

**Seabird numbers and breeding success
in Britain and Ireland, 2006**

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Data on numbers at colonies throughout the UK and Ireland are held in the Seabird Colony Register database, which can be accessed, following registration, at www.jncc.gov.uk/smp.

Instructions for contributions of seabird data:

This report and subsequent editions are reliant on the contributions of observers throughout Britain and Ireland. If you would like to contribute data and information for future editions please note the following:

Observers should, if possible, enter their whole colony counts online at www.jncc.gov.uk/smp. Contributors must first register on the website before they will be given permission to enter data. Alternatively, counts should be entered electronically or electronically on to SMP data sheets (see Appendix 1) or download from www.jncc.gov.uk/seabirds).

Plot count and productivity data should be entered on to the existing standard data sheets (download from www.jncc.gov.uk/seabirds).

All data and other observations should be emailed (preferably) or posted to Roddy Mavor at roddy.mavor@jncc.gov.uk, or Joint Nature Conservation Committee, Dunnet House, 7 Thistle Place, Aberdeen, AB10 1UZ.

Deadline for submission of data for inclusion in the relevant edition of this report is 30 November in the year they were collected.

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Summary

Some findings of particular note in 2006 are summarised below:

Observers at many seabird colonies throughout Britain reported a later than average breeding season in 2006. Feeding conditions again appeared to be less than ideal, with most species probably affected by a shortage of food, especially during the latter stages of chick-rearing.

It was another late breeding season on Shetland for **red-throated divers**, where the number of pairs nesting was generally high, but success was below average. On Orkney, the number of pairs nesting was also high and they were more successful than average. On Eigg, all nests again failed due to predation by otters.

Northern fulmar numbers decreased in Orkney and in western Britain between 2005 and 2006, but increased in Shetland and in eastern Britain. Overall, success was slightly below the UK and Ireland long-term mean.

Productivity of **Manx shearwaters** was below average at the few monitored colonies. On Rum, it was the latest and most protracted breeding season since 1969. Crows removed eggs from accessible burrows on Bardsey.

A survey of **European storm-petrel** colonies on the Isles of Scilly found 1,398 AOS, similar to that recorded in 2000. **Leach's storm-petrel** numbers on Dun, St. Kilda, were estimated at 13,523 AOS, similar to numbers in 2003, suggesting that the decline in the size of the UK's largest colony had at least slowed.

After the decreases in 2005, in response to a late winter/early spring wreck, **great cormorant** and **European shag** numbers in many eastern regions increased, but decreases were noted in the west. Breeding success of European shag was also higher than in 2005 in eastern regions, but not the west.

After a long period of decline, **Arctic skua** numbers in Shetland and Orkney increased for a second successive year. Breeding success in these regions was higher than in 2005, despite complete failures at some colonies, but was low in west Scotland. **Great skua** breeding success was higher than in 2005 too, particularly in Shetland.

Mediterranean gulls continued to increase, with at least 350 pairs fledging approximately 250 young. **Black-headed, common** and **lesser black-backed gulls** also had a poor breeding season in 2006 with relatively few young fledged in many regions. Mink activity at colonies in western Scotland was found to have reduced breeding success of common gulls by 75%, lesser black-backed gulls by 33% and **herring gulls** by 36%.

Black-legged kittiwake numbers decreased, or remained stable, in most regions although in SE England numbers were 70% higher than in 2005; the first increase detected there since 1995. Breeding success was low, except in NE England. Pipefish were again a major component of food items brought back to the nest.

Sandwich tern numbers and breeding success were similar to 2005. **Roseate tern** numbers were almost 20% higher than in 2005, due to a substantial increase at Rockabill, and productivity was high overall. **Common terns** had a better breeding season than in 2005, with higher numbers and breeding success in most regions. **Arctic terns** suffered large declines in Scotland (except in Shetland) and breeding success for this species, and **little tern**, was high in Wales but generally poor elsewhere. Presumed food shortages, predation, bad weather and tidal inundation were all factors which depressed tern breeding success in 2006.

Common guillemot numbers were mostly stable between 2005 and 2006, but declines occurred in a few western regions of Britain, and in NE Ireland. Regional trends have been mostly positive since 1986 although declines have occurred in Scotland recently. Mean productivity was, after 2004 and 2005, the third lowest recorded. **Razorbill** numbers in plots increased in Orkney, but decreased, or at least remained stable, in most regions since 2005. Whole-colony counts indicated increases in eastern regions, and in NW England, but numbers in most western regions declined. For the third successive year mean breeding success was markedly lower than the long-term average. Productivity was particularly low in colonies in the Northern Isles and Wales.

Black guillemot numbers in Shetland and Orkney were stable between 2005 and 2006. However, numbers have halved in Orkney since 1986, although there has been virtually no change in numbers in Shetland over this time. **Atlantic puffin** breeding success was near average in 2006. However, success was low on Fair Isle and St. Kilda, although at the last site productivity was double that of 2005, which was the worst season recorded there.

1 Introduction

This is the eighteenth 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. Available data on seabird breeding numbers and breeding success at seabird colonies in 2006 are summarised and compared with results from previous years, primarily 2005, with an analysis of longer term trends in the context of recent findings.

The information contained in this report has been collated from many sources. These include research staff and wardens from a variety of organisations including RSPB, SOTEAG, JNCC, Scottish Natural Heritage, English Nature, Countryside Council for Wales, Irish National Parks and Wildlife Service, the Wildlife Trusts, bird observatories, National Trust and National Trust for Scotland, the Centre for Ecology and Hydrology and BirdWatch Ireland. Many dedicated fieldwork volunteers also contribute valuable data to the Seabird Monitoring Programme; refer to the Acknowledgements section for details.

One aim of the annual report is to draw attention to notable changes in seabird numbers or breeding performance, 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 populations of great cormorants, gulls and terns where data are available.

Any comments on this report, or offers of help for future years, would be greatly appreciated by the authors. We are also keen to receive any existing additional information on numbers or breeding success for any seabird species, whether at coastal or inland colonies, which may not have been previously submitted to the Seabird Monitoring Programme. Any such data will be added to the long-term seabird databases maintained by JNCC and RSPB, including the JNCC/Seabird Group Seabird Colony Register.

Details of recommended methods for assessing seabird numbers and breeding success are given in the *Seabird monitoring handbook for Britain and Ireland* (Walsh *et al.* 1995). Copies of the *Handbook*, or other advice on seabird monitoring methodology, may be obtained from the Seabirds and Cetaceans Unit of JNCC at the address given on the title page.

1.1 The Seabird Monitoring Programme

The JNCC's Seabird Monitoring Programme facilitates the co-ordination of seabird monitoring on a UK-wide basis. The aim of the SMP is to contribute information to enable the appropriate agencies to maintain favourable status of seabird populations in the UK and the Republic of Ireland. It ensures that sufficient data on breeding numbers and appropriate demographic and behavioural parameters of seabirds are collected- both regionally and nationally - to enable their population and conservation status to be assessed, and to monitor the impacts of ecosystem pressures.

Seabird monitoring directly funded by JNCC focuses particularly on species such as northern fulmar, European shag, black-legged 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 JNCC contracts, at several geographically dispersed 'key sites': Isle of May (south-east Scotland), Fair Isle (Shetland), Canna (north-west Scotland) and Skomer (Wales).

Triennial monitoring of numbers and breeding success is also undertaken by JNCC on Orkney Mainland, and in Grampian (north-east Scotland); in 2006, the triennial work programme involved monitoring colonies on Orkney. 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.

The RSPB monitors the numbers and breeding success of a range of seabird species throughout the UK through their network of reserves, and largely co-ordinates the monitoring of terns in Britain. Further RSPB monitoring or survey effort is directed at petrels and skuas.

In Shetland, Aberdeen University, under contract to SOTEAG, carries out extensive population monitoring of cliff-nesting 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 northern fulmar, common guillemot and razorbill, annual counts are carried out in sample plots, and for European shag, black-legged kittiwake and black guillemot, counts are made of longer stretches of coastline at intervals of two or more years. Breeding success has also been assessed annually 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 bodies, including the National Parks and Wildlife Service and BirdWatch Ireland. Fieldwork at some Irish colonies is grant-aided by the Seabird Group.

1.2 The Seabird Colony Register

The Seabird Colony Register, is an online database of numbers of seabirds breeding at colonies throughout Britain and Ireland. The SCR is maintained by the JNCC who, with the Seabird Group, co-own the database. Observers are now being encouraged to enter their data directly onto the database online at www.jncc.gov.uk/smp. Contributors must first register on the website before they will be given permission to enter data. Users of the website can also access previous data from any colony in Britain and Ireland. Records in the SCR date back to 1968 and include data collected during three complete seabird censuses (see below), as well as data collected by the SMP.

Most species of seabird breeding in Britain and Ireland have been censused three times: during 'Operation Seafarer' in 1969-70 (Cramp *et al.* 1974), the 'Seabird Colony Register' census (SCR) in 1985-88 (Lloyd *et al.* 1991) and 'Seabird 2000' in 1998-2002 (Mitchell *et al.* 2004, www.jncc.gov.uk/marine/seabirds/seabird2000/default.htm). The most recent population estimates for each country within the British Isles are given in Table 1.1.1 and were derived from Seabird 2000, except for northern gannet (see Wanless *et al.* 2004, 2005a, b). Table 1.1.1 also shows changes in total population size within Britain and Ireland since each of the previous two censuses.

1.3 Data presentation and methods

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

1.3.1 Population changes: use of regional samples

In order to allow concise and standardised presentation of population data, individual colonies are not comprehensively considered in detail in this report. Details of the original counts used in assessing population changes are held by JNCC, RSPB and SOTEAG.

For most species, with the exception of some terns, it is neither practicable nor valid to assess year-to-year changes for the breeding population as a whole, because such changes may vary markedly between different areas and monitoring effort is uneven. Instead, the coastline has been subdivided into 14 'regions', as defined in Figure 1.2.1 and Table 1.2.1. Within each region, valid counts of whole colonies (excluding very small colonies and colonies where counting error is known or suspected to exceed 5%), or of sample plots within colonies, are summed for year-to-year population 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 2005 and 2006. Some of the changes indicated by these counts may be of a short-term nature, not necessarily indicative of longer-term trends. For example, year-to-year changes in species such as black-legged kittiwake or European shag may in some instances reflect fluctuations in the proportion of the adult population attempting to breed. Movements of breeding birds to or from unmonitored colonies, notably in the case of terns, great cormorants, and black-headed gulls, may also contribute to apparent changes. Even where inter-colony movements do not occur, changes shown by sample populations are not necessarily representative of wider populations.

1.3.2 Calculation of population trends

Regional population trends are assessed using population indices, rather than sums of actual colony counts, because different combinations of colonies may be counted in different years. The population index in a baseline year (1986 unless otherwise noted), is set at 100, subsequent population changes being expressed relative to this value. Further details of the derivation of these population indices are given in Walsh *et al.* (1990) and in Thompson *et al.* (1997). Note that it has not been practicable to provide full listing in the tables of the sites used in the compilation of regional indices; please contact the authors for details.

Average annual rates of population change are calculated by linear regression of the logarithms of index values on year. The significance of the slope of the regression, equivalent to the average annual rate of increase or decrease in the population, is then assessed using the t-test (Mathsoft 1997). Population trends are not presented in this report for some mobile species, such as gulls, Arctic terns and common terns, for which the numbers of colonies and/or breeding pairs monitored each year are considered too small to enable wider population trends to be confidently assessed.

1.3.3 Accuracy and representativeness of counts

In comprehensive assessments of long-term changes in seabird numbers, there is inevitably some loss of count accuracy at the expense of obtaining complete geographical coverage. However, even 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 northern fulmar, common guillemot and razorbill, numbers of adults attending colonies can fluctuate markedly from day to day. Given this 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 usually 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 go undetected. 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 European shags, black-legged kittiwakes and black guillemots in Shetland.

1.3.4 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, ideally randomly selected, within colonies. For such species, the figures presented here have generally been averaged (rather than combined) across plots. For terns, whole-colony assessments of productivity are usually made. Full details of breeding success monitoring methods are given in Walsh *et al.* (1995). For some species or regions where few colonies are currently monitored, the results presented may not be fully representative. Also, in many cases, 'low-input' methods of assessing breeding success are used and these will tend to overestimate the productivity of breeding pairs slightly (Walsh *et al.* 1995). However, this is considered acceptable, as major geographical or year-to-year changes will still be obvious.

Table 1.1.1 Breeding seabird numbers in Britain and Ireland. Most figures are for 1998-2002 (Mitchell *et al.* 2004) but those for Northern gannet and roseate tern include more recent updates. All counts are of pairs unless otherwise stated. ¹ Not surveyed during Operation Seafarer and SCR. ² Northern gannet figures are from the complete UK and Ireland survey of colonies in 2003-2005 (Wanless *et al.* 2004, 2005a, b) with subsequent updates. ³ Inland colonies were not surveyed during Operation Seafarer or SCR. ⁴ Roseate tern figures are from this report. ⁵ Counts are of individuals. ⁶ Counts of pre-breeding adults were not carried out during Operation Seafarer and were not conducted in the Republic of Ireland during the SCR.

<i>Species</i>	<i>Scotland</i>	<i>England</i>	<i>Wales</i>	<i>Isle of Man</i>	<i>Channel Islands</i>	<i>Northern Ireland</i>	<i>Republic of Ireland</i>	<i>Total population</i>	% change since previous survey (coastal populations only)	
									<i>Seafarer (1969-70)</i>	<i>SCR (1985-88)</i>
Northern fulmar	485,852	6,291	3,474	3,147	317	5,992	32,918	537,991	+74	0
Manx shearwater ¹	126,545	367	168,133	34	10	4,633	32,545	332,267		
European storm-petrel ¹	21,370	1,475	2,805	0	60	0	99,065	124,775		
Leach's storm-petrel ¹	48,047	0	0	0	0	0	310	48,357		
Northern gannet ²	182,511	3,940	32,095	0	7,409	0	36,111	261,561	+90	+40
Great cormorant	3,626	2,896	1,699	134	115	663	4,548	13,681		
coastal component ³	3,626	1,315	1,634	134	115	663	4,073	11,560	+44	+7
European shag	21,487	3,863	914	912	1,403	301	3,426	32,306	-5	-25
Arctic skua	2,136	0	0	0	0	0	0	2,136	+106	-37
Great skua	9,634	0	0	0	0	0	1	9,635	+213	+26
Mediterranean gull	0	108	0	0	0	2	3	113		
Black-headed gull	43,191	82,728	1,986	2	0	10,107	3,876	141,890		
coastal component ³	6,888	65,549	850	2	0	4,037	2,066	79,392	+6	+2
Mew gull	48,113	44	0	6	0	557	1,060	49,780		
coastal component ³	20,467	33	0	6	0	383	586	21,475	+65	+39
Lesser black-backed gull	25,057	64,208	20,722	114	1,734	1,973	2,876	116,684		
coastal component ³	21,565	44,133	20,682	114	1,734	1,033	2,062	91,323	+83	+42
Herring gull	72,130	45,365	13,974	7,126	4,347	714	5,521	149,177		
coastal component ³	71,659	43,932	13,930	7,126	4,347	707	5,413	147,114	-57	-17
Great black-backed gull	14,776	1,476	427	405	310	76	2,243	19,713		
coastal component ³	14,773	1,466	425	405	310	71	2,241	19,691	-12	-6
Black-legged kittiwake	282,213	76,281	7,293	1,045	3	13,060	36,100	415,995	-7	-23
Sandwich tern	1,068	9,018	450	0	0	1,954	1,762	14,252	+18	-11
Roseate tern ⁴	5	95	2	0	0	5	890	1,000	-65	+52
Common tern	4,784	4,676	674	0	174	1,704	2,485	14,497	-3	-2
Arctic tern	47,306	3,602	1,705	8	0	767	2,735	56,123	+7	-29
Little tern	331	1,521	75	20	0	0	206	2,153	+12	-25
Common guillemot ⁵	1,167,841	91,986	57,961	4,566	476	98,546	138,108	1,559,484	+139	+32
Razorbill ⁵	139,186	11,144	12,638	1,524	65	24,084	27,446	216,087	+29	+23
Black guillemot ⁶	37,505	7	28	602	0	1,174	3,367	42,683		
Atlantic puffin	493,042	75,734	10,328	85	311	1,610	19,641	600,751	+33	+19

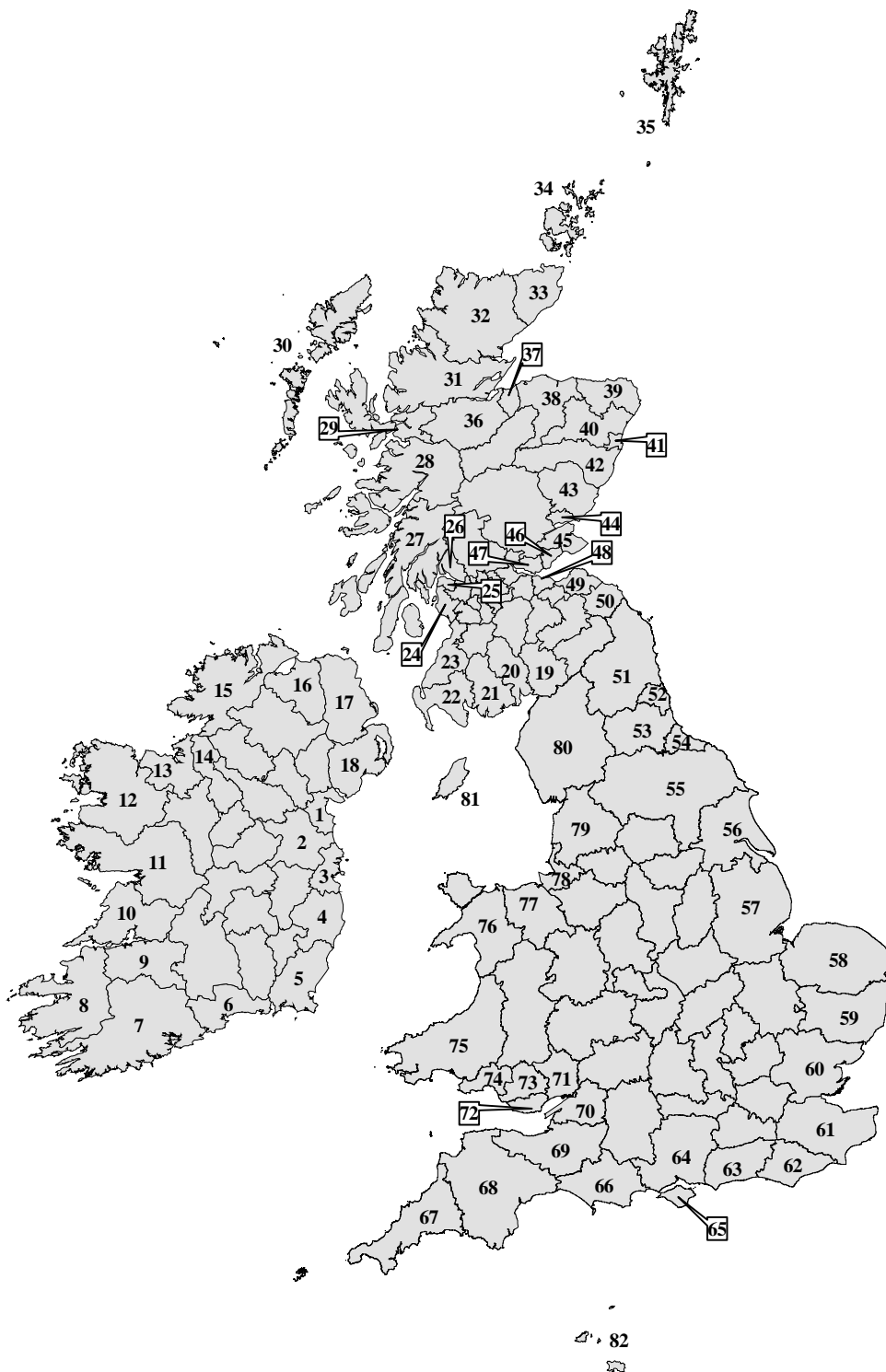


Figure 1.2.1 Coastal counties and districts of Britain and Ireland. See Table 1.2.1 for details of the coastal regions (combinations of counties or districts) used in this report.

Table 1.2.1 Groupings of coastal counties and 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 or district name (numbers refer to Figure 1.2.1)	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 and Eskdale (19), Nithsdale (20), Stewartry (21), Wigtown (22), Kyle and Carrick (23), Cunninghame (24), Inverclyde (25), Dunbarton (26), Argyll and Bute (27)	SW Scotland
Lochaber (28), Skye and Lochalsh (29), Western Isles (30), west coast of Ross and Cromarty (31), north-west coast of Sutherland (32)	NW Scotland
Orkney (34)	Orkney
Shetland (35)	Shetland
Caithness (33), east coast of Sutherland (32), east coast of Ross and Cromarty (31), Inverness (36)	N Scotland
Nairn (37), Moray (38), Banff and Buchan (39), Gordon (40), City of Aberdeen (41), Kincardine and Deeside (42)	NE Scotland
Angus (43), City of Dundee (44), north-east Fife (45), Kirkcaldy (46), Dunfermline (47), West Lothian, City of Edinburgh (48), East Lothian (49), Berwickshire (50)	SE Scotland
Northumberland (51), Tyne and 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 and Isles of Scilly (67), Devon (68), Somerset (69), Avon (70), Channel Islands (82)	SW England and 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 and Isle of Man

2 General features of the 2006 breeding season

After a dry and mild start to 2006, March was cold with below average temperatures in many regions, particularly Scotland, where it was colder than any of the winter months (Dec-Feb) for the first time since 1975/76. Rainfall varied but some areas received over double the March average. April was mild, with above average levels of sunshine across almost all of the UK. Rainfall was above average in NW Scotland but below average in SW England. May was wet in most places, except NE Scotland, with some areas in England and Wales receiving double the average rainfall. Mean temperatures were close to average across Northern Scotland and well above average in East Anglia. Sunshine was above average in Shetland but below average in southern England. June was warm, dry and sunny across most of the UK, with mean temperatures generally 1-2°C above average and sunshine well above average across southern England. Rainfall was close to average across western Scotland, but well below average in the Midlands. The warm, sunny and dry weather continued with many areas having their warmest ever July. August was slightly warmer than average in most places, but cooler than in July in Central England, and sunshine was close to or below average throughout the UK. In East Anglia, around double the average rainfall was recorded (www.metoffice.gov.uk/climate/uk/2006).

Many seabirds bred later than average throughout the UK. In Shetland, late nesting was reported for red-throated diver (various areas), northern fulmar (Foula), European storm-petrel (Mousa), European shag (Sumburgh Head), great and Arctic skua (various colonies), black-legged kittiwake (Fair Isle) and Arctic tern (various colonies). Northern gannets, which normally show little variation in between-year laying dates, were reckoned to be three weeks late in nesting at Hermaness (Okill 2006b) and up to four weeks later than a decade ago at Ailsa Craig (B. Zonfrillo, pers. comm.). On Canna and the Treshnish Isles many nests of European shag, common guillemot and black-legged kittiwake still contained eggs or small young in late June/early July (Swann, 2006a, Ward *et al.* 2006). Examination of Manx shearwater burrows on Rum indicated the latest and most protracted breeding season since 1969 (median laying date 2 June, range 1 May-4 July) (Ramsay 2006). Most species on Skomer bred one to two weeks late (Brown and Darke 2006). On the Isle of May seabirds bred earlier than in recent years, but still later than average, with low attendance noted early on (Newell *et al.* 2006).

