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**Seabird numbers and breeding success
in Britain and Ireland, 1995**

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Summary

This report presents results of seabird monitoring at colonies throughout Britain and Ireland in 1995, and makes comparisons with results from 1994 or earlier years. The report is produced annually as part of JNCC's Seabird Monitoring Programme, in collaboration with the Royal Society for the Protection of Birds, the Shetland Oil Terminal Environmental Advisory Group and other bodies.

In general, 1995 was a moderately good year for all seabird species monitored in Britain and Ireland. However, the following findings are worthy of particular note:

- Mammalian predation continues to pose major problems to some seabird populations. This applies particularly to gulls, terns and black guillemots in western Scotland, where predation by introduced American mink has caused widespread breeding failure and the desertion of some colonies. In one study area in this region, 1829 pairs of common terns at 23 colonies in 1987 had declined to less than 1140 pairs at 14 colonies by 1995. Avian predators, including great skuas at several kittiwake colonies in Shetland, reduced breeding success at some seabird colonies in 1995.
- High tides again caused breeding failure in some black-headed gull, arctic tern and little tern colonies.
- There was a highly significant decrease in fulmar breeding success from 1994 to 1995, with circumstantial evidence that heat stress may have reduced chick survival at some colonies during the hot summer of 1995.
- There was evidence of a possible halt to the long term cormorant population decline in Shetland.
- Shag populations in SE Scotland and NE England showed evidence of limited recovery from the 1993-94 winter wreck. The breeding season at colonies in these regions was unusually protracted, although output remained lower than in other regions.
- In Shetland, shag and black guillemot populations in the vicinity of the *Braer* oil spill site showed evidence of some recovery.
- A census of inland nesting common gulls in NE Scotland found a 35-40% increase at Mortlach Hills (to c. 18,400 pairs) but a 73-80% decline in the Correen Hills (to c. 4700 pairs). As in 1994, breeding success was very low at the Correen Hills colony.
- A survey in 1994 found that c. 4% (c. 3700 pairs) of the British and Irish population of lesser black-backed gulls and c. 8% (c. 16,800 pairs) of herring gulls now nest on roof tops and that this habit is increasing amongst common and great black-backed gulls.
- In south Wales, the breeding success of lesser black-backed gulls was very low for the third season in a row, possibly because of reduced availability of discards from trawlers.
- In 1995, the numbers of pairs of kittiwakes attempting to breed in SE Scotland and NE England returned to levels similar to those of 1991 to 1993, following major reductions in 1994. However, breeding success in SE Scotland remained poor.
- Some Irish Sea kittiwake colonies again experienced almost total breeding failure in 1995. On the Isle of Man, fulmars also produced very few chicks in 1995.
- Roseate tern numbers remained stable overall, but there is evidence of some spread to new colonies.
- Guillemot numbers continued to increase along the east coast of Great Britain and in Wales and breeding success was generally high.

1 Introduction

This is the seventh annual report on the results of seabird monitoring at colonies throughout Britain and Ireland, produced jointly by JNCC, RSPB and SOTEAG, as part of JNCC's Seabird Monitoring Programme. Breeding success and population changes noted at seabird colonies in 1995 are summarised and compared with results from 1994 or, in some cases, earlier years.

The Seabird Monitoring Programme facilitates the co-ordination of seabird monitoring on a UK-wide basis, with the aim of ensuring that adequate data on breeding numbers and breeding performance of seabirds are collected both regionally and nationally. The programme assists JNCC, RSPB and partner organisations, including the statutory country agencies, to monitor aspects of the health of the wider marine environment around the UK and to provide sound advice relevant to the conservation needs of breeding seabirds. In order to provide a wider context, results are where possible collated for the British Isles as a whole, including the Isle of Man and the Channel Islands.

One aim of the annual report is to draw attention to notable changes in seabird numbers or breeding success which may merit direct conservation action or further research. It is also intended to provide feedback and, we hope, encouragement for future work, to the many individuals and organisations contributing data, by placing results for individual colonies or regions in a wider context. The results presented refer mainly to coastal or island populations of seabirds, but reference is also made to inland results for some species (cormorant, gulls and terns).

This year's report concentrates mainly on comparisons between 1994 and 1995 results, although some reference is made to earlier years where relevant (e.g. gannet). It is intended that future reports will reassess longer-term trends for one or more species annually, summary details for all species in the period 1986-92 can be found in the 1993 report (Walsh *et al.* 1994).

Any comments on this report, or offers of help for future seasons, would be greatly appreciated by the authors. We are also keen to receive any additional information on numbers or breeding success for any seabird species, whether at coastal or inland colonies. Such data would be added to the long-term databases maintained by JNCC and RSPB, including the JNCC/Seabird Group's Seabird Colony Register and the RSPB's Tern Database.

Details of recommended methods for assessing seabird numbers and breeding success are given in the *Seabird monitoring handbook for Britain and Ireland*, published in 1995 by JNCC, RSPB, ITE and the Seabird Group. Copies of the Handbook, or other advice on seabird monitoring methodology, may be obtained from the Seabirds and Cetacean's Branch of JNCC at the address given on the title page.

1.1 Sources of information for the report

Information is collated from many sources, including: research or wardening staff of RSPB, SOTEAG, JNCC, Scottish Natural Heritage, English Nature, Countryside Council for Wales and the Office of Public Works Wildlife Service in Ireland; local wildlife trusts, bird observatories, the National Trust, the Institute of Terrestrial Ecology, the Seabird Group, the Irish Wildbird Conservancy and other organisations; and many fieldwork volunteers (see Acknowledgments).

Seabird monitoring directly funded by JNCC focuses particularly on marine species such as fulmar, shag, kittiwake and auks, for which changes in breeding populations, breeding success or other parameters may provide evidence of changes in the marine environment as a whole. The most detailed monitoring is undertaken, through external contracts, at several geographically-dispersed 'key sites': Isle of May (SE Scotland), Fair Isle (Shetland), Canna (NW Scotland) and Skomer (Wales). Long-term

monitoring of numbers and breeding success is also undertaken on Orkney Mainland, on St Kilda (NW Scotland) and in Grampian (NE Scotland).

Monitoring of breeding success of cliff-breeding species is also encouraged by JNCC at many other colonies, partly by contributing to fieldwork costs of volunteers via the Seabird Group. JNCC and the Seabird Group also collaborate on the Seabird Colony Register, a database of colony counts for Britain and Ireland, which is maintained as part of the Seabird Monitoring Programme. Many observers and organisations (including SOTEAG and RSPB) contribute to the Register annually, and these counts are also used in assessing annual population changes in particular regions.

Nearly all coastal colonies in Britain and Ireland were censused for the Register in 1985-87, providing a baseline for future largescale surveys of this kind. Population changes since the previous full survey (the Seabird Group's Operation Seafarer in 1969-70) are summarised in Table 1.2, which is derived from Lloyd *et al.* (1991) with updates based on more recent data for some species. It is hoped that a full repeat census of coastal seabird colonies will take place around the millennium.

The RSPB monitors the numbers and breeding success of a range of seabird species throughout the UK through their network of reserves, and the monitoring of terns in Britain is also largely coordinated by RSPB. Further RSPB monitoring or survey effort is directed at petrels and at arctic terns and skuas at many colonies in Shetland and Orkney.

In Shetland, Aberdeen University, under contract to SOTEAG, carries out extensive population-monitoring of cliff-breeding species and black guillemots. This work is funded by the Sullom Voe Association Ltd, and forms part of a wider scheme of biological monitoring in Shetland. For fulmar, guillemot and razorbill, annual counts are carried out in sample plots while for shag, kittiwake and black guillemot, counts are made of longer stretches of coastline at intervals of two years or more. Assessment of breeding success has also been carried out at many colonies since the mid-1980s.

Available data for Irish colonies are also collated by JNCC and RSPB, helping to place patterns or trends for British colonies in a wider context. Contacts are maintained with a number of organisations including the National Parks and Wildlife Service, the Irish Wildbird Conservancy, and the National Trust. Fieldwork at some Irish colonies is grant-aided by the Seabird Group.

1.2 Data-presentation and methods

Some potential limitations of the information presented in this report are outlined below. Further discussion of methodological considerations and details of analyses are given in the *Seabird Monitoring Handbook* (Walsh *et al.* 1995) and in previous annual reports.

1.2.1 Population changes: use of regional samples

To allow concise and standardised presentation of population data for each species, individual colonies are not, with the exception of gannet, Manx shearwater, petrels and some terns, considered in detail in this report. However, original counts used in assessing population changes are included in limited-circulation appendices held by JNCC, RSPB and SOTEAG.

For most species, with the exception of some terns, neither is it practicable to assess year-to-year changes for the population as a whole, because such changes are known to vary markedly between different parts of the British Isles and monitoring effort is uneven.

Instead, the coastline has been subdivided into 14 'regions', as defined in Figure 1.1 and Table 1.1. and, for most species, population data are summarised region-by-region. Valid counts (section 1.2.2) of whole colonies, or of sample plots within colonies, are summed for year-to-year comparisons. The aim of this approach is to draw attention to any common patterns shown by a number of regions, as well as to highlight any notable changes shown by colonies in particular regions.

Regional population changes for most species are tabulated for 1994-95. Readers should bear in mind that some of the population changes indicated by these counts may be of a short-term nature, not necessarily consistent with longer-term trends. For example, some year-to-year changes in species such as kittiwake may reflect fluctuations in the proportion of adults attempting to breed. Movements of breeding birds to or from unmonitored colonies, notably in the case of cormorants, black-headed gulls and terns, may also contribute to apparent changes. Even where inter-colony movements do not occur, changes shown by sample populations may not necessarily be representative of a wider population (section 1.2.2).

Although long-term population trends have not been calculated incorporating 1994 and 1995 data, some summaries of earlier trends are given. These trends were assessed using a system of population indices, with 1986-87 average counts set as an arbitrary 100. This enables average annual rates of population change, and their statistical significance, to be assessed by regression of the logarithms of index values against year. Details of the derivation of indices and trends are given in the 1993 report.

1.2.2 Accuracy and representativeness of counts

In comprehensive assessments of long-term changes in seabird numbers (e.g. between 1969-70 and 1985-87, Lloyd *et al.* 1991), there is inevitably some loss of count accuracy at the expense of obtaining complete geographical coverage. However, stricter criteria, covering factors such as census unit, timing, frequency and apparent accuracy of counts, need to be applied when selecting counts for assessment of short-term changes, as in this report. For most species, single, well-timed counts of apparently occupied nests are sufficient. However, the possibility of undetected variations in count accuracy, count coverage or timing of breeding season should be borne in mind.

For fulmar, guillemot and razorbill, numbers of adults attending colonies can fluctuate markedly from day to day. Given this source of variation, assessment of population change for these species ideally requires five to ten counts of adults (auks) or apparently occupied nest-sites (fulmars) in June each year. The statistical significance of changes shown by such counts can be assessed using *t*-tests. Where such replication of counts is necessary, it is rarely possible to count the whole of a large colony. Therefore, counts are normally of sample plots within a colony, but these plots, even where randomly selected, will not necessarily be representative of the colony as a whole.

The seabird colonies regularly monitored may not be representative of British or Irish populations as a whole. Representativeness is more likely to be achieved within particular regions but cannot be assumed, especially if few colonies or small population samples are monitored. In particular, if efforts are concentrated on individual colonies, the formation of new colonies elsewhere may be missed. Coverage of extensive stretches of coastline is a more satisfactory approach for species not requiring replicate counts. This approach is used, for example, in SOTEAG's monitoring of shags, kittiwakes and black guillemots in Shetland.

1.2.3 Breeding success: use of 'low-input' methods

For general monitoring purposes, the number of chicks fledged per breeding pair is the most useful parameter for gauging breeding success. Productivity of species other than terns is usually assessed for sample plots, which ideally are randomly selected, within colonies. For such species, the figures presented here have generally been averaged (rather than combined) between plots. For terns, whole-colony assessments of productivity are usually made.

Note that for some species or regions, few colonies are currently monitored, so that results may not be fully representative. In most cases, the 'low-input' methods used will overestimate the productivity of breeding pairs slightly (Walsh *et al.* 1995). This is considered acceptable, as major geographical or year-to-year changes will still be obvious.



Figure 1.1 Coastal counties / districts of Britain and Ireland. See table 1.1 for details of the coastal regions used in this report. Reproduced, with permission, from Lloyd *et al.* (1991).

Table 1.1 Groupings of coastal counties or districts used in assessing regional population changes. These regions are based on Figure 2 of Lloyd *et al.* (1991), except that Shetland and Orkney are each treated separately from 'NE Scotland' and the Inverness-to-Caithness coastline is treated separately ('N Scotland') from 'NW Scotland'.

County / district name (numbers refer to figure 1.1)	Region
Louth (1), Meath (2), Dublin (3), Wicklow (4), Wexford (5), Waterford (6)	SE Ireland
Cork (7), Kerry (8), Limerick (9), Clare (10)	SW Ireland
Galway (11), Mayo (12), Sligo (13), Leitrim (14), Donegal (15)	NW Ireland
Londonderry (16), Antrim (17), Down (18)	NE Ireland
Annandale & Eskdale (19), Nithsdale (20), Stewartry (21), Wigtown (22), Kyle & Carrick (23), Cunninghame (24), Inverclyde (25), Dunbarton (26), Argyll & Bute (27)	SW Scotland
Lochaber (28), Skye & Lochalsh (29), Western Isles (30), W coast of Ross & Cromarty (31), NW coast of Sutherland (32)	NW Scotland
Orkney (34)	Orkney
Shetland (35)	Shetland
Caithness (33), east coast of Sutherland (32), east coast of Ross & Cromarty (31), Inverness (32)	N Scotland
Nairn (37), Moray (38), Banff & Buchan (39), Gordon (40), City of Aberdeen (41), Kincardine & Deeside (42)	NE Scotland
Angus (43), City of Dundee (44), NE Fife (45), Kirkcaldy (46), Dunfermline (47), West Lothian, City of Edinburgh (48), East Lothian (49), Berwickshire (50)	SE Scotland
Northumberland (51), Tyne & Wear (52), Durham (53), Cleveland (54), North Yorkshire (55), Humberside (56), Lincolnshire (57)	NE England
Norfolk (58), Suffolk (59), Essex (60)	E England
Kent (61), East Sussex (62), West Sussex (63), Hampshire (64), Isle of Wight (65)	SE England
Dorset (66), Cornwall/Isles of Scilly (67), Devon (68), Somerset (69), Avon (70), Gloucestershire, Channel Islands (82)	SW England / Channel Islands
Gwent (71), South Glamorgan (72), Mid Glamorgan (73), West Glamorgan (74), Dyfed (75), Gwynedd (76), Clwyd (77)	Wales
Merseyside (78), Lancashire (79), Cumbria (80), Isle of Man (81)	NW England / Isle of Man
Londonderry (16), Antrim (17), Down (18)	NE Ireland

Table 1.2 Counts or estimates of total breeding populations of seabirds in Britain and Ireland. Most figures are for 1985-87, figures for gannets, skuas, and roseate and arctic tern include recent updates. See Lloyd *et al.* (1991), from which 1985-87 counts are taken, for further details. Units are 'pairs' for most species (apparently occupied nests/sites or, for skuas, territories), with the exception of auks for which units are individual birds.

	Coastal population		% change ^c 1969-87 B & I coast	Total population ^d	
	Britain ^a	Britain & Ireland ^b		Britain ^a	Britain & Ireland ^b
Fulmar	537 000	571 000	+85%	537 000	571 000
Manx shearwater ^e	250 000+	c275 000	?	250 000+	c275 000
Storm petrel	41+ colonies	72+ colonies	?	41+ cols.	72+ cols.
Leach's petrel	6+ colonies	7+ colonies	?	6+ cols.	7+ cols.
Gannet ^f	200 700	236 500	+36%	200 700	236 500
Cormorant	6 000	10 400	+30%	6 800	11 700
Shag	36 400	47 300	+40%	36 400	47 300
Arctic skua ^g	3 200	3 200	≤ +220%	3 200	3 200
Great skua ^g	8 500	8 500	≤ +150%	8 500	8 500
Black-headed gull	77 300	84 200	+13%	167 000	233 000
Common gull	14 800	15 700	+21%	67 800	71 400
Lesser black-backed gull	62 300	65 700	+31%	82 300	88 700
Herring gull	135 000	191 000	-43%	150 000	206 000
Great black-backed gull	18 300	23 300	+3%	18 400	23 400
Kittiwake	492 000	544 000	+22%	492 000	544 000
Sandwich tern	14 000	18 400	+53%	14 000	18 600
Roseate tern ^h	64-70	686-696	-80%	64-70	686-696
Common tern	11 800	14 700	-1%	12 700	16 000
Arctic tern ⁱ	42 400	44 900	-14%	42 900	45 500
Little tern	2 400	2 800	+40%	2 400	2 800
Guillemot	1 047 000i	1 203 000i	+118%	1 047 000i	1 203 000i
Razorbill	147 000i	182 000i	probably +	147 000i	182 000i
Black guillemot	37 500i	40 500i	probably +	37 500i	40 500i
Puffin ^j	898 000i	940 000i	slightly +?	898 000i	940 000i

Notes:

- Figures for Britain exclude Isle of Man and the Channel Islands (included under Britain & Ireland).
- Irish figures include some estimates (mainly for fulmar, shag and gulls) for coastal sections which had not been surveyed by 1988.
- Net change based on comparison with total recorded during the 1969-70 'Operation Seafarer' survey (re-analysis of counts summarised by Cramp *et al.* 1974); differences in count methods prevent direct comparison for some species.
- British & Irish totals for some species include estimates of inland populations, to be revised once further information has been collated for the SCR.
- Manx shearwater figures very approximate (midpoints of population estimates).
- Gannet figures are from a complete survey of North Atlantic colonies carried out by Sarah Wanless and Stuart Murray in 1994 and 1995.
- Skua figures are from 1992 survey of Orkney & Shetland, plus 1991-93 updates for Handa and St Kilda, otherwise 1985-87. Although some nest inland in mainland Scotland, all are treated as coastal here.
- Roseate tern figures are from 1995 (this report), allowing for small numbers at uncounted colonies.
- Arctic tern figures include Shetland and Orkney counts from the 1989 RSPB survey (Avery *et al.* 1993), with counts of individuals divided by 1.5 to give an estimate of pairs.
- Puffin figures very approximate (including a high proportion of counts of pairs, multiplied by two to give individuals).

