BTO Research Report No. 277

Winter Gull Roosts in the United Kingdom in January 1993 With Recommendations for Future Surveys of Wintering Gulls

Authors

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EXECUTIVE SUMMARY

1. This report is in two main parts. The first (chapters 1-4) summarises the results of the January 1993 Winter Gull Roost Survey and makes comparison with past surveys undertaken in 1953, 1963, 1973 and 1983. The second (Chapter 5) provides recommendations for future surveys of the UK's wintering gull populations.

2. The report provides minimum population estimates for Black-headed Gull *Larus ridibundus*, Common Gull *L. canus*, Lesser Black-backed Gull *L. fuscus*, Herring Gull *L. argentatus* and Great Black-backed Gull *L. marinus*, for inland and coastal sites, both at regional and national levels, based on the 1993 survey. These estimates represent the sums of the estimated numbers of birds counted of each species. No attempt has been made to estimate the numbers of gulls in areas not covered by the survey.

3. In total, 2,599,333 gulls were counted in Great Britain during the January 1993 Winter Gull Roost Survey, 1,268,048 at inland sites and 1,331,285 on the coast. This total included an estimated 1,679,341 Black-headed Gulls, 428,441 Common Gulls, 60,757 Lesser Black-backed Gulls, 374,358 Herring Gulls, 42,990 Great Black-backed Gulls and 13,446 of other species. A further 19,030 gulls were also counted in Northern Ireland, 3,853 in the Isle of Man and 8,477 in the Channel Islands

4. Black-headed Gulls were proportionally more common at inland sites, whilst Herring Gulls were conversely more common on the coast. In relation to the total numbers of gulls counted, Black-headed Gulls were most numerous in England, Common Gulls most numerous in Scotland, Lesser Black-backed Gulls least common in Scotland and most common in Wales, and Herring Gulls more common in Scotland than in England. Great Black-backed Gulls were rather more evenly distributed.

5. The following thresholds, calculated as 1% of the minimum British population, are recommended as broad indicators of the national importance of sites for wintering gulls: Black-headed Gull – 17,000, Common Gull – 4,300, Lesser Black-backed Gull – 610, Herring Gull – 3,800 and Great Black-backed Gull – 430.

6. Using these thresholds, 22 sites would qualify as nationally important for Black-headed Gull, 23 for Common Gull, 19 for Lesser Black-backed Gull, 19 for Herring Gull and 20 for Great Black-backed Gull. The Severn Estuary, largely due to the roost at Frampton & Waveridge Sands, held an estimated 7% of the minimum population estimate of Black-headed Gulls, 8% of Common Gulls and 29% of Lesser Black-backed Gulls.

7. Only inland sites in England (and the large roost at Frampton & Waveridge Sands on the Severn Estuary) were looked at in every one of the five surveys. All species increased in number here between the first survey in 1953 and that in 1993, though rates of change varied between species. The numbers of Black-headed Gulls counted increased by 244%, those of Common Gulls by 472%, those of Great Black-backed Gull by 732% and those of Lesser Black-backed Gull by 16,402%. The numbers of Herring Gull counted increased overall by 81% between 1953 and 1993, though declined greatly between 1973 and 1983. The increases in gull populations have probably resulted in increases in both the number of roost sites occupied and the numbers of gulls using individual roosts.

8. Analysis of data from three in-depth studies suggested that single counts, such as those used by the Winter Gull Roost Surveys, may not be representative of numbers over the winter as a whole. Thus, whilst single co-ordinated counts may provide estimates of the national populations present at a fixed time during winter, it may be important to monitor key sites over several months if total site usage is to be estimated.

9. Improvements to the existing methodology are recommended for future surveys, so as to provide more accurate estimates (with confidence limits) of the UK's wintering gull populations. Such surveys should aim to provide separate estimates of gull populations inland and on the coast, by extrapolating from the samples of sites counted.

10. The suggested date for the next Winter Gull Roost Survey is the winter of 2003/04. Pilot work suggested for the winter of 2002/03 would aim to test methods of counting gulls flying in to roost along defined stretches of coast and include a study of the timing of arrival of gulls at roosts.

1. INTRODUCTION

This report presents results of a United Kingdom-wide survey of winter gull roosts carried out in January 1993 and provides minimum population estimates for five species: Black-headed Gull *Larus ridibundus*, Common Gull *L. canus*, Lesser Black-backed Gull *L. fuscus*, Herring Gull *L. argentatus* and Great Black-backed Gull *L. marinus*. Four previous surveys (Hickling 1954, 1967, 1977, Bowes *et al.* 1984) suggested that wintering populations of gulls increased between the 1950s and 1970s, and certainly there is considerable evidence that breeding populations, particularly of Lesser Black-backed Gull and Herring Gull, rose through the 20th century until this time (Harris 1970, Davis 1974, Chabrzyk & Coulson 1976, Monaghan & Coulson 1977, Lloyd *et al.* 1991). More recent evidence suggests that the increases in the UK breeding populations of Black-headed Gull, Lesser Black-backed Gull and Great Black-backed Gull have slowed, whilst the breeding populations of Common Gull and Herring Gull have declined (Lloyd *et al.* 1991, Tasker *et al.* 1991, Gibbons *et al.* 1993). Indeed, the Common Gull is now listed as a Species of Conservation Concern due to the decline in its numbers (Tucker & Heath 1994).

The increases in gull populations seen through the 20th century are thought to be primarily the result of a reduction in human persecution (hunting and egg-collection) and an increase in food availability, from rubbish tips, wastewater outfalls and commercial fishery wastes. The increased use of rubbish tips (Horton *et al.* 1983) and outfalls (Ferns & Mudge 2000) has brought gulls back into conflict with man, mainly due to concern about the spread of disease (Fenlon 1981, 1983, Benton *et al.* 1983, Butterfield *et al.* 1983, Coulson *et al.* 1983a, Fricker 1984, Monaghan *et al.* 1985, Ferns & Mudge 2000). In particular, there is a worry that gulls may act as carriers of salmonella between these sources and the inland water reservoirs that they roost on at night. Concern over such health risks, the hazard posed by gulls to aircraft (Rochard & Horton 1980, Gosler *et al.* 1995, Civil Aviation Authority 1998) and the effects of increasing numbers of gulls on wetland and coastal habitats and other seabirds and waterbirds has prompted efforts to disturb gulls from favoured sites or to reduce the size of their colonies. Lesser Black-backed Gulls, for example, have been culled at Abbeystead in the Pennines partly in order to prevent contamination of a local reservoir (Wanless *et al.* 1996), whilst on the Isle of May repeated destruction of eggs helped to reduce populations of Lesser Black-backed and Herring Gulls which threatened other nesting seabirds (Duncan 1978, Wanless & Langslow 1983). It is probable that such policies contributed to regional declines of these species in the 1970s and 1980s (Lloyd *et al.* 1991).

However, whilst it can be argued that there is a need to control gull numbers in certain locations, it is important that this should not impact upon their conservation status in the UK. The UK holds considerable percentages of the European populations of these species (Hagemeijer & Blair 1997) and, notably, holds 71% of the breeding population of one subspecies of the Lesser Black-backed Gull, *L. fuscus graellsii* (JNCC 2001). Wintering gull populations, particularly in eastern Britain, include large numbers of birds from Scandinavian and continental breeding populations, whilst birds of British origin are more predominant in the west (Stanley *et al.* 1981, Coulson *et al.* 1983b, 1984a, 1984b, Cramp & Simmons 1983, Horton *et al.* 1983, 1984, Monaghan *et al.* 1983, Christmas *et al.* 1986, MacKinnon & Coulson 1987).

In order to properly conserve these species, it is essential that the sizes of both breeding and wintering populations are known and that sites which are important for individual species are identified. This report firstly presents minimum winter population estimates for the five species, for inland and coastal sites, at both regional and national levels, based on the 1993 survey. These estimates represent the sums of the estimated numbers of birds counted of each species. No attempt has been made to extrapolate these estimates to take into account areas not covered by the survey. Secondly, we provide new threshold levels by which sites of national importance for wintering gulls can be identified.

2. METHODS

2.1 Field Methods

The January 1993 Winter Gull Roost Survey followed the same methods used by those in 1953, 1963, 1973 and 1983 (Hickling 1954, 1967, 1977, Bowes *et al.* 1984). These previous surveys varied in their coverage. The (January) 1953 survey recorded inland (and some coastal) roosts in England and parts of Scotland (Hickling 1954). The next survey, again primarily of inland sites in England, was planned for December 1962 and January 1963, but owing to the exceptionally severe winter weather that winter, the majority of counts were undertaken in December 1963 (Hickling 1967). The survey undertaken in January 1973 also included inland roosts in Wales (Hickling 1977). The survey in January 1983 was the first to cover the whole of Great Britain (and also the Channel Islands, though not the Isle of Man) and also the first to cover the majority of coastal sites.

The 1993 survey covered coastal and inland sites in Great Britain and Northern Ireland and included counts from the Isle of Man and the Channel Islands. Observers were asked to count or estimate the numbers of gulls at roosts around sunset between 21 and 31 January 1993, preferably on 22 or 23 January. Suggested methods of counting gulls were given on the reverse of the survey cards issued to observers. Counts of birds flying into roosts typically give more accurate estimates than counts of the numbers of birds already settled at a site, particularly if birds roost on choppy water. At larger roosts, several observers were stationed around the site to simultaneously cover birds arriving on different flight-lines. Counts at individual sites may have underestimated the overall numbers using a roost, particularly if some flight lines were difficult to survey or if many birds arrived after dark. This was known to be the case at the large Frampton & Waveridge Sands roost on the Severn Estuary, for example. In this case the actual numbers of gulls counted prior to darkness have been used in analyses (these figures are also quoted in Durham 1994), as they were in previous surveys, rather than figures that included estimates of the numbers that may have arrived after dark (Purveur 1994).

At some roosts, identification of individual species was not possible throughout the period of observation. In these cases, observers instead provided information on the numbers of unidentified 'small' gulls (Black-headed and Common Gulls) and unidentified 'large' gulls (Lesser Black-backed, Herring and Great Black-backed Gulls) counted in addition to any counts of individuals identified to species. More detailed discussion of the difficulties of counting gulls at roosts is provided by Shedden (1983).

2.2 Data Analysis

2.2.1 Minimum Population Estimates and 1% Thresholds

Minimum population estimates are calculated for Black-headed Gull, Common Gull, Lesser Black-backed Gull, Herring Gull and Great Black-backed Gull, for inland and coastal sites, at county, regional and national levels. Inland sites surveyed included reservoirs, natural and man-made lakes, pools and marshes, rivers, clay-pits, gravel-pits, flooded colliery works, power station lagoons, settling ponds, sewage works, flooded washlands and terrestrial sites, including buildings, playing fields and rubbish tips. Coastal sites were defined as either estuarine, open coast (including islands) or harbours. Analysis excludes data collected from some offshore gas and oil platforms not visible from land.

Following Bowes *et al.* (1984), 10 regions were defined within Great Britain: South-West England, South-East England, East Anglia, Midlands, North England, Wales, South Scotland, East Scotland and North Scotland (see Appendix 1). Data were also collected from Northern Ireland, the Isle of Man and the Channel Islands.

To calculate population estimates, the numbers of each species counted were summed (for inland and coastal habitat separately in each county, region or country) together with estimates calculated from counts of unidentified 'small' and 'large' gulls. Estimates of the numbers of Black-headed and

Common Gulls that made up counts of unidentified small gulls were calculated by using the following formula:

estimate of species x = count of small gulls $\times$ $p_{species\ x}$

where $p_{species\ x}$ = the number of species x counted in the region / the total number of Black-headed Gull and Common Gulls counted in the region

A similar approach was used to estimate the numbers of Lesser Black-backed, Herring and Great Black-backed Gulls that made up counts of large gulls. Counts from the 1963, 1973 and 1983 surveys were also reanalysed using similar methodologies to estimate counts of gull species from counts of unidentified species where necessary. As a result of using this methodology, minimum population estimates for these surveys may not match those previously reported.

It should be noted that the summed counts only provide minimum population estimates. This is because some areas may have been overlooked or because the sizes of some roosts may have been underestimated. No attempt has been made to extrapolate these estimates to take into account areas not covered by the survey.

The minimum population estimates calculated for Great Britain (excluding the Isle of Man and Channel Islands) were used to calculate thresholds – rounded-up 1% levels of the estimates – so that sites of potential national importance for each species could be identified and listed. Estuaries were treated as one in this analysis.

2.2.2 Comparison with Earlier Surveys

Comparison with the results of the previous surveys largely focuses on changes within inland sites in England, as apart from the Frampton & Waveridge Sands roost, no other sites were looked at in every survey. Minimum population estimates of gulls at inland sites in England are plotted together with the number of sites surveyed each year and the number with roosts. Data concerning the size of roosts in the 1953, 1963 and 1973 surveys were taken from Hickling (1954, 1967 & 1977) and it should be noted that these papers gave only limited information concerning those sites which were surveyed but which held no gulls.

Comparative minimum population estimates are tabulated for inland and coastal sites in England, Wales and Scotland for those years in which they were covered.

Trends in regional gull numbers were looked at in more detail using counts from those sites covered in every survey. In addition to the Frampton & Waveridge Sands roost, data were available from 16 other inland sites, in three regions of England. Data from the sites within each region were summed and plotted together with the counts from Frampton & Waveridge Sands against year for each species. Data for South-East England came from King George V & William Girling Reservoirs, King George VI and Staines Reservoirs and Queen Mary Reservoir. Those for the Midlands came from Belvide, Eye Brook and Swithland Reservoirs, Doddington Pool, Ellesmere and Rostherne Mere; those for North England from Ardsley, Blackmoorfoot, Eccup and Wintersett Reservoirs, Hornsea Mere, Ullswater and Windermere.

2.2.3 Assessment of the Representiveness of Single Counts

The calculation of 1% thresholds allows sites of potential national importance for each species to be identified. However, before firmly qualifying the status of these sites, it is important to know whether or not the one-off counts used in the survey can be taken as representative of numbers over a longer period.

To assess the representiveness of single counts, counts reported in three in-depth studies – of the roosts at the King George V & William Girling Reservoirs (Meadows 1961), Chelford Farmwood Pool (Barber & Barber 1986) and Frampton & Waveridge Sands (Durham 1989, 1990, 1991, 1992, 1993, 1994) – are presented. Rather than reporting monthly maxima, as is normal for county and local bird reports, these studies report the results of a series of counts. Counts for the three sites are graphed to indicate seasonal patterns in gull abundance, whilst for the first two sites, coefficients of variation (CV) (the standard deviation divided by the mean expressed as a percentage) were calculated for counts of each species between December and February.

3. RESULTS

3.1 Coverage

A total of 283 inland and 433 coastal sites were surveyed in 1993 (see Table 3.1.1). The majority (97%) of the inland sites were wetlands; only nine roosts were reported from sites on dry land. Of 269 inland sites in England looked at in previous surveys, 137 (51%) were covered in 1993. Likewise, 14 (28%) of 50 inland sites in Wales and 27 (46%) of 59 inland sites in Scotland were covered in 1993. Only two inland sites were covered in previous surveys in Northern Ireland and none in the Isle of Man or Channel Islands.