Seabirds were slightly more successful than in 2004 and 2005, which were the poorest seasons since 1986. Low success in those years was attributed to low availability of sandeels and this again appeared to be the case in 2006. However, evidence pointed to a shortage of food during the chick-rearing period prior to which feeding conditions seemed favourable. In Shetland, at Sumburgh Head, many adult common guillemots returned with sandeels in mid-June but later in the month no fish were seen. Gadoids were favoured in early July but by mid-month indigestible pipefish predominated, also noted at Compass Head (Heubeck 2006, Okill 2006b). Arctic tern and black-legged kittiwake also fed their young with pipefish. Red-throated divers caught mostly sillocks, with sandeels extremely scarce (Okill 2006a). On Fair Isle, varying proportions of sandeels were recorded in the diets of black-legged kittiwake (0% of items), common guillemot (33%), razorbill (96%) and Atlantic puffin (7%). Pipefish were a main constituent in samples collected from all species, except razorbill, but despite the high percentage of sandeels in their diet razorbill chicks gained little weight and some even lost weight (Shaw *et al.* 2006). Many discarded pipefish were found around puffin burrows one of which had 85 at the entrance. At several other colonies (Foula, Noss and Compass Head), few, if any, adult Atlantic puffins were seen carrying sandeels in early July. In contrast, at Hermaness, observations of returning common guillemots and Atlantic puffins indicated sandeels were present and numerous throughout the season (Kilgour 2006). On Orkney, observations indicated gadoids and clupeids were brought in to colonies with reasonable frequency in the last two weeks of June. On the Isle of May, common guillemots fed young mainly on clupeids and European shags brought in a variety of bottom-living fish. Initially, sandeels were prominent in the diet of other species but few 1-group fish were present in food samples during chick rearing. Feeding conditions deteriorated markedly toward the end of breeding season, badly affecting black-legged kittiwake and Atlantic puffin (Newell *et al.* 2006). A marked increase of pipefish in the diet of many seabirds was also noticed there, and on Coquet, where sandeels appeared to be plentiful throughout the season, but tern chicks were starving by late July. Gulls and terns at various other sites on the east coast of the UK were also affected by a presumed shortage of food. Colonies in western regions reported a similar situation to those in eastern Britain. On St. Kilda, Atlantic puffins brought in silver fish initially but pipefish predominated as July progressed. Some puffin chicks showed food related stress (variable sizes and developmental stages) and over two visits in July a few chicks gained no weight, or even lost weight, although no dead chicks were found (Money 2006). On Canna, common guillemots brought in sandeels (41% of items) and gadoids (51%) but regurgitations from European shag chicks, and shag pellets, held virtually no sandeels (Swann 2006a). On the Treshnish Isles, fewer adult common guillemots than expected brought in fish in late June but Atlantic puffins regularly returned with large loads (Ward 2006). Black-legged kittiwakes on Ailsa Craig had apparent difficulty finding food at a vital time; many chicks alive in mid July, albeit at the downy/half-grown stage, died within one week (B. Zonfrillo, pers. comm.). At Seaforth, sandeels and late season sprat and herring were apparently in short supply (S. White, pers. comm.).

3 Species accounts

Nomenclature follows *Checklist of Birds of Britain and Ireland* (British Ornithologists Union 1992) and subsequent relevant BOURC updates published in *Ibis* and reported on www.bou.org.uk.

3.1 Red-throated diver *Gavia stellata*

In 2006, it was another late breeding season in Shetland, but the number of pairs nesting was high. Success was below average overall with productivity on Hermaness and Foula being especially low, possibly due to food shortage and predation, respectively. In common with 2004 and 2005, few sandeels were fed to chicks, and many food items observed were young saithe. On Orkney, overall success was above average with birds on Hoy and Rousay particularly successful when compared with the average success for these areas. On Mainland, success was below average due low water levels at breeding lochs. In NW Scotland, divers had above average success on Handa and Coll. All nests on Eigg failed due to predation by otters.

Breeding numbers and breeding success (Figure 3.1.1, Table 3.1.1)

In **Shetland**, the number of pairs found nesting in regularly monitored areas was high, as in 2005, although birds were far less successful, with overall breeding success of 0.54 chicks fledged per breeding pair below the long-term mean. Success was especially low at Hermaness (0.38), where most pairs failed at an early stage, possibly due to food shortage (Kilgour 2006), and on Foula (0.33) where many chicks disappeared during the second half of July possibly due to predation (Gear 2006). On Fetlar, the number of pairs nesting was the highest recorded since monitoring began. Success at this site was higher than average, at 0.68 chicks fledged per breeding pair. Twelve pairs had clutches depredated and four of seven chicks lost were known to have been taken by either great skuas or otters (*Lutra lutra*) (Luxford and Smith 2006). After a very successful season in 2005, divers on Yell fledged only 0.50 chicks per breeding pair in 2006, slightly below the long-term mean for the area.

Table 3.1.1 Breeding success of red-throated diver, 2005 and 2006, and 1986-2005: figures are estimated number of chicks fledged per breeding pair (Shetland, NW Scotland) or occupied site (Orkney). Note that the number of pairs does not necessarily indicate total populations in study areas.

Region/site	2005		2006		1986-2005	
	Pairs	Fldg/pair	Pairs	Fldg/pair	Mean (\pm s.e.)	No. of years
Shetland						
Hermaness	9	0.89	8	0.38	0.90 (\pm 0.08)	20
Fetlar	24	0.54	28	0.68	0.53 (\pm 0.05)	20
Yell	10	0.80	12	0.50	0.54 (\pm 0.08)	17
Foula	11	0.64	9	0.33	0.48 (\pm 0.05)	20
Sample total	54	0.67	57	0.54	0.60 (\pm0.03)	20
Orkney						
Hoy	57	0.72	56	0.77	0.60 (\pm 0.03)	17
Rousay	4	1.00	8	0.62	0.37 (\pm 0.11)	14
Mainland	16	0.75	21	0.52	0.66 (\pm 0.07)	17
Sample total	77	0.74	85	0.69	0.59 (\pm0.04)	17
NW Scotland						
Handa	4	1.50	6	1.50	1.23 (\pm 0.09)	19
Rum	11	0.82	12	0.58	0.62 (\pm 0.06)	17
Eigg	3	0.33	3	0.00	0.73 (\pm 0.14)	20
Coll	11	0.00	12	0.92	0.51 (\pm 0.20)	5

In the Shetland Ringing Group's study area, due to a wet winter and above average rainfall between March and July water levels at nesting lochs remained high throughout the breeding season with little fluctuation in levels which can cause problems in some years. As in 2004 and 2005, adults returned to breeding lochs later than normal, with evidence that a small proportion of pairs did not attempt to

breed. Again, while some pairs began incubation at the normal time a second wave of birds began nesting *c.* 2 weeks later, presumably in response to improved feeding conditions allowing birds to attain breeding condition late on. Thirty-nine successful pairs (those with chicks in July) was low compared with 2005 (which was atypically successful) and with the long-term mean (1980-2005 mean 50.3, s.d. ± 9.2). The mean brood size at fledging, at 1.23, was also lower than average (1979-2005 mean, 1.35, s.e. ± 0.02). In common with the two previous seasons, few sandeels were seen to be delivered to chicks; nearly all food items identified were saithe *Pollachius virens*, which have a lower calorific value than sandeels, but it is still possible for divers to successfully raise chicks on this lower quality fish (Okill 2006a).

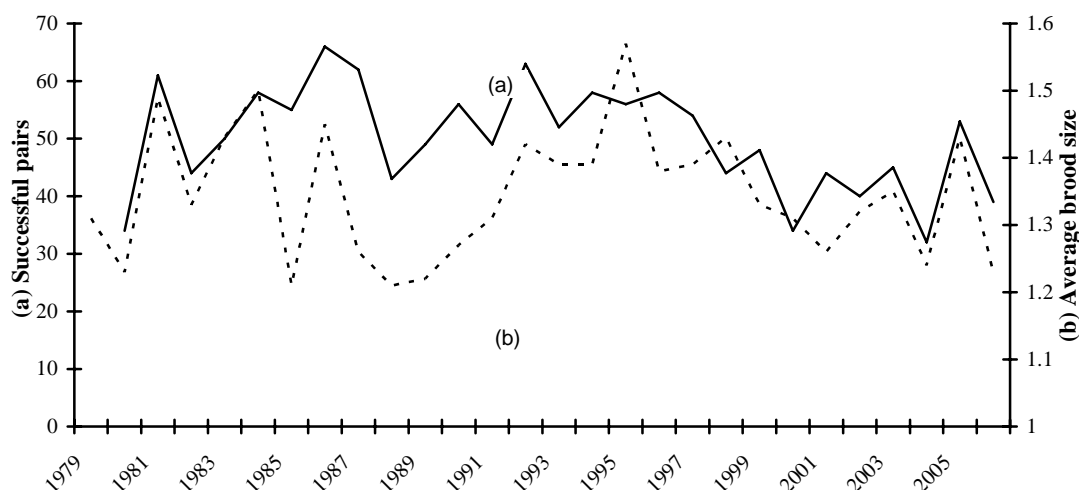


Figure 3.1.1 Annual variation in (a) numbers of 'successful' pairs (with chicks in mid-July) and (b) average brood-size near fledging at red-throated diver study areas in Shetland (parts of Unst, Eshaness, North Roe and Bressay), 1979-2006. Data are from Okill (2006a).

In **Orkney**, overall breeding success was 0.69 chicks fledged per pair, slightly lower than in 2005 but above average. Divers on Hoy had their second most successful season since monitoring began, fledging 0.77 chicks per breeding pair. In total, 140 known nesting sites were checked, 56 were occupied and 38 were successful, rearing a total of 43 chicks (Williams and Williams 2006). Divers in Orkney only occasionally rear broods of two, compared with those nesting in Shetland, where broods of two are more common. Nine broods of two were recorded in 2006, an above average figure for Hoy, where five or fewer such broods are usually raised. Of those sites that failed, 13 did so during incubation, two at the chick stage and three at an unknown stage. On Mainland, more sites were monitored than in 2005 but breeding success was lower than average, at 0.52 chicks per pair. A very dry summer meant that six pairs failed due to low water levels at two lochs (Meek 2006). On Rousay, eight pairs were present on potential breeding lochs but only four pairs eventually nested, raising five chicks (0.62 per pair), which constitutes a good breeding season at this relatively unproductive site.

In **north-west Scotland**, there was great variation in breeding success at four monitored sites. On Handa and Coll, divers were relatively successful with above average success on both islands (1.50 and 0.92 chicks per pair, respectively). On Rum, breeding success was just below average with 0.58 chicks fledged per pair. On Eigg, three pairs nested but all failed due to predation by otters; this has been an annual problem on the island over the previous decade (J. Chester, pers. comm.).

3.2 Northern fulmar *Fulmarus glacialis*

Between 2005 and 2006, numbers in Orkney and most western regions of Britain decreased, but in Shetland and eastern regions numbers increased. Long-term trends indicated increasing numbers in Wales but declines in other regions since the mid 1990s. Mean breeding success was only slightly below the long-term average. Breeding success in N Scotland and Wales was poor and was also low in SE Scotland and the Isle of Man.

Breeding numbers (Tables 3.2.1 and 3.2.2, Figure 3.2.1)

In general, fulmar numbers in northern and eastern regions of Britain increased between 2005 and 2006, whereas numbers in western regions apparently declined. In sample plots at colonies in Shetland an increase of 18.4% was recorded. Repeated counts of apparently occupied sites (AOS) in plots indicated a significant increase at Troswick Ness (32.2%, $t=7.908$, d.f.=8, $p<0.001$), where disturbance by cats *Felis catus* and ferrets *Mustela furo* was thought to have been the main reason for declines in 2005; there were no sightings of either species in 2006 (Heubeck 2006). Changes at Sumburgh Head, Eshaness and Burravoe were minimal and non-significant. Large proportional increases also occurred in plots used to monitor breeding success at Hermaness (+32.4%) and Fair Isle (+18.0%) although the count at the latter site was still the third lowest on record after low counts in 2004 and 2005 (Shaw *et al.* 2006). A whole-colony count was also carried out on Fair Isle, where 27,896 AOS were recorded, 36.6% more than in 2000, a period when the regional index as measured via sample plots was declining. However, this count is still far lower than the 43,317 AOS recorded in 1996. In **Orkney**, sample plots monitored triennially at several colonies revealed that numbers had fallen by 13.8% overall since 2003, with significant declines at Costa Head (14.8%, $t=2.636$, d.f.=8, $p<0.05$) and Row Head (17.8%, $t=2.465$, d.f.=9, $p<0.05$). Furthermore, a whole-colony count at Marwick Head recorded 346 AOS, close to that found in 2004 (330 AOS) but 51.6% fewer than were recorded in 1999. After a period of increase between 1986 and 2000 the regional trend, as measured via triennial sample plots, has declined steadily since.

Table 3.2.1 Regional population changes (apparently occupied sites in late May or June) at monitored northern fulmar colonies, 2005-2006 (or earlier where monitoring is not carried out annually). Counts with a reported inaccuracy of $> \pm 5\%$, and regional samples of fewer than 100 AOS, are excluded. Trends for 1986-2005 are average annual rates of change shown by sample populations. Statistical significance of trends (t-test) indicated as: n.s. not significant, * $P < 0.05$, *** $P < 0.001$. Further details of calculation of trends are given in section 1.2.2.

Region	2003	2005	2006	% change since previous count	% annual change
SW Scotland ^a		1,326	1,133	-14.6	-1.1 n.s. 1993-2005
NW Scotland ^b		1,067	923	-13.5	-1.3 * 1986-2005
Shetland ^c		1,988	2,354	+18.4	0.0 n.s. 1986-2005
Orkney ^d	717	-	618	-13.8	+1.2 n.s. 1986-2003
NE Scotland ^e		179	210	+17.3	-
SE Scotland ^f		1,429	1,809	+26.6	-0.3 n.s. 1986-2005
NE England ^g		425	531	+24.9	0.0 n.s. 1986-2005
Wales ^h		1,454	1,256	-13.6	+1.7 *** 1986-2005

Colonies: ^a Mull of Galloway, Tiree Reef, Ceann a'Mhara, Coll, Lunga, Colonsay (sample plots), Sanda; ^b Priest Island, Canna, Eigg, Handa (plot counts); ^c Hermaness (productivity plot), Eshaness (plot counts), Burravoe (plot counts), Troswick Ness (plot counts), Sumburgh Head (plot counts), Fair Isle (productivity plots); ^d Sands of Forvie; ^e Mull Head, Gultak, Costa Head, Marwick Head, Row Head; ^f Isle of May, Inchkeith, Inchgarvie, Inchmickery, Inchcolm, The Lamb, Craighleith, Fidra, Tantallon, Bass Rock; St. Abb's Head; ^g Farne Islands, Coquet Island, Saltburn, Boulby Cliff; ^h Caldey, Barafundle to Giltar, St Margaret's Island, Stackpole Head plus Elegug Stacks and adjacent coastline, Ramsay, Skomer, Bardsey, South Stack, Great Orme, Lochtyrn (plots), New Quay (plots).

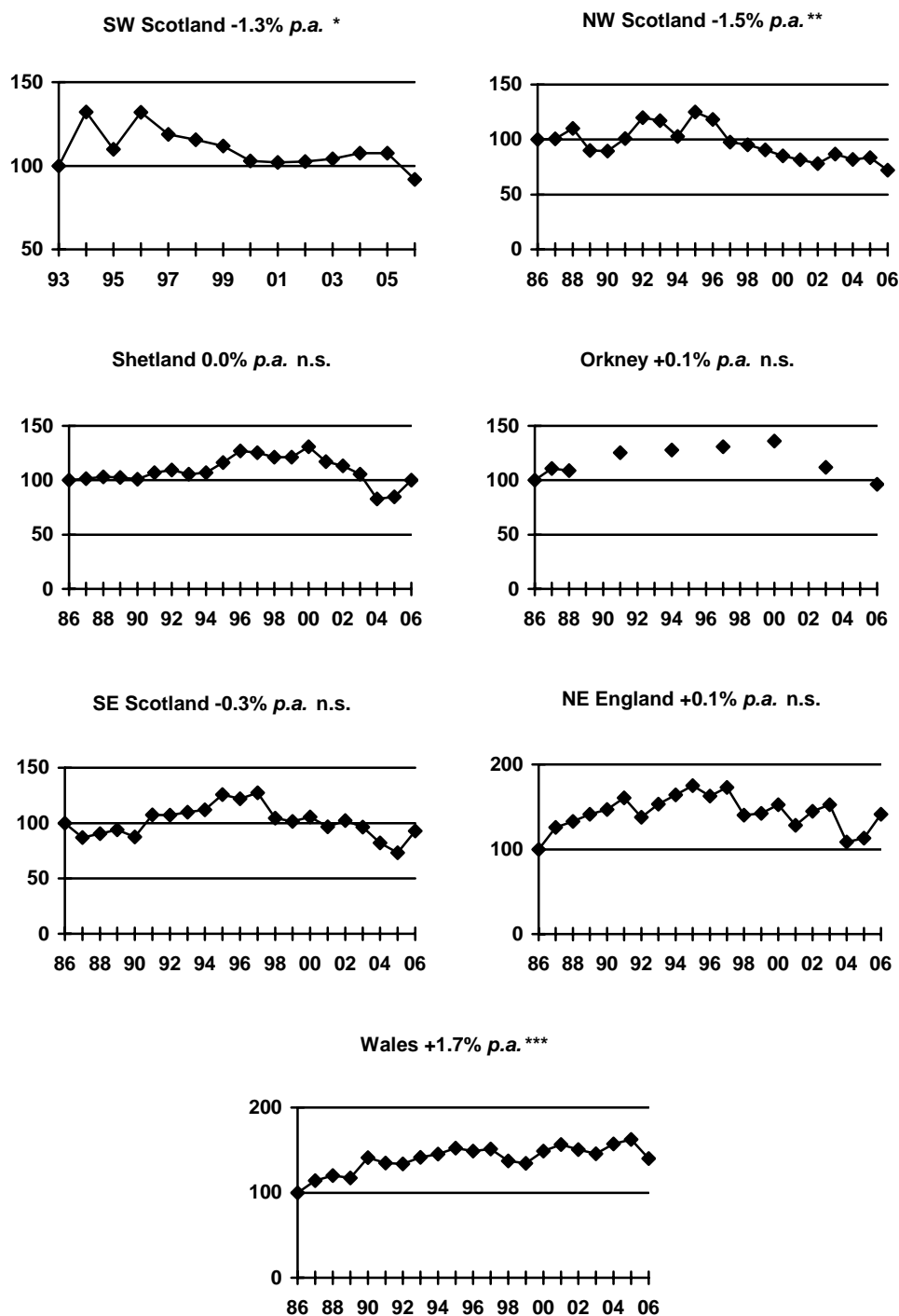


Figure 3.2.1 Regional population indices for breeding northern fulmars, 1986-2006 (apparently occupied sites in June). Average annual rates of change were calculated by regression of natural log of index against year (see section 1.2.2. for details). Unless otherwise indicated, three or more colonies were counted in each year. Statistical significance of trends (t-test) indicated as: n.s. not significant, * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

A further increase, of 17.3%, was detected at the Sands of Forvie NNR, the sole colony monitored in 2005 and 2006 in **north-east Scotland**. Increases in 2005 and 2006 came after four consecutive years of decline, so the number breeding is over 40% fewer than recorded during the peak count, in 2000. Whole-colony counts at Fowlsheugh also indicate a decline over approximately the same period: 230 AOS in 2006 being 34.7% fewer than in 1999.

Table 3.2.2 Population changes of northern fulmar 2005-2006 and 1986-2005 at selected sites. P\W indicates plot or whole-colony counts.

Region/Site		2005	2006	2005-2006 % change	1986-2005		
					Mean	<u>±</u> s.d.	No. of years
SW Scotland							
Coll	W	158	154	-2.5	136	33	11
Colonsay	W	550	452	-17.8	595	62	14
Lunga	W	587	507	-13.6	540	80	13
Mull of Galloway	W	24	15	-37.5	49	20	20
NW Scotland							
Priest Island	W	169	198	+17.2	228	68	3
Handa	P	280	233	-16.8	297	18	5
Canna	W	439	349	-20.5	501	91	20
Eigg	W	179	143	-20.1	162	34	19
Shetland							
Troswick Ness	P	704	931	+32.2	971	140	20
Sumburgh Head	P	231	237	+2.6	236	28	16
Burravoe	P	192	184	-4.2	168	26	19
Eshaness	P	280	272	-2.9	353	38	10
Hermaness	P	315	417	+32.4	410	82	7
Fair Isle	P	266	314	+18.0	342	73	13
NE Scotland							
Sands of Forvie	W	179	210	+17.3	260	65	17
SE Scotland							
Isle of May	W	276	298	+8.0	283	66	18
Inchkeith	W	302	344	+13.9	439	86	19
Inchgarvie	W	201	240	+19.4	177	51	16
Fidra	W	127	176	+38.6	200	59	20
Inchmickery	W	41	41	0.0	26	12	17
Inchcolm	W	131	240	+83.2	187	43	15
Craigleith	W	62	157	+153.2	156	37	18
Tantallon	P	82	80	-2.4	102	16	7
Bass Rock	W	45	46	+2.2	83	47	12
St. Abb's Head	W	158	190	+20.3	299	69	20
NE England							
Farnes	W	176	240	+36.4	232	34	20
Coquet	W	34	51	+50.0	54	15	19
Huntcliff	W	115	110	-4.3	117	40	16
Boulby Cliff	W	100	130	+30.0	115	20	16
Wales							
Lochtyn	P	14	16	+14.3	16	3	2
New Quay	P	5	4	-20.0	6	1	2
Skomer	W	726	595	-18.0	662	66	20
Elegug Stacks	W	21	21	0.0	26	8	10
Skokholm	P	14	12	-14.3	14	4	3
St Margaret's Island	W	15	8	-46.7	10	6	13
Stackpole Head	W	45	43	-4.4	45	6	8
	P	27	25	-7.4	28	3	10
Bardsey	W	42	39	-7.1	38	8	18
South Stack	W	19	8	-57.9	31	14	14
Caldey	W	115	84	-27.0	94	21	19
NW England/Isle of Man							
St. Bee's Head	W	40	17	-57.5	61	24	18
Glen Maye Gorge	W	32	17	-46.9	25	6	14
NE Ireland							
Isle of Muck	W	36	43	+19.4	44	20	5

In south-east Scotland, numbers at sampled colonies were 26.6% higher than in 2005, the first substantial increase in the regional index since 1997. Of 10 colonies monitored in the region virtually

no change was detected at Inchmickery, Tantallon and Bass Rock but at the seven others increases ranged from +8% on the Isle of May to +153% at Craigeleith where, together with Inchcolm and Fidra, a large decline was recorded between 2004 and 2005 (NB: the 2005 report incorrectly reported an increase on Fidra between 2004 and 2005). The regional trend for **north-east England**, also displays a downward trend since the mid-1990s despite occasional periods of increase. Between 2005 and 2006, numbers at sampled colonies increased by 24.9% overall, with proportional increases greater than 30% recorded at Boulby Cliff, the Farne Islands and in the small colony on Coquet, although numbers were stable at Huntcliff.

In contrast, numbers in western regions appeared to have declined between 2005 and 2006. In **north-west Scotland**, the regional total was 13.5% lower than in 2005, with moderate sized decreases in whole-colony counts from Canna and Eigg and in plots on Handa, where the decrease was statistically significant ($t=3.148$, $d.f.=8$, $P<0.05$). On Priest Island, numbers increased by 17% since 2005 but the colony still holds approximately 30% fewer nest than in 2001. The regional index, in common with many others, indicates a downward trend since the mid-1990s. A similar sized decline, of 14.6%, was recorded in **south-west Scotland** between 2005 and 2006. Counts on Colonsay (plots), Lunga and Mull of Galloway (both whole-colonies) suggested moderate to large declines although estimates (not included in the regional total) from two of the largest colonies - Ceann a'Mhara (1400 AOS) and Sanda (500 AOS) - and a whole-colony count of Coll, indicated virtually no change. Until now the regional index had been fairly stable since 2000, with evidence of a decline from 1996 to 2000.