2.1 Red-throated diver *Gavia stellata*

Breeding numbers and success (figure 2.1.1, table 2.1.1)

Four sample areas of Shetland are monitored annually by the Shetland Ringing Group. At these sites, numbers of pairs with chicks in mid-July fell slightly, by 3%, from 58 in 1994 to 56 in 1995, close to the average of 54 (s.d.= 8.4) for the period since 1980. The mean brood size of 1.57 was the highest yet recorded.

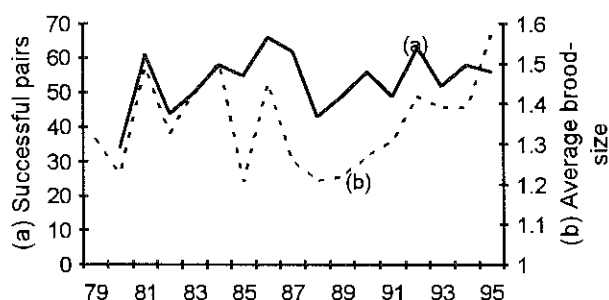


Figure 2.1.1 Annual variation in (a) numbers of 'successful' pairs (with chicks in mid July) and (b) average brood-size near fledging at red-throated diver study areas in Shetland (parts of Unst, Eshaness, North Roe and Bressay), 1979-95. Data are from Okill (1995a).

At the RSPB study sites on Yell (Lumbister and South Yell quadrat) the numbers of pairs which laid eggs rose from 21 in 1994 to 25 in 1995, and breeding success was also higher at 0.44 chicks fledged per breeding pair. A separate survey of the Graveland peninsula in north east Yell in July found sixteen breeding pairs, one fewer than in 1994, but in line with the general recovery noted since 1991 (Fowler 1995). On Fetlar, there was no change in numbers of breeding pairs (19), but productivity doubled to 0.74 chicks fledged per pair. On Hermaness, there were 8 breeding attempts, lower than the peak figures in 1986-88 but average for subsequent years, and breeding success was high at 1.50 fledglings per pair, only previously matched in 1993. On Foula, numbers of breeding pairs are now almost recovered to early 1980s levels, and the number of chicks surviving to mid-July was substantially greater than in 1994.

Overall in Shetland, up to 0.71 chicks fledged per breeding pair, a moderately good season and similar to 1993, as compared to a productivity of just 0.35 in 1994. However, there was considerable variation between study areas with breeding success ranging from 0.44 to 1.50.

On Orkney, productivity on Hoy was also higher in 1995 than in 1994, but the situation was reversed for Mainland sites and also on Rousay, where no young were successfully reared. Overall productivity was moderate at 0.51 fledglings per occupied site.

Away from the Northern Isles, little systematic information is collected on this species. However on Handa in 1995 three pairs were present and raised a total of five chicks (1.67 per pair).

Seabird numbers and breeding success, 1995

Table 2.1.1 Red-throated diver breeding success, 1994-95: estimated number of chicks fledged per breeding pair.

Site	1994		1995	
	Pairs	Fldg./pr.	Pairs	Fldg./pr.
Hermaness	7	0.86	8	1.50
Fetlar	19	0.37	19	0.74
Yell	22	0.27	25	0.44
Foula	11	0.18	12	≤0.75
SHETLAND sample total	59	0.35	65	≤0.71
Hoy	73	0.42	65	0.69
Rousay	10	0.10	11	0.00
Mainland	35-39	≈0.41	21	0.19
ORKNEY sample total	118-122	≈0.39	97	0.51
Handa	3	1.00	3	1.67

Note that numbers of pairs do not necessarily indicate total populations in study areas. Orkney figures are occupied sites at not all of which are eggs laid.

2.2 Fulmar *Fulmarus glacialis*

Breeding numbers (table 2.2.1)

Numbers of apparently occupied sites (AOS) in sample populations increased in all regions between 1994 and 1995, broadly in line with regional trends for the period 1986 to 1993. The largest increase was in NW Scotland (+21.6%), where the colony on Canna recovered to 1993 levels (653 AOS) following a dip (to 517 AOS) in 1994. In SE Scotland an overall increase of 12.2% reflected increases at all sites monitored in the Firth of Forth, with the exception of St. Abb's Head where there was no change from 1994.

Replicate counts of sample plots were made at seven colonies in both 1994 and 1995. Of these, only Troswick Ness in Shetland, showed any significant change (+18%, $t=9.671$, d.f. = 8, $p<0.01$), with this increase possibly reflecting the apparent absence of feral ferrets at this site in 1995. Non-significant increases were recorded at all but one of the other sample plots in Shetland, continuing the pattern of gradual population increase.

Surveys along the Grampian coast in 1995 (Walsh *et al.* 1996) recorded 2820 AOS between Buchan Ness and Collieston, equivalent to an average annual increase of 5.3% since 1986, and 4420 AOS between Gamrie and Pennan, equivalent to an increase of up to 11.7% per annum over the same period. However, numbers may have been somewhat underestimated along the Gamrie to Pennan coast in 1986, thus inflating the apparent subsequent rate of increase. No significant changes for the period 1992 to 1995 were evident from replicate counts of sample plots within these two stretches of coastline.

Table 2.2.1 Population changes at monitored fulmar colonies, 1994-95 (apparently occupied sites in June).

Superscript = number of colonies with 10+ AOS counted in both years; counts with a reported inaccuracy of $>\pm 5\%$, and regional samples <100 AOS, are excluded. Figures for Shetland are based mainly on the means of 5 annual counts of study plots within each colony. Trends for 1986-93 are average annual rates of change shown by sample populations (significant trends indicated as: * $P<0.05$; ** $P<0.01$)

	NW Scotland ^a	Shetland ^b	SE Scotland ^c	NE England ^d	Wales ^e	NW Eng. & I. of Man ^f
1986-93 annual % change	+2.6	+1.5*	+3.2*	+5.0*	+4.4**	+1.2
1994	630	2196	1910	335	1014	800
1995	766	2392	2143	355	1045	833
1994-95 % change	+21.6% ²	+8.9% ⁶	+12.2% ⁸	+6.0% ³	+3.1% ⁵	+4.1% ⁶

Colonies: ^a Canna, Handa (plot counts); ^b Hermaness, Eshaness, Burravoe, Troswick Ness, Sumburgh Head, Fair Isle; ^c Isle of May, Fidra, St Abb's Head, Inchkeith, Inchgarvie, Inchmickery, Incholm, Craigleith; ^d Farne Islands, Coquet Island, Bempton (plots); ^e Skomer, Skokholm, Elegug Stacks, Caldey, Bardsey; ^f Traie Vane-Gob yn Ushtey, Peel Hill, Glen Maye, Contrary Head-Traie Cronkan, Glen Maye Gorge, Marine Drive Douglas, St. Bee's Head.

Breeding success (table 2.2.2)

Overall, breeding success averaged 0.41 (\pm s.e. 0.03) chicks fledged per site at 37 colonies, similar to the 1986-94 average (0.42 \pm s.e. 0.01, based on 13-34 colonies annually), but lower than the 1994 figure of 0.48 (\pm s.e. 0.02, $n=34$). The mean decrease of 0.08 (\pm s.e. 0.03) across 29 colonies where productivity was measured by comparable methods in 1994 and 1995 was highly significant ($t=3.360$).

At a regional level, significant decreases were recorded in NW Scotland ($-0.15 \pm \text{s.e. } 0.01$), NE England ($-0.21 \pm \text{s.e. } 0.005$) and the Isle of Man ($-0.16 \pm \text{s.e. } 0.06$). As in 1994, productivity was lowest in the Isle of Man and highest at Ailsa Craig.

Anecdotal reports from several colonies, including Ailsa Craig, two colonies on Orkney and the Isle of May, indicate that an unknown proportion of chicks died from heat stress, attributable to unusually hot and dry weather in 1995. This effect was also noted at the Isle of Man, but poor breeding performance there over a number of years suggests that some other factor(s) may also be adversely influencing productivity.

Table 2.2.2 Fulmar breeding success, 1994-95: estimated number of chicks fledged per apparently occupied site at sample colonies (n = number of colonies).

Figures are based on regularly-occupied sites or on the average numbers of occupied sites in June, and are presented as the mean and standard error of figures for individual colonies. Changes in breeding success are indicated for colonies where similar methods have been used in both years (significant changes based on t-test * $P < 0.05$, ** $P < 0.01$)

Region	1994 chicks fledged per site				1995 chicks fledged per site				1994-95 change	
	sites ⁿ	range	mean	\pm s.e.	sites ⁿ	range	mean	\pm s.e.	mean ⁿ	\pm s.e.
SW Scotland ^a	19 ¹		0.68		14 ¹		0.79		+0.11 ¹	
NW Scotland ^b	485 ³	0.45-0.56	0.50	± 0.03	188 ²	0.34-0.42	0.38	± 0.04	-0.15 ²	$\pm 0.01^*$
Shetland ^c	>2916 ⁸	0.37-0.64	0.50	± 0.03	2867 ⁷	0.48-0.68	0.53	± 0.03	+0.02 ⁶	± 0.03
Orkney ^d	826 ⁶	0.39-0.61	0.51	± 0.04	>1109 ⁷	0.00-0.56	0.41	± 0.07	-0.04 ⁶	± 0.04
N Scotland ^e	63 ¹		0.44		311 ⁴	0.17-0.70	0.49	± 0.11	-0.27 ¹	
SE Scotland ^f	583 ⁴	0.21-0.63	0.48	± 0.10	371 ⁴	0.24-0.50	0.37	± 0.07	-0.15 ³	± 0.11
NE England ^g	158 ²	0.62-0.63	0.63	± 0.01	182 ²	0.42-0.42	0.42	± 0.00	-0.21 ²	$\pm 0.005^*$
SW England/ Channel Is ^h	32 ¹		0.34		49 ²	0.48-0.50	0.49	± 0.01	-	
Wales ⁱ	217 ²	0.44-0.55	0.49	± 0.06	230 ²	0.45-0.50	0.48	± 0.03	-0.02 ²	± 0.03
Isle of Man ^j	734 ⁶	0.12-0.49	0.33	± 0.06	802 ⁶	0.03-0.32	0.17	± 0.04	-0.16 ⁶	$\pm 0.06^*$
TOTAL	>6033 ³⁴	0.12-0.68	0.48	± 0.02	>6123 ³⁷	0.00-0.70	0.41	± 0.03	-0.08 ²⁹	$\pm 0.03^{**}$

Colonies: ^a Ailsa Craig; ^b Canna, Handa; St. Kilda (1994 only); ^c Hermaness, Lumbister (1994 only), Eshaness, Noss, Westerwick, Troswick Ness, Sumburgh Head, Fair Isle; ^d Papa Westray, Rousay coast, Rousay inland (1995 only), Costa Head, Mull Head, Gultak, Hoy; ^e Easter Ross; St. John's Head (1995 only), Sandside Head (1995 only), near Wilkhaven (1995 only); ^f Isle of May, Fidra, Tantallon, St Abb's Head (whole colony estimate 1994, plot monitoring 1995); ^g Outer Farne Islands, Coquet Island; ^h West Bay-Burton Bradstock, Annet (1995 only); ⁱ Skomer, Skokholm; ^j Traie Vane-Gob yn Ushtey, Will's Strand-Gob y Deigan, Peel Hill, Glen Maye, Bradda, Douglas.

2.3 Manx shearwater *Puffinus puffinus*

Breeding numbers and success

As in other years, relatively little information is available for this species and data from additional sites would be very welcome. However, approximate estimates of numbers were recorded from several colonies in 1995, including 200-500 burrows on Lunga, Treshnish Isles (SW Scotland), 300-350 pairs on Eigg (NW Scotland) and 150-220 pairs on Sanda (SW Scotland). All of these figures are in line with other recent estimates. On Old Lighthouse Island, Copeland Islands in NE Ireland a total of 680 chicks were ringed, compared to an average of 456 (s.d.= 104.0) from 1985 to 1994. Numbers of chicks ringed in the last few years, plus size of offshore rafts in the early breeding season, suggest that this colony is increasing in size and currently holds in the order of one thousand pairs.

On Canna (NW Scotland), occupancy of study burrows was again low (40%) and estimated breeding success in a sample of 16 burrows in which eggs were laid was only 0.25 chicks fledged per egg, the lowest recorded since 1982. There was some evidence of rat predation with several partly eaten youngsters found. By contrast, on neighbouring Rum, where rat predation is apparently not a problem for shearwaters (Thompson 1987), 70 out of 84 burrows with eggs in late May held chicks in August, giving a high estimated breeding success rate of 0.83 fledglings per egg. On Rathlin Island (NE Ireland), Manx shearwaters are now confined to inaccessible grassy cliff ledges following the introduction of ferrets to the island several years ago (D. Allen, pers. comm.).

On Skomer (Wales), 47 burrows with eggs fledged 22 chicks, an average of only 0.47 per egg, mainly reflecting low hatching success, although it was not clear how representative this figure was of the colony as a whole.

2.4 Storm petrel *Hydrobates pelagicus*

Breeding numbers

Fieldwork on Skokholm continued at the two walls which have been studied annually since 1992. Between 24 May and 5 July, ten paired visits were made to the 85 sites permanently marked in 1994, one visit in the daytime and another the following night, during which purr calls were played at full volume. The number of apparently occupied sites increased to 101 in 1995, the overall response rate in daytime being 38% of that obtained during darkness. It is possible however, that improved counting methods are responsible for at least part of the increase in numbers over the study period. In addition, a number of wall-sites were found to be suitable for monitoring with an endoscope.

Further work to establish the size of the storm petrel population on Skokholm was carried out by RSPB, using playback methods. Ten random lengths of dry-stone wall were selected for nocturnal visits during the territory establishment phase. Occupied burrows were found by playback of male calls at potential sites. A single daytime visit to each site later in the season with similar playback obtained responses from 34% of those sites known to be occupied from nocturnal visits. Densities of territories within randomly chosen areas of rockfall and rockburrow habitats were also estimated using diurnal playback. From these two types of estimate, the overall population on Skokholm was put at 3000-4000 pairs, with the population in the quarry now estimated at between 900 and 1800 pairs (M. Betts, pers. comm. to D. Gibbons). Although the figure of 3000-4000 pairs is lower than the 1970 estimate of 5,000-7,000 pairs, some of the apparent decline could be due to differences in methods. However, it appears that there has been a substantial decline in numbers of birds nesting in the rockburrow habitat on the island.

On Sanda, there were an estimated 150-220 occupied burrows, in line with estimates for the period from 1989 to 1994. On the Treshnish Islands, 1000-2500 pairs were estimated to be present in both 1994 and 1995.

There will be further development of census methods in 1996, building on work carried out at several sites. The aim is to produce a simple and safe method for the census of breeding storm petrels, which can be used at a variety of sites.

2.5 Leach's petrel *Oceanodroma leucorhoa*

Breeding numbers

Gruney, Ramna Stacks (Shetland) was found to hold 20 occupied burrows in 1995, similar to the numbers found from 1992 to 1994. Responses were noted to playback of calls at burrow entrances and burrow contents examined using an endoscope. Endoscope checks confirmed breeding Leach's petrels in 20 burrows, an additional 20 burrows were examined but found to be empty.

Discussion

Colonies are particularly difficult to monitor due to their inaccessibility, and it is likely that some are missed. Petrel monitoring techniques are currently being developed further and will be published as an addition to the current monitoring manual (Walsh *et al.* 1995) in the near future.

2.6 Gannet *Morus bassanus*

Breeding numbers (table 2.6.1)

Those gannetries not censused in Britain and Ireland in 1994 were counted by a number of volunteers in 1995 (see acknowledgments), as part of a survey of gannet colonies in the North Atlantic, co-ordinated by Sarah Wanless and Stuart Murray and supported by SNH, JNCC, SOC, BTO and RSPB. The 1994 results are summarised in table 2.6.1. Further details of the results for the St. Kilda and Troup Head colonies are given in Murray & Wanless (in press) and Wanless *et al.* (in press) respectively. A paper on the status of the gannet in Scotland is also nearing completion. Pending publication of the full survey results, the 1995 counts are available either from Sarah Wanless (ITE, Banchory) or from the Seabird Colony Register (JNCC, Aberdeen).

Table 2.6.1 Gannet colony counts: 1984-88 taken from Lloyd *et al.* (1991); 1994 from S. Murray & S. Wanless (pers. comm.).

S = Apparently Occupied Sites; N = Apparently Occupied Nests. Figures in parenthesis are indirect estimates rather than new counts.