Although the 1993 survey only included half the inland sites previously looked at, it is probable that few large roosts were overlooked. This is because sites that had previously held high numbers of gulls had a higher probability of being resurveyed than those with few. The 63% (n = 193) of inland sites in England surveyed in 1983 and then subsequently resurveyed in 1993, for example, held 75% of the Black-headed Gulls counted in 1983, 89% of the Common Gulls, 98% of the Lesser Black-backed Gulls, 89% of the Herring Gulls and 74% of the Great Black-backed Gulls.

The 1993 survey covered roosts on major estuaries, though was less complete in its coverage of the open coast, particularly in Scotland. (No counts were received from coastal sites in the Borders or from the Northern Isles and only limited information from the Western Isles.) Coastal sites (except for a few large roosts such as that at Frampton & Waveridge Sands on the Severn Estuary) were first extensively covered in the 1983 survey. Direct comparison of the numbers of sites counted in 1983 and 1993 was not possible, as the limits of the stretches of coastline covered were not defined in either survey and because the stretches often did not match between the two surveys.

3.2 Minimum Population Estimates and 1% Thresholds

In total, 2,599,333 gulls were counted in Great Britain during the January 1993 Winter Gull Roost Survey, 1,268,048 at inland sites and 1,331,285 on the coast. Minimum population estimates for each of the five main species are given in Table 3.2.1, together with rounded 1% levels of these values (*i.e.* 1% thresholds). An estimated 65% of gulls counted were Black-headed Gulls, 16% Common Gulls, 2% Lesser Black-backed Gulls, 14% Herring Gulls and 2% Great Black-backed Gulls. Other species observed included Mediterranean Gull *L. melanocephalus*, Ring-billed Gull *L. delawarensis*, Western Yellow-legged Gull *L. (cachinnans) michahellis*, Iceland Gull, *L. glaucoides*, Glaucous Gull *L. hyperboreus* and Kittiwake *Rissa tridactyla*.

Including counts of these other species, a further 19,030 gulls were also counted in Northern Ireland, 3,853 in the Isle of Man and 8,477 in the Channel Islands (Table 3.2.1).

The total numbers of gulls counted at inland and coastal sites at county, regional and national levels are provided in Appendices 1a & 1b. Regional totals within Great Britain are also shown in Figures 3.2.1 and 3.2.2.

Black-headed Gulls were proportionally more common at inland sites, whilst Herring Gulls were conversely more common on the coast. Chi-square tests also indicated that there were biases in the proportions of the five species found in each country (for inland sites: $\chi^2_8 = 189{,}554.2$, $P < 0.0001$; for coastal sites $\chi^2_8 = 16{,}628.4$, $P < 0.0001$). In relation to the total numbers of gulls counted, Black-headed Gulls were most numerous in England, Common Gulls most numerous in Scotland, Lesser Black-backed Gulls least common in Scotland and most common in Wales, and Herring Gulls more common in Scotland than in England. Great Black-backed Gulls, in contrast, were rather more evenly distributed.

Table 3.2.2 indicates those individual sites (treating estuaries as one) in Great Britain which surpassed the 1% threshold levels and which, in the absence of more complete population estimates, could be

considered as nationally important for the five species. The most important site was the Severn Estuary, which largely due to the roost at Frampton & Waveridge Sands, held an estimated 7% of the minimum population estimate of Black-headed Gulls, 8% of Common Gulls and 29% of Lesser Black-backed Gulls. Sites which held at least 20,000 gulls are listed in Table 3.2.3.

The reliability of a single count in determining a site's importance for a species is assessed in the discussion.

3.3 Comparison with Earlier Surveys

3.3.1 Comparison of Minimum Population Estimates

Comparative minimum population estimates for inland and coastal sites in England, Wales and Scotland for those years in which they were covered are shown in Tables 3.3.1.1 and 3.3.1.2. Numbers of gulls counted in 1983, 1973, 1963 and 1953 at inland and coastal sites at county, regional and national levels are provided respectively in Appendices 2-5. As these tables indicate, only inland sites in England (and the roost at Frampton & Waveridge Sands on the Severn Estuary) were looked at in every one of the five surveys.

Figure 3.3.1.1 indicates that both the total number of gulls counted at inland sites in England and the number of sites surveyed have increased over the forty year period. Rates of increase have varied between species. The numbers of Black-headed Gulls counted have increased by 244%, those of Common Gulls by 472%, those of Great Black-backed Gull by 732% and those of Lesser Black-backed Gull by 16,402%. The numbers of Herring Gull counted increased overall by 81% between 1953 and 1993, though declined greatly between 1973 and 1983.

These observed increases may, in part perhaps, be explained by the apparent increase in coverage between 1953 and 1993 (the number of sites surveyed increased from 58 to 202 over this period). However, it is also probable that increased gull numbers (and increases in the numbers of gravel pits and reservoirs) have led to an increase in the numbers of inland sites occupied by gulls (see section 3.3.2). It should also be noted that the papers summarising the results of the first three surveys gave only limited information on those sites which were surveyed but which held no gulls (Hickling 1954, 1967 & 1977) and thus the coverage of these surveys is likely to be underestimated.

Comparison of Tables 3.3.1.1 and 3.3.1.2 shows that between 1983 and 1993, Black-headed Gull numbers declined slightly at both inland and coastal sites in England, whilst numbers of Common Gulls and Herring Gulls showed considerably increases. In contrast, Lesser Black-backed Gull numbers declined at inland sites but increased at coastal sites, whilst conversely, Great Black-backed Gull numbers increased at inland sites but declined on the coast.

In Wales, numbers of Black-headed and Common Gulls counted have increased at inland sites, but decreased on the coast. Herring Gull numbers have declined, to some extent, both inland and on the coast, whilst numbers of Lesser Black-backed Gulls have increased. Great Black-backed Gull numbers have also increased on the coast.

In Scotland, there have been increases in the numbers of Black-headed Gulls, Lesser Black-backed Gulls and Herring Gulls counted at inland sites, but declines in the numbers of Common Gulls and Great Black-backed Gulls. Comparison of the numbers counted at coastal sites in 1983 and 1993 in Scotland is probable inappropriate due to differences in the extent of coverage in the two surveys.

In Northern Ireland, there have probably been overall increases in Black-headed Gull and Herring Gull numbers, but decreases in the numbers of Common Gulls.

3.3.2 Comparison of Counts at Individual Sites

Figures 3.3.2.1 – 3.3.2.5 show how numbers of gulls have changed at those English roosts which have been counted in every survey. Black-headed Gulls increased in all regions between 1953 and 1993, with the greatest rise in numbers being seen at the Frampton & Waveridge Sands roost. Numbers in South-east England and the Midlands have fallen since 1983, however. Common Gull numbers have increased moderately in Northern England and greatly at the Frampton & Waveridge Sands roost since 1953. These increases have been counteracted by a decline at Midlands' roosts, however. Changes in the numbers of Lesser Black-backed Gulls reflect those of Black-headed Gulls. Numbers have increased greatly at the Frampton & Waveridge Sands roost, but after peaks in 1983, have fallen back in South-east England and the Midlands. Herring Gull numbers have fallen in South-east England and since 1973, also in the Midlands. Numbers of Great Black-backed Gulls rose dramatically in South-east England between 1953 and 1963, but have since declined. Numbers have shown a consistent rise in Northern England, however.

3.4 Assessment of the Representiveness of Single Counts

Figures 3.4.1-3.4.3 show how numbers of gulls varied at the King George V & William Girling Reservoirs, Chelford Farmwood Pool and Frampton & Waveridge Sands between 1957 and 1960, in the winter of 1985/86 and between 1988 and 1992 respectively. In most cases there were clear seasonal patterns in the numbers of each species found at each site. Lesser Black-backed Gulls, for example, peaked in number in autumn as birds moved south on passage (see also Horton *et al.* 1984, Rossiter 1997) – at the King George V & William Girling Reservoirs in September and at Chelford in November. Black-headed, Herring and Great Black-backed Gull numbers tended to peak during mid-winter, *i.e.* when the Winter Gull Roost Surveys are undertaken. In contrast, Common Gull numbers at all three sites tended to peak in late winter or early spring. At Frampton & Waveridge Sands, where Common Gulls are the second most numerous species, the total numbers of gulls counted were consistently higher in late winter / early spring than in early winter.

The other important aspect that the graphs for the King George V & William Girling Reservoirs and Chelford make clear is that peaks in gull numbers tend to be brief. As a result, as the sizes of the coefficients of variation shown in Table 3.4.1 indicate, there is great variability from one count to the next. Single counts, such as those used by the Winter Gull Roost Surveys, therefore, may both miss the peak numbers of particular species and also may not be representative of numbers over the winter as a whole.

Thus whilst single co-ordinated counts may provide regular estimates of the national populations present at a fixed time during winter, it may be important to monitor key sites over several months.

4. DISCUSSION

The 1993 Winter Gull Roost Survey counted an estimated 1,679,341 Black-headed Gulls, 428,441 Common Gulls, 60,757 Lesser Black-backed Gulls, 374,358 Herring Gulls, 42,990 Great Black-backed Gulls and 13,446 gulls of other species in Great Britain. A further 19,030 gulls were also counted in Northern Ireland, 3,853 in the Isle of Man and 8,477 in the Channel Islands. These totals can only be treated as minimum population estimates for three main reasons, however.

Firstly, it is clear that coverage, particularly of coastal areas in Scotland, was incomplete. Even at inland sites in England, only 51% of sites previously covered were looked at in 1993, although this may have in part been due to the loss of some wetland sites, such as sewage farms. Comparison of sites covered in the 1983 and 1993 surveys indicated, however, that few large roosts were likely to have been overlooked in the 1993 survey (at least in England).

Secondly, it is also probable that the sizes of some roosts may have been underestimated. This would have been the case if some flight lines were difficult to survey or if many birds arrived at roosts after dark (Shedden 1983).

Lastly, it should also be noted that the population estimates exclude those gulls that may have roosted in areas offshore not visible from land, though still within UK Territorial Waters (*i.e.* 12 nautical miles from shore). The five species with which this report is primarily concerned, however, are all to a greater or lesser degree associated with land and the majority of those that do feed offshore during the day are likely to join roosts around the coast that would be covered in a land-based survey. Black-headed Gulls are most associated with coastal waters when inland feeding sites are frozen or covered with snow (Lack 1986) and few are seen at sea in winter (Tasker *et al.* 1987, Webb *et al.* 1990, Stone *et al.* 1995). Concentrations of Common Gulls may be found feeding offshore in winter in the southern North Sea (Tasker *et al.* 1987, Skov *et al.* 1995) and Irish Sea (Webb *et al.* 1990), though many of these birds roost on estuaries (Vernon & Walsh 1966, Tasker *et al.* 1987). Concentrations of Lesser Black-backed Gulls, Herring Gulls and Great Black-backed Gulls are also found offshore in winter, the former notably in the Irish Sea, the latter two species being more widely distributed (Tasker *et al.* 1987, Webb *et al.* 1990, Skov *et al.* 1995, Stone *et al.* 1995). Most of these birds are found in waters relatively close to land, however. Previous studies have found that Herring Gulls are the least maritime of these species, often preferring to feed at rubbish tips and that Lesser Black-backed Gulls show a greater tendency to associate with fishing boats (Furness *et al.* 1992, Noordhuis & Spaans 1992).

There is, therefore, some uncertainty concerning the degree to which the totals underestimate the actual numbers of gulls that wintered in the UK in January 1993. However, the totals do provide a valuable picture of the way in which wintering gull numbers have changed since the first survey in 1953 and also provide an initial measure by which important sites can be identified. In comparison to Wetland Birds Survey (WeBS) Counts, the 1993 Winter Gull Survey recorded many more birds. No gull count data were available from WeBS for the winter of 1993/94. In the winter of 1993/94, though, WeBS only recorded peaks of 243,748 Black-headed Gulls (15% of the 1993 Winter Gull Roost Survey total), 36,915 Common Gulls (9%), 10,971 Lesser Black-backed Gulls (18%), 48,554 Herring Gulls (13%) and 6,420 Great Black-backed Gulls (15%) in Great Britain (Cranswick *et al.* 1995).

The growth in gull populations in the UK and much of western Europe since 1900 has been attributed to reductions in human persecution (hunting and egg-collection) and an increase in food availability, from rubbish tips, waste water outfalls and fishery wastes (Spaans 1971, Lloyd *et al.* 1991). The increased use of rubbish tips and also farmland for feeding and the increased availability of inland roost sites (in the form of gravel pits and water reservoirs) have led to a spread in species' inland distributions. Black-headed and, notably, Herring Gulls have become particularly associated with rubbish tips (Monaghan 1980, Greig *et al.* 1983, 1985, Horton *et al.* 1984). Lesser Black-backed Gulls, in particular, may have benefited from fishery wastes (Bergman 1982, Furness *et al.* 1992,

Noordhuis & Spaans 1992) and now winter further north than earlier in the 20th century (Cramp & Simmons 1983).

The increase in wintering populations seen at least until the 1970s resulted in increases in gull numbers at individual roosts and the number of sites occupied (though the increase in the latter is difficult to quantify). The change in gull numbers in the London area during the 1960s was recorded by Sage (1970), who compared counts made in December 1968 and January 1969, with those made in December 1963 as part of the national Winter Gull Roost Survey (Sage 1964). This comparison indicated that Black-headed Gull numbers had risen from 165,050 to 192,212 (*i.e.* by 16%) in this five year period, Common Gull numbers from 20,050 to 31,104 (55%), Lesser Black-backed gull numbers from 2,340 to 6,520 (179%) and Herring Gull numbers from 26,700 to 30,044 (13%), whilst those of Great Black-backed Gull fell 6,325 to 5,865 (a 7% decrease).

Since 1973, the rate of increase in the wintering gull population in the UK has slowed. The numbers of Herring Gulls counted at inland sites in England fell dramatically between 1973 and 1983, perhaps due to control of numbers at breeding colonies (Coulson 1991, Lloyd *et al.* 1991), though between 1983 and 1993 numbers increased once more, possibly because of relaxation of such controls. Lesser Black-backed Gull numbers decreased inland in England between 1983 and 1993, but increased on the coast and in Wales. Decreases of some of their breeding populations have been linked with food shortages resultant from overfishing (Hiom *et al.* 1991, Strann & Vader 1992, Gibbons *et al.* 1993). The numbers of Black-headed Gulls counted have also decreased at coastal sites, whilst though Common and Great Black-backed Gulls have continued to increase inland in England, their numbers have declined sharply in Scotland. Evidence from those inland sites in South-east England and the Midlands looked at in every survey shows that gull numbers have declined here too over the last 10 or 20 years.

