



BTO Research Report No. 483

**An assessment of the feasibility of
annual monitoring of winter gull roosts in the UK
and possible outputs from such a scheme**

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EXECUTIVE SUMMARY

1. The recent 2003/04-2005/06 Winter Gull Roost Survey (WinGS) estimated that the UK supported over 3.75 million gulls in winter. As in previous surveys, estimates were produced using counts of gulls at roosts, which provide the best means to estimate total winter populations as sizeable proportions of species' populations may be counted at relatively few key sites. Despite the importance of the UK to gulls, current annual monitoring of these birds – through diurnal Wetland Bird Survey (WeBS) counts – is limited. Here, we investigate the feasibility and worth of annual monitoring of (key) gull roost sites.
2. Annual monitoring of gull roosts would potentially provide two main benefits:
 - i. Better identification of sites worthy of statutory designation
 - ii. Indexing of species' UK winter populations.
3. Comparison of WinGS and WeBS Core Counts indicated that many more sites were identified as holding nationally or internationally important numbers of gulls using WinGS counts ($n = 61$) than using WeBS Core Counts ($n = 26$), primarily because the latter is less comprehensive in coverage of gull populations.
4. Indices produced using WinGS and WeBS Core Counts were broadly similar, but the latter may have been unrepresentative because of less comprehensive coverage of populations, particularly in inland regions.
5. We investigated the frequency of existing volunteer counting of gull roosts for those WinGS key sites (following Banks *et al.* 2007, sites identified before that survey as holding at least 1,000 roosting gulls) where counts of individual species exceeded national or international thresholds or which held at least 20,000 gulls. Information was obtained from the WinGS dataset itself, (county) bird reports and a questionnaire sent to those volunteers who had surveyed the sites in question for WinGS.
6. Information from the WinGS dataset indicated that most key roost sites (66% of those where counts of individual species exceeded national or international thresholds or which held at least 20,000 gulls) were only counted once in any one winter of the survey. Most (77%) were also only counted in one winter. Volunteers' responses to questionnaires furthermore indicated that most important sites were only covered either just for WinGS or intermittently on other occasions. Although responses suggested that relatively few (11) of these key roost sites ($n = 33$) were counted regularly, i.e. annually, monthly or more frequently, bird report data suggested that regular counts took place at, at least, 16 more sites, as well as at several smaller roost sites. The 27 WinGS key sites (44% of those holding nationally or internationally important numbers of roosting gulls) where bird reports or questionnaires suggested that gull roosts may be counted regularly (i.e. at least annually) are highlighted in Table 3.3.1.
7. Questionnaires also investigated the interest among counters in submitting more regular gull roost count data in future. Thirty-nine (of 61) respondents expressed an interest in submitting future counts, 35 regularly. This equated to 32 different WinGS key sites, 31 where counts might be regular, i.e. 20 more and three times as many as respondents suggested were currently being regularly covered. Most respondents were happy to use an online system.
8. Annual monitoring of gull roosts would be most successful in fulfilling the first benefit, i.e. in providing better identification of (wintering) sites worthy of statutory designation, as it would allow the calculation of five-year peak means similar to those used currently for waterbirds, which would be more representative of the numbers regularly occurring at sites. For this purpose, counts between November and March should be prioritised, though a minimum requirement would be a single count undertaken each January to tie in to the International Waterbird Census. However, there would be a limit to the number of sites that might be

covered annually. It should also be noted that, even with data from annual monitoring, it would still also be necessary to consider data from WeBS to provide a more comprehensive assessment of important sites.

9. Indexes produced from annual gull roost counts would potentially be more representative of each species' population than those produced using WeBS Core Counts, though again limited due to the number of sites that could be covered. As a result, indexing from annual monitoring of gull roosts may be restricted, therefore, to producing national or site-specific rather than regional trends. Again, for this purpose, counts between November and March should be prioritised and a minimum requirement would be a single count undertaken each January. It should be noted, that if sites are to be designated for the numbers of wintering gulls that they support, annual roost counts would be required to monitor the status of these sites. As many are important primarily as roosts sites, this could not be achieved by WeBS Core Counts alone.
10. Accepting these limitations, annual monitoring of (key) gull roost sites would certainly help inform both identification of sites worthy of statutory designation and the indexing of species' populations. It is thus recommended that a scheme is set up for annual monitoring of roost sites.
11. A suggested approach to implementing an annual monitoring scheme, through an online system, is outlined.

1. INTRODUCTION

The recent 2003/04-2005/06 Winter Gull Roost Survey (hereafter 'WinGS') has highlighted the importance of the UK for wintering gulls. Over 3.75 million gulls of 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* – were estimated to be wintering inland or on the coast of Great Britain, with a further 69,000 in Northern Ireland, 27,000 in the Channel Islands and 12,000 in the Isle of Man. The survey has provided new national population estimates and also, for Great Britain, new 1% thresholds for use in identifying sites of national importance for these species (Banks *et al.* 2007).

The Winter Gull Roost Surveys have traditionally taken place every 10 years, with the aim of generating winter population estimates from single counts undertaken in January. Counts of gulls at roosts provide the best means to estimate total winter populations, as in contrast to the day when birds may be distributed widely across a variety of foraging habitats, roosting gulls tend to be restricted to wetland habitats (typically large inland water bodies or coastal near-shore waters). Thus sizeable proportions of species' populations may be counted at a relatively few key sites.

In this report we investigate the feasibility and worth of annual monitoring of (key) gull roost sites. Annual monitoring of gull roosts would potentially provide two main benefits:

- i. Better identification of sites worthy of statutory designation;
- ii. Indexing of species' UK winter populations.

To date, no Special Protection Areas (SPAs) have been designated in the UK for their importance for wintering gulls. A provisional list of sites (based on the one-off WinGS counts) surpassing the new 1% national thresholds or 1% international thresholds or holding an assemblage of 20,000 gulls was compiled by Banks *et al.* (2007). However, more frequent and annual counts would better define those sites meeting such criteria and so worthy of statutory designation (see Stroud *et al.* 2001).

The Winter Gull Roost Surveys have indicated some declines in the numbers of gulls that winter in the UK, notably of Herring Gull and more recently Black-headed Gull; however, these surveys only provide a snapshot of changes once every 10 years. Indices of the numbers of gulls wintering in the UK could be derived from Wetland Bird Survey (WeBS) counts. However, it is uncertain how well these indices would describe the true population changes as, firstly, WeBS greatly underestimates total gull populations because counts are usually made in the day-time when many gulls may be feeding away from monitored wetland sites and, secondly, as counts of gulls are optional.

The aims of this study were thus to:

1. Identify those sites in the UK where numbers of gulls surpass thresholds or hold an assemblage of 20,000 gulls at least once during winter, that ought to be targeted for annual monitoring, and compare the effectiveness of WinGS and WeBS Core Counts in identifying these sites.
2. Compare the species' indices produced using WinGS and WeBS Core Counts and their representativeness.
3. Determine the frequency of existing volunteer counting at key gull roosts. For waterbirds, a 'five-year peak mean' is presently used to define the number of individuals that a site regularly supports. This part of the work would aim to determine (for the benefit of the Country Agencies and JNCC) the most suitable future approach for assessing site status for gulls, given the inherent variability in gull roost numbers and data limitations.

4. Determine the interest among counters in submitting more regular gull roost count data.
5. Provide conclusions as to the feasibility and worth of setting up annual monitoring of gull roosts (i.e. in being able to provide better indexing of species' UK populations and identification of important sites).
6. Identify the requirements for implementing an online system for volunteers to submit counts and for regular reporting of results in the future.

2. METHODS

2.1 Identification of Sites Where Gull Numbers Surpass 1% Thresholds or Exceed 20,000 Birds

Three sources of information were used to identify sites where gull numbers have surpassed 1% thresholds or exceeded 20,000 birds during winter and thus which most warrant annual monitoring and may be worthy of future statutory designation.

For Great Britain, 1% national thresholds were taken from Banks *et al.* (2007). There are no all-Ireland population estimates for wintering gulls and thus no 1% thresholds. For Northern Ireland, we thus use the threshold values presented by Crowe (2005). International 1% thresholds are taken from Wetlands International (2006). It should be noted that the advised 1% threshold of international importance for Herring Gull relates solely to the *argenteus* race of the species. The international importance threshold is therefore lower than the 1% national importance threshold, which does not distinguish between races. Similarly, the 1% international importance threshold for Lesser Black-backed Gull is based on the *graellsii* race only, according to Ramsar guidance in both cases.

Firstly, data from the recent 2003/04-2005/06 Winter Gull Roost Survey were analysed to determine the peak count of each of the five main species and the peak total count at each WinGS site over the course of the survey. As with previous Winter Gull Roost Surveys, WinGS aimed to generate winter population estimates using single counts undertaken in January. 'Key sites' (following Banks *et al.* 2007, sites identified before that survey as holding at least 1,000 roosting gulls) were targeted in the first winter of the survey and for most sites (or their sub-sites) only a single count was obtained (see later). Supplementary counts were nevertheless encouraged within and across winters. In order to provide complete estimates of the total numbers of gulls wintering in the UK, WinGS also used counts from sample sites to estimate the numbers of gulls not using the predefined key sites. However, no counts exceeding 1% thresholds or 20,000 birds were recorded from these sites.

The preliminary list of sites where gull numbers surpassed 1% thresholds or 20,000 birds drawn up by Banks *et al.* (2007) was based only on those single counts (mostly undertaken in January 2004) that were used for the estimation of species' populations. In the case of some large sites, the site totals reported in Banks *et al.* (2007) were derived by summing the counts from two or more sub-sites which, in some instances, may have been counted on different dates (or even winters). In this report, we use these data and all other supplementary counts submitted across the three winters of the survey to identify whether the numbers reported may have been superseded on any other single date. Note, winter was defined in this and all subsequent analyses as November to March (following standard WeBS methodology).

Totals for individual species did not include estimates derived from numbers of unidentified 'small' gulls (Black-headed or Common Gulls), unidentified 'large' gulls (Lesser Black-backed, Herring or Great Black-backed Gulls) or other unspecified 'unidentified' gulls. Some coastal sites were also incompletely counted. Thus, in some cases, totals are minimum figures and some sites potentially important for individual species may have been missed.

Data from WeBS were used to derive 'five-year peak mean' values for each of the five main species and the total count at WeBS sites for the period 2001/02-2005/06. For waterbirds, these five-year peak means are used to define the numbers of individuals that a site regularly supports. Two separate sets of values are presented. The first follow those in 'Waterbirds in the UK 2005/06' (Musgrove *et al.* 2007) and use data not only from WeBS 'Core Counts', but also other sources, including WinGS counts, supplementary daytime and roost counts, and low tide counts, and from any month of the year. In the second case, we present five-year peak mean values based on winter WeBS Core Counts only.

Lastly, we also reviewed the most recent available (county) bird reports for winter counts that surpassed species' 1% thresholds. (These counts, therefore, represent the peaks recorded in the most recent winter for which data were available.)

Counts exceeding national or international thresholds from the different data sources are tabulated for each species. Similarly, those WinGS counts and WeBS five-year peak mean counts exceeding 20,000 birds are also presented. It should be noted that site definitions may vary between the surveys. Where sites could be matched to existing Sites of Special Scientific Interest (SSSIs) or Special Protection Areas (SPAs), this is noted.

2.2 Comparison of Species' Indices Produced Using Wings and Webs Core Counts and Their Representativeness

Indices of the numbers of gulls wintering in regions of the UK have previously been derived from WinGS counts by Banks *et al.* (submitted). Analyses used data from the six surveys from January 1953 to January 2004 to produce indices for each species for nine regions of Great Britain (it was not possible to calculate reliable indices for Northern Ireland due to the small number of sites covered prior to the most recent survey). Modelling was limited by the lack of zero count data in early data sets. Two alternative models were therefore used to develop these indices. Firstly, the 'no assumed zero' model made no assumptions about the numbers of gulls present at roost sites when they were not included in the surveys. A second set of indices was created with the assumption that inland sites held no gulls until first monitored (the 'assumed zero' model; see Burton *et al.* 2005, Banks *et al.* submitted for further details of modelling approach).

These are reproduced here, together with indices produced using annual WeBS Core Count data (WeBS unpublished data). In this case, analyses used the average of counts from November to March to produce indices of the numbers of each species in 11 regions of Great Britain and Northern Ireland (see Maclean & Austin (2006) for methodological details). Regions differed between analyses, those for WinGS counts being based on administrative boundaries, those for WeBS using Environment Agency (EA) / Scottish Environment Protection Agency (SEPA) boundaries.

Differences in the indices produced by the two surveys and, in particular, the representiveness of the counts used to derive them, are discussed.

2.3 Frequency of Existing Volunteer Counting of Gull Roosts and Interest Among Counters in Submitting More Regular Gull Roost Count Data

We investigated the frequency of existing volunteer counting of gull roosts for those WinGS key sites where (WinGS) counts of individual species exceeded national or international thresholds or which held at least 20,000 gulls ($n = 61$). Information was obtained from the WinGS dataset itself, (county) bird reports and a questionnaire sent to those volunteers who had surveyed the sites in question for WinGS.

From the WinGS dataset, we calculated the maximum number of roost counts undertaken at the WinGS key site, or the maximum for any single sub-site of it, in any one winter of the survey (2003/04-2005/06). We also calculated the number of winters that the site was counted (or again the maximum for any single sub-site of it) over the course of the survey.

Using information presented in the most recent available bird reports, we classified the frequency of gull counting during winter as 'occasional' (i.e. less than once a winter), annual, monthly or 'frequent' (ca. once a week). Many bird reports only provide incomplete data or monthly maxima and thus, in the majority of cases, it was not possible to infer the absolute number of counts undertaken during winter or to infer a higher frequency of counting than 'monthly'. Note, in some cases, it was also not possible to infer whether counts were undertaken at roosts or diurnally.

Questionnaires asked six questions:

- i. Which gull roost(s) had observers counted?
- ii. Whether the 2003/04-2005/06 Winter Gull Roost Survey was the only time that observers had counted gulls at the roost site(s) named?
- iii. If not, how frequently did observers count the gulls roosting at this site – occasionally, annually, monthly, more frequently?
- iv. Would observers be inclined to count gull roosts on a regular basis if there was a formal national monitoring programme and if so how often – only occasionally, annually, monthly, more frequently?
- v. Were observers interested in submitting past and future counts to the BTO?
- vi. If so, were observers willing to submit counts online?

Questionnaires were sent to the primary named observer for inland sites and all named observers for coastal sites (as these were often split into several sub-sites).