Site	1984-88 counts		1994 Count	% change		Notes
	Count	Year		overall	p.a.	
Hermaness, Shetland	9904 N	1986	11,994 N	+21	+2.4	10,057 N in 1991
Noss, Shetland	6900 S	1984	7310 S	+6	+0.6	6856 N in 1992
Foula, Shetland	124 S	1987	600 S	+384	+25.3	c. 280 N in 1991
Fair Isle, Shetland	258 S	1986	825 N	+220	+15.6	
Sule Stack, Orkney	5900 S	1985	4888 S	-17	-2.1	
Sula Sgeir, Western Isles	9143 S	1985	10,440 S	+14	+1.5	
St. Kilda, Western Isles	50,050 S	1985	60,428 S	≤+21	+2.1	1985 count low
Flannans, Western Isles	414 S	1988	1438 S	+247	+23.1	
Shiant, Western Isles	0 S	1987	0 S	-	-	1S in 1986
Troup Head, Grampian	2 S	1988	239+ S	-	-	
Bass Rock, Lothian	21,591 S	1985	39,751 S	+84	+7.0	
Ailsa Craig, Strathclyde	22,811 S	1985	-	-	-	Counted in 1995
Scar Rocks, Dumfries & Galloway	770 S	1984	-	-	-	Counted in 1995
Bempton, N. Yorkshire	780 S	1987	1631 N	+109	+11.1	1510 N in 1993
Ortac, Alderney	1985 S	1987	2098 S	+6	+0.8	1868 S in 1989
Les Etacs, Alderney	2536 S	1987	3380 S	+33	+4.2	c. 2746 S in 1992
Grassholm, Dyfed	(30,000 S)	1986	26,277 S	-	-	c. 27,500 S in 1991
Clare Island, Co. Mayo	2 S	1986	-	-	-	
Little Skellig, Co. Kerry	22,500 S	1984	26,436 S	+17	+1.6	
Bull Rock, Co. Cork	1511 S	1985	1815 S	+20	+2.1	
Great Saltee, Co. Wexford	710 S	1987	1250 S	+76	+8.4	1050 S in 1990
Irelands Eye, Co. Dublin	17 S	1989	45 N	+165	+21.5	47 N in 1992

These results suggest a continuing increase of the British and Irish gannet population at an overall rate of c. 2.5-3.0% p.a. Rates of change at individual colonies are highly variable, with some of the more recently formed (e.g. Troup Head) or smaller (e.g. Fair Isle) colonies expanding very rapidly and some large colonies (e.g. St. Kilda) growing more slowly. Only at Sule Stack and Grassholm have numbers of pairs apparently decreased or remained stable in recent years.

Seabird numbers and breeding success, 1995

Breeding success (table 2.6.2)

At the four colonies where breeding success was monitored in both 1994 and 1995, average productivity in both seasons was at or close to the overall 1986 to 1994 average of $0.69 \pm \text{s.e. } 0.02$ (based on up to six colonies annually). There was a significant mean decrease in productivity between 1994 and 1995 at three colonies in Shetland ($t=5.100$) and, as in 1993 and 1994, productivity at Fair Isle was higher (0.75) than at Hermaness (0.67) or Noss (0.66). No productivity data were available for Troup Head or Bempton in 1995.

Table 2.6.2 Gannet breeding success, 1994-95: estimated number of chicks fledged per occupied nest (n = number of colonies).

Figures are presented as the mean and standard error of figures for individual colonies. Changes in breeding success are indicated for colonies studied in both years (significant changes based on t-test * $p < 0.05$)

Region	1994 chicks fledged/nest				1995 chicks fledged/nest				1994-95 change	
	nests ⁿ	range	mean	$\pm \text{s.e.}$	nests ⁿ	range	mean	$\pm \text{s.e.}$	mean ⁿ	$\pm \text{s.e.}$
SW Scotland ^a	72 ¹		0.67		64 ¹		0.66		-0.01 ¹	
Shetland ^b	1314 ³	0.68-0.77	0.71	± 0.03	1298 ³	0.66-0.75	0.69	± 0.03	-0.02 ³	$\pm 0.003^*$
TOTAL	1386 ⁴	0.67-0.77	0.70	± 0.02	1362 ⁴	0.66-0.75	0.69	± 0.02	-0.02 ⁴	$\pm 0.003^*$

Colonies: ^a Ailsa Craig; ^b Hermaness, Noss, Fair Isle

2.7 Cormorant *Phalacrocorax carbo*

Breeding numbers (table 2.7.1)

Most of the counts summarised here, with the exception of those for the Northern Isles, were provided by Dr. R.M. Sellers who runs the Cormorant Breeding Colony Survey. In 1995, around half of the UK cormorant colonies were counted and complete coverage was achieved in Shetland (Shetland Ringing Group), Orkney (SNH), Caithness and at inland colonies in England. In Caithness, there was a 92% increase in numbers, to 177 apparently occupied nests (AONs), following a dramatic decline from 233 in 1993 to 92 in 1994. In Shetland, there was a small (6%) increase in numbers in 1995, to 215 AONs, suggestive of a potential halt or reversal to the long-term population decline. An aerial survey of the Orkney colonies located 491 AONs, including 223 on Calf of Eday and 153 at Berry Holm (D. Wood, in press). This 1995 estimate is 14% lower than that derived from the last comprehensive survey in 1985. However, given the typical magnitude of variation in breeding numbers between seasons in this species, and also differences in the timing of the two surveys, these results do not necessarily indicate any long term decline in the Orkney colonies. Two Orkney colonies monitored in both 1994 and 1995 showed an 8.5% increase in numbers of AONs between these years.

A count of all inland colonies in England in 1995 found a record total of 1172 AONs at nine sites (Sellers *et al.*, in press). These results indicate continued strong growth in the inland breeding population in England, at 28% per annum between 1991 and 1995, with Abberton reservoir in Essex remaining the most important inland colony (503 AONs in 1995).

In regions where full coverage was not possible, care has to be taken in interpreting results of counts at sample colonies as movements between colonies may account for some of the recorded changes in numbers from year to year. However, the increase in sample populations in SE Scotland between 1994 and 1995 may be indicative of further recovery from the major decline in the proportion of adults breeding in 1993. Numbers of AONs also increased between 1994 and 1995 at sample colonies in NE England, following a decline between 1993 and 1994. In SW England, the Great Mewstone colony, last counted in 1992, was found to have continued to expand (110 AONs in 1995) and there was a 25% increase between 1994 and 1995 at five other colonies.

In Wales, numbers at thirteen colonies monitored in both 1994 and 1995 remained stable overall, but the Puffin Island colony increased further to 703 AONs. In NE Ireland, a decrease of 13% was recorded following a long term increase in numbers in this region. In SE Ireland, a census of the Lambay Island colony found 605 AONs, a marked decline on previous estimates of just over 1000 in 1991 and 1985. However, numbers at Ireland's Eye, the only colony in the region which was counted in both 1994 and 1995, increased by a further 18.0%, to 256 AONs in 1995.

Breeding success

Few data are available on breeding success. At North Sutor (N Scotland) an average of 1.73 (\pm s.e. 0.07) chicks fledged per nest (from 102 nests in two plots), as compared to 2.36 (\pm s.e. 0.18) for the period 1991 to 1994. Two colonies, totalling 76 nests, situated in Loch Fyne and the Sound of Jura on the west coast of Scotland, each held over two chicks per nest in mid-June. However, a third colony of 33 nests in Loch nan Uamh, which was subject to heavy gull predation of eggs and young, held just 0.76 large young per nest in late June to mid-July. In Shetland, the average brood-size for productive pairs was 2.3, lower than in 1994 and 1993 (2.9 and 3.1 respectively). At Will's Strand on the Isle of Man, 43 young of all ages were recorded in and around 19 nests in mid-June and mid-July, an average brood size of 2.3.

Seabird numbers and breeding success, 1995

Table 2.7.1 Population changes at monitored cormorant colonies, 1994-95 (apparently occupied nests in May-June).

Superscript = number of colonies counted in both years. Regional samples <50 AONs are excluded. Trends for 1986-93 are average annual rates of change shown by sample populations (significant trends indicated as: * P<0.05; ** P<0.01; *** P<0.001)

	SW Scotland ^a	Shetland ^b	Orkney ^c	N Scotland ^d	SE Scotland ^e	NE England ^f
1986-93 annual % change	+5.5	-6.7**	-	+0.5	+0.6	+2.9*
1994	442	203	199	343	478	264
1995	429	215	216	465	526	286
1994-95 % change	-2.9% ⁴	+5.9% ⁵	+8.5% ²	+35.6% ⁷	+10.0% ⁶	+8.3 ³
	Inland, England ^g	SW England ^h	NW Eng./I. Man ⁱ	Wales ^j	NE Ireland ^k	
1986-93 annual % change	+24.1***	+0.3	+1.5	-0.3	+6.5**	
1994	922	111	84	1830	262	
1995	995	c. 139	88	1824	227	
1994-95 % change	+7.9% ⁷	+25.2% ⁵	+4.8% ³	-0.3% ¹³	-13.4% ³	

Colonies: ^a Port O' Warren, Rigg Bay, Currarie-Portandea, Sanda Island; ^b High Holm, Clett Stacks, W. Muckle Roe, Grocken, Ramna Stacks; ^c Boray Holm, Little Green Holm; ^d Stack O' Brough, Stack of Ulbster, Stacks of Occumster, Ceann Leathad, Neuk Mohr, Ord Point, North Sutor; ^e Craigleith, Lamb, Carr Craig, Haystack, Long Graig/Inchkeith, Fast Castle Head; ^f Farne Islands, Saltburn, Boulby Cliff; ^g Rutland Water (Leics.), Abberton Res. (Essex), Paxton Pits (Cambs.), Walthamstow Res. (G. London), Site 'A' (Wiltshire), Besthorpe (Notts.), Stodmarsh (Kent); ^h Carswell Cove, Thatcher Rock, Parson & Clerk, Burgh Island, Looe Island; ⁱ St. Bees Head, Grune Point, Wills Strand; ^j St. Margaret's Island, Llangranog, Ogof Goch, Blockhouse Stack/Thorn Island, New Quay Head, Yns Gwylan-fawr, Rhoscolyn Beacon, Craig yr Aderyn, Great Orme, Little Orme, Llanddwyn Island, Panderi/Pen Glog, Puffin Island; ^k Bird Island, Black Rock, Burial Island

2.8 Shag *Phalacrocorax aristotelis*

Breeding numbers (table 2.8.1)

Populations of shags at monitored colonies in SE Scotland and NE England showed some evidence of recovery from the major winter wreck of 1993-94. Breeding numbers in SE Scotland increased by 38.6% from 1994, to c. 30% of pre-wreck (1992) numbers. In NE England, a 31.8% increase from 1994 brought numbers back up to c. 50% of pre-wreck numbers. Counts along the Boddam to Collieston coast in NE Scotland indicated that this region had also been affected by the wreck, with a decline of 79% in stretches counted in both 1992 and 1995. This followed a 145% increase over the same stretches between 1986 and 1992. The overall change from 1986 to 1995 along the entire Boddam to Collieston coast was -49.3%, to 223 pairs. A decrease of 47.7% between 1992 and 1995 was also recorded at the Lion's and Troup Heads section of the Gamrie to Pennan coast in the outer Moray Firth. However, there was an overall population increase of 40.9% along this coast between 1986 and 1995, largely attributable to very rapid expansion of the colony at Aberdour Bay.

Sample population counts in Shetland suggested a halt to the previous population decline. Of particular note was a 27% increase at Sumburgh Head, the first sign of population recovery at this site in the wake of mortality caused by the *Braer* oil spill. In NW Scotland, the population on Canna rose for a second year, by 17%, following a 33% decline between 1990 and 1993. A similar increase (13%) was seen at Annet in the Isles of Scilly. On Sanda, in SW Scotland, the population fell by around 40%. It is unclear whether this reflects a genuine decline in the breeding population or, possibly, a deferred breeding season, such as seen on the Isle of May in 1993. However, there is evidence of a genuine population decrease at this site in recent years, with average numbers declining from 957 (\pm s.e. 77.0) in 1986-90 to 570 (\pm s.e. 81.2) in 1991-95. The possible impact of fixed salmon gill nets in the surrounding area is unknown. The colony on Lambay Island, Dublin (SE Ireland) held 1164 pairs in 1995, similar to the 1174 pairs recorded in 1991.

Breeding success (table 2.8.2)

Average productivity was moderately high at 17 study-colonies in 1995 (1.45 \pm s.e. 0.14 chicks fledged per nest), compared to 1.56 (\pm s.e. 0.17) at 18 colonies within the same regions in 1994 and an overall average of 1.32 (\pm s.e. 0.07 measured at 3 to 20 colonies annually) between 1986 and 1994. There were no significant regional changes in productivity between 1994 and 1995.

The lowest productivity figures were again recorded in SE Scotland (0.95) and NE England (0.91). The breeding season on the Isle of May was very protracted with first eggs laid in mid-March, the earliest recorded, and some pairs laying second clutches in mid-July. The highest breeding output recorded was at colonies in SW Scotland, the notable exception in this region being Eilean Fraoich in the Sound of Jura where American mink predation again caused complete breeding failure. In Shetland, breeding success was high at both Sumburgh head (1.55 chicks fledged per nest) and Troswick Ness (1.69), with no evidence of corvid predation at either site. However, crow *Corvus corone* predation was noted at Noness (0.96) and ravens *Corvus corax* may have caused some depression of breeding success at Westerwick (1.07).

Seabird numbers and breeding success, 1995

Table 2.8.1 Population changes at monitored shag colonies, 1992-95 (apparently occupied nests in May-June).

Superscript = number of colonies with 10+ AONs counted in all four years; counts with a reported inaccuracy of $> \pm 5\%$, and regional samples < 100 AONs, are excluded.

	SW Scotland ^a	NW Scotland ^b	Shetland ^c	SE Scotland ^d	NE England ^e	SW England ^f
1992	-	1034	932	3345	1871	127
1993	669	792	713	1334	1948	142
1994	700	924	708	743	771	144
1995	431	1057	721	1030	1016	163
1994-95 % change	-38.4% ²	+14.4% ³	+1.8% ⁸	+38.6% ⁶	+38.1% ¹	+13.2% ¹

Colonies: ^a Mull of Galloway, Sanda Island; ^b Eigg, Canna, Handa (plots); ^c Fair Isle (plots), Hermaness (plots), Noness, Noss, Troswick Ness, Sumburgh Head, Mousa, Boddam cliffs; ^d Isle of May, Inchkeith, Craigeith, Lamb, Fidra, St Abb's Head; ^e Farne Islands, Coquet Island; ^f Annet.

Table 2.8.2 Shag breeding success, 1994-95: estimated number of chicks fledged per occupied nest at sample colonies (n = number of colonies).

Figures are based on nests where eggs or apparent incubation were recorded, and are presented as the mean and standard error of figures for individual colonies. The average change in breeding success is indicated for colonies studied in both years (none of the regional changes was statistically significant)

Region	1994 chicks fledged/nest				1995 chicks fledged/nest				1994-95 change	
	nests ⁿ	range	mean	\pm s.e.	nests ⁿ	range	mean	\pm s.e.	mean ⁿ	\pm s.e.
SW Scotland ^a	151 ⁷	0.00-3.35	1.77	± 0.43	175 ⁷	0.00-2.67	1.76	0.32	+0.12 ⁴	± 0.44
NW Scotland ^b	56 ¹		1.45		62 ¹		1.37		-0.08 ¹	
Shetland ^c	254 ⁵	1.15-1.81	1.52	± 0.13	264 ⁵	0.96-1.69	1.33	± 0.14	-0.19 ⁵	± 0.16
N Scotland ^d	56 ¹		1.54		72 ¹		1.64		+0.10 ¹	
SE Scotland ^e	140 ³	0.68-1.31	1.10	± 0.21	212 ²	0.90-1.00	0.95	± 0.05	-0.08 ²	± 0.24
NE England ^f	179 ¹		1.01		239 ¹		0.91		-0.10 ¹	
Isle of Man	15 ¹		2.13		18 ¹		1.28		-0.85 ¹	
TOTAL	851 ¹⁹	0.00-3.35	1.56	± 0.17	1042 ¹⁸	0.00-2.67	1.45	± 0.14	-0.10 ¹⁵	± 0.13

Colonies: ^a Mull of Galloway (1995 only), Ruadh Sgeir, Eilean Aoghainn, Eilean Fraoich, Eilean Buidhe, Eilean Dubh (1995 only), Dubh Fheith (1994 only), Eilean na Cille, Garbh Eilean (1994 only), Eilean Glasa (1995 only); ^b Canna; ^c Noness, Troswick Ness, Westerwick, Sumburgh Head, Fair Isle; ^d North Sutor; ^e Isle of May, Fidra (1994 only), St Abb's Head; ^f Farne Islands.

2.9 Arctic Skua *Stercorarius parasiticus*

Breeding numbers (table 2.9.1)

At the eleven regularly monitored colonies in Shetland, there was a further decline in overall breeding numbers to 127 AOTs (143 in 1994). At Hermaness, the entire breeding population is monitored annually and the decline evident here in recent years continued from 1994 (14 AOTs) to 1995 (12 AOTs). At the two study colonies on Yell, Lumbister and Blackpark, numbers of AOTs fell to 18 (from 21 the previous year), while the Fetlar study population at Tronamires and Funzie Ness remained similar to the 1994 levels at 18 AOTs (17 in 1994). On Fetlar, first and second/third summer birds were noted around the island (D Suddaby, pers. obs.). Numbers of AOTs at the Noss study colony were stable at 14 AOTs. On Foula, however, a decline continued from 134 AOTs in 1994 to 126 AOTs in 1995, although adult survival was high (88.9%; Furness 1995). The continued decline in breeding numbers suggests that recruitment of new breeders in 1995 was unusually low (Furness 1995). Numbers of AOTs also decreased on Fair Isle, from 93 in 1994 to 87 in 1995.