Table 3.2.2 indicated that 22 sites could be deemed nationally important for Black-headed Gull, 23 for Common Gull, 19 for Lesser Black-backed Gull, 19 for Herring Gull and 20 for Great Black-backed Gull, as they all held 1% or more of the estimated minimum wintering populations of the species when surveyed in January 1993. It should be noted, however, that as the population estimates calculated are only minima, some of these sites may not have held 1% of the actual British wintering populations of the species. Sites where estimates were calculated from counts of unidentified 'small' or 'large' gulls should also be resurveyed to gather more accurate data on the numbers of individual species. Clearly, also, before firmly qualifying the status of these roost sites, it is important to know whether or not the one-off counts used in the survey can be taken as representative of numbers over a longer period.

The degree of variability in the numbers of gulls using roosts in winter is primarily a reflection of the reliability of local food resources. In areas where rubbish tips and other human waste provide dependable sources of food, previous studies have shown that gulls may be strongly site-faithful both within and between winters (Horton *et al.* 1983, Coulson *et al.* 1984a, Christmas *et al.* 1986, Gosling 1986). Even in such areas, however, the numbers of gulls using individual roosts may be highly affected by the weather, disturbance (deliberate or not) and at coastal sites, by the state of the tide. During the 1973 Winter Gull Roost Survey, for example, many inland roosts in Cumbria were deserted by gulls for sites on the coast because of the severe winter weather (Hickling 1977). Thus, as seen in Section 3.4 of this report, there may be considerable variation in the numbers present at a site, even from day-to-day.

5. RECOMMENDATIONS

The previous surveys of winter gull roosts have probably underestimated the overall populations of wintering gulls. However, it would be possible to improve the methodology for future surveys, so as to provide more accurate estimates with confidence limits. The advantages and disadvantages of an alternative approach, based on counts of feeding birds, are discussed later.

An improved Winter Gull Roost Survey should aim to provide separate estimates of gull populations inland and on the coast. On the coast, it is suggested that the survey should cover all major estuaries and any other important roosts previously known, from earlier surveys or more recent bird reports, to be above a certain threshold size. Outwith these areas, the survey should sample defined sections of coast with the aim of providing boot-strapped estimates of the total numbers of gulls roosting on the coast away from major sites. These estimates could be stratified according to country or county. This element of the survey would thus adopt a similar approach to that used by the Non-Estuarine Waterfowl Survey (NEWS) of 1997/98 (Rehfisch *et al.* in prep.).

Likewise, all inland sites previously found to be above a certain threshold size should be surveyed. Populations using other inland waterbodies could be estimated by bootstrapped extrapolations from counts of gulls roosting on samples of sites within regional or habitat based strata (which would take into account the number and size of roost sites available). As few roosts are found at non-wetland habitats, such an approach should provide realistic estimates of the populations of gulls using inland sites in winter.

The previously suggested methodology, of counting birds as they arrive at the roost, certainly provides the best way of estimating numbers using a roost. It is important that the methodology is standardised between counters, however. Notably, it should be emphasized that guessed estimates of the numbers of gulls arriving after dark should not be included in these counts, even though these may be considerable, as there can be no way of determining the accuracy of these estimates. Rather, counts undertaken before dark and estimates of the numbers arriving afterwards should be recorded separately, so that it is possible to compare counts made at different sites or in different surveys. Detailed study, aided by the use of night-viewing equipment, of the timing of arrival of gulls at a few key roost sites would provide useful data on the accuracy of guessed estimates of the numbers arriving after dark.

It is also often difficult for observers to accurately identify individual species of gulls throughout the period of observation. In these cases, where it was not possible to estimate the proportions of each species in a group of birds, observers in the 1993 survey were instead asked to provide information on the numbers of unidentifiable 'small' gulls (Black-headed and Common Gulls) and 'large' gulls (Lesser Black-backed, Herring and Great Black-backed Gulls) counted, in addition to any counts of individual species. Such an approach is recommended for future surveys.

Following the main survey, it is suggested that a selection of the most important sites (including all those with gull populations above the 1% thresholds calculated using the new population estimates) should be resurveyed the following winter. Monthly counts from September to March would help to determine the degree of variability in numbers over the winter and to detect broader seasonal patterns. In this way it would be possible to identify the majority of those sites which hold nationally important numbers of a species at some point during the non-breeding seasons.

The possible limitation of this improved methodology is that it would still underestimate populations due to the difficulties of counting gulls arriving at roosts after dark and that it would overlook some inland roosts in non-wetland habitats and any roosts that formed at sea within Territorial Waters. To overcome this, a second alternative methodology could be used to provide estimates of national gull populations. This would aim to survey gulls during the day at feeding sites, at inland sites, on the coast (within sight from the land) and offshore. Inland, all major waterbodies would have to be surveyed and an estimate calculated for other non-wetland habitat using a bootstrapped extrapolation

from sampled tetrads. On the coast, an approach similar to that used by NEWS would again have to be used. Offshore, distributions of gulls have been mapped by the JNCC's Seabirds at Sea Team (SAST) (*e.g.* Tasker *et al.* 1987, Webb *et al.* 1990, Stone *et al.* 1995). Their surveys have provided estimates of the densities of seabirds, including gulls, in different areas at different times of year, though have not allowed estimation of populations using offshore waters.

Although it is arguably more comprehensive, this second approach is clearly limited by the need of having to combine population estimates from a variety of different surveys. Even if realistic population estimates could be obtained, there would still be a need to subsequently conduct a roost survey so as to identify sites which held nationally important numbers of roosting gulls. The revised version of the existing methodology suggested would thus be the best way of providing population estimates with confidence limits.

A tetrad-based survey of inland habitats, though not the best approach to providing population estimates of gulls – notably because of the clumped nature of their feeding distributions – would provide useful information on habitat preferences and relative densities in different regions.

The suggested date for the next Winter Gull Roost Survey is the winter of 2003/04. Pilot work undertaken during the winter of 2002/03 would aim to test methods of counting gulls flying in to roost along defined stretches of coast. This pilot work should also include a study of the timing of arrival of gulls at roosts, so as to provide an indication of the proportions of birds arriving after dark in differing situations.

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		1953	1963	1973	1983	1993
England	Inland	58	60	143	192	202
	Coastal	18	1	2	138	224
Wales	Inland	0	0	10	48	30
	Coastal	0	0	0	78	88
Scotland	Inland	6	0	0	58	43
	Coastal	3	0	0	82	73
Northern Ireland	Inland	0	0	0	2	3
	Coastal	0	0	0	3	12
Isle of Man	Inland	0	0	0	0	5
	Coastal	0	0	0	0	21
Channel Islands	Inland	0	0	0	0	0
	Coastal	0	0	0	5	15

Table 3.1.1 The numbers of inland and coastal sites covered by the 1953, 1963, 1973, 1983 and 1993 Winter Gull Roost Surveys.

	Minimum Population	1% Threshold
Great Britain		
Black-headed Gull	1,679,341	17,000
Common Gull	4,28,441	4,300
Lesser Black-backed Gull	60,757	610
Herring Gull	374,358	3,800
Great Black-backed Gull	42,990	430
Northern Ireland		
Black-headed Gull	15,412	
Common Gull	1,596	
Lesser Black-backed Gull	0	
Herring Gull	1,973	
Great Black-backed Gull	48	
Isle of Man		
Black-headed Gull	1,281	
Common Gull	16	
Lesser Black-backed Gull	0	
Herring Gull	2,283	
Great Black-backed Gull	273	
Channel Islands		
Black-headed Gull	4,128	
Common Gull	17	
Lesser Black-backed Gull	32	
Herring Gull	3,901	
Great Black-backed Gull	396	

Table 3.2.1 Minimum Population Estimates for Black-headed Gull, Common Gull, Lesser Black-backed Gull, Herring Gull and Great Black-backed Gull wintering in Great Britain, Northern Ireland, the Isle of Man and the Channel Islands, together with 1% Thresholds for Great Britain.

Site	County	BH	CM	LB	HG	GB
Alt Estuary	Merseyside				5,213 (1.4)	
Audenshaw Reservoirs	Greater Manchester		5,500 (1.3)			
Balderhead Reservoir	Durham		5,800 (1.4)			
Blackpool (Crusader Bank)	Lancashire				4,185 (1.1)	
Blithfield Reservoir	Staffordshire	26,200 (1.6)		1,580 (2.6)		
Brogborough Pit No 1	Bedfordshire					1,100 (2.6)
Brogborough Pit No 2	Bedfordshire				4,100 (1.1)	3,000 (7.0)
Calvert Clay Pits	Buckinghamshire			832 (1.4)		
Chew Valley Reservoir	Avon	36,350 (2.2)	18,710 (4.4)	3,240 (5.3)		
Colt Crag Reservoir	Northumberland		7,400 (1.7)			
Copmere	Staffordshire			720 (1.2)		
Cruden Bay (Slains Castle)	Grampian				4,100 (1.1)	
Derwent Reservoir	Northumberland		4,400 (1.0)			
Draycote Water	Warwickshire	38,500 (2.3)	11,550 (2.7)	2,200 (3.6)		550 (1.3)
Droitwich - Westwood Great Pool	Hereford & Worcester			1,700 (2.8)		
Farmoor Reservoir	Oxfordshire			2,281 (1,640-2,802) (3.8)		
Filey Bay	Yorkshire				4,240 (1.1)	
Firth of Clyde	Strathclyde	19,000 (1.1)				
Firth of Forth	Central, Fife and Lothian Regions	23,523 (1.4)	5,676 (1.3)		11,977 (3.2)	
Firth of Forth - Longannet Lagoons	Fife				19,700 (5.2)	624 (1.5)
Goultrop Roads	Dyfed			1,029 (1.7)		
Gronant Shore	Clwyd		4,526 (1.1)			
Hallington Reservoir	Northumberland		6,700 (1.6)			
Hanningfield Reservoir	Essex		4,448 (4,421-4,707) (1.0)			1,102 (1,098-1,120) (2.6)

Table 3.2.2 Sites which held at least 1% of the minimum Great Britain populations of Black-headed Gull (BH), Common Gull (CM), Lesser Black-backed Gull (LB), Herring Gull (HG) and Great Black-backed Gull (GB) in January 1993. Numbers of gulls counted are shown for those species for which the site was deemed nationally important, together with the proportion of the minimum national population held at the site in parentheses. Counts which included estimates calculated from counts of unidentified 'small' and 'large' gulls are given with minimum (counts of the species alone) and maximum possible values (counts of the species plus the total count of small or large gulls where appropriate).

Site	County	BH	CM	LB	HG	GB
Haweswater Reservoir	Cumbria		8,080 (1.9)			
Hilfield Park Reservoir	Hertfordshire	24,939 (1.5)				
Humber Reservoir	Humberside					677 (669-894) (1.6)
Kempston Hardwick	Bedfordshire					650 (1.5)
King George V & William Girling Reservoirs	Greater London	33,000 (2.0)	4,550 (1.1)	1,010 (1.7)		
Llandegfedd Reservoir	Gwent			2,000 (3.3)		
Llys-y-fran Reservoir	Dyfed			5,000 (8.2)		
Loch Leven	Tayside		9,990 (1,556-12,697) (2.3)			
Loch of Skene	Grampian		12,910 (3.0)			
Looe Bay	Cornwall					750 (1.7)
Lound Gravel Pit	Nottinghamshire					831 (1.9)
Mersey Estuary	Cheshire & Merseyside	27,330 (27,206-27,368) (1.6)			5,316 (2,356-5,489) (1.4)	538 (427-3,560) (1.3)
Mersey Narrows	Merseyside			1,000 (1.6)	5010 (1.3)	
Morecambe Bay	Cumbria & Lancashire	22,919 (1.4)	7,260 (1.7)	693 (1.1)		
New Swillington Ings	Yorkshire					500 (1.2)
Orwell Estuary	Suffolk	17,536 (16,579-17,779) (1.0)	4,473 (4,230-5,430) (1.0)			
Pagham Harbour	Sussex			909 (715-4,715) (1.5)	10,912 (7,978-11,978) (2.9)	1,231 (358-4,358) (2.9)
Poole Harbour	Dorset	26,407 (1.6)	7,027 (1.6)			
Queen Elizabeth II Reservoir	Surrey	41,021 (40,201-41,107) (2.4)				438 (246-1,243) (1.0)
Queen Mary Reservoir	Surrey	23,992 (0-26,500) (1.4)				
Ribble Estuary	Lancashire & Merseyside	38,116 (2.3)	10,047 (2.3)		70,127 (18.7)	
Ribble Estuary – Marshside Nature Reserve	Merseyside				10,000 (2.7)	

Table 3.2.2 Continued.

Site	County	BH	CM	LB	HG	GB
Roadford Reservoir	Devon			1,100 (1.8)		
Romney Sands	Kent		10,000 (2.3)		7,000 (1.9)	3,000 (7.0)
Rutland Water	Leicestershire		8,000 (1.9)			
Scarborough North Bay & Scalby Ness	Yorkshire					608 (1.4)
Severn Estuary	Avon, Gloucestershire, Glamorgan, Gwent & Somerset	67,587 (41,881-126,775) (6.5)	35,671 (18,364-77,552) (8.3)	17,290 (6,649-17,911) (28.5)	4,223 (1.1)	
Solway Firth	Cumbria & Dumfries & Galloway	24,990 (21,629-26,044) (1.5)	12,567 (11,513-15,928) (2.9)		13,812 (11,355-13,875) (3.7)	
South Cerney	Gloucestershire			1,200 (2.0)		
South Walney	Cumbria				14,000 (3.7)	
Southampton Water	Hampshire	18,815 (1.1)				
Stewartby Clay Pit	Bedfordshire	23,600 (1.4)			9,950 (2.6)	5,400 (12.6)
Strathclyde Park Loch	Strathclyde				11,300 (3.0)	
Tamar Complex	Cornwall & Devon					478 (1.1)
Thames Estuary	Essex, Greater London & Kent	44,496 (2.6)	8,881 (2.1)		4,962 (4,939-4,971) (1.3)	2,399 (5.6)
Thames Estuary Pitsea Landfill Site	Essex					691 (1.6)
Theale Gravel Pits	Berkshire			1,200 (2.0)		
Tophill Low Reservoir	Humberside		9,000 (2.1)			
Ullswater	Cumbria		11,454 (2.7)			
Wash	Lincolnshire & Norfolk	38,982 (33,963-40,255) (2.3)	13,931 (12,658-18,950) (3.3)		7,255 (5,289-7,472) (1.9)	454 (255-2,438) (1.1)
Wheldrake Ings	Yorkshire	29,500 (1.8)				
Willen Lake	Buckinghamshire		5,000 (1.2)			
Wilstone Reservoir	Hertfordshire	19,363 (13,329-19,994) (1.2)				
Wraysbury Reservoir	Buckinghamshire			618 (0-1,120) (1.0)		
Ythan Estuary	Grampian		5,700 (1.3)			

Table 3.2.2 Continued.

