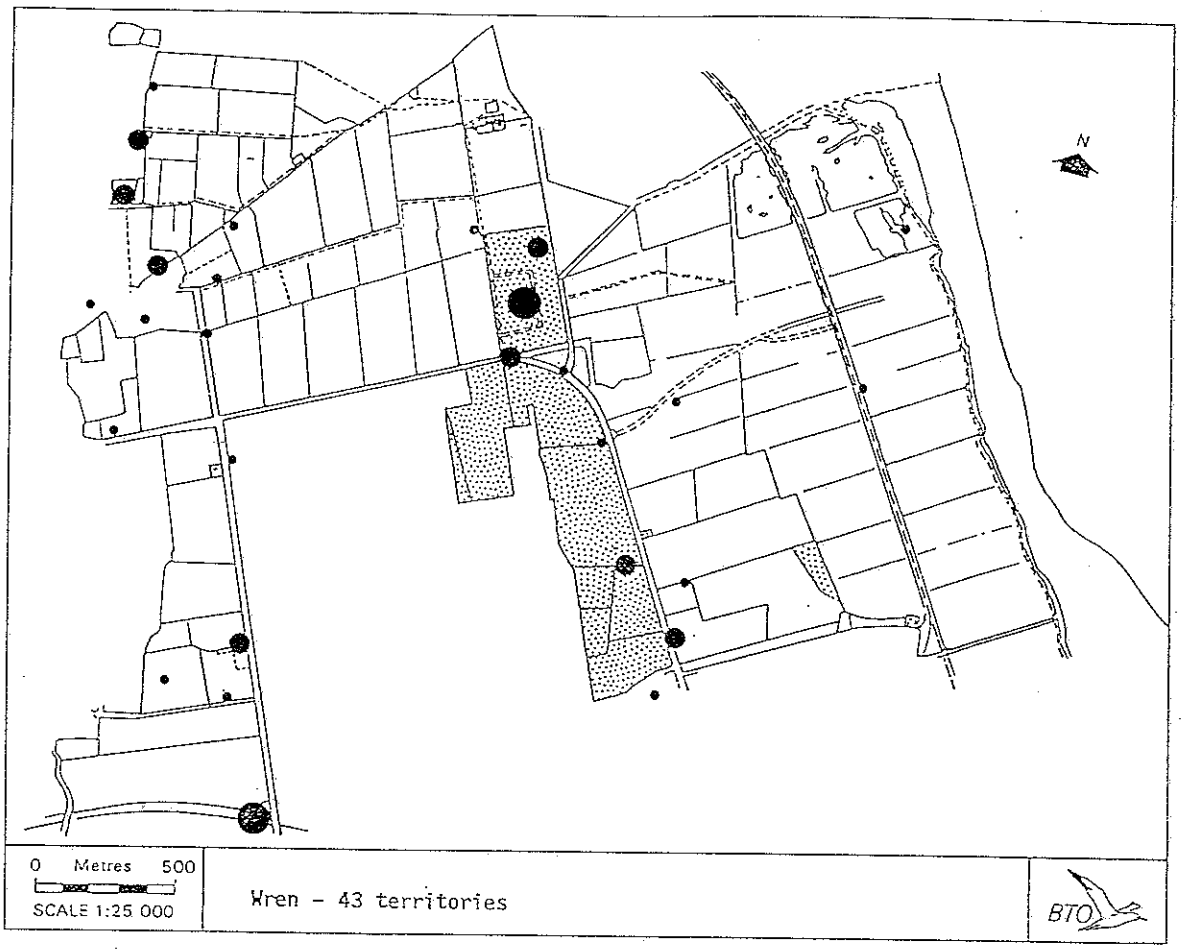


Figure 138

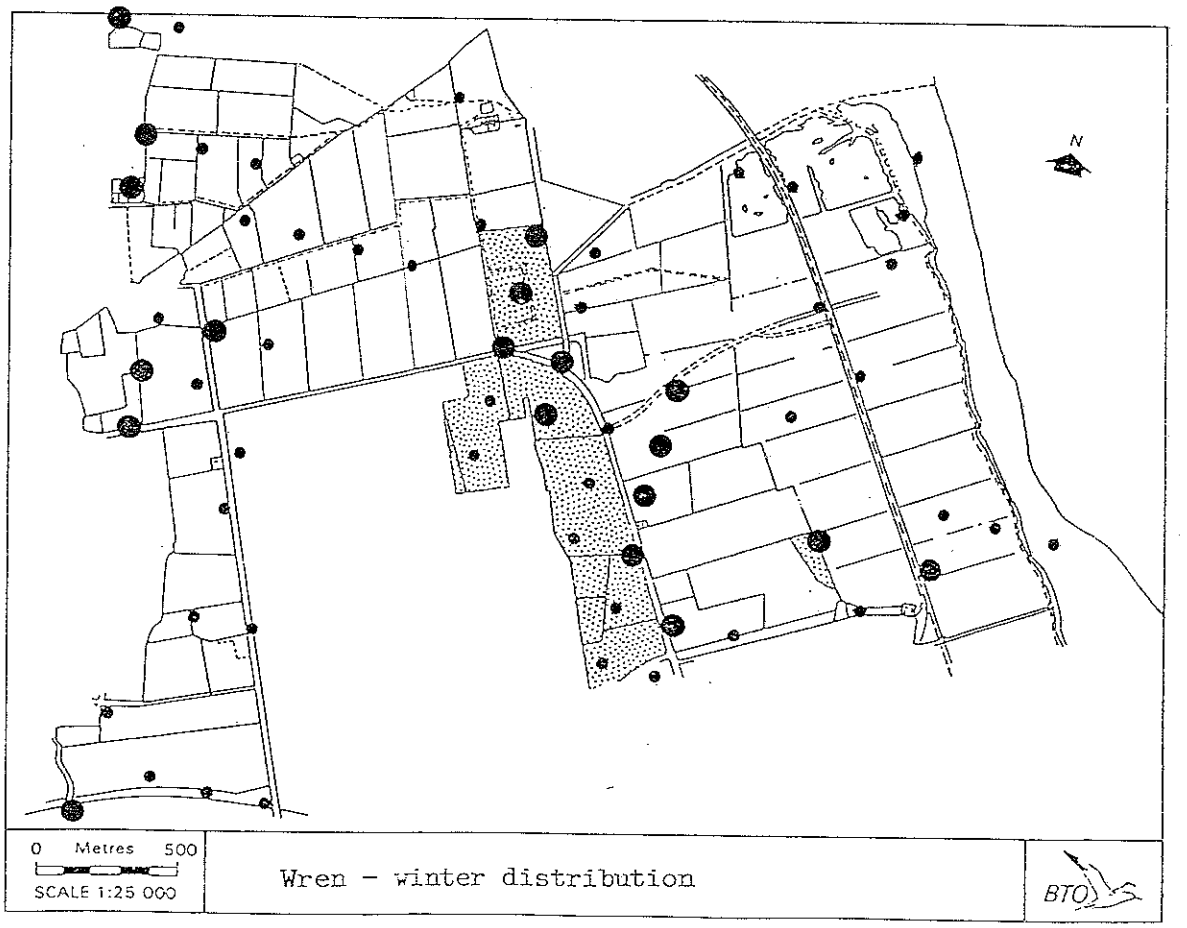


Figure 139

YELLOWHAMMER

Territories: 66

One of the most familiar farmland birds, occurring on open dry ground with bushes, low trees or telegraph poles as song posts. Yellowhammers are widely distributed through a range of open habitats, including heaths, commons, young forestry plantations and woodland edges, but avoid dense scrub. Farmland and woodland territory densities both average 8 pairs/square km, and the national population is around 1.5 million pairs. Yellowhammers are sedentary but in winter and spring often form feeding flocks that frequent arable land.

This species was widespread across the farmland habitat of the survey area in both summer and winter. In winter, flocks of more than 20 birds were recorded at two sites, Chasehill Farm stockyard and disturbed ground around the Nirex compound, east of the Rosper Road.