In **Wales**, the decrease recorded between 2005 and 2006, at -13.6%, was of a similar amount to that observed in western Scotland. The only statistically significant change detected in sample plots was at Skokholm (-14.3%, $t=2.802$, $d.f.=17$, $P<0.05$) largely because plots at Welsh colonies hold few AOS and within year variation is usually high. Some sites monitored via whole-colony counts indicated large proportional changes, although many of these hold fewer than 50 AOS, e.g. South stack, St. Margaret's Island. Moderately large declines were observed in the two largest colonies monitored, on Skomer (-18.0%) and Caldey (-27.0%). In contrast to most other British regions the regional population index shows a largely upward trend since 1986 and, although the decline between 2005 and 2006 appears to be the largest ever recorded in the region, the overall annual rate of change remains positive and statistically highly significant. In **north-west England/Isle of Man**, numbers in three small colonies fell by 48.7% overall with the largest declines noted at St. Bee's Head and at Glen Maye Gorge. In **south-west England**, overall numbers at colonies sampled in both 2005 and 2006 were stable but on the Isles of Scilly fulmars increased by 53% since 1999, to 279 AOS. The sole colony monitored in **north-east Ireland**, on the Isle of Muck, increased by 19.4% following a decline recorded between 2004 and 2005.

Breeding success (Tables 3.2.3 and 3.2.4)

Mean productivity of northern fulmar across 35 sites in Britain and Ireland in 2006 was 0.38 (s.e. ± 0.03) chicks per AOS, slightly below the 1986-2005 mean of 0.41 (s.e. ± 0.01) recorded from between 13 to 41 colonies annually. There was no statistically significant difference between 29 colonies monitored in both 2005 and 2006.

Table 3.2.3 Northern fulmar breeding success grouped regionally, 2005-2006: estimated number of chicks fledged per apparently occupied site at sample colonies (superscript 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 means and standard errors of figures for individual colonies. Changes in breeding success are indicated for colonies where similar methods have been used in both years (significant changes, as indicated by t-test: *P<0.05).

Region	2005 chicks fledged/site				2006 chicks fledged/site				2005-2006 change	
	AOS ⁿ	Range	Mean	+s.e.	AOS ⁿ	Range	Mean	+s.e.	Mean ⁿ	+s.e.
SW Scotland ^a	164 ²	0.61-1.00	0.80	±0.20	5 ¹	-	0.80	-	-0.20 ¹	-
NW Scotland ^b	600 ³	0.31-0.42	0.35	±0.04	520 ³	0.35-0.46	0.40	±0.03	+0.05 ³	±0.06
Shetland ^c	2,387 ⁸	0.17-0.48	0.34	±0.03	2,704 ⁸	0.35-0.55	0.44	±0.03	+0.10 ⁸	±0.03*
Orkney ^d	716 ⁷	0.18-0.50	0.35	±0.05	886 ⁹	0.11-0.71	0.38	±0.06	-0.02 ⁷	±0.01
N Scotland ^e	76 ²	0.00-0.07	0.04	±0.04	67 ²	0.03-0.13	0.08	±0.05	+0.04 ²	±0.08
SE Scotland ^f	217 ²	0.00-0.27	0.14	±0.14	219 ²	0.08-0.44	0.26	±0.18	+0.12 ²	±0.04
NE England ^g	211 ³	0.23-0.57	0.38	±0.10	291 ³	0.32-0.52	0.44	±0.06	+0.05 ³	±0.05
Wales ^h	126 ¹	-	0.49	-	134 ¹	-	0.20	-	-0.29 ¹	-
Isle of Man ⁱ	107 ⁴	0.20-0.44	0.32	±0.06	25 ²	0.06-0.50	0.28	±0.22	+0.07 ²	±0.23
NE Ireland ^j	40 ²	0.27-0.44	0.36	±0.08	No data	-	-	-	-	-
NW Ireland ^k	No data	-	-	-	272 ³	0.11-0.52	0.32	±0.12	-	-
SW Ireland ^l	No data	-	-	-	151 ¹	-	0.53	-	-	-
Total	4,644 ³⁴	0.00-0.57	0.35	±0.03	5,274 ³⁵	0.03-0.71	0.38	±0.03	+0.04²⁹	±0.02

Colonies: ^a Ailsa Craig, Ben Feall (2005 only); ^b Handa, St. Kilda, Canna; ^c Hermaness, Burravoe, Eshaness, Noss, Troswick Ness, Sumburgh Head, Foula, Fair Isle; ^d Costa Head, Mull Head, Gultak, Rousay, Papa Westray, Old Man and Bay of Creeklund (2006 only) both Hoy, North Ronaldsay (2006 only), Eynhallow; ^e Easter Ross, Wilkhaven; ^f Isle of May, Tantallon; ^g Farne Islands, Coquet, Marsden Cliffs; ^h Skomer; ⁱ Glen Maye, Bradda (2005 only), Glen Mooar-Gob y Deigan (2005 only), Cass Strooan-Peel Headlands; ^j Old Lighthouse Island, Big Copeland Island (both 2005 only); ^k Aughris Head, Dundawoona Point, Horn Head; ^l Cliffs of Moher.

As in 2005, overall success in **north Scotland** was again the lowest in the UK. At North Sutor, success was 0.03 chicks fledged per AOS and at Wilkhaven 0.13 chicks per AOS were fledged. Despite several consecutive years of low productivity, these figures still fall below the respective colony means. In **south-east Scotland**, overall success was 0.26 chicks fledged per AOS, below the long-term UK mean, although higher than in 2005. However, success at the two colonies monitored varied greatly. At Tantallon, where productivity has been low since 2002 and no chicks fledged at all in 2004 and 2005, 0.08 chicks per AOS were fledged. This contrasts with the Isle of May, where fulmars fledged 0.44 chicks per AOS, just above the long-term colony mean. Although the method used on the Isle of May is not designed to determine when breeding attempts fail, losses appeared more-or-less equally divided between the egg and chick periods (Newell *et al.* 2006). The reasons for low productivity in recent years at North Sutor, Wilkhaven and Tantallon remain unknown, especially when compared with the relative success recorded on the Isle of May.

Fulmars in **north-east England** were relatively successful, overall fledging a mean of 0.44 chicks per AOS. At the constituent colonies, breeding success on Coquet Island (0.47 chicks fledged per AOS) and on the Farne Islands (0.52) was close to their respective long-term means although success at the latter site was lower than in 2005. At Marsden Cliffs, where few years' data have been collected, fulmars were more successful than in 2005, fledging 0.32 chicks per AOS.

On **Shetland**, mean breeding success was 0.45 chicks fledged per AOS, a significant increase on that recorded in 2005 at the same eight colonies. Foula was the most successful colony in the region, fledging 0.55 chicks per AOS. On Fair Isle and at Eshaness it was the most successful breeding season since 1994, with birds fledging 0.50 and 0.54 chicks per AOS, respectively, well above the long-term colony means. Above average success was also recorded at Burravoe (0.47 chicks fledged per AOS) although few years are available for comparison at this site. At Troswick Ness (0.41 chicks fledged per AOS), fulmars were three times more successful than in 2004 and 2005. At Hermaness,

for the fifth consecutive year productivity was very low in one plot, possibly as a result of heavy predation of eggs by hooded crows, great skuas and great black-backed gulls, which nest nearby (Kilgour 2006). Success at Noss, Sumburgh Head and Hermaness (0.37, 0.36 and 0.35 chicks fledged, respectively), was below average at each colony but close to the 2006 U.K. mean.

Table 3.2.4 Breeding success (chicks fledged per AOS) of northern fulmar 2005-2006 and 1986-2005 at selected sites. Figures in parentheses under 2005 and 2006 are the number of occupied sites from which the success estimate was derived. * Number of chicks fledged per egg laid.

Region/site	2005	2006	Mean	1986-2005 ±s.e.	No. of years
SW Scotland					
Ailsa Craig *	1.00 (6)	0.80 (5)	0.74	0.03	14
NW Scotland					
Handa	0.32 (279)	0.46 (233)	0.46	0.03	17
St. Kilda	0.42 (232)	0.35 (197)	0.38	0.02	13
Canna	0.31 (89)	0.39 (90)	0.40	0.02	20
Shetland					
Hermaness	0.29 (320)	0.35 (417)	0.41	0.03	17
Burravoe	0.34 (192)	0.47 (184)	0.32	0.01	3
Eshaness	0.35 (280)	0.54 (272)	0.42	0.02	20
Noss	0.34 (193)	0.37 (209)	0.40	0.03	13
Foula	0.39 (203)	0.55 (141)	0.39	-	1
Troswick Ness	0.17 (704)	0.41 (931)	0.39	0.02	20
Sumburgh Head	0.37 (229)	0.36 (236)	0.45	0.02	20
Fair Isle	0.48 (266)	0.50 (314)	0.44	0.02	20
Orkney					
North Ronaldsay	-	0.42 (57)	0.23	0.06	8
Papa Westray	0.27 (82)	0.29 (110)	0.48	0.06	10
Rousay	0.41 (56)	0.40 (63)	0.52	0.04	14
Eynhallow	0.18 (88)	0.11 (85)	0.12	0.06	2
Costa Head	0.44 (120)	0.41 (138)	0.47	0.03	17
Mull Head	0.50 (164)	0.51 (182)	0.40	0.03	17
Gultak	0.44 (90)	0.36 (157)	0.40	0.03	17
Bay of Creeklund, Hoy	No data	0.71 (17)	No data	-	-
Old Man, Hoy	0.22 (116)	0.22 (77)	0.45	0.04	11
N Scotland					
Wilkhaven	0.00 (35)	0.13 (38)	0.22	0.07	9
Easter Ross	0.07 (41)	0.03 (39)	0.16	0.04	12
SE Scotland					
Isle of May	0.27 (135)	0.44 (139)	0.40	0.02	20
Tantallon	0.00 (82)	0.08 (80)	0.31	0.05	19
NE England					
Farne Islands	0.57 (133)	0.52 (183)	0.54	0.02	20
Coquet Island	0.35 (34)	0.47 (51)	0.46	0.05	9
Marsden Cliffs	0.23 (44)	0.32 (57)	0.23	-	1
NW England/Isle of Man					
Peel Headlands	0.20 (9)	0.50 (8)	0.34	0.11	5
Glen Maye	0.22 (32)	0.06 (17)	0.35	0.04	19
Wales					
Bardsey *	0.88 (42)	0.74 (39)	0.74	0.03	14
Skomer	0.49 (126)	0.20 (134)	0.46	0.03	17
NW Ireland					
Aughris Head	No data	0.52 (61)	No data	-	-
Dundawoona Point	No data	0.11 (45)	No data	-	-
Horn Head	No data	0.32 (166)	No data	-	-
SW Ireland					
Cliffs of Moher	No data	0.53 (151)	No data	-	-

Mean breeding success on **Orkney** in 2006 was 0.35 chicks fledged per AOS from nine colonies, similar to the 2005 mean; for individual colonies, success was generally also similar to that in 2005. Productivity was lowest at Eynhallow (0.11 chicks fledged per AOS), which in recent years has been the poorest performing colony in the region, but was also low on Papa Westray (0.29) and at Old Man, Hoy (0.22). The most successful colony in the region was at Bay of Creekland, where 0.71 chicks fledged per AOS, although few fulmar sites were monitored there. Only on North Ronaldsay (0.42) and at Mull Head (0.51) was breeding success higher than the respective long term colony means. Below average productivity was recorded at Gultak (0.36), Costa Head (0.41) and on Rousay (0.40) although these three colonies are still moderately successful when compared to the 2006 and long-term U.K. means.

In **north-west Scotland** mean breeding success was 0.40 chicks fledged per AOS, higher than that recorded in 2005 but not significantly so. Breeding success at the three monitored colonies was close to their respective means, highest in the region on Handa (0.46) and lowest at St. Kilda (0.35). Productivity was 0.39 chicks per AOS on Canna, where one study plot failed completely, probably due to a pair of white-tailed eagles *Haliaeetus albicilla* which depredated large numbers of adult fulmars in the vicinity; the eagles took large chicks in 2005 (Swann 2006a). Of the five nests monitored on Ailsa Craig (**south-west Scotland**) four fledged young.

In **north-west England/Isle of Man** overall success was 0.28 chicks fledged per AOS. The two colonies monitored, at Peel Headlands and Glen Maye (both on the Isle of Man), fared differently, where 0.50 and 0.06 chicks fledged per AOS respectively, although the sample size was small at Peel Headlands (8 AOS). On Skomer (**Wales**), fulmars had their least successful breeding season since monitoring began, fledging just 0.20 chicks per AOS; one study plot, containing 24 AOS, failed completely. Fulmars on Bardsey were typically successful in 2006, fledging 0.74 chicks from 39 nests, equal to the long-term colony mean.

Data were received for the first time from several colonies in Ireland. In **north-west Ireland**, breeding success at Aughris Head (0.52 chicks per AOS) was high, slightly below the long-term UK and Ireland average at Horn Head (0.32) but low at Dundawoona Point (0.11) where some sites failed at an early stage for unknown reasons (Hall *et al.* 2006). In **south-west Ireland**, breeding success at Cliffs of Moher was also high at 0.53 chicks per AOS.

3.3 Manx shearwater *Puffinus puffinus*

Breeding numbers and breeding success (Table 3.3.1)

In **north-west Scotland**, breeding success on Rum, at 0.59 chicks per egg laid, was well below the long-term average. The breeding season there was considered to have been the latest and most protracted since 1969, possibly in part due to very cold weather in April and May (Ramsay 2006).

Table 3.3.1 Breeding success of Manx shearwaters (chicks fledged per AOB or egg), 2005-2006 and 1986-2005. Figures in parentheses under 2005 and 2006 indicate the number of occupied burrows from which success was derived.

Region/site	2005	2006	1986-2005 mean	
			Mean (\pm s.e.)	No. of years
NW Scotland				
Rum	0.57 (110)	0.59 (166)	0.68 (\pm 0.04)	13
SW Scotland				
Sanda	0.95 (60)	No data	0.89 (\pm 0.06)	5
Wales				
Skomer	0.56 (122)	0.47 (110)	0.56 (\pm 0.04)	15
Bardsey	0.79 (150)	0.74 (50)	0.81 (\pm 0.01)	10

In **Wales**, breeding success on Bardsey (0.74 chicks fledged per AOB) was at its lowest since monitoring began in 1996, although birds still fared better than at other sites monitored in 2006. Outwith the study plot, a pair of carrion crows *Corvus corone* targeted accessible nest chambers for the fifth successive year, taking 29 eggs (Stansfield 2006).

On Skomer and Skokholm, a series of sample plots were set-up during the full census in 1998. Annual surveys, using tape playback, reveal a significant upward trend in the number of responses since then at both colonies (Perrins 2006). Breeding success was again monitored in a sample of burrows at the Isthmus on Skomer. Both the hatching success (58%) and the number of chicks fledged per egg (0.47) was lower than average. Of 46 nests with eggs that failed 14 eggs were abandoned, five eggs were broken, two burrows were taken over by puffins and 25 were found to be empty, either failing at the egg stage or when the chicks were very young. The estimated adult survival rate, at 89% for 2004 (the most recent year for which an estimate is available), is close to the long-term mean (86%, 1977-2003, s.d. \pm 9) but is considered low compared with an earlier more detailed study of the species on Skokholm; however, there appears to be no discernable long-term trend (Perrins 2006).

3.4 European storm-petrel *Hydrobates pelagicus*

Breeding number and breeding success

There are inherent difficulties in censusing petrels accurately, arising from their patchy distribution and nocturnal habits, the presence of non-breeders and the siting of nests deep within burrows, cavities or crevices in remote areas. However, a standardised method for repeatable surveys has been developed, involving the use of diurnal play-back of the male's "purr" song (Gilbert *et al.* 1998a,b; Ratcliffe *et al.* 1998). Other methods are also used to monitor populations on an annual basis.

With the exception of 2000, birds on Mousa (**Shetland**) have experienced late breeding seasons since 1997; 2006 was no different. On 9 September, 47 chicks were large enough to ring (41 in 2005, 34 in 2004, 50 in 2003, 47 in 2002, 35 in 2001, 49 in 2000 and 38 in 1999) but seven adults were still incubating and it was estimated that most chicks would not fledge until October. Eight failed eggs were also recorded but no dead chicks were found (Okill 2006b). On Noss, tape play-back was carried out in early August from a boat at several sites inaccessible by land but resulted in only one response (Sykes and Bliss 2006).

On Shillay (**north-west Scotland**), visited annually in mid-July, a tape play-back survey at two sample plots elicited 77 responses compared with 53 in 2005 (baseline figure of 73 in 2002). Outside of the plots, responses were readily obtained at a number of sites, which gave the impression that the colony was thriving. A pair of great skuas, which bred in previous years, were absent in 2006, and may explain the increases detected (A. Johnson, pers. comm.). In the Village Bay area of Hirta, St. Kilda, a tape play-back survey estimated 29 apparently occupied sites (AOS) (95% CLs 20-55). This represents a substantial decline from the 76 AOS (95% CLs 63-124) found in 1999 but is close to figures recorded in 2004 (28, range 23-34) and 2005 (39, range 26-75) (Money 2006). In **south-west Scotland**, a tape play-back survey along a 330m transect of the boulder beach on Lunga, which held a total of c.450 AOS in 2001, elicited only 20 responses; it is thought that a storm may have rendered the site largely unsuitable for breeding (Ward 2006).

In the **Channel Islands/south-west England**, a tape play-back survey on Burhou in July 1999 found 60 AOS (95% CLs 49-83). Repeated in July 2006, 28 responses were obtained, indicating 80 AOS. Responses came from the same areas as in the initial survey but in addition some were obtained from burrows at the east end of the island (L. Soanes, pers. comm.). A repeat survey on the Isles of Scilly, previously covered in 2000, produced similar results: the number of islands with storm-petrels was the same (11) and total numbers were stable at 1,398 AOS (95% CLs 1,104-2,064) in 2006 compared with 1,475 (1,055-2,268) in 2000. On Annet, which holds almost 60% of the islands' storm petrels, a decline of 16% to 788 AOS was attributed to rat activity in 2004 (Heaney *et al.* 2007).

In **south-west Ireland**, surveys of the Magharee Islands in mid to late June using tape play-back found storm-petrels on three islands; Gurrig (10 responses), Inishtooskert (26) and Illauntannig (33) which equates to a population, using a conversion factor of 2.4 (Mitchell *et al.* 2004), of 166 AOS. These are the first accurate figures obtained for the species on these islands (O'Clery 2006).

In **Wales**, a sample plot at Tom's House on Skomer yielded an average of 10 responses over three nights in late July, indicating 23 AOS (based on a response rate of 2.27 calculated in 2004). Numbers at this site in 2003 and 2004 were apparently higher, estimated at 41 and 39 AOS respectively.

3.5 Leach's storm-petrel *Oceanodroma leucorhoa*

Breeding number and breeding success

Survey work was confined to St. Kilda (**north-west Scotland**) in 2006. On Dun, a census of the whole-colony was carried out following the methods used in a 2003 census. The total number of AOS calculated from responses obtained via tape play-back was 13,523 (95% CLs 11,311-15,924) which equated to a non-significant decline of 6% since 2003. The location and number of responses from sampled quadrats suggested the density of Leach's storm-petrels was not uniform across the island, with the highest densities in grassy areas with large rocks (Newson 2006). However, as has been stated previously, the current number on the island is well below that recorded in 1999, when 27,704 AOS (95% CLs 20,430-38,506) were estimated, a decline attributed to predation by great skuas. On Hirta, of 25 nest boxes installed in cleits in 2004, nine showed some signs of activity in 2006 (none in 2004 and 4 in 2005), four of which had Leach's storm-petrel nests (Money 2006).

3.6 Northern gannet *Morus bassanus*

Breeding numbers (Figure 3.6.1)

Few data on breeding numbers were received in 2006. The recently established (2003) colony at Noup Head, Westray (**Orkney**), increased from 27 apparently occupied nests (AON) in 2005 to 43 (+59.3%). Elsewhere in the region, three adults (one actively displaying) were seen on Copinsay and a pair was reported on the Calf of Eday (Meek 2006) perhaps suggesting further colonisation may occur. Although a whole-colony count of the gannetry on Fair Isle (**Shetland**) was not carried out in 2006 it was reported that the newest sub-colony, Sheep Rock, where there is ample room for expansion, increased by 76% from 25 AON in 2005 to 44 (Shaw *et al.* 2006).

Breeding success (Table 3.6.1)

Mean productivity in 2006 was 0.73 (s.e. ± 0.05) chicks fledged per AON, from five monitored colonies. This is above the 1986-2005 mean of 0.69 (s.e. ± 0.01) chicks per AON measured at between three and six colonies annually. Only in 1986 and 1988 (0.74 and 0.78 chicks fledged per AON, respectively) have gannets been more successful.

In **Shetland**, breeding success at the three monitored colonies was generally equal to or above that recorded in 2005. On Hermaness, gannets had a less successful season compared with the colony average, fledging 0.62 chicks per nest. It was noted as being a late season, with incubation not starting until 10 May. Hatching was also protracted, such that chicks were still present in September (Kilgour 2006). The late nesting contrasts with Noss, where many birds were incubating by the end of April and the first chick hatched on 22 May, suggesting incubation began around one month earlier than at Hermaness. Subsequently, success on Noss was above average, with 0.77 chicks fledging per nest (Sykes and Bliss 2006). At Noup Head on Westray (**Orkney**), the 43 nests held 26 large chicks when surveyed (date unknown) (Meek 2006). This is similar to previous values from this recently established gannetry; productivity is usually lower at newly formed colonies, because colonizing birds tend to be less experienced breeders than is the majority at established sites.

Table 3.6.1 Northern gannet breeding success 2005 and 2006, and 1986-2005: estimated number of chicks fledged per occupied nest. Productivity is shown as the mean and standard error of figures from sample plots (superscript = number of plots) where applicable.

Colony	2005 fledged/nest		2006 fledged/nest		1986-2005 fledged /nest	
	AON ⁿ	Mean (\pm s.e.)	AON ⁿ	Mean (\pm s.e.)	Mean (\pm s.e.)	Years
SW Scotland						
Ailsa Craig	244 ²	0.74 (± 0.12)	354 ²	0.86 (± 0.08)	0.70 (± 0.02)	15
Shetland						
Hermaness	836 ³	0.69 (± 0.03)	865 ³	0.62 (± 0.02)	0.66 (± 0.01)	17
Noss	494 ⁴	0.69 (± 0.02)	472 ⁴	0.77 (± 0.04)	0.70 (± 0.01)	20
Orkney						
Noup Head	27 ¹	0.52 (-)	43 ¹	c.0.61 (-)	c.0.66 (± 0.14)	2
Wales						
Grassholm	811 ¹	0.80 (-)	586 ¹	0.79 (-)	0.77 (± 0.02)	4
All colonies	2,412 ⁵	0.69 (± 0.05)	2,320 ⁵	0.73 (± 0.05)	0.69 (± 0.01)	20

Ailsa Craig (**south-west Scotland**), was the most successful colony in Britain in 2006 with 0.86 chicks fledged per nest. This was well above the colony average, and equal to the previous most successful season, in 2003. It was reported as being another late season, estimated at up to four weeks later than in the mid 1990s (B. Zonfrillo, pers. comm.).

In **Wales**, breeding success on Grassholm measured 0.79 chicks fledged per nest, similar to that recorded in 2005 but only slightly higher than the colony mean.

3.7 Great cormorant *Phalacrocorax carbo*

Between 2005 and 2006, declines were recorded in most regions in western Britain and in eastern England. Numbers in eastern Scotland and in SW England increased, with little change noted in SW Scotland, NE Ireland and Inland England. Long-term trends measured since 1986 indicate that numbers have increased inland and in regions adjacent to the northern part of the Irish Sea. Breeding success was generally higher than in 2005 but still below average for three of the six colonies monitored.

Breeding numbers (Tables 3.7.1 and 3.7.2, Figure 3.7.1)

Between 2005 and 2006, declines were recorded in most regions in western Britain. Sampled colonies held 28.2% fewer nests than in 2005 in **north-west Scotland**, where large proportional declines were noted at An Glas Eilean (-43.8%) and Loch an Tomain (-27.5%) with a lesser decline recorded at Eilean an Inbhire Bhain (-11.8%). In **south-west Scotland**, where the regional index has been falling since 1994 and where five colonies have been deserted since 1999, there was little overall change at sample colonies, which held 4.3% fewer nests than in 2005. A decrease of 15.5% was recorded at Port o' Warren but increases of 10% or greater were noted at Eilean Dubh, Ruadh Sgeir, and Corr Eilean. Numbers at Horse island and Sanda were largely unchanged.