3. RESULTS

3.1 Identification of Sites Where Gull Numbers Surpass 1% Thresholds or Exceed 20,000 Birds

Sites where numbers of individual species surpassed respective national or international thresholds according to the 2003/04-2005/06 Winter Gull Roost Survey, WeBS or recent bird report counts are shown in Tables 3.1.1-3.1.5¹. The numbers of sites surpassing thresholds using WinGS count data or WeBS annual report / core count data and the numbers of additional sites that surpassed thresholds according to single counts noted in bird reports are summarised in Table 3.1.6. Those sites supporting in excess of 20,000 gulls either according to WinGS or WeBS are identified in Table 3.1.7.

As these tables indicate, many more sites were identified as holding important numbers of gulls using the roost counts undertaken during the recent 2003/04-2005/06 Winter Gull Roost Survey ($n = 61$) than based on WeBS Core Counts ($n = 26$). In total, WinGS counts identified 27 cases where sites had held internationally important numbers of individual species and 72 where sites held nationally important numbers (60 in Great Britain, 12 in Northern Ireland). In contrast, according to WeBS (core) counts there were just seven cases where sites had held internationally important numbers of individual species and 38 where sites held nationally important numbers (22 in Great Britain, 16 in Northern Ireland). It should be noted that the figures from WinGS counts represent peak counts over the course of the survey (2003/04-2005/06), rather than averages of peaks across years as is the case with the figures from WeBS. Most WinGS sites, however, were counted only once (or at least in only one winter) over the three years of the survey (see section 3.3 and Table 3.3.1).

Data from bird reports also identified a further 27 cases where sites had held nationally important numbers of individual species (24 in Great Britain, three in Northern Ireland) and 11 cases where sites had held internationally important numbers.

More sites were identified as being nationally important for Lesser Black-backed Gull than any other species.

3.2 Comparison of Species' Indices Produced Using Wings and Webs Core Counts and Their Representativeness

Indices of the numbers of gulls wintering in regions of Great Britain produced using WinGS counts from January 1953 to January 2004 (after Banks *et al.* submitted) and WeBS Core Counts from 1993/94 to 2005/06 (Wetland Bird Survey unpublished data) are shown in Figures 3.2.1-3.2.5.

Regional trends between the 1993/94 and 2003/04 winters were on the whole broadly similar between the two sets of indices. For example, both indicated gentle declines over that period in Black-headed Gulls numbers in most regions. Continuing increases in Lesser Black-backed Gull numbers were also recorded in southeast English regions by both surveys, as well as increases in Herring Gull numbers in the Midlands and southwest England. WeBS indices revealed some large inter-annual fluctuations, notably for the least numerous species, i.e. Lesser Black-backed and Great Black-backed Gull.

There were, however, large differences in the numbers of gulls that informed the two sets of indices. Count data for the final year of each dataset (Table 3.2.1) indicate that over Great Britain as a whole, between 1.9 (Lesser Black-backed Gull) and 5.8 (Common Gull) times as many gulls informed the

¹ Bird report data from: Andrews 2007, Berry *et al.* 2006, Booth 2006, Cox 2007, Dunmore *et al.* 2006, Emley 2007, Evans 2007, Fisher & Holliday 2007, Fray 2007, Geary & Reay 2006, Gibbs 2006, Green *et al.* 2007, Hazard 2005, Hodge & Mace 2007, Holmes 2006, James 2006, Lincolnshire Bird Club 1997, Murray & Pyatt 2007, Newsome 2007, Nightingale & Brind 2005, Northern Ireland Birdwatchers Association 2004, Paul *et al.* 2006, Robinson & Hartley 2004, Smith 2006, Waite 2002, Wallen 2007, White 2004, Wilson 2006, Wright 2006.

indices calculated from WinGS data compared to those from WeBS data. Between 21% (Herring Gull) and 50% (Lesser Black-backed Gull) of estimated national populations (Banks *et al.* 2007) were represented in WinGS indices compared to 8% (Herring Gull) and 27% (Lesser Black-backed Gull) for the WeBS indices.

There were also large differences according to region, with the discrepancy between the representativeness of WinGS and WeBS Core Counts being most apparent in inland regions. In the inland Thames and Midlands WeBS regions, less than 1,000 birds informed the WeBS indices for Common, Lesser Black-backed, Herring and Great Black-backed Gull. In comparison, numbers informing the WinGS indices for these species in the WinGS Midlands region ranged from 5,563 birds (Great Black-backed Gull) to 56,964 birds (Common Gull).

3.3 Frequency of Existing Volunteer Counting of Gull Roosts and Interest Among Counters in Submitting More Regular Gull Roost Count Data

For those WinGS key sites where (WinGS) counts of individual species exceeded national or international thresholds or which held at least 20,000 gulls ($n = 61$), the frequency of existing volunteer counting of gull roosts, as indicated by data from WinGS, bird reports and questionnaires, is summarised in Table 3.3.1 (for questionnaire return rate see 3.3.3).

3.3.1 Frequency of WinGS counts per winter

Those WinGS key sites where (WinGS) counts of individual species exceeded national or international thresholds or which held at least 20,000 gulls were counted between once and nine times in any single winter of the survey, though 66% were counted just once. Most – 77% – were also only counted in one winter.

For all WinGS key sites (whole sites or, if divided, sub-sites of these), the frequency of counting during winter 2003/04 ranged from one to 45 times, though again the majority were just counted once and only two sites were counted more than 10 times (Fig. 3.3.1.1). On the whole, inland sites were counted more frequently than coastal sites – 17% of inland sites being counted more than once, compared to 10% of coastal sites.

3.3.2 Frequency of gull counting according to bird reports

It was possible to classify the frequency of counting at 33 of the 61 sites identified. Twelve (36%) of these were counted only ‘occasionally’ (i.e. less than once a year), four (12%) annually, 16 (48%) monthly and one (3%) ‘frequently’ (probable once a week).

3.3.3 Questionnaire responses

Responses were received from 61 (53%) of 116 people to whom questionnaires had been sent (some approached concerning more than one site).

From these responses, it was possible to determine the frequency of existing gull roost counting at 33 WinGS key sites (20 inland, 13 coastal). Sixteen (48%) were covered by respondents only during WinGS, six (18%) covered only occasionally (outwith WinGS), one (3%) annually, seven (21%) monthly and three (9%) frequently, i.e. weekly.

Thirty-nine (64%) of the respondents expressed an interest in submitting gull roost counts in future, 31 also saying that they would be happy submitting counts online (two saying not, six expressing no preference). Two (5%) said they might submit counts frequently (i.e. more than once a month), 14 (36%) once a month during winter, two (5%) more than once a winter, 17 (44%) once a winter and four (10%) just occasional counts.

4. DISCUSSION

4.1 Identification of Sites Where Gull Numbers Surpass 1% Thresholds or Exceed 20,000 Birds

Tables 3.1.1-3.1.7 indicated that many more sites were identified as holding important numbers of gulls (i.e. numbers that surpassed national or international thresholds or exceeded 20,000 birds) using the roost counts undertaken during the recent 2003/04-2005/06 Winter Gull Roost Survey than using WeBS Core Counts. This is unsurprising as WeBS Core Counts greatly underestimate total gull populations because, firstly, they are usually made in the day-time when many gulls may be feeding away from monitored wetland sites and, secondly, as counts of gulls are optional. The difference was most apparent for inland sites, such as reservoirs, which, though they may support large nocturnal roosts, may be little used for foraging in comparison to terrestrial habitats such as farmland or at landfills. Nevertheless, it is important to note that a number of sites were identified as holding important numbers based only on WeBS Core Counts.

As noted in '*Waterbirds in the UK 2005/06*' (Musgrove *et al.* 2007), it is also important to bear in mind the distinction between sites that regularly hold wintering populations of national or international importance and those which may happen to exceed the appropriate qualifying levels only in occasional winters. The Ramsar convention states that key sites must be identified on the basis of demonstrated regular use and, for this reason, the five-year peak mean values derived from WeBS data have been used to define the number of individual waterbirds that a site regularly supports. Rather than using the one-off peaks from WinGS, it would be best, therefore, to use a number of roost counts to define the importance of sites for particular gull species and gulls as a whole. By calculating values based on several years of counts, some sites identified as important in this report may not surpass thresholds, whereas others not identified might.

Given that neither WinGS nor WeBS identified all those sites deemed as important, identification of sites worthy of statutory designation would be best achieved through consideration of both WinGS and WeBS data.

For WinGS, a sensible option would be to average counts from the 2003/04-2005/06 and previous 1993 and 1983 surveys (previous surveys did not cover the coast or all countries). This approach is not without its drawbacks, however. Firstly, it may not be possible to match all sites across surveys (or define the extent of many prior to the 2003/04-2005/06 survey). Secondly, it should also be noted that, given the changes in gull populations wintering in the UK over the last 20 years, the average calculated may not be representative of current numbers using a site – this is particularly likely to be the case for Common and Lesser Black-backed Gull, whose populations have risen greatly over this period (Burton *et al.* 2005, Banks *et al.* submitted).

It should also be noted that a number of important sites may be missed by this approach as they have not been counted regularly enough by either WinGS or WeBS. In total, data from bird reports indicated 27 cases where sites had held nationally important numbers of individual species and 11 cases where sites had held internationally important numbers, but not been identified as having held important numbers by either WinGS or WeBS. In two cases, these sites were refuse tips and it is likely that other non-wetland sites that are used by foraging gulls may be found to be important for gulls were such habitats to be better monitored. While in some cases, these counts might have been exceptional 'one-offs', it is clear that more regular monitoring – both of roosting and foraging sites – is needed in order that all important sites are recognised. Beyond this, there is much to be learnt about how gulls may use complexes of roost sites and the catchment areas of roosts. Thus, future studies recording flight-lines to and from roosts or the movements of radio-/satellite-tagged birds would be of benefit to a wider monitoring programme.

Annual monitoring of roost sites would be advantageous, therefore, in allowing the calculation of five-year peak means similar to those used currently for waterbirds, which would be more representative of

the numbers regularly occurring at sites and would also ensure that fewer sites were overlooked. WinGS counts identified 61 sites that held important numbers of gulls (Table 3.1.7) and that most warrant annual monitoring. A further eight wetland sites were identified as holding important numbers of gulls by WeBS Core Counts alone and bird reports indicated 22 more sites where better monitoring would also be advantageous.

Two further points should be noted regarding the identification of important roost sites. Firstly, in many instances it may be difficult for observers to reliably identify gulls to species. This is particularly the case during roost counts, due to the greater numbers of birds and the speed at which they typically have to be counted. During WinGS, gulls that could not be assigned to species were classified by observers as small, large or unidentified. In such cases, sites where totals surpassed 20,000 birds were thus still recognised, but those important for individual species may not have been. The problem may also apply to diurnal WeBS Core Counts and it is probable that in such instances, as counting of gulls is optional, counts are simply not submitted.

Secondly, the numbers of some gull species are very much greater during passage periods. This is particularly the case for Lesser Black-backed Gull, whose numbers peak at most sites in the autumn. For this species, several sites may thus be deemed to be important in winter due to counts in November (at the end of the passage period) although, at this time, the species' population is likely to be much greater than that in January upon which the threshold for the species is based. As a result, more sites were identified as being nationally important for Lesser Black-backed Gull than any other species. Many other sites that are important to the species as autumn staging sites may nevertheless not be recognised at all.

Sites used diurnally by large numbers of Lesser Black-backed Gulls during passage periods might be identified from WeBS counts. However, as the main aim of WinGS was to assess the populations of species wintering in the UK, and supplementary counts were only obtained for a minority of sites, insufficient data currently exist to fully assess which roost sites are important for the species in other seasons. A monitoring scheme would help address this need, though a full national survey would be required to assess the overall numbers of gulls occurring in the UK during passage periods and so put counts from individual sites in context.

4.2 Comparison of Species' Indices Produced Using Wings and Webs Core Counts and Their Representativeness

For the period for which they have overlapped (1993/94 to 2003/04), the indices produced from WinGS and WeBS Core Counts appeared to show broadly similar trends. Formal comparison was not possible due to the different regions used in the two surveys (these being historic artefacts of previous analyses), while of course for this period there were only two values from WinGS counts compared to 11 from WeBS.

Count data for the final year of each dataset revealed, however, that far fewer birds informed the indices produced using WeBS Core Counts than those based on WinGS counts. Given that WeBS Core Counts greatly underestimate total gull populations – see reasons above – this is not unexpected. Even taking no account of small, large or otherwise unidentified gulls, WinGS counts recorded a total of 1,176,011 Black-headed Gulls, 411,025 Common Gulls, 61,795 Lesser Black-backed Gulls, 293,542 Herring Gulls and 32,847 Great Black-backed Gulls in Great Britain (Banks *et al.* 2007) compared to peaks of 183,960 Black-headed Gulls, 41,616 Common Gulls, 29,065 Lesser Black-backed Gulls, 47,346 Herring Gulls and 9,740 Great Black-backed Gulls during WeBS Core Counts in 2005/06 (Musgrove *et al.* 2007); (population estimates for the species are provided in Table 3.2.1). The indices based on WeBS Core Counts may thus not be representative as they record a much smaller proportion of overall populations and also because of the incompleteness of counts at some sites.

The problem of representativeness was most apparent in inland regions. The numbers of gulls informing the indices for the WinGS Midlands region were at least an order of magnitude greater than those informing the indices for equivalent WeBS regions. As indicated above, this reflects partly differences in habitat use between gulls wintering on the coast and inland. Gulls prefer to roost on open water, either on large inland water bodies or coastal near-shore waters, where they may be free from disturbance and predators. On the coast, a high proportion of birds may remain on the same sites during the day as they also provide suitable foraging habitats. In contrast, in inland regions gulls may largely forage in terrestrial habitats, such as farmland and refuse tips, and only use waterbodies such as reservoirs to roost on at night.

It is important to note that there is likely to be inherent ‘noise’ in indices based on WeBS, as WeBS Core Counts are not fixed to a certain time of day. At coastal sites, counts are usually timed according to the tide, most taking place at or around high tide: if these tides are towards evening then gull numbers are likely to be much greater than if the count was undertaken earlier. By only counting in the evening, when gulls are arriving at roosts, much of this noise would be reduced, though, of course, counting may be less easy due to the large numbers.

The indices based on WeBS Core Counts suggested some large inter-annual fluctuations, notably for Lesser Black-backed and Great Black-backed Gull. Although these were perhaps no greater than those observed in the equivalent regional trends of many waterbird species (see Maclean & Austin 2006), given the small portion of overall populations that these counts represent, it is not clear how accurately these fluctuations may reflect the true processes operating at a regional level. The potential for such fluctuations to occur nevertheless indicates the value of annual surveying.