In Orkney, there were 231 AOTs at the five regularly monitored colonies, a slight decrease on the 1994 figure of 245.

On Handa, only 27 AOTs were noted, but the observers felt this to be an underestimate of the true population (Archer 1995).

Table 2.9.1 Population changes at monitored arctic skua colonies, 1994-1995 (apparently occupied territories).

Superscript = number of colonies counted in both years.

	Foula	Fair Isle	other Shetland	total Shetland	Orkney
1994	134	93	143	378	245
1995	126	87	127	340	231
% change 1994 - 95	-6.0%	-6.5%	-11.2% ¹¹	-10.1% ¹³	-5.7% ⁵

Breeding success (table 2.9.2)

Overall productivity at Hermaness averaged 1.00 chick fledged per AOT from a total of 12 AOTs (with two pairs failing at the egg stage. On Fetlar, 17 chicks fledged from a total of 18 AOTs. Adults were noted to depredate wader, tern and gull eggs, with wader chicks probably taken later in the season (D Suddaby, pers. obs.). All fourteen nests on Noss had clutches of two eggs, although two nests failed at the egg stage due to predation. Chicks were depredated throughout the season, 13 chicks surviving to fledge giving an overall productivity of 0.93 although this sample size is very small. On Foula, chick survival was thought to be good, with very few being killed by great skuas. Many pairs, however, were noted to have lost eggs, perhaps following wet weather during incubation (Furness 1995).

Overall productivity at the five study sites in Orkney was 0.93 chicks fledged per AOT, higher than the 0.87 per AOT fledged in 1994.

Table 2.9.2 Arctic skua breeding success 1994 and 1995: number of chicks fledged per apparently occupied territory (AOT).

Colony	1994		1995	
	AOTs	overall numbers. fledged per AOT	AOTs	overall numbers. fledged per AOT
Unst (2 cols)	34	0.97	29	0.90
Fetlar (2 cols)	17	1.24	18	0.94
Yell (2 cols)	21	0.93	18	1.17
Noss	14	0.71	14	0.93
Mousa	23	1.04	19	1.21
Mainland (3 cols)	34	1.03	29	1.10
Foula	134	1.19	126	-
Papa Westray*	149	0.68	135	1.00
Westray	32	0.63	29	0.74
Rousay*	30	1.07	33	1.12
Mainland	24	0.21	22	0.95
Hoy	11	0.18	12	0.08

Note: * numbers of AOTs monitored in 1994 were incorrectly given in the 1994 report as 31 for Papa Westray and 20 for Rousay.

2.10 Great Skua *Stercorarius skua*

Breeding numbers (table 2.10.1)

There were a total of 228 AOTs at the eight regularly monitored colonies in Shetland in 1995, little changed on the 1994 total of 233. On the traditional Noss study plot, a total of 52 AOTs were found in early June. On Fetlar and Unst, numbers changed little at study plots, with 55 AOTs noted at three colonies on Fetlar, and 38 AOTs found in the Hermaness study area on Unst. On Foula, breeding numbers were also similar to those of 1994, but numbers at club sites were much higher than in the previous year (Furness 1995). Both high adult survival and improved breeding success in recent years have probably contributed to this increase. In contrast to the rest of Shetland, there was a 29% population increase at Fair Isle to a record 130 AOTs in 1995. This included territories established in new areas.

At three study colonies in Orkney, the increase in breeding numbers continued, with 111 AOTs compared to 95 in 1994. On Handa (NW Scotland), there were 115 AOTs, a slight increase on the 112 of 1994.

Table 2.10.1 Population changes at monitored great skua colonies, 1994-95 (apparently occupied territories).

Superscript = number of colonies counted in both years.

	Fair Isle	other Shetland	total Shetland	Orkney	Handa
1994	101	233	334	95	112
1995	130	228	358	111	115
% change 1994-95	+28.7%	-2.1% ⁸	+7.2% ⁹	+16.8% ³	+2.7%

Breeding success (table 2.10.2)

At the eight regularly monitored colonies in Shetland, 210 chicks were thought to have fledged from 228 AOTs giving an overall productivity of 0.90 fledged per AOT. On Noss, with an estimated 56 chicks hatched from 52 AOTs, the overall productivity (0.96 chicks fledged per pair) was the highest since monitoring began in 1989. Wardens noted that kittiwakes were taken as food and that cannibalism was common (Goddard & Hemsley 1995). On Fetlar, overall productivity was 0.95 per AOT (from 55 AOTs). All regurgitations were of whitefish, although cannibalism was noted at both study areas on a small scale (Suddaby 1995). Arctic skua fledglings were also taken in the Baa Neap/Tronamires area. At the Hermaness study site, 35 chicks were thought to have fledged from 38 AOTs, giving a productivity of 0.92 chicks per AOT. On Foula, the overall productivity was around 1 chick per pair, which is by far the highest figure in the last ten years. Pellet analysis indicated that both chicks and non-breeders were taking more sandeels than in any season within the last ten years.

At study plots in Orkney, an overall productivity of 0.92 young fledged per AOT was considerably higher than the 1994 figure of 0.60.

There has been no significant change in overall productivity at study plots in either Orkney or Shetland between 1991 and 1995. Great skuas are opportunistic feeders for which both direct observations and analyses of pellets indicate an increased proportion of birds and discarded fish in the diet, in response to low sandeel availability.

Table 2.10.2 Great skua breeding success, 1994-1995: number of chicks fledged per apparently occupied territory (AOT).

Colony	1994		1995	
	n	overall nos. fledged/AOT	n	overall nos. fledged/AOT
Hermaness	42	0.74	38	0.92
Fetlar (2 cols.)	52	1.08	55	0.95
Mainland (2 cols.)	50	0.88	47	0.94
Yell	49	0.65	25	0.64
Mousa	12	0.92	11	1.09
Noss	53	0.75	52	0.96
Fair Isle	101	c. 1.20	130	c. 1.15
NW Hoy	38	0.61	40	0.93
S Hoy	24	0.29	31	0.84
E Hoy	33	0.82	40	1.00

2.11-2.15 Gulls *Larus* spp.

2.11 Black-headed gull *Larus ridibundus*

Breeding numbers (table 2.11.1)

Few sites are counted regularly, and the mobility of breeding populations also makes it difficult to obtain any valid assessments of regional population trends. However, a further decrease, of over 20% between 1994 and 1995, was recorded at Coquet Island, which holds the bulk of the coastal population in NE England. The population of 2243+ pairs recorded in 1995 is the lowest in ten years, but may partially be accounted for by an earlier than normal count date. In SE England, the observed decline in numbers between 1994 and 1995 was wholly attributable to repeated wash-outs of many nests by high tides at Chichester Harbour, with no change in numbers at other monitored sites.

Table 2.11.1 Population changes at monitored black-headed gull colonies, 1993 -95 (breeding pairs / apparently occupied nests in May-June).

Superscript = number of colonies counted in all years. Regional samples <200 pairs are excluded.

	SW Scotland ^a	NE England ^b	SE England ^c	NW Eng. / I. of Man ^d	NE Ireland ^e
1993	403	4064	-	142	6075
1994	200	3123	8479	120	7023
1995	207	2306+	7841	261	6868
1994-95 % change	+3.5% ⁶	-26.2% ²	-7.5% ⁴	+117.5% ¹	-2.2% ^{>1}

Colonies: ^a Argyll & Bute coast (six colonies); ^b Coquet Island, Farnes; ^c Rye, Langstone and Chichester Harbours, North Solent NNR; ^d Foulney; ^e Strangford Lough (several colonies).

In NW England, numbers of pairs more than doubled at the Foulney Island colony, which, however, remains well below the population levels of 500-1000 pairs seen between 1986 and 1991. Numbers at various colonies in Argyll & Bute showed some sign of stabilising in 1995, but mink remain a major problem in this area (see below).

Breeding success (table 2.11.2)

At study-colonies on the west coast of Scotland, overall breeding success was similar to that recorded in 1994, with a number of colonies again failing completely or producing very few chicks because of predation by mink. Five monitored colonies, holding a total of 210 nests, which showed no sign of mink predation, fledged 0.24-0.40 chicks per nest as compared to the complete breeding failure experienced at the remaining four monitored colonies, totalling 99 nests, where mink predation was evident.

There was some improvement in overall breeding success at monitored colonies in SE England, although high tides were again responsible for almost total breeding failure at Chichester Harbour and the Newtown Estuary (Isle of Wight). Average breeding success at the other three sites monitored in this region was moderate, at 0.57 (\pm s.e. 0.08) chicks fledged per pair. Elsewhere, breeding success was again highest on Coquet Island, NE England, where an average of 1.70 chicks fledged per nest in 1995.

Table 2.11.2 Black-headed gull breeding success, 1994-95: estimated number of chicks fledged per breeding pair at sample colonies (n = number of colonies).

Region	1994 fledged/pair			1995 fledged/pair		
	prs ⁿ	range	total	prs ⁿ	range	total
SW Scotland ^a	340 ⁴	0.00-0.72	0.26-0.35	289 ⁷	0.00-0.83	0.17-0.29
NW Scotland ^b	39 ¹		0	20 ²		0.00
Shetland ^c				32 ¹		0.66
NE England ^d	76 ¹		1.15	51 ¹		1.70
SE England ^e	1838 ⁴	0.00-0.5	0.10	c.1677 ⁵	≤0.02-≥0.65	c. 0.33

Colonies: ^a Argyll & Bute coast; ^b southern Lochaber coast; ^c Fetlar; ^d Coquet Island; ^e Rye, Langstone and Chichester Harbours, Newtown estuary, Dungeness (1995 only).

2.12 Common gull *L. canus*

Breeding numbers (table 2.12.1)

As few sites are counted regularly, it is difficult to assess regional or national population trends. In particular, very few colonies in Orkney and Shetland, which hold nearly 70% of coastal nesting common gulls in Britain (Lloyd *et al.* 1991), have been counted in recent years. However, on the west coast of Scotland (Argyll & Bute and southern Lochaber), annual counts at fifteen study colonies over the past four years (table 2.12.1) are suggestive of a recent overall decline in this area, possibly attributable to predation by mink (see below and black-headed gull). Another area counted annually is Strangford Lough in NE Ireland, where there are a number of small colonies on scattered islands. Numbers in this area are continuing to increase, reaching 113 pairs in 1995 as compared to 29 pairs in 1986.

Table 2.12.1 Numbers of common gulls in study colonies on the west coast of Scotland 1992-95
Figures are sum of counts of pairs at fifteen colonies in Argyll & Bute and southern Lochaber

Year	1992	1993	1994	1995
No. of pairs	c. 1046	1020	844	743

In 1995, the very large inland colonies in Grampian, NE Scotland, were surveyed for the first time since 1988-89 (White *et al.* 1996). The Mortlach Hills colony, the largest in Britain, was found to have increased by c. 35-40% to c. 18,400 pairs. However, over the same period, the Correen Hills colony had declined by c. 73-80% to c. 4,700 pairs. Some of the birds from the Correen Hills may have moved to the Mortlach Hills, or to a relatively new colony at Bluemills, which held at least 2500 pairs in 1995, but the increases at these colonies are not sufficient to compensate fully for the decline at the Correen Hills. The reasons for this decline are unclear, but afforestation of part of the colony area, with apparent consequent increase in predator activity, together with poor spring feeding conditions attributable to dry weather may be possible contributory factors.

A survey of roof-nesting gulls in Britain and Ireland in 1994 (Raven & Coulson, in prep.) found at least 95 common gull pairs at ten sites in northern and western Scotland. This marks a major increase in this habit for this species (see also herring, lesser black-backed and great black-backed gulls).

Breeding success (table 2.12.2)

Most of the available data are from colonies in SW and NW Scotland where predation by mink again caused severe breeding depression. In 1995, 23 colonies monitored in SW Scotland reared 0.40-0.52 chicks per pair, and ten colonies in Lochaber (NW Scotland) fledged 0.16-0.17 chicks per pair. This represented an improvement on the previous two seasons, but many colonies continued to experience total breeding failure. In the two regions combined, average fledging success at colonies with no evidence of mink predation was ≥ 0.49 ($n=12$, s.e. ± 0.11) chicks per pair as compared to ≤ 0.05 ($n=21$, s.e. ± 0.03) at colonies where there was evidence of mink predation, and where no control measures were taken early in the season. Mammalian predation, species uncertain, was also apparently responsible for low breeding success at Dungeness in SE England.

The Correen Hills colony in NE Scotland again appeared to suffer near-total breeding failure, as seen in 1994. One of the main sub-colonies was abandoned in the middle of the season, possibly because of excessive disturbance by predators, and a very low proportion of nests held eggs during the colony census in late May (see above). In Orkney, breeding success was gauged to be generally good and over one chick per pair fledged at the RSPB's Hobbister reserve on Mainland Orkney.

Table 2.12.2 Common gull breeding success, 1994-95: estimated number of chicks fledged per breeding pair at sample colonies (n = number of colonies).

Region	1994 fledged/pair			1995 fledged/pair		
	prs ⁿ	range	total	prs ⁿ	range	total
SW Scotland ^a	1020 ²³	0.00-1.07	0.27-0.39	951 ²³	0.00-0.98	0.40-0.52
NW Scotland ^b	203 ¹¹	0.00-1.00	0.11-0.21	235 ¹⁰	0.00-1.90	0.16-0.17
Shetland ^c	7 ¹		0.57	5 ¹		0.60
Orkney ^d	-		-	75 ³		1.09
SE England ^d	8-10 ¹		c. 0.33	12 ¹		0.17

Colonies: ^a various, Argyll & Bute coast; ^b various, southern Lochaber coast; ^c Fair Isle; ^d Hobbister (3 colonies); ^e Dungeness.

2.13 Lesser black-backed gull *L. fuscus*

Breeding numbers (table 2.13.1)

Few large colonies are counted regularly, particularly in England, which holds over 40% of the UK population. However, a review of available data by Walsh and Gordon (1994) suggested that coastal populations are generally increasing. Between 1994 and 1995, a further population increase (+29%) was seen on the Isle of May, the largest colony in the Firth of Forth. The same percentage increase was also recorded at the small colony on Inchmickery, the only other major site censused in the Forth in both seasons. This continued increase is in line with the 72% rise recorded for the Forth islands between 1987 and 1994 (Harris & Wanless 1994).

At sample colonies in Wales, there was a further decrease in numbers from the peak recorded in 1993. On Annet, Scilly, the population rose by 12% between 1994 and 1995, to 1051 pairs, slightly below the 1993 population peak of *c.* 1107 pairs. A further increase (8%) was seen in the small population in Strangford Lough, NE Ireland, which reached 141 pairs as compared to *c.* 30 in 1986-90. On Lambay Island, SE Ireland, 258 pairs were recorded in 1995, compared to 63 in 1991 and 150 in 1987.

A 1994 survey of roof-nesting gulls in Britain and Ireland received records of 2994 pairs of lesser black-backed gulls at 84 sites, from which an estimated total of 3700 pairs was derived, equivalent to over 4% of the total British and Irish population (Raven & Coulson, in prep.). This equates to an overall increase in numbers of 19% per annum since the last survey in 1976, with colonisation of new sites, at an average rate of 13% per annum, playing a major role. In 1976, roof-nesting lesser black-backed gulls were largely confined to the Bristol Channel, but have now spread to most coastal regions of Great Britain, as well as to a growing number of inland sites. Most notably, some 1140 pairs now nest on rooftops in the Forth-Clyde valley in central Scotland.

Table 2.13.1 Population changes at monitored lesser black-backed gull colonies, 1993-95 (breeding pairs / apparently occupied nests in May-June).

Superscript = number of colonies counted in both 1994 and 1995. Regional samples <200 pairs are excluded.

	SE Scotland ^a	Wales ^b
1993	1259	25299
1994	1270	23784
1995	1635	19253
1994-95 % change	+28.7% ¹	-19.1% ⁴

Colonies: ^a Isle of May; ^b Skomer, Skokholm, Bardsey, Caldey.

Breeding success (table 2.13.2)

In 1995, for the third season running, productivity was low on Skokholm and Skomer in Dyfed (0.04-0.11 chicks fledged per pair). On Skokholm, 42 % of the 3000 nests counted in late May were empty and only 300 chicks were estimated to fledge. On Skomer, productivity was estimated at 0.03 to 0.11 chicks fledged per nest. These figures are similar to those recorded in 1989-90, when an average of <0.05 chicks fledged per nest on Skomer, and are well below the levels required for long-term population maintenance (see above). This poor reproductive performance may possibly be related to an apparent reduction in the availability of trawler waste in adjacent sea areas (Stone *et al.* 1992, Walsh *et al.* 1993).

Overall productivity at study-colonies in SW Scotland improved in 1995, but mink predation of eggs and chicks caused complete failure at one of the colonies monitored and reduced productivity at a second (see also accounts for other gulls). On the Isle of May, productivity declined to an estimated *c.* 0.56 chicks fledged per nest, compared to 1.24 in 1994, and was again much lower than that of herring gulls breeding at the same site (*c.* 1.44 chicks fledged per nest). The highest productivity recorded for lesser black-backed gull in 1995 was at the RSPB's Hobbister Reserve on Mainland Orkney, where 80 young were estimated to fledge from the same number of nests.

Table 2.13.2 Lesser black-backed gull breeding success, 1994-95: estimated number of chicks fledged per breeding pair at sample colonies (n = number of colonies).

Colonies where breeding success is reduced by control measures are excluded.