Table 3.7.1 Regional population changes at monitored great cormorant colonies, 2005-2006 (apparently occupied nests in May-June). Regional samples of fewer than 50 AON are excluded. Trends for 1986-2005 are average annual rates of change shown by sample populations. Statistical significance of trends indicated as: n.s. not significant, * P < 0.05, *** P < 0.001). Further details of calculation of trends are given in section 1.2.2.

Region	2005	2006	2005-2006 % change	% annual change
SW Scotland ^a	282	270	-4.3	+0.4 n.s. 1986-2005
NW Scotland ^b	110	79	-28.2	-
N Scotland ^c	220	233	+5.9	-3.5*** 1986-2005
NE Scotland ^d	81	93	+14.8	-
SE Scotland ^e	303	347	+14.5	-1.1 n.s. 1986-2005
NE England ^f	254	227	-10.6	-1.1* 1986-2005
Inland England ^g	345	357	+2.3	+9.5*** 1986-2005
SE England ^h	252	228	-9.5	-
SW England ⁱ	111	127	+14.4	-1.8*** 1986-2005
Wales ^j	772	656	-15.0	+0.7 n.s. 1986-2005
NW England/Isle of Man ^k	252	202	-19.8	+6.1*** 1986-2005
NE Ireland ^l	490	465	-5.1	+7.4*** 1986-2005

Colonies: ^a Sanda, Port o' Warren, Ruadh Sgeir, Black Harbour, Corr Eilean, Eilean Dubh, Horse Island; ^b An Glas Eilean, Eilean an Inbhire Bhain, Loch an Tomain; ^c Stacks of Occumster, Ceann Leathad, Traigh Bhuidhe, Neuk Mhor, Ord Point, Cnoc na Stri, North Sutor; ^d Sand of Forvie; ^e Craigleith, Carr Craig, Haystack, The Lamb, Inchkeith, Inchmickery; ^f Farne Islands, Huntcliff, Boulby Cliff; ^g Fairburn Ings, Chain Corner, Rutland Water, Swithland Reservoir, Aldermaston; ^h Dungeness, Rye Harbour; ⁱ Ballard Cliff, White Nothe, Gad Cliff, Thatcher Rock, Burgh Island; ^j Llangranog, South Stack, Skomer, St Margaret's Island, Ynysoedd Gwylan, Ynys Traws, Craig yr Aderyn, Great Orme, Little Orme; ^k South Solway, St. Bee's Head, Grune Point, Wood's Strand, Haweswater; ^l Strangford Lough.

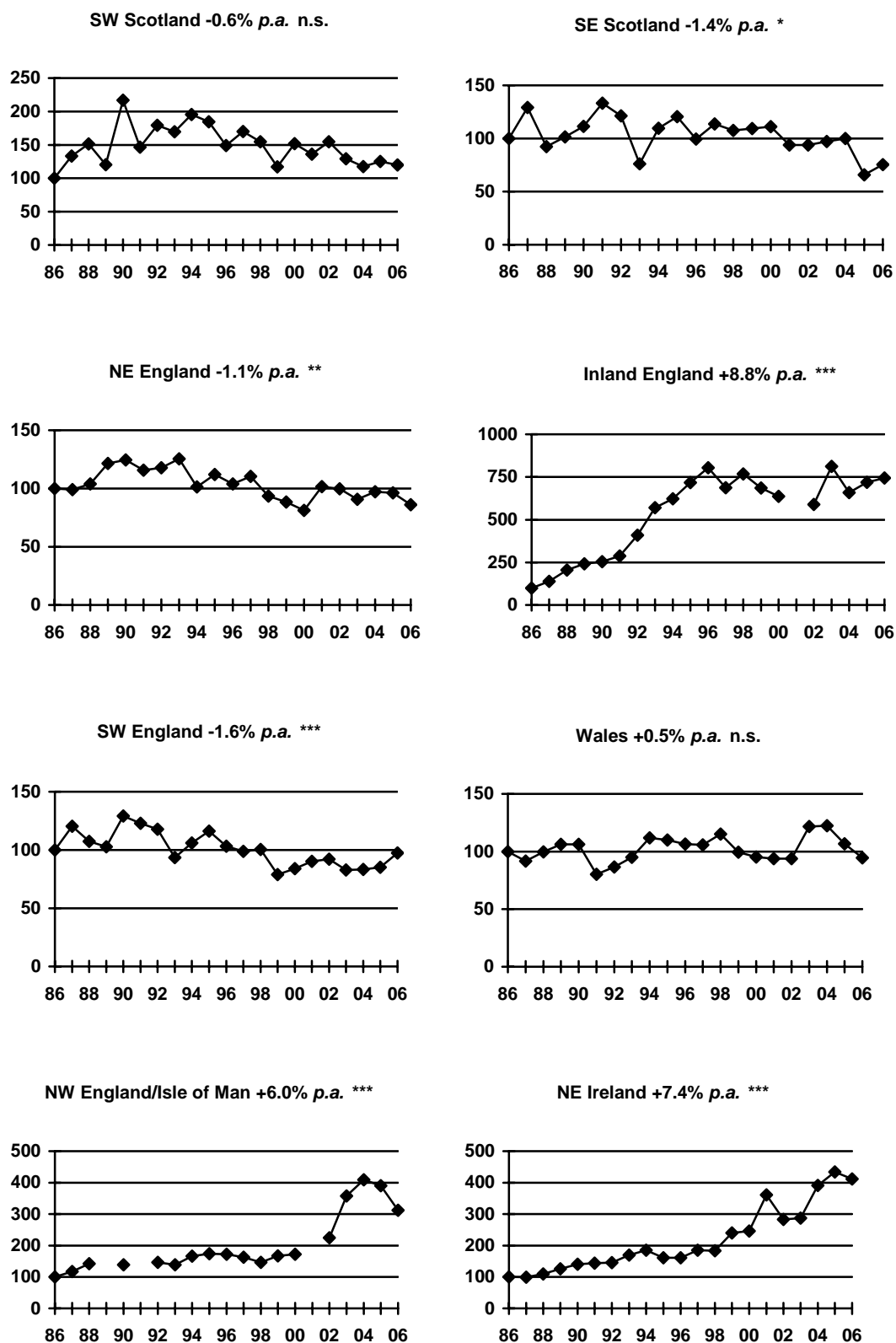


Figure 3.7.1 Regional population indices for breeding great cormorant, 1986-2006 (apparently occupied nests in late May or June). Average annual rates of change were calculated by regression of natural log of index against year (see section 1.2.2. for details). Statistical significance of trends (t-test) indicated as: n.s. not significant, * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$.

In **north-west England/Isle of Man**, numbers were 19.8% lower than in 2005. Large declines were detected at South Solway (-48.2%) and Grune Point (-30.2%) with a smaller decline at Wood's Strand (-9.7%) but numbers were unchanged in the largest colony, at St. Bee's Head, which held 90 pairs. The regional index now appears to be declining after the steep increase that was detected between 2002 and 2004; prior to that the trend, although increasing since 1986, had been fairly shallow. The regional sample for **Wales** also declined, by 11.5% between 2005 and 2006, with decreases of 12-24% recorded at St. Margaret's Island, Craig yr Aderyn and Little and Great Ormes heads. On Ynsoedd Gwylan, the only Welsh colony to show a substantial increase between 2005 and 2006, 50 AON were counted, an increase of 28.2%. At some smaller colonies in the region, e.g. Skomer, Ynys Traus numbers were largely unchanged between the two years. The regional index has fluctuated since 1986, with no sustained directional changes. At Strangford Lough, the sole colony monitored in **north-east Ireland**, numbers declined slightly (to 465 AON, -5.1% since 2005), after four successive years of increase. Despite this fall in numbers the colony is still almost four times the size it was in 1986. **South-west England** was the only western region where sampled colonies increased, by 14.4% between 2005 and 2006. Although little change was detected at the largest colony, Ballard Cliff, increases of 12% or greater were noted at Gad Cliff, White Nothe and Thatcher Rock. The regional index was in decline between 1990 and 1999 but appears to have levelled out and even increased slightly since then.

On the east coast of Scotland regional samples indicated that numbers generally increased, or at least remained stable, between 2005 and 2006. In **north Scotland**, 5.9% more nests were recorded than in 2005. Large proportional declines at the relatively small colonies at Taigh Bhuidhe and Ord of Caithness were compensated by small increases at the larger colonies of North Sutor and Cnoc Na Stri. In addition, Stacks of Occumster was again occupied, holding 16 AON, after being temporarily deserted in 2005. The regional trend is one of decline, as six colonies have been deserted in the last decade, although two new ones have been formed. At Sands of Forvie, the sole colony monitored in **north-east Scotland**, numbers increased by 14.8% to 93 AON - the fifth year of increase since the colony was formed in 2001. The regional sample for **south-east Scotland** also showed an increase, of 14.5% since 2005. Notable in this region was the recolonisation of Carr Craig (25 AON in 2006), temporarily deserted the previous year when birds moved to nearby Haystack - an island not used by nesting cormorants since 1997 - which itself held similar numbers between 2005 and 2006. Elsewhere in the region, increases occurred at Inchkeith and on The Lamb, with little change recorded at Craighleith. However, despite this increase the regional index has not yet recovered to 2004 levels since the late winter/early spring wreck of 2005 when higher than usual numbers of cormorants and shags were reported from eastern coasts during the annual beached birds survey (Schmitt 2005).

Few data were received from colonies in the Northern Isles. In **Orkney**, surveys on 26 August found 137 AON on Boray Holm (155 AON on 2 September 2005) and 47 AON on Little Green Holm (101 AON on 26 August 2004). The late count dates make comparison with previous data difficult but there does not appear to be any noticeable trend at either colony in recent years.

Numbers in both **north-east** and **south-east England** declined. On the Farne Islands, the largest colony in the north-east, 9.7% fewer nests were counted than in 2005. Large proportional declines of approximately 35% were recorded at Rye Harbour and at Saltburn; 19 AON at the last site was the lowest on record. At Dungeness, colonised in 1993, numbers increased by 20.3% to 142 AON, the highest number recorded there. At Boulby Cliffs similar numbers were found in both years. The regional trend for north-east England appears to show a decline since the early 1990s although there has been some fluctuation.

In **Inland England**, the trend was steeply upward between 1986 and 1996, when a plateau was reached, and since then the index has been relatively flat albeit with an apparent dip between 2000 and 2002. Overall numbers in 2005 and 2006 were stable, with declines recorded at Rutland Water, Aldermaston and Fairburn Ings compensated by large proportional increases at Swithland Reservoir and Chain Corner.

Table 3.7.2 Population changes of great cormorant 2005-2006 and 1986-2005 at selected sites.

Region/Site	2005	2006	2005-2006 % change	1986-2005		
				Mean	±s.d.	No. of years
SW Scotland						
Horse Island	81	79	-2.5	34	25	2
Port o' Warren	116	98	-15.5	150	38	14
Sanda	19	18	-5.3	23	6	18
Ruadh Sgeir	17	19	+11.8	18	5	6
Eilean Dubh	19	21	+10.5	10	6	9
Corr Eilean	30	35	+16.7	13	15	11
NW Scotland						
Eilean an Inbhire Bhain	27	24	-11.1	20	4	7
An Glas Eilean	32	18	-43.8	29	4	12
Loch an Tomain	51	37	-27.5	46	8	6
N Scotland						
Stacks of Occumster	0	16	-	17	12	14
Traighe Bhuidhe	21	10	-52.4	18	12	4
Ord of Caithness	15	12	-20.0	71	37	15
Cnoc na Stri	41	45	+9.8	25	18	4
North Sutor	143	150	+4.9	213	39	15
NE Scotland						
Sands of Forvie	81	93	+14.8	31	30	5
SE Scotland						
Inchkeith	85	102	+20.0	106	24	5
Craigeleith	112	109	-2.7	90	24	16
Carr Craig	0	25	-	103	62	19
Haystack	51	49	-3.9	20	38	20
The Lamb	55	62	+12.7	115	43	19
NE England						
Farne Islands	185	167	-9.7	219	42	20
Saltburn	29	19	-34.5	40	11	19
Boulby	40	41	+2.5	19	16	16
SE England						
Dungeness	118	142	+20.3	77	35	9
Rye Harbour	134	86	-35.8	91	51	6
Inland England						
Rutland Water	123	98	-20.3	43	51	17
Swithland Reservoir	38	49	+28.9	38	-	1
Aldermaston	45	41	-8.9	24	14	8
Fairburn Ings	87	79	-9.2	87	-	1
Chain Corner	52	90	+73.1	52	-	1
SW England						
Gad Cliff	32	36	+12.5	71	28	18
White Nothe	29	33	+13.8	28	7	6
Ballard Cliff	69	72	+4.3	102	31	16
Thatcher Rock	38	44	+15.8	37	12	12
Wales						
St Margaret's Island	147	129	-12.2	204	50	20
Ynysoedd Gwylan	39	50	+28.2	66	17	15
Craig yr Aderyn	71	62	-12.7	72	13	13
Great Ormes Head	43	33	-23.3	43	19	15
Little Ormes Head	429	367	-14.5	305	87	16
NW England/Isle of Man						
South Solway	56	29	-48.2	41	25	4
St. Bee's Head	90	90	0.0	30	33	13
Grune Point	63	44	-30.2	56	11	15
Wood's Strand	31	28	-9.7	35	3	3
NE Ireland						
Strangford Lough	490	465	-5.1	241	106	20

Breeding success (Table 3.7.3)

Mean productivity in 2006 was 1.58 (s.e. ± 0.36) chicks per AON from six colonies, below the long-term mean of 1.92 (s.e. ± 0.07) chicks per AON, recorded from between three and 15 colonies annually. However, most colonies were more successful than in 2005 and three colonies had greater than average success.

At North Sutor (**north Scotland**), the only colony monitored on the east coast, breeding success was above average for the site at 2.28 chicks fledged per nest. Other cliff-nesting species at this colony had low productivity in 2006, having suffered predation by great black-backed gulls (Swann 2006b).

In the colony at South Solway 'B' (**north-west England**), where all nests were systematically destroyed in 2005, success measured 1.97 young fledged per nest, well above average for the colony (M. Carrier, pers. comm.). Ynysoedd Gwylan (**Wales**) was the most successful colony in the U.K. in 2006, fledging 2.34 chicks per nest although this was below average for this extremely successful colony. Elsewhere in the region, success at the small colony on Skomer (1.70) was also above average. At Ballard Cliff (**south-west England**) breeding success, at 1.17 chicks fledged per nest, was below average. Mean clutch size from a sample of 21 nests was 3.19 eggs (range of 3.07-3.15 in three years during period 2002-2005).

Table 3.7.3 Breeding success (chicks fledged per occupied nest) of great cormorant 2005 and 2006 and 1986-2005 at selected sites. Figures in parentheses under 2005 and 2006 are the number of nests from which success estimate was derived.

Region/site	2005	2006	1986-2005	
			Mean (\pm s.e.)	No. of years
NW Scotland				
An Glas Eilean	c.1.56 (32)	c.0.00 (18)	1.73 (0.28)	13
N Scotland				
North Sutor	1.33 (53)	2.28 (110)	2.06 (± 0.15)	15
SW England				
Ballard Cliff	1.22 (40)	1.17 (35)	1.34 (± 0.09)	5
Wales				
Ynysoedd Gwylan	2.21 (39)	2.34 (50)	2.97 (± 0.31)	6
Skomer	1.27 (11)	1.70 (10)	1.59 (± 0.29)	6
NW England/Isle of Man				
South Solway 'B'	0.00 (56)	1.97 (29)	1.09 (± 0.49)	4
Will's Strand	2.41 (29)	No data	2.48 (± 0.04)	7

In **north-west Scotland**, near complete failure was recorded at An Glas Eilean in early June. Fifteen of 18 nests were empty, the remaining three holding one egg each. Egg shells of cormorants and shags were found under rocks and the remains of an adult cormorant was found by a mink *Mustela vison* den with other avian prey (Craik 2006). Unfortunately, the animal eluded trapping and so, with complete failure also recorded for other species nesting on this islet, it seems unlikely that the three surviving nests would have produced any young.

3.8 European shag *Phalacrocorax aristotelis*

After the large decreases recorded in N and SE Scotland and NE England in 2005, linked to a major seabird wreck reported in late winter/early spring of 2005, numbers in these regions increased in 2006 as populations recovered slightly. In NW Scotland, also affected by the wreck, no recovery was detected. In other west coast regions of Britain numbers appeared to fall between 2005 and 2006. Overall breeding success was close to the long-term British and Irish mean; success was high in Wales but low in SW, NW and N Scotland and NE England.

Breeding numbers (Tables 3.8.1 and 3.8.2, Figure 3.8.1)

Low breeding numbers of European shags were recorded in several regions in 2005, particularly those on the east coast of the UK. These declines followed a ‘wreck’ which occurred in late winter/early spring of 2005, after which the number of dead shags found on beached bird surveys was the highest since 1994 (Schmitt 2005). Over two-thirds of dead birds were recorded on beaches in the east of Scotland and north-east England, with a further 20% found in western Scotland (Schmitt 2005). In 2006, numbers in eastern regions subsequently increased, although regional totals, as shown by the population index graphs, were still lower than that recorded prior to the ‘wreck’. In **north Scotland**, numbers in the sole colony monitored, at North Sutor, increased by 23.1% to 320 AON. In **south-east Scotland**, an increase of 36.8% was recorded. Numbers were found to have increased by 10% or more at all colonies, except Craigleith where a decline of 9.9% was recorded, and at Inchkeith where virtually no change had occurred. On the Farne Islands, the sole colony from which data is available in **north-east England**, numbers were 19.5% higher than in 2005. On the Isle of May, the adult return rate was close to average at 83%, which contrasts with that following the ‘wreck’ in 2005, when only 36% of adults returned (Newell *et al.* 2006).

Table 3.8.1 Regional population changes at monitored European shag colonies, 2005-2006 (apparently occupied nests in May-June). Counts with a reported inaccuracy of $> \pm 5\%$, and regional samples of fewer than 100 AON, are excluded. Trends for 1986-2005 are average annual rates of change shown by sample populations. Statistical significance of trends indicated as: n.s. not significant, ** $P < 0.01$, *** $P < 0.001$). Further details of calculation of trends are given in section 1.2.2.

Region	2005	2006	2005-2006 % change	% annual change
SW Scotland ^a	1,484	1,251	-15.7	+3.7 ** 1994-2005
NW Scotland ^b	465	430	-7.5	-5.9*** 1987-2005
Shetland ^c	567	739	+30.3	-3.3*** 1986-2005
N Scotland ^d	260	320	+23.1	-
SE Scotland ^e	956	1,308	+36.8	-5.2** 1986-2005
NE England ^f	937	1,120	+19.5	-1.0 n.s. 1994-2005
Wales ^g	259	234	-9.7	-

Colonies: ^a Sanda Island, Colonsay (sample plots), Ceann a Mhara, Lunga, Coll, Eilean Dubh, Carraig an Daimh, Ruadh Sgeir, Eilean na Cille, Eilean Aoghainn; ^b Priest Island, An Glas Eilean, Eilean Balnagowan, Handa (plots), Eigg, Canna; ^c Fair Isle (plots), Noss, Sumburgh Head, Noness, Cumlewick Ness, Troswick Ness to Virkie; ^d North Sutor; ^e Isle of May, Inchkeith, Fidra, Inchmickery, Inchcolm, Haystack, Carr Craig, Craigleith, The Lamb, Bass Rock, St. Abb's Head; ^f Farne Islands; ^g Caldey, Stackpole Head, Elegug Stacks and nearby, Skomer, Middleholm, Ramsay Island, Bishops and Clerks, St Margaret's Island, Bardsey, Ynysoedd Gwylan, Little Ormes Head.

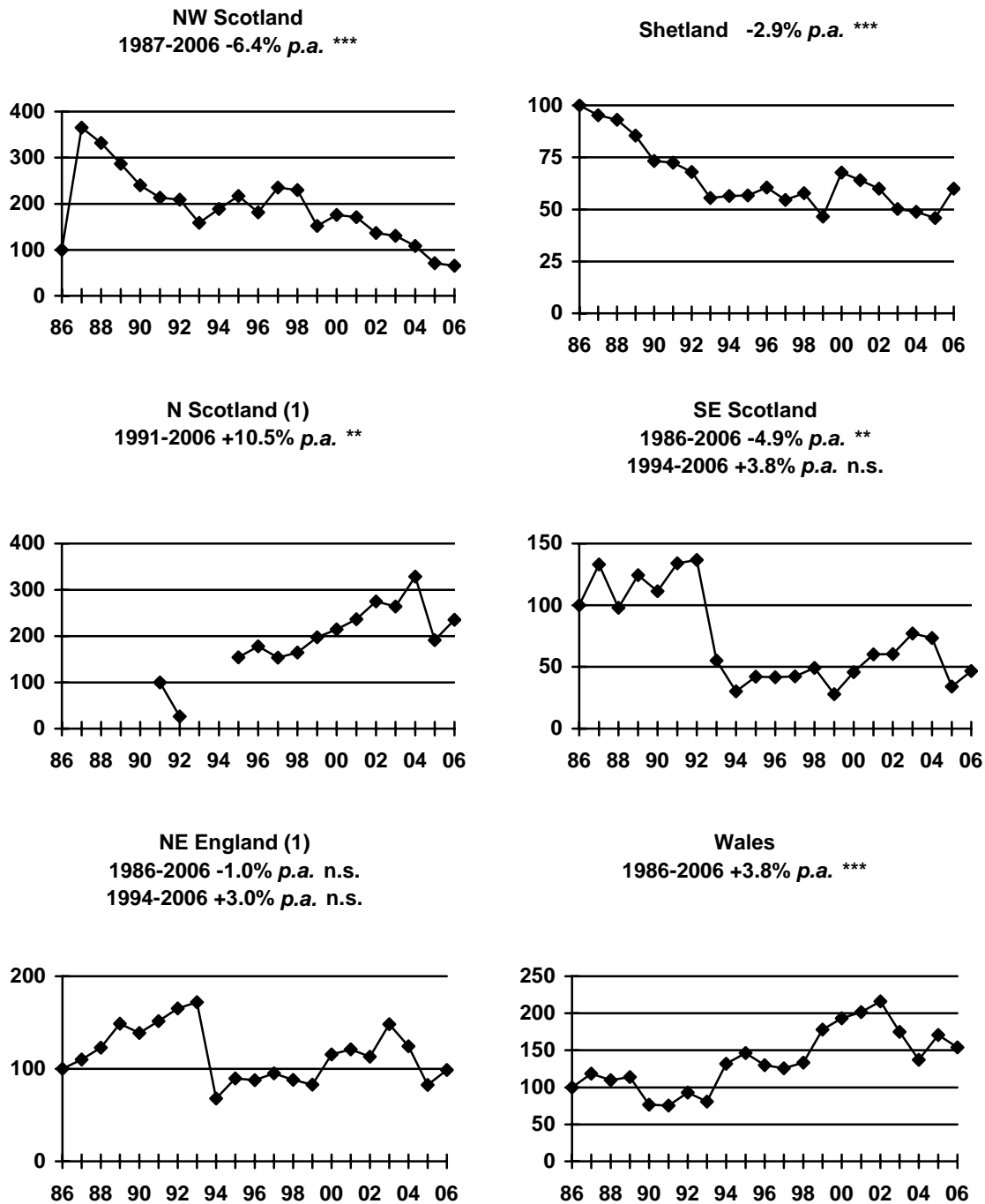


Figure 3.8.1 Regional population indices for breeding European shags, 1986-2006 (apparently occupied nests in late May or June). Average annual rates of change were calculated by regression of natural log of index against year (see section 1.2.2. for details). Trends are shown for the periods indicated. Unless otherwise indicated, three or more colonies were counted in year. Note: the large increase in index value between 1986-87 for north-west Scotland is due to many European shags on Canna not nesting in 1986. Statistical significance of trends (t-test) indicated as: n.s. not significant, ** P < 0.01, *** P < 0.001.