4.3 Frequency of Existing Volunteer Counting of Gull Roosts and Interest Among Counters in Submitting More Regular Gull Roost Count Data

Information from the WinGS dataset indicated that most key roost sites were only counted once in any one winter of the survey and, likewise, most in only one winter. Volunteers’ responses to questionnaires also indicated that most of those sites where gull numbers surpassed thresholds or 20,000 birds were only covered either just for WinGS or intermittently on other occasions. Although responses suggested that relatively few (11) of these key roost sites were counted regularly, i.e. annually, monthly or more frequently, bird report data suggested that regular counts took place at, at least, 16 more. (The 27 WinGS key sites where regular counts occur are highlighted in Table 3.3.1.) Indeed, it was apparent from reports that several other smaller roost sites not included among the key sites identified are also covered regularly. Certainly it seems probable that several observers who count gull roosts regularly, and who submit counts to county recorders for use in bird reports, may not have taken part in WinGS (and so wouldn’t have been sent a questionnaire). While many may be interested, in the first instance, in finding the rarer species or subspecies among roosting flocks, it is clear that many do undertake roost counts or, if they do not presently, could be encouraged to do so. If an annual monitoring scheme is to be set up, it is important that these people, as well as those who took part in WinGS and keen WeBS counters, are targeted.

Although responses were only received from 61 of 116 people to whom questionnaires had been sent, 39 respondents expressed an interest in submitting gull roost counts in future, 35 regularly, i.e. annually or more frequently. This equated to 32 different WinGS key sites, 31 where counts might be regular, i.e. 20 more and three times as many as respondents suggested were currently being regularly covered. Most respondents were also happy to use an online system. As suggested from bird report data, several more sites are also currently being regularly counted and it would be hoped that submissions of these counts could also be encouraged.

It should be noted, though, that both the data from bird reports and the responses to questionnaires suggested that few of the very largest gull roosts are currently being counted regularly. This problem is greatest at large estuarine coastal sites, where complete coverage requires many observers watching different flightlines. Thus the only attempts to completely survey sites such as The Wash, Humber

Estuary, Firth of Forth and Severn Estuary (see Table 3.17) have been during the Winter Gull Roost Surveys, though parts of these sites – such as the large Frampton & Waveridge Sands roost on the Severn Estuary – may be covered at least annually. Even some large inland roosts such as that at Chew Valley Lake have also, due to their size, only been covered during the Winter Gull Roost Surveys. Thus while it might be possible to encourage more regular counting through the setting-up of a monitoring scheme, it should not be expected that the very largest roosts would be counted more than once annually at best.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Worth of Annual Monitoring of Gull Roosts

The comparison of WinGS and WeBS Core Counts provided two main conclusions:

- First, that many more sites were identified as holding important numbers of gulls using Winter Gull Roost Survey than using WeBS Core Counts, primarily because the latter is less comprehensive in coverage of gull populations.
- Second, that indices produced using WinGS and WeBS Core Counts were broadly similar, but that the latter may have been unrepresentative because of less comprehensive coverage of populations, particularly in inland regions.

Given this, there is clearly the potential for annual monitoring of roosts to provide both the benefits identified, i.e. better identification of sites worthy of statutory designation and better indexing of species' populations. However, before implementing an annual monitoring scheme, it is important to recognise that there are limitations as to what might be achieved. Most key roost sites are only counted intermittently. Questionnaire responses / bird reports suggested that regular (i.e. annual or more frequent) roost counts probably take place at no more than 27 (44%) of those WinGS key sites where numbers surpassed national or international thresholds or exceeded 20,000 birds ($n = 61$; see Table 3.3.1), though it is likely that many more smaller roosts are also counted regularly. Nevertheless, it is also clear from this study that a system for submission of counts would encourage more frequent monitoring of gull roosts, though only partial coverage might be possible at the largest sites.

5.1.1 Identification of important sites

Annual monitoring of gull roosts would probably be most successful in fulfilling the first benefit, i.e. in providing better identification of (wintering) sites worthy of statutory designation, as it would allow the calculation of five-year peak means similar to those used currently for waterbirds, which would be more representative of the numbers regularly occurring at sites and would also ensure that fewer sites were overlooked. For this purpose, counts between November and March should be prioritised, though a minimum requirement would be a single count undertaken each January to tie in to the International Waterbird Census. The following limitations should be noted. Firstly, that fewer sites than were covered in the recent 2003/04-2005/06 Winter Gull Roost Survey would be covered annually and for some it would only be possible to get counts during such periodic national surveys. Secondly, only annual (rather than monthly or more frequent) counts might be received from some sites, though this would still be adequate to calculate five-year means. Thirdly, for some large sites it may only be possible to obtain partial coverage on a regular basis. Fourthly, at some sites it may not be possible to identify all gulls to species, due to the numbers involved. Lastly, even with data from annual monitoring, however, it would still also be necessary to consider data from WeBS to provide a more comprehensive assessment of important sites.

5.1.2 Indexing of gull populations

Although fewer sites than were covered in the recent 2003/04-2005/06 Winter Gull Roost Survey would be covered by annual monitoring, it would be hoped that proportional coverage of species' populations would still be greater than that achieved by WeBS Core Counts. The indices produced from annual roosts counts are also likely to be more representative across regions / habitat than those produced using WeBS Core Counts and more accurate due to the consistency in the timing of counts. Nevertheless, given that fewer sites would be covered annually, annual WinGS indices – at least at a regional scale – may potentially be biased by site-specific changes.

Indexing from annual monitoring of gull roosts may be limited, therefore, to producing national or site-specific trends. Again, for this purpose, counts in winter (i.e. between November and March)

should be prioritised and a minimum requirement would be a single count undertaken each January. It should be noted, that if sites are to be designated for the numbers of wintering gulls that they support, annual roost counts would be required to monitor the status of these sites. As many are important primarily as roosts sites, this could not be achieved by WeBS Core Counts alone.

5.2 Recommendations and Requirements for Implementing a System for Volunteers to Submit Gull Roost Counts and Future Reporting

Accepting the above limitations, annual monitoring of (key) gull roost sites would certainly help inform both identification of sites worthy of statutory designation and the indexing of species' populations. It is thus recommended that a scheme is set up for annual monitoring of roost sites.

In doing this, the following suggestions should be borne in mind:

- Work is initially needed to identify and approach all those birdwatchers currently monitoring gull roosts so as to maximise coverage. Approaches should be made to those who undertook counts for WinGS, WeBS counters, county bird recorders and through birding media. Given the number of sites currently being monitored and interest among counters, a feasible initial aim would be to obtain counts from 40 roosts in the first winter. The 91 sites identified as holding important numbers of gulls in this report (and in particular those 27 where roosts may already be counted regularly) should be targeted, though counts from other sites should be welcomed as some may prove to be important for gulls and all counts would help to inform indices.
- At the same time, a system should be set up for online submission of counts. If the scheme were primarily an online survey, this would reduce the time required to manage it. Count forms would still be necessary to allow inclusion of some important sites, though it would be hoped that the need for this could be kept to a minimum.
- Having first sought agreement of the WeBS partnership, online submission should, ideally, be through *WeBS Online*, i.e. the BTO online system used for WeBS. This would help to advertise the scheme, maximise efficiency, minimise costs and allow simple incorporation of counts into the overall WeBS database.
- Count site boundaries should be defined from the outset and, as with WeBS, observers should be able to see the definition of their site through the online system.
- Following WeBS protocols, there should be recommended dates for counting each month. These should not be on the same days as WeBS Core Count Priority Dates (several respondents to questionnaires suggested that they would not be able to undertake both WeBS and roost counts in the same day). Co-ordinated data collection is necessary to prevent indices being biased by exceptional counts. Supplementary counts should nevertheless be encouraged as these would aid identification of important sites.
- For the purposes of identifying important sites and indexing, counts during winter (i.e. between November and March) should be prioritised. A single priority date should also be set for each January, to be used at those sites where only one count a year is possible. This would tie in to the counts of the International Waterbird Census.
- If it is not possible for observers to identify gulls to species, it is important that birds should only be classified as 'small', 'large' or 'unidentified' (following WinGS). It is possible to estimate the numbers of each species among these classes; this would be acceptable for indexing, but limit the identification of sites worthy of designation at least for their importance for individual species, if not the overall assemblage of gulls that they hold.

- Reports from monitoring should be delivered annually. The primary outputs, i.e. five-year peak means for monitored sites and the first indices would not be deliverable until five years have passed. By this time it would be hoped that the number of sites being monitored would have increased.

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WinGS site	WeBS site	Other site	County	Designation ²	WinGS peak count ³	WeBS peak mean (all counts) ⁴	WeBS peak mean (Core Counts only) ⁵	Bird report ⁶
Belfast Lough	Belfast Lough		Antrim	SPA	11,055 (J)	7,807	6,779	5,500 (M)
Bewl Bridge	Bewl Water		Sussex		69,000 (J)	38,088		69,000 (J)
Chew Valley Lake	Chew Valley Lake		Avon	SPA	29,800 (J)	29,800†		
		Culmore Tip	Derry					5,000 (D)
		Derwent Reservoir	Durham, Northumberland					30,000 (F)
Firth of Forth			Central, Fife, Lothian	SPA	26,835 (S)			
Humber	Humber Estuary		Lincolnshire, Yorkshire	SPA	34,118 (S)	21,450		100,000 ⁷ (M)
Hurleston Reservoir			Cheshire		20,000 (D)			20,000 (?)
Island Barn Reservoir & Knight & Bessborough Reservoirs & Queen Elizabeth II Reservoir			Surrey	SPA ⁸	24,187 (J)			
King George V Reservoir & William Girling Reservoir ⁹			Greater London, Essex	SSSI	25,600 (J)			
		Lackford	Suffolk	SSSI				22,000 (D)
	Larne Lough		Antrim	SPA		1,122	1,185	
Lough Foyle	Lough Foyle		Derry	SPA	1,300 ¹⁰ (J)	1,866	1,107	2,780 (N)
Lough Neagh	Loughs Neagh and Beg		Antrim, Armagh, Down, Londonderry, Tyrone	SPA*	1,821 (S)	4,036	4,036	2,387 (M)
Outer Ards	Outer Ards Shoreline		Down	SPA	1,003 ¹¹ (S)	4,261	4,175	
Ribble & Alt Estuaries			Lancashire, Merseyside	SPA*	21,491 (S)			
	Ribble Estuary ¹²		Lancashire	SPA*			24,460	
Rutland Water			Leicestershire	SPA	21,000 (J)			
Severn Estuary			Gloucestershire, Avon, Somerset, Gwent, East Glamorgan	SPA	20,080 ¹³ (S)			25,000 ¹⁴ (N)
		Southfield Reservoir	Yorkshire	SSSI				20,000 (D)
Strangford Lough	Strangford Lough		Down	SPA	3,177 (S)	3,506	2,968	
Thames Estuary	Thames Estuary		Essex, Greater London, Kent	SPA ¹⁵	43,602 (S)	41,825	44,548	35,000 ¹⁶ (M)
Wash			Lincolnshire, Norfolk	SPA	25,657 (S)			

Table 3.1.1 Counts of Black-headed Gull in the UK exceeding national or international (winter) thresholds.¹

¹ GB threshold: 20,000 (Banks *et al.* 2007); All-Ireland ‘threshold of significance’: 1,000 (Crowe 2005); International threshold: 20,000.

² * – notification includes breeding gull designation or seabird assemblage featuring gulls (SPAs) or explicit mention of wintering gulls (SSSIs).

³ Data for WinGS sites are peaks from (main or supplementary) counts undertaken between November and March, 2003/04 to 2005/06. Totals do not include estimates derived from numbers of ‘small’, ‘large’ or ‘unidentified’ gulls; some coastal sites were also incompletely counted; thus, in some cases, totals are minimum figures (see Banks *et al.* 2007). S = summed count from two or more sub-sites surveyed on different dates; N = November; D = December; J = January; F = February; M = March.

⁴ WeBS five-year peak means for 2001/02-2005/06 from Musgrove *et al.* (2007), potentially including data from WinGS counts, supplementary daytime and roost counts, and low tide counts and from any month of the year. † – mean based on one winter’s count only.

Table 3.1.1 Continued.

⁵ WeBS five-year peak means for 2001/02-2005/06 using data from winter (November to March) WeBS Core Counts.

⁶ N = November; D = December; J = January; F = February; M = March; ? = unspecified winter count.

⁷ Total including Common Gulls, from Read's Island only.

⁸ Knight & Bessborough Reservoirs form part of the South West London Waterbodies SPA.

⁹ King George V Reservoir & William Girling Reservoir form the Chingford Reservoirs SSSI.

¹⁰ WinGS count for Roe Estuary only.

¹¹ WinGS counts for Outer Ards and Guns Island Ballyhoran.

¹² Part of Ribble and Alt Estuaries SPA.

¹³ WinGS counts for Severn Estuary and Severn Estuary Frampton & Waveridge Sands.

¹⁴ Bird report data for Rhymney Great Wharf only.

¹⁵ The Thames Estuary WinGS site overlaps only slightly with the Thames Estuary and Marshes SPA; the Thames Estuary WeBS site encompasses the Benfleet and Southend Marshes, Foulness (Mid-Essex Coast Phase 5) and Thames Estuary and Marshes SPAs.

¹⁶ Bird report data for St. Mary's Bay to Coombe Bay – part of Thames Estuary and Marshes SPA.