Site	County	BH	CM	LB	HG	GB	Total
Severn Estuary	Avon, Gloucestshire, Glamorgan, Gwent & Somerset	67,587	35,671	17,290	4,223	121	165,536
Ribble Estuary	Lancashire & Merseyside	38,116	10,047	64	70,127	111	118,465
Thames Estuary	Essex, Greater London & Kent	44,496	8,881	543	4,962	2,399	61,422
Wash	Lincolnshire & Norfolk	38,982	13,931	58	7,255	454	60,683
Chew Valley Reservoir	Avon	36,350	18,710	3,240	700	0	59,008
Solway Firth	Cumbria & Dumfries & Galloway	24,990	12,567	97	13,812	283	58,049
Draycote Water	Warwickshire	38,500	11,550	2,200	2,200	550	55,001
Queen Elizabeth II Reservoir	Surrey	41,021	1,912	537	1,433	438	45,340
Firth of Forth	Central, Fife and Lothian Regions	23,523	5,676	53	11,977	128	41,360
King George V & William Girling Reservoirs	Greater London	33,000	4,550	1,010	2,350	90	41,000
Stewartby Clay Pit	Bedfordshire	23,600	890	100	9,950	5,400	39,940
Mersey Estuary	Cheshire & Merseyside	27,330	1,858	356	5,316	538	35,443
Morecambe Bay	Cumbria & Lancashire	22,919	7,260	693	3,292	227	34,462
Poole Harbour	Dorset	26,407	7,027	204	510	145	34,297
Wheldrake Ings	Yorkshire	29,500	3,600	3	184	271	33,559
Pagham harbour	Sussex	15,661	2,497	909	10,912	1,231	31,210
Romney Sands	Kent	10,000	10,000	1	7,000	3,000	30,504
Blithfield Reservoir	Staffordshire	26,200	40	1,580	740	142	28,705
Hilfield Park Reservoir	Hertfordshire	24,939	3,197	42	9	8	28,195
Queen Mary Reservoir	Surrey	23,992	2,508	356	856	289	28,000
Strathclyde Park Loch	Strathclyde	11,500	850	53	11,300	6	23,710
Rutland Water	Leicestershire	14,500	8,000	30	160	173	22,863
Hanningfield Reservoir	Essex	14,934	4,448	163	1,863	1,102	22,512
Audenshaw Reservoirs	Greater Manchester	16,500	5,500	275	65	32	22,373
Firth of Clyde	Strathclyde	19,000	3,000	0	200	0	22,200
Orwell Estuary	Suffolk	17,536	4,473	1	120	31	22,161
Willen Lake	Buckinghamshire	14,000	5,000	100	1,700	200	21,001
Firth of Forth - Longannet Lagoons	Fife	94	0	12	19,700	624	20,432
Eccup Reservoir	Yorkshire	16,000	4,000	0	300	64	20,364
Wilstone Reservoir	Hertfordshire	19,363	846	22	3	2	20,236

Table 3.2.3 Sites which held at least 20,000 gulls in January 1993.

	1953	1963	1973	1983	1993
Black-headed Gull					
England	241,520	316,667	707,696	898,654	830,730
Wales	-	-	10,414	15,213	16,993
Scotland	-	-	-	40,066	42,610
Northern Ireland	-	-	-	1,301	1,150
Common Gull					
England	28,899	100,691	95,998	106,628	165,389
Wales	-	-	2,968	47	5,718
Scotland	-	-	-	57,883	39,045
Northern Ireland	-	-	-	0	0
Lesser Black-backed Gull					
England	165	6,960	15,823	36,154	27,228
Wales	-	-	249	1,582	7,264
Scotland	-	-	-	18	307
Northern Ireland	-	-	-	0	0
Herring Gull					
England	35,333	58,157	104,114	42,875	63,780
Wales	-	-	4,425	3,877	2,112
Scotland	-	-	-	32,538	39,703
Northern Ireland	-	-	-	0	247
Great Black-backed Gull					
England	2,532	7,416	14,764	9,442	21,077
Wales	-	-	11	60	14
Scotland	-	-	-	1,597	1,189
Northern Ireland	-	-	-	50	3

Table 3.3.1.1 Minimum population estimates of wintering gulls at inland sites in England, Wales and Scotland in 1953, 1963, 1973, 1983 and 1993.

	1983	1993
Black-headed Gull		
England	612,966	597,735
Wales	101,227	68,736
Scotland	252,113	122,537
Northern Ireland	5,640	14,262
Common Gull		
England	179,057	152,168
Wales	23,352	20,875
Scotland	133,559	45,246
Northern Ireland	2,650	1,596
Lesser Black-backed Gull		
England	18,251	21,522
Wales	1,487	4,222
Scotland	305	214
Northern Ireland	0	0
Herring Gull		
England	79,076	183,284
Wales	31,220	27,065
Scotland	95,746	58,414
Northern Ireland	79	1,726
Great Black-backed Gull		
England	21,120	17,632
Wales	630	1,209
Scotland	6,495	1,869
Northern Ireland	64	45

Table 3.3.1.2 Minimum population estimates of wintering gulls at coastal sites in England, Wales and Scotland in 1983 and 1993.

	BH	CM	LB	HG	GB
a	21.1	72.8	55.6	30.9	40.4
b	58.2	77.3	61.6	69.8	127.5

Table 3.4.1 Coefficients of variation for counts of gulls at **a.** The King George V & William Girling Reservoirs and **b.** Chelford Farmwood Pool, between December and February. Data for the former sites came from 1957 to 1960 and for the latter from the winter of 1985/86.

The coefficient is the ratio of the standard deviation of the counts to the mean. Values over 50% indicate that data are skewed in their distribution and thus highly variable.

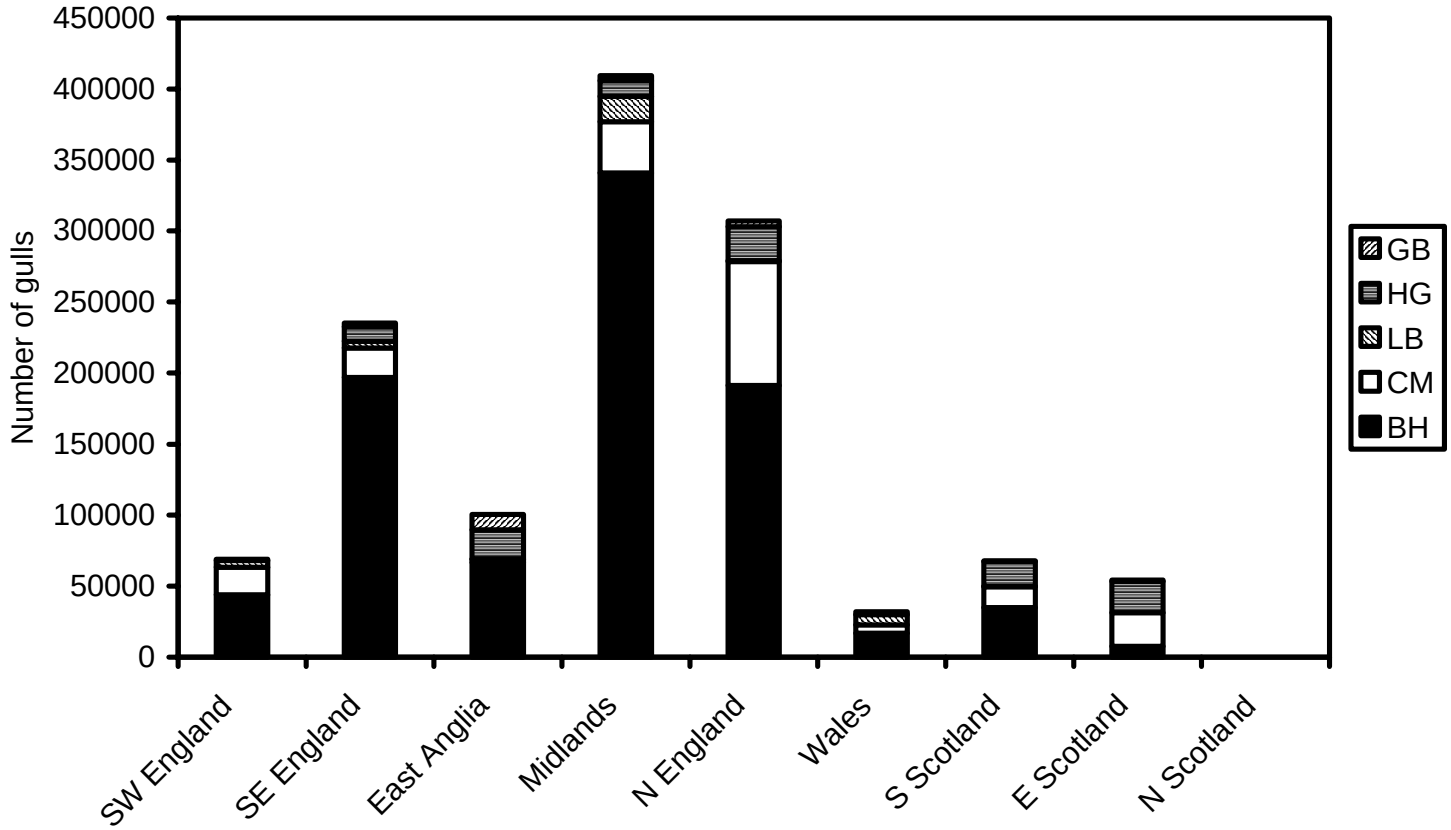

Figure 3.2.1 Estimated numbers of gulls counted at inland sites in Great Britain in January 1993. BH = Black-headed Gull, CM = Common Gull, LB = Lesser Black-backed Gull, HG = Herring Gull and GB = Great Black-backed Gull.

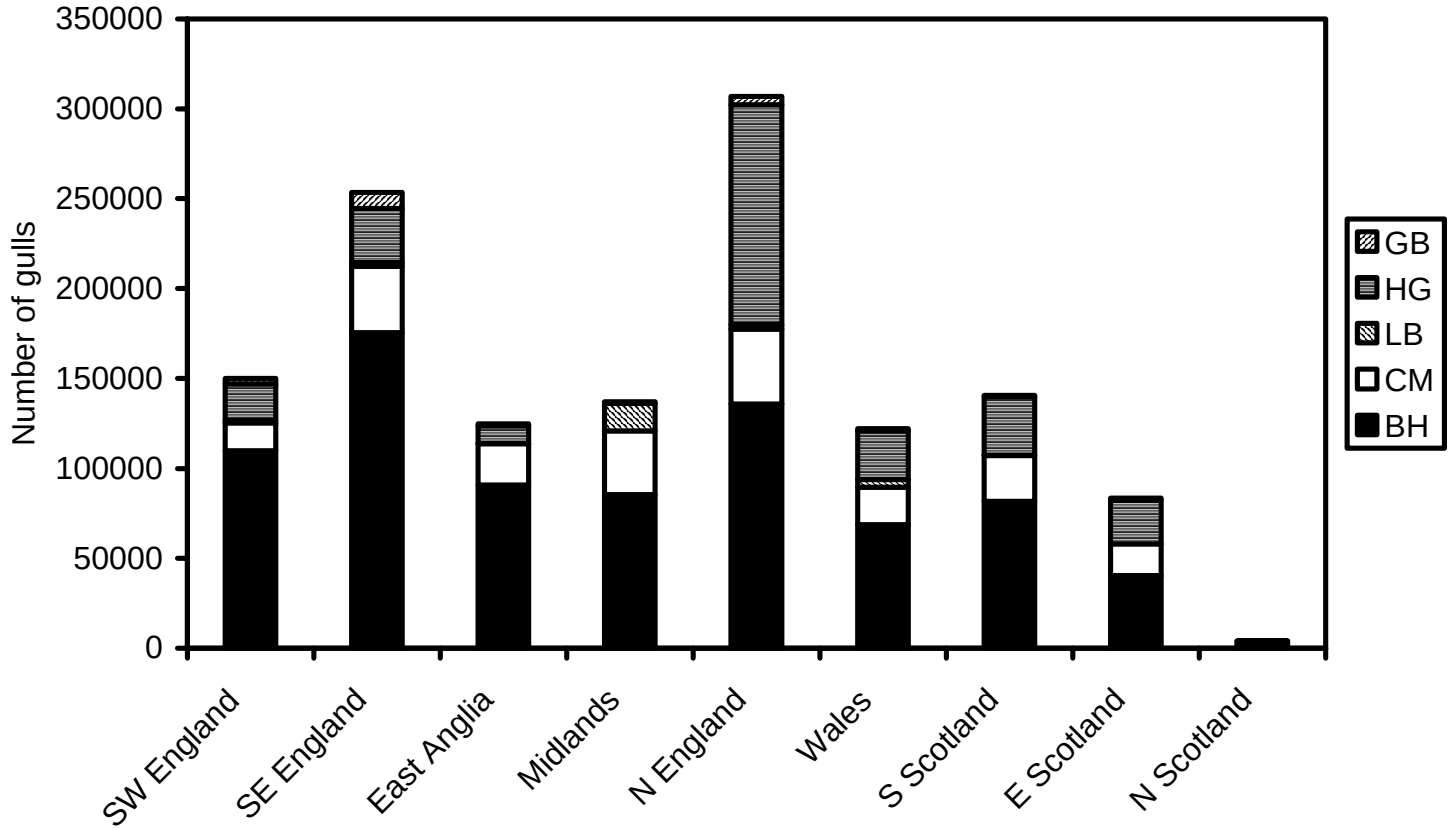

Figure 3.2.2 Estimated numbers of gulls counted at coastal sites in Great Britain in January 1993.