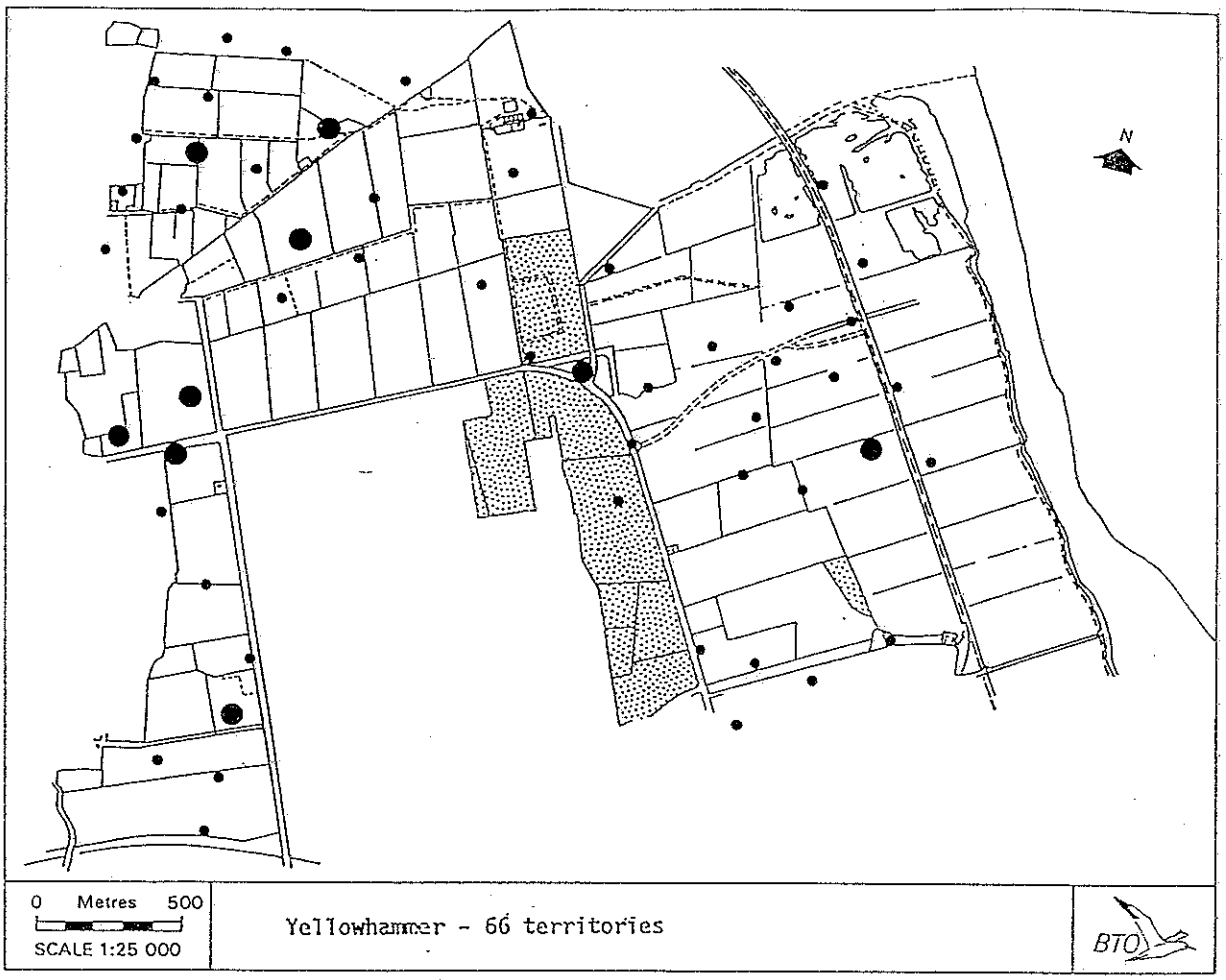


Figure 140

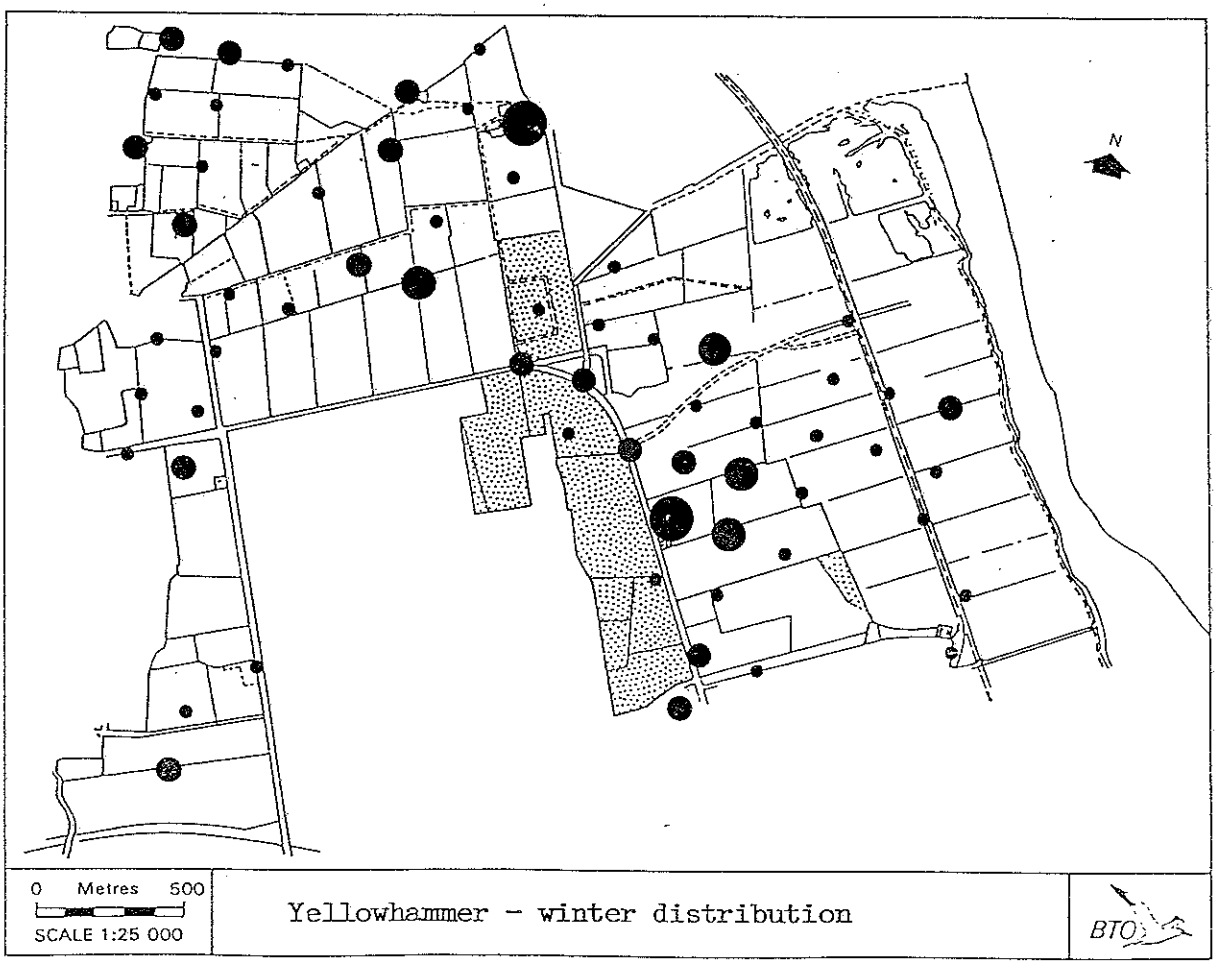


Figure 141

YELLOW WAGTAIL

Territories: 9

A summer migrant generally associated with a range of wet habitats, such as damp meadows, freshwater marshes, lakes, reservoirs and gravel pit margins. Birds will also nest on industrial waste ground. Densities in 1982 suggest a British population of around 175,000 pairs.

Territories were present in arable and pasture fields, particularly in the eastern half of the survey area.

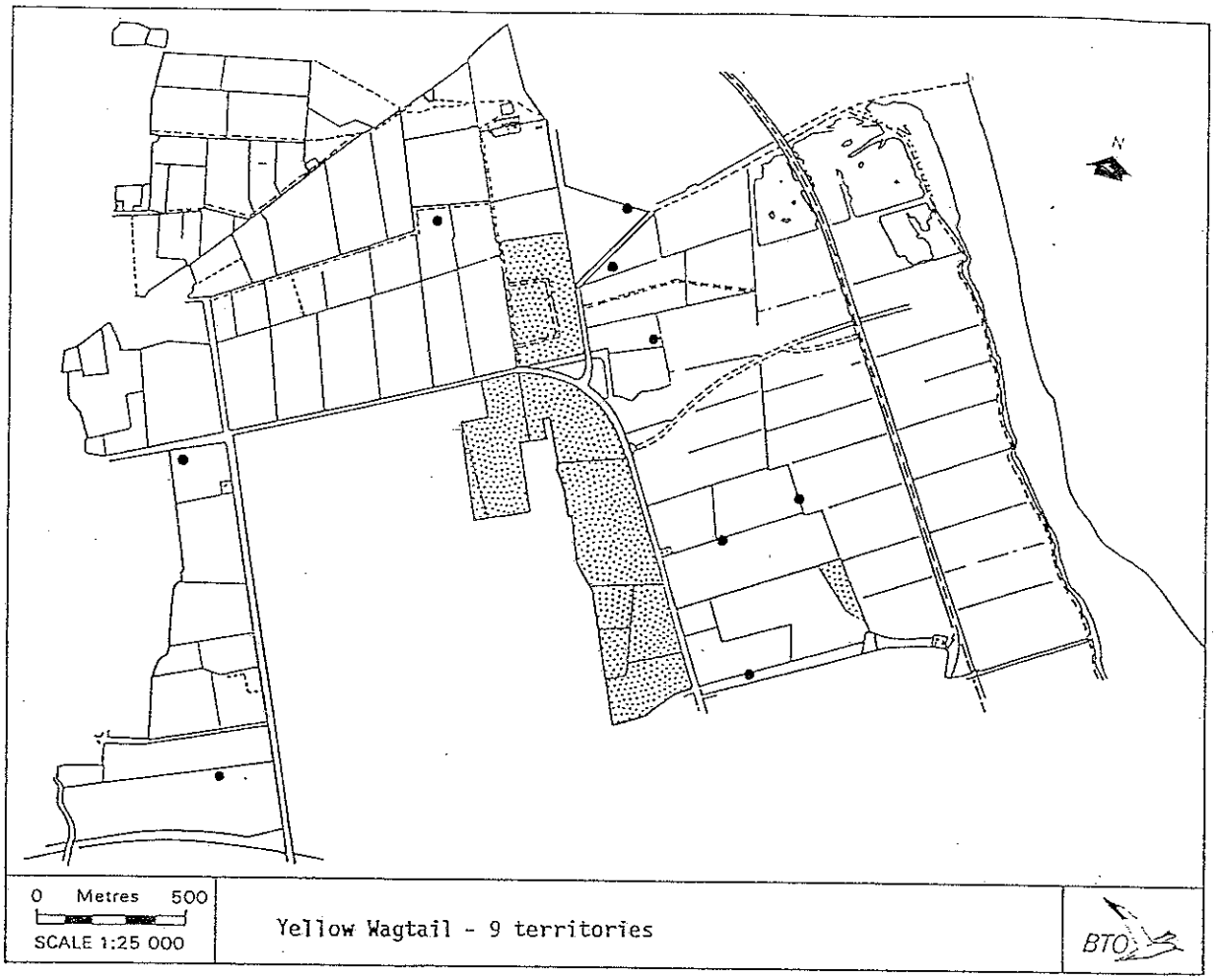

N
0 Metres 500
SCALE 1:25 000
Yellow Wagtail - 9 territories
BTO

Figure 142

10.4 Qualifying levels for national and international importance

Wildfowl	National (Great Britain)	International
Dark-bellied Brent Goose	900	1300
Eider	500	20000**
Gadwall	50	550
Goldeneye	150	2000
Mallard	5000	20000**
Pintail	250	750
Pochard	500	2500
Red-breasted Merganser	100	400
Shelduck	750	1250
Shoveler	90	1000
Teal	1000	2000
Tufted Duck	600	5000
Wigeon	2000	5000
Waders		
Avocet	5*	260
Bar-tailed Godwit	610	5500
Black-tailed Godwit	50	400
Curlew	910	3000
Dulin : winter	4300	20000**
passage	2000	-
Golden Plover	2000	10000
Greenshank	4	500
Grey Plover	210	800
Knot	2200	3500
Lapwing	10000	20000**
Oystercatcher	2800	7500
Purple Sandpiper	160	?
Redshank: winter	750	2000
passage	1200	-
Ringed Plover: passage	230	400
winter	300	1000
Ruff	15*	10000
Sanderling: passage	300	500
winter	140	150
Snipe	?	10000
Spotted Redshank	2*	500
Turnstone	450	500
Whimbrel: passage	50	500

- British population too small for meaningful figure to be obtained.

* Where 1% of the British wintering population is less than 50 birds, 50 is normally used as a minimum qualifying level for national importance.

** A site regularly holding more than 20,000 waterfowl qualifies as internationally important by virtue of absolute numbers.

Sources for criteria for International Importance: Scott (1982); Ruger et al (1986); Smart (in press).

Appendix 10.5 Birds recorded in the survey area

	Passage, vagrant & wintering birds (A)	County atlas records (B)	1987 Records (C)	1987 breeding birds (D)
American Golden Plover	2			
Arctic Skua	1			
Arctic Tern	1			
Avocet	1,2			
Baird's Sandpiper	1			
Bar-tailed Godwit	1		+	
Barn Owl		3		
Bearded Tit	1			
Bewick's Swan	1			
Bittern	1			
Black Redstart		3		
Black Tern	1			
Black-headed Gull	1		+	
Black-tailed Godwit	1			
Black-throated Diver	1			
Blackbird		1,3	+	*
Blackcap	1			
Blue Tit		1,3	+	*
Brambling	1			
Brent Goose	1			
Bullfinch		1,3	+	*
Canada Goose		1,3	+	*
Carrion Crow		1,3	+	*
Chaffinch		1,3	+	*
Collared Dove		3	+	*
Common Gull	1		+	
Common Sandpiper	1		+	
Common Scoter	1			
Common Tern	1			
Coot		1,3	+	*
Cormorant	1			
Corn Bunting	1			
Cuckoo		1,3	+	
Curlew	1		+	
Curlew Sandpiper	1,2			
Dunlin	1			
Dunnock		1,3	+	*
Eider	1			
Fieldfare	1			
Gadwall	1			
Gannet	1			
Garden Warbler		3	+	*
Garganey		2,3	+	
Goldcrest	1			
Golden Oriole	4		+	
Golden Plover	1			
Goldeneye	1			
Goldfinch		1,3	+	*
Goosander	1			

Grasshopper Warbler		1,3	+	*
Great Spotted Woodpecker	1	3	+	*
Great Tit		1,3	+	*
Great-crested Grebe	1,4		+	
Green Sandpiper	1			
Green Woodpecker			+	*
Greenfinch		1,3	+	*
Greenshank	1		+	
Grey Heron	1		+	
Grey Partridge		3	+	*
Grey Phalarope	1			
Grey Plover	1			
Greylag Goose	1			
Great Black-backed Gull	1		+	
Hen Harrier	2			
Herring Gull	1		+	
Hobby	3			
House Martin			+	
House Sparrow				*
Jack Snipe	1			
Jackdaw		3	+	
Jay		3	+	*
Kentish Plover	2,3			
Kestrel			+	
Kingfisher	1			
Kittiwake	1			
Knot	1			
Lapwing		3	+	
Lesser Whitethroat		1,3	+	*
Lesser Yellowlegs	1			
Lesster Black-backed Gull	1			
Linnet		3	+	*
Little Egret	1			
Little Grebe		1,3	+	*
Little Gull	1			
Little Owl	1			
Little Ringed Plover	2,3		+	
Little Stint	1,2			
Little Tern	1			
Long-tailed Duck	1			
Long-tailed Skua	1			
Long-tailed Tit		1,3	+	*
Magpie		1,3	+	*
Mallard		1,3	+	
Marsh Harrier	1			
Meadow Pipit		3	+	*
Merlin	1			
Mistle Thrush		3	+	*
Moorhen		1,3	+	*
Mute Swan		1,3	+	
Oystercatcher		1	+	
Pectoral Sandpiper	1			
Pheasant		3	+	*
Pied Flycatcher	1			
Pied Wagtail		1,3	+	
Pink-footed Goose	1			
Pintail	1			

Pochard			+	*
Purple Sandpiper	1			
Red-breasted Merganser	1			
Red-crested Pochard	1			
Red-footed Falcon	2			
Red-legged Partridge		3	+	*
Red-necked Grebe	1			
Red-necked Phalarope	1			
Red-throated Diver	1			
Redpoll		1,3	+	*
Redshank		1	+	
Redstart	1			
Redwing	1			
Reed Bunting		1,3	+	*
Reed Warbler		1,3	+	*
Ringed Plover		3	+	*
Rock Pipit	1			
Rook			+	
Roseate Tern	1			
Ruff	1			
Sand Martin	1		+	
Sanderling	1			
Sandwich Tern	1			
Scaup	1			
Sedge Warbler		1,3	+	*
Sharp-tailed Sandpiper	1			
Shelduck		1,3	+	
Short-eared Owl	1			
Shoveler	1			
Skylark		1,3	+	*
Slavonian Grebe	1			
Smew	1			
Snipe	1			
Snow Bunting	1			
Song Thrush		1,3	+	*
Sparrowhawk	1		+	
Spoonbill	1			
Spotted Flycatcher		3	+	*
Spotted Redshank	1			
Starling		3	+	*
Stock Dove		3	+	*
Stonechat	1			
Swallow		3	+	*
Swift			+	
Tawny Owl		3	+	*
Teal	1			
Temminck's Stint	2			
Tree Pipit	1			
Tree Sparrow				*
Tufted Duck		1	+	
Turnstone	1			
Turtle Dove		1,3	+	*
Twite	1			
Velvet Scoter	1			
Water Rail	1			
Wheatear	1,4		+	*
Whimbrel	1		+	

Whinchat	1			
White-fronted Goose	1			
White-winged Black Tern	1			
Whitethroat		1,3	+	*
Whooper Swan	1			
Wigeon	1			
Willow Tit		1,3	+	*
Willow Warbler		1,3	+	*
Wood Pigeon		3	+	*
Woodcock	1			
Woodlark	1			
Woood Sandpiper	1			
Wren		1,3	+	*
Wryneck	1			
Yellow Wagtail		1,3	+	*
Yellowhammer		1,3	+	*

A total of 179 species

Source of data: 1 Lincs & South Humb. Trust files. Report on K. pits reserve 1968-79. Scant data 84-85 from hon wardens file.