WinGS site	WeBS site	Other site	County	Designation ²	WinGS peak count ³	WeBS peak mean (all counts) ⁴	WeBS peak mean (Core Counts only) ⁵	Bird report ⁶
Belfast Lough	Belfast Lough		Antrim	SPA	553 (J)	2,312	2,024	748 (D)
Bewl Bridge	Bewl Water		Sussex		75,000 (F,M)	51,016		75,000 (M)
Blythburgh	Blyth Estuary		Suffolk		8,000 (J)	12,000		
Chew Valley Lake	Chew Valley Lake		Avon	SPA	18,200 (J)	9,100		
		Derwent Reservoir	Durham, Northumberland					80,000 (F)
	Eccup Reservoir		Yorkshire	SSSI			7,000	
Eye Brook Reservoir	Eyebrook Reservoir		Leicestershire		16,100 (J)	16,100†		
Firth of Forth			Central, Fife, Lothian	SPA	14,647 (S)			
Hallington Reservoir	Hallington Reservoir		Northumberland		25,000 (D)	16,335		8,100 (N)
Haweswater Reservoir	Haweswater Reservoir		Cumbria		27,986 (M)	14,557		20,060 (M)
Humber	Humber Estuary		Lincolnshire, Yorkshire	SPA	31,134 (S)	15,503		100,000 ⁷ (M)
King George V Reservoir & William Girling Reservoir ⁸			Greater London, Essex	SSSI	9,460 (J)			
	Larne Lough		Antrim	SPA		719	717	
Loch of Skene			Grampian	SPA	17,284 (J)			
Lough Foyle	Lough Foyle		Derry	SPA	1,050 ⁹ (J)	4,102	2,460	
	Loughs Neagh and Beg		Antrim, Armagh, Down, Londonderry, Tyrone	SPA*		826	826	942 (M)
	Lower Derwent Ings		Yorkshire	SPA		7,230		
Outer Ards	Outer Ards Shoreline		Down	SPA	1,110 ¹⁰ (S)	1,454	1,454	
	Ribble Estuary ¹¹		Lancashire	SPA		9,817	9,817	
Rutland Water	Rutland Water		Leicestershire	SPA	12,080 (J)	7,346	12,250	
	Rye Harbour and Pett Level ¹²		Sussex	SPA		8,600†		
Stanford Reservoir			Leicestershire / Northamptonshire		8,110 (J)			
Strangford Lough	Strangford Lough		Down	SPA	504 (S)	612		
Wash			Lincolnshire, Norfolk	SPA	7,794 (S)			
Tophill Low Reservoir	Tophill Low Reservoirs		Yorkshire	SSSI	11,150 (J)	17,094	15,586	
Ullswater			Cumbria	SSSI	11,470 (J)			
Solway Estuary	Solway Estuary		Cumbria, Dumfries & Galloway	SPA	12,486 (S)	8,379		
West Water Reservoir	West Water Reservoir		Borders	SPA	10,050 (J)	10,050†		8,150 (N)
		Wroxham Broad	Norfolk					8,000 (D)

Table 3.1.2 Counts of Common Gull in the UK exceeding national or international (winter) thresholds.¹

¹ GB threshold: 7,000 (Banks *et al.* 2007); All-Ireland ‘threshold of significance’: 500 (Crowe 2005); International threshold: 20,000.

² * – notification includes breeding gull designation or seabird assemblage featuring gulls (SPAs) or explicit mention of wintering gulls (SSSIs).

Table 3.1.2 Continued.

³ Data for WinGS sites are peaks from (main or supplementary) counts undertaken between November and March, 2003/04 to 2005/06. Totals do not include estimates derived from numbers of ‘small’, ‘large’ or ‘unidentified’ gulls; some coastal sites were also incompletely counted; thus, in some cases, totals are minimum figures (see Banks *et al.* 2007). S = summed count from two or more sub-sites surveyed on different dates; N = November; D = December; J = January; F = February; M = March.

⁴ WeBS five-year peak means for 2001/02-2005/06 from Musgrove *et al.* (2007), potentially including data from WinGS counts, supplementary daytime and roost counts, and low tide counts and from any month of the year. † – mean based on one winter’s count only.

⁵ WeBS five-year peak means for 2001/02-2005/06 using data from winter (November to March) WeBS Core Counts.

⁶ N = November; D = December; J = January; F = February; M = March; ? = unspecified winter count.

⁷ Total including Black-headed Gulls, from Read’s Island only.

⁸ King George V Reservoir & William Girling Reservoir form the Chingford Reservoirs SSSI.

⁹ WinGS count for Roe Estuary only.

¹⁰ WinGS counts for Outer Ards and Guns Island Ballyhoran.

¹¹ Part of Ribble and Alt Estuaries SPA.

¹² Part of Dungeness to Pett Level SPA.

WinGS site	WeBS site	Other site	County	Designation ²	WinGS peak count ³	WeBS peak mean (all counts) ⁴	WeBS peak mean (Core Counts only) ⁵	Bird report ⁶
	Alde complex		Suffolk	SPA		1,725	2,042	
Bartley Reservoir	Bartley Reservoir		West Midlands		1,200 (F)	1,200†		
Belvide Reservoir	Belvide Reservoir		Staffordshire	SSSI*	3,000 (J)	1,500		3,000 (J)
Blashford Lakes ⁶	River Avon - Fordingbridge to Ringwood ⁷	Ibsley Water	Hampshire, Wiltshire	SSSI	1,350 (D)	4,187		2,210 (N)
Blithfield Reservoir	Blithfield Reservoir		Staffordshire	SSSI	2,620 (J)	1,310		
		Brogborough No. 1 & Stewartby Clay Pit	Bedfordshire					2,650 (M)
Burghfield Gravel Pits & Theale Gravel Pits	Theale Gravel Pits		Berkshire		6,800 (J)	10,576		
		Calvert	Buckinghamshire					2,000 (M)
		Carsington Water	Derbyshire					7,000 (N)
		Chasewater	Staffordshire					1,250 (N)
Chelmarsh Reservoir			Shropshire		3,500 (J)			3,500 (J)
Chew Valley Lake	Chew Valley Lake		Avon	SPA	7,015 (J)	7,015†		
		Colliford Reservoir	Cornwall					1,520 (N)
Droitwich Westwood Great Pool	Great Pool Westwood Park		Hereford & Worcester	SSSI	3,800 (J)	2,430	2,270	4,000 (J)
		East Hoyle Bank ⁸	Merseyside	pSPA				3,500 (?)
	Hule Moss ⁹		Borders	SPA		2,068		
Island Barn Reservoir & Knight & Bessborough Reservoirs & Queen Elizabeth II Reservoir			Surrey	SPA ¹⁰	1,758 (J)			
	Lakenheath Fen		Suffolk				1,500†	
	Llangorse Lake		Powys	SSSI		1,222		
		Llys-y-Fran Reservoir	Dyfed	SSSI				2,000 (J)
	Longnewton Reservoir		Teesside			2,356		
	Loughs Neagh and Beg		Antrim, Armagh, Down, Londonderry, Tyrone	SPA*		1,110	539	
	Lower Windrush Valley Gravel Pits		Oxfordshire			1,387	1,314	
	Morecambe Bay		Cumbria, Lancashire	SPA		30,899	10,519	25,000 ¹ (M) ₁
		Ogston Reservoir	Derbyshire					1,900 (N)
		Priorslee Lake	Shropshire					3,605 (N)
Queen Mary Reservoir	Queen Mary Reservoir		Middlesex		6,656 (J)	6,656†		
	Alt Estuary ¹²		Lancashire, Merseyside	SPA		1,783		
	Ribble Estuary ¹²		Lancashire	SPA		3,011		

Table 3.1.3 Counts of Lesser Black-backed Gull in the UK exceeding national or international (winter) thresholds.¹

WinGS site	WeBS site	Other site	County	Designation ²	WinGS peak count ³	WeBS peak mean (all counts) ⁴	WeBS peak mean (Core Counts only) ⁵	Bird report ⁶
Roadford Reservoir	Roadford Reservoir		Devon		3,978 (N)	1,267		4,592 (N)
Severn Estuary	Rutland Water		Leicestershire	SPA		2,180		
	Severn Estuary		Gloucestershire, Avon, Somerset, Gwent, East Glamorgan	SPA	6,713 ¹³ (S)	5,364	1,397	7,250 ¹⁴ (J)
South Cerney	Frampton Pools ¹⁵		Gloucestershire	SPA		1,500	1,500†	
	Cotswold Water Park (West)		Gloucestershire, Wiltshire	SSSI	5,800 (N)	5,800		2,500 (D)
Cropston Reservoir & Swithland Reservoir			Leicestershire		2,050 ¹⁶ (N)			
Thames Estuary	Thames Estuary		Essex, Greater London, Kent	SPA ¹⁷	1,898 (S)	1,983	1,382	
		Throckmorton	Hereford & Worcester					4,500 (N)
		Torr Works (Merehead) Reservoir	Somerset					2,600 (N)

Table 3.1.3 Continued.

¹ GB threshold: 1,200 (Banks *et al.* 2007); All-Ireland ‘threshold of significance’: 500 (Crowe 2005); International threshold: 5,500.

² * – notification includes breeding gull designation or seabird assemblage featuring gulls (SPAs) or explicit mention of wintering gulls (SSSIs).

³ Data for WinGS sites are peaks from (main or supplementary) counts undertaken between November and March, 2003/04 to 2005/06. Totals do not include estimates derived from numbers of ‘small’, ‘large’ or ‘unidentified’ gulls; some coastal sites were also incompletely counted; thus, in some cases, totals are minimum figures (see Banks *et al.* 2007). S = summed count from two or more sub-sites surveyed on different dates; N = November; D = December; J = January; F = February; M = March.

⁴ WeBS five-year peak means for 2001/02-2005/06 from Musgrove *et al.* (2007), potentially including data from WinGS counts, supplementary daytime and roost counts, and low tide counts and from any month of the year. † – mean based on one winter’s count only.

⁵ WeBS five-year peak means for 2001/02-2005/06 using data from winter (November to March) WeBS Core Counts. † – mean based on one winter’s count only.

⁶ N = November; D = December; J = January; F = February; M = March; ? = unspecified winter count.

⁷ Part of River Avon System SSSI; peak from WinGS data for Ibsley Water only.

⁸ Part of Mersey Narrows and North Wirral Foreshore pSPA.

⁹ Part of Greenlaw Moor SPA.

¹⁰ Knight & Bessborough Reservoirs form part of the South West London Waterbodies SPA.

¹¹ Bird report data for South Walney.

¹² Part of Ribble and Alt Estuaries SPA.

¹³ WinGS counts for Severn Estuary and Severn Estuary Frampton & Waveridge Sands.

¹⁴ Bird report data for Frampton & Waveridge Sands.

¹⁵ Part of Severn Estuary SPA.

¹⁶ Peak from WinGS supplementary counts for Swithland Reservoir only.

¹⁷ The Thames Estuary WinGS site overlaps only slightly with the Thames Estuary and Marshes SPA; the Thames Estuary WeBS site encompasses the Benfleet and Southend Marshes, Foulness (Mid-Essex Coast Phase 5) and Thames Estuary and Marshes SPAs.

WinGS site	WeBS site	Other site	County	Designation ²	WinGS peak count ³	WeBS peak mean (all counts) ⁴	WeBS peak mean (Core Counts only) ⁵	Bird report ⁶
Belfast Lough	Belfast Lough	Culmore Tip Dungeness ⁷	Antrim	SPA	854 (J)	8,388	7,769	4,970 (J)
			Derry	SPA				10,000 (D)
Firth of Forth	Firth of Forth Inner Moray Firth	Lendalfoot	Kent	SPA	12,313 (S)	11,405	15,434	12,000 (J)
			Central, Fife, Lothian Highland Strathclyde	SPA SPA		15,478		
Lough Neagh	Lough Neagh and Lough Beg	East Hoyle Bank ⁸ Scolt Head ¹⁰	Antrim, Armagh, Down, Londonderry, Tyrone	SPA*		541	541	6,000 (M)
			Merseyside	pSPA				8,000 (?)
Morecambe Bay	Morecambe Bay		Cumbria, Lancashire	SPA		10,579	8,132	10,000 ⁹ (F)
			Norfolk	SPA				6,000 (M)
Outer Ards	Outer Ards		Down	SPA	924 ¹¹ (S)	1,209	1,209	
Queen Mary Reservoir	Queen Mary Reservoir		Middlesex		8,279 (J)	8,279†		
Ribble & Alt Estuaries	Ribble Estuary ¹²		Lancashire, Merseyside	SPA*	19,592 (S)			
			Lancashire	SPA			22,975	14,924
Roughrigg Reservoir	Roughrigg Reservoir		Strathclyde		15,144 (J)			
Severn Estuary	Severn Estuary		Gloucestershire, Avon, Somerset, Gwent, East Glamorgan	SPA	5,997 ¹³ (S)			10,000 ¹⁴ (N)
Strangford Lough	Strangford Lough	Torbay	Down	SPA	1,755 (S)	653		
			Devon					18,000 (M)
Wash	The Wash		Lincolnshire, Norfolk	SPA	13,189 (S)	6,546		

Table 3.1.4 Counts of Herring Gull in the UK exceeding national or international (winter) thresholds.¹

¹ GB threshold: 7,300 (Banks *et al.* 2007); All-Ireland 'threshold of significance': 500 (Crowe 2005); International threshold: 5,900.

² * – notification includes breeding gull designation or seabird assemblage featuring gulls (SPAs) or explicit mention of wintering gulls (SSSIs).

³ Data for WinGS sites are peaks from (main or supplementary) counts undertaken between November and March, 2003/04 to 2005/06. Totals do not include estimates derived from numbers of 'small', 'large' or 'unidentified' gulls; some coastal sites were also incompletely counted; thus, in some cases, totals are minimum figures (see Banks *et al.* 2007). S = summed count from two or more sub-sites surveyed on different dates; N = November; D = December; J = January; F = February; M = March.

⁴ WeBS five-year peak means for 2001/02-2005/06 from Musgrove *et al.* (2007), potentially including data from WinGS counts, supplementary daytime and roost counts, and low tide counts and from any month of the year. † – mean based on one winter's count only.

⁵ WeBS five-year peak means for 2001/02-2005/06 using data from winter (November to March) WeBS Core Counts.

⁶ N = November; D = December; J = January; F = February; M = March; ? = unspecified winter count.

⁷ Part of Dungeness to Pett Level SPA.

⁸ Part of Mersey Narrows and North Wirral Foreshore pSPA.

⁹ Bird report data for South Walney.

¹⁰ Part of North Norfolk Coast SPA.

¹¹ WinGS counts for Outer Ards and Guns Island Ballyhoran.

¹² Part of Ribble and Alt Estuaries SPA.

¹³ WinGS counts for Severn Estuary and Severn Estuary Frampton & Waveridge Sands.

¹⁴ Bird report data for Rhydney Great Wharf only.