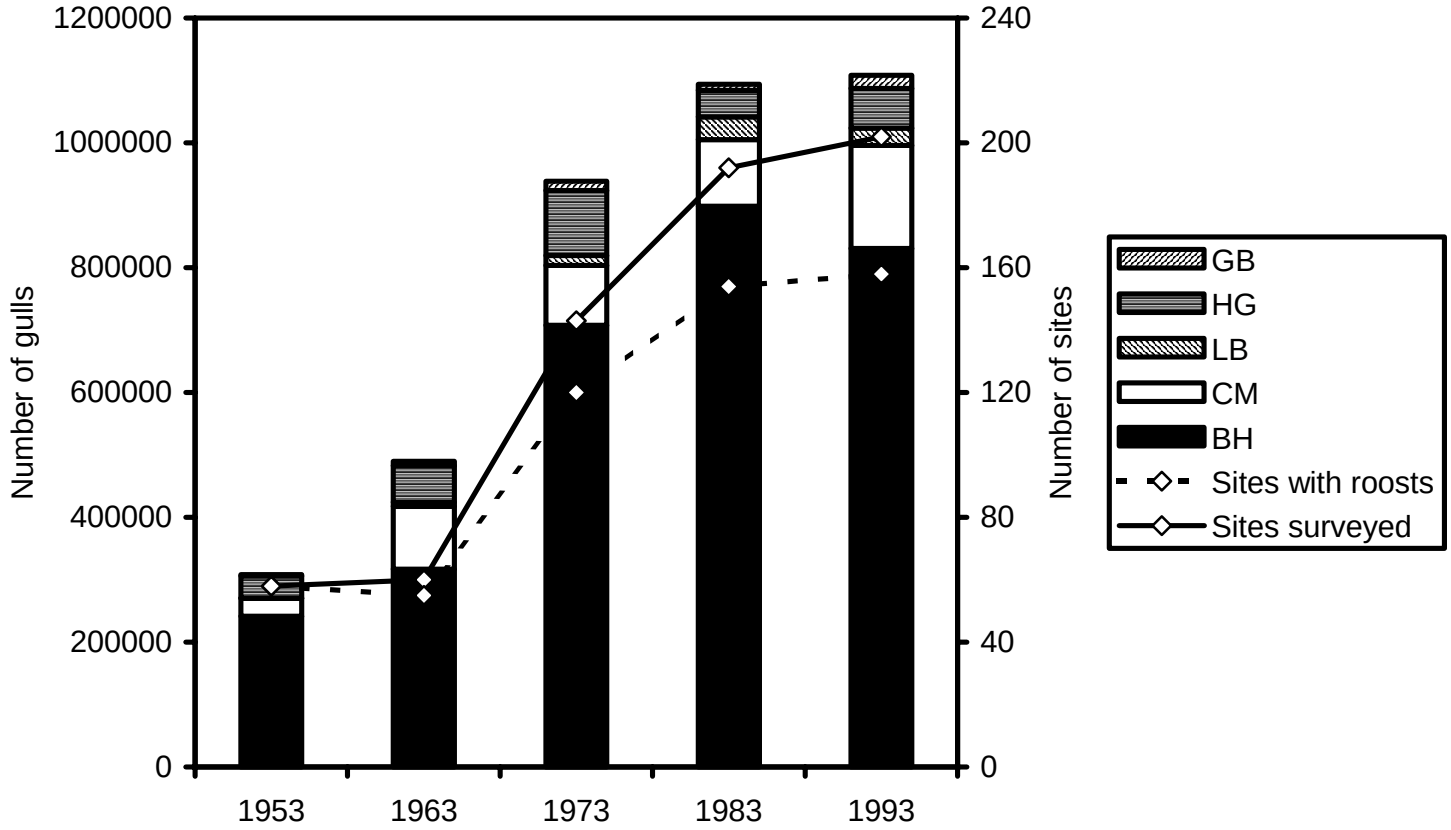

Figure 3.3.1.1 Numbers of gulls counted at inland sites in England during the 1953, 1963, 1973, 1983 and 1993 surveys, in relation to the number of sites surveyed and with roosts.

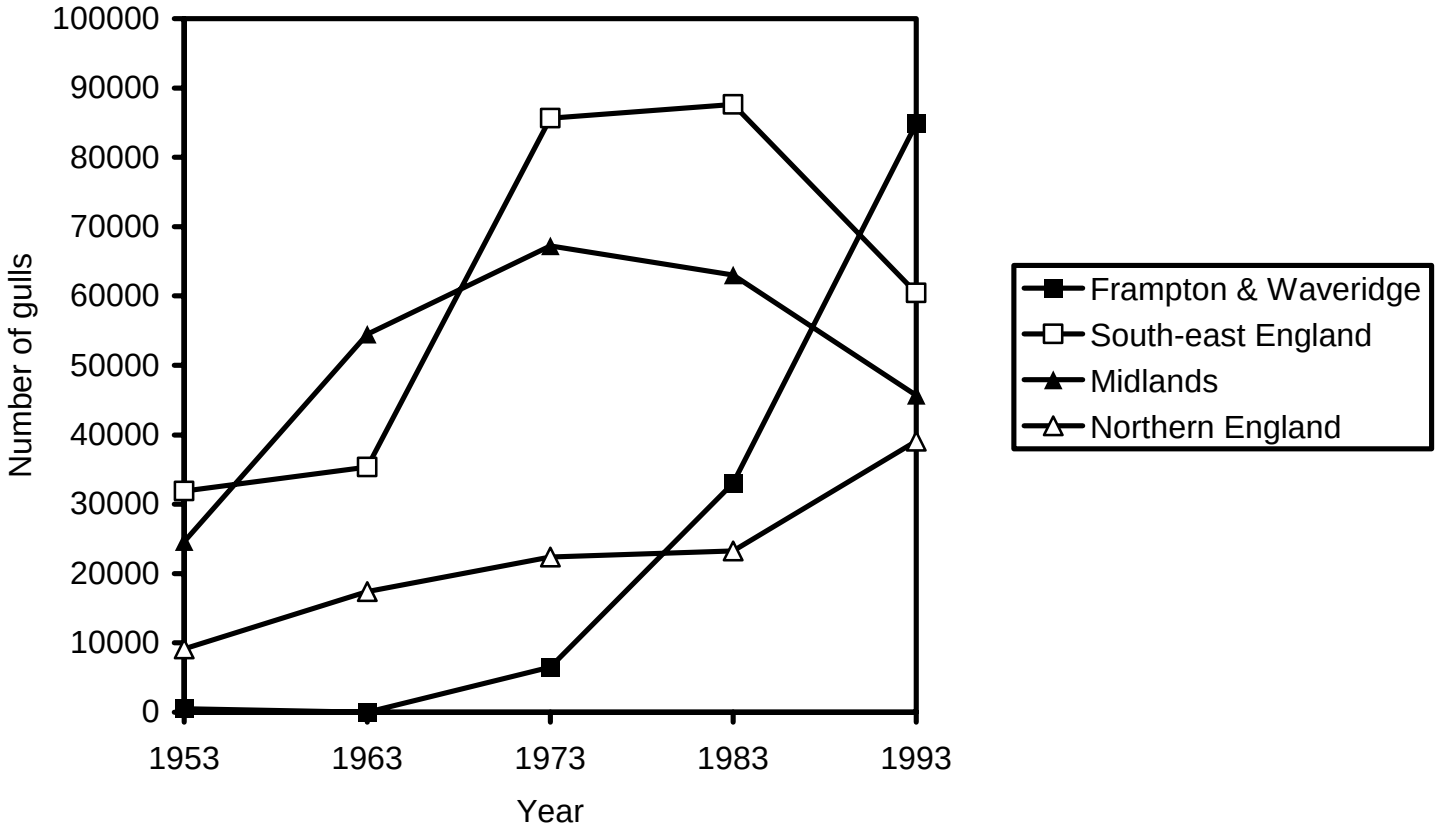

Figure 3.3.2.1 Numbers of Black-headed Gulls at roosts surveyed in 1953, 1963, 1973, 1983 and 1993.

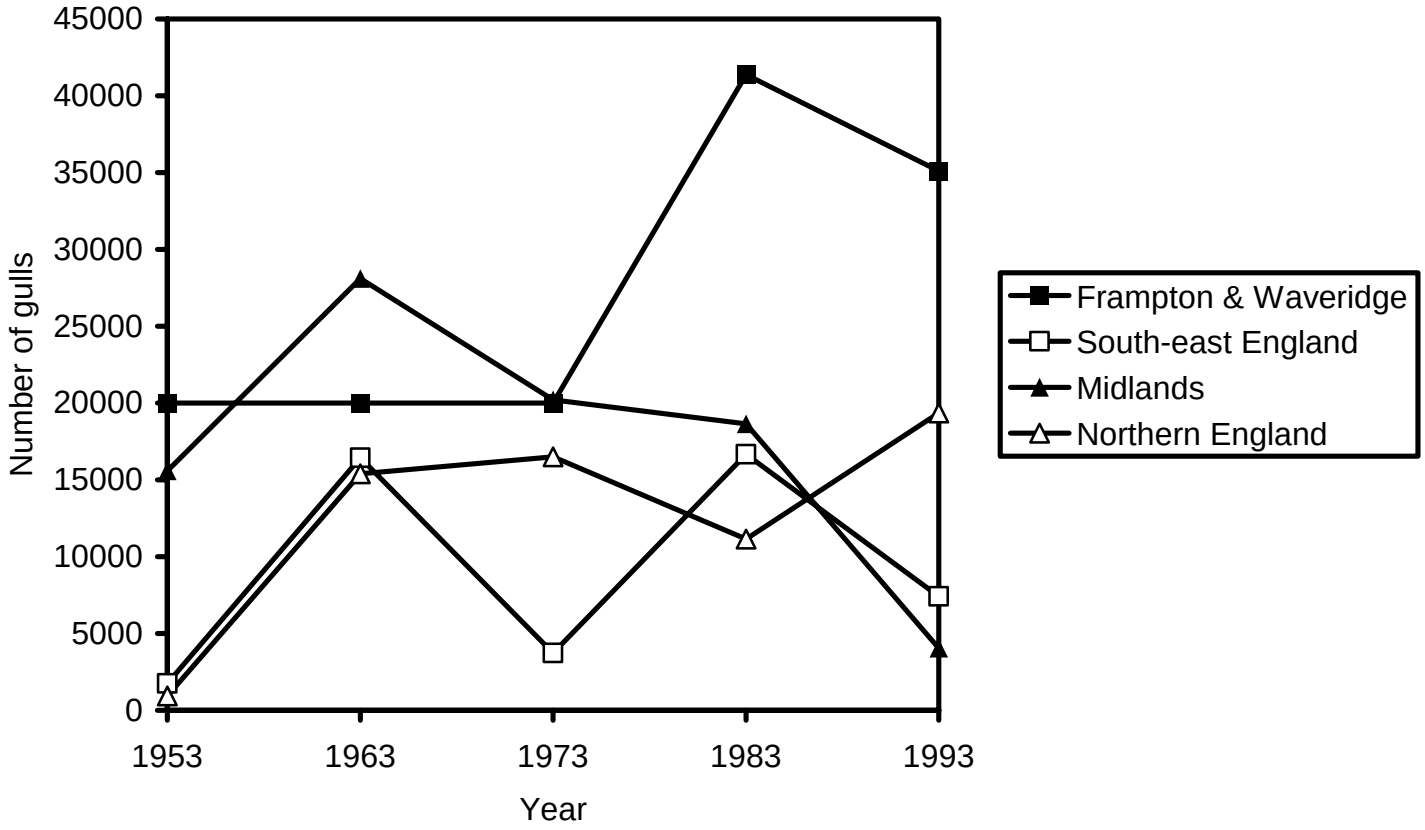

Figure 3.3.2.2 Numbers of Common Gulls at roosts surveyed in 1953, 1963, 1973, 1983 and 1993.

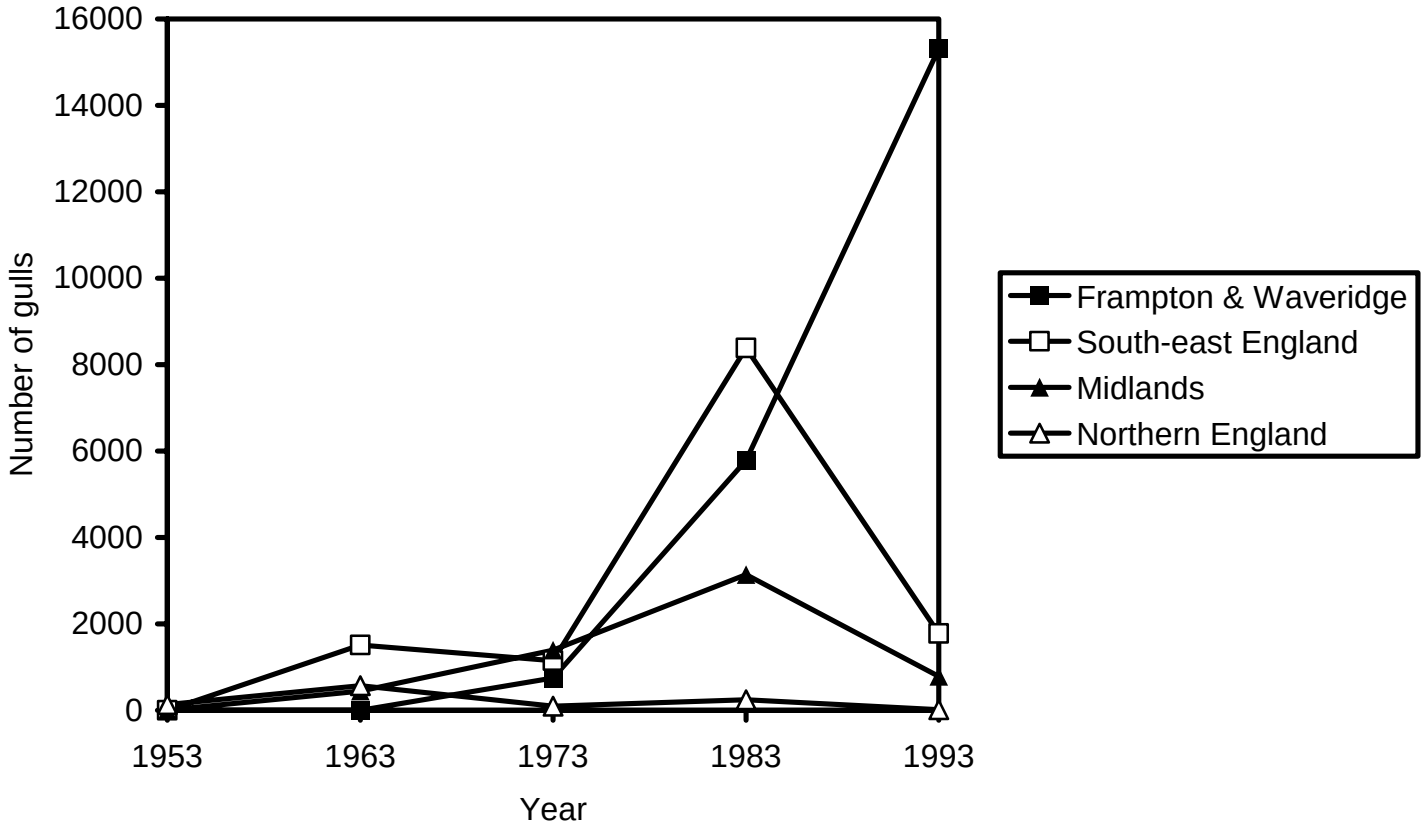

Figure 3.3.2.3 Numbers of Lesser Black-backed Gulls at roosts surveyed in 1953, 1963, 1973, 1983 and 1993.