A substantial increase was also recorded in **Shetland** between 2005 and 2006, where numbers were 30.3% higher, although between-year comparison was mostly restricted to colonies in the south-east of the region (Heubeck 2006). Large proportional increases (of 40% or greater) were recorded from a whole-colony count at Sumburgh Head and in sample plots on Fair Isle, with a moderate increase also noted in a whole-colony count at Noness (+16.9). On Noss, there was virtually no change since 2005

although 92 AON was the highest count there since 1996. Counts of seven other colonies in the west and north-east of Mainland in 2006 also indicated an overall increase, of 23.2% since 2004. However, it is thought the increases detailed above probably reflect greater non-breeding during 2003-2005, deduced from cliff-top examination of nest contents, rather than genuine population change (Heubeck 2006). Elsewhere in the region, a survey of Papa Stour indicated a decline of approximately 17% since 1999, from 360 to 299 AON, although two geos could not be fully accessed by boat in 2006 so may have been undercounted. Limited data was received from **Orkney**, where the number on Auskerry totalled 70 AON, 42.9% higher than in 2005.

Table 3.8.2 Population changes of European shag 2005-2006 and 1986-2005 at selected sites. All counts refer to whole colony unless stated.

Region/Site	2005	2006	2005-2006 % change	Mean	1986-2005 ±s.d.	No. of years
SW Scotland						
Lunga	184	78	-57.6	227	83	13
Ceann a Mhara	112	50	-55.4	115	22	6
Ruadh Sgeir	62	51	-17.7	78	33	14
Sanda	c.800	c.800	0.0	657	166	18
Eilean Dubh	22	28	+27.3	42	23	11
Eilean Aoghainn	22	26	+18.2			
Carraig an Daimh	47	8	-83.0	26	17	13
Eilean na Cille	37	23	-37.8	21	10	14
Coll	157	158	+0.6	62	52	12
NW Scotland						
Canna	327	348	+6.4	890	324	20
Eigg	37	40	+8.1	59	35	19
Shetland						
Sumburgh Head	153	230	+50.3	257	107	19
Noss	89	92	+3.4	77	16	20
Noness	177	207	+16.9	162	19	11
Fair Isle (plots)	97	137	+41.2	169	45	20
Orkney						
Auskerry	49	70	+42.9	25	8	7
N Scotland						
North Sutor	260	320	+23.1	260	106	13
SE Scotland						
Isle of May	281	485	+72.6	906	513	20
Inchkeith	161	165	+2.5	47	51	20
Inchmickery	52	57	+9.6	35	19	16
Fidra	115	198	+72.2	131	70	20
Craigeith	131	118	-9.9	310	184	19
The Lamb	49	65	+32.7	149	107	18
Bass Rock	18	36	+100.0	53	44	15
St. Abb's Head	131	162	+23.7	284	108	20
NE England						
Farne Islands	937	1,120	+19.5	1,317	340	20
Wales						
Middleholm	39	50	+28.2	33	9	10
Bardsey	42	48	+14.3	31	17	20
Ynysoedd Gwylan	131	87	-33.6	102	30	9
SW England						
St Aldhelm's – Durlston Head	63	62	-1.6	53	7	11

In contrast to the increases detected in regions in the north and east of Britain numbers in three regions in the west were lower than in 2005. In **north-west Scotland**, also affected by the ‘wreck’ early in 2005, numbers fell, by 7.5%. On Canna and Eigg, where large decreases were recorded in 2005, only a few more nests were recorded in 2006 with declines noted on Priest Island and at An Glas Eilean, where mink were a problem. The regional trend indicates numbers have been falling steadily since 1987, bar a period of increase in the mid-1990s. A larger decline, of 15.7%, was found in **south-west Scotland**. Although no change was noted on Coll, nor estimated to have occurred on Sanda, several other sites declined by a range of 17-83%, with the largest reductions occurring at Lunga, Ceann a Mhara and Carraig an Daimh. Eileans Dubh and Aoghainn were the only colonies in the region which increased in numbers. Fewer nests were also recorded at colonies sampled in **Wales**. Most monitored colonies in the region comprise 10 pairs or fewer, and despite increases at medium sized colonies on Middleholm and Bardsey, that the largest colony, Ynysoedd Gwylan (more than twice as big as any other), declined by 33.6% had a greater bearing on the index, which fell by 9.7%. The regional trend had generally been increasing since 1990 but there is evidence of a decline in recent years. In **south-west England**, a complete census of the Isles of Scilly recorded 1,296 nests, an increase of 17.0% since 1999 (Heaney *et al.* 2007); Samson and Annet were the only islands in the archipelago which declined, by 19% to 34 nests and 15% to 177 nests, respectively. Elsewhere in the region, numbers between St. Aldhelm’s Head and Durlston were stable between 2005 and 2006 but nearby the small colony at Gad Cliff increased from four to 14 AON.

Breeding success (Tables 3.8.3 and 3.8.4)

Among 16 colonies where detailed monitoring was undertaken in 2006, mean breeding success was 1.27 (s.e. ± 0.16) chicks per nest, slightly below the long-term mean of 1.29 (s.e. ± 0.04) recorded from between three and 20 colonies sampled during 1986-2005. A comparison of 14 colonies sampled in both 2005 and 2006 revealed that shags were more successful in 2006, but this was not statistically significant.

Table 3.8.3 European shag breeding success, grouped regionally 2005-2006: estimated number of chicks fledged per occupied nest at sample colonies (superscript 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 figures used for some colonies in both years in south-west Scotland as well as for An Glas Eilean in north-west Scotland are based on just one or a few visits and are therefore approximate; those for other colonies and regions are based on regular checks of sample nests. Changes in breeding success are indicated for colonies studied in both years, n.s.-not significant, * $P < 0.05$, ** $P < 0.01$.

Regions	2005 chicks fledged/nest				2006 chicks fledged/nest				2005-2006 change	
	Nests ⁿ	Range	Mean	\pm s.e.	Nests ⁿ	Range	Mean	\pm s.e.	Mean ⁿ	\pm s.e.
SW Scotland ^a	586 ⁶	0.59-2.02	1.21	± 0.21	289 ⁸	0.00-2.48	0.92	± 0.34	-0.80 ⁴	± 0.11 **
NW Scotland ^b	440 ³	0.61-1.72	1.04	± 0.35	328 ³	0.00-1.06	0.64	± 0.33	-0.39 ³	± 0.67 n.s.
Shetland ^c	174 ³	0.00-0.84	0.50	± 0.26	248 ³	1.06-1.60	1.32	± 0.16	+0.82 ³	± 0.19 *
Orkney ^d	5 ¹	-	1.60	-	7 ¹	-	1.29	-	-0.31 ¹	-
N Scotland ^e	41 ¹	-	0.17	-	43 ¹	-	0.81	-	+0.64 ¹	-
SE Scotland ^f	71 ²	0.29-0.42	0.36	± 0.07	165 ²	0.98-1.45	1.22	± 0.23	+0.86 ²	± 0.17 n.s.
NE England ^g	264 ¹	-	0.86	-	297 ¹	-	0.85	-	0.01 ¹	-
Wales ^h	212 ³	2.17-2.59	2.35	± 0.12	185 ³	1.90-2.20	2.03	± 0.09	-0.32 ³	± 0.21 n.s.
Total	1,788 ¹⁹	0.00-2.59	1.09	± 0.17	1,562 ²²	0.00-2.48	1.12	± 0.16	-0.05 ¹⁸	± 0.19 n.s.
Detailed only	1,568 ¹⁵	0.00-2.59	1.10	± 0.21	1,449 ¹⁶	0.00-2.48	1.27	± 0.16	+0.22 ¹⁴	± 0.17 n.s.

Colonies: ^a Ailsa Craig (2006 only), Ruadh Sgeir, Eilean Aoghainn (2005 only), Eilean Buidhe (2006 only), Carraig an Daimh (2006 only), Eilean na Cille, Coll, Eilean Balnagowan, Dubh Fheith (2006 only), Sanda (2005 only), Lady Isle (2005 only); ^b Canna, Rum, An Glas Eilean (2005 only); ^c Sumburgh Head, Fair Isle, Foula; ^d Papa Westray; ^e North Sutor; ^f Isle of May, St. Abb’s Head; ^g Farne Islands; ^h Bardsey, Ynysoedd Gwylan, Middleholm.

Colonies in **Wales** continue to be the most successful in the UK, with mean breeding success again greater than two chicks per nest although colonies were less successful than in 2005. Productivity was

greatest at Ynysoedd Gwylan (2.20 chicks fledged per nest), which was also the only colony in the region with higher than average success. At Bardsey and Middleholm, 1.90 and c.2.00 chicks fledged per nest, respectively.

Mean breeding success in **north-west Scotland**, at 0.64 chicks fledged per nest, was much lower than in 2005. This was because shags on An Glas Eilean, a relatively successful colony the previous year, failed completely in 2006 due to heavy mink predation. On 5 June all nests on the islet were empty and the remains of many dead adults were found (Craik 2006). On Rum and Canna, shags were actually more successful than in 2005 although productivity (1.06 and 0.87 chicks fledged per nest, respectively) was still below average for each colony. High levels of egg predation by common ravens *Corvus corax* were noted at two plots on Canna, where only one nest out of 24 fledged young. At a further two plots, where many shags nest under boulders, gulls depredated eggs in more open sites (Swann 2006a). In **south-west Scotland**, overall breeding success was 0.92 chicks fledged per nest, lower than in 2005, significantly so among four colonies monitored in both years. Success was particularly poor at three colonies in the Sound of Jura; complete failure occurred at Carraig an Daimh, only one young fledged from 23 nests on Eilean na Cille (0.04 per nest) and 4-6 young fledged from 51 nests on Ruadh Sgeir (c.0.10). Low productivity was also recorded on Coll (0.51). Elsewhere in the region, shags were more successful, fledging over one chick per nest on Dubh Fheith (1.33) and Eilean Buidhe (1.50) and two chicks per nest or more at Eilean Balnagowan (2.00) and Ailsa Craig (2.48). At the latter site breeding success appeared to be high across the whole island, not just in the study plot, with an estimated 400 chicks fledging from c.150 nests (B. Zonfrillo pers. comm.).

Table 3.8.4. Breeding success (chicks fledged per occupied nest) of European shag 2005 and 2006 and 1986-2005 at selected sites. Figures in parentheses under 2005 and 2006 are the number of nests from which the success estimate was derived.

Region/site	2005	2006	1986-2005		
			Mean	±s.e.	No. of years
SW Scotland					
Ailsa Craig	No data	2.48 (21)	No data	-	-
Coll	1.50 (157)	0.51 (158)	1.29	0.21	2
Ruadh Sgeir	c.0.85 (62)	c.0.10 (51)	1.04	0.15	12
Eilean na Cille	c.0.97 (36)	c.0.04 (23)	1.66	0.14	12
Eilean Balnagowan	2.50 (4)	c.2.00 (5)	2.50	-	1
Eilean Buidhe	No data	c.1.50 (20)	2.06	0.17	10
Carraig an Daimh	No data	0.00 (8)	1.08	1.08	2
Dubh Fheith	No data	c.1.33 (3)	1.58	-	1
NW Scotland					
Rum	0.61 (66)	1.06 (22)	1.11	0.25	4
Canna	0.78 (274)	0.87 (295)	1.11	0.12	20
An Glas Eilean	c.1.72 (100)	0.00 (11)	1.01	0.20	11
Shetland					
Sumburgh Head	0.84 (118)	1.29 (163)	1.17	0.07	18
Fair Isle	0.66 (47)	1.60 (47)	1.38	0.08	20
Foula	0.00 (9)	1.06 (33)	0.68	0.20	9
Orkney					
Papa Westray	1.60 (5)	1.29 (7)	1.60	-	1
N Scotland					
North Sutor	0.17 (41)	0.81 (43)	1.36	0.13	14
SE Scotland					
Isle of May	0.42 (42)	1.45 (81)	0.91	0.11	20
St. Abb's Head	0.29 (29)	0.98 (84)	1.24	0.13	16
NE England					
Farne Islands	0.86 (264)	0.85 (297)	0.95	0.09	19
Wales					
Bardsey	2.59 (42)	1.90 (48)	2.21	0.12	12
Ynysoedd Gwylan	2.17 (131)	2.20 (87)	2.02	0.08	7
Middleholm	2.30 (39)	≤2.00 (50)	2.11	0.17	4

Regions adjacent to the North Sea, which generally had a poor breeding season in 2005, were more productive in 2006. In **Shetland**, mean breeding success was 1.32 chicks fledged per nest, a significant increase on that recorded in 2005. Productivity was above average for all three colonies monitored and at Sumburgh Head (1.29) and Fair Isle (1.60) it was the most successful breeding season since 2002. On Foula, which failed completely in 2004 and 2005, productivity measured 1.06 chicks fledged per nest, the most successful season there since 1999. A detailed study at Sumburgh Head revealed egg laying to be earlier and more consistent than in 2005, with the percentage of nests started which proceeded to (presumed) incubation above 90% for the first time since 2002. The main factor which reduced breeding success was heavy swell in the second week of July, which washed out 25 of 67 active nests low on the cliff (Heubeck 2006). In the small colony on Papa Westray (**Orkney**), 1.29 chicks fledged per nest, fewer than did so in 2005. No other breeding success data were available from this region but examination of 92 nests with chicks on the Pentland Skerries, Swona, Switha and Auskerry in late June and early July suggested a good breeding season; 8% of nests held broods of one, 35% broods of two, 49% broods of three and 5% broods of four which equates to an average brood size of 2.50 chicks per nest (Meek 2006).

At North Sutor (**north Scotland**), shags were almost five times more successful than in 2005, fledging 0.81 chicks per nest, although this was still well below the long-term site mean. Productivity at one plot, an open site on a stack, was reduced probably due to predation by gulls (Swann 2006b). In **south-east Scotland**, mean breeding success was 1.22 chicks fledged per nest. After two years of low productivity success on the Isle of May (1.45) was well above the long-term average for the colony. Breeding was early compared with 2005, with the first egg laid on 25 April (6 May in 2005) although this is still late compared with the long-term mean of 11 April. Diet studies found that sandeels were the most frequent prey in regurgitates, composing 90% of items and 53% by biomass. Although the proportion of sandeels in the diet was higher than in the preceding two years most were 0-group fish whereas normally older sandeels make up the bulk of the diet of shags on the island (Newell *et al.* 2006). At St. Abb's Head, shags were more successful than in 2005, fledging 0.98 chicks per nest, but this was still below average for the colony. On the Farne Islands (**north-east England**), breeding success was similar to 2005, at 0.85 chicks fledging per nest but below average for the colony.

3.9 Arctic skua *Stercorarius parasiticus*

Between 2005 and 2006 numbers of apparently occupied territories (AOT) at sample colonies in Shetland and Orkney increased, but a small decline was noted in west Scotland. Overall, Arctic skuas were more productive in Orkney than in Shetland and west Scotland, but temporal and localised food shortages occurred across the regions, although these were far less severe than in 2005.

Breeding numbers (Tables 3.9.1 and 3.9.2)

In **Shetland**, numbers of AOT continued to increase following the decline between 2003 and 2004. A particularly notable increase was recorded on Fair Isle, where numbers reached the highest level since 1992. Numbers also increased on Foula, but remained well below the long-term average. Of the pairs that occupied territories on Foula, 77.2% laid eggs (25.5% in 2005). Most colonies elsewhere in Shetland increased except for those at Colvadale and Hermaness, both on Unst, and on Fetlar. The study plots on Fetlar reached their lowest level since monitoring began there in 1990. A count of all Arctic skuas on the island revealed 99 AOT: just half the 198 AOT recorded in 1991 (148 in 1992, 125 in 1993 and 96 in 2001).

Table 3.9.1 Regional population changes at monitored Arctic skua colonies, 2005-2006 (apparently occupied territories). Superscript = number of colonies counted in both years. Note that British totals are for the sample of monitored colonies in that year only and not the entire population.

Region	2005	2006	2005-2006 % change
Shetland ^a	240	290	+20.8 ¹⁶
Orkney ^b	92	125	+35.9 ⁸
W Scotland ^c	33	32	-3.0 ²
Britain	365	447	+22.5 ²⁶

Colonies: ^aFoula, Fair Isle, Fetlar, Black Park, Lumbister, Colvadale, Dalsetter, Kettlaness, Mousa, Noss Hill, Noness, Culswick, Mioness, Tingon, Noss, Hermaness; ^bNorth Hill, Brings, Gallo Hill, Binga Fea, Birsay Moors, Ward Hill, Rothisholm, Auskerry; ^cHanda, Coll.

In **Orkney**, numbers at sample sites recovered moderately from the decline between 2004 and 2005. Although numbers at the colony at North Hill almost doubled between 2005 and 2006 and reached the highest level since 1999, they remained well below the long-term average for the colony. Surveys failed to detect any AOT at Gallow Hill and Binga Fea, but variable rates of increase were reported from four other study plots. In contrast, the colony at Birsay Moors Reserve declined from 26 AOT in 2005 to just nine in 2006.

The Arctic skua population on Handa (**north-west Scotland**) declined to its lowest level since 1986. Of the 17 AOT recorded, 15 pairs actually nested. Numbers at Coll (**south-west Scotland**) increased from 12 pairs in 2005 to 15 pairs in 2006.

Table 3.9.2 Population (apparently occupied territories) changes of Arctic skua 2005-2006 and 1986-2005 at selected sites. (N/a = not applicable as only two years of data available).

Region/Site	2005	2006	2005-2006 % change	1986-2005	
				Mean (\pm s.d.)	No. of years
Shetland					
Papa Stour	+	37	-	N/a	N/a
Black Park (Yell)	2	7	+250.0	N/a	N/a
Lumbister (Yell)	7	9	+28.6	N/a	N/a
Colvadale (Unst)	20	9	-55.0	N/a	N/a
Dalsetter (Mainland)	4	5	+25.0	N/a	N/a
Kettlaness (Mainland)	8	9	+12.5	N/a	N/a
Noss Hill (Mainland)	0	3	-	N/a	N/a
Noness (Mainland)	1	1	0.0	N/a	N/a
Culswick (Mainland)	8	11	+37.5	N/a	N/a
Mioness (Mainland)	6	7	+16.7	N/a	N/a
Tingon (Mainland)	12	15	+25.0	N/a	N/a
Hermaness (Unst)	7	4	-42.9	12 (3)	14
Fetlar	9	7	-22.2	17 (5)	16
Noss	5	5	0.0	12 (5)	20
Mousa	12	14	+16.7	16 (6)	16
Fair Isle	71	105	+47.9	83 (21)	19
Foula	68	79	+16.2	110 (35)	17
Orkney					
North Hill, Papa Westray	37	70	+89.2	109 (41)	17
Lushan (Mainland)	0	No data	-	N/a	N/a
Brings (Rousay)	9	20	+122.2	N/a	N/a
Gallo Hill (Westray)	4	0	-100.0	N/a	N/a
Binga Fea (Hoy)	1	0	-100.0	N/a	N/a
Birsay Moors (plots) (Mainland)	11	No data	-	N/a	N/a
Ward Hill (Eday)	8	18	+125.0	N/a	N/a
Rothiesholm (Stronsay)	6	7	+16.7	N/a	N/a
NW Scotland					
Handa	21	17	-19.0	31 (6)	20

Breeding success (Tables 3.9.3 and 3.9.4)

Breeding success varied considerably across **Shetland**. A late start to the breeding season was reported from Fetlar (Luxford and Smith 2006), Foula (Heubeck 2006) and many of the study plots on the Mainland (Okill 2006). Although there was no apparent food shortage on Fetlar (Luxford and Smith 2006), just five young fledged from 99 pairs on the whole of the island. On Foula, food was scarce and regurgitates from chicks ringed were of larval whitefish (Heubeck 2006). In contrast, Arctic skuas on Noss were the most productive for eight years. On Fair Isle, productivity was the highest since 1992; more young fledged on the island than in the previous six years combined and also twice as many young fledged in 2006 as on all other monitored sites across Shetland combined. However, post-fledging mortality may have been high as depredation of juvenile Arctic skuas by great skuas was observed on several territories late in the season (Shaw *et al.* 2006).

On **Orkney**, Arctic skuas were considerably more productive than in 2005, although a temporary food shortage later in the season reduced fledging success (P. Higson, pers. comm., cited in Meek 2006). Productivity at the North Hill colony at Papa Westray was the highest in the archipelago.

Table 3.9.3 Arctic skua breeding success grouped regionally, 2005-2006: estimated number of chicks fledged per apparently occupied territory at sample colonies (superscript = number of colonies). When more than one colony was sampled in a given region, the overall figure given is the total number of fledglings divided by the total number of apparently occupied territories across all colonies. Note that the same colonies have not necessarily been monitored in each region each year and that the number of pairs given here are sample sizes (and do not necessarily indicate population changes between years).

Region	2005 chicks fledged/pair			2006 chicks fledged/pair		
	AOT ⁿ	Range	Overall	AOT ⁿ	Range	Overall
Shetland ^a	271 ¹⁷	0.00-1.00	0.11	419 ¹⁷	0.00-1.00	0.31
Orkney ^b	75 ⁷	0.00-0.38	0.27	108 ³	0.00-0.84	0.76
W Scotland ^c	33 ²	0.48-0.83	0.61	32 ²	0.18-0.53	0.34

Colonies ^aFoula, Fair Isle, Papa Stour (only in 2006), Black Park, Lumbister, Colvadale, Dalsetter, Kettlaness, Mousa, Noss Hill (only in 2006), Noness, Culswick, Mioness, Tingon, Noss, Hermaness, Fetlar whole island (only in 2006), Fetlar study plots (only in 2005), Fetlar Vord Hill to Cruss (only in 2005); ^bNorth Hill, Brings, Gallo Hill (only in 2005), Binga Fea (only in 2005), Birsay Moors Reserve (only in 2005), Ward Hill, Rothiesholm (only in 2005); ^cHanda, Coll.

Although 15 pairs on Handa (**north-west Scotland**) fledged three young, only two of these left the island (C. Smith, pers. comm.). On Coll (**south-west Scotland**), Arctic skuas were more productive and eight young fledged from 15 AOT at three sites (10 fledged from 12 AOT in 2005). Heavy depredation by great skuas and great black-backed gulls reduced fledging success at one of the sites on Coll (S. Wellock, pers. comm.).

Table 3.9.4. Breeding success (chick fledged per apparently occupied territory) of Arctic skua 2005-2006 and 1986-2005 at selected sites. (N/a = not applicable as only two years of data available).

Region/site	2005	2006	1986-2005	
			mean (\pm s.e.)	No. of years
Shetland				
Papa Stour	No data	0.00	N/a	N/a
Black Park (Yell)	0.00	0.14	N/a	N/a
Lumbister (Yell)	0.00	0.00	N/a	N/a
Colvadale (Unst)	0.05	0.00	N/a	N/a
Dalsetter (Mainland)	0.75	1.00	N/a	N/a
Kettlaness (Mainland)	0.38	0.22	N/a	N/a
Noss Hill (Mainland)	No data	0.00	N/a	N/a
Noness (Mainland)	1.00	0.00	N/a	N/a
Culswick (Mainland)	0.50	0.36	N/a	N/a
Mioness (Mainland)	0.17	0.14	N/a	N/a
Tingon (Mainland)	0.08	0.40	N/a	N/a
Hermaness (Unst)	0.14	0.00	0.51 (0.10)	15
Fetlar	0.00	0.00	0.39 (0.12)	19
Noss	0.40	0.80	0.42 (0.08)	20
Mousa	0.50	0.93	0.47 (0.12)	16
Fair Isle	0.07	0.82	0.53 (0.10)	18
Foula	0.01	0.03	0.49 (0.12)	15
Orkney				
North Hill, Papa Westray	0.30	0.84	0.62 (0.10)	17
Lushan (Mainland)	No data	No data	N/a	N/a
Brings (Rousay)	0.33	0.55	N/a	N/a
Gallo Hill (Westray)	0.00	No data	N/a	N/a
Binga Fea (Hoy)	0.00	No data	N/a	N/a
Ward Hill (Eday)	0.38	0.67	N/a	N/a
Rothiesholm (Stronsay)	0.00	No data	N/a	N/a

3.10 Great skua *Stercorarius skua*

Numbers of apparently occupied territories (AOT) increased in Shetland between 2005 and 2006. A small decrease was noted in Orkney, but numbers remained broadly stable in west Scotland. Breeding success throughout the regions was higher than in 2005, particularly so in Shetland.