2 1979-85 Lincolnshire Bird Report (annual)

3 1980-(89). Lincolnshire Bird Club tetrad Breeding Atlas Project. (unpublished data from ongoing survey). * The four tetrads which which include the survey area cover a much greater area than the survey area itself.

4 This study.

Appendix 10.6 Scientific names of birds mentioned in the text

American Golden Plover	Pluvialis diminica
Arctic skua	Stercorarius parasiticus
Arctic tern	Sterna paradisaea
Avocet	Recurvivostra avocetta
Baird's Sandpiper	Calidris baird
Bar-tailed Godwit	Limosa lapponica
Barn Owl	Tyto alba
Barnacle Goose	Branta leucopsis
Bearded tit	Panurus biarmicus
Bewick's Swan	Cygnus columbianus
Bittern	Botaurus stellaris
Black-headed Gull	Larus ridibundus
Black-tailed Godwit	Limosa limosa
Blackbird	Turdus merula
Blackcap	Sylvia atricapilla
Black-headed gull	Larus ridibundus
Black Redstart	Phoenicurus ochruros
Black Tern	Chlidonias major
Black-throated Diver	Gavia arctica
Blue Tit	Parus caeruleus
Brambling	Fringilla montifringilla
Brent Goose	Branta bernicla
Bullfinch	Pyrrhula pyrrhula
Canada Goose	Branta canadensis
Carrion Crow	Corvus corone
Chaffinch	Fringilla coelebs
Chiffchaff	Phylloscopus collybita
Collared Dove	Streptopelia decaocto
Common Gull	Larus canus
Common Sandpiper	Actiris hypoleucos
Common Scoter	Mellanitta nigra
Common Tern	Sterna hirundo
Coot	Fulica atra
Cormorant	Phalacrororax carbo
Corn Bunting	Milaria calandra
Cuckoo	Cuculus canorus
Curlew	Numenius arquata
Curlew Sandpiper	Calidris ferruginea
Dunlin	Calidris alpina
Dunnock	Prunella modularis
Eider	Somateria mollissima
Fieldfare	Turdus pilaris
Firecrest	Regulus ignicapillus
Gadwall	Anas strepera
Gannet	Sula bassana
Garden Warbler	Sylvia borin
Garganey	Anas querquedula
Goldcrest	Regulus regulus
Golden Plover	Pluvialis apricaria
Goldeneye	Bucephala albeola
Goldfinch	Carduelis carduelis
Golden Oriole	Oriolus oriolus
Golden Ploer	Pluvialis apricaria
Goosander	Merganser merganser
Grasshopper Warbler	Locustella naevia
Great Black-backed Gull	Larus marinus

Great Crested Grebe	Podiceps cristatus
Great Spotted Woodpecker	Dendrocopos major
Great Tit	Parus major
Green Sandpiper	Tringa ochropus
Green Woodpecker	Picus viridis
Greenfinch	Carduelis chloris
Greenshank	Tringa nebularia
Grey Heron	Ardea cinerea
Greylag Goose	Anser anser
Grey Partridge	Perdix perdix
Grey Phalarope	Phalaropus fulicarius
Grey Plover	Pluvialis squatarola
Hen Harrier	Circus cyaneus
Herring Gull	Larus argentatus
Hobby	Falco subbuteo
House Martin	Delichon urbica
House Sparrow	Passer domesticus
Jack Snipe	Lymnocryptes minimus
Jackdaw	Corvus monedula
Jay	Garrulus glandarius
Kentish Plover	Charadrius alaxandrinus
Kestrel	Falco tinnunculus
Kingfisher	Alcedo atthis
Kittiwake	Rissa tridactyla
Knot	Calidris canutus
Lapwing	Vanellus vanellus
Lesser Black-backed Gull	Larus fuscus
Lesser Spotted Woodpecker	Dendrocopus minor
Lesser Whitethroat	Sylvia curruca
Lesser Yellowlegs	Tringa flavipes
Linnet	Carduelis cannabina
Little Egret	Egretta garzetta
Little Grebe	Tachybaptus ruficollis
Little Gull	Larus minutus
Little Owl	Athene noctua
Little Ringed Plover	Charadrius dubius
Little Stint	Calidris minuta
Little Tern	Sterna albifrons
Long-tailed Duck	Clangula hyemalis
Long-tailed Skua	Stercorarius longicaudus
Long-tailed Tit	Aegithalos caudatus
Magpie	Pica pica
Mallard	Anas platyrhynchos
Marsh Harrier	Circus aeruginosus
Meadow Pipit	Anthus pratensis
Merlin	Falco columbarius
Mistle Thrush	Turdus viscivorus
Moorhen	Gallunula chloropus
Mute Swan	Cygnus olor
Nightingale	Luscinia megarhynchos
Nuthatch	Sitta europaea
Oystercatcher	Haematopus ostralegus
Pectoral Sandpiper	Calidris melanotos
Pheasant	Phasianus colchicus
Pied Flycatcher	Ficedula hypoleuca
Pied Wagtail	Motacilla alba
Pink-footed Goose	Anser brachyrhynchus
Pintail	Anas acuta
Pochard	Aythya ferina
Red-breasted Merganser	Merganser serrator

Red-crested Pochard	Netta rufina
Red-footed Falcon	Falco vestpertinus
Red-legged Partridge	Alectoris rufa
Red-necked Grebe	Podiceps grisegena
Red-necked Phalarope	Phalaropus lobatus
Redpoll	Carduelis flammea
Redshank	Tringa totanus
Redstart	Phoenicurus phoenicurus
Red-throated Diver	Gavia stellata
Reed Bunting	Emberiza schoeniclus
Reed Warbler	Acrocephalus scirpaceus
Redwing	Turdus iliacus
Ringed Plover	Charadrius hiaticula
Robin	Erithacus rubecula
Rock Pipit	Anthus petrasus
Rook	Corvus frugilegus
Roseate Tern	Sterna dougallii
Ruff	Philomachus pugnax
Sanderling	Calidris alba
Sand Martin	Riparia riparia
Sandwich Tern	Sterna sandvicensis
Scaup	Anas marila
Sedge Warbler	Acrocephalus schoenobaenus
Shelduck	Tadorna tadorna
Sharp-tailed Sandpiper	Calidris acuminata
Short-eared Owl	Asio flammeus
Shoveler	Anas clypeata
Skylark	Alauda arvensis
Slavonian Grebe	Podiceps autitus
Smew	Mergus albellus
Snipe	Gallinago gallinago
Snow Bunting	Plectrophenax nivalis
Song Thrush	Turdus philomelos
Sparrowhawk	Accipiter nisus
Spoonbill	Platalea leucorodia
Spotted Flycatcher	Muscicapa striato
Spotted Redshank	Tringa erythropus
Starling	Sturnus vulgaris
Stock Dove	Columba oenas
Stonechat	Saxicola torquata
Swallow	Hirundo rustica
Swift	Apus apus
Tawny Owl	Strix aluco
Teal	Anas crecca
Temminck's Stint	Calidris temminckii
Treecreeper	Certhia familiaris
Tree Pipit	Anthus trivialis
Tree Sparrow	Passer montanus
Tufted Duck	Anas fuligula
Turnstone	Arenaria interpres
Turtle Dove	Streptopelia turtur
Twite	Carduelis flavirostris
Velvet Scoter	Mellanitta fusca
Water Rail	Rallus aquiaticus
Wheatear	Oenanthe oenanthe
Whinchat	Saxicola rubetra
White-fronted Goose	Anser albifrons
Whitethroat	Sylvia communis
White-winged Black Tern	Chlidonias leucopterus
Whooper Swan	Cygnus cygnus

Wigeon	Anas penelope
Willow Tit	Parus montanus
Willow Warbler	Phylloscopus trochilus
Woodcock	Scolopax rusticola
Wood Lark	Lullula arborea
Woodpigeon	Columba palumbus
Wood Sandpiper	Tringa glareola
Wren	Troglodytes troglodytes
Wryneck	Jynx torquilla
Yellowhammer	Emberiza citrinella
Yellow Wagtail	Motacilla flava

Appendix 10.7 Dates of terrestrial and inter-tidal winter surveys

(On all intertidal visits all stages of the tidal cycle were covered)

Winter intertidal visit dates

17th November 1987
26th November 1987
2nd December 1987
23rd December 1987
8th January 1988
15th January 1988
29th January 1988
8th February 1988
19th February 1988
24th February 1988
2nd March 1988
9th March 1988

Winter terrestrial visit dates

23rd - 25th November 1987
4th - 8th December 1987
21st - 24th December 1987
4th - 6th January 1988
12th-15th January 1988
22nd - 26th January 1988
2nd - 4th February 1988
15th - 17th February 1988
25th - 27th February 1988
3rd - 5th March 1988

BTO COMMON BIRDS CENSUS INSTRUCTIONS

Text: John Marchant

AN INTRODUCTION TO THE CBC

A frequent talking point among bird-watchers, particularly in summer, is the status of the various breeding species. Questions might be raised such as "*How badly were Wrens affected by the latest cold winter?" "Are there fewer Lesser Whitethroats breeding this year?" "Has there been a change in the relative status of Blackcap and Garden Warbler over the last decade?"*

The Common Birds Census provides a solid base for answering such questions using the BTO's network of active members. It was started in 1962, following pilot trials in the previous year, at the instigation of the Nature Conservancy (now Nature Conservancy Council). Its aim was to monitor bird population numbers chiefly on farmland, where the growing use of agricultural chemicals and the accelerating destruction of hedgerows were causing particular concern. Other habitats, notably woodland, were also included in the scheme (especially from 1964). The method is as objective as possible, which is essential for wide acceptance of the results. Fieldwork is carried out according to specified guidelines, minimum levels of effort are set down, and a paired sample technique is used by which results are only compared between seasons where the effort has been consistent (see below).

Birdwatchers everywhere found that Whitethroats had suddenly become scarce in 1969 : the CBC was able to estimate these decreases at 71% on farmland and 65% in woodland habitats. Drought in West Africa was later identified as the cause of the decrease.
Photo: Eric Hosking

In addition to monitoring, the CBC offers other information of particular value to local and national conservation. A by-product of the method we use is a set of maps showing the location of each territorial bird. These species maps can be used to estimate the density of the various species on the plot, for comparison between years or between plots, and provided that the habitat description is sufficiently detailed it is also possible to see how the birds are distributed in relation to different elements of the habitat.

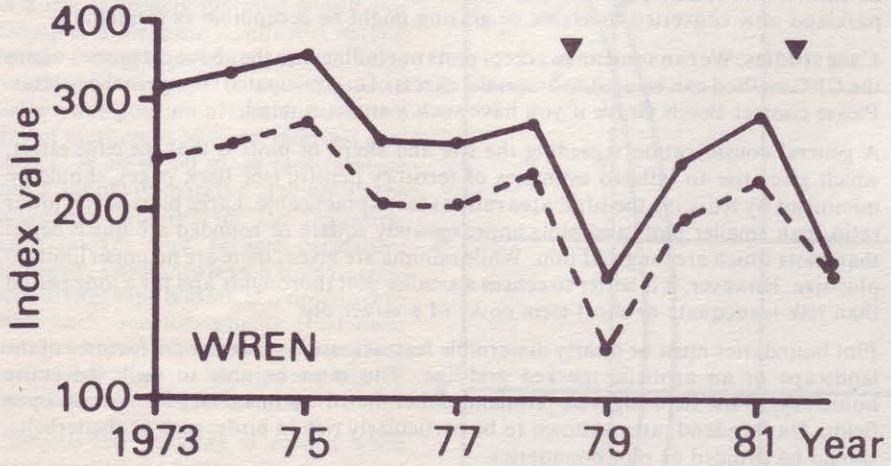
Where the habitat alters during the lifespan of a census, for example by removal of hedgerows on farmland or by a change in management in woodland, the effects of these alterations on bird populations can be measured by comparing the species maps before and after. The CBC can also be used to predict the likely effects of proposed management, by extrapolation from established case studies.