Region	1994 fledged/pair			1995 fledged/pair		
	prs ⁿ	range	total	prs ⁿ	range	total
SW Scotland ^a	<i>c.</i> 1000 ⁵	0.0 - <i>c.</i> 0.4	<i>c.</i> 0.10	<i>c.</i> 900 ⁷	0.0 - <i>c.</i> 0.7	<i>c.</i> 0.40
SE Scotland ^b	<i>c.</i> 1270 ¹		<i>c.</i> 1.24	<i>c.</i> 1635 ¹		<i>c.</i> 0.56
Wales ^c	<i>c.</i> 23100 ²		0.25 - 0.30	<i>c.</i> 18500 ²		0.04 - 0.11

Colonies: ^a Reisa mhic Phaidean, Eilean na Cille, Eilean Ghamhna, Bach Island (1994 only), Eilean Fraoch, Corr Eilean (1995 only), Eilean Mor (1995 only), Eilean Dubh (1995 only), Reisa an t'Struith (1995 only); ^b Isle of May, ^c Skomer, Skokholm.

2.14 Herring gull *L. argentatus*

Breeding numbers (table 2.14.1)

Few colonies are counted regularly, but a review of available data by Walsh and Gordon (1994) suggested that coastal populations have been roughly stable or declining in recent years. A number of sample colonies were counted in the 1993-95 period, but these suggest few clear trends, with considerable variability both between colonies and years in the direction of observed changes in numbers. Between 1994 and 1995, a substantial increase in numbers was recorded at sample colonies in the Firth of Forth, including the Isle of May where numbers have increased by 75% since 1992 following a period of decline.

In NE Scotland, the colony at St Cyrus declined further, to only 2 pairs in 1995 from 911 nests in 1989. Elsewhere in this region, a survey of the Buchan Ness to Collieston coast found a 33% overall decrease in numbers, to 2955 pairs, between 1986 and 1995. However, over the same period, there was an overall increase of up to 62%, to 4196 pairs, at colonies between Gamrie and Pennan (Walsh *et al* 1996). These results are indicative of the variability in population trends within regions, with factors such as predation, disturbance and botulism contributing to the declines noted at some colonies.

In Wales, there was little overall change in numbers in monitored colonies between 1994 and 1995. However, there was again considerable variation between colonies with population increases on Caldey (+6%) and Bardsey (+15%) but decreases on Skomer (-21%) and Skokholm (-5%). In NE Ireland, there was evidence of some recovery in populations at Strangford Lough, which increased by 20% to over 540 pairs in 1995, following a major decline between 1986 to 1993/94, possibly caused by botulism. However, on Lambay Island, SE Ireland, only 2485 pairs were recorded in 1995 as compared to over 5500 in the mid-1980s.

Raven and Coulson's 1994 survey of roof-nesting gulls in Britain and Ireland received records of 11,047 pairs of herring gulls from 188 sites, giving an estimated total of 16,800 pairs, equivalent to over 8% of the total breeding population. This represents an average rise of 10% per annum since 1976, mainly attributable to expansion of existing colonies. The most rapid expansion has been in NE Scotland, western Britain and western Ireland. The largest numbers recorded were in Aberdeen, with 2000 pairs.

Table 2.14.1 Population changes at monitored herring gull colonies, 1993-95 (breeding pairs / apparently occupied nests in May-June).

Superscript = number of colonies counted in both years. Regional samples <200 pairs are excluded. Trends for 1986-92 are average annual rates of change shown by sample populations (significant trends indicated as: * P<0.05; ** P<0.01)

	NW Scotland ^a	SE Scotland ^b	Wales ^c	NW England / Isle of Man ^d	NE Ireland ^e
1986-92 annual % change	+1.6	-7.5**	-0.7	-2.7	-15.3**
1993	1161	2736	2546	801	1008
1994	997	2711	2877	770	1134
1995	995	3287	2849	847	1216
1994-95 % change	-	+21.2% ⁵	-1.0% ⁶	+10.0% ²	+7.2% ^{>2}

Colonies: ^a Eigg, Canna (plots); ^b Isle of May, Inchgarvie, Eyebroughty, Incholm, St. Abb's Head; ^c Stackpole Head, Skomer, Skokholm, Caldey, Bardsey, Ynys Gwylan-fawr; ^d St. Bee's Head, Calf of Man (plot); ^e Strangford Lough (several colonies), Gun's Island.

Breeding success (table 2.14.2)

With the exception of Skokholm, where lesser black-backed gull productivity also declined in 1995, breeding success at monitored colonies was generally higher in 1995 than in the previous year. Colonies on Canna (NW Scotland) and the Isle of May (SE Scotland) fledged in excess of one chick per pair and high productivity was also recorded from the RSPB's Hobbister reserve on Mainland Orkney and from West Bay to Burton Bradstock in Dorset. However, mink predation again reduced productivity at a number of sites along the west coast of Scotland. In study colonies holding more than ten nests, average breeding success was 0.77 chicks fledged per pair (\pm s.e. 0.071) over ten colonies where there was no evidence of mink predation, compared to 0.18 (\pm s.e. 0.095) over six colonies where mink predation occurred. Three of these colonies, holding *c.* 300 nests, failed completely.

Table 2.14.2 Herring gull breeding success, 1994-95: estimated number of chicks fledged per breeding pair at sample colonies (n = number of colonies).

Colonies where breeding success is reduced by control measures are excluded

Region	1994 fledged/pair		1995 fledged/pair	
	prs ⁿ	total	prs ⁿ	total
SW/NW Scotland ^a	4176 ²⁸	0.38-0.40	<i>c.</i> 2656 ²⁸	0.45-0.65
NW Scotland ^b	162 ¹	1.6	101 ¹	1.8
SE Scotland ^c	<i>c.</i> 2122 ¹	<i>c.</i> 1.33	<i>c.</i> 2554 ¹	<i>c.</i> 1.44
Wales ^d	105 ¹	1.31	103 ¹	0.68

Colonies: ^a Various colonies in Argyll & Bute and southern Lochaber; ^b Canna; ^c Isle of May; ^d Skokholm.

2.15 Great black-backed gull *L. marinus*

Breeding numbers (table 2.15.1)

Only small regional samples are counted regularly, with very limited coverage of Shetland, Orkney, N and NW Scotland which hold over 60% the British and Irish population (Lloyd *et al.* 1991). However, a review of the available data by Walsh & Gordon (1994) suggests that coastal populations in the UK have generally increased or been roughly stable during the period since 1986. Few changes of note were observed at monitored colonies between 1992 and 1995, but there was some suggestion of a temporary increase in numbers on western coasts (NW Scotland, SW England and Wales) in 1994 with numbers falling back again at a number of colonies in 1995.

In Gwynedd, the colony at Ynys Gwylan-fawr held 49-50 pairs in 1994 and 1995, as compared to less than 10 in 1990 and 1991. The colony at the Nigg oil terminal in N Scotland also continued to expand over this period, having started at just four pairs in 1990. In NE Ireland, the small population in Strangford Lough increased by 63% between 1994 and 1995 following an earlier decline, possibly attributable to botulism (see also herring gull)

A recent survey of roof-nesting gulls in Britain and Ireland (Raven & Coulson, in prep) recorded eleven pairs of great black-backed gulls at ten sites in SW England, Cumbria, Strathclyde and eastern Scotland, suggesting a geographical expansion of this habit in this species.

Breeding success (table 2.15.2)

Overall breeding success at monitored colonies in 1995 was high at c. 1.4 chicks fledged per pair, in line with results from recent years. As in 1994, the highest productivity rates were at the Isle of May and Nigg oil terminal, both sites where there is protection from disturbance. In Argyll and Bute, SW Scotland, mink apparently had little impact on the breeding success of this species as compared to other gulls.

Table 2.15.1 Population changes at monitored great black-backed gull colonies, 1992-95 (breeding pairs / apparently occupied nests in May-June).

Superscript = number of colonies counted in all years. Regional samples <50 pairs are excluded.

	NW Scotland ^a	Shetland ^b	N. Scotland ^c	SW England ^d	Wales ^e	NE Ireland ^f
1992	118	57	31	118	69	67
1993	122	68	50	121	84	54
1994	138	76	85	149	110	43
1995	124	75	99	124+	108	70
1994-95 % change	-10.1% ³	-1.3% ¹	+16.5% ¹	≤16.8% ¹	-1.8% ⁴	+62.8% ^{>1}

Colonies: ^a Eigg, Canna, Handa; ^b Noss; ^c Nigg oil terminal; ^d Annet; ^e Skomer, Skokholm, Caldey, Eilegug Stacks; ^f Strangford Lough (several colonies).

Table 2.15.2 Great black-backed gull breeding success, 1994-95: estimated number of chicks fledged per breeding pair at sample colonies (n = number of colonies).

Colonies where breeding success is reduced by control measures are excluded

Region	1994 fledged/pair			1995 fledged/pair		
	prs ⁿ	range	total	prs ⁿ	range	total
SW Scotland ^a	155 ⁶	0.11-1.33	0.72+	71 ⁶	0.00-3.00	1.31
Orkney ^b	145 ³	0.85-1.25	1.10	97 ²	1.51-1.55	1.53
N Scotland ^c	69 ¹		1.90	79 ¹		2.00
SE Scotland ^d	6 ¹		2.17	7 ¹		c. 2.00
Wales ^e	32 ¹		0.94	39 ¹		0.85
Isle of Man ^f			-	37 ¹		0.59
NE Ireland ^g	30+ ¹		2.2	-		-

Colonies: ^a Ruadh Sgeir, Abbot Island, Eilean Gainimh, Eilean Glas (1995 only), Dubh Sgeir, Kilmaronag islet (1995 only), Bach Island (1994 only), Carraig an Daimph (1994 only); ^b Birsay Moors, Hobbister, Papa Westray North Hill (1994 only); ^c Nigg; ^d Isle of May; ^e Skokholm; ^f Calf of Man; ^g Strangford Lough.

2.16 Kittiwake *Rissa tridactyla*

Breeding numbers (table 2.16.1)

In SE Scotland, the numbers of breeding kittiwakes recovered in 1995, following a major decrease between 1993 and 1994 in the numbers of pairs building nests. On the Isle of May there was a 103% increase in numbers of apparently occupied nests (AONs) from 3,751 in 1994 to 7603 in 1995. A similar recovery was also seen in NE England, where there had been a less marked decline in 1994, with a 12.3% increase in numbers of AONs on the Farnes. In NE Scotland, numbers recovered at Fowlsheugh, while colony counts along the Grampian coast were in line with the general east coast pattern of a long term increase in numbers punctuated by periods of decline. Overall numbers of AONs along the Buchan Ness to Collieston coast increased by 28% (to 24,960) between 1986 and 1995 and an even larger increase of 94% (to 31660) was recorded for the Gamrie to Pennan coast. However, more frequent monitoring of shorter stretches of cliff within these areas indicated a 23% decrease from 1992 to 1995 between Boddam and Cruden Bay and a 20% decline at Troup and Lions Heads over the same period. The southernmost North Sea colonies, in E and SE England, showed a further increase in numbers between 1994 and 1995.

Table 2.16.1 Population changes at monitored kittiwake colonies, 1993-95 (apparently occupied nests in late May/June).

Superscript = number of colonies with 10+ AONs counted in 1994 and 1995; counts with a reported inaccuracy of $>\pm 5\%$, and regional samples <100 AONs, are excluded. Trends for 1986-93 are average annual rates of change shown by sample populations (significant trends indicated as: ** $P < 0.01$)

	NW Scotland ^a	Shetland ^b	NE Scotland ^c	SE Scotland ^d	NE England ^e	E England ^f
1986-93 annual % change	+0.7	-6.7	-	+1.6	+1.8	-
1993	1045	-	531	24546	(7183+)	167
1994	1171	5991	430	18349	6916	222
1995	1225	5882	560	23610	7705	259
1994-95 % change	+4.6% ²	-1.8% ⁶	+30.2% ¹	+28.7% ⁷	+11.4% ⁴	+16.7% ¹

	SE England ^g	SW England ^h	Wales ⁱ	NE Ireland ^j	SE Ireland ^k
1986-93 annual % change	+0.3	-	-1.4	-	-5.8**
1993	2413	322	3059	807	1084
1994	2603	306	3106	801	1130
1995	2822	307	2823	788	1014
1994-95 % change	+8.4% ³	+0.3% ⁷	-9.1% ³	-1.6% ²	-10.3% ²

Colonies: ^a Canna, Handa (plots); ^b Hermaness (plots), Noss (no 1993 counts), Troswick Ness, Noness, Boddam, Fair Isle (plots); ^c Fowlsheugh; ^d Isle of May, Inchkeith, Craigeleith, Lamb, Fidra, Inchcolm, St Abb's Head; ^e Farne Islands, Coquet Island (no 1993 counts), Gateshead, Bempton (plots); ^f Lowestoft; ^g Fan Bay-West Langdon Cliffs (3 colonies); ^h Blackers Hole, Isles of Scilly (6 colonies); ⁱ Elegug Stacks, Skomer, Bardsey; ^j Rathlin (plots), Guns Island; ^k Dunmore, Portally.

In Shetland, there was no change in numbers of AONs in plots at Hermaness, but a further small decline was recorded on Fair Isle. On the SE Mainland little change was seen at colonies monitored in both 1994 and 1995, with the exception of Troswick Ness where numbers of AONs declined from 187 to 45. This was attributed to desertion of the site by many adults following intense predation of both adults and chicks by great skuas in 1994 (Heubeck 1996). Five survey sites on West Mainland held

23% more AONs in 1995 than when last surveyed in 1993, suggesting some regional recovery after a long term decline. However, colonies on Unst declined further, by 37%, between 1991 and 1995.

On western coasts, sample populations in NW Scotland showed a further small increase, but in Wales declined by 9%. In SW England, numbers were static between 1994 and 1995. Numbers at colonies in SE Ireland declined in 1995 in line with long-term trends, following evidence of some recovery in 1994, and a small decline was also noted in NE Ireland.

Breeding success (table 2.16.2, figure 2.16.1)

Overall productivity was moderately high in 1995, with an average of 0.79 (\pm s.e. 0.07) chicks fledged per nest at 45 colonies, compared to the 1986-94 average of 0.73 (\pm s.e. 0.03, based on 30-61 colonies annually) and to 0.72 (\pm s.e. 0.06) at 47 colonies in 1994. There was no significant change in productivity between 1994 and 1995 across 42 colonies monitored in both seasons (average change $+0.02 \pm$ s.e. 0.045).

There was considerable variation both between and within regions. Colonies in eastern Scotland and south-western Britain were again generally the least successful, with an average of 0.57 chicks fledged per nest in both regions (\pm s.e. 0.26 and 0.33 respectively). In SE Scotland, productivity averaged 0.51 (\pm s.e. 0.17) chicks fledged per nest, not significantly different from 1994 (mean change $+0.15 \pm$ s.e. 0.09), but suggestive of a continuing recovery from the low of 1993. Within this region, the colony at Dunbar remained the most productive (0.95 chicks fledged per nest) while breeding output on Fidra was again very low (0.12). Colonies in NE Scotland showed a significant increase in productivity from 1994 to an average of 0.66 (average change $+0.24 \pm$ s.e. 0.049, $t=4.955$, $P<0.05$). In contrast to the situation in eastern Scotland, productivity in NE, E and SE England, was high at all colonies (0.82-1.39 chicks fledged per nest, mean $1.06 \pm$ s.e. 0.19).

Both colonies monitored in the Isle of Man and one of two in SE Ireland experienced complete breeding failure, while in Wales productivity ranged from 0.37-0.95 chicks fledged per nest (mean $0.66 \pm$ s.e. 0.16). However, productivity at colonies in SW England was generally higher than in recent years and the newly established colony at North Hallsands in Devon had the highest recorded breeding success for any colony in 1995 (1.52 chicks fledged per nest). This colony is thought to have been established by birds displaced from the abandoned former colony site at Start Point, which was subjected to considerable disturbance during lighthouse refurbishment in 1993. The reasons for the generally poor performance of colonies on southern Irish Sea coasts are unclear, but food availability seems likely to be the most important.

In Shetland, breeding success averaged only 0.54 (\pm s.e. 0.13) chicks fledged per nest over nine colonies but, as in 1994, was very variable, ranging from complete failure at Eshaness and Troswick Ness to 1.04 chicks fledged per nest at Westerwick. Overall in Shetland, there was a highly significant average decrease in breeding success between 1994 and 1995 ($-0.23 \pm$ s.e. 0.06, $t=3.88$, $p<0.01$). As in the previous year, predation by great skuas was apparently responsible for the breeding failure at Eshaness and Troswick Ness (Heubeck 1996), but there was also some evidence to suggest a possible food shortage late in the season at a number of other sites.

In Orkney and northern Scotland, productivity was high at all eight colonies monitored (0.95-1.42 chicks fledged per nest, mean $1.22 \pm$ s.e. 0.12). Excluding Fowl Craig (Papa Westray), where breeding success declined from 1.49 chicks fledged per pair in 1994 to 0.95 in 1995, the remaining five colonies monitored in Orkney showed a highly significant increase in productivity ($+0.20 \pm$ s.e. 0.04, $t=5.19$, $p<0.01$). In SW Scotland, productivity at Ailsa Craig rose from 0.40 in 1994 to 0.78 in 1995. In NW Scotland, average productivity at two colonies also remained high at 1.14 (\pm s.e. 0.34) chicks fledged

Seabird numbers and breeding success, 1995

per nest, but was significantly lower than in 1994 (average change $-0.07 \pm \text{s.e. } 0.005$, $t=13.0$, $p<0.05$). Handa was again one of the most successful colonies anywhere in Britain (1.47 chicks fledged per nest).

Table 2.16.2 Kittiwake breeding success, 1994-95: estimated number of chicks fledged per occupied, well-built nest at sample colonies (n = number of colonies).