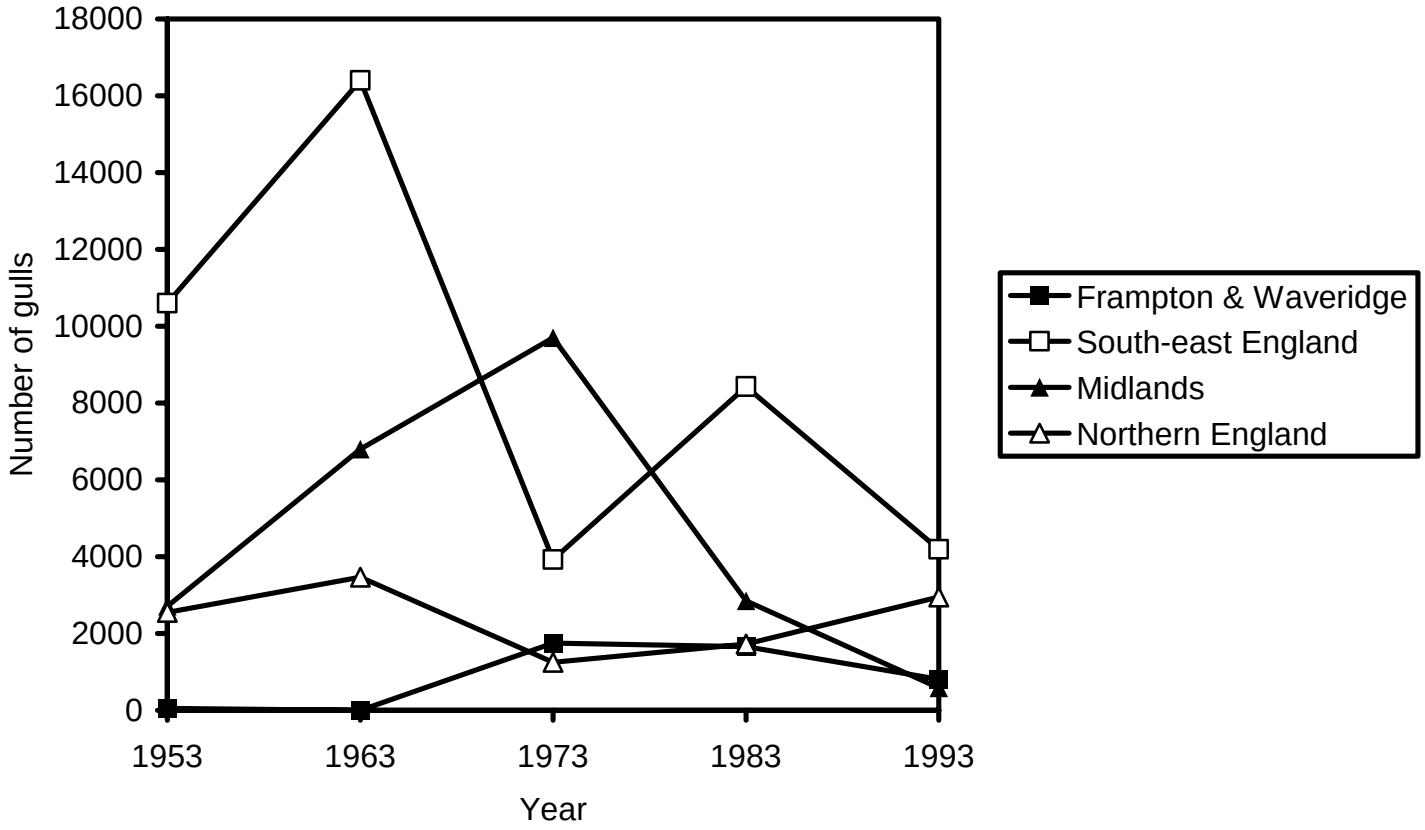

Figure 3.3.2.4 Numbers of Herring Gulls at roosts surveyed in 1953, 1963, 1973, 1983 and 1993.

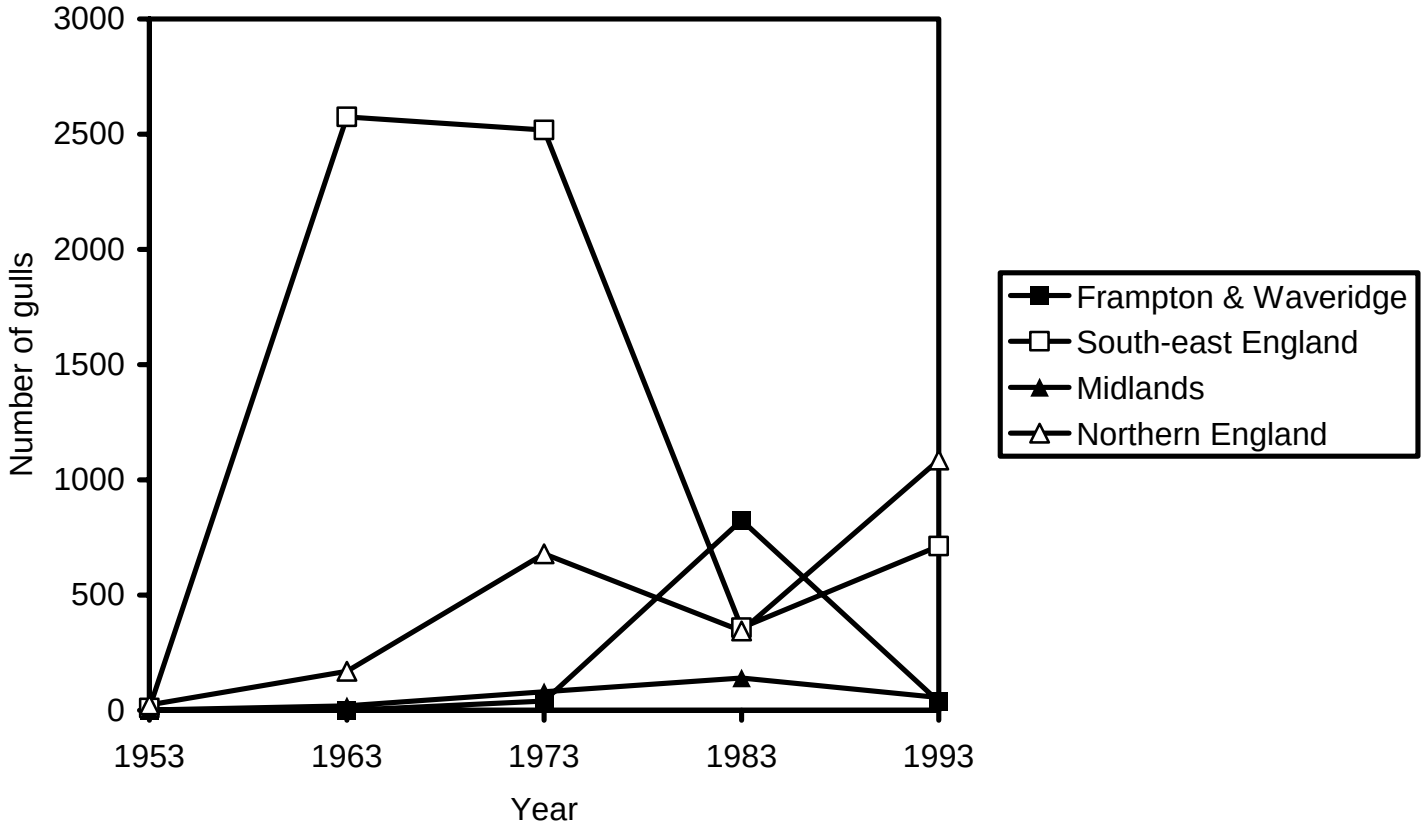

Figure 3.3.2.5 Numbers of Great Black-backed Gulls at roosts surveyed in 1953, 1963, 1973, 1983 and 1993.

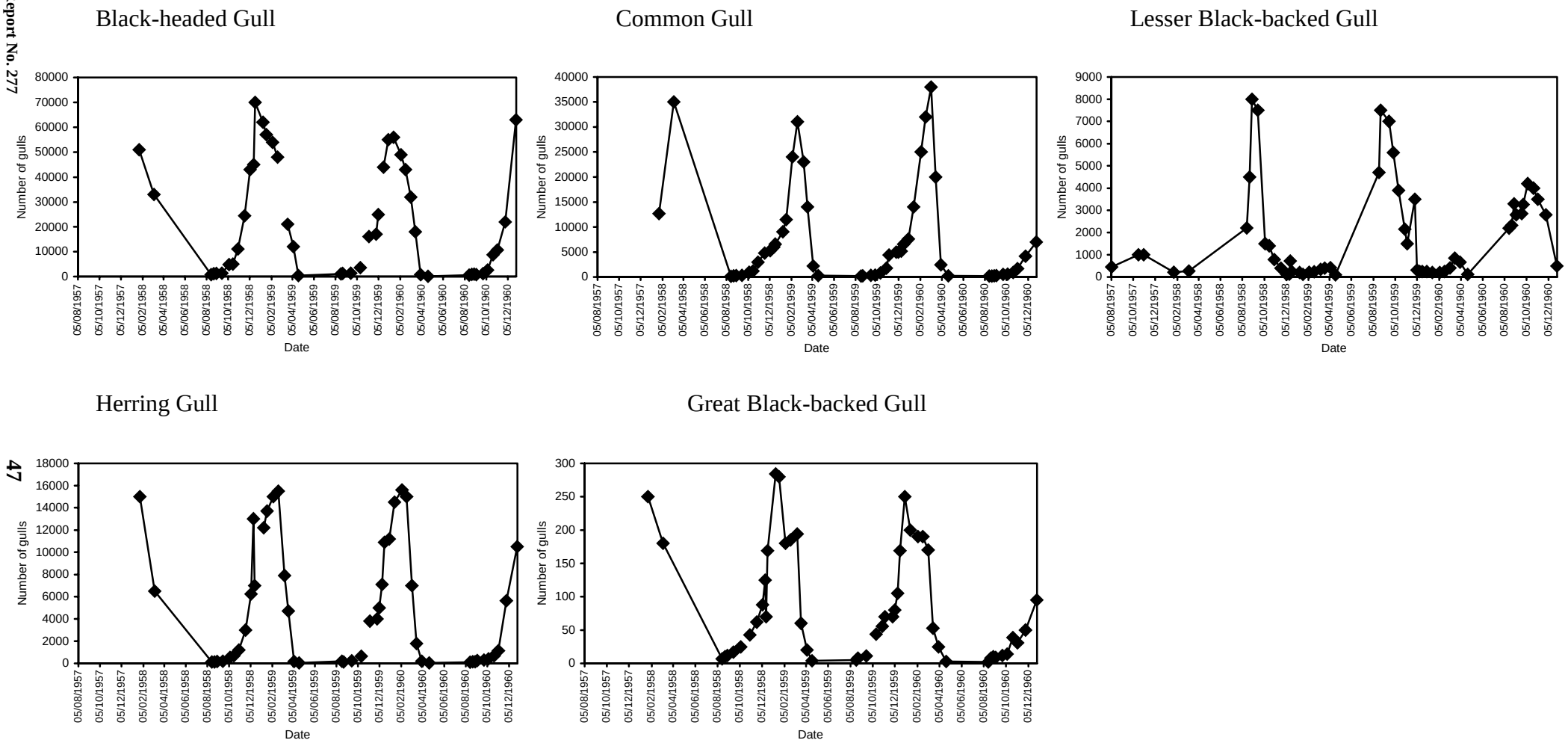

Figure 3.4.1 Numbers of gulls roosting at the King George V & William Girling Reservoirs in the Lea Valley between 1957 and 1960 (after Meadows 1961).

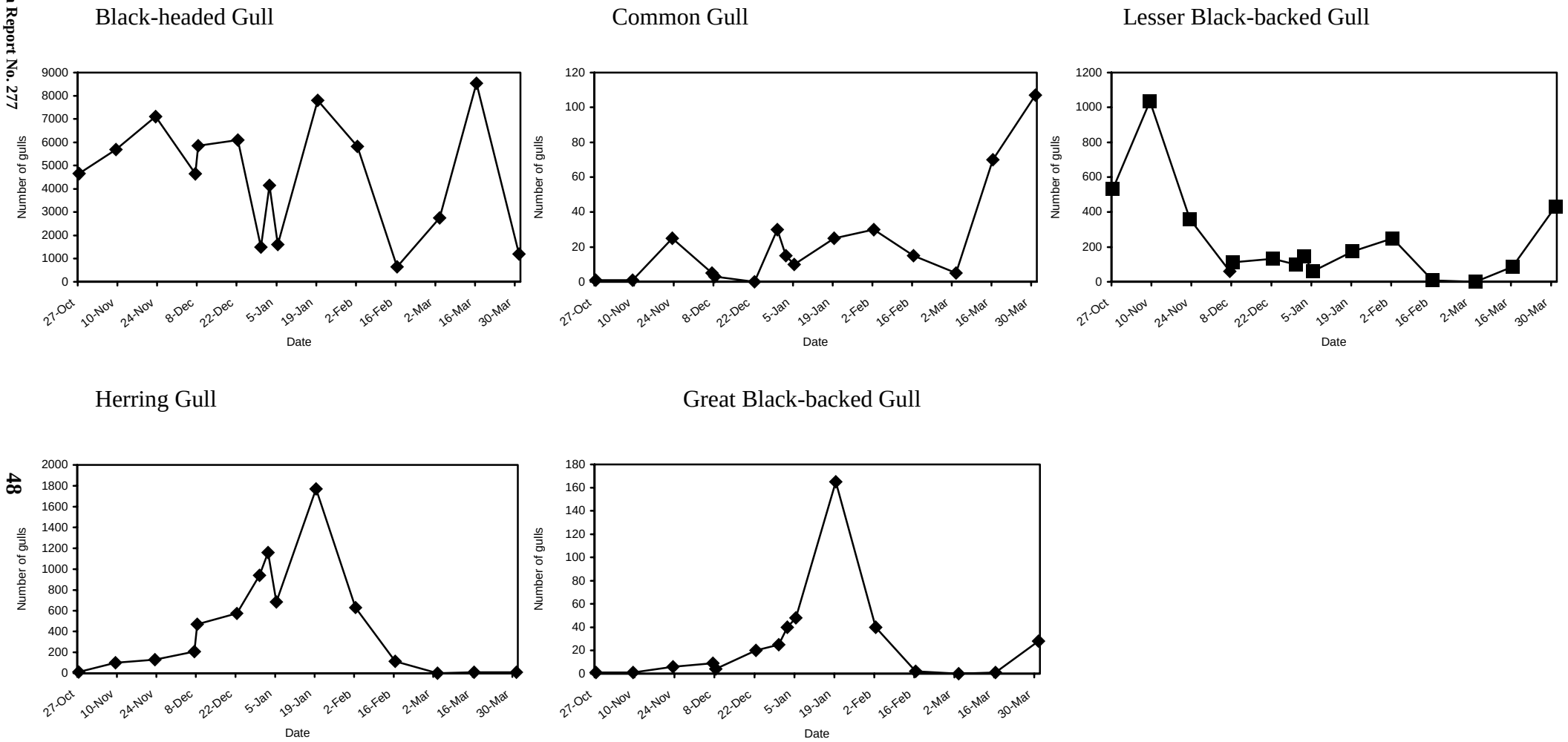

Figure 3.4.2 Numbers of gulls roosting at Chelford Farmwood Pool in Cheshire in the winter of 1985/86 (after Barber & Barber 1986).