In 1982 the CBC scheme (and five of the original observers!) completed 21 years of continuous monitoring of populations. Current applications of the CBC data include study of the effects of changes in farming practice on birds, the effects of woodland management and the significance of the reductions in resident birds brought about by the recent severe winters. The NCC continues to fund the CBC and is the major user of the results.

INDEXING POPULATION LEVELS

The results of the CBC provide indices of population change for (currently) sixty bird species. Many of the indices have been running since 1962. The scheme is called the **Common** Birds Census simply because only species which are fairly numerous provide samples large enough to build a population index.

The index for any particular species is a measure of its change in abundance relative to an arbitrarily chosen 'datum-year', in which the index value was set at 100. It is not a measure of relative abundance between species. For most species 1966 is usually given as the datum year: thus an index of 620 for Stock Doves in 1982 means that the CBC data estimate it to be 6.2 times as common as a territory-holding bird as it was in 1966, but the fact that this was the highest index value in 1982 does not mean Stock Dove was our commonest bird in that year!



An example of a CBC index graph. The indices for Wren over ten years 1973-82 clearly show the impact of the two hard winters 1978/79 and 1981/82 (marked with triangles). The changes on farmland (solid line) are clearly parallelled in woodland (dotted line). Indices are given relative to 100 in 1966. Data are available from 1962.

Each index is updated annually by applying the total percentage change detected between the year in question and the previous year on the available sample of census plots. Only plots where coverage was adequate and comparable between the two seasons can be included in the sample. The territory totals for each species and plot are compared with those on the same plots in the previous year, to give paired estimates of the change between the two seasons. This pairing procedure ensures a robust method of indexing, but it does mean that **single-season censuses, and those lacking consistent coverage between seasons, cannot be used in the index calculations.**

THE METHODS OF THE COMMON BIRDS CENSUS

The basis of any method of monitoring bird numbers must be some standard way of counting birds which can be repeated exactly between breeding seasons over a long period of time. The CBC method is based on the **mapping method**, in which a series of thorough visits are made to all parts of a defined plot and **contacts** with birds (by sight or sound) are recorded on large-scale maps. The maps on which the contacts are registered in the field are referred to as the **visit maps**. At the end of the season, the registrations are copied across onto a separate map for each species (the **species map**) which summarises all the information obtained for that species during the season, and each species map is then analysed to estimate the number of territories found.

A special advantage of the mapping method is that maps are produced which show the approximate location of every territory detected. These maps can be compared in detail between years to show the preferred sites of each species in relation to the habitat, and any effects of habitat change. Where species maps are not needed to answer the questions posed in a particular study, simpler and less time-consuming methods are available, such as those involving point counts or transects, but only the mapping method as described here can be used in the Common Birds Census.

The visit map is clipped to a board and carried around the plot. Binoculars are essential for finding birds and locating them accurately.

Marking a registration on the visit map. Brightly-coloured ballpoints are best, so that the entries stand out well from the background.

Photos: Jane Marchant

Who can help?

For effective monitoring on farmland and in broad-leaved woodland, a total of about 250 plots is required, half in each habitat category, scattered throughout the UK. New contributions meeting the following criteria are welcome:

1. **Observers must be competent to identify readily both by sight and by sound all species likely to occur, and fit enough physically to cover all parts of the chosen plot without excessive fatigue.**
2. **Unless it is a specially approved case study the chosen plot must be representative of the farmland or woodland in the surrounding region, and must meet all the other requirements specified below under "Selecting a plot".**
3. **The fieldwork procedure must be in full accordance with these Instructions.**
4. **The observer must intend at least two consecutive seasons' work on the same plot, employing the same thorough fieldwork effort, so that the results can be used towards the calculation of population indices. This applies even where an already-established plot is being taken over from another observer.**

Considerable commitment is demanded of the observer both for fieldwork and the subsequent paperwork, but most observers find census work very enjoyable. It is most rewarding to gain both the intimate knowledge of a particular area that a census gives and the satisfaction of contributing to conservation nationally; most observers also find their results are of local value for conservation or simply for the county bird report.

If in doubt about the value of your potential contribution, or if you have any other queries relating to the Common Birds Census, please write to:-

Common Birds Census, Populations Section, British Trust for Ornithology, Beech Grove, Station Road, Tring, Herts HP23 5NR.

HOW TO START

To ensure the best use of resources for map analysis and research at Beech Grove, only those plots which can be classified as either 'farmland' or 'semi-natural woodland' can be accepted as new plots for monitoring purposes.

Farmland can be any type of arable, horticultural or grazing land except unenclosed sheepwalk, provided that it is more or less typical of the local countryside. Where small woods and copses occur among fields, they should be treated as part of a farmland plot, but the proportion of woodland included should be typical of that in the surrounding area and in any case should be less than 10% of the plot. **Please aim for at least 60 hectares (150 acres):** plots smaller than 40 hectares (100 acres) cannot be accepted.

Woodland includes all kinds of semi-natural broad-leaved and mixed woodland but excludes parkland, scrubby heathland and even-aged plantations of conifers. As far as possible, plots should be typical of woods (other than conifer plantations) in the area. **At least 10 hectares (25 acres) are needed.** 'Parkland,' for which no new plots can be accepted, is itself a vague term; it is meant to encompass all sorts of open land with scattered trees which cannot be described as semi-natural because it has a *use* aside from its value as woodland (eg. town parks, cemeteries, golf courses). (Ancient ornamental parkland now converted to arable or grazing might be acceptable as farmland.)

Case studies. We can sometimes accept plots not falling into the above categories where the CBC method can be used to assess the effects of an anticipated change in the habitat. Please contact Beech Grove if you have such a study in mind.

A general consideration regarding the size and shape of plots is that the edge effect, which gives rise to inflated estimates of territory density (see back page), should be minimised by reducing the edge: area ratio as far as practicable. Large plots have a lower ratio than smaller plots and plots approximately square or rounded are much better than plots which are long and thin. While minima are given, there are no upper limits to plot-size. However, it is better to census a smaller plot thoroughly and for a long period than risk inadequate or short-term cover of a larger one.

Plot boundaries must be clearly discernible features, such as permanent features of the landscape or an artificial marked grid-line. You must be able to walk the entire boundary, so use field edges on farmland rather than draw imaginary lines across open fields. On farmland, areas known to be particularly rich in birds, such as shelterbelts, should be avoided as plot boundaries.

In all cases, you must ensure that you have the permission of the landowner(s) or tenant(s) to carry out a census and to visit every part of the proposed area. Special permission must be sought if the plot needs any gridding (see opposite).

Obtaining maps

Once you have chosen provisional boundaries, send to Beech Grove a tracing from the relevant Ordnance Survey map, preferably at the 25 inches to the mile scale (1: 2500). The local library will often have them. If you are unable to obtain the 25 inch maps, send us a tracing from a smaller-scale map and we will order the full-scale maps from the Ordnance Survey. (Plots which you have surveyed and gridded need not be traced from the O.S. map, but please be sure to use 1:2500 scale.)

The final tracing of the plot should show not only the plot boundaries copied from the 1:2500 map but also sufficient internal detail to enable accurate plotting and transcription of registrations. This would include tracks, buildings, hedges, isolated trees (mark with a cross), grid lines if present, and perhaps other features such as telegraph poles (mark with a dot) and tree-stumps where detail is otherwise sparse. Too much detail may however mean that registrations have to be plotted aside from their true positions, thus decreasing the accuracy of the plotting, and may conceal the registrations. Unless you can provide your own outline maps for the census (normally 25–30 maps a year) we will prepare and keep the master-tracing and send you a supply of blank maps at the start of each season. **If you run short of maps during the season, please ask for more rather than economise on visits or overcrowd the species maps.**

The process of obtaining maps may initially take as long as six weeks if we need to order from the Ordnance Survey. It is therefore a good idea to begin as far in advance of the proposed first visit as is possible, and in any case by the end of February so that fieldwork can begin not later than mid-April.

Probationary Period

Censusing is a skill for which some potential observers are better suited than others. Please regard your first two years of census work as a 'probationary period' during which you can improve your census skills. After this time we will be able to continue analysing your maps only if they are comparable with those of other contributors. Most observers will have no difficulty achieving the required standard. From time to time we will be staging weekend courses on census methods both for novices and as 'finishing schools' for observers who already have some censusing experience.

GRIDDING A WOODLAND PLOT

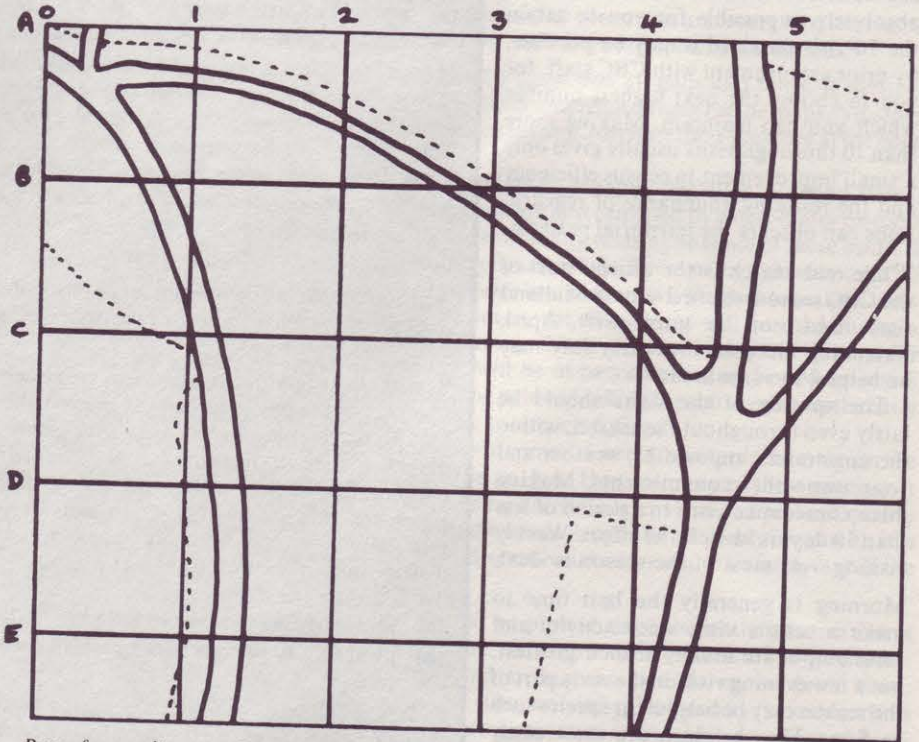
Census work in woodland requires special care. The habitat often appears fairly uniform and visibility, especially in the height of summer, tends to be restricted by the lower canopy or shrub layer; it becomes very difficult for the observer to know his own position, let alone those of the birds! Particularly for species with small territories, inaccurate plotting may lead to over-estimation of territory numbers. The solution to the problem is to locate a number of features, widely scattered, which are easily recognisable as you walk around the plot, and to mark them on the master-tracing. These can be used as reference points when censusing and when compiling species maps. However, if after marking all tracks, paths and other accurately located features some parts of the plot remain empty of reference points, some **gridding** will be necessary.

In its simplest form gridding involves only the addition to the master-tracing (copied from the 25" Ordnance Survey) of a few accurately surveyed points. For example, if there are insufficient natural features along a particular path (already on the master-map) to enable you to judge your position accurately, a simple line of markers at 50 metre intervals may suffice. A 30 or 50 metre tape-measure and a supply of marking tape are all the equipment required for the fieldwork. Each marker must be semi-permanent and easily visible : two-inch wide fluorescent orange tape is ideal. It is necessary to label each one individually (best done using a broad-tipped black waterproof pen) and to enter the location and label of the marker on the master-map.

Compass-line gridding is needed when large areas of the master-map are devoid of features, and (in the extreme case) when no Ordnance Survey map is available. The first step is to choose a base-line, normally along part of the plot boundary but along an internal ride if no other straight lines are available. This is marked at 50 metre intervals, and then grid-lines are set up at right angles until the required area is completely covered by a 50-metre grid. An accurate sighting-compass is required. Grid-lines parallel to the base-line can be labelled alphabetically, and those at right angles with numbers, so that each grid-point has a logical and unique label (**A1, A2, A3; A1, B1, C1**, etc).

This sort of gridding is best accomplished by a team of three people, each of whom carries a lightweight surveying pole (a stick marked with fluorescent tape); the three poles can be used to carry a straight line forward through the woodland quite accurately without constant recourse to compass-bearings. Gridding should ideally be tackled in the winter, when visibility inside the wood is at its greatest.

Further advice can be sought from Beech Grove. In all cases where gridding is needed, it is necessary to seek special permission from the landowner even though access to the plot may already have been obtained.