WinGS site	WeBS site	Other site	County	Designation ²	WinGS peak count ³	WeBS peak mean (all counts) ⁴	WeBS peak mean (Core Counts only) ⁵	Bird report ⁶
	Belfast Lough		Antrim	SPA		716	716	
Brogborough No. 1 & Stewartby Clay Pit			Bedfordshire		1,242 (J)			
Coquet Island	Coquet Island	Camel Estuary	Cornwall					802 (J)
Dungeness ⁶	Dungeness Gravel Pits ⁷	Culmore Tip	Northumberland	SPA*	980 (J)	980†		500 (D)
Grafham Water	Durham Coast ⁸		Derry					2,000 (J)
Hoveringham	Grafham Water		Kent	SPA	1,000 (J)	1,000†		
Humber			Durham	SPA		776		
Llys-y-Fran Reservoir	Humber Estuary		Cambridgeshire	SSSI	1,050 (J)	1,050†		
Lound Gravel Pit ⁹			Nottinghamshire		1,600 (J)			
Wheldrake Ings ¹⁰	Lower Derwent Ings		Lincolnshire, Yorkshire	SPA	2,387 (S)	2,200		
			Dyfed	SSSI	1,500 (J)			
			Nottinghamshire	SSSI*	1,176 (J)			
			Yorkshire	SPA		1,130	1,113	
	Lynemouth Ash Lagoons		Yorkshire	SPA	815 (J)			760 (F)
Ogston Reservoir	Ogston Reservoir		Northumberland			1,074†		
	Pegwell Bay ¹¹		Derbyshire	SSSI*	900 (J)	900†		810 (D)
		Portland Harbour	Kent	SPA		882		
		Seghill Tip	Dorset					1,000 (D)
		South Shields	Northumberland					1,000 (J)
		Sunderland Harbour	Tyne & Wear					1,130 (N)
	Tees Estuary ¹²		Tyne & Wear					1,120 (N)
Thames Estuary	Thames Estuary		Cleveland	SPA		1,294	1,294	875 ¹³ (N)
			Essex, Greater London, Kent	SPA ¹⁴	857 (S)	1,428	1,501	1,060 ¹⁵ (J)
	The Wash		Lincolnshire, Norfolk	SPA		3,219	863	
	Tophill Low Reservoirs		Yorkshire	SSSI		858	857	

Table 3.1.5 Counts of Great Black-backed Gull in the UK exceeding national or international (winter) thresholds.¹

¹ GB threshold: 760 (Banks *et al.* 2007); All-Ireland 'threshold of significance': 500 (Crowe 2005); International threshold: 4,400.

² * – notification includes breeding gull designation or seabird assemblage featuring gulls (SPAs) or explicit mention of wintering gulls (SSSIs).

³ Data for WinGS sites are peaks from (main or supplementary) counts undertaken between November and March, 2003/04 to 2005/06. Totals do not include estimates derived from numbers of 'small', 'large' or 'unidentified' gulls; some coastal sites were also incompletely counted; thus, in some cases, totals are minimum figures (see Banks *et al.* 2007). S = summed count from two or more sub-sites surveyed on different dates; N = November; D = December; J = January; F = February; M = March.

⁴ WeBS five-year peak means for 2001/02-2005/06 from Musgrove *et al.* (2007), potentially including data from WinGS counts, supplementary daytime and roost counts, and low tide counts and from any month of the year. † – mean based on one winter's count only.

⁵ WeBS five-year peak means for 2001/02-2005/06 using data from winter (November to March) WeBS Core Counts.

⁶ N = November; D = December; J = January; F = February; M = March; ? = unspecified winter count.

Table 3.1.5 Continued

⁷ Part of Dungeness to Pett Level SPA.

⁸ Part of Northumbria Coast SPA.

⁹ Part of Sutton and Lound Gravel Pits SSSI.

¹⁰ Part of Lower Derwent Valley SPA.

¹¹ Part of Thanet Coast and Sandwich Bay SPA.

¹² Part of Teesmouth and Cleveland Coast SPA.

¹³ Bird report data for Seal Sands.

¹⁴ The Thames Estuary WinGS site overlaps only slightly with the Thames Estuary and Marshes SPA; the Thames Estuary WeBS site encompasses the Benfleet and Southend Marshes, Foulness (Mid-Essex Coast Phase 5) and Thames Estuary and Marshes SPAs.

¹⁵ Bird report data for St. Mary's Bay to Coombe Bay – part of Thames Estuary and Marshes SPA.

Site importance	Method	BH	CM	LB	HG	GB
International	WinGS counts	12	4	5	6	0
	WeBS 2005/06 annual report	4	1	5	7	0
	WeBS 2005/06 Core Counts	2	0	1	4	0
	Bird Reports	+3	+1	+1	+6	0
National (GB)	WinGS counts	12	17	15	5	11
	WeBS 2005/06 annual report	4	14	22	5	13
	WeBS 2005/06 Core Counts	2	4	8	3	5
	Bird Reports	+3	+2	+11	+3	+5
National (All Ireland)	WinGS counts	5	4	0	3	0
	WeBS 2005/06 annual report	6	6	1	4	1
	WeBS 2005/06 Core Counts	6	5	1	3	1
	Bird Reports	+1	0	0	+1	+1

Table 3.1.6 Numbers of sites surpassing national or international 1% thresholds for gull species using WinGS count data or WeBS annual report / core count data, and numbers of additional sites that surpass thresholds according to single counts noted in bird reports.

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

WinGS Site	WeBS site	County	Designation	WinGS peak total ¹	WeBS peak mean ²
Wash	The Wash	Lincolnshire & Norfolk	SPA	124,907 (S)	24,961
Bewl Bridge		Sussex		103,021 (J)	
Humber		Lincolnshire & Yorkshire	SPA	72,188 (S)	
Chew Valley Lake		Avon	SPA	58,428 (J)	
Firth of Forth	Forth Estuary	Central, Fife & Lothian	SPA	57,196 (S)	28,273
Severn Estuary		Gloucestershire, Avon, Somerset, Gwent, East Glamorgan	SPA	56,622 (S)	
Thames Estuary	Thames Estuary	Essex, Greater London & Kent	SPA ³	50,998 (S)	91,451
Ribble & Alt Estuaries	Ribble Estuary	Lancashire & Merseyside	SPA*	47,160 (S)	85,451
Queen Mary Reservoir		Surrey		43,716 (J)	
Queen Mother Reservoir		Berkshire		40,500 (J)	
King George V Reservoir & William Girling Reservoir ⁴		Greater London, Essex	SSSI	36,883 (J)	
Rutland Water	Rutland Water	Leicestershire	SPA	33,501 (J)	37,854
Mersey Estuary		Cheshire & Merseyside	SPA	32,606 (J)	
Solway Estuary		Cumbria & Dumfries & Galloway	SPA	32,322 (S)	
Hallington Reservoir		Northumberland		32,070 (D)	
Draycote Water		Warwickshire		29,965 (J)	
Eye Brook Reservoir		Leicestershire	SSSI	29,404 (J)	
Haweswater Reservoir		Cumbria		28,880 (M)	
Mepal Gravel Pit & Ouse Washes		Cambridgeshire & Norfolk	SPA	28,877 (J)	
Ullswater		Cumbria		27,260 (D)	
Island Barn Reservoir & Knight & Bessborough Reservoirs & Queen Elizabeth II Reservoir		Surrey	SPA ⁵	26,517 (J)	
Morecambe Bay	Morecambe Bay	Cumbria & Lancashire	SPA*	24,769 (S)	58,483
Lackford		Suffolk	SSSI	24,698 (J)	
Poole Harbour	Poole Harbour	Dorset	SPA*	24,385 (F)	30,052
Chasewater (Cannock Reservoir)		Staffordshire		23,604 (J)	
Fletton Brick Pit		Cambridgeshire		22,786 (J)	
Ferring to Goring		Sussex		21,235 (J)	
Breydon Water		Norfolk	SPA	20,999 (J)	

Table 3.1.7 Sites which hold at least 20,000 gulls either according to WinGS counts or WeBS core count five-year peak means.

WinGS Site	WeBS site	County	Designation	WinGS peak total ¹	WeBS peak mean ²
Hurleston Reservoir		Cheshire		20,903 (D)	
Strathclyde Park Loch		Strathclyde	SSSI	20,837 (J)	
Blithfield Reservoir		Staffordshire	SSSI	20,318 (J)	
South Cerney		Gloucestershire & Wiltshire	SSSI	20,272 (J)	
Portsmouth Harbour		Hampshire	SPA	20,015 (J)	
	Lower Derwent Ings	Yorkshire	SPA		54,551
	Tophill Low Reservoirs	Yorkshire	SSSI		50,595
	Eccup Reservoir	Yorkshire	SSSI		43,250
	Belfast Lough	Antrim	SPA		34,798
<i>n</i> sites				33	11

Table 3.1.7 Continued.

¹ Data for WinGS sites are peaks from (main or supplementary) counts undertaken between November and March, 2003/04 to 2005/06. Some coastal sites were incompletely counted (see Banks *et al.* 2007). S = summed count from two or more sub-sites surveyed on different dates; N = November; D = December; J = January; F = February; M = March.

² WeBS five-year peak means for 2001/02-2005/06 from Musgrove *et al.* (2007) derived from WeBS Core Counts; figures represent the means of the peak numbers of all gulls for the winters of 2001/02-2005/06.

³ The Thames Estuary WinGS site overlaps only slightly with the Thames Estuary and Marshes SPA; the Thames Estuary WeBS site encompasses the Benfleet and Southend Marshes, Foulness (Mid-Essex Coast Phase 5) and Thames Estuary and Marshes SPAs.

⁴ King George V Reservoir & William Girling Reservoir form the Chingford Reservoirs SSSI.

⁵ Knight & Bessborough Reservoirs form part of the South West London Waterbodies SPA.

a.

Region	BH	CM	LB	HG	GB
North and east Scotland	12,954	45,542	31	9,204	402
Southwest Scotland	23,472	6,349	326	27,170	684
Northeast England	122,654	84,480	82	13,137	6,720
East Anglia	159,428	33,024	1,734	23,910	2,457
Southeast England	182,165	39,689	20,476	22,245	3,515
Midlands	227,309	56,964	19,479	14,122	5,563
Southwest England	100,510	36,239	16,750	18,898	1,324
Wales	19,558	4,656	718	10,674	392
Northwest England	68,033	33,171	2,485	13,117	2,317
GB total	916,083	340,114	62,081	152,477	23,374
GB population estimate	2,155,147	695,833	124,654	729,801	75,860
% of GB population estimate represented	42.5	48.9	49.8	20.9	30.8

b.

Region	BH	CM	LB	HG	GB
Northern Ireland	15,775	4,502	1,742	7,360	1,725
SEPA Highland Grampian and Western Isles	1,973	10,106	36	6,241	620
SEPA Southwest Area	7,366	3,866	171	4,025	239
SEPA Southeast Area	10,326	5,466	1175	4,165	260
EA North East Region	40,606	18,052	1167	8,368	3,087
EA Anglian Region	39,622	8,380	3154	5,566	1,350
EA Southern Region	21,299	2,999	705	1,957	1,954
EA Thames Region	12,131	687	124	280	79
EA Midlands Region	9,909	200	730	349	104
EA South West Region	27,412	1,192	1,819	8,902	1,185
EA Wales Region	13,443	3,006	6,771	8,118	524
EA North West Region	40,447	4,961	17,334	8,175	731
GB total	224,534	58,915	33,186	56,146	10,133
GB population estimate	2,155,147	695,833	124,654	729,801	75,860
% of GB population estimate represented	10.4	8.5	26.6	7.7	13.4

Table 3.2.1 Numbers of gulls informing species' indices for regions of Great Britain produced using **a.** WinGS counts from January 1953 to January 2004 (after Banks *et al.* submitted) and **b.** WeBS Core Counts from 1993/94 to 2005/06. Data are counts (or estimates) for the final year of each dataset. Great Britain population estimates are taken from Banks *et al.* (2007).

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

WinGS site ¹	Maximum number of WinGS counts per winter ²	Number of winters counted by WinGS ³	Coverage from bird reports ⁴	Coverage from questionnaires ⁵
Bartley Reservoir	2	1	Monthly	
Belfast Lough	2	1		
Belvide Reservoir	1	1	<i>Monthly</i>	
Bewl Bridge	45	2	Frequent	Weekly
Blashford Lakes	3	1	Monthly	
Blithfield Reservoir	1	1	<i>Occasional</i>	
Blythburgh	1	1		
Breydon Water	1	2	Occasional	
Brogborough No. 1 & Stewartby Clay Pit	2	2		Weekly ⁶
Burghfield Gravel Pits & Theale Gravel Pits	4	2		Occasional
Chasewater (Cannock Reservoir)	1	2	<i>Monthly</i>	
Chelmarsh Reservoir	1	1	Monthly	Annual
Chew Valley Lake	1	1		Only WinGS
Coquet Island	1	1		Only WinGS
Cropston Reservoir & Swithland Reservoir	9	2	Monthly	
Draycote Water	1	1		Only WinGS
Droitwich Westwood Great Pool	1	1	<i>Monthly</i>	
Dungeness	4	1	<i>Monthly</i>	
Eye Brook Reservoir	1	1	Occasional	
Ferring to Goring	1	1		Only WinGS
Firth of Forth	11	3	<i>Occasional</i>	Weekly ⁶
Fletton Brick Pit	2	1	<i>Occasional</i>	
Grafham Water	1	1		
Hallington Reservoir	4	3	Monthly	
Haweswater Reservoir	5	1		
Hoveringham	1	1		
Humber	1	2	<i>Occasional</i>	
Hurleston Reservoir	9	2	Occasional	
Island Barn Reservoir & Knight & Bessborough Reservoirs & Queen Elizabeth II Reservoir	1	1		Only WinGS
King George V Reservoir & William Girling Reservoir	1	1		
Lackford	1	1	Monthly	Monthly
Llys-y-Fran Reservoir	1	1	Occasional	Only WinGS
Loch of Skene	1	1	Occasional	Occasional
Lough Foyle	1	1	<i>Annual</i>	Only WinGS
Lough Neagh	1	2	<i>Annual</i>	Only WinGS
Lound Gravel Pit	1	1		
Mepal Gravel Pit & Ouse Washes	1	3	<i>Monthly</i>	Only WinGS
Mersey Estuary	2	1		Only WinGS
Morecambe Bay	1	1	<i>Occasional</i>	Only WinGS
Ogston Reservoir	5	1	Monthly	
Outer Ards	1	2		Only WinGS
Poole Harbour	1	1		Monthly
Portsmouth Harbour	1	1		Occasional
Queen Mary Reservoir	1	1		Only WinGS
Queen Mother Reservoir	1	1		
Ribble & Alt Estuaries	1	1		Only WinGS
Roadford Reservoir	4	1	Monthly	

Table 3.3.1 Frequency of gull roost counts at those WinGS key sites where counts of individual species exceeded national or international (winter) thresholds or which held at least 20,000 gulls, as indicated by data from WinGS, bird reports and questionnaires. Italics indicate sites where gulls are present and counted on more than one sub-site.

WinGS site ¹	Maximum number of WinGS counts per winter ²	Number of winters counted by WinGS ³	Coverage from bird reports ⁴	Coverage from questionnaires ⁵
Roughrigg Reservoir	1	1		Only WinGS
Rutland Water	1	1	Occasional	Occasional
<i>Severn Estuary</i>	3	2	Annual	Only WinGS
<i>Solway Estuary</i>	4	1	<i>Occasional</i>	Monthly
<i>South Cerney</i>	3	1		Occasional
Stanford Reservoir	1	1		
<i>Strangford Lough</i>	1	1	<i>Annual</i>	
Strathclyde Park Loch	1	1		Monthly
<i>Thames Estuary</i>	1	1		Monthly ⁷
Tophill Low Reservoir	1	1		
Ullswater	5	1	Monthly	Monthly
<i>Wash</i>	3	1		Occasional
West Water Reservoir	1	1	Monthly	
Wheldrake Ings	1	1	Monthly	Monthly

Table 3.3.1 Continued.