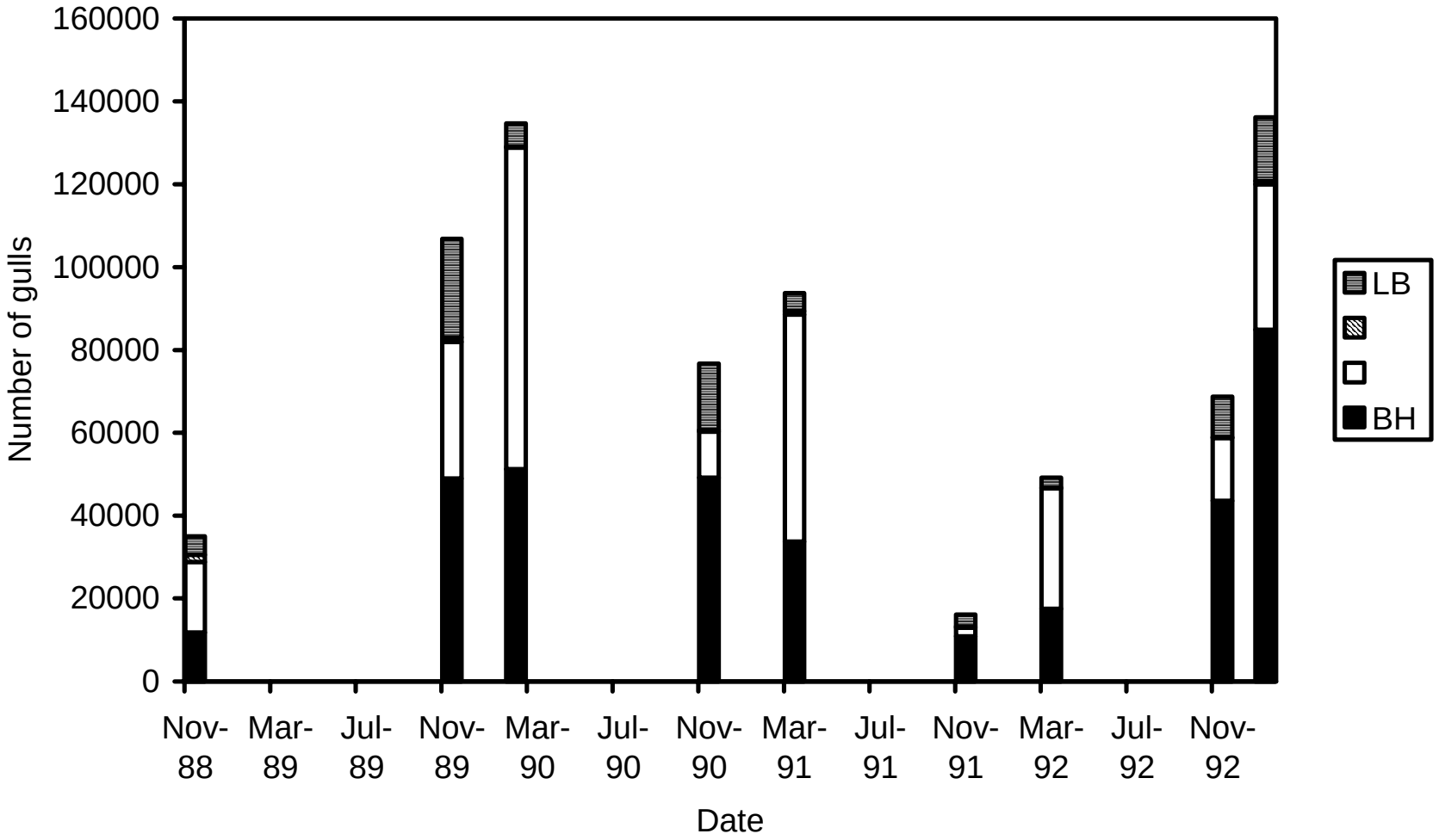

Figure 3.4.3 Numbers of gulls roosting at Frampton & Waveridge Sands on the Severn Estuary between November 1988 and January 1993 (using data from Durham 1989, 1990, 1991, 1992, 1993, 1994).

Appendix 1 Estimated numbers of gulls counted in the 1993 Winter Gull Roost Survey.

a Inland sites

	BH	CM	LB	HG	GB	Others	TOTAL
SW England							
Avon	36,350	18,710	3,240	700	0	8	59,008
Cornwall	2,000	8	355	25	3	1	2,392
Devon	2,324	35	1,107	110	36	0	3,612
Dorset	0	0	0	0	0	0	0
Somerset	3,328	550	35	129	0	0	4,042
Wiltshire	0	0	0	0	0	0	0
TOTAL	44,002	19,303	4,737	964	39	9	69,054
SE England							
Berkshire	22,035	1,508	1,630	1,134	399	4,840	31,546
Essex	35,737	7,336	495	4,202	1,951	4	49,725
Hampshire	0	0	0	0	0	0	0
Hertfordshire	44,302	4,043	64	12	10	0	48,431
Kent	1,030	11	0	1	0	0	1,042
London	43,420	4,920	1,479	3,360	429	3	53,611
Surrey	66,509	4,474	912	2,308	926	0	75,129
Sussex	600	40	2	1	0	0	643
TOTAL	213,633	22,332	4,582	11,018	3,715	4847	260,127
East Anglia							
Bedfordshire	34,200	1,780	190	17,400	10,150	0	63,720
Cambridgeshire	0	0	0	0	0	0	0
Lincolnshire	0	0	0	0	0	0	0
Norfolk	100	10	0	0	0	0	110
Suffolk	18,973	312	222	471	150	0	20,128
TOTAL	53,273	2,102	412	17,871	10,300	0	83,958
Midlands							
Buckinghamshire	29,990	6,572	1,565	2,532	563	2	41,224
Cheshire	50,890	1,052	1,107	767	146	1	53,963
Derbyshire	30,538	925	609	1,234	328	3	33,637
Gloucestershire	5,625	210	1,202	52	0	0	7,089
Hereford & Worcester	4,900	5	1,709	85	9	2	6,710
Leicestershire	53,131	10,548	695	698	226	1	65,299
Northamptonshire	10,900	1,455	146	138	18	0	12,657
Nottinghamshire	14,264	963	3	246	929	0	16,405
Oxfordshire	22,615	89	2,826	687	148	2	26,367
Shropshire	10,590	1,207	1,196	424	74	0	13,491
Staffordshire	55,715	177	3,399	1,355	301	7	60,954
Warwickshire	38,500	11,550	2,200	2,200	550	1	55,001
West Midlands	1,300	0	200	0	0	0	1,500
TOTAL	328,958	34,753	16,857	10,418	3,292	19	360,660
N England							
Cleveland	2,750	40	0	295	40	0	3,125
Cumbria	11,989	24,343	14	238	14	1	36,599
Durham	1,700	5,800	0	0	4	0	7,504
Greater Manchester	23,240	5,886	288	93	42	1	29,550
Lancashire	21,652	4,336	157	348	71	0	26,564
Humberside	4,168	10,437	0	645	727	0	15,977
Merseyside	5,469	2,031	136	10,067	118	0	17,821

Appendix 1a Continued.

	BH	CM	LB	HG	GB	Others	TOTAL
Northumberland	9,581	18,550	7	2,276	285	0	30,699
Tyne & Wear	0	0	0	0	0	0	0
Yorkshire	110,314	15,477	40	9,545	2,431	2	137,809
TOTAL	190,863	86,900	642	23,507	3,732	4	305,648
ENGLAND TOTAL	830,729	165,390	27,230	63,778	21,078	4,879	1,079,447
WALES							
Clwyd	1,318	2,550	0	140	0	0	4,008
Dyfed	2,774	126	5,000	150	8	0	8,058
Glamorgan	1,710	41	77	1,020	3	1	2,852
Gwent	10,000	3,000	2,000	800	3	0	15,803
Gwynedd	11	0	2	0	0	0	13
Powys	1,180	1	185	2	0	0	1,368
TOTAL	16,993	5,718	7,264	2,112	14	1	32,102
S Scotland							
Borders	6,911	8,011	0	939	239	1	16,101
Dumfries & Galloway	3,817	412	0	19	0	0	4,248
Lothian	4,716	4,637	20	1,314	98	0	10,785
Strathclyde	19,400	1,791	274	15,153	14	1	36,633
TOTAL	34,844	14,851	294	17,425	351	2	67,767
E Scotland							
Central	406	67	1	606	15	0	1,095
Fife	282	434	12	19,832	672	2	21,234
Grampian	1,600	12,910	0	890	48	5	15,453
Tayside	5,478	10,783	0	950	103	0	17,314
TOTAL	7,766	24,194	13	22,278	838	7	55,096
N Scotland							
Highland	0	0	0	0	0	0	0
Orkney	0	0	0	0	0	0	0
Shetland	0	0	0	0	0	0	0
Western Isles	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0
SCOTLAND TOTAL	42,610	39,045	307	39,703	1,189	9	122,863
Northern Ireland							
Antrim	0	0	0	0	0	0	0
Armagh	0	0	0	0	0	0	0
Down	0	0	0	0	0	0	0
Fermanagh	0	0	0	0	0	0	0
Londonderry	0	0	0	0	0	0	0
Tyrone	1,150	0	0	247	3	0	1,400
TOTAL	1,150	0	0	247	3	0	1,400
Isle of Man	0	0	0	0	0	0	0
Channel Islands	0	0	0	0	0	0	0

Appendix 1b Coastal sites

	BH	CM	LB	HG	GB	Others	TOTAL
SW England							
Avon	7,284	21	73	288	13	0	7,679
Cornwall	20,272	1,438	1,003	7,654	944	676	31,987
Devon	33,045	1,164	152	8,171	1,153	19	43,704
Dorset	44,757	12,624	254	3,529	889	16	62,069
Somerset	4,625	133	35	377	22	2	5,194
TOTAL	109,983	15,380	1,517	20,019	3,021	713	150,633
SE England							
Essex	37,776	8,833	587	5,365	2,496	140	55,197
Hampshire	44,900	5,096	206	1,113	713	2	52,030
Isle of Wight	2,927	509	4	222	9	4	3,675
Kent	32,862	14,701	102	10,903	3,534	606	62,708
London	5,000	500	20	150	50	0	5,720
Sussex	52,025	7,258	1,071	12,414	2,173	307	75,248
TOTAL	175,490	36,897	1,990	30,167	8,975	1,059	254,578
East Anglia							
Lincolnshire	23,137	4,260	55	6,074	423	4	33,953
Norfolk	27,545	12,921	3	1,915	100	0	42,484
Suffolk	40,134	5,853	36	1,866	474	118	48,481
TOTAL	90,816	23,034	94	9,855	997	122	124,918
Midlands							
Cheshire	643	2	39	11	7	0	702
Gloucestershire	84,929	35,360	15,330	805	39	0	136,463
TOTAL	85,572	35,362	15,369	816	46	0	137,165
N England							
Cleveland	10,724	3,759	3	3,720	654	6	18,866
Cumbria	10,380	2,186	162	15,413	317	1	28,459
Durham	0	0	0	0	0	0	0
Humberside	4,932	6,819	199	1,602	842	0	14,394
Lancashire	16,184	5,116	663	6,168	145	70	28,346
Merseyside	77,989	15,312	1,514	86,001	846	127	181,789
Northumberland	8,387	3,451	11	1,911	410	17	14,187
Tyne & Wear	650	1,500	1	28	0	1	2,180
Yorkshire	6,627	3,353	0	7,584	1,380	2	18,946
TOTAL	135,873	41,496	2,553	12,2427	4,594	224	307,167
ENGLAND TOTAL	597,734	152,169	21,523	18,3284	17,633	2,118	974,461
WALES							
Clwyd	10,130	7,714	101	1,963	507	1	20,416
Dyfed	24,758	8,420	1,981	13,504	387	13	49,063
Glamorgan	23,979	1,149	1,932	4,569	112	1	31,742
Gwent	855	0	33	231	20	0	1,139
Gwynedd	9,014	3,592	176	6,798	182	2	19,764
TOTAL	68,736	20,875	4,223	27,065	1,208	17	122,124

Appendix 1b Continued.

	BH	CM	LB	HG	GB	Others	TOTAL
S Scotland							
Borders	0	0	0	0	0	0	0
Dumfries & Galloway	33,415	15,216	124	16,493	338	6,300	71,886
Lothian	21,342	4,615	18	7,626	78	0	33,679
Strathclyde	26,916	5,785	1	8,426	274	3	41,405
TOTAL	81,673	25,616	143	32,545	690	6,303	146,970
E Scotland							
Central	0	0	0	0	0	0	0
Fife	12,506	4,310	35	7,386	161	3	24,401
Grampian	20,072	10,980	36	15,474	804	28	47,394
Tayside	7,836	2,310	0	1,525	103	85	11,859
TOTAL	40,414	17,600	71	24,385	1,068	116	83,654
N Scotland							
Highland	450	2,000	0	1,454	59	2	3,965
Orkney	0	0	0	0	0	0	0
Shetland	0	0	0	0	0	0	0
Western Isles	0	30	0	31	52	1	114
TOTAL	450	2,030	0	1,485	111	3	4,079
SCOTLAND TOTAL	122,537	45,246	214	58,415	1,869	6,422	234,703
Northern Ireland							
Antrim	0	14	0	180	19	0	213
Down	11,062	1,074	0	1,046	17	0	13,199
Londonderry	3,200	508	0	500	9	1	4,218
TOTAL	14,262	1,596	0	1,726	45	1	17,630
Isle of Man	1,281	16	0	2,283	273	0	3,853
Channel Islands	4,128	17	32	3,901	396	3	8,477

Note: totals given in this appendix may not precisely match those in Tables 3.3.1.1 and 3.3.1.2 due to rounding errors.