Part of an outline map for a woodland plot with a full 50 metre grid, reproduced at the standard 1:2500 scale. Grid-points are marked A1, B2, C3, C4, etc. The observer can follow the grid-lines, using a compass if necessary, so that he always knows his position on the map.

IN THE FIELD

The mapping visit

The basis of the CBC fieldwork is the **mapping visit,** involving full coverage to all parts of the plot. Normally each visit should be completed within a period of a few hours; *partial visits are to be avoided if at all possible.*

Carry an outline of the plot (the visit map) attached to a clipboard or suitably-sized piece of hardboard using a bulldog clip or elastic bands. Use a brightly-coloured pen: BTO staff find that fine-pointed red ballpoints are ideal. Do not use ink which runs when wet. Always write as small and as neatly as possible.

You will need your binoculars, but no other equipment. You must not use tape-recorded calls to elicit playback responses from the birds.

When to visit

The number of territories you find will depend to some extent on the number of visits you make. **It is therefore essential that the number of visits is the same – plus or minus one at the most – from year to year, so that any changes detected are not simply due to the change in effort.**

The standard now adopted for the CBC is **10 complete mapping visits** during the census season, mid-March to late June. This is sufficient for detection of a high proportion of the real territories present (the proportion depending on your own characteristics as a birdwatcher). If it is absolutely impossible for you to attain the 10-visit standard it may be possible, by prior arrangement with CBC staff, for you to choose the next highest number which you can maintain. Making more than 10 thorough visits usually gives only a small improvement in census efficiency and the resulting abundance of registrations can obscure the territorial patterns.

While mid-March is the official start of the CBC season, the first visit to Midland sites need not be until early April. Extending the visits into early July may be helpful in some areas.

The spacing of the visits should be fairly even throughout the season, within the constraints imposed by weather and your own other commitments. Making three consecutive visits in a period of less than 10 days is wasteful of effort. Weekly visiting over most of the season is ideal.

Morning is generally the best time to make a census visit, since activity and song output are usually at their greatest, but a few evening visits in the early part of the season may be helpful for species such as Song Thrush which are most easily detected then. A combination of 8 morning visits and 2 evening visits is probably the ideal for most plots; the evening visits should not be consecutive. Do not persist with evening visits if you find them unproductive. Avoid the early afternoon, when bird activity is low, and avoid also the dawn chorus when bird detectability may change rapidly during the course of your visit and lead to uneven cover. In British conditions, bird activity on farmland and in woodland remains at a moderately high level until about noon. For a three-hour census visit (about the average) it is best therefore to start either **before 9 a.m. or after 5 p.m.**

Cold, windy or wet days are to be avoided since the activity and detectability of the birds are much reduced. Showery days make acceptable census weather, since birds are often quite active after each shower; it is important to protect the visit map as much as possible from the rain, and to carry a pencil since ballpoint pens do not work when wet. On particularly fine days an early start is recommended since bird activity may tail off somewhat earlier than expected. **Please do not allow persistently bad weather during a season to prevent you from carrying out your full complement of visits.** It is better to make a relatively inefficient visit, perhaps on a windy or showery day, than to miss a visit entirely. Ending the season short of visits is likely to jeopardise the comparability of your results.

. . . . . *unacceptable census weather!*
Photo: Kenneth Taylor

SPECIAL PROCEDURES

Partial visits

Normally, a full mapping visit covering all parts of the plot should be carried out during a single outing. If this is not possible, it can be composed of two or more **partial visits**. Partial visits should **only** be used in the following circumstances:-

(a) where a full visit was rained off before completion, to complete the coverage of that visit. (Alternatively, it may be better to make a new start.)

(b) to record extra observations, made outside full visits, for species otherwise poorly recorded, for example any Tawny Owls or Woodcock seen or heard on a special short visit at dusk. Casual registrations for common species are not required. Remember that, if you are making special visits for crepuscular species, you must do so every year if your effort is to be comparable.

(c) where a non-standard procedure for regular partial visits, for example in a group census (see below), has been specially approved by CBC staff.

In every case, it is essential that **each partial visit is given a different visit letter** so that the registrations made on each partial visit can be readily distinguished on the species map. Suffixes are the best way of doing this; for example if the third visit was composed of four partial visits they could be labelled C_1, C_2, C_3, and C_4 – they must not be lumped under **C**. It must always be clear which visit map registrations belong to each visit letter. Use different coloured ballpoints for each partial visit, or if necessary different outline maps.

Group censuses

A group census is one where a large plot is divided into sub-plots and covered by a team of observers; each full visit to a sub-plot is effectively a partial visit to the full plot. Partial visit letters must be used.

Regular use of partial visits, as in a group census, has two important drawbacks. Firstly, coverage of the plot is necessarily uneven; the internal boundaries between sub-plots will tend to receive up to twice the cover given to other parts of the plot. Secondly, if the observers stick to the same sub-plots, real differences in bird density between different parts of the plot will be obscured by the differences in censusing efficiency between the observers. These drawbacks do not affect the value of the results for assessing population change between years, but may bias the investigation of territory distribution in relation to habitat.

To minimise these biases:-

(a) please be sure to make 10 full visits, so that all parts of the plot are well-covered, and

(b) please try to set up a rota by which each sub-plot is visited by different observers in turn.

Where full visits to a plot are shared between several observers, the number of visits made by each should be the same (plus or minus one at the most) from year to year. If the team is of 3 or more and some turnover of observers is likely, please ensure that no observer makes more than half the visits.

Fieldwork procedure

The aim of your visit is to mark on the map the location and movements of every bird present or flying over during the visit, but to **record each individual once only**. The symbols section and the example maps show how this can be done. Since birds are small, difficult to see, and fast-moving relative to the observer, some inadvertent double-recording is bound to occur: the procedure for assessing the final total of clusters (usually performed by BTO staff) makes allowance for this. **If however individual birds are persistently plotted more than once the final total of territories will be an over-estimate.**

It is essential when registering birds on the visit map that the standard codes are used for species and activities. This will ensure that the maps can be readily understood at Beech Grove. The full list of codes and symbols is given overleaf. **Please take special note of the section describing dotted and solid lines between registrations**, since proper use of these symbols is essential for easy and accurate analysis of your maps.

As you enter the plot, record the date and your starting time. On completion, note your finishing time – we use your total time spent censusing as a measure of consistency in effort between years. Make a brief note of the weather (e.g. "fine, sunny, NW3", where NW3 indicates the wind direction and force, or "cool, showery, cloud 3/8, SW2") and the extent of your coverage during the visit.

Farmland plots: special hints on coverage

About 3–4 hours are required for thorough coverage of the average farmland plot (70 hectares). Progress can be quite fast, since the number of birds detectable from any one point is usually rather limited, but the route should take the observer at least once along every major internal hedgerow as well as completely around the perimeter of the plot. Accurate placing of the registrations on the map is normally made easy by the network of field boundaries.

Take care not to damage crops and hedgerows. If there is no path next to a hedge that must be walked, the best alternative is the first set of tractor wheel-tracks (tramlines), usually about 5m.

Most farmland plots are an intricate patchwork of fields and hedgerows.
Photo: Kenneth Taylor

from the hedge. Only where the fields are unusually large (greater than 25 hectares) might it be necessary for you to stray further from the field edge, and for this you should seek special permission.

Frequent use of binoculars is essential for an efficient census on farmland, since typically most of the birds in view will be some distance away. Sequential movements of individual birds should be recorded carefully: the point beyond which a bird cannot be driven along a hedge is likely to correspond closely to the edge of its territory.

Coverage should be as even as possible, but more time should be allowed for areas where bird density is higher. The direction and, if possible, starting point of the route should be varied between visits.

Woodland plots: special hints

A thorough visit to the average woodland plot (20 hectares) should take about 3–4 hours. A route should be followed which takes you to within 50 metres of every part of the plot at least once during the visit; the direction and, if possible, starting point of the route should be varied between visits to improve the evenness of cover. As on farmland, **even cover of the whole plot is essential**. In particularly dense woodland, a compass may be helpful to enable the observer to follow a marked grid-line or to cross a block of woodland between marked paths. Progress should be quite slow and careful so that there is time to register all the birds seen or heard, and so as to disturb the birds as little as possible. The majority of contacts in woodland will be by sound; practice will help you estimate the positions of birds you can hear but not see. If unsure of how far a singing bird is away from you, try the method of triangulation – walk twenty metres or so and estimate its direction from another point.

In contrast to the situation on farmland, where you are more or less restricted to the field-edges, you can wander anywhere within a woodland plot during the course of a visit. It is well worth using this freedom on occasion to follow distant noises of particular interest to ensure that the birds in question are recorded accurately on the map. Examples might be a tapping noise (a Nuthatch, one of the spotted woodpeckers, or just a Great Tit?), a Chaffinch singing against the one you have just recorded (it will be important to plot this valuable registration accurately) or your first record of a Golden Oriole! Where you have deviated from your planned route, however, it is important to reassess carefully the route for the rest of the visit so that all parts of the plot are covered evenly.

SOME STATISTICS

At the 25" (1:2500) scale: one centimetre represents 25 metres, one inch represents about 70 yards, an acre is represented very accurately by one square inch, and one hectare (a square with sides of 100 metres) is represented by 16 square centimetres (or four 50-metre grid-squares). These Instructions, closed and laid across your census map, would cover about 39 hectares (or 96 acres).

What to record . . . .

All species seen or heard during visits are relevant to the census and every bird should be recorded on the visit and species maps, with the following specific exceptions:-

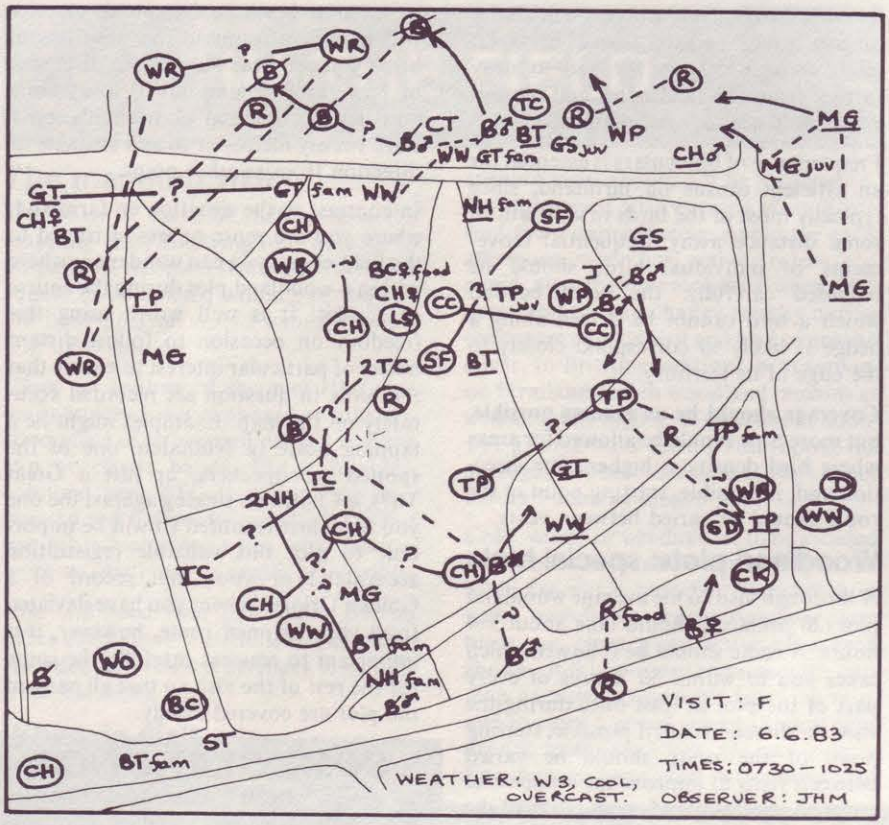
(1) Grey Heron, Rook, Sand Martin, Feral Pigeon and all gulls and terns. If nesting, please give a count or estimate of active nests and record them on the maps. No other registrations are needed. If present but not nesting, just note their presence at the edge of each relevant visit map.

(2) Woodpigeon, Swift, Swallow, House Martin, Magpie, Jackdaw, Carrion Crow, House Sparrow and Starling. These species are best censused by a nest-count on most plots. Please make special efforts to locate as many nests as possible of these birds. If you are confident that you are recording nearly all the active nests, you may omit all other registrations if you wish, as for species listed under (1), but please make it clear that you are doing so. Normally, however, the assessment will be made using a combination of nests and other registrations. Observations of song and display, for example in Woodpigeon and Starling, will be of particular value. For Magpie and Carrion Crow, special attention should be paid to looking for active nests on the early visits, before they become concealed by too much foliage.

(3) Fieldfare, Redwing, Brambling and other common winter visitors seen only on the early visits will usually be ignored by the analyst. However, any of these species, or any unexpected spring migrant, might be recorded on later visits and perhaps qualify as a territory-holder (even though out of normal range and probably unmated); it is best to plot everything and allow us to discard what turns out to be irrelevant at the end of the census.