Figures are presented as the mean and standard error of figures for individual colonies. Changes in breeding success are indicated for colonies studied in both years (significant changes, based on t-test: * $P<0.05$; ** $P<0.01$).

Region	1994 chicks fledged/nest				1995 chicks fledged/nest				1994-95 change	
	nests ⁿ	range	mean	\pm s.e.	nests ⁿ	range	mean	\pm s.e.	mean ⁿ	\pm s.e.
SW Scotland ^a	124 ¹		0.40		105 ¹		0.78		+0.38 ¹	
NW Scotland ^b	1026 ³	0.74-1.54	1.05	± 0.25	596 ²	0.80-1.47	1.14	± 0.34	-0.07 ²	$\pm 0.005^*$
Shetland ^c	2462 ⁹	0.00-1.23	0.75	± 0.16	2292 ⁹	0.00-1.04	0.54	± 0.13	-0.23 ⁹	$\pm 0.06^{**}$
Orkney ^d	1283 ⁶	0.80-1.49	1.14	± 0.09	1176 ⁶	0.95-1.42	1.22	± 0.07	+0.08 ⁶	± 0.13
N Scotland ^e	165 ¹		0.96		198 ²	1.18-1.27	1.23	± 0.05	+0.22 ¹	
NE Scotland ^f	789 ³	0.29-0.49	0.41	± 0.06	1004 ³	0.45-0.82	0.66	± 0.11	+0.24 ³	$\pm 0.05^*$
SE Scotland ^g	2124 ⁴	0.10-0.64	0.39	± 0.12	1861 ⁴	0.12-0.95	0.51	± 0.17	+0.15 ³	± 0.09
NE England ^h	1468 ⁵	0.88-1.01	0.96	± 0.02	1372 ⁵	0.85-1.39	1.09	± 0.09	+0.13 ⁵	± 0.09
E England ⁱ	222 ¹		1.21		259 ¹		1.17		-0.04 ¹	
SE England ^j	137 ¹		0.95		110 ¹		0.82		-0.13 ¹	
SW England ^k	422 ⁴	0.00-0.89	0.45	± 0.20	330 ³	0.73-1.52	1.06	± 0.24	+0.42 ²	± 0.34
NW England/ I. of Man ^l	191 ²	0.16-0.73	0.44	± 0.28	204 ²	0.00-0.00	0.00		-0.45 ²	+0.29
Wales ^m	1863 ⁴	0.27-0.90	0.53	± 0.13	1930 ⁴	0.37-0.95	0.66	± 0.16	+0.13 ⁴	$\pm 0.13^*$
SE Ireland ⁿ	1134 ²	0.03-0.63	0.33	± 0.30	1014 ²	0.00-0.50	0.25	± 0.25	-0.08 ²	± 0.05
TOTAL	13886 ⁴⁷	0.00-1.54	0.72	0.06	12451 ⁴⁵	0.00-1.52	0.79	± 0.07	+0.02 ⁴²	± 0.045

Colonies: ^a Ailsa Craig; ^b Canna, Handa; St. Kilda (1994 only); ^c Hermaness, Eshaness, Westerwick, Foula, Noss, Ramna Geo, Troswick Ness, Sumburgh Head, Fair Isle; ^d Papa Westray, Rousay, Marwick Head, Row Head, Mull Head, Gultak; ^e North Sutor, near Nigg (1995 only); ^f Bullers of Buchan, Sands of Forvie, Fowlsheugh; ^g Isle of May, Fidra, Dunbar, St Abb's Head; ^h Farne Islands, Coquet Island, Gateshead, Saltburn, Bempton; ⁱ Lowestoft; ^j South Foreland; ^k Durlston Head to St. Albans Head, Berry Head (1994 only), Start Point (1994 only), North Hallsands (1995 only), Isles of Scilly; ^l Calf of Man, Contrary Head-Traie Cronkan; ^m Elegug Stacks, Skomer, Bardsey, Great Ormes Head; ⁿ Dunmore, Portally.

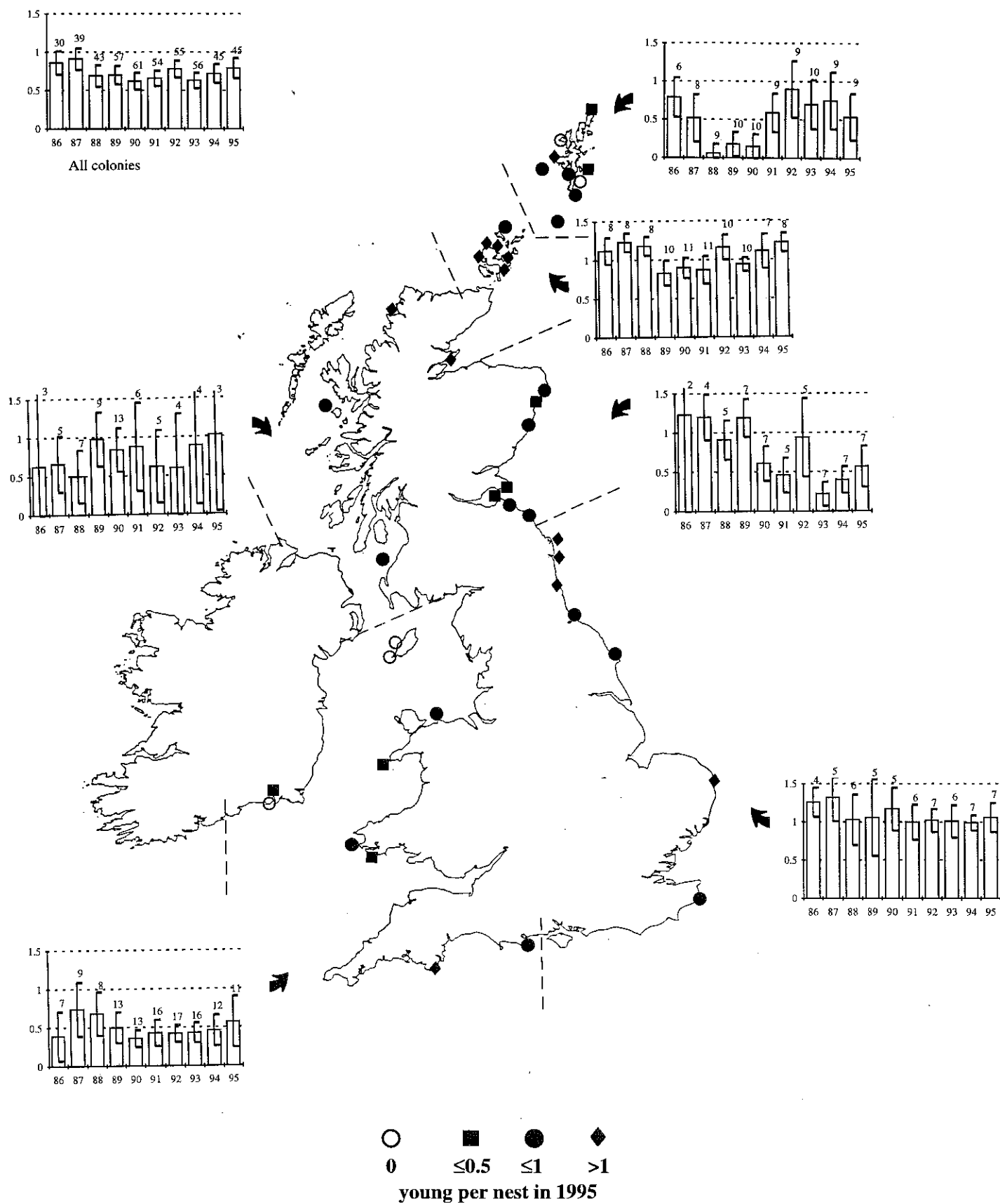


Figure 2.16.1 Breeding productivity (chicks fledged per well-built nest) at kittiwake colonies during 1986-95, showing regional and annual variation. Symbols on map represent 1995 figures for individual colonies; histograms show annual averages for each region (with 95% confidence limits and numbers of colonies).

2.17 Sandwich tern *Sterna sandvicensis*

Breeding numbers (tables 2.17.1 & 2.17.2)

Sandwich tern colonies receive good annual coverage. At Loch Ryan, in SW Scotland, numbers have consistently risen in recent years, and this year at least 80 nests were recorded, with conditions noted as 'very crowded' (P Collin, pers. comm.). There were 491 pairs at two colonies in NE Scotland, which, although much lower than the 1994 figure, is still considered high. In SE Scotland, there were only five recorded pairs at two colonies, where there had been 129 pairs in the previous year. However, it is thought that birds may have been deterred by plastic sheeting used to control vegetation, which was removed later than intended due to poor weather conditions preventing access to the site.

In NE England, 3111-3611 pairs nested on Coquet Island and the Farne Islands. Five colonies in E England saw a total of 3591-3691 pairs (compared to 4111 at these colonies in 1994), with birds apparently having moved back to Blakeney Point from Scolt Head between 1994 and 1995. Six monitored colonies in SE England held between 315 and 355 pairs, while the one colony in SW England increased again to 107 pairs (from 70 in 1994).

In Wales, numbers at Cemlyn climbed back to 650 pairs. In NW England, sandwich terns returned to nest at Hodbarrow, with a total of 402 pairs at two occupied colonies. NE Ireland apparently underwent a similar redistribution, with a maximum of 1036 pairs, compared to 947 in the previous year. One of the two study colonies in NW Ireland suffered disturbance by mink in 1994 and was subsequently deserted in 1995, although birds were thought to have relocated to the remaining colony. In SE Ireland, 1130 nests were counted at one colony, similar to the 1994 figure.

As is often the case with this species, there were quite substantial and variable regional changes in breeding numbers between 1994 and 1995. Some regions increased in numbers and others declined, with some colony desertions. These results reflect the mobile nature of this species. At the sample of 24 occupied colonies which were monitored in both years, overall numbers declined by 7% between 1994 and 1995. This decline was largely explained by a fall in breeding numbers in Scotland and NE Ireland.

Table 2.17.1 Population changes at monitored Sandwich tern colonies, 1994-95 (breeding pairs).

Superscript = number of colonies counted in both years. Trends for 1986-93 are average annual rates of change shown by sample populations (significant trends indicated as: $P^* < 0.05$)

	SW Scotland	NE Scotland	SE Scotland	NE England	E England	SE England	Wales
1986-93 annual % change	-	0.0	-10.5	-1.9	+2.3	-1.9	-2.8
1994	60	923	129	c. 3361	c. 4111	282	400
1995	80	481	5	c. 3380	c. 3641	333	650
% change	+33.3% ¹	-47.8% ¹	-96.1% ²	-0.01% ²	-11.4% ⁵	+18.1% ³	+62.5% ¹

	SW England	NW England	NE Ireland	NW Ireland	SE Ireland	Sample total
1986-93 annual % change	+9.5	+0.1	-4.9	-1.2	+16.3*	-0.6
1994	70	380	949	243	1447	12,355
1995	107	402	1036	222	1130	11,467
% change	+52.8% ¹	+5.8% ²	+9.2% ³	-8.6% ²	-21.9% ¹	-7.2% ²⁴

Table 2.17.2 Numbers of Sandwich tern breeding pairs at regularly counted colonies in Britain and Ireland.

(- indicates that no data were available)

Colony	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Loch of Strathbeg	493	130	404	239	121	283	304	515	923	481
Sands of Forvie	597	1082	664	744	1126	1115	29	0	0	-
Inchmickery	416	656	383	272	418	473	112	9	98	1
Coquet Island	1049	1586	1616	1164	1203	1736	2131	1469	1611	1543
Farne Islands	3456	2870	3408	3445	2846	2126	2730	2349	c1750	1837
Scott Head	2550	3089	2775	1052	0	320	280	853	2406	1588
Blakeney Point	1000	475	1000	1500	3000	3000	4000	3000	1000	c1450
Minsmere	1	0	0	0	5	20	0	0	0	23
Havergate	145	200	63	50	60	84	70	125	300	250
Foulness/Maplin	98	243	350	300	280	280	548	275	405	330
Dungeness	350	3	125	220	240	250	250	40	0	0
Rye Harbour	42	155	0	3	25	2	0	90	c125	c100
Pagham Harbour	0	0	0	0	26	2	0	0	0	
Chichester Harbour	12	27	0	15	22	5	27	45	9	0
Langstone Harbour	0	3	2	0	0	0	0	0	0	0
North West Solent	176	220	305	198	150	151	150	85	148	233
Pitts Deep-Hurst	45	50	70	-	25	0	90	103	150	-
Brownsea Island	103	25	72	90	64	75	82	120	70	107
Anglesey	450	700	1080	830	517	601	500	564	400	650
South Walney	45	180	0	0	0	0	450	0	0	0
Foulney	400	550	700	770	720	332	0	253	380	343
Hodbarrow	0	0	0	50	120	520	360	100	0	59
Swan Island	63	74	117	138	130	135	132	c. 64	152	234
Green Island	61	286	78	36	59	172	108	c. 721	449	270
Strangford Lough	1418	2127	2228	962	1482	879	657	587	346	532
Lady's Island Lake	524	708	412	1317	1395	1469	1129	1254	1447	1130
Lough Swilly	95	102	73	76	109	99	116	119	220	222
Mulroy Bay	112	98	225	240	79	76	107	117	23	0
Total	13701	15639	16150	13763+	14122	14205	14333	12857	12412	-

Breeding success (table 2.17.3)

At four colonies in NE/SE Scotland, 496 pairs were thought to have fledged a minimum of 102 young. At the Coquet Island colony, productivity was good at c. 0.75 young fledged per pair. Colonies in E England also generally fared well (overall productivity 0.78+ young fledged per pair), but this masks the complete failure of 250 pairs at Havergate, probably due to foxes.

At Cemlyn, where all other tern species failed in 1995, 506 young were thought to have fledged from 650 pairs. Stoat and corvid control was carried out here in 1995. Colonies in NW England fared badly: Foulney Island suffered complete breeding failure in 1995, with only one chick thought to have fledged from 343 pairs, while no young fledged from the 59 pairs at Hodbarrow. Foxes were a likely culprit at Foulney, while heat stress may have contributed to failures at Hodbarrow.

Table 2.17.3 Sandwich tern breeding success, 1994-1995: estimated number of chicks fledged per breeding pair at sample colonies (n = number of colonies).

Note that the same colonies have not necessarily been monitored in each region each year, and that numbers of pairs given here are sample sizes (and do not necessarily indicate population changes between years).

Region	1994 fledged/pair			1995 fledged/pair		
	prs ⁿ	range	total	prs ⁿ	range	total
NE Scotland	923 ¹	-	0.33	491 ²	-	0.21
SE Scotland	129 ²	0.00-0.68	0.16	5 ²	-	0.4
NE England				1543 ¹	-	0.75
E England	4111 ⁴	0.66-1.11	0.99	2191 ⁴	0.00-1.2	0.78
SE England	c134 ²	0.00-0.02	0.02	c100 ¹	-	0.03
SW England	70 ¹	-	0.46	107 ¹	-	0.93
Wales				650 ¹	-	0.78
NW England	380 ¹	-	0.60	402 ²	-	0.0
NW Ireland	243 ²	-	<1.32	222 ¹	-	0.89
TOTAL	5990 ¹³	0.02-1.32	0.84	5711 ¹⁵	0.0-1.2	0.66

2.18 Roseate tern *Sterna dougalli*

Breeding numbers (table 2.18.1)

Breeding numbers in the UK as a whole, remained stable in 1995, with a total of 72 pairs. However, several new sites were used this year. Eleven pairs bred at sites on the Firth of Forth, with one pair using a former breeding site not colonised for over 40 years. Rings carried by this pair indicated that both birds had fledged from Rockabill, one in 1989 and the other in 1992.

Coquet Island and the Farne Islands also held similar numbers to previous years, at 38 and 2 pairs respectively. Tyres have been put down at these two sites to encourage nesting and one pair used one of these on the Farne Islands in 1995. One pair of roseates also nested amongst other terns at a new site in NE England. In NW England, three birds from Rockabill and Anglesey were seen regularly at a site in Merseyside.

There appeared to be no breeding attempts on the Scilly Isles in 1995 (4-7 pairs here in 1994), although some adults were seen in the vicinity of former colonies (P Robinson, pers. obs.). Two of three regularly used sites in Anglesey were abandoned this year, while peregrines and crows caused disturbance at the remaining colony. Eleven pairs nested at this remaining colony this year, compared to the overall figure of 20 pairs at the Anglesey sites in 1994.

In Northern Ireland, however, roseates bred successfully for the first time in two years, at two sites in Co. Antrim. In SE Ireland, breeding numbers at Rockabill increased by 40% on the 1994 figure, with a minimum of 554 pairs recorded before July 1. This increase was probably largely due to the influx of terns of the 1992 cohort (identified from rings). Birds which had fledged in 1993 were also noted amongst loafing groups (including two ringed in Brittany), suggesting that breeding numbers may increase further in the 1996 season. Birds may also have moved up to Rockabill from Lady's Island Lake, where numbers were considerably lower than in the previous year.

Outside Britain, counts of incubating birds at the Brittany colony suggested a slight increase from 80 pairs in 1994 to 85 this year. A count of the established colonies on the Azores gave an estimated 1000 pairs. However, a full survey throughout the Azores in 1996 will give a better estimate of the true population size.

Table 2.18.1 Roseate tern numbers (breeding pairs) at major colonies (those holding at least 20 pairs in at least one year) during 1986-95, and breeding success (chicks fledged/pair) in 1995.