¹ Highlighting indicates those sites where bird reports or questionnaires suggested that gull roosts may be counted regularly (i.e. at least annually) – green for those sites where complete counts are likely and yellow where only partial counts might be obtained.

² The maximum number of ‘WinGS’ roost counts undertaken at the WinGS key site, or the maximum for any single sub-site of it, in any one winter of the survey (2003/04-2005/06).

³ The number of winters that the WinGS site was counted, or the maximum for any single sub-site of it, over the course of the survey (2003/04-2005/06).

⁴ Frequency of winter roost counts undertaken at the site, or the maximum for any single part of it, according to the most recent bird report data. Many bird reports only provide incomplete data or monthly maxima and thus, in the majority of cases, it is not possible to infer a higher frequency of counting than ‘monthly’. Italics indicate that reports did not specify whether counts were undertaken at roosts or diurnally.

⁵ Frequency of winter roost counts undertaken at the site, or the maximum for any single sub-site of it, according to questionnaire responses.

⁶ Not all species counted every time.

⁷ Monthly counts in autumn on one section, otherwise only WinGS.

Figures 3.2.1-3.2.5 Indices for the numbers of gulls wintering in regions of Great Britain produced using **a.** WinGS counts from January 1953 to January 2004 (after Banks *et al.* submitted) and **b.** WeBS Core Counts from 1993/94 to 2005/06.

1. Black-headed Gull **2.** Common Gull **3.** Lesser Black-backed Gull **4.** Herring Gull **5.** Great Black-backed Gull.

In these figures, index values are relative to 1 in the most recent survey.

In plots based on WinGS counts, filled circles show indices and 95% confidence limits derived from 'no assumed zero' models, open circles indices and confidence limits from 'assumed zero' models (see Burton *et al.* 2005, Banks *et al.* submitted for details of modelling approach). Dotted lines show indices for inland roosts before coastal roosts were first surveyed. Regions: 1 = north and east Scotland; 2 = southwest Scotland; 3 = northeast England; 4 = East Anglia; 5 = southeast England; 6 = Midlands; 7 = southwest England; 8 = Wales; 9 = northwest England.

Plots based on WeBS Core Counts use data for September to March. Regions: 1 = SEPA Highland Grampian & Western Isles; 2 = SEPA Southwest area; 3 = SEPA Southeast area; 4 = EA North East region; 5 = EA Anglian region; 6 = EA Southern region; 7 = EA Thames region; 8 = EA Midlands region; 9 = EA South West region; 10 = EA Wales region; 11 = EA North West region; 12 = Northern Ireland.

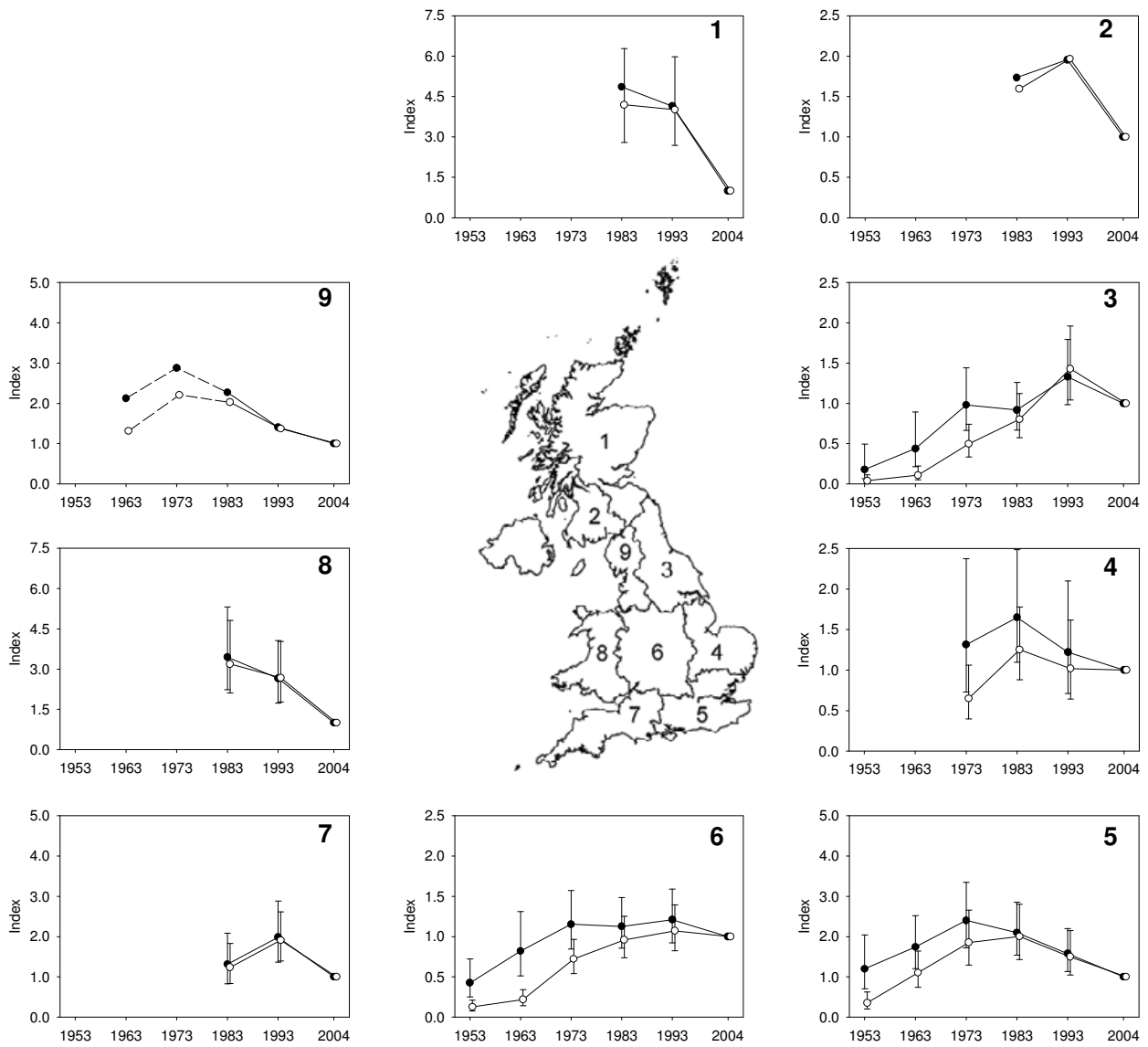


Figure 3.2.1a: Black-headed Gull (WinGS)

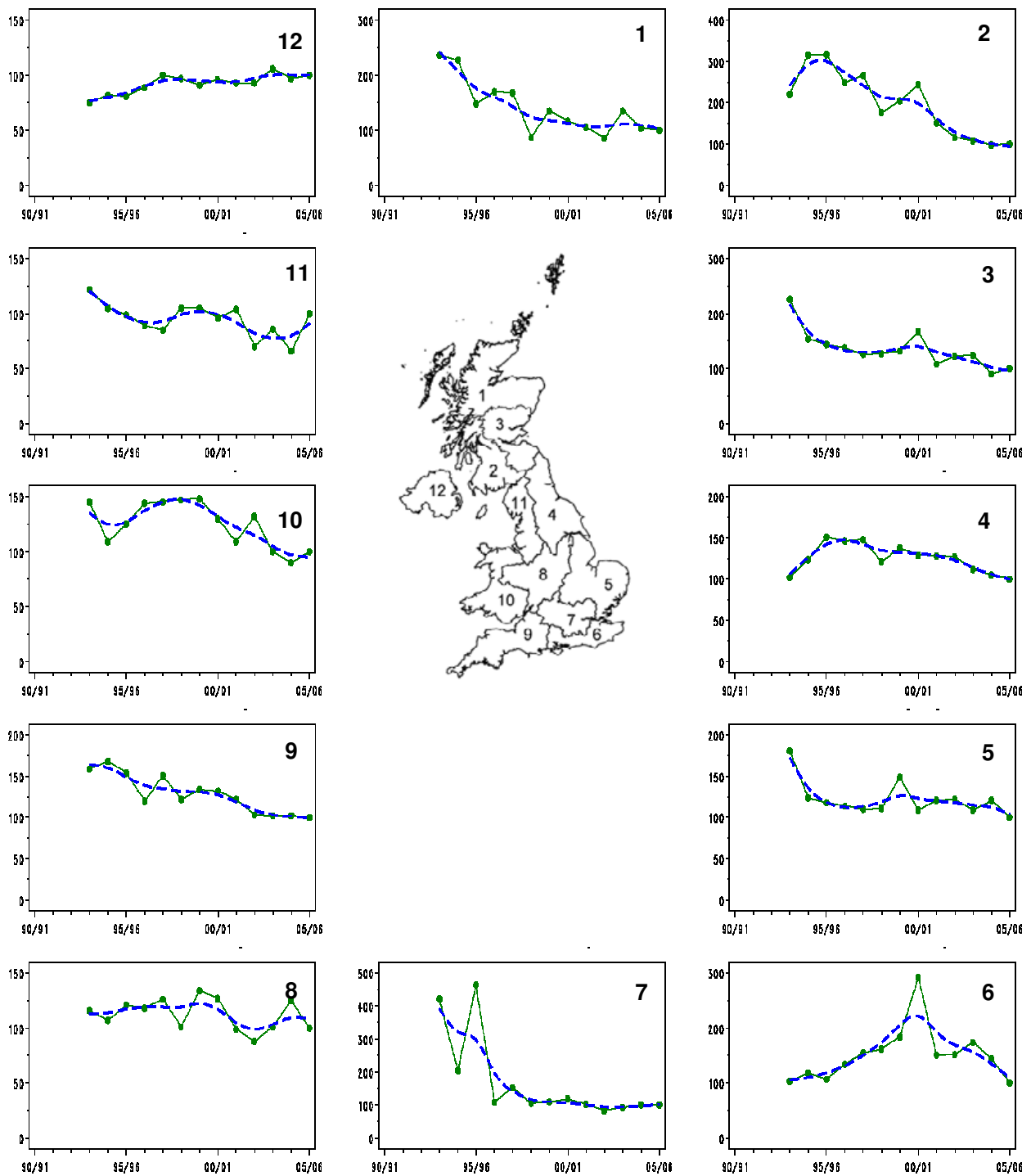


Figure 3.2.1b: Black-headed Gull (WeBS)

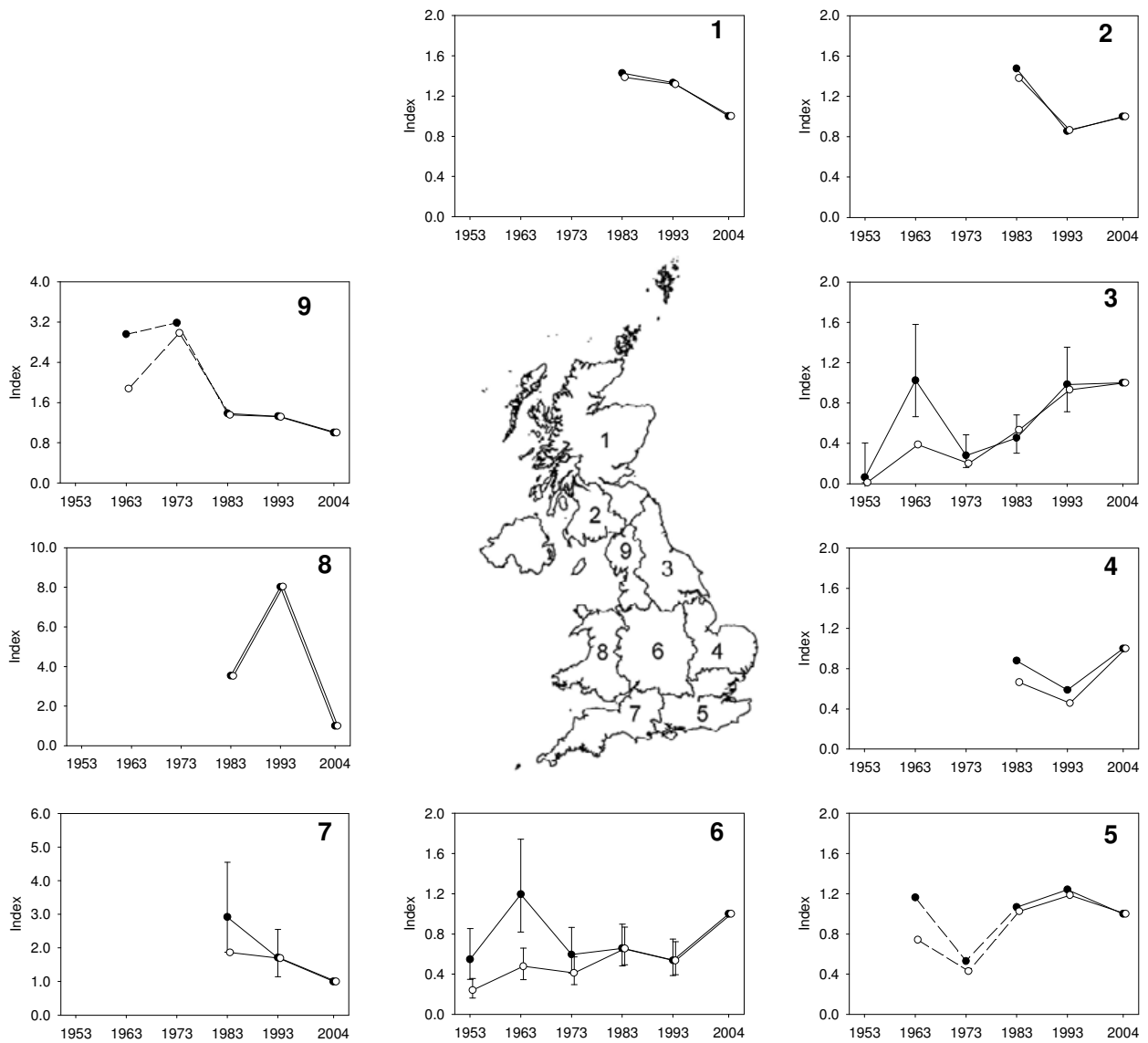


Figure 3.2.2a: Common Gull (WinGS)