Birds just outside the plot boundary should be plotted since this extra information is essential for defining the full extent of the territories which straddle the boundary. Remember that such birds may be found within the boundaries on later visits. Simultaneous registrations (dotted lines) are, as always, especially valuable. It is important to be consistent between seasons in the extent to which you record birds outside the boundaries.

Intensive nest-searching is not recommended. It is exceedingly time-consuming to find enough nests to make a significant contribution to the census results. Additionally, it is



Part of a completed visit map for a woodland census, reproduced at the 1 : 2500 scale as used in the field. It was a productive visit and all parts of the map are crowded with registrations. The dotted lines will be particularly helpful in the later analysis of territories. Blackbird registrations have already been copied to the species map and cancelled with a light stroke of the pen.

important (but very difficult in practice) to standardise nest-finding effort between years. However, please record all active nests you find during normal census work, using dotted lines where appropriate to denote nests of different pairs. Do not spend time nest-searching to the detriment of mapping the birds, except for those species (Rook, Sand Martin, Magpie, Carrion Crow, etc.) for which nest counts are particularly important. Remember to distinguish between natural sites and nestboxes. Submit nest record cards separately. As with all nest-finding, it is essential to keep disturbance to a minimum. Finally, do not change your nest-finding effort on the plot between seasons to an extent which may affect the results.

COMPILING THE SPECIES MAPS

This is normally a job for the late summer, in the weeks following the fieldwork, but it can be done concurrently with the fieldwork if you prefer. Compilation of species maps cannot be undertaken by BTO staff.

Check that you have given each visit a **visit letter**. These should start with A and typically run through to K (omitting I) for a ten-visit census. Suffixes should be added to the visit letters to distinguish any partial visits. Select each species in turn, and copy neatly all registrations of the chosen species from the visit maps onto a fresh outline map. As you transfer them **substitute** the visit letter for the species code (so that, for example, **CH** on visit G becomes **G** on the Chaffinch species map) and **cancel** the visit map registration with a light stroke of your pen. **It is essential to cancel the registrations, so that the visit maps can later be checked for any registrations missed. All registrations must be transferred to the species maps: do not let your information be wasted by leaving it on the visit maps.** Copy all conventions (arrows, dotted lines, etc.) exactly as they appear on the visit maps. The single exception here is when a nest is recorded on more than one visit: the asterisk for any one nest should appear only once on the species map, with the appropriate visit letters listed beside it. Some slight displacement of the registrations may occasionally be necessary, for example where a bird repeatedly uses the same songpost, but plot them as close as possible to the original spot.

Brightly-coloured pens are best for species maps, s
soluble pens which fade quickly in sunlight and r
different colours, several species can be combined
based in different parts of the plot: for example o
might make a good combination. Take care not t
results of 10 visits appear on roughly 15–18 speci

Once the species maps are complete, please double
will almost certainly find some! If you wish, you m
species, following the guidelines given below. This
several species on a sheet please use **only a soft lead**
to make any necessary amendments. An example

SPECIES A

This standard list of conventions is designed f
necessary. Additional activities of territorial sign
clear abbreviation.

CH, CH♂, CH♀ 3CH juvs, CH2♂1♀	Chaffinch sight rec one pair of Chaffi
R fam	Juvenile Robins wi
R	A calling Robin
R	A Robin repeatedly territorial significa
(R)	A Robin in song.
-RR-	An aggressive enco
* R	An **occupied** nest significance by the
BT	Blue Tits nesting in nest in a nestbox.
* PW on	Pied Wagtail nest
PW mat	Pied Wagtail carry
PW food	Pied Wagtail carry

Movements of birds can be indicated by an arro

GR →	A calling Greenfinc
(D) →	A singing Dunnock
→ B♂	A male Blackbird f
WR → WR	A Wren moving be

The following conventions indicate which registr
proper use will be essential for the accurate asse

(WR) - - - (WR)	Two Wrens in song **simultaneous regist** territories.
* - - - - - * LI LI	Two Linnet nests another example of
(CK) — (CK)	The solid line indic
(SD) — ? — (SD)	The question-mark bird. This conventio already covered – it before, **without ris** marked solid line,
(WR) WR mat	No line joining the depending on the p involved. (You ma registrations were a
C* C*	Where adjacent nes and second broods.

**Please use the following abbreviations of species n
the list, use a longer (unambiguous) abbreviation.
the Waterways Bird Survey and Winter Atlas; yo**

that the registrations stand out well from the background. Avoid water-
y tend to spread. Fine-pointed ball-pens are recommended. By using
a single map. Try to combine species of differing abundance and those
farmland, Skylark (a field species) and Dunnock (chiefly in hedgerows)
overcrowd the maps. Good economy of materials is achieved where the
sheets.

heck the visit maps for registrations missed. Experience shows that you
y then make a provisional estimate of the number of territories for each
ill be very useful to us when we finalise the analysis. Even when there are
encil for your provisional analysis, so that it is easy for the BTO analysts
pecies map is shown overleaf.

ID ACTIVITY CODES

clear and unambiguous recording. Symbols can be combined where
cance, such as display or mating, should be noted using an appropriate

ds, with age, sex or number of birds if appropriate. Use CH♂ to indicate
hes, so that 2CH♂ means two pairs together.

n parent(s) in attendance.

giving alarm calls or other vocalisations (not song) thought to have strong
e.

nter between two Robins.

Robins. Do not mark unoccupied nests, which are not of territorial
selves.

specially provided site. Please remember to use this special symbol for a

th an adult sitting.

g nest material.

g food.

using the following conventions:

flying over (seen only in flight)

perched then flying away (not seen to land).

ing in and landing (first seen in flight).

veen two perches. The solid line indicates it was **definitely the same bird**.

tions relate to different, and which to the same individual birds. **Their**
sment of clusters at Beech Grove.

t the same time, i.e. **definitely different** birds. The dotted line indicates a
ation (or contemporary contact) and is of very great value in separating

ccupied simultaneously, and thus belonging to different pairs. This is
he value of dotted lines. Only adjacent nests need to be marked in this way.

tes that the registrations definitely refer to the same bird.

d solid line indicates that the registrations relate to **probably the same**
is of particular use when your census route brings you back past an area
s possible to mark new positions of (probably the same) birds recorded
of double-recording. If you record birds without using the question-
er-estimation of territories will result.

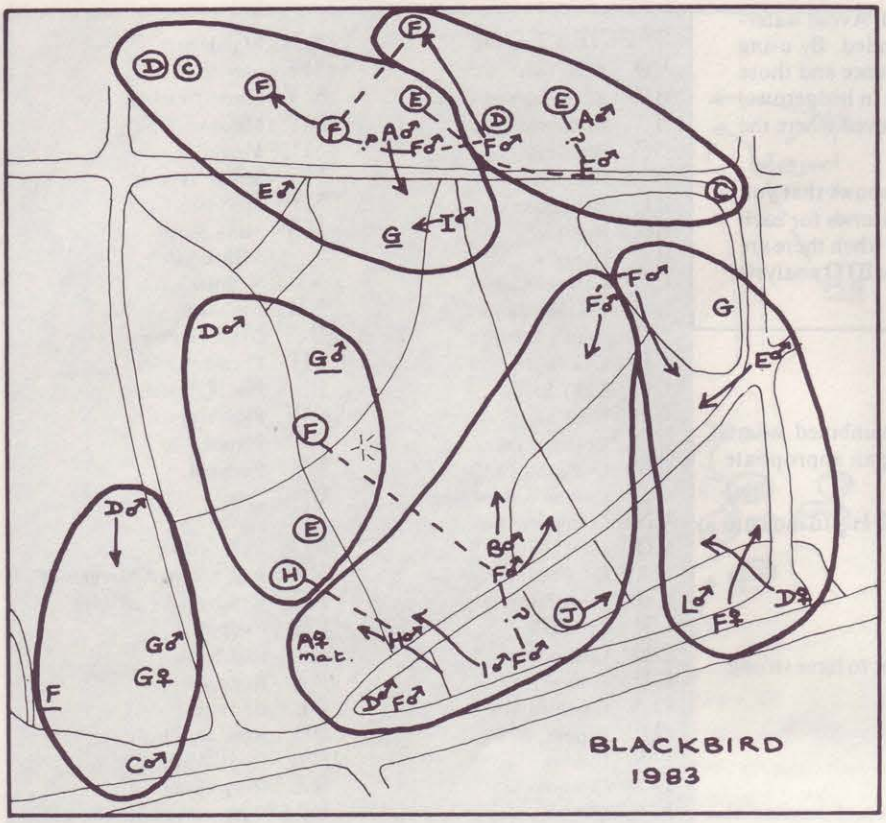
egistrations – it will be assumed that the birds are **probably** different, but
ttern of other registrations they may be treated as if only one bird was
if you wish use a question-marked dotted line, indicating that the
most certainly of different birds.)

are marked without a line, it will often be assumed that they were first
or a replacement nest following an earlier failure.

mes. If uncertain of the correct code, or if you encounter a species not on
These codes are the same as those used for other BTO schemes including
u may also find them helpful in other birdwatching studies.

SPECIES CODES:

BO	Barn Owl
BH	Black-headed Gull
B	Blackbird
BC	Blackcap
BT	Blue Tit
BL	Brambling
BF	Bullfinch
BZ	Buzzard
CG	Canada Goose
C	Carrion Crow
CW	Cetti's Warbler
CH	Chaffinch
CC	Chiffchaff
CT	Coal Tit
CD	Collared Dove
CM	Common Gull
CS	Common Sandpiper
CN	Common Tern
CO	Coot
CA	Cormorant
CB	Corn Bunting
CR	Crossbill
CK	Cuckoo
CU	Curlew
DW	Dartford Warbler
DI	Dipper
DN	Dunlin
D	Dunnock
E	Eider
FP	Feral Pigeon
FF	Fieldfare
FC	Firecrest
GW	Garden Warbler
GC	Goldcrest
GF	Golden Pheasant
GP	Golden Plover
GN	Goldeneye
GO	Goldfinch
GD	Goosander
GH	Grasshopper Warbler
GB	Great Black-backed Gull
GG	Great Crested Grebe
GS	Great Spotted Woodpecker
GT	Great Tit
GE	Green Sandpiper
G	Green Woodpecker
GR	Greenfinch
GK	Greenshank
H	Grey Heron
P	Grey Partridge
GL	Grey Wagtail
HF	Hawfinch
HH	Hen Harrier
HG	Herring Gull
HM	House Martin
HS	House Sparrow
JD	Jackdaw
J	Jay
K	Kestrel
KF	Kingfisher
L	Lapwing
LB	Lesser Black-backed Gull
LS	Lesser Spotted Woodpecker
LW	Lesser Whitethroat
LI	Linnet
LG	Little Grebe
LO	Little Owl
LP	Little Ringed Plover
LE	Long-eared Owl
LT	Long-tailed Tit
MG	Magpie
MA	Mallard
MN	Mandarin
MT	Marsh Tit
MW	Marsh Warbler
MP	Meadow Pipit
ML	Merlin
M	Mistle Thrush
MH	Moorhen
MS	Mute Swan
N	Nightingale
NJ	Nightjar
NH	Nuthatch
OC	Oystercatcher
PH	Pheasant
PF	Pied Flycatcher
PW	Pied Wagtail
PT	Pintail
PO	Pochard
Q	Quail
RN	Raven
RG	Red Grouse
RM	Red-breasted Merganser
RL	Red-legged Partridge
LR	Redpoll
RK	Redshank
RT	Redstart
RE	Redwing
RB	Reed Bunting
RW	Reed Warbler
RZ	Ring Ousel
RI	Ring-necked Parakeet
RP	Ringed Plover
R	Robin
RC	Rock Pipit
RO	Rook
RY	Ruddy Duck
SM	Sand Martin
SW	Sedge Warbler
SU	Shelduck
SE	Short-eared Owl
SV	Shoveler
SK	Siskin
S	Skylark
SN	Snipe
ST	Song Thrush
SH	Sparrowhawk
SF	Spotted Flycatcher
SG	Starling
SD	Stock Dove
SC	Stonechat
SL	Swallow
SI	Swift
TO	Tawny Owl
T	Teal
TP	Tree Pipit
TS	Tree Sparrow
TC	Treecreeper
TU	Tufted Duck
TD	Turtle Dove
TW	Twite
WA	Water Rail
W	Wheatear
WC	Whinchat
WH	Whitethroat
WN	Wigeon
WT	Willow Tit
WW	Willow Warbler
WO	Wood Warbler
WK	Woodcock
WL	Woodlark
WP	Woodpigeon
WR	Wren
YW	Yellow Wagtail
Y	Yellowhammer



This is the Blackbird species map from the same census as the example visit map on page 6. On transfer to the species map the B for Blackbird has been replaced in every case by the visit letter F, but the symbols indicating sex, song and movements have not been changed. The map has already been analysed, and six territories found on this portion of the plot, although two of these lie mostly beyond the northern boundary.