Region: Colony	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Chicks/pair 1995
SE Scotland:											
Inchmickery	18	20	21	5	0	0	0	0	2	0	-
Forth colony B	-	2	12	-	15	23	17	17	7	11	1.2
NE England:											
Farne Islands	9	14	21	12	4	3	4	3	2-3	2	1.0
Coquet Island	20	17	21	25	23	20	29	c. 30	c. 38	38	c. 1.0
Wales:											
Anglesey colony A	200	40	45	70	35	1	0	16	18	0	-
Anglesey colony B	0	21	0	19	7	0	0	0	0	0	-
NE Ireland:											
Larne Lough	21	25	23	37	19	4	3	0	4	8	0.63
Carlingford Lough	34	40	7	25	3	0	0	0	0	0	-
SE Ireland:											
Rockabill	177	250	332	194	321	366	378	427	394	554	c. 1.26
Lady's Island Lake	0	8	0	76	60	56	76	76	140	60	-
TOTAL*	490	450	480	470	490	450	520	578	614	686	c. 1.23

* Annual totals, and overall productivity in 1995, include other regularly-counted, small colonies

Breeding success

The eleven pairs at sites in the Forth fledged 13 young. At both Coquet Islands and the Farnes, fledging success was estimated at c. 1.0 chick per pair. At the remaining colony in Anglesey, 8 young fledged from a total of 11 pairs, despite disturbance from peregrines and egg predation by crows. Eight pairs at the two colonies in Northern Ireland raised five chicks, while overall productivity at Rockabill was estimated to be 1.26 chicks fledged per pair.

Discussion

There have been some encouraging signs this year, with some new sites colonised and others apparently being prospected. This increasing spread of the population is very welcome news and will hopefully continue in the 1996 season. Dispersal patterns of immature adults are now being detected using the individual ringing programme started in 1992. Increases in sub-adult attendance at Rockabill is encouraging and suggests that there may be further increases in breeding numbers in the next year or two.

In the Azores, wardens are now present at the Flores, Terceira and Graciosa colonies to minimise disturbance from tourists and fishermen.

2.19 Common tern *Sterna hirundo*

Breeding numbers (table 2.19.1)

In Scotland, overall breeding numbers at monitored colonies fell by *c.* 16% between 1994 and 1995. A long-running study at sample coastal colonies in NW and SW Scotland has recorded a steady decline in breeding numbers over the last nine years (Craik 1995). In 1987, 1829 pairs were recorded at 23 colonies in the study area, this now having declined to 1107-1137 pairs at 14 colonies. Much of the decline in breeding numbers is apparently attributable to predation by introduced American mink. Elsewhere in SW Scotland, the Treshnish Isles held breeding common and arctic terns for the first time in several years. In N and NE Scotland, at five colonies monitored in both years, there was a decline from 888 pairs in 1994 to 569 pairs in 1995. Human disturbance and the presence of gulls contributed to the reduction in numbers at Brora with smaller numbers also breeding at Nigg and St Fergus. Elsewhere in Britain, monitored coastal colonies showed little change in overall breeding numbers, although there was some redistribution of pairs among colony sites in some areas. Inland, many colonies occupying breeding rafts increased in numbers with some pairs also attempting to nest on shorelines or grass banks, where nests were depredated.

Breeding success

Overall productivity at study colonies in NW and SW Scotland was estimated in the range of 0.33-0.46 young fledged per pair. Mink again took many chicks although, in general, productivity was high at colonies where mammalian predators were absent or controlled. In N and NE Scotland, an overall figure of 0.32 young fledged per pair reflected the complete failure of 206 pairs at Nigg, following predation by feral cats and mustelids (see arctic terns). Six colonies monitored in SE Scotland were fairly successful with an overall figure of 0.67 young fledged per pair, while in NE England, productivity was extremely high at Coquet Island, with 763 pairs thought to have fledged 1343 young.

Elsewhere, in SE England, mink and gull predation accounted for nearly all chicks fledged at Dungeness, with kestrels taking many chicks in the North Solent NNR. By contrast, Rye Harbour had a very successful season with *c.* 2.3 chicks fledged per pair. Colonies in Wales fared reasonably well, with an overall productivity at five colonies of 0.84 young per pair. Disturbance by peregrines is likely to have contributed to almost complete failure at Cemlyn this year.

In 1995, overall productivity at monitored coastal colonies in Britain was reasonably good at 0.82 chicks fledged per pair. Many inland colonies are monitored annually, and productivity at colonies on man-made platforms seems generally good. Problems can arise when rafts ground in dry weather allowing access by rats, although the main causes of failure appear to be adverse weather conditions. Further information on inland colonies would be greatly welcomed and should be forwarded to Emma Brindley, RSPB, The Lodge, Sandy, Bedfordshire SG19 2DL.

Table 2.19.1 Population changes at monitored common tern colonies, 1994-1995 (breeding pairs).

Superscript = number of colonies counted in both years (including known colonies not occupied in 1994-1995).

	NW/SW Scotland	N. Scotland	NE Scotland	SE Scotland	NE England	SE England
1994	700	493	395	774	1140	552
1995	762	316	253	652	1063	511
% change	+8.9% ⁶	-35.9% ³	-35.9% ²	-15.8% ⁸	-6.7% ³	-7.4% ⁹
	SW England	NW England	Wales	England & Wales	NE Ireland	SE Ireland
1994	251	23	439	2405	1068	289
1995	267	35	530	2406	945	351
% change	+6.4% ³	+52.2% ¹	+20.7% ⁴	0.0% ²⁰	-11.5% ³	+21.5% ¹

Table 2.19.2 Common tern breeding success, 1994-95: estimated number of chicks fledged per breeding pair at sample colonies (n = number of colonies).

Note that the same colonies have not necessarily been monitored in each region in each year, and that numbers of pairs given here are sample sizes (not necessarily indicating population changes between years).

Region	1994 fledged/pair			1995 fledged/pair		
	prs ⁿ	range	total	prs ⁿ	range	total
SW Scotland	785 ⁸	0.00-1.59	0.88	1063 ¹¹	0.00-1.80	0.41
NW Scotland	379 ⁵	0.00-1.31	1.05	46 ²	-	0.00
N Scotland	493 ³	0.22-0.48	0.27	331 ³	0.00-0.36	0.13
NE Scotland	395 ²	0.03-0.14	0.06	253 ²	0.50-0.60	0.55
SE Scotland	339 ⁶	0.54-1.35	0.91	236 ⁶	0.00-1.05	0.67
SCOTLAND	2391 ²⁵	0.00-1.59	0.65	1924 ²⁴	0.00-1.80	0.40
NE England				963 ²	-	1.75
E England	691 ⁶	0.50-2.50	1.31			
SE England	354 ⁴	0.00-1.73	0.41	499 ⁸	0.00-2.31	0.86
SW England	281 ³	0.08-2.00	0.65	267 ³	0.00-0.66	0.45
NW England	66 ⁴	0.00-0.43	0.18+	92 ²	0.08-0.77	0.51
ENGLAND	1392 ¹⁷	0.00-2.50	0.91	1821 ¹⁵	0.00-2.31	1.25
WALES	478 ⁵	0.70-1.90	1.1	590 ⁵	0.02-1.00	0.84
BRITAIN	4261 ⁴⁷	0.00-0.25	0.79	4340 ⁴⁴	0.00-2.31	0.82
SE Ireland	289 ¹		<1.74	351 ¹	-	1.89

2.20 Arctic tern *Sterna paradisaea*

Breeding numbers (table 2.20.1)

Counts at regularly monitored coastal sites in Argyll and Strathclyde continued in 1995. Over the past nine years there has been a range contraction in the study area, from 299 pairs at 21 colonies in 1987, to 290-293 pairs at only 12 colonies in 1995. This situation is similar to that of common terns; 23 colonies in the study area in 1987 having fallen to 14. Predation by American mink has been heavy at some colonies in recent years and is likely to have contributed to the desertion of some small islands.

In N Scotland, numbers at three colonies counted in both 1994 and 1995, declined from 544 to 243 pairs. In NE Scotland, breeding numbers rose at St Fergus in 1995, to 354 pairs from 243 in 1994. Mink and ferrets were trapped this year and gull predation was thought to be minimal. Breeding numbers at five colonies in SE Scotland which were counted in both years rose to 630 pairs in 1995 from 564 in 1994, with numbers at the largest colony on the Isle of May increasing further to 608 pairs in 1995. In NE England, numbers were slightly down at Coquet and the Farne Islands (708 pairs at Coquet and 3066 on the Farnes), but remained stable at Long Nanny at 280 pairs (256 in 1994).

At two colonies in Anglesey, breeding numbers increased in 1995, to 1247 pairs from 1053 in 1994. In NE Ireland, a maximum of 281 pairs nested at Strangford Lough and 268 at Cockle Island. In SE Ireland, breeding numbers at Rockabill increased again, to 49 pairs, with an estimated 100 pairs at Lady's Island Lake.

Breeding success (table 2.20.2)

Productivity was monitored at twenty colonies in Shetland. The overall figure of 0.52 chicks fledged per pair was higher than the 1994 figure of 0.19. However, as in previous years, there was considerable regional variation, with productivity ranging from 0.00 to 0.87 chicks fledged per pair, the latter figure being recorded at the largest study colony, Exnaboe. In Orkney, seven colonies were monitored and overall breeding success at these sites was higher than in 1994, at 0.79 chicks fledged per pair. Again, however, there were substantial differences between colonies with figures ranging from 0.00 to 1.5 fledglings per pair.

Productivity at the twelve monitored colonies in SW Scotland, was much improved this year, with c. 290 pairs fledging 252-274 young (0.86-0.94 per pair). At three colonies in N Scotland, 243 pairs raised only 5 young, with the Brora and Nigg colonies failing completely. At Brora, a lesser black-backed gull with a broken wing took many eggs in the early season, and human disturbance contributed to general failure later on, while at Nigg, feral cats and mustelids accounted for most chick losses.

At four colonies in NE Scotland, overall productivity was 0.68 per pair, with a good season at Kinloss (maximum of 1.13 chicks fledged per pair). At St Fergus, productivity was higher than in recent years, at 0.32 chicks per pair. Wooden chick shelters were provided and vegetation encouraged to grow alongside some of the colonies. These factors, together with warm, dry weather, helped to raise productivity. At St Cyrus, foxes were thought to have contributed to the failure of nine pairs.

High tides washed out at least two small colonies in SE Scotland, with another succumbing to crow and gull predation. Colonies in NE England, however, had a more successful season; on Coquet Island, c. 956 young fledged from 708 pairs and on the Farne Islands, productivity at a sample of 154 nests was also good, at 0.77 young fledged per pair.

Peregrines contributed to low productivity at two of three colonies in Wales, although overall productivity was high, at 0.82 young fledged per pair, due to very successful year at the largest Anglesey colony. In NW England, only 8 young fledged from 54 pairs at Foulney Island.

Table 2.20.1 Population change at monitored arctic tern colonies, 1994-1995 (breeding pairs).

Superscript = number of colonies counted in both years (including known colonies not occupied in 1994-95).
Regional samples <100 pairs in 1994 are excluded.

	N Scotland	NE Scotland	SE Scotland	NE Scotland	SW Scotland	Wales	NE Ireland
1994	544	245	564	4189	61	1053	243
1995	243	363	630	4054	161	1247	281
% change	-55.3% ³	+48.1% ²	+11.7% ⁵	3.2% ³	+164% ⁷	+18.4% ²	+15.6% ¹

Table 2.20.2 Arctic tern breeding success, 1994-1995: estimated number of chicks fledged per breeding pair at sample colonies (n= number of colonies).

Note that the same colonies have not necessarily been monitored in each region each year and that numbers of pairs given here are sample sizes (and do not necessarily indicate population change between years) < = figures which may be substantial overestimates (mainly based on number of chicks ringed).

Region	1994 chicks fledged/pair			1995 chicks fledged/pair		
	prs ⁿ	range	total	prs ⁿ	range	total
SW Scotland	66 ⁶	0.00-1.11	0.77	290 ¹²	0.0-1.4	0.86 - 0.94
NW Scotland	41 ³	0.0-1.0	0.22	-	-	-
Shetland	707 ¹⁵	0.00-1.14	0.19	2881 ²⁰	0.00-0.87	0.52
Orkney	807 ⁶	0.01-0.59	0.17	3431 ⁷	0.0-1.5	0.79
N Scotland	544 ³	0.11-0.48	0.20	243 ³	0.00-0.42	0.02
NE Scotland	245 ²	0.0-1.0	0.02	793 ⁴	0.00-1.13	0.68
SE Scotland	570 ⁵	0.00-0.74	0.70	24 ⁴	0.0-0.8	0.21
NE England	256 ¹		0.54+	988 ²	0.36-1.35	1.07
Wales	1078 ³	0.87-1.30	0.98	1277 ³	0.00-0.97	0.82
NW England	44 ¹		0.48	54 ¹	-	0.15
SE Ireland				49 ¹		≤1.43

2.21 Little tern *Sterna albifrons*

Breeding numbers (table 2.21.1)

At eight colonies in Scotland which were counted in both 1994 and 1995, numbers remained fairly stable at 64 pairs (60 in 1994). In NE England, there were a total of 204 pairs at eight colonies which had held 161 pairs in 1994, an increase of nearly 27%. Along the East Anglia coast, numbers at the Great Yarmouth colony increased again, to 250 pairs, but continuing declines in Lincolnshire and Suffolk mean that 73% of the regional population is now concentrated in Norfolk. Breeding numbers were little changed overall in SE England at eight colonies counted in both years.

At Chesil in Dorset, 90 pairs nested, higher than the 1994 figure of 77 pairs. At Gronant in Wales, the high of 77 pairs in 1994 fell back to 65 pairs in 1995. In NW England, overall breeding numbers remained fairly stable, with 51 pairs at seven colonies in 1995 where there had been 56 in 1994.

Breeding Success (table 2.21.2)

Exceptionally high tides in summer 1995 led to overall failure at many colonies. Nest rescue attempts at various colonies seemed to prove successful (although young frequently succumbed to predation at a later stage). Overall fledging success at 50 colonies monitored throughout Britain was 0.49 chicks per pair.

At three colonies monitored in 1995 in SW and N Scotland, 36 pairs fledged a maximum of 14 young, giving an overall productivity of 0.39 chicks per pair. At four monitored colonies in NE Scotland, 22 pairs fledged a maximum of 10 young. Problems noted here were predation by foxes, crows and gulls. In SE Scotland, productivity was assessed at three colonies, where 21 pairs produced a total of 6-9 young.

In NE England, at eight monitored colonies, only 15 young were thought to have fledged from a total of 179 pairs (0.08 fledged per pair). A combination of high tides, sand blow and predation led to these failures, with fox, kestrel, gulls, rooks, crows and merlin listed among predators. Populations in E England fared reasonably well, with at least 407 young fledged from 693 pairs (0.59 chicks per pair) at colonies where fledging success was monitored.

At the Chesil colony, only 37 young were thought to have fledged from 90 pairs, with many failures at the egg stage and chicks taken by kestrels. At Gronant, eggs and nests were moved beyond reach of the high tides, some of these going on to produce young while others succumbed to predation by foxes and a crow. In NW England, productivity was monitored at five colonies, where 29 young fledged from 38 pairs.

Further details of individual colony management are available in the first edition of a little tern newsletter, which is now available. The main aim of this is to exchange information on methods used to solve problems which are common to many little tern colonies. Copies of this are available from Emma Brindley, RSPB, The Lodge, Sandy, Beds, SG19 2DL.

Table 2.21.1 Population changes at monitored little tern colonies, 1994-1995 (breeding pairs).
Superscript = number of colonies counted in both years (including known colonies not occupied in 1994-1995).
Regional samples <50 pairs are excluded.

	Scotland	NE England	E England	SE England	SW England	Wales	NW England	BRITAIN
1994	60	161	866	155	77	77	56	1452
1995	64	204	776	171	90	65	51	1421
% change								
1994-95	+6.6% ⁸	+26.7% ⁸	-10.4% ³¹	+10.3% ⁸	+16.9% ¹	-15.6% ¹	-8.9% ⁷	-2.1% ⁶⁴

Table 2.21.2 Little tern breeding success, 1994-5: estimated number of chicks fledged per breeding pair at sample colonies (n = number of colonies).

Note that the same colonies may not necessarily have been counted in each region each year and that numbers of pairs given here are sample sizes (and do not necessarily indicate population changes between years).

Region	1994 fledged/pair			1995 fledged/pair		
	pairs ⁿ	range	total	pairs ⁿ	range	total
SW Scotland	5 ²	-	0.0	17 ²	0.64-0.67	≥0.65
N Scotland	10 ¹	-	0.4	19 ¹	-	≤0.16
NE Scotland	2 ¹	-	0.0	22 ⁴	0.0-0.71	≤0.45
SE Scotland	42 ⁵	0.0-0.1	0.05	21 ³	0.0-0.6	≥0.33
SCOTLAND	59 ⁹	0.0-0.4	0.11	79 ¹⁰	0.0-0.71	0.39
NE England	154 ⁶	0.0-1.17	0.40	179 ⁸	0.0-0.3	0.08
E England	811 ²²	0.0-1.60	0.86	687 ²⁰	0.0-1.2	0.59
SE England	167 ⁷	0.0-0.6	0.18	171 ⁶	0.0-1.43	0.52
SW England	77 ¹	-	0.53	90 ¹	-	0.41
Wales	77 ¹	-	1.68	65 ¹	-	0.57
NW England	56 ⁷	0.0-1.0	0.20	38 ⁴	0.0-1.2	0.76
ENGLAND/WALES	1342 ⁴⁴	0.0-1.6	0.72	1230 ⁴⁰	0.0-1.43	0.50
SE Ireland	≤6 ⁹		<0.1	-	-	-
TOTAL	1470 ⁵⁵	0.0-1.6	0.67	1309 ⁵⁰	0.0-1.43	0.49

2.22 Guillemot *Uria aalge*

Breeding numbers (table 2.22.1)

Further increases in numbers of birds attending study plots were recorded in SE Scotland from 1994 to 1995, with a 31% rise on the Isle of May ($t=6.802$, $d.f.=18$, $p<0.001$) and a 26% increase at St. Abb's Head ($t=3.861$, $d.f.=14$, $p<0.01$). A smaller rise, of 8.3%, was also recorded from colonies in NE England. Whole colony counts further north, in Grampian, found increases of 116% (9% p.a.) and 176% (12% p.a.) between 1986 and 1995 for the Boddam to Collieston and the Gamrie to Pennan coasts respectively. Counts of study plots in the same areas detected a very highly significant increase of 19.3% in 13 plots at the Buchan cliffs and a non-significant 7.8% increase in 11 plots at Troup and Lion's Heads for the period 1992 to 1995 (Walsh *et al.* 1996). This is in line with the significant increase in numbers in NE Scotland over the period 1986-93.