Appendix 2 Estimated numbers of gulls counted in the 1983 Winter Gull Roost Survey.

a Inland sites

	BH	CM	LB	HG	GB	Others	TOTAL
SW England							
Cornwall	1,765	26	25	82	72	0	1,970
Somerset	5,500	22	11	0	0	0	5,533
TOTAL	7,265	48	36	82	72	0	7,503
SE England							
Berkshire	44,757	4,240	4,291	3,691	50	0	57,029
Essex	25,100	3,100	130	1,780	2,170	0	32,280
Hampshire	14,137	80	21	52	9	0	14,299
Hertfordshire	40,204	2,877	114	100	90	0	43,385
Kent	8,695	94	2	90	5	0	8,886
London	63,125	12,139	3,086	6,667	339	0	85,356
Surrey	110,490	5,475	7,152	4,043	213	0	127,373
Sussex	18,253	505	5	109	10	0	18,882
TOTAL	324,761	28,510	14,801	16,532	2,886	0	387,490
East Anglia							
Bedfordshire	26,980	716	94	1,215	685	0	29,690
Cambridgeshire	32,500	1,227	33	704	350	0	34,814
Lincolnshire	22,570	3,025	36	1,271	104	0	27,006
Norfolk	63,369	487	156	150	374	0	64,536
Suffolk	16,010	26	7	181	154	0	16,378
TOTAL	161,429	5,481	326	3,521	1,667	0	172,424
Midlands							
Buckinghamshire	16,325	580	304	150	96	0	17,455
Cheshire	45,419	294	2,296	510	20	2	48,539
Derbyshire	13,200	103	670	1,590	515	4	16,078
Gloucestershire	12,576	108	59	5	0	0	12,748
Hereford & Worcester	2,000	0	180	30	2	0	2,212
Leicestershire	67,500	30,530	6,080	3,560	837	1	108,507
Northamptonshire	14,844	5,635	159	639	92	0	21,369
Nottinghamshire	7,150	100	64	216	315	1	7,845
Oxfordshire	8,750	511	3,632	1,453	47	2	14,393
Shropshire	23,000	1,100	1,748	1,741	14	0	27,603
Staffordshire	43,750	48	3,766	2,700	184	3	50,448
Warwickshire	29,500	2,703	1,256	1,750	119	1	35,328
West Midlands	1,943	0	39	5	2	0	1,989
TOTAL	285,957	41,712	20,253	14,349	2,243	14	364,514

Appendix 2a Continued

	BH	CM	LB	HG	GB	Others	TOTAL
N England							
Cumbria	12,259	7,015	142	1,910	215	0	21,541
Cleveland	120	100	0	150	200	0	570
Humberside	16,613	10,720	84	600	656	2	28,673
Lancashire	16,297	1,473	119	1,431	105	0	19,425
Greater Manchester	18,658	3,278	135	1,354	96	0	23,521
Yorkshire	55,295	8,291	258	2,946	1,302	3	68,092
TOTAL	119,242	30,877	738	8,391	2,574	5	161,827
ENGLAND TOTAL	898,654	106,628	36,154	42,875	9,442	19	1,093,753
WALES							
Clwyd	1,040	0	0	2,452	14	0	3,506
Dyfed	350	10	1,200	50	2	0	1,612
Gwynedd	565	10	5	1,102	12	0	1,694
Glamorgan	364	10	0	0	0	0	374
Gwent	3,358	0	139	142	32	0	3,671
Powys	9,536	17	238	131	0	0	9,922
TOTAL	15,213	47	1,582	3,877	60	0	20,779
S Scotland							
Borders	8,473	14,690	1	476	94	0	23,734
Dumfries & Galloway	5,600	330	0	193	3	0	6,126
Lothian	8,175	20,065	0	4,053	193	0	32,486
Strathclyde	6,727	2,649	15	13,248	71	1	22,710
TOTAL	28,975	37,734	16	17,970	361	1	85,057
E Scotland							
Central	2,145	1,418	2	3,163	95	0	6,823
Fife	1,746	925	0	5,860	532	0	9,063
Grampian	1,000	12,000	0	3,502	80	1	16,582
Tayside	6,200	3,746	0	1,793	471	1	12,210
TOTAL	11,091	18,089	2	14,318	1,178	2	44,680
N Scotland							
Highland	0	0	0	150	43	0	193
Orkney	0	1,700	0	0	0	0	1,700
Western Isles	0	360	0	100	15	1	475
TOTAL	0	2,060	0	250	58	1	2,369
SCOTLAND TOTAL	40,066	57,883	18	32,538	1,597	4	132,106
NORTHERN IRELAND							
Tyrone	1,301	0	0	0	50	0	1,351

Appendix 2b Coastal sites

	BH	CM	LB	HG	GB	Others	TOTAL
SW England							
Avon	11,970	153	155	1,743	52	1	14,074
Cornwall	5,548	36	548	2,038	125	211	8,506
Dorset	5,350	10,118	0	473	17	0	15,958
Devon	37,300	2,252	0	626	137	151	40,466
Somerset	1,100	6,601	0	250	3	0	7,954
TOTAL	61,268	19,160	703	5,130	334	363	86,958
SE England							
Essex	17,614	6,900	114	2,039	662	62	27,391
Hampshire	23,088	3,715	10	513	253	0	27,579
Isle of White	666	0	0	24	4	0	694
Kent	65,234	12,514	61	10,579	2,324	1,118	91,830
Sussex	111,010	12,135	127	6,006	1,066	9	130,353
TOTAL	217,612	35,264	312	19,161	4,309	1,189	277,847
East Anglia							
Lincolnshire	12,206	9,611	17	1,544	915	1	24,294
Norfolk	94,021	23,847	7	4,972	7,547	1	130,395
Suffolk	4,500	30	0	350	150	202	5,232
TOTAL	110,727	33,488	24	6,866	8,612	204	159,921
Midlands							
Cheshire	1,462	550	292	929	61	0	3,294
Gloucestershire	33,552	42,376	5,810	1,706	831	0	84,275
TOTAL	35,014	42,926	6,102	2,635	892	0	87,569
N England							
Cumbria	3,606	60	149	20,032	158	0	24,005
Cleveland	9,400	2,250	0	1,295	461	92	13,498
Humberside	44,214	18,255	286	4,974	2,952	0	70,681
Lancashire	17,467	2,192	485	7,174	874	0	28,192
Merseyside	110,955	24,441	10,190	8,229	786	2	154,603
Yorkshire	2,703	1,021	0	3,579	1,742	107	9,152
TOTAL	188,345	48,219	11,110	45,283	6,973	201	300,131
ENGLAND TOTAL	612,966	179,057	18,251	79,075	21,120	1,957	912,426
WALES							
Clwyd	14,611	10,177	102	2,502	90	0	27,482
Dyfed	31,077	6,000	305	14,832	377	0	52,591
Gwynedd	16,970	5,184	8	9,325	114	1	31,602
Glamorgan	25,789	1,131	402	3,621	38	0	30,981
Gwent	12,780	860	670	940	11	0	15,261
TOTAL	101,227	23,352	1,487	31,220	630	1	157,917

Appendix 2b Continued

	BH	CM	LB	HG	GB	Others	TOTAL
S Scotland							
Borders	2,757	42	6	429	2	31	3,267
Dumfries & Galloway	58,270	25,212	97	4,648	383	0	88,610
Lothian	137,592	88,128	177	31,298	2,291	2	259,488
Strathclyde	15,501	3,874	17	5,877	210	100	25,579
TOTAL	214,120	117,256	297	42,252	2,886	133	376,944
E Scotland							
Central	4,913	705	0	9,128	124	0	14,870
Fife	4,194	53	5	5,699	609	0	10,560
Grampian	10,885	6,190	0	9,800	517	5	27,397
Tayside	13,485	626	0	5,650	203	100	20,064
TOTAL	33,477	7,574	5	30,277	1,453	105	72,891
N Scotland							
Highland	4,130	6,518	3	15,558	438	84	26,731
Orkney	126	2,003	0	1,327	675	3	4,134
Western Isles	260	207	0	6,332	1,043	48	7,890
TOTAL	4,516	8,728	3	23,217	2,156	135	38,755
SCOTLAND TOTAL	252,113	133,558	305	95,746	6,495	373	488,590
NORTHERN IRELAND							
Down	5,270	1,650	0	79	64	0	7,063
Londonderry	370	1,000	0	0	0	1	1,371
TOTAL	5,640	2,650	0	79	64	1	8,434
CHANNEL ISLANDS							
Jersey	1,265	0	0	1,911	3	0	3,179

BH = Black-headed Gull; CM = Common Gull; LB = Lesser Black-backed Gull; HG = Herring Gull; GB = Great Black-backed Gull.

Only those counties where gulls were counted are included.
Note: totals given in this appendix may not precisely match those in Table 3.3.1.1 and 3.3.1.2 due to rounding errors.

Appendix 3 Estimated numbers of gulls counted at inland sites in the 1973 Winter Gull Roost Survey.

	BH	CM	LB	HG	GB	TOTAL
SW England						
Avon	1,200	200	200	15,100	30	16,730
Devon	125	0	606	425	0	1,156
Somerset	1,000	15	2	300	0	1,317
TOTAL	2,325	215	808	15,825	30	19,203
SE England						
Berkshire	5,570	0	10	330	0	5,910
Essex	31,200	750	250	250	810	33,260
Hertfordshire	29,000	1,160	1,050	1,840	105	33,155
Kent	14,580	1,725	27	2,216	1,230	19,778
London	69,621	3,026	932	3,195	2,047	78,821
Surrey	101,777	4,638	1,291	4,423	3,709	115,838
Sussex	17,450	400	45	100	15	18,010
TOTAL	269,198	11,699	3,605	12,354	7,916	304,772
East Anglia						
Bedfordshire	23,993	0	0	975	0	24,968
Cambridgeshire	43,640	2,410	92	2,120	288	48,550
Lincolnshire	15,340	15,830	5	230	75	31,480
TOTAL	82,973	18,240	97	3,325	363	104,998
Midlands						
Buckinghamshire	36,500	1,020	107	2,760	400	40,787
Cheshire	24,030	1,802	425	8,402	135	34,794
Derbyshire	15,000	50	770	735	75	16,630
Gloucestershire	4,100	8	241	104	1	4,454
Leicestershire	25,750	18,810	616	1,265	21	46,462
Northamptonshire	17,129	4,304	503	1,002	201	23,139
Nottinghamshire	5,860	25	21	382	400	6,688
Oxfordshire	3,650	350	0	3,500	25	7,525
Shropshire	19,650	1,000	0	500	0	21,150
Staffordshire	31,200	52	6,300	6,000	41	43,593
Warwickshire	60,000	0	0	30,000	0	90,000
TOTAL	242,869	27,421	8,983	54,650	1,299	335,222
N England						
Cumbria	8,410	19,784	44	354	0	28,592
Humberside	18,000	2,400	250	2,700	2,950	26,300
Lancashire	21,943	2,450	581	4,678	208	29,860
Greater Manchester	17,100	2,300	27	4,790	60	24,277
Northumberland	665	3,267	0	1,887	725	6,544
Yorkshire	44,213	8,222	1,428	3,551	1,212	58,626
TOTAL	110,331	38,423	2,330	17,960	5,155	174,199
ENGLAND TOTAL	707,696	95,998	15,823	104,114	14,763	938,394

Appendix 3 Continued.

	BH	CM	LB	HG	GB	TOTAL
WALES						
Clwyd	710	210	0	550	0	1,470
Dyfed	5	0	17	27	0	49
Gwynedd	370	2,700	1	36	1	3,108
Gwent	4,300	40	200	1,150	10	5,700
Powys	5,029	18	31	2,662	0	7,740
TOTAL	10,414	2,968	249	4,425	11	18,067

BH = Black-headed Gull; CM = Common Gull; LB = Lesser Black-backed Gull; HG = Herring Gull; GB = Great Black-backed Gull.

Only those counties where gulls were counted are included.
Note: totals given in this appendix may not precisely match those in Table 3.3.1.1 due to rounding errors.

Appendix 4 Estimated numbers of gulls counted at inland sites in the 1963 Winter Gull Roost Survey.

	BH	CM	LB	HG	GB	TOTAL
SW England						
Avon	7,000	2,000	176	2,000	0	11,176
SE England						
Essex	15,000	3,000	0	300	178	18,478
Hertfordshire	20,000	2,050	30	5,010	2,501	29,591
London	44,250	7,630	682	4,112	725	57,399
Surrey	105,050	8,950	1,460	19,700	2,850	138,010
TOTAL	184,300	21,630	2,172	29,122	6,254	243,478
East Anglia						
Bedfordshire	7,200	1,800	0	2,500	0	11,500
Lincolnshire	12,000	3,000	0	10	0	15,010
TOTAL	19,200	4,800	0	2,510	0	26,510
Midlands						
Cheshire	21,500	0	31	5,007	1	26,539
Derbyshire	660	0	30	30	1	721
Leicestershire	20,500	26,001	400	1,550	3	48,454
Northamptonshire	402	250	0	50	0	702
Nottinghamshire	300	0	0	0	0	300
Shropshire	8,000	2,000	5	2,000	3	12,008
Staffordshire	10,500	100	1,060	300	15	11,975
Warwickshire	60	0	0	0	0	60
TOTAL	61,922	28,351	1,526	8,937	23	100,759
N England						
Cumbria	8,500	10,000	270	60	0	18,830
Durham	600	1,900	0	400	400	3,300
Lancashire	16,300	3,020	1,346	9,750	211	30,627
Greater Manchester	6,150	3,430	0	1,434	6	11,020
Northumberland	1,750	20,050	20	480	330	22,630
Yorkshire	10,945	5,510	1,450	3,464	192	21,561
TOTAL	44,245	43,910	3,086	15,588	1,139	107,968
ENGLAND TOTAL	316,667	100,691	6,960	58,157	7,416	489,891

BH = Black-headed Gull; CM = Common Gull; LB = Lesser Black-backed Gull; HG = Herring Gull; GB = Great Black-backed Gull.

Only those counties where gulls were counted are included.

Appendix 5 Estimated numbers of gulls counted at inland sites in the 1963 Winter Gull Roost Survey.

	BH	CM	LB	HG	GB	TOTAL
SW England						
Dorset	300	100	0	600	0	1,000
Devon	750	250	0	3,000	25	4,025
TOTAL	1,050	350	0	3,600	25	5,025
SE England						
Berkshire	600	0	0	0	0	600
Hertfordshire	5,550	20	0	100	0	5,670
Kent	575	0	0	125	0	700
London	30,100	100	0	100	0	30,300
Surrey	22,900	1,960	0	15,600	410	40,870
TOTAL	59,725	2,080	0	15,925	410	78,140
East Anglia						
Cambridgeshire	92,300	7,700	0	2,000	20	102,020
Norfolk	33,000	2,000	0	7,000	2,050	44,050
TOTAL	125,300	9,700	0	9,000	2,070	146,070
Midlands						
Cheshire	12,900	0	6	2,110	2	15,018
Herefordshire	1,950	0	0	50	0	2,000
Leicestershire	16,100	15,105	1	850	0	32,056
Northamptonshire	4,200	0	0	0	0	4,200
Nottinghamshire	2,100	10	0	400	0	2,510
Oxfordshire	1,080	100	0	20	0	1,200
Shropshire	2,400	550	0	50	2	3,002
Staffordshire	1,500	2	0	100	0	1,602
Warwickshire	300	0	0	0	0	300
TOTAL	42,530	15,767	7	3,580	4	61,888
N England						
Cumbria	5,250	50	0	200	0	5,500
Humberside	1,000	400	0	3	0	1,403
Lancashire	2,000	0	0	500	0	2,500
Greater Manchester	200	0	0	0	0	200
Merseyside	125	0	0	0	0	125
Tyne & Wear	0	0	0	50	0	50
Yorkshire	4,340	552	158	2,475	23	7,548
TOTAL	12,915	1,002	158	3,228	23	17,326
ENGLAND TOTAL	241,520	28,899	165	35,333	2,532	308,449

BH = Black-headed Gull; CM = Common Gull; LB = Lesser Black-backed Gull; HG = Herring Gull; GB = Great Black-backed Gull.

Only those counties where gulls were counted are included.