HABITAT DESCRIPTION

Information on the nature of the habitat is an essential complement to the data you supply on the numbers and distribution of the territorial birds on your plot. It enables us to assess how representative is our index (by comparing the habitat of our plots with that of farmland or woodland as a whole), to compare the birds on plots of differing habitat and, most importantly perhaps, to measure the effects on birds of specified changes in the environment.

If the habitat of your plot is subjected to major change, subsequent census results may form the basis of a detailed case study. **We are likely to welcome the continuation of a census following such a change, even where the changed area is substantially less attractive for birds**, but please check with us first to ensure that the results will be worthwhile.

The following items are needed annually to accompany each completed census sent to Beech Grove:-

(a) **a habitat map.** A full habitat map is essential in the first year but in subsequent years it is necessary only to show changes from the previous year's map, and any special information which is relevant to that year (including field-use on farmland plots). Details on compiling habitat maps are given below.

(b) **a completed habitat questionnaire.** Each observer will be sent a questionnaire before the start of the season, to be completed as fully as possible and returned with the maps. The content of the questionnaire may vary from year to year but for farmland will include field-use (cropping, management, farm chemicals used, etc), hedgerow management and other detailed aspects of habitat change. If there has been no change on the plot, whether farmland or woodland, this will be your opportunity to say so.

In addition, photographs of the plot are very helpful to the analyst, since they give an accurate impression of the habitat; they must be regarded as a complement to the habitat maps and questionnaires, **not a substitute**. Colour slides are particularly welcome. Please enclose with them a map showing the points from which the photographs were taken, and a note of the date.

Farmland habitat maps

In your first season, and in any subsequent season if you wish, please complete a **full habitat map**. This should be on one of the outline maps sent to you for the census and should describe the permanent skeleton of the plot – including any hedges, fences, ditches, tracks and lanes, farmsteads, gardens, scrub, copses, permanent pasture, streams and standing water – together with a note of the field use in that season. Conventions are to mark hedgerows and wooded areas in green, and any streams or standing water in blue. Mapping should extend for 50–100 metres beyond the plot boundaries. The following details should be given:-

(a) **the plot boundaries, clearly marked.**
(b) **contours, copied from the 6″ or 2½″ O.S. maps.**
(c) **a six-figure grid reference for a point near the centre of the plot.**
(d) **a description of each copse or block of woodland (see woodland section opposite).**
(e) **the structure of each hedge in terms of height, width, shape, main species of hedgerow shrubs and species and height of standard trees. The positions of standard trees should be marked with a cross.**
(f) **position of any nestboxes.**
(g) **any other details you think may affect the distribution of birds on your plot.**

Estimate hedge width at the height at which the width is greatest; for hedges not recently trimmed it may be necessary to give ranges for height and width rather than single values.

A full habitat map will be welcome in any subsequent year of the census, and would be particularly useful following a period of habitat change, but the only requirement following the initial year is for a **'crops and changes'** map. This should show:-

(a) **any changes in the habitat since the map for the preceding year**, e.g. hedgerow losses, streams which have been dredged,
(b) **the cropping or field-use,**
(c) **the hedgerows present in that year, marked with a green line**, and
(d) **the period of the season for which any standing water was present.**

The 'crops and changes' map can be used to illustrate points you mention in your answers on the annual questionnaire. Please remember that unless you inform us of changes we might assume that the information on your previous habitat map is correct, so it is very important to **keep up to date with recording habitat change**.

Habitat information is best collected during the course of normal visits, but make a special visit if you wish. Notes made on the visit maps should be cancelled as they are copied to the habitat map.

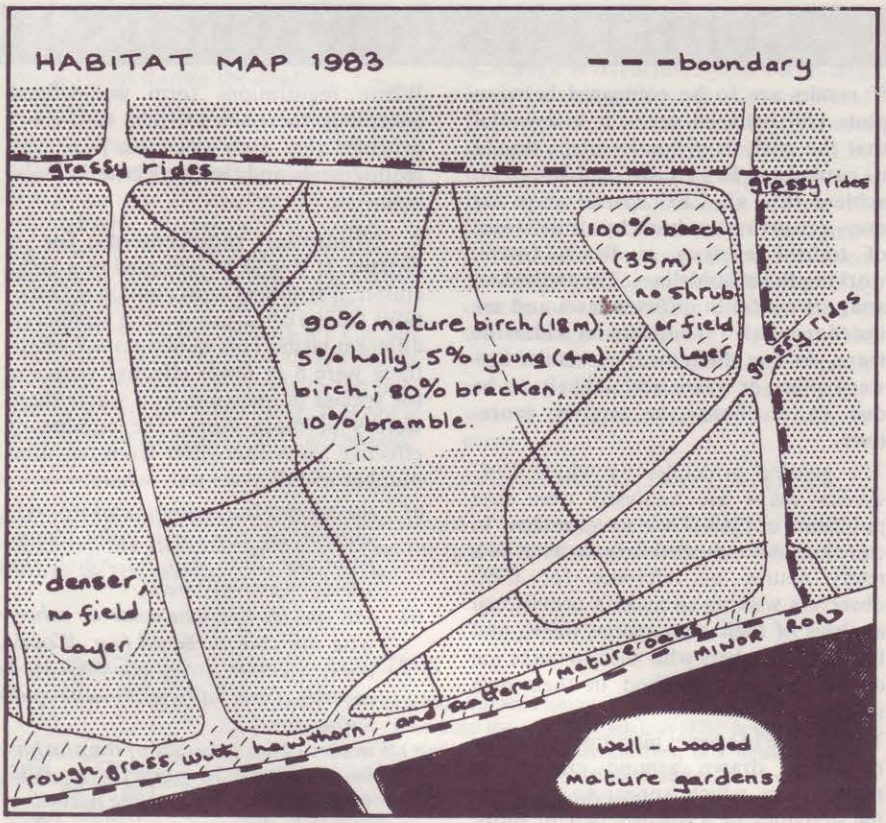
Woodland habitat maps

As for farmland, a full habitat map is requested to accompany your first census. Please read the section on farmland habitat maps and mark all the features listed there, where relevant to the habitats present on your plot and in the surrounding 50–100 metre zone. In addition, the following specifically woodland features should be recorded:-

(a) rides, clearings and glades
(b) boundaries between the major stand types, together with a brief description of each type.

Stand types can be recognised as blocks of woodland within which the tree and shrub species and the woodland structure are broadly uniform. Please provide the following details for each stand:-

1. **Management type:** stands may vary in management (e.g. high forest, wood pasture, active coppice, derelict coppice). In coppiced woods, the boundaries of different ages of coppice should be marked and the approximate date of cutting provided. Please inform us of any management activity on the annual questionnaire.
2. **Canopy or tree layer:** list the dominant species of trees and estimate by eye the approximate % cover for each tree species contributing more than 10% of the total ground cover. Also estimate the typical height of the dominant tree species: BTO staff can advise on methods if necessary.
3. **Shrub layer** (1 to 5m above ground): list the main species, their typical height and approximate % cover.
4. **Field layer and ground composition:** record the approximate percentage cover of grass, heather, herbs, bracken, bramble, rocks etc.



The habitat map for the same section of CBC woodland plot as in the other examples. This is a simplified version of the original, which shows more details and uses colours to distinguish stand types. On the original map, the management type is given as "abandoned wood pasture now moving towards high forest structure, grazed by deer."

Many plots contain only 3–4 different stand types which can be readily identified, and it will be rare to need more than 7 or 8. A friendly botanist may be able to assist. If in difficulty consult Beech Grove.

A simplified example of a woodland habitat map is shown above, to give an indication of what is required.

Please remember to keep us informed of any changes in habitat in subsequent years. Maps showing **changes only** would be welcome in addition to the completed questionnaire.

A varied piece of woodland on an Oxfordshire census plot, holding a good variety of bird species. Both Blackcap and Chiffchaff regularly hold territory around this point in the wood. *Photo: John Marchant*

SUBMISSION OF RETURNS

When completed, the visit, species and habitat maps should be sent to Beech Grove. It would be helpful to the analyst if you could also include a separate list of the visit letters, dates and times. Please try to send us your completed maps **before the New Year.**

If the maps are relatively small they are best folded and sent in an envelope, but larger maps should be rolled tightly and (ideally) packed in a cardboard tube. In either case, please ensure that a return address is included in the parcel. For added security, you can send the visit and species maps separately so that it is unlikely both will be lost.

The final assessment of territories is made by Beech Grove staff, so that we can be certain that maps from different sites, observers and years are always analysed in the same way. Once the analysis is complete we will send you our version of the results together with a first assessment of the overall changes in population. It is a good idea for you to send a copy of the results to the county bird recorder, so that they can be summarised in the annual bird report.

The original species maps will normally be retained on file at Beech Grove. They are our ultimate authority for the statements we make based on the CBC results, and are needed to back up our conservation claims if challenged. It is not possible for us routinely to copy the species maps for observers who wish to retain their original maps, but we can supply suitable tracing paper or, if necessary, extra outline maps for observers who wish to make their own copies. Please confer with CBC staff if you wish to retain copies of the species maps. Visit maps will normally be returned on request.

GUIDELINES FOR SPECIES MAP ANALYSIS

If results are to be compared between plots and between years, it is essential that the analysis of species maps should be carried out in a consistent fashion. To achieve this, all CBC species maps for every census are analysed by a small team of trained analysts at Beech Grove, working to set guidelines. The individual analysts confer in difficult cases and are tested regularly for consistency within the team, so any differences in results between plots or years are unlikely to be due to a change in analyst procedure.

The guiding principles by which CBC species maps are analysed were first published in 1968. They are given here in clarified and expanded form so as to be a ready source of reference for CBC observers wishing to make a provisional analysis of their own species maps, and for BTO members who wish to make use of the mapping method in their own studies.

The essence of species map analysis is that rings are drawn around clusters of registrations which appear to represent the activities of a distinct pair of birds. The ring itself merely encloses those registrations treated as forming part of the cluster, and does not necessarily indicate the territory boundaries. By convention, the rings drawn are non-overlapping, although in reality adjacent territories may overlap. The clustering procedure is merely an expedient for assessing the number, distribution and relationship to habitat of territory-holding birds on the data available.

Bird behaviour varies between individuals and between habitats, and may be detected and interpreted differently by different observers. It is therefore inappropriate for the analysis guidelines to be a set of fixed and rigid rules. An element of subjectivity remains even when the guidelines are followed: sometimes there may be more than one allowable way to analyse a species map. Decisions made by the CBC analysts, however, are not arbitrary since they draw on their accumulated experience of censuses in a wide variety of habitats and on their field knowledge of bird behaviour. Examples of cluster analysis are shown opposite to illustrate various of the points made below.

1. Ideal clusters. The typical species map shows discrete grouping of letters indicating the positions held by territorial males on different visits. Each grouping or cluster may show a sequence of observations on different visits of probably the same pair of birds, but in practice will probably show some duplication whereby males or females are registered more than once on a single visit. Areas from which dotted lines radiate may be identified readily as potential clusters.

Where registrations form well-defined groupings, these are accepted as clusters provided that each meets the minimum requirements and the other criteria given below.

2. Minimum requirements for a cluster. If it is to be accepted as a valid cluster, a grouping must contain registrations from a certain minimum number of different visits. This minimum is 2 where there were 8 or fewer **effective visits** for the species in question, or 3 where there were 9 or more visits. The number of effective visits can differ from the total number of full visits only where:-

a) the species is a migrant and was not present on the early visits (count from the first visit on which the species was registered),

b) the species is crepuscular or otherwise difficult to record (e.g. Woodcock, Nightjar, owls), in which case 2 records from different visits will suffice, or

c) in rare cases, coverage of the plot has been uneven: in particularly awkward cases it may even be necessary to apply different minima in different parts of the plot.

A further requirement is that there must be **ten full days** separation between the first and last registrations in the group. This rule (only) is waived in 'expedition methodology' where the visits are compressed into a short period of the season for the purposes of a special study. To determine whether clusters span ten days, it is helpful to keep a list of the visit letters and dates to hand during the analysis.

A single record of a **nest containing eggs or young** can be accepted as the basis of a cluster, even in the rare case of being unsupported by any other registrations. This does not apply to fledged juveniles, or to chicks of nidifugous species (such as Mallard, Pheasant or Lapwing) since they may have moved a considerable distance from the nest.

3. Dotted and solid lines. Two registrations joined by a dotted (or dashed) line should not be included in the same cluster, unless it is probable that the registrations relate to male and female of the same pair, or to juveniles. Such lines are of the greatest value in delimiting clusters. Singing birds can normally be identified safely as males, but for some species females might also be recorded as being in song (e.g. Tawny Owl, Green Woodpecker).

Two records joined by a solid line are effectively the same registration and must not be treated as part of two separate territories.