In NW Scotland, there was no significant change in numbers of birds attending study plots on Handa. In Shetland, attendance at study plots fell slightly overall between 1994 and 1995, with a significant decrease at Hermaness (12.5%, $t=4.109$, $d.f.=8$, $p<0.01$) for the second year in succession. The latest decline was mainly attributable to the abandonment of one site, possibly caused by cat predation. There was also a significant drop in attendance recorded at Fair Isle (-14.6%, $t=6.020$, $d.f.=16$, $p<0.001$). This result may in part have arisen from possible observer error at one plot in 1994, but an overall 8.6% decrease across the remaining four plots suggests a genuine decrease in numbers of adults present. At two other Shetland sites there were significant population increases (Eshaness: +8.3%, $t=3.876$, $d.f.=8$, $p<0.01$; Noss: +13.6%, $t=3.187$, $d.f.=7$, $p<0.05$). No data are available on population changes in Orkney between 1994 and 1995 because a winter rock fall at Papa Westray necessitated some alteration to the study plots

Elsewhere, counts at study plots indicated a further population increase in Wales, continuing a significant trend for the period 1986-93. For the second season running, there was a significant increase on Skomer (Dyfed), of 10% ($t=5.848$, $d.f.=18$, $p<0.001$). However, a 32% decrease ($t=8.724$, $d.f.=5$, $p<0.001$) was recorded from plots on Lundy in Devon. On Rathlin Island, NE Ireland, numbers rose by 42.4% (significance not testable) following a *c.* 24% decline in the previous year.

Breeding success (table 2.22.2)

Overall breeding success was again high, averaging 0.76 chicks per site (\pm s.e. 0.02) at 12 study-colonies, the same as in 1994 and close to the 1986-94 average (0.74 \pm s.e. 0.01, based on 3-12 colonies annually). As in 1994, the highest productivity recorded was in SW England (0.83 chicks fledged per site at Durlston Head. The lowest was on Fair Isle in Shetland, with an average of 0.67 (\pm s.e. 0.02) chicks fledged per site from two study plots, the poorest recorded since 1988. As in 1994, breeding success was also relatively poor on Handa in NW Scotland (0.69 chicks fledged per site), with all other colonies fledging on average 0.73 to 0.81 chicks per site.

There were no significant regional changes in productivity, and individual colonies also generally showed no major change. However, productivity at Marwick Head and Mull Head on Orkney increased by 0.10 and 0.08 chicks fledged per site respectively, following rather poor breeding success in 1994. There was some evidence of a major decline in productivity at Berry Head in Devon, although inconsistencies in methods between the two years made it impossible to quantify this.

Table 2.22.1 Population changes at monitored guillemot colonies, 1994-95 (adults attending colony in first three weeks of June).

Superscript = number of colonies counted in both years. Figures are based on the means of 3-10 annual counts of study plots within each colony (except [] = <3 valid counts). Trends for 1986-93 are average annual rates of change shown by sample populations (significant trends indicated as: * P<0.05)

	NW Scotland ^a	Shetland ^b	NE Scotland ^c	SE Scotland ^d	NE England ^e	Wales ^f	SW England ^g	NE Ireland ^h
1986-93 annual % change	+8.5	-0.7	+4.0*	+1.4	+2.8	+3.6*	-	+1.8
1994	1711	11192	[2756]	4705	27521	5907	951	2168
1995	1610	10885	3405	6090	29796	6024	647	3088
1994-95 % change	-5.9% ¹	-2.7% ⁷	[+23.5%] ¹	+29.4% ²	+8.3% ²	+2.0% ³	-31.9% ¹	+42.4% ¹

Colonies: ^aHanda; ^bSumburgh Head, Hermaness, Burravoe, Eshaness, Noss, Troswick Ness, Fair Isle; ^cFowlsheugh; ^dIsle of May, St. Abb's Head; ^eBempton, Farne Islands ^fSkomer, Skokholm, South Stack; ^gLundy; ^hRathlin Island.

Table 2.22.2 Guillemot breeding success, 1994-95: estimated number of chicks fledged per site regularly occupied by a pair or per pair laying (n = number of colonies).

Figures are presented as the mean and standard error of figures for individual colonies. Changes in breeding success are indicated for colonies studied in both years (none of the regional changes is statistically significant).

Region	1994 chicks fledged/pair				1995 chicks fledged/pair				1994-95 change	
	sites ⁿ	range	mean	±s.e.	sites ⁿ	range	mean	±s.e.	mean ⁿ	±s.e.
NW Scotland ^a	216 ¹		0.70		196 ¹		0.69		-0.01 ¹	
Shetland ^b	301 ²	0.72-0.78	0.75	±0.03	268 ²	0.67-0.79	0.73	±0.06	-0.02 ²	±0.03
Orkney ^c	354 ³	0.65-0.83	0.72	±0.05	354 ³	0.73-0.80	0.77	±0.02	+0.05 ³	±0.04
N Scotland ^d	83 ¹		0.73		91 ¹		0.76		+0.03 ¹	
SE Scotland ^e	775 ¹		0.79		805 ¹		0.81		+0.02 ¹	
NE England ^f	140 ¹		0.81		164 ¹		0.77		-0.04 ¹	
SW England ^g	166 ²	0.82-0.86	0.84	±0.02	≤74 ¹		0.83		+0.01 ¹	
Wales ^h	187 ¹		0.73		333 ²	0.75-0.78	0.77	±0.02	+0.02 ¹	
TOTAL	2222 ¹²	0.65-0.86	0.76	±0.02	2185 ¹²	0.67-0.83	0.76	±0.01	+0.01 ¹¹	±0.01

Colonies: ^aHanda; ^bSumburgh Head, Fair Isle; ^cPapa Westray, Marwick Head, Mull Head; ^dNorth Sutor; ^eIsle of May; ^fBempton; ^gDurlston Head, Berry Head (1994 only); ^hSkomer, Skokholm (1995 only).

2.23 Razorbill *Alca torda*

Breeding numbers (table 2.23.1)

Counts of adults at sample colonies indicated a rather varied regional pattern of change in numbers of attendant adults between 1994 and 1995. Significant increases of 16% ($t=2.850$, $d.f.=18$, $p<0.05$) on the Isle of May (Fife) and of 6% ($t=3.246$, $d.f.=18$, $p<0.01$) on Skomer (Dyfed) were in line with long term regional trends. In Shetland, numbers also continued to increase generally, from the 1989/90 low. A significant increase of 33% ($t=3.191$, $d.f.=8$, $p<0.05$) was noted in plots on Noss, following a 16% decline between 1993 and 1994. At Troswick Ness, there was a rise of 27% ($t=2.940$, $d.f.=8$, $p<0.05$). A large increase was noted in plots on Rathlin Island (NE Ireland), although the statistical significance of this could not be assessed. The only other major change was a 14% decrease on Handa ($t=2.523$, $d.f.=12$, $p<0.05$). In NE Scotland, a census of stretches of the Grampian coast found large increases in populations since 1986. These were equivalent to +152% on the Boddam to Collieston coast and +286% on the Gamrie to Pennan coast. Significant increases were also recorded for the period 1992-95 in two sets of study plots on the same stretches of coast, with a +30% change ($p<0.001$) in 17 plots between Cruden Bay and Boddam and a +20% change ($p<0.01$) in 15 plots at Troup and Lion's Heads (Walsh *et al.* 1996).

Breeding success

As usual, only limited data were available. Average breeding success at three colonies monitored in detail was moderate ($\leq 0.61 \pm s.e. 0.07$ chicks fledged per breeding site) and similar to 1994 ($\leq 0.62 \pm s.e. 0.04$ at the same colonies), but lower than the overall 1986-94 average ($\leq 0.70 \pm s.e. 0.02$ over 1 to 4 colonies monitored annually). Skomer was the most successful site monitored in 1995, producing 0.72 ($\pm s.e. 0.03$) chicks per site over 177 sites in five plots, compared to 0.54 ($\pm s.e. 0.08$) in 1994. Less detailed monitoring on neighbouring Skokholm indicated a very successful season there. In contrast to Wales, productivity at Scottish sites declined in 1995. On the Isle of May, 143 breeding sites in four plots averaged 0.62 ($\pm s.e. 0.09$) chicks per site (0.69 $\pm s.e. 0.05$ in 1994). This was the lowest productivity recorded in ten years (1986-94 average $0.73 \pm s.e. 0.02$) and was attributable to unusually high, unexplained losses at the egg stage. On Fair Isle (Shetland), 47 sites fledged ≤ 0.49 chicks per site compared to the average of ≤ 0.64 ($\pm s.e. 0.05$) between 1991 and 1994. However, although unusually high numbers of dead chicks were observed in the study plot, this was not evident elsewhere and the productivity estimate may not be fully representative of the colony as a whole.

Table 2.23.1 Population changes at monitored razorbill colonies, 1994-95 (adults attending colony in first three weeks of June).

Superscript = number of colonies counted in both years. Figures are based on means of 3-10 annual counts of study plots within each colony (except [] = <3 valid counts). Trends for 1986-93 are average annual rates of change shown by sample populations (significant trends indicated as: * $P<0.05$; ** $P<0.01$)

	NW Scotland ^a	Shetland ^b	NE Scotland ^c	SE Scotland ^d	Wales ^e	NE Ireland ^f
1986-93 annual % change	-	-0.2	+2.2	+3.5**	+3.1**	-1.2
1994	36	429	[258]	952	1543	561
1995	31	486	203	1109	1512	943
1994-95 % change	-13.9% ¹	+13.3% ⁶	[-21.3%] ¹	+16.5% ²	-2.0% ³	+68.1% ¹

Colonies: ^a Handa; ^b Sumburgh Head, Hermaness, Eshaness, Noss, Troswick Ness, Burravoe; ^c Fowlsheugh; ^d Isle of May, St. Abb's Head; ^e Skomer, Skokholm, South Stack; ^f Rathlin Island.

2.24 Black guillemot *Cephus grylle*

Breeding numbers (table 2.24.1)

In Shetland, pre-breeding counts of adults at monitoring sites generally indicated relatively little change between 1994 and 1995. Numbers at sites along the coastline affected by the *Braer* oil spill of January 1993 suggest a partial recovery. At West Burra and Kettlaness, the moderately good recovery seen in 1994 was not sustained in 1995 (West Burra: 1994: 118, 1995:110; Kettlaness: 1994: 92, 1995: 89). On Fair Isle, where a decrease in 1993 may also have been related to the *Braer* wreck, numbers also decreased between 1994 and 1995 (-9%) following an increase from 1993 to 1994 (+16%). However, at Boddam to Virkie, where 123 birds were counted in 1992, the partial recovery seen in 1994 (104) was maintained in 1995 (125). At other Shetland sites monitored in both 1994 and 1995, there was a slight overall increase in numbers, in line with the long term trend. At sites close to the *Pionersk* oil spill of October 1994 (Aithsetter, Gulberwick-Easter Quarff) there was no evidence of any impact on breeding numbers. At a limited number of sites surveyed in Yell Sound, there was little evidence of any substantial change in numbers since 1993. However, some decreases were apparent among small scattered colonies in the south west of the Sound, possibly attributable to localised otter predation.

Pre-breeding counts of adults also decreased at both count sites on Papa Westray (Orkney). A further 6% decrease was recorded at the Holm of Papa Westray, where numbers have decreased steadily since 1983, perhaps because of predation or disturbance by rats or gulls (see below). At North Hill, numbers have fluctuated markedly in recent years, and the 16% decrease recorded in 1995 followed a 50% increase in the previous year. The only other standardised counts available in 1995 were from Peel Hill (Isle of Man), where numbers declined (-12%) for the third year in succession.

Table 2.24.1 Population changes at monitored black guillemot colonies, 1993-95 (adults in breeding habitat in early morning, late March-early May).

Superscript = number of colonies/lengths of coastline counted in both years. Trends for 1983/86-93 are average annual rates of change shown by sample populations (significant trends indicated as: * P<0.05). In Shetland, "other coasts" excludes Yell Sound.

	'Braer coast', Shetland ^a	Fair Isle	Other coasts, Shetland ^b	Papa Westray, Orkney	Isle of Man ^c
1983/86-93 annual % change	-1.2(85-93)	-	+1.7*(85-93)	-3.7 (83-93)	+4.2
1992	372		569		
1993	264	263	609	374	126
1994	320	304	615	422	120
1995	324	277	635	375	106
1994-95 % change	+1.3% ³	-8.9% ¹	+3.3% ⁴	-11.1% ²	-11.7% ¹

Colonies: ^a Kettlaness, West Burra, Boddam-Virkie; ^b Lunning, Levaneap, Kirkabister, Aithsetter; ^c Peel Hill.

Breeding success

Limited data were available for 1995. On Fair Isle (Shetland), an average of 0.72 chicks fledged per site (n = 32). This was an improvement on 1994 (0.58), but still well below the 1993 figure (1.23). Predation by cats may be contributing to this decreased breeding success (P. Harvey pers comm. to M. Heubeck). On Yell, of 16 active nest sites located in early July only six contained one or more chicks when revisited later in the month and evidence of predation, probably by otter, was found at several of the failed sites (Kirby 1995). A detailed study on the Holm of Papa Westray (Orkney) found 0.57

chicks fledged per site (n=70), substantially lower than that recorded in 1994 (0.89). Evidence of predation of chicks, presumably by rats, was found at nine nests and gulls were observed to take chicks from a further two nests, with no evidence of predation being left.

In SW and NW Scotland (Argyll & Bute and the southern part of Lochaber district) there was again evidence of predation by mink of both adults and eggs or chicks and a further six former colonies were found to be abandoned in 1995, following mink predation in previous years (C. Craik, pers. comm.).

2.25 Puffin *Fratercula arctica*

Breeding numbers

Very little information is available on numbers of pairs breeding at most colonies. On the Isle of May (SE Scotland), counts of apparently occupied burrows (AOBs) in study plots indicated little change from 1994 (M.P. Harris, pers. comm.), in line with the 1986-93 average rate of change for the sample population of +0.4% per year. The population on Coquet Island (NE England) increased by c. 22% per year between 1986 and 1993, but now shows evidence of levelling off or gradually declining. In 1995, the population was estimated as c. 11,400 AOBs, c. 10% less than in 1994. On Fair Isle, a whole island census in late April recorded a total of 17,386 individuals, 25% less than in 1989. However, this decrease may fall within the limits of accuracy for this census technique. At Hermaness, there were estimated to be at least 19,110 occupied burrows in 1995 (based on counts of loafing adults and the ratio of loafing adults to occupied burrows within a study plot), similar to the figure of 22,960+ occupied burrows produced using the same methodology in 1987.

Breeding success (table 2.25.1)

Average breeding success in 1995 was 0.78 chicks fledged per egg/occupied burrow at six colonies; was similar to the 1986-94 average (0.78 ± s.e. 0.016 at two to five of these same colonies annually). There were no statistically significant overall or regional differences in productivity between 1994 and 1995. Highest productivity was seen at east coast colonies (Isle of May, Farnes and Coquet Island). Chick survival at Sumburgh Head was poor (0.53, n=15), probably as a result of predation by feral cats. Poor weather prevented any productivity data being collected from Hermaness.

Table 2.25.1 Puffin breeding success, 1994-95: estimated number of chicks fledged per egg or occupied burrow (Wales) (n = number of colonies).

Figures are presented as the mean and standard error of figures for individual colonies. Changes in breeding success are indicated for colonies studied in both years, none are statistically significant

Region	1994 chicks fledged/pair				1995 chicks fledged/pair				1994-95 change	
	sites ⁿ	range	mean	±s.e.	sites ⁿ	range	mean	±s.e.	mean ⁿ	±s.e.
NW Scotland ^a	100 ¹		0.73		-		-			
Shetland ^b	64 ¹		0.83		109 ¹		0.74		-0.09 ¹	
SE Scotland ^c	189 ¹		0.85		180 ¹		0.83		-0.02 ¹	
NE England ^d	216 ²	0.80-0.82	0.81	±0.01	224 ²	0.80-0.89	0.85	±0.05	+0.04 ²	0.06
Wales ^e	171 ¹		0.76		142 ²	0.63-0.77	0.70	±0.07	+0.01 ¹	
TOTAL	740 ⁶	0.73-0.85	0.79	±0.02	655 ⁶	0.63-0.89	0.78	±0.04	-0.01 ⁵	±0.03

Colonies: ^a Dun (St Kilda); ^b Fair Isle; ^c Isle of May; ^d Farne Islands, Coquet Island; ^e Skomer, Skokholm (1995 only).

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