Breeding numbers (Tables 3.10.1 and 3.10.2)

Overall numbers at monitored sites in **Shetland** increased by more than a quarter between 2005 and 2006. At colonies on Fair Isle, Noss and Mousa and study plots on Fetlar, numbers were the highest since records began. A whole island count on Fetlar revealed an increase of 11.5% since 2001 (Luxford and Smith 2006). Counts of great skuas within study plots designed to monitor Arctic skuas revealed an overall increase of 27.2% from 125 AOT in 2005 to 159 AOT in 2006 (N. Ratcliffe, pers. comm.). The most notable increase amongst these study plots occurred at Papa Stour, where numbers almost doubled.

Table 3.10.1 Regional population changes at monitored great skua colonies, 2005-2006 (apparently occupied territories). Superscript = number of colonies counted in both years.

Region	2005	2006	2005-2006 % change
Shetland^a	470	595	+26.6 ¹⁵
Orkney^b	57	55	-3.5 ³
West Scotland^c	225	221	-1.8 ⁵

Colonies ^a Fair Isle, Papa Stour, Noss Hill, Noness, Tingon, Mousa, Kettlaness, Lumbister, Black Park, Noss, Hermaness, Colvadale, Baa Neap, Funzie Ness, Lambhoga; ^b Stourdale, North Hill, Ward Hill; ^c Handa, Canna, Coll, Priest Island, Treshnish Islands

Table 3.10.2 Population (apparently occupied territories) changes of great skuas 2005-2006 and 1986-2005 at selected sites. (N/a = not applicable as only two years of data available).

Region	2005	2006	2005-2006 % change	1986-2005	
				Mean (\pm s.d.)	No. of years
Shetland					
Papa Stour	29	56	+93.1	N/a	N/a
Noss Hill (Mainland)	19	29	+52.6	N/a	N/a
Noness (Mainland)	10	11	+10.0	N/a	N/a
Tingon (Mainland)	7	6	-14.3	N/a	N/a
Kettlaness (Mainland)	3	4	+33.3	N/a	N/a
Lumbister (Yell)	31	41	+32.3	N/a	N/a
Black Park (Yell)	2	3	+50.0	N/a	N/a
Colvadale (Unst)	24	9	-62.5	N/a	N/a
Hermaness (Unst)	39	38	-2.6	43 (15)	17
Fetlar	72	85	+18.1	62 (8)	11
Noss	66	89	+34.8	52 (12)	18
Mousa	24	35	+45.8	17 (6)	12
Fair Isle	144	189	+31.3	110 (29)	19
Orkney					
North Hill (Papa Westray)	14	17	+21.4	11 (3)	10
Stourdale (Hoy)	38	34	-10.5	46 (13)	20
Ward Hill (Eday)	5	4	-20.0	N/a	N/a
NW Scotland					
Handa	212	202	-4.7	132 (60)	18

In **Orkney**, a small overall decline was recorded at three sample sites. The colony at Stourdale, Hoy, declined to its lowest level since 1988, whereas the North Hill colony increased to its highest level since recording started in 1996. At the Hoy RSPB reserve, 189 AOT were counted, compared with 377 in 2000, the most recent previous count available for the site.

On Handa (**north-west Scotland**), a small decline in numbers was recorded, following a record high count in 2005. Elsewhere in the region, three AOT were reported on Canna (two in 2005 and 2004), and two on Priest Island (four in 2005 and six in 2004). On Coll (**south-west Scotland**), 11 AOT were recorded compared with seven in 2005 and 11 in 2004. Three AOT were recorded on three of the Treshnish Isles (none in 2005 and 2004 and three in 2003).

Breeding success (Tables 3.10.3 and 3.10.4)

Overall breeding success in **Shetland** was considerably higher than in the previous four years. Productivity on Fair Isle was the highest since 1998, following four years when most birds experienced breeding failure. On Fetlar, productivity was also well above the long-term average. Although birds on Noss, Hermaness and Mousa were more productive than in 2005, productivity remained at or below their respective long-term averages. Anecdotal evidence suggested a late and poor breeding season on Foula, where weak territorial defence lead to high conspecific depredation later in the season (Heubeck 2006).

Table 3.10.3 Great skua breeding success, grouped regionally 2005-2006: estimated number of chicks fledged per apparently occupied territory at sample colonies (superscript n = number of colonies). When more than one colony was sampled in a given region, the overall figure given is the total number of fledglings divided by the total number of breeding pairs across all colonies. Note that the same colonies have not necessarily been monitored in each region each year and that the number of pairs given here are sample sizes (and do not necessarily indicate population changes between years).

Region	2005 chicks fledged/AOT			2006 chicks fledged/AOT		
	Pairs ⁿ	Range	Overall	Pairs ⁿ	Range	Overall
Shetland ^a	369 ⁹	0.00-0.70	0.23	437 ⁸	0.00-1.33	0.79
Orkney ^b	70 ⁷	0.00-2.00	0.39	55 ³	0.00-1.06	0.56

Colonies ^aFoula (only in 2005), Fair Isle, Mousa, Black Park (only in 2005), Noss, Hill of Papilgeo (only in 2006), Hermaness, Fetlar (3 colonies); ^bBinga Fea (only in 2005), Lushan (only in 2005), Stourdale, Ward Hill (only in 2005), North Ronaldsay (only in 2005), North Hill, Rothiesholm (only in 2005), Eynhallow (only in 2006).

In **Orkney**, great skuas were overall slightly more productive than in 2005. At the North Hill colony, Papa Westray, productivity was the highest recorded for four years. At Stourdale, Hoy, productivity was slightly lower than in 2005. The four to five pairs on Eynhallow are believed to have failed (Meek 2006).

On Handa (**north-west Scotland**), productivity (recorded as young fledged per breeding pair) was higher than in 2005, but only half the long-term average. Three young fledged at three AOT on Canna (one in 2005 and three in 2004). On Coll (**south-west Scotland**) six young fledged from nine breeding pairs at 11 AOT, thus productivity was at 0.55 young per AOT higher than in 2005 (0.43 in 2005 and 0.09 in 2004).

Table 3.10.4 Breeding success (chicks fledged per apparently occupied territory) of great skuas 2005-2006 and 1986-2005 at selected sites. (- indicates no data were available).

Region/site	2005	2006	1986-2005	
			mean (\pm s.e.)	No. of years
Shetland				
Hermaness (Unst)	0.51	0.58	0.80 (0.06)	18
Fetlar	0.57	0.91	0.74 (0.10)	11
Noss	0.17	0.53	0.50 (0.06)	18
Mousa	0.17	0.49	0.67 (0.10)	11
Fair Isle	0.01	0.96	0.65 (0.09)	17
Foula	0.32	No data	0.55 (0.08)	17
Orkney				
North Hill, Papa Westray	0.57	1.06	0.64 (0.08)	10
Stourdale, Hoy	0.45	0.38	0.33 (0.11)	2
West Scotland				
Handa	0.07	0.42	0.88 (0.20)	6
	(young/pair)	(young/pair)	(young/pair)	

3.11 Mediterranean gull *Larus melanocephalus*

Breeding numbers and breeding success (Tables 3.11.1)

Mediterranean gull was an extreme rarity in Britain as recently as the 1930s but numbers have increased substantially in recent decades. Colonies around the Black Sea increased from an estimated 93,500 pairs in 1961 to a minimum of 330,000 pairs in 1982 (Cramp and Simmons 1983; Siokhin *et al.* 1988), with a range expansion westwards. A small breeding population became established in Hungary in the late 1950s, and breeding has occurred in most west European countries since then. In Britain, breeding was first recorded in 1968 and annually from 1979 in increasing numbers, a trend mirrored in other countries in central and Western Europe (Donald and Bekhuis 1993).

The breeding population in the United Kingdom and Ireland continues to increase steadily. During the national Seabird 2000 survey (1999-2002), 113 pairs were recorded (Mitchell *et al.* 2004). In 2004, a minimum of 148 pairs were counted and in 2005 there were 224-226 pairs. Data were received from nine colonies in 2006, which held 350 pairs. Although it is difficult to quantify year-to-year changes in numbers due to incomplete coverage (in 2006 no details were received from two colonies which held 60+ pairs in 2005) it is evident that the UK and Ireland population is still increasing.

In **south-east England**, the species' stronghold, two sites held 339 pairs. At the largest colony numbers increased by 140.0% from from 110 pairs in 2005 to 264 pairs. Breeding success was also high at this colony, with 204 chicks fledging (0.77 chicks per nest). At a second sizeable colony, numbers doubled between 2005 and 2006 from 37 pairs to 75 pairs, which fledged 43-50 chicks (0.57-0.67 chicks per nest). At a third site, where pairs have regularly been in attendance during the breeding season for several years, no pairs were seen in 2006.

In **east England**, four sites held a total of five nests, four fewer than at the same colonies in 2005. Details of breeding success were scant: one pair fledged one young. No data were received from regions in the north of England, where up to seven pairs have been present in recent years.

In **Ireland**, six pairs nested at two sites, which held seven pairs in 2005; no details were received of breeding success.

Table 3.11.1 Breeding success of Mediterranean gull 2005-2006. Note that the same colonies have not necessarily been monitored in each year so that the number of pairs does not indicate population changes between years. Superscript = number of colonies.

Region	2005		2006	
	Pairs	Young	Pairs	Young
E England	10-12 ⁵	c.12	5 ⁴	c.1
SE England	160 ⁴	c.206-207	339 ²	c.247-254
All Ireland	7 ²	7	6 ²	No data

3.12 Black-headed gull *Chroicocephalus ridibundus*

Between 2005 and 2006, numbers of black-headed gulls decreased in five regions, mostly by 10-20% although in Orkney numbers were approximately 25% lower. Increases were noted in three regions - NE Scotland, NW England and NE Ireland - and numbers remained unchanged in a further two. However, changes at single colonies are not necessarily representative of broader trends because black-headed gulls readily move breeding sites between years, more so than most gulls. Breeding success was low generally; few colonies fledged more than one chick per pair while complete, or near complete, failure was recorded at six.

Breeding numbers and breeding success (Tables 3.12.1, 3.12.2 and 3.12.3)

In 2006, black-headed gull numbers decreased in many regions but increases were noted in some regions bordering the Irish Sea. In **north-east Ireland**, overall numbers were 17.5% higher than in 2005 with increases at Strangford Lough, Larne Lough and Lower Lough Erne and a decrease at the smaller colony in Carlingford Lough. Numbers were stable at Lady's Island Lake (**south-east Ireland**) between 2005 and 2006. Numbers increased by 10.3% in **north-west England**, with increases at Hodbarrow, the Dee Estuary and at the now small Rockcliffe Marsh colony. At Hodbarrow and Rockcliffe long-term declines were evident, as both colonies held over 1,000 pairs in the late 1980s or early 1990s. In **Wales**, the sole monitored colony, at Valley Lakes, also increased. The only breeding success data from any of the above colonies came from Rockcliffe Marsh where all five pairs failed.

Table 3.12.1 Regional population changes at monitored black-headed gull colonies, 2005-2006 (breeding pairs, apparently incubating adults or apparently occupied nests in May-June). Regional samples of fewer than 100 pairs are excluded.

Region	2005	2006	2005-2006 % change
SW Scotland ^a	300	259	-13.7
Orkney ^b	915	690	-24.6
NE Scotland ^c	c.539	c.664	+23
NE England ^d	4,647	4,032	-13.2
E England ^e	5,012	4,959	-1.1
SE England ^f	7,315	6,586	-10.0
SW England ^g	213	173	-18.8
NW England ^h	852	940	+10.3
NE Ireland ⁱ	5,578	6,554	+17.5
SE Ireland ^j	1,042	1,052	+1.0

Colonies: ^a Mersehead, Tiree Reef, Eilean Inshaig, Eilean an Ruisig, Airds Islet; ^b Shapinsay, Egilsay, The Loons, Loch of Banks, Brodgar; ^c Loch of Strathbeg, Sands of Forvie; ^d Farne Islands, Coquet Island, Haverton Hole, Saltholm, Stanghow Moor, Blacktoft Sands, Fairburn Ings, Reads Isle, Dearne Valley; ^e Gibraltar, Snettisham, Blakeney Point, Scolt Head, Snettisham, Minsmere, Havergate, Titchwell; ^f Rye Harbour, Dungeness, Chichester, Langstone Harbour, Hayling Oysterbeds, North Solent; ^g Brownsea Island; ^h Hodbarrow, Rockcliffe, Dee Estuary; ⁱ Strangford Lough, Lower Lough Erne, Carlingford Lough, Larne Lough; ^j Lady's Island Lake.

The only other region with an increase was **north-east Scotland**, where numbers were 23.2% higher than in 2005. A substantial increase was recorded at Loch of Strathbeg, but at Sands of Forvie NNR, the largest colony in the region, numbers could only be estimated in 2006 (but also showed an increase) so the 23% increase is approximate.

Numbers decreased by 13.7% overall in **south-west Scotland**, with a large proportional increase at Mersehead, decreases at Eilean an Ruisg and Tiree Reef, but little change at Eilean Inshaig. A decrease was noted at Balranald, the only colony visited in both years in **north-west Scotland**. Breeding success data collected in both regions as part of the Mink-Seabird Project indicated 146 pairs fledged 101 chicks (0.69 per pair) at five sites where mink control was carried out (Craik 2006). This is low compared with some years (1.53 chicks fledged per pair in 2005) mainly due to poor success at Eilean an Ruisg, where young gull and tern chicks and eggs were taken by a specialist herring gull.

In **Orkney**, numbers at sampled colonies fell by 24.6%. At The Loons, although numbers increased by 16.7%, the additional six pairs were no compensation for the decrease at nearby Loch of Banks, where 237 pairs nested in 2005 but none in 2006. Elsewhere, a large proportional increase was recorded on Egilsay, and numbers on Shapinsay appeared stable. Breeding success at the two latter colonies was poor; the Egilsay colony failed completely and only eight chicks fledged on Shapinsay. On Fetlar (**Shetland**), black-headed gulls had their most successful breeding season since 1997, fledging 0.86 chicks per pair from 28 pairs (Luxford and Smith 2006).

At Loch of Kinnordy (**south-east Scotland**) only 15 pairs nested, down 40.0% from 2005 and much lower than the 225 pairs in 2003. In **north-east England**, numbers were 13.2% lower. Declines were recorded at most colonies, in most cases of 15-30%, but at Stanghow Moor from 75 pairs to zero. A large increase occurred at Read's Island, where 250 pairs were counted compared with 50 pairs in 2004 and 2005. Several small colonies around Haverton and Saltholme also increased. Breeding success data were only available from Coquet, where productivity was below average at 1.00 chick fledged per pair from 2,966 pairs.

Table 3.12.2 Population change of black-headed gull 2005-2006 and 1986-2005 at selected colonies. Figures are breeding pairs, apparently incubating adults or apparently occupied nests in May-June.

Region/Site	2005	2006	2005-2006 % change	1986-2005	
				Mean (\pm s.d.)	No. of years
SW Scotland					
Mersehead	3	13	+333.3	24 (31)	3
Eilean Inshaig	86	90	+4.7	120 (91)	16
Eilean an Ruisg	44	39	-11.4	22 (24)	7
The Reef, Tiree	160	109	-31.9	73 (77)	3
NW Scotland					
Balranald	39	19	-51.3	39 (-)	1
Shetland					
Fetlar	20	28	+40.0	26 (29)	10
Orkney					
Egilsay	21	51	+142.9	85 (56)	5
Shapinsay	620	593	-4.4	516 (77)	5
Loch of Banks	237	0	-100.0	138 (87)	3
The Loons	36	42	+16.7	62 (28)	3
NE Scotland					
Loch of Strathbeg	8	64	+700.0	920 (998)	6
Sands of Forvie	531	c.600	+13	417 (388)	17
SE Scotland					
Loch of Kinnordy	25	15	-40.0	125 (141)	2

Table 3.12.2 (cont.)

NE England					
Coquet Island	3,501	2,966	-15.3	2,901 (919)	19
Farne Islands	396	342	-13.6	138 (99)	19
Haverton/Saltholme	11	26	+136.4	-	-
Stanghow Moor	75	0	-100.0	75 (-)	1
Blacktoft Sands	19	15	-21.1	11 (9)	3
Fairburn Ings	335	250	-25.4	265 (64)	3
Read's Island	50	250	+400.0	50 (0)	2
Dearne Valley	260	183	-29.6	295 (49)	2
E England					
Scolt Head	c.1,705	c.1,460	-14	1,938 (623)	5
Blakeney Point	c.1,000	c.1,000	0.0	982 (1,050)	6
Snettisham	1,355	1,554	+14.7	1,540 (374)	3
Minsmere	423	416	-1.7	289 (182)	6
Havergate	323	222	-31.3	362 (400)	8
Titchwell	153	202	+32.0	94 (83)	2
Gibraltar	c.53	105	+98.1	53 (-)	1
SE England					
Rye Harbour	c.1,340	c.1,641	+22	533 (405)	17
Langstone Harbour	4,743	4,921	+3.8	1,744 (1,827)	16
North Solent NNR	c.1,200	0	-100.0	5,611 (2,525)	20
SW England					
Brownsea Island	213	173	-18.8	129 (64)	11
Wales					
Valley Lakes	43	53	+23.3	74 (43)	2
NW England					
Hodbarrow	350	400	+14.3	309 (348)	12
Rockcliffe Marsh	2	5	+150.0	498 (485)	9
Dee Estuary	510	535	+7.0	433 (257)	3
NE Ireland					
Strangford Lough	3,097	3,802	+22.8	4,189 (1,434)	20
Carlingford Lough	78	33	-57.7	25 (20)	11
Larne Lough	1,775	2,033	+14.5	965 (511)	10
Lower Lough Erne	628	686	+9.2	628 (-)	1
SE Ireland					
Lady's Island Lake	1,042	1,052	+1.0	709 (287)	5

In **east England**, numbers appeared to be stable between 2005 and 2006 although the size of some larger colonies was estimated. Increases were detected at Snettisham, Titchwell and Gibraltar Point, the latter colony doubling size, with decreases at Havergate and at Scolt Head. At Minsmere and Blakeney numbers were similar to 2005. Breeding success was poor at Havergate and Gibraltar Point, due to predation by large gulls and foxes *Vulpes vulpes*, respectively, but moderate at Scolt Head and at Blakeney it was the highest of the last five years.

In **south-east England**, numbers were 10.0% lower overall than in 2005. Although numbers increased, or at least remained stable, in the two largest colonies - Rye Harbour and Langstone Harbour - a large decline was recorded at North Solent NNR, from c.1,200 pairs to zero, although 10-15 pairs did finally nest off-site some way up the the Beaulieu River. North Solent NNR held over 8,000 pairs as recently as 2001, the decline attributed, at least in part, to disturbance by peregrines *Falco peregrinus* and foxes. However, 7,600 pairs between Lymington-Keyhaven in 2006 may have included birds displaced from this colony. No black-headed gulls nested at Dungeness, where a long-term decline has occurred since 1,100 pairs were estimated in 1994. Chichester Harbour, another formerly large colony, has also held few pairs in recent years. Elsewhere, 1,200 pairs were estimated at Flander's Mare, a large decline since 2,000-3,500 pairs were estimated in 2005. Breeding success was above average at Rye Harbour and Hayling Oysterbeds but low at Langstone Harbour, possibly

due to foxes. At Brownsea Island (**south-west England**), numbers fell by 18.8% to 173 pairs which fledged 0.34 chicks per pair, a below-average value for this colony.

Table 3.12.3 Breeding success (chicks fledged per pair) of black-headed gull 2005-2006 and 1986-2005 at selected colonies. Figures in parentheses under 2005 and 2006 are the number of nests from which the success estimates were derived.

Region/Site	2005	2006	Mean	1986-2005 ±s.e.	No. of years
SW Scotland					
Eilean Inshaig	0.66 (86)	0.77 (90)	0.56	0.17	11
Sgeir na Caillich	No data	0.87 (8)	0.49	0.09	12
Eilean Ruisg	c.1.48 (44)	0.34 (39)	1.01	0.19	7
Airds Islet	1.86 (7)	1.37 (8)	0.82	0.25	10
NW Scotland					
Eilean nan Gabhar	No data	0.00 (1)	0.23	0.23	2
Shetland					
Fetlar	0.35 (20)	0.86 (28)	0.26	0.10	10
Orkney					
Egilsay	0.00 (21)	0.00 (51)	0.23	0.12	6
Shapinsay	0.24 (620)	0.01 (593)	0.50	0.19	4
NE England					
Coquet Island	0.41 (3,501)	1.00 (2,966)	1.23	0.12	10
E England					
Havergate	-	0.01 (222)	0.25	0.01	2
Blakeney Point	c.0.40 (1,000)	c.0.70 (1,000)	0.32	0.10	4
Scolt Head	c.1.17 (1,705)	c.0.68 (1,460)	0.99	0.11	3
Gibraltar Point	c.1.89 (c.53)	c.0.02 (105)			
SE England					
Rye Harbour	c.1.50 (1,340)	c.1.06 (1,641)	0.84	0.17	12
Langstone Harbour	c.1.10 (4,743)	c.0.32 (4,921)	0.65	0.12	12
Hayling Oysterbeds	0.00 (27)	0.83 (12)	0.50	0.27	3
SW England					
Brownsea Island	c.0.56 (213)	c.0.34 (173)	0.51	0.12	5
NW England					
Rockcliffe Marsh	0.50 (2)	0.00 (5)	0.20	0.09	5

3.13 Mew gull *Larus canus*

Between 2005 and 2006 the numbers of mew gulls remained fairly stable although an increase was detected in NE Ireland and a decrease in N Scotland. Breeding success was again enhanced in those colonies where mink were controlled in western Scotland, but was generally low in other regions.

Breeding numbers and breeding success (Tables 3.13.1, 3.13.2 and 3.13.3)

Most mew gull data received came from colonies in **south-west** and **north-west Scotland**, where many of the colonies surveyed are small islets containing few pairs. Total numbers in both regions changed little between 2005 and 2006 although there was much variation between colonies; changes at some of the larger colonies are presented in Table 3.13.2. In the Mink-Seabird Project study area (Mallaig to Tarbert on the Kintyre peninsula) spread over both regions, 54 sites held 1,349 pairs. Mink control was carried out at 18 of these sites, which together held 715 pairs and fledged approximately 704 chicks (0.98 chicks per pair). This contrasted with 31 colonies with no (or unsuccessful) mink control, where success was only 0.25 (*c.* 134 chicks fledged from 544 pairs) which suggested that mink lowered breeding success by 75% at unprotected colonies (Craik 2006). Between 1996 and 2005, the average apparent reduction in productivity of mew gulls due to mink predation was 55% (s.d. 16%, range 27-76%). Elsewhere, breeding success on Handa was higher than in 2005 with 19 pairs fledging 1.31 chicks per pair.

Table 3.13.1 Regional population changes at monitored mew gull colonies, 2005-2006 (breeding pairs, apparently incubating adults or apparently occupied nests in May-June). Regional samples of fewer than 50 pairs are excluded.

Region	2005	2006	2005-2006 % change
SW Scotland ^a	<i>c.</i> 944	<i>c.</i> 937	-0.7
NW Scotland ^b	<i>c.</i> 503	<i>c.</i> 481	-4.4
Orkney ^c	595	631	+6.1
N Scotland ^d	180	137	-23.9
NE Ireland ^e	351	397	+13.1

Colonies: ^a Suite of 31 small islets in Argyll and Bute; Coll, Tiree Reef, Loch Gruinart; ^b Suite of 13 small islets in Lochaber; Eilean Hoan, Handa, Eigg, Canna; ^c Auskerry, North Hill, Whaness, Sandy Loch, Brodgar, Loch of Banks, The Loons; ^d North Sutor, Alness Point, Ardgay, Bonar Bridge; ^e Strangford Lough, Lower Lough Erne, Carlingford Lough, Larne Lough, Copeland Islands, Isle of Muck.