Records joined by a question-marked solid line may be treated alternatively as if they were separate birds, or the same bird, according to the pattern of other registrations. If included in a single territory, the registration does not count as a "double" (see 5 below).

4. Multiple sightings. A number of birds seen together in a flock may be registered as, for example, **4BT** for four Blue Tits or **2B♂** for two male Blackbirds together. Another common example is a registration of territorial conflict between two or more birds.

Where it is undesirable that such a registration should be treated as part of a single cluster, the analyst can divide the registration between two or more clusters. This is usually the appropriate course for dealing with registrations of conflict which often indicate the boundary between adjacent territories.

5. Double registrations. Double or repeat registrations frequently occur within apparently good groupings. Such registrations might belong to the same individual unwittingly registered more than once, or to different birds (perhaps the territory-holder and a migrant or a wandering male). Where there are more than two double registrations, or where the distribution of the double registrations is associated with a spatial division in the grouping, the analyst should consider whether to draw two clusters. The following points should be taken into account:-

a) whether splitting the group would yield two acceptable clusters, in terms of the minimum requirements, which accord with the territory size and distribution to be expected at that point on the plot.

b) the likelihood of the species performing rapid undetected movements across its territory (several species are especially likely to produce double registrations in this way. Examples include Whitethroat and other Sylvia *warblers, Willow Tit, Chiffchaff and Wren.)*

c) the likelihood of migrants singing while on passage (particularly high for Willow Warbler during their peak of spring arrival).

d) the likelihood of wandering males (high for species which frequently feed outside the defended area of the territory, e.g. Yellowhammer and especially Blackbird which also has a sizeable floating population of non-breeding birds in some years).

e) the number of double registrations is likely to increase with the number of visits made to the plot.

f) double registrations of females are to be expected in polygynous species (such as Pheasant) and should not be counted.

6. Excess registrations. Some registrations will be difficult to assign to particular clusters. In general they should be included in the nearest cluster, except where:-

a) the registrations are close to the plot boundary and probably belong to territories outside the plot, or

b) the resulting cluster would then have too many double registrations, or be too large for the species and habitat concerned, or

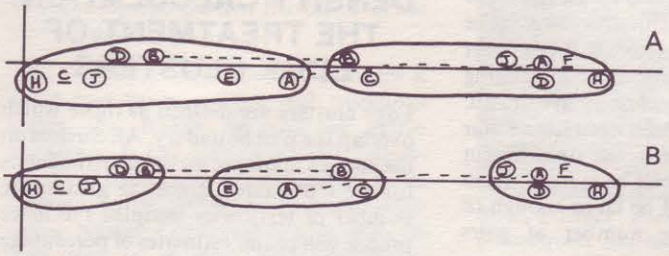
c) the registrations are likely to be of wandering individuals or late migrants (particularly early in the season) or of fledged juveniles (late season).

Excess registrations are those which do not fit into any cluster when the above guidelines are applied. It is best to draw a little arc around them to indicate their likely origin (off the plot, probably belonging to adjacent cluster, etc) and to show that their presence has been taken into account during the analysis.

7. Diffuse registrations. Common species in uniform habitats may show a diffuse rather than a grouped distribution of registrations. Dotted lines are particularly valuable in these circumstances. A start may be made by looking for the best nucleus of territorial activity (e.g. observations on successive visits, perhaps in an area from which dotted lines are emanating), drawing a cluster and then working outwards towards areas where the pattern of groupings is less clear. It is not a good idea to start arbitrarily at the edge of the map.

8. Large territories. Species with large territories (e.g. Kestrel, Green Woodpecker, Grey Partridge) present a special problem since the registrations rarely form obvious spatial groupings. Where the registrations fall close to two edges of the plot with a substantial gap between, it is often better to assign them to different groupings (either or both of which may qualify as an accepted cluster) than to draw a single cluster covering most of the plot. The size of the cluster drawn should always be appropriate to the territory-size of the species in the habitat concerned.

The following diagrams show examples of correct (and in some cases incorrect) assessment of territory numbers using the standard CBC guidelines. Assume there are ten visits throughout, the plot is farmland, and that the species is a strongly territorial resident in all but the last example. The maps are not intended to be the standard 1 : 2500 scale.

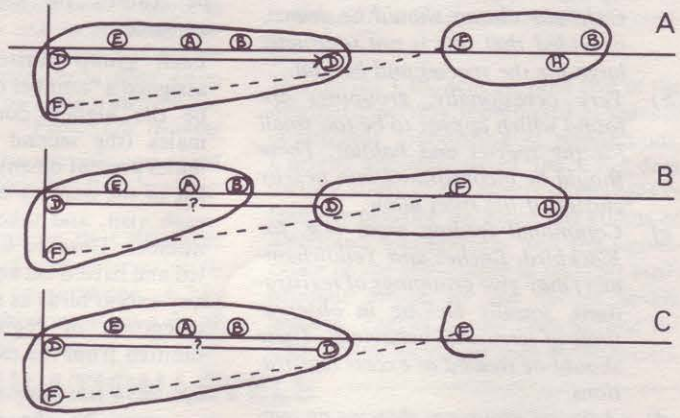


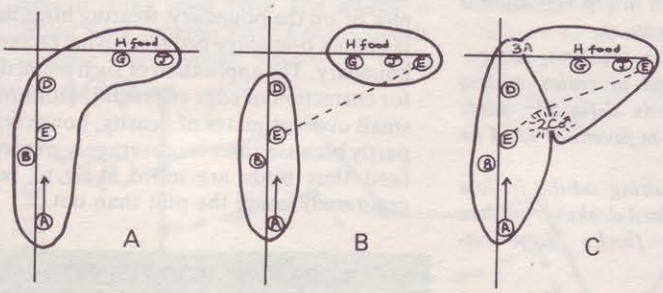
DOTTED, SOLID AND QUESTION-MARKED SOLID LINES

This example shows the correct treatment of lines between registrations. The dotted line *FF* means that the two *F* registrations cannot be placed in the same cluster (A,B and C). In C, the second *F* is treated as an excess registration. The solid line *DD* (example A) means that both *D* records were of the same bird and should be placed in the same cluster. The question-marked solid line *DD* (B and C) can be treated in either of the two ways, depending on the pattern of other registrations. In B, there are sufficient registrations to support a second cluster *DFH* and the *D* records are treated as being of separate birds. In C, there is no support for a second cluster and both *D* records are treated as if one bird was involved. These examples are correct as they stand, but on a real map might be influenced by the pattern of adjoining registrations.

GOOD CLUSTERS

A and B show two different analyses of the same set of registrations. A is unsatisfactory because the apparent nucleus *ABC* is split between two clusters. B, giving three smaller clusters, is a better analysis because it uses *ABC* as the basis of a separate cluster. The treatment of dotted lines is correct in both examples.



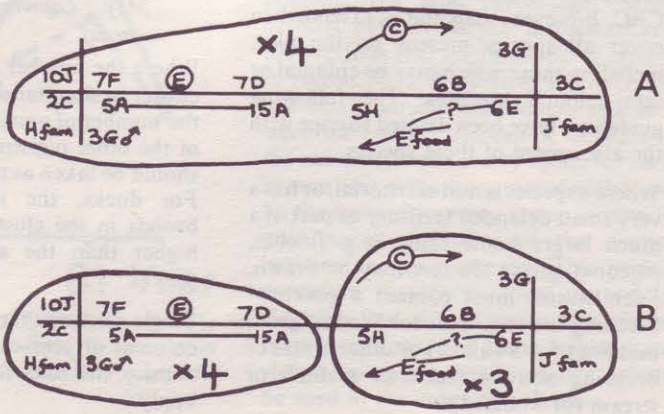


SEMI-COLONIAL SPECIES

For a semi-colonial species such as Linnet it is often necessary to draw clusters representing groups of territories. Examples A and B show correct and incorrect treatments of the same set of registrations. A is correct, based on totals of 7 birds on visits *D, E* and *F*. The high count on visit *A* is discarded as probably a remnant of winter flocks, while that on visit *J* probably includes juveniles. B is incorrect, since the peak counts in these two adjacent putative clusters occurred on different visits, and combining them as in A considerably reduces the assessment.

TERRITORY SHIFTS, MULTIPLE SIGHTINGS

Three correct examples of analysis. In A, the two groupings *ABDE* and *GHJ* are merged into a single cluster on the assumption that there has been a shift of territory. It would be wrong to draw two clusters where such groupings are so close together. In B, the addition of a second *E* and a dotted line makes it clear that there are two clusters. In C, the example is extended to show the correct treatment of multiple registrations. Neither cluster has any double registrations.



". . . . does not apply to fledged juveniles . . . . . since they may have moved a considerable distance from the nest."
Drawing: P. Barwick

9. Spurious groupings. Groupings of registrations sometimes occur which, although fulfilling the minimum requirements, should not be treated as separate clusters.

a) Two distinct adjacent groupings which treated as a single unit have no more than two double registrations, may (particularly in an open or patchy environment) represent two separate songposts of a single bird. Only one cluster should be drawn, provided that this is not unusually large for the species and habitat.

b) Very occasionally, groupings are found which appear to be too small for the species and habitat. These should be incorporated into nearby clusters if the rules allow.

c) Communal feeding areas (e.g. for Blackbird, finches and Yellowhammer) may give groupings of registrations, usually lacking in observations of territorial behaviour. These should be treated as excess registrations.

d) Adjacent groupings showing no temporal overlap (e.g. visits **ABD** *and* **EGJ***) should be treated as an example of* **territory-shift** *and merged into a single cluster, unless this seems unlikely in view of the species, habitat and distribution of registrations.*

10. Clusters representing semi-colonial groups of birds. The mapping method works best for territorial and non-colonial birds (chiefly passerines). In the CBC, however, mapping is extended to cover all species present on the plot, including those which may be colonial or semi-colonial breeders. The following guidelines have been devised to cope with the assessment of these species.

Where a species is non-territorial, or has a very small defended territory as part of a much larger home range (e.g. finches, pigeons), group clusters may be drawn. Each cluster must contain a potential breeding site (e.g. trees for Woodpigeon, buildings for Swallow) or other centre of breeding activity (such as a ditch or stream for Mallard).

The registrations should be divided into groups according to their spacing (ignoring any on the early visits which appear to be of winter flocks). This division must be performed carefully, since the final cluster total may vary considerably depending on how many group clusters are drawn. Putative clusters which contain similar peak numbers of birds, but on different visits, should in general be merged. Each group cluster should be large enough to be realistic for the number of pairs assigned.

Each group cluster should then be assigned a "number of pairs". This should be the highest confirmed number of males (the second highest number of males present on any single visit): make a list of the number of males recorded on each visit, and take the second highest number. Unsexed birds should be totalled and halved between the sexes, treating any excess birds as males. The following categories of registrations should be omitted from the calculations:-

a) high numbers on early visits which may be the remnants of winter flocks.

b) exceptionally high numbers on a single visit which might represent a feeding concentration,

c) high counts after the first observations of fledged juveniles, unless recorded as birds definitely adult (birds recorded as juveniles **must** *be omitted),*

d) influxes of moulting adults in late season e.g. Mallard drakes from late May, Lapwing flocks (June onwards).

Where the number of nests in the group cluster **in simultaneous use** is higher than the number of pairs assigned on the basis of the other registrations, the nest count should be taken as the "number of pairs". For ducks, the number of different broods in the cluster should be used if higher than the assessment based on drakes.

Single clusters may also be drawn for colonial or semi-colonial species at low density; the rules for single clusters then apply.

HOW TO RECORD THE ASSESSMENT

The total number of clusters assessed should be entered on the species map and the summary sheet using the following conventions:-

✓ no clusters assessed, species probably not holding territory. Ticks for species which are common winter visitors should be omitted.

n.c. no count: species probably holding territory, but no assessment made because either it was not mapped by the observer or no proper assessment was possible from the map.

N. adjacent to the assessed number, indicates the figure was based entirely on a count of active nests.

DENSITY CALCULATION: THE TREATMENT OF EDGE CLUSTERS

Edge clusters are defined as those which overlap the plot boundary. All clusters on the species maps are included in the totals for the CBC index, since the greater the number of territories sampled the more precise will be our estimates of percentage change. Dividing the simple total by the area of the plot is likely to give an inflated estimate of the density of territories, because some of the clusters counted will probably lie outside the plot boundaries.

In studies of density and community structure, the totals should be reduced to those strictly relevant to the area within the boundaries. Any clusters lying entirely outside the boundaries should be excluded, together with a proportion of the edge clusters (those which have some registrations inside and some outside).

The method currently recommended by the International Bird Census Committee is to exclude edge clusters unless more than half of the registrations lie within the plot or on the boundary, treating birds in farmland boundary hedges as lying on the boundary. The application of such methods for correction of edge effect still results in small over-estimates of density, however, partly because observer coverage is greater (and thus birds are more likely to be registered) inside the plot than out.

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