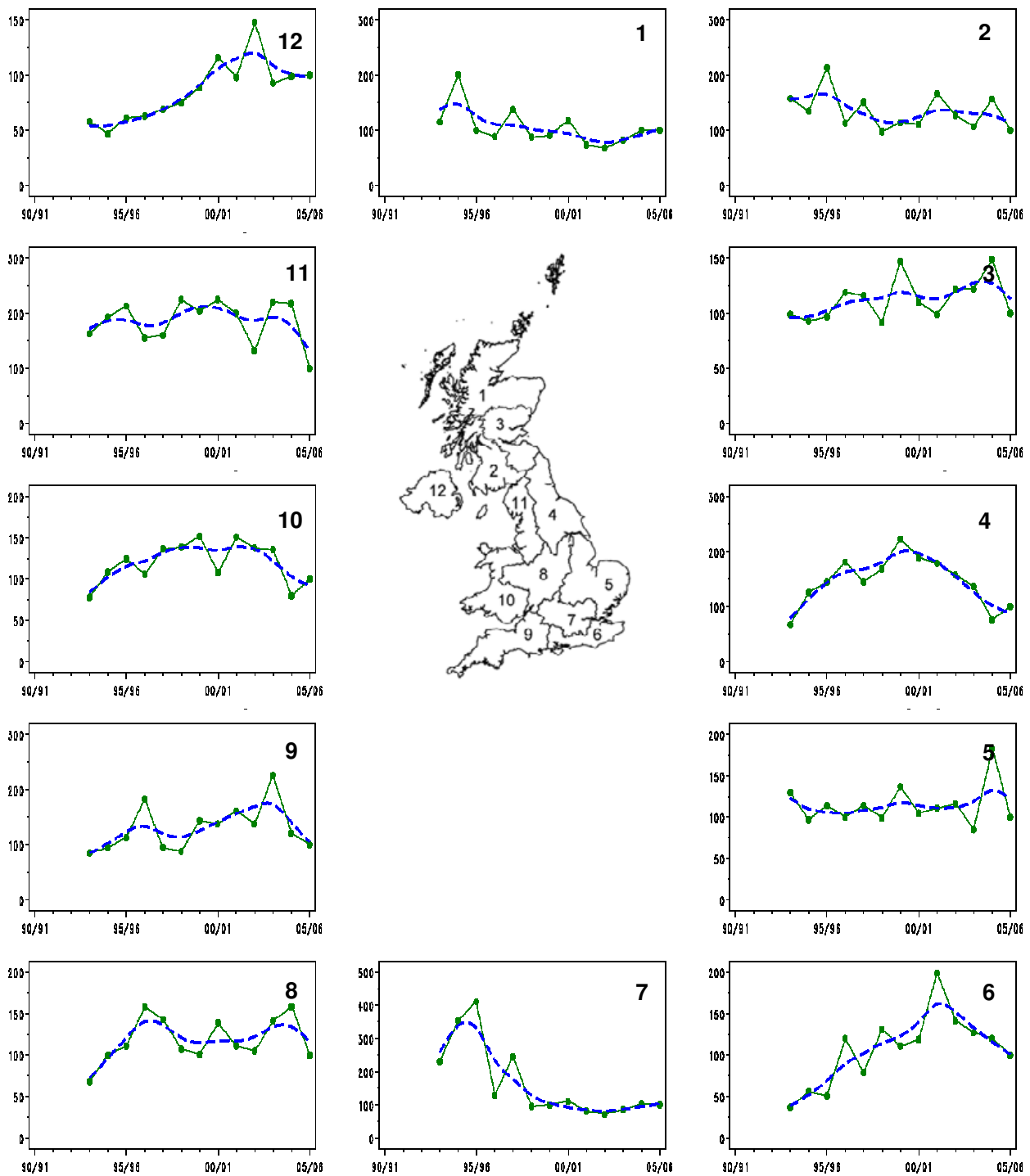


Figure 3.2.2b: Common Gull (WeBS)

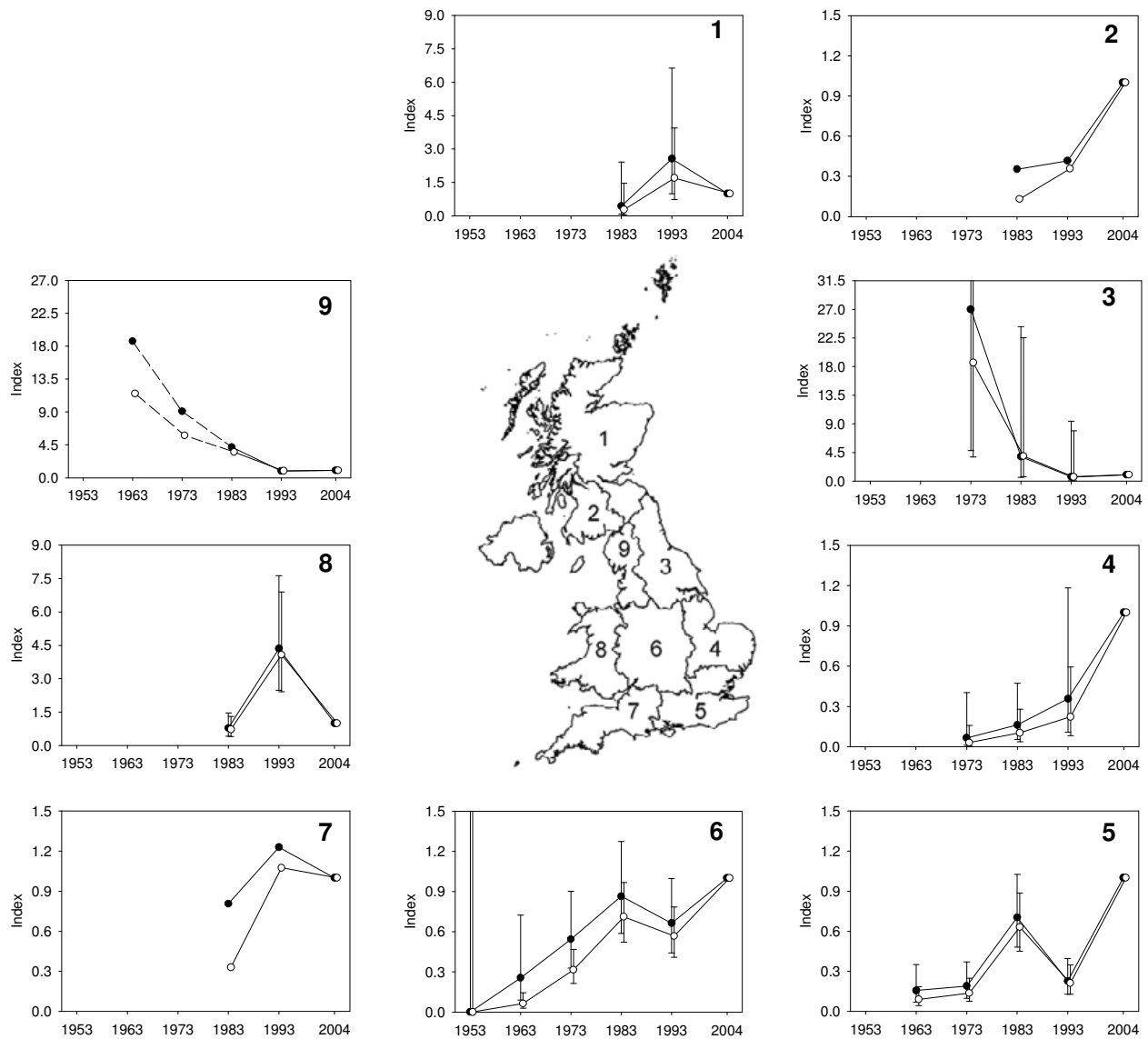


Figure 3.2.3a: Lesser Black-backed Gull (WinGS)

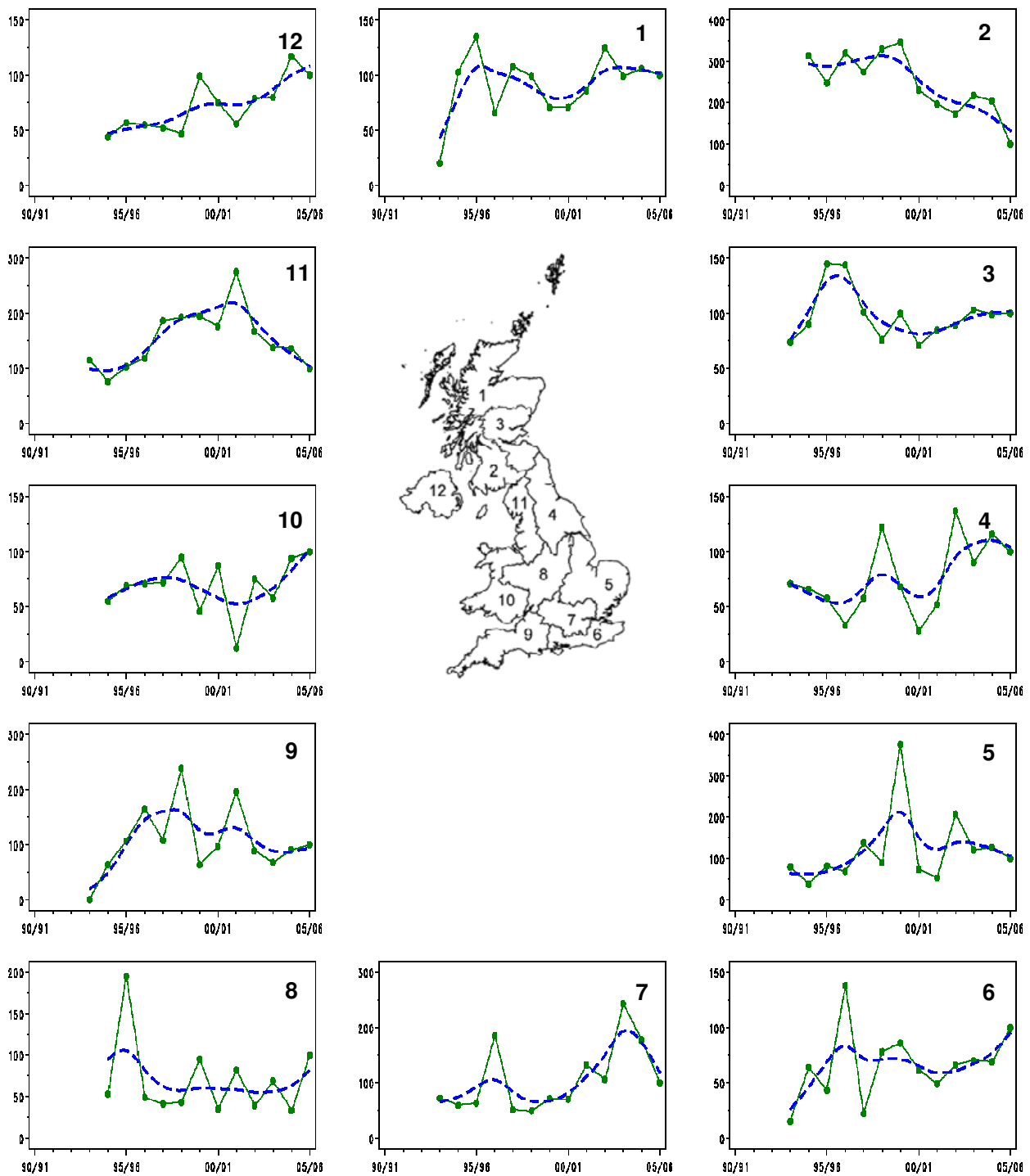


Figure 3.2.3b: Lesser Black-backed Gull (WeBS)

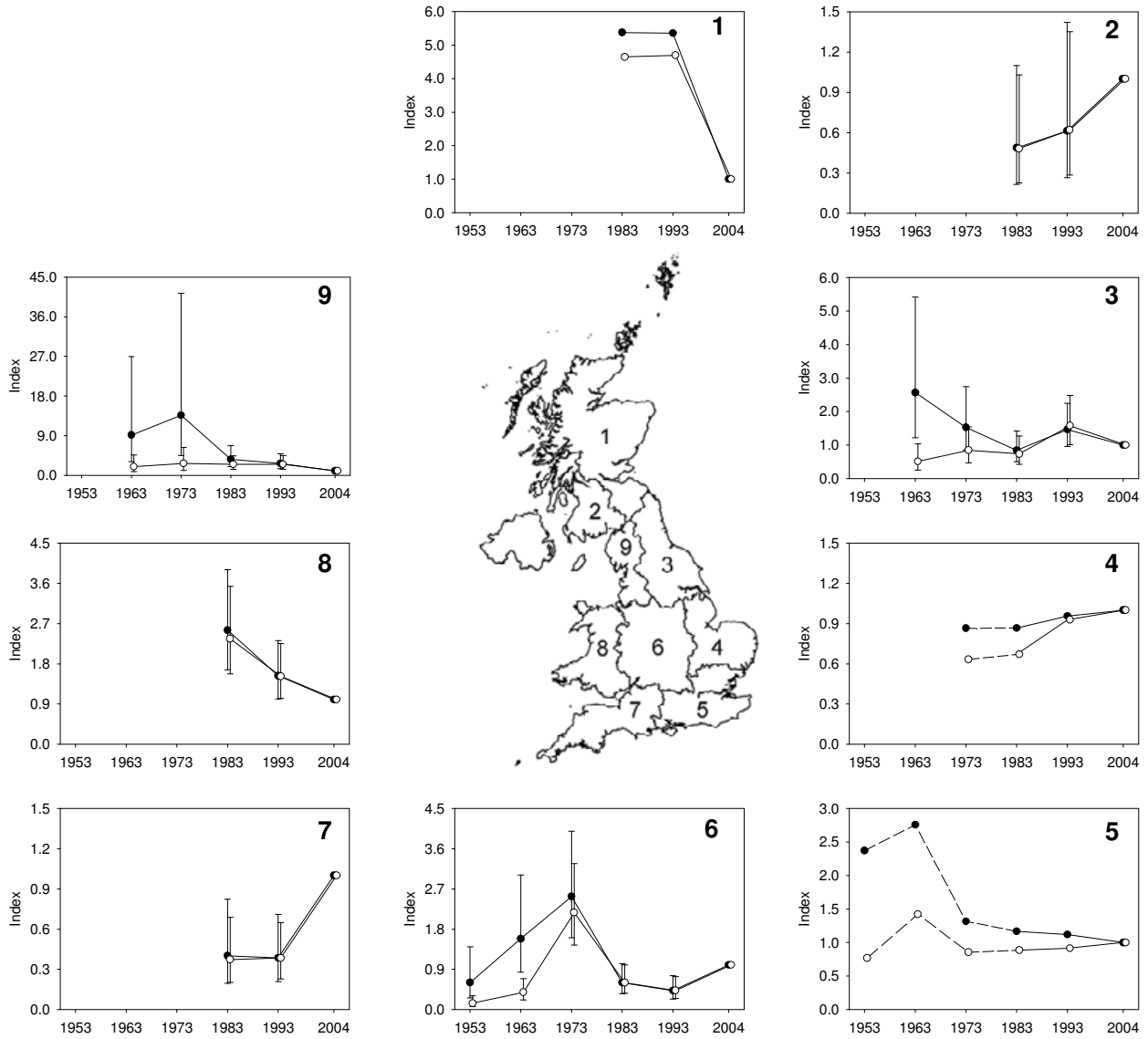


Figure 3.2.4a: Herring Gull (WinGS)