In **Orkney**, overall numbers at sampled colonies were similar to that in 2005. Increases were recorded in the small colony at North Hill and at Whaness and Sandy Loch, Hoy. At Loch of Banks numbers fell by almost half but there was virtually no change in the nearby colony at The Loons. Breeding success, including subjective assessments from visits to colonies to ring chicks, appeared to be low at most colonies, except at Sandy Loch and on Westray where over one chick fledged per nest (Meek 2006). In **Shetland**, 10 pairs on Fair Isle raised few chicks but visits to ring chicks in colonies around the Mainland suggested reasonable productivity at Flotta and Hildasay (close to one chick fledged per nest fledged) but low productivity at Sandy Loch, Lerwick.

In **north Scotland**, overall numbers decreased by 23.9%. After the 35% decrease between 2004 and 2005 at Nigg, a further large reduction was observed in 2006 from 82 to just 27 pairs, the lowest since 1995. Breeding success was also low there, for the third successive year, at 0.15 chicks fledged per pair, again mainly due to high levels of egg predation, which was a problem in 2005. At Alness Point, where there has been heavy disturbance by man in recent years, no gulls or terns nested. Around Bonar Bridge, numbers at monitored colonies increased by almost one-third but these fledged just 0.27 chicks per nest. A small colony of 30 pairs in Strathcarron was slightly more successful, fledging 0.47 chicks per pair (A. Ramsay, pers. comm.).

Table 3.13.2 Population changes of mew gull 2005-2006 and 1986-2005 at selected sites. Figures are apparently occupied nests, apparently occupied territories or pairs.

Region/sites	2005	2006	2005-2006 % change	1986-2005	
				Mean (\pm s.d.)	No. years
SW Scotland					
Kilmaronag	320	316	-1.2	305 (43)	16
Glas Eilean	55	63	+14.5	67 (18)	12
Eilean an Ruisg	49	38	-22.4	42 (15)	16
Eilean da Mheinn	25	23	-8.0	14 (14)	6
Aird's Islet	22	20	-9.1	24 (6)	13
Abbot Islands	47	40	-17.5	26 (12)	15
Eilean Coltair	28	5	-82.1	18 (10)	4
Eilean Inshaig	35	43	+22.9	30 (18)	16
Ban Eileanan	12	22	+83.3	48 (19)	11
Tucker's Islet	95	92	-3.2	90 (12)	12
The Reef, Tiree	81	75	-7.4	66 (16)	3
NW Scotland					
Handa	32	19	-40.6	15 (9)	15
Canna	9	7	-22.2	13 (4)	20
Eigg	76	51	-19.7	64 (9)	19
Eilean Rubha an Ridire	54	70	+29.6	14 (17)	9
Barcaldine	c.70	c.50	-28.6	35 (20)	11
Eilean Nan Gall	37	39	+5.4	15 (10)	13
Ballachulish Beach	86	115	+33.7	66 (12)	6
Eilean Munde	70	81	+15.7	16 (19)	15
Eilean Dubh	15	10	-33.3	19 (13)	12
Narrows, Loch Teacuis	14	6	-57.1	6 (4)	8
Shetland					
Mousa	11	8	-27.3	8 (4)	4
Fair Isle	9	10	+11.1	8 (2)	20
Orkney					
North Hill	8	15	+87.5	34 (25)	6
Loch of Banks	32	17	-46.9	33 (8)	4
The Loons	325	320	-1.5	297 (72)	4
Whaness, Hoy	c.180	c.200	+11.1	200 (20)	3
Sandy Loch, Hoy	44	55	+25.0	43 (2)	2
N Scotland					
Nigg	82	27	-67.1	64 (47)	16
Bonar Bridge	83	110	+32.5	85 (4)	2
Alness Point	15	0	-100.0	68 (33)	10
SE England					
Dungeness	10	10	0.0	11 (1)	9
NE Ireland					
Strangford Lough	170	256	+50.6	95 (44)	19
Lower Lough Erne	164	126	-23.2	146 (35)	3

The regional total increased by 13.1% in **north-east Ireland**, where a substantial increase was noted at Strangford Lough. Excluding a dip between 2000 and 2002, numbers have been increasing at this site since 1986 and 256 pairs in 2006 is by far the highest recorded (the previous peak was 170 pairs in 2005). In contrast, numbers at Lower Lough Erne fell by 23.2%. Elsewhere in the region, numbers in small colonies at Carlingford Lough (5 pairs), Lough Larne (6) and on the Isle of Muck (4) were similar to 2005.

Small numbers of mew gulls were reported at various colonies in England. Data were received from Scolt Head and Blakeney Point (**east England**), where a total of three pairs nested but no young fledged at either colony for the third year in succession. Productivity was also low at Havergate, where 15 pairs fledged 2 chicks. At Dungeness (**south-east England**), 10 pairs nested, a typical number for the site which has held 9-13 pairs since 1994.

Table 3.13.3 Breeding success (chicks per pair) of mew gulls 2005-2006 and 1986-2005 at selected colonies. Figures in parentheses under 2005 and 2006 are the number of nests from which the estimates of success are derived.

Region/sites	2005	2006	1986-2005		
			Mean	±s.e.	No. of years
NW Scotland					
Handa	1.06 (32)	1.31 (19)	1.06	-	1
Shetland					
Fair Isle	0.44 (9)	0.80 (10)	0.47	0.08	17
Orkney					
Mill Dam, Shapinsay	No data	0.00 (1)	0.01	-	1
Whaness	c.0.30 (180)	c.0.38 (200)	0.55	0.28	3
Sandy Loch	0.95 (44)	1.04 (55)	0.95	-	1
N Scotland					
Nigg	0.05 (82)	0.15 (27)	0.85	0.15	10
Bonar Bridge	0.59 (83)	0.27 (30)	0.59	-	1
Strathcarron	No data	0.47 (30)	No data	-	-
E England					
Havergate	No data	0.13 (15)	No data	-	-
Blakeney Point	0.00 (3)	0.00 (2)	0.00	0.00	3
Scolt Head	0.00 (3)	0.00 (1)	0.20	0.20	3

3.14 Lesser black-backed gull *Larus fuscus*

Between 2005 and 2006, large increases were noted in SE Scotland, SW Scotland and E England. Skomer, the largest colony in Wales, declined by 22%. Breeding success data indicated high productivity at North Hill (Orkney) but low success elsewhere. A study in western Scotland indicated that removing mink from small offshore islets could boost productivity by 50%.

Breeding numbers and breeding success (Tables 3.14.1, 3.14.2 and 3.14.3)

In **south-west Scotland**, where it was previously considered that numbers had been declining since 2000, sampled colonies were estimated to hold 32.6% more pairs than in 2005. Changes since 2005 at several of the largest colonies monitored are shown in Table 3.14.2. No birds were found breeding on Eilean Gamhna which generally held between 50-150 pairs each year from 1994-2004. Complete breeding failure occurred here for the first time in 2005 and few birds of any species nested on the islet in 2006; this decline attributable to mink activity. In total, within the Mink-Seabird Project study area (Mallaig to Tarbert on the Kintyre peninsula) 20 sites together held approximately 739 pairs. Breeding success data from 13 of these colonies, although also approximate, indicated that at two

colonies where mink were controlled gulls fledged 50% more chicks than at sites with no (or unsuccessful) mink control; the fledging rates were *c.*0.75 (from 108 pairs) and *c.*0.50 (from 598 pairs) chicks per pair, respectively (Craik 2006). Elsewhere in the region, an estimated 1,200 pairs were present on Horse Island, suggesting numbers have declined by over 55% since 2000 when 2,677 were present. In **north-west Scotland**, few pairs nested on Canna, where there is little sign of recovery from the recent decline which saw an 86% fall between 2001 and 2005 (Swann 2006a). Elsewhere, an increase was noted on Eigg.

Table 3.14.1 Regional population changes at monitored lesser black-backed gull colonies, 2005-2006 (breeding pairs, apparently incubating adults or apparently occupied nests in May-June). Regional samples of fewer than 100 pairs are excluded.

Region/site	2005	2006	2005-2006 % change
SW Scotland ^a	<i>c.</i> 386	<i>c.</i> 512	+32.6
SE Scotland ^b	1,581	2,059	+30.2
NE England ^c	483	560	+15.9
E England ^d	1,236	2,035	+64.6
Wales ^e	17,646	15,182	-14.0
NE Ireland ^f	387	383	-1.03

Colonies: ^a Suite of 11 small islets in Argyll and Bute; Coll, Lunga; ^b Isle of May, Inchgarvie, Haystack, Carr Craig, The Lamb, Inchmickery, Fidra; ^c Coquet, Farne Islands, Longnewton Reservoir; ^d Terrington, Havergate, Minsmere; ^e Caldey, Barafundle-Giltar, Stackpole Head, Elegug Stacks and nearby coast, Skomer, Middleholm, Skokholm, Ramsey, Bishop and Clerks, Bardsey, Ynys Gwylan Fawr, South Stack, Valley Lakes; ^f Strangford Lough, Isle of Muck, Lower Lough Erne.

Increases were also detected in sample populations in several east coast regions of Britain. In **south-east Scotland**, monitored colonies held 30.2% more pairs than in 2005. Increases were detected on the majority of islands in the Firth of Forth, those on Inchmickery, Fidra and the Isle of May being especially notable and numbers at the last site the highest on record. Elsewhere, nine pairs nested on The Lamb, where none had nested since 2003; prior to this, a steep decline had occurred, from 88 pairs in 1999. Breeding success on the Isle of May from a sample of 333 nests was 0.88 chicks per nest, an average figure for the colony. Increases were also recorded in sample populations in both **north-east** and **east England**. Particularly large (greater than 55%) were the proportional changes at Terrington Outer Trial Bank and Havergate, while an increase of 18.6% was recorded on the Farne Islands. Numbers on Coquet were essentially unchanged since 2005 but have declined since 2001. Most other colonies monitored in eastern regions in 2005 and 2006 were small, with little information on breeding success. Mousa (**Shetland**) held seven pairs compared with two in 2005. In **Orkney**, numbers fell by half for the second year in succession on North Hill, Papa Westray, to five pairs which fledged one chick each, an above-average value for the colony. Twelve pairs nested at Nigg (**north Scotland**), one more than in 2005, and 24 pairs at Dungeness (**south-east England**) was one fewer than in 2005.

Large numbers are monitored annually in **Wales**, where sample colonies held 14.0% fewer pairs overall than in 2005. However, this apparent decline was largely due to a 22.1% fall in numbers on Skomer, the largest colony, which held 10,552 pairs; so, although increases, some substantial, were recorded on Skokholm, Caldey, Middleholm and at South Stack, the net result was a decrease. Numbers on Bardsey were similar to 2005 with decreases on Ramsey and the Bishops and Clerks. Breeding success was low, although close to the respective colony averages, on Skokholm and Skomer. At the latter site, where breeding success is estimated from recapture of ringed chicks, success has been well below that needed for the population to sustain itself (*c.* one fledgling per pair; Perrins 2006) since recording began and numbers are now half those of 1993, although the decline has not been constant. Birds were more successful on Bardsey, where success was close to average, but no young fledged from the few pairs on Ynys Gwylan Fawr. In **north-east Ireland**, there was little

change in overall numbers between 2005 and 2006; decreases at Strangford Lough and at the small colony on the Isle of Muck were compensated by an increase at Lower Lough Erne.

Table 3.14.2 Population changes of lesser black-backed gull 2005-2006 and 1986-2005 at selected colonies. Figures are breeding pairs, apparently incubating adults or apparently occupied nests in May-June.

Region/site	2005	2006	2005-2006 % change	1986-2005 Mean (\pm s.d.)	No. years
SW Scotland					
Reisa MhicPhaidean	c.200	c.200	0.0	302 (124)	12
Eilean Gamhna	4	0	-100.0	88 (39)	12
Eilean Mor	c.150	c.100	-33	107 (50)	12
Eilean na Cille	c.0	c.100	++	113 (71)	15
Burnt Isles	11	74	+572.7	33 (18)	7
NW Scotland					
Eigg	35	40	+14.3	37 (11)	19
Canna	4	7	+75.0	35 (10)	20
Orkney					
North Hill	10	5	-50.0	18 (8)	6
N Scotland					
Nigg	11	12	+9.1	6 (3)	7
SE Scotland					
Isle of May	1,320	1,884	+42.7	1,131 (387)	20
Inchmickery	109	135	+23.9	142 (57)	9
Fidra	131	162	+23.7	293 (220)	13
NE England					
Farne Islands	431	511	+18.6	482 (72)	2
Coquet	50	47	-6.0	96 (75)	6
E England					
Havergate	208	325	+56.3	253 (34)	4
Terrington OTB	1,026	1,704	+66.1	957 (833)	9
SE England					
Dungeness	25	24	-4.0	10 (8)	6
Wales					
Skomer	13,537	10,552	-22.1	13,776 (2,115)	18
Middleholm	47	56	+19.1	87 (44)	7
Skokholm	2,417	2,786	+15.3	3,036 (749)	16
Ramsey Island	205	181	-11.7	267 (88)	8
Bishop and Clerks	54	40	-25.9	75 (25)	6
South Stack	104	137	+31.7	67 (53)	16
Bardsey	596	615	+3.2	393 (165)	20
Caldey	616	735	+19.3	371 (204)	19
NE Ireland					
Strangford Lough	118	105	-11.0	102 (62)	20
Lower Lough Erne	256	269	+5.1	269 (170)	3
Isle of Muck	13	9	-30.8	13 (9)	6

Table 3.14.3 Breeding success (chicks fledged per pair) of lesser black-backed gull 2005-2006 and 1986-2005 at selected colonies. Figures in parentheses under 2004 and 2005 are the number of nests from which the estimates of success are derived.

Region/Site	2005	2006	1986-2005		
			Mean	±s.e.	No. of years
Orkney					
North Hill	0.40 (10)	1.00 (5)	0.80	0.40	2
SE Scotland					
Isle of May	1.40 (170)	0.88 (333)	0.88	0.07	17
Wales					
Skomer	0.56 (13,537)	0.25 (10,552)	0.27	0.04	17
Skokholm	No data	0.21 (2,786)	0.17	0.02	11
Bardsey	c.0.84 (596)	0.68 (615)	0.72	0.07	10
Ynys Gwylan Fawr	0.00 (7)	0.00 (4)	0.00	-	1

3.15 Herring gull *Larus argentatus*

In most regions overall numbers remained similar between 2005 and 2006, except in N Scotland and E England, where numbers almost doubled, and in NW England, where numbers almost halved. Productivity measured at a few sites indicated a good breeding season on Noss and a poor one at Canna with few other values of note. In western Scotland, mink activity reduced productivity by 36% - a typical figure.

Breeding numbers and breeding success (Tables 3.15.1 and 3.15.2)

In **north-west Scotland**, sample colonies held 12.1% more pairs of herring gulls than in 2005. Substantial increases were noted at Sligneach Mor and Eilean Balnagowan, the largest colony surveyed. However, on Canna only 96 pairs nested, the fewest to do so during the years 1986-2006. This was the sixth consecutive year of decline at this colony although a downward trend has been evident since 1989. Breeding success was again low with 0.24 chicks fledging per pair; most nests appeared to fail at the egg stage (Swann 2006a). On Eigg, numbers were also at their lowest level since monitoring began. In **south-west Scotland**, there was little change in overall numbers between 2005 and 2006. At most colonies in this region changes were largely unremarkable except at Eilean Mor where an increase of 45.4% was noted (although numbers were depressed there in 2005); the colony held an average of *c.*800 pairs between 2000 and 2004. In the Mink-Seabird Project study area (Mallaig to Tarbert on the Kintyre peninsula), which is spread over both regions, 5,300 pairs were present across 46 sites, mostly small inshore islets. The effects of mink depredation on breeding success were studied at colonies holding at least 10 pairs. At 11 sites where mink were successfully removed success was 1.05 chicks per pair (from *c.*2,198 pairs) compared with 0.67 chicks per pair from 23 sites with no (or unsuccessful) mink control (*c.*3,066 pairs) suggesting that mink reduced herring gull productivity by about 36% (Craik 2006).

Table 3.15.1 Regional population changes at monitored herring gull colonies, 2005-2006 (breeding pairs, apparently incubating adults or apparently occupied nests in May-June). Regional samples of fewer than 200 pairs are excluded.

Region/site	2005	2006	2005-2006 % change
SW Scotland ^a	<i>c.</i> 3,934	<i>c.</i> 4,107	+4.4
NW Scotland ^b	<i>c.</i> 1,468	1,645	+12.1
N Scotland ^c	214	426	+99.1
SE Scotland ^d	4,538	4,591	+1.2
NE England ^e	954	885	-7.2
E England ^f	728	1,428	+96.2
Wales ^g	4,712	5,139	+9.1
NW England ^h	292	160	-45.2
NE Ireland ⁱ	295	311	+5.4

Colonies: ^a Suite of 33 islets in Argyll and Bute; Ben Feall, Lunga, Mull of Galloway; ^b Suite of 11 islets in Lochaber; Eilean Hoan, Priest Island, Handa, Canna, Eigg; ^c Nigg; ^d Isle of May, Inchgarvie, Inchmickery, Eyebroughty, Carr Craig, Fidra, Haystack, The Lamb, Longcraig, St. Abb's Head; ^e Farne Islands, Coquet, Saltburn, Boulby Cliffs, Hartlepool, Longnewton Reservoir; ^f Terrington OTB, Minsmere, Havergate; ^g Caldey, Barafundle to Giltar, Elegug Stacks and nearby coast, Stackpole Head, Skomer, Middleholm, Skokholm, Ramsey, Bishop and Clerks, Bardsey, Ynysoedd Gwylan, South Stack, Valley Lakes; ^h St. Bee's Head, Hodbarrow; ⁱ Strangford Lough, Isle of Muck.

A large decline was noted in **north-west England**, where herring gull numbers at St. Bee's Head were 45.9% lower than in 2005. In other western regions of the UK and in Ireland, however, numbers were generally within 10.0% of those in 2005. In **Wales**, overall numbers were 9.1% higher than in 2005 but proportionally large increases were noted at Skokholm, Ynysoedd Gwylan and on the Bishops and Clerks. Decreases were noted at Stackpole Head, Ramsey Island and Middleholm but little change at Caldey, Elegug Stacks, Skomer, Bardsey and South Stack.

Table 3.15.2 Population changes of herring gull 2005-2006 and 1986-2005 mean at selected colonies. Figures are breeding pairs or apparently occupied nests in May-June.

Region/site	2005	2006	2005-2006 % change	1986-2005	
				Mean (\pm s.d.)	No. years
SW Scotland					
Eilean Mor	c.550	c.800	+45.4	534 (258)	11
NW Scotland					
Eilean Balnagowan	c.500	c.700	c.+40.0	349 (154)	12
Sligneach Mor	106	177	+67.0	140 (69)	12
Canna	112	96	-14.3	1,123 (387)	19
Eigg	280	213	-23.9	377 (106)	17
Shetland					
Noss	37	26	-29.7	68 (20)	20
Mousa	15	12	-20.0	11 (4)	5
N Scotland					
Nigg	214	426	+99.1	98 (116)	16
SE Scotland					
Isle of May	2,851	2,916	+2.3	2,313 (557)	20
Inchgarvie	180	152	-15.6	201 (64)	15
Inchmickery	319	257	-19.4	250 (120)	11
Carr Craig	38	38	0.0	45 (9)	17
The Lamb	27	51	+88.9	108 (84)	10
Fidra	957	917	-4.2	1,116(378)	13
St. Abb's Head	157	248	+58.0	371 (159)	20
NE England					
Farne Islands	540	505	-6.5	532 (11)	2
Boulby Cliffs	290	280	-3.4	403 (98)	18
Saltburn	40	30	-25.0	122 (77)	18
Hartlepool	68	53	-22.1	35 (47)	2
E England					
Terrington OTB	684	1,339	+95.8	597 (523)	10
Havergate	42	86	+104.8	64 (41)	4
SE England					
Dungeness	122	133	+7.4	69 (38)	9
SW England					
Durlston-St Aldhelm's Head	82	93	+13.4	83 (16)	8
Ballard	29	25	-13.8	17 (8)	8
Gad Cliff	56	34	-39.3	40 (15)	3
Wales					
Caldey	1,792	1,897	+5.9	1,379 (494)	16
Stackpole Head	151	130	-13.9	73 (47)	9
Elegug Stacks	113	120	+6.2	98 (23)	4
Skomer	475	434	-8.6	478 (98)	16
Middleholm	127	95	-25.2	107 (19)	9
Skokholm	255	365	+43.1	324 (57)	20
Ramsey Island	236	197	-16.5	190 (36)	8
Bishops and Clerks	38	112	+194.7	121 (117)	2
Bardsey	595	557	-6.4	478 (150)	15
Ynysoedd Gwylan	206	489	+137.4	303 (102)	10
South Stack	387	412	+6.5	339 (122)	13
NW England					
St. Bee's Head	290	157	-45.9	497 (138)	19
NE Ireland					
Strangford Lough	264	284	+7.6	674 (515)	20

Breeding success was below average at several of these colonies and was especially low on Skokholm, Skomer and Ynysoedd Gwylan. Birds on Bardsey were more successful, fledging 1.05 chicks per pair although this too was below the long-term mean for the site. In the sample in **south-west England**, 9.0% fewer herring gulls nested than in 2005. Decreases occurred at Gad Cliff and Ballard with an increase at Durlston-St. Aldhelm's Head. In **north-east Ireland**, Strangford Lough held 284 pairs, close to 2005, although a long-term decline is evident since 1986, when over 2,000 pairs nested.

In many eastern regions of the UK, there was also little overall change between 2005 and 2006. However, in **north Scotland**, numbers at Nigg almost doubled from 214 to 426 pairs. A near doubling of numbers was also evident in **east England** where 96.2% more pairs were found in sample colonies, principally at Terrington Outer Trial Bank where 1,339 pairs nested compared with 684 pairs in 2005. In the far smaller colony at Havergate, numbers also doubled to 86 pairs.

In **south-east Scotland**, sample colonies held 4,591 pairs compared with 4,538 pairs in 2005. Little change was detected on the Isle of May, Carr Craig and Fidra; decreases of 15-20% were noted on Inchgarvie and Inchmickery and proportionally large increases were detected on The Lamb and at St. Abb's Head, although the increase at the latter site was partly an artefact of the atypically low numbers found there in 2005; 157 pairs nested in 2005 prior to which numbers had seldom fallen below 250 pairs. Breeding success data were available only from the Isle of May, where it appeared to be an average year. Overall numbers were relatively stable in **north-east England**, with a decrease of just 7.2%. Large proportional decreases, of greater than 20.0%, were evident in the relatively small colonies of Saltburn and Hartlepool although in the regional total these declines were buffered by much larger colonies on the Farne Islands and at Boulby Cliffs, where numbers were stable between 2005 and 2006. In **south-east England**, after the large increase at Dungeness between 2004 and 2005, when numbers almost doubled from 62 to 122 pairs, the colony was relatively stable at 133 pairs.

Few sizable colonies were monitored in the Northern Isles. On Noss (**Shetland**), where a long-term decline, albeit with fluctuations, has taken place since 1989 when 110 pairs were present, numbers fell by 29.7% to 26 pairs. However, it was a very productive breeding season on the island with an average of 1.92 chicks fledged per pair, the highest recorded there. In **Orkney**, anecdotal evidence from visits to colonies to ring chicks suggested a successful breeding season at Noup Head, Burray Ness and Sandside, where productivity was close to, or exceeded, one chick per pair, but on Grass Holm and Switha herring gulls fledged approximately one chick per two pairs (Meek 2006).

Table 3.15.3 Breeding success (chicks fledged per pair) of herring gull 2005-2006 and 1986-2005 at selected colonies. Figures in parentheses under 2005 and 2006 are the number of nests from which the estimates of success are derived.

Region/Site	2005	2006	1986-2005		
			Mean	±s.e.	No. of years
NW Scotland					
Canna	0.13(112)	0.24 (96)	0.74	0.16	16
Shetland					
Noss	1.32 (37)	1.92 (26)	0.84	0.14	8
SE Scotland					
Isle of May	0.60 (184)	0.95 (179)	0.98	0.08	17
Wales					
Skomer	0.87 (52)	0.53 (49)	0.77	0.09	11
Skokholm	No data	0.47 (148)	0.70	0.12	11
Bardsey	1.01 (595)	1.05 (557)	1.22	0.10	10
Ynysoedd Gwylan	1.02 (206)	0.64 (489)	1.15	0.07	7

3.16 Great black-backed gull *Larus marinus*

Except for a decline in Wales, numbers in most regions were stable between 2005 and 2006. Breeding success was generally high except in NW Scotland, NW England and NE Ireland.

Breeding numbers and breeding success (Tables 3.16.1, 3.16.2 and 3.16.3)

In 2006, numbers in most regions were similar to 2005, excluding **Wales** where the sampled colonies held 18.1% fewer pairs. Of colonies with 10 pairs or more, proportional declines of 30% or above were noted on The Skerries, Ramsey, Bishops and Clerks and on Middleholm, and lesser declines on Skokholm and Ynsoedd Gwylan. There was virtually no change on Skomer between the two years. Where monitored, breeding success at these colonies was generally close to average and the few nests on Bardsey were highly productive.

In **south-west Scotland** and **north-west Scotland**, where many small colonies are sampled each year, some of which can only be estimated, overall numbers were similar to 2005. Declines were noted on Handa, Eigg and Canna but there was little change at Eilean Hoan, the largest colony monitored. Within the study area of the Mink-Seabird Project (encompassing near shore habitat between Mallaig and Tarbert on the Kintyre peninsula), a minimum of 505 pairs was found at 54 sites (498 pairs at 53 sites in 2005). At 41 sites where productivity was monitored, breeding success averaged *c.*0.70 chicks fledged from *c.*0.463 nests (*c.*0.72 across 278 nests in 2005). Mink control was carried out at seven of these sites, where productivity was *c.*0.81 chicks pair from approximately 100 pairs, compared with 0.67 chicks per pair from approximately 363 nests at 34 sites with no (or unsuccessful) mink control (Craik 2006). Elsewhere, breeding success on Canna was again well below average, as it has been since 2001. Between 1997-2000 an average of 1.32 chicks per pair fledged from this colony compared with an average of 0.22 for 2001-2006 (Swann 2006a).

Table 3.16.1 Regional population changes at monitored great black-backed gull colonies, 2005-2006 (breeding pairs, apparently incubating adults or apparently occupied nests in May-June). Regional samples of fewer than 50 pairs are excluded.

Region	2005	2006	2005-2006 % change
SW Scotland ^a	<i>c.</i> 426	<i>c.</i> 434	+1.9
NW Scotland ^b	<i>c.</i> 332	<i>c.</i> 306	-7.8
Shetland ^c	92	93	+1.1
Orkney ^d	64	58	-9.4
SE Scotland ^e	47	52	+10.6
Wales ^f	375	307	-18.1

Colonies: ^a Suite of 38 small islets in Argyll and Bute, Lunga, Ben Feall, Horse Island; ^b Suite of 5 small islets in Lochaber, Eilean Hoan, Eigg, Canna, Priest Island, Handa; ^c Noss, Mousa; ^d North Hill, Auskerry; ^e Isle of May, Craigleith, The Lamb, Fidra, Inchkeith, Inchcolm, Inchmickery, Inchgarvie, Carr Craig; ^f Caldey, Barafundle- Giltar, Skomer, Skokholm, Middleholm, Stackpole Head plus Elegug Stacks, Ramsey Island, Bishop and Clerks, South Stack, Valley Lakes, The Skerries, Bardsey, Ynsoedd Gwylan.

There was virtually no change in total numbers at two monitored colonies in **Shetland** where an increase on Mousa was offset by a decrease on Noss. Breeding success at the latter site appeared to be high, with a minimum of 0.86 chicks fledged per nest. Accurate counts of nests and chicks on the inaccessible stack of Cradle Holm on Noss were difficult due to thick vegetation, but a minimum of 39 chicks fledged from 63 nests there, compared with 23 chicks from nine nests elsewhere on the island (Sykes and Bliss 2006).

Similarly, few colonies were sampled in both 2005 and 2006 on **Orkney**, where there appeared to be no change in numbers on Auskerry but a decrease at North Hill, although birds nesting at the last site

were successful, fledging 1.52 chicks per nest, an above-average value. Anecdotal evidence suggested other sites (e.g. Auskerry, Switha, Holm of Faray) were less successful than North Hill, fledging far fewer than one chick per nest (Meek 2006). At Nigg, the sole site monitored in **north Scotland**, 33 pairs were found in 2006, a slight increase on 2005 when 24 pairs nested but well below the 173 pairs in 2002. However, breeding success could not be estimated at this site as no birds nested in the usual study plot. In **south-east Scotland**, sample colonies held 10.6% more pairs than in 2005. Most nest on the Isle of May, where numbers fell by seven nests to 25 in 2006. However, increases elsewhere led to an overall increase for the region e.g. on Craigleith numbers trebled to 18 pairs.

Table 3.16.2 Population change of great black-backed gull 2005-2006 and 1986-2005 at selected colonies. Figures are breeding pairs, apparently incubating adults or apparently occupied nests in May-June.

Region/Site	2005	2006	2005-2006 % change	1986-2005	
				Mean (\pm s.d.)	No. of years
SW Scotland					
Ben Feall, Coll	11	11	0.0	11 (1)	2
Lunga	31	32	+3.2	51 (14)	13
NW Scotland					
Eilean Hoan	144	153	+6.3	144 (-)	1
Handa	33	26	-21.2	37 (10)	17
Eigg	18	12	-33.3	16 (5)	19
Canna	29	20	-31.0	75 (16)	20
Shetland					
Noss	77	72	-6.5	69 (14)	20
Mousa	15	21	+40.0	14 (5)	5
Orkney					
North Hill	31	25	-19.4	56 (22)	6
Auskerry	33	33	0.0	43 (16)	3
N Scotland					
Nigg	24	30	+25.0	96 (54)	16
SE Scotland					
Craigleith	6	18	+200.0	5 (2)	12
Isle of May	32	25	-21.9	16 (9)	14
Wales					
The Skerries	40	20	-50.0	16 (11)	10
Skokholm	68	61	-10.3	44 (16)	15
Skomer	109	114	+4.6	58 (23)	20
Middleholm	40	27	-32.5	39 (15)	12
Ramsey Island	16	10	-37.5	14 (11)	7
Bishop and Clerks	31	8	-74.2	31 (3)	4
Ynysydd Gwylan	48	44	-8.3	40 (18)	13
NW England					
Rockcliffe Marsh	15	39	+160.0	20 (19)	11
NE Ireland					
Strangford Lough	38	39	+2.6	56 (23)	20

Along the east and south-east coast of England, the great black-backed gull is a scarce breeding species (Mitchell *et al.* 2004), so few colonies are available for monitoring. Five pairs nested on the Farne Islands (**north-east England**), where seven pairs nested in 2005, and a single pair again nested at Dungeness (**south-east England**).

Outside Wales and Scotland, few other colonies were monitored in western regions. At Rockcliffe Marsh (**north-west England**), after four successive years of decrease, numbers more than doubled to 39 pairs but productivity was again below average, at 0.53 chicks fledged per pair. In **south-west England**, small colonies at Ballard and Durlston held a minimum of 18 pairs (15 pairs in 2005) with three pairs again nesting on Brownsea Island. At Strangford Lough (**north-east Ireland**) following the crash which saw only one pair nest in 2001, numbers have been relatively stable in recent years with 39-44 pairs usually present. Elsewhere, two pairs nesting on Copeland Island failed to fledge any chicks.

Table 3.16.3 Breeding success of great black-backed gull (chicks fledged per pair) 2005-2006 and 1986-2005 at selected colonies. Figures in parentheses under 2005 and 2006 are the number of nests from which the estimates of success are derived.

Region/Site	2005	2006	1986-2005		
			Mean	±s.e.	No. of years
NW Scotland					
Canna	0.13 (23)	0.17 (18)	0.72	0.20	9
Shetland					
Noss	≥0.48 (77)	≥0.86 (72)	0.65	0.12	5
Orkney					
North Hill	0.42 (31)	1.52 (25)	0.81	0.21	4
SW England					
Brownsea	0.33 (3)	1.00 (3)	0.44	0.29	3
Wales					
Skomer	1.40 (25)	1.35 (26)	1.29	0.06	10
Skokholm	No data	1.07 (61)	1.15	0.08	13
Bardsey	2.33 (3)	2.33 (3)	1.84	0.28	9
Ynsoedd Gwylan	1.17 (48)	1.30 (44)	1.52	0.10	7
NW England					
Rockcliffe Marsh	0.53 (15)	0.51 (39)	0.67	0.06	5
NE Ireland					
Big Copeland Island	2.00 (2)	0.00 (2)	2.00	-	1

3.17 Black-legged kittiwake *Rissa tridactyla*

There was no general geographical pattern to changes in breeding numbers between 2005 and 2006. Total numbers in six regions declined by approximately 10-20% but remained virtually unchanged in four others. The only increases of any size were in NE and SE England, with numbers in the latter region 70% higher than in 2005; the first year of increase detected there since 1995. Breeding success was lower than 2005 but not significantly so. Colonies in SW and N Scotland were very unsuccessful, with productivity in most other regions generally poor - only in NE England was fledging close to one young per nest. Feeding conditions again appeared to be poor, especially during the latter half of the chick rearing period. Pipefish were again noted to be a major component of food items brought back to the nest. Predation at several colonies further lowered success.

Breeding numbers (Tables 3.17.1 and 3.17.2, Figure 3.17.1)

Black-legged kittiwakes may move between colonies and hence, year to year changes in numbers at sample colonies may not necessarily reflect larger scale regional population changes.

In **Shetland**, overall numbers of AON in annual monitoring plots showed a small increase between 2005 and 2006, as with the increase recorded between 2004 and 2005, possibly reflecting less non-breeding in 2006. On Foula, numbers increased by 18.9%, which represents a halt to the 50% decrease recorded between 1997 and 2003 (Gear 2006; Heubeck 2006). However, numbers at this site are currently only one-quarter of those recorded between 1987-1992. In **Orkney**, whole-colony counts at five mainland sites recorded a total of 4,396 AON, which represented a decline of 39.0% since they were last monitored, in 2003. Declines in excess of 20% were recorded at all five colonies, with the largest proportional changes occurring at Marwick Head (-43.4% to 2,185 AON) and Mull Head (-44.1% to 449 AON). Like many regions around the UK, populations in both Shetland and Orkney are in long-term decline but the decline seems to have begun 5-10 years earlier in Shetland, where the rate of decline since 1985 has also been greater.

Table 3.17.1 Regional population changes at monitored black-legged kittiwake colonies, 2005-2006 (apparently occupied nests in late May or June). Trends for north-east Scotland are based on triennial monitoring at Troup/Lion's Head and Bullers of Buchan. Counts with a reported inaccuracy of > 5% and regional samples of fewer than 300 AON are excluded. Statistical significance of trends (t-test) indicated as: n.s. not significant, ** P<0.01, ***P<0.001. Further details of calculation of trends are given in section 1.2.2.

Region	2005	2006	2005-2006 % change	% annual change	
SW Scotland ^a	1,754	1,793	+2.2	+2.8***	1986-2005
NW Scotland ^b	1,546	1,459	-5.6	-2.2***	1986-2005
Shetland ^c	2,079	2,228	+7.2	-9.0***	1985-2005
NE Scotland ^d	313	260	-16.9	-8.1 **	1992-2004
SE Scotland ^e	12,830	11,249	-12.3	-4.6***	1986-2005
NE England ^f	11,249	9,730	-13.5	-1.5 **	1986-2005
E England ^g	387	411	+6.2	-	
SE England ^h	177	302	+70.6	-10.3***	1986-2005
Wales ⁱ	4,504	4,099	-9.0	-1.6***	1986-2005
NW England ^j	1,113	1,360	+22.2	-0.9 n.s.	1986-2005
SE Ireland ^k	860	711	-17.3	-0.1 n.s.	1986-2005
NW Ireland ^l	1,032	867	-16.0	-	

Colonies: ^a Ceann a Mhara, Lunga, Colonsay, Mull of Galloway, Sanda; ^b Canna, Handa (productivity plots); ^c Sumburgh Head, Noness, Noss, Burrae, Ramna Geo, Hermaness, Fair Isle (all productivity plots), Foula; ^d Sands of Forvie NNR; ^e Isle of May, Inchkeith, Craighleith, The Lamb, Fidra, Inchcolm, Bass Rock, St. Abb's Head; ^f Farne Islands, Coquet Island, Huntcliff, Boulby Cliffs, Hartlepool; ^g Sizewell Riggs, Lowestoft; ^h Fan Bay-West Langdon Cliffs; ⁱ Great Orme, Little Orme, South Stack, Bardsey, St Margaret's Island, Skomer, Elegug Stacks; ^j St. Bee's Head, Seaforth; ^k Rockabill, Dunmore East, Portally, Ardnamult; ^l Downpatrick Head.

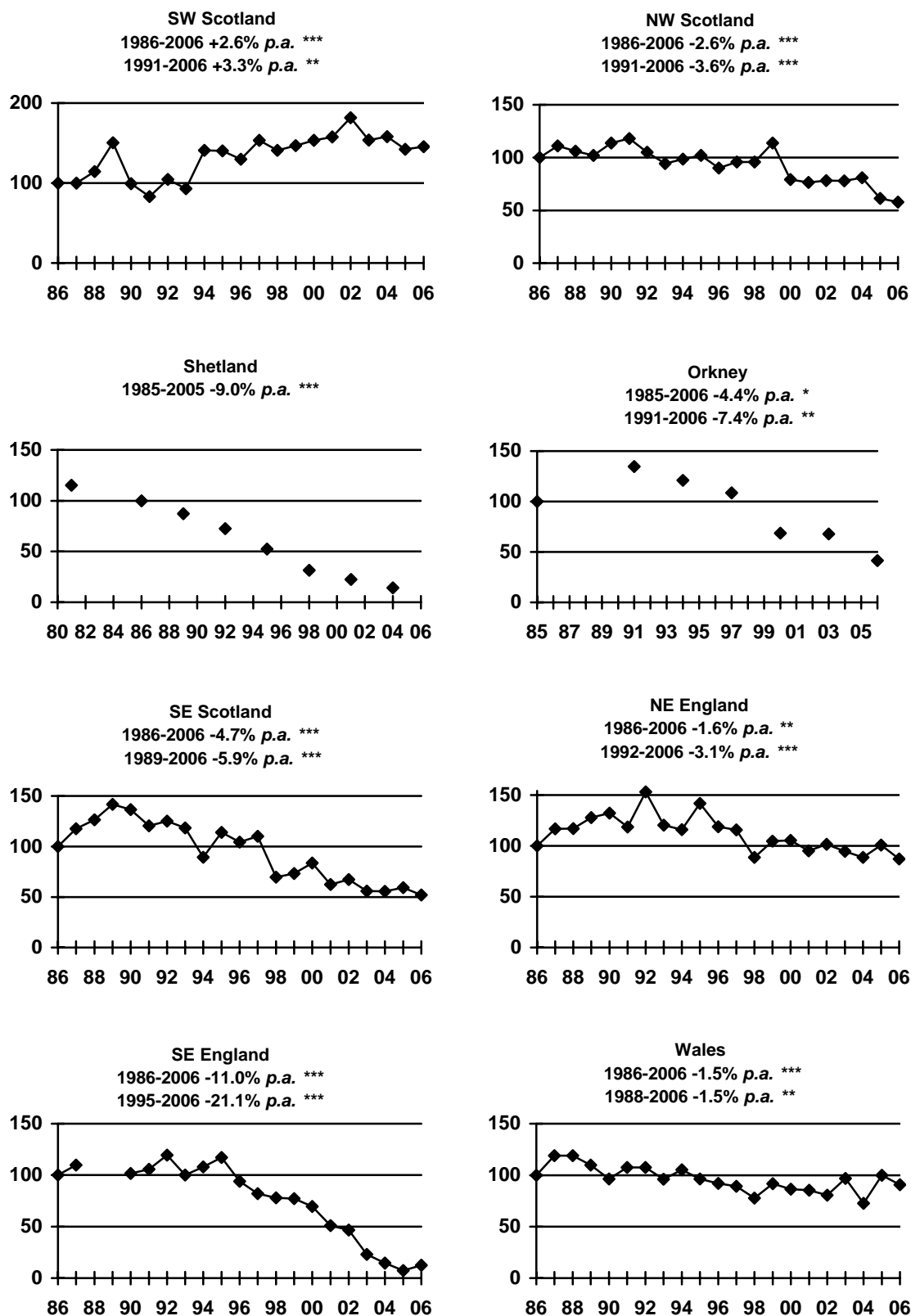


Figure 3.17.1 Regional population indices for breeding black-legged kittiwakes, 1986-2006 (apparently occupied nests in June). Average annual rates of change were calculated by regression of natural log of index against year (see section 1.2.2. for details). Statistical significance of trends (t-test) indicated as: n.s. not significant, * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. For Shetland, chain indices are presented for 1981, then in three-year groups from 1985-1987 and plotted as the middle year of each group.

Few colonies are monitored annually in **north** and **north-east Scotland**, where further declines were noted at North Sutor and Sands of Forvie between 2005 and 2006. Both now hold only one-quarter of the respective peak counts recorded during the 1990s. Monitoring is carried out at approximately six-yearly intervals at Fowlsheugh, where 10,575 AON were counted in 2006. This corresponds to a decline of 43.8% since 1999 and 69.7% since 1992, when peak numbers were recorded. Compared with an even earlier baseline numbers at this colony are currently around half of those recorded in 1986.

Overall numbers in **south-east Scotland** and **north-east England** also declined by 12.3% and 13.5%, respectively. Most sizeable colonies (>2,000 AON) in these regions experienced declines of 10% or greater with any increases occurring at the smaller colonies holding 100-300 nests (e.g. Inchcolm, Coquet and Hartlepool) with an exceptional increase of 144.9% recorded at The Lamb. On the Isle of May, 3,167 AON was the lowest count recorded since the beginning of the SMP. Trends in both regions have been downward since the late 1980s/early 1990s although in south-east Scotland, where the index has fallen by 50% since 1986, the rate of decline is almost double that found to the south.

Increases were also noted in the small colonies monitored in **east England** (e.g. Lowestoft) and **south-east England** where, after 10 successive years of decline, an increase of 70.6% occurred at South Foreland. This region has the highest rate of decline in Britain, measuring -11% *per annum* since the 1986 baseline and -21% *per annum* since 1995 prior to which the population had been at least relatively stable or perhaps increasing.

In **north-west** and **south-west Scotland** the long-term trends in each region have diverged since the early 1990s, with a highly significant increase detected in the south-west (although with a decline most recently), but a significant decrease in the north-west. Between 2005 and 2006 there was little overall change detected in each region, with changes at individual colonies in the north-west also minimal. However, at the St. Kilda archipelago, a complete count of all islands and stacks found just 1,516 AON, a decrease of 63.2% since 1999 and in accordance with the decline shown by the regional index. In the south-west a large increase was noted at Lunga, which may just reflect higher nest survival in 2006 as annual monitoring is done in late June/early July, outwith the main count period. Decreases were recorded at the Mull of Galloway and in plots on Colonsay with almost identical numbers nesting at Ceann a Mhara in both years.

Table 3.17.2 Population changes of black-legged kittiwake 2005-2006. The peak count in the period 1986-2006 and year of occurrence is also shown for each colony. Figures refer to the number of apparently occupied nests.

Region/Site	2005	2006	2005-2006 % change	Peak count	Year
Shetland					
Foula	898	1,065	+18.9	4,350	1987
SW Scotland					
Mull of Galloway	306	262	-14.4	448	1997
Lunga	604	814	+34.8	1,010	2001
Ceann a Mhara	724	719	-0.7	1,060	1988
Colonsay (plots)	95	67	-29.5	-	-
NW Scotland					
Canna	968	905	-6.5	1,340	2004
Handa (plots)	578	554	-4.2	-	-
N Scotland					
North Sutor	230	210	-8.7	827	1997
NE Scotland					
Sands of Forvie	313	260	-16.9	1,036	1992
SE Scotland					
Isle of May	3,790	3,167	-16.4	8,129	1990
Inchkeith	329	295	-10.3	678	1992
Craigleith	492	444	-9.8	1,028	1993
Lamb	94	202	+114.9	250	1989
Fidra	257	275	+7.0	726	1987
Inchcolm	66	73	+10.7	190	1995
Bass Rock	563	505	-10.3	3,044	1997
St. Abb's Head	7,239	6,288	-13.1	19,066	1989
NE England					
Farne Islands	5,376	4,713	-12.3	6,393	1990
Coquet Island	127	162	+27.6	162	2006
Huntcliff	2,725	2,245	-17.6	6,625	1992
Boulby Cliffs	2,900	2,480	-14.5	4,875	1992
Hartlepool	121	130	+7.4	138	2003
E England					
Sizewell Rigs	255	257	+0.8	257	2006
Lowestoft	132	154	+16.7	259	1995
SE England					
South Foreland	177	302	+70.6	2,878	1992
SW England					
Blacker's Hole	66	56	-15.2	90	1992
Wales					
Ramsey Island	228	201	-11.8	489	1995
St. Margaret's Island	179	331	+84.9	379	1986
Skomer	2,281	2,067	-9.4	2,543	1987
Bardsey	365	358	-1.9	365	2005
Elegug Stacks	46	48	+4.3	486	1990
Great Ormes Head	814	882	+8.4	1,494	1988
Little Ormes Head	577	199	-65.5	924	1987
NW England					
St. Bee's Head	1,055	1,300	+23.2	1,630	1994
NE Ireland					
Isle of Muck	256	239	-6.6	830	1987
SE Ireland					
Rockabill	178	138	-22.5	178	2005
Dunmore	634	565	-10.9	1,211	1986
NW Ireland					
Downpatrick Head	1,032	867	-16.0	1,073	2003

In **north-west England**, where the population index had been remarkably stable since 2002, there was a large increase, attributable to the colony at St. Bee's Head, where 1,300 AON were counted, the highest number there since 2000. Overall numbers in sampled colonies in **Wales** declined by 9.0% between 2005 and 2006. A steady decline in the regional index is noticeable since 1987/88 but in recent years there has been some fluctuation in the trend. In 2006, a particularly large decline of 65.5% was recorded at Little Ormes Head, where one sub-colony was deserted (176 AON in 2005) and another declined from 258 to 12 AON. Smaller declines, of 11.8% and -9.4%, were recorded at Ramsey and Skomer, respectively. On St. Margaret's Island, where only four AON were found in 2001, a substantial increase of 84.9% occurred, with 331 AON recorded by far the highest count there since 1988. This increase, the fourth in succession, was possibly due to birds moving from the nearby Gower peninsula as a result of disturbance caused by sand dredging in the vicinity of colonies. Numbers were relatively unchanged on Bardsey and at Elegug Stacks over the two years. After the increase recorded between 2004 and 2005 the small colony at Blackers Hole (**south-west England**) declined by 15.2% to 56 AON, a more typical figure for this colony.

In Ireland, the few colonies monitored in 2005 and 2006 all decreased in size; on the Isle of Muck (**north-east Ireland**) 6.6% fewer nests were recorded, Dunmore and Rockabill (both **south-east Ireland**) held 10.9% and 22.5% fewer nests, respectively, and at Downpatrick Head (**north-west Ireland**) numbers were 16.0% lower. Following three successive years of decline the count at Dunmore was the lowest on record.

Breeding success (