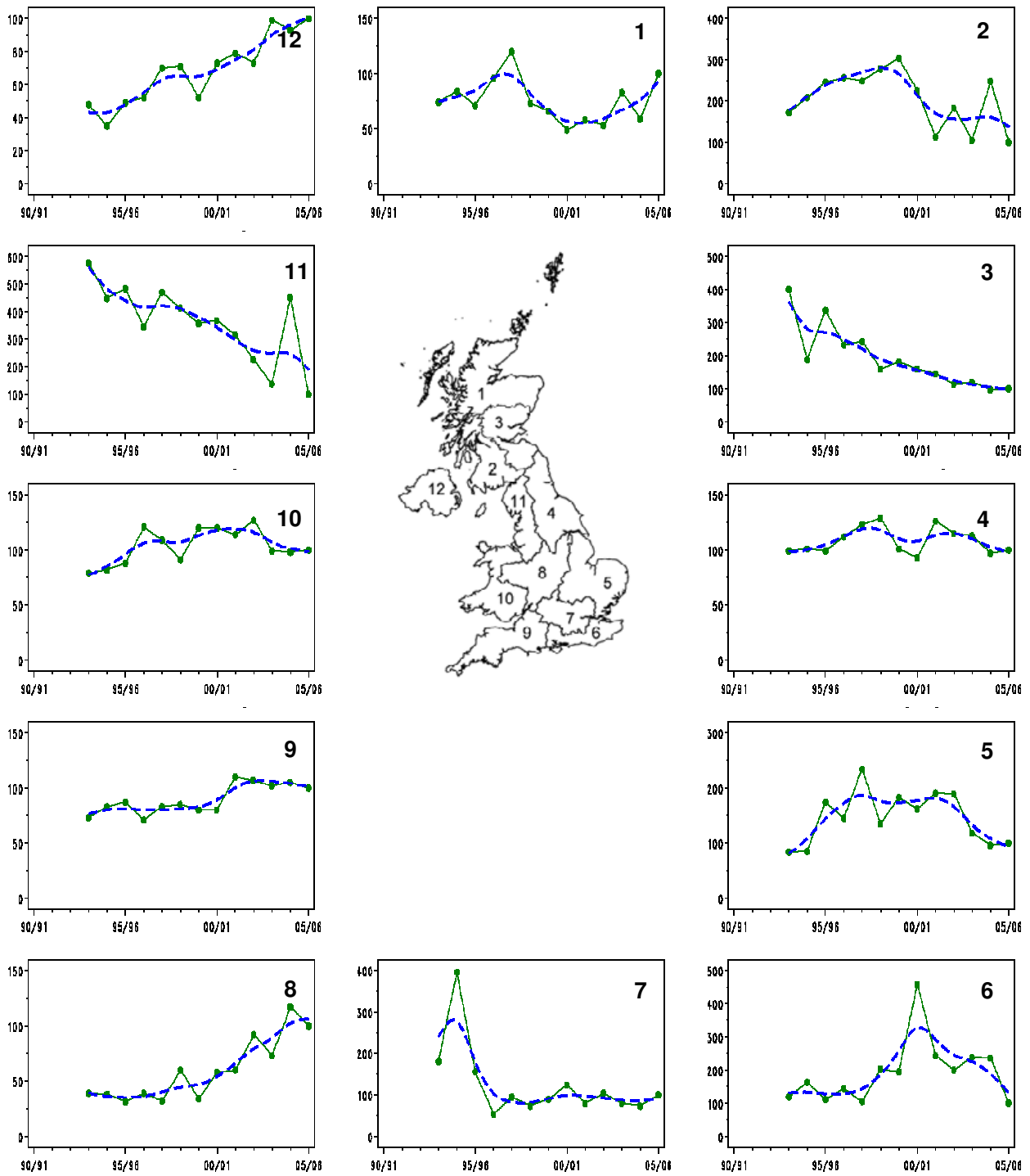


Figure 3.2.4b: Herring Gull (WeBS)

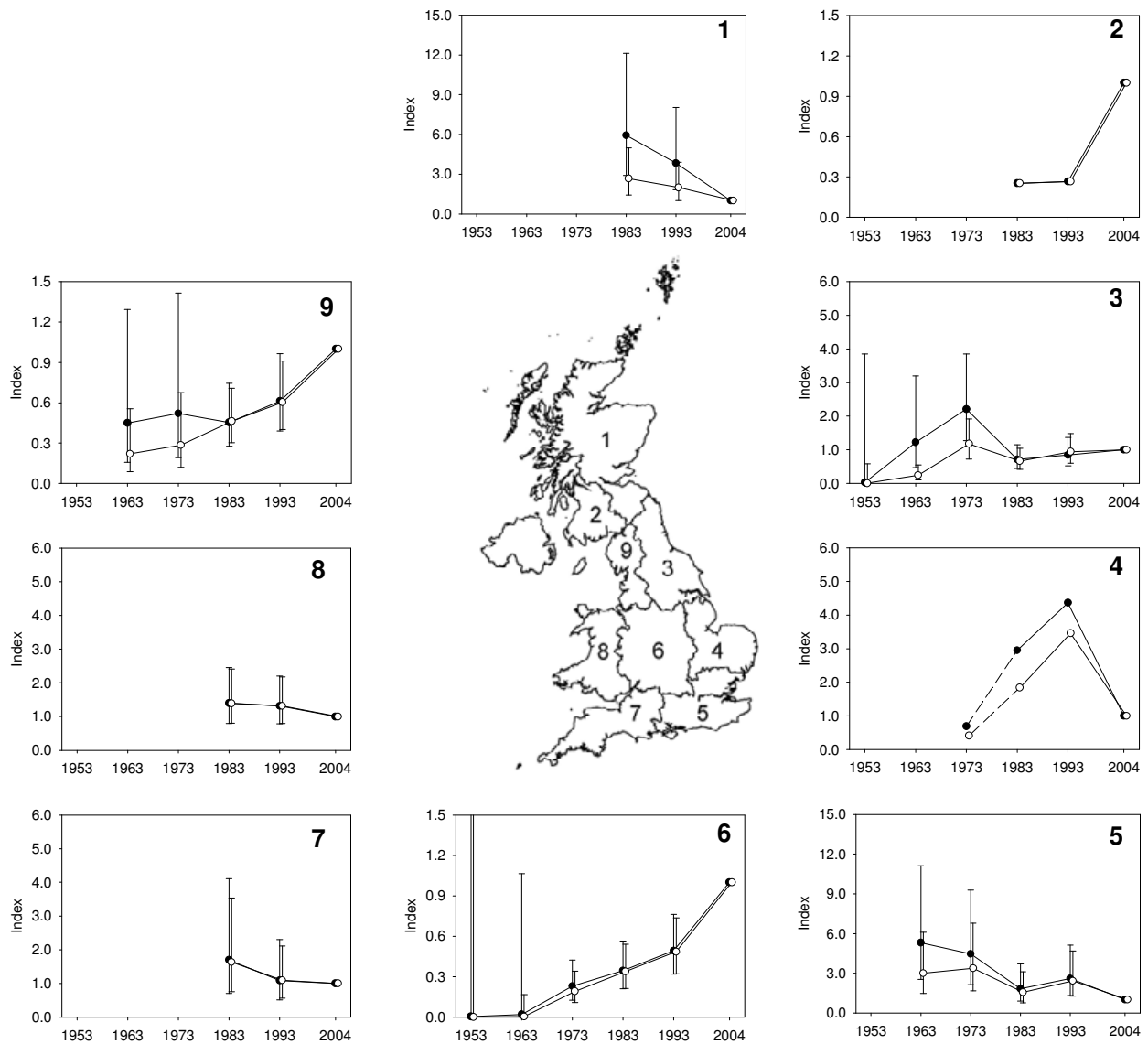


Figure 3.2.5a: Great Black-backed Gull (WinGS)

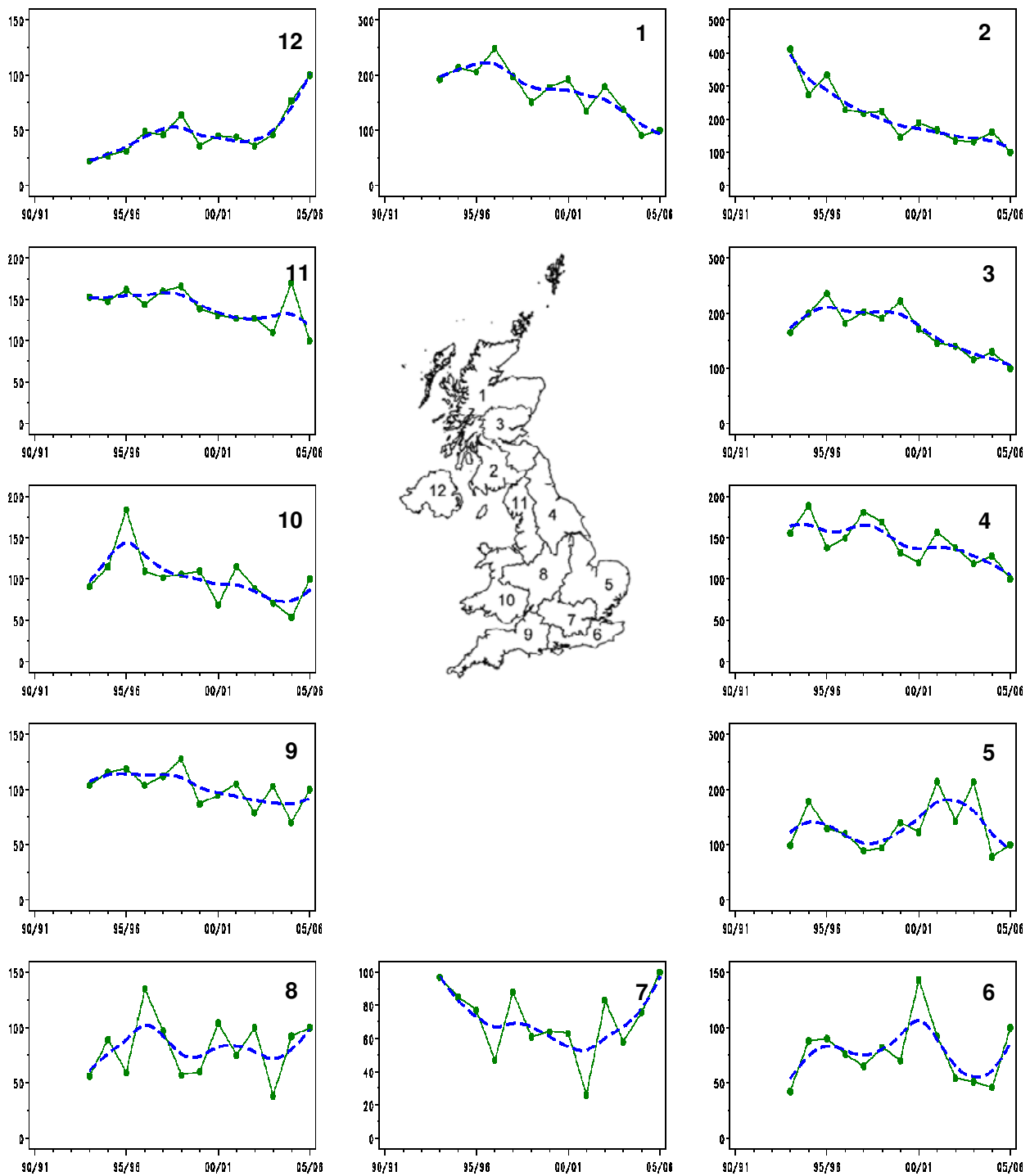


Figure 3.2.5b: Great Black-backed Gull (WeBS)

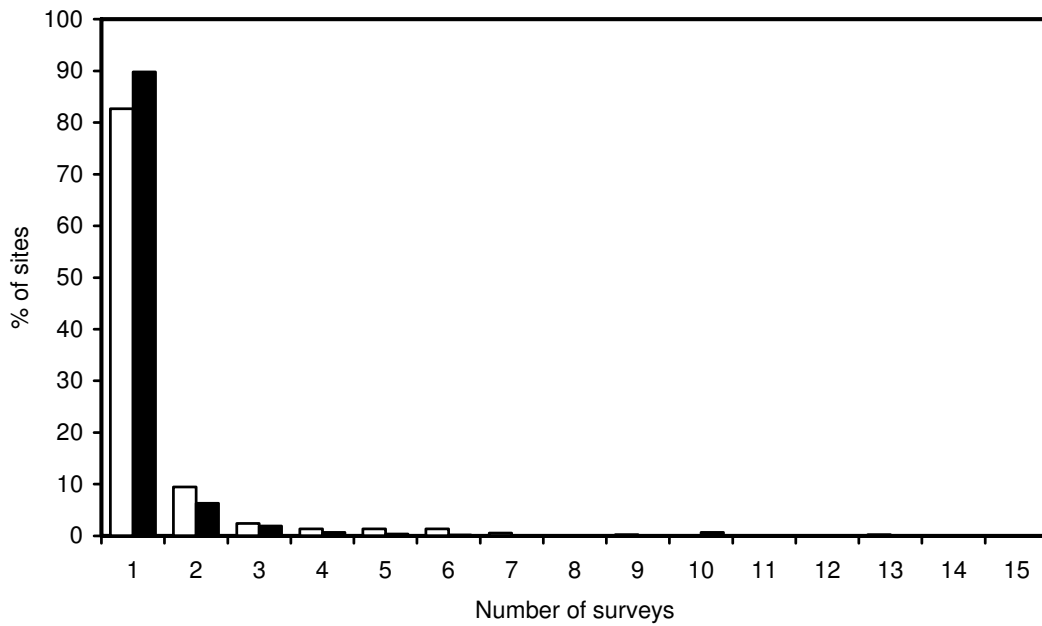


Figure 3.3.1.1 The frequency that WinGS key sites (whole sites or, if divided, sub-sites of these) were surveyed for roosting gulls during winter 2003/04. White columns = inland key sites / sub-sites ($n = 370$); black columns = coastal key sites / sub-sites ($n = 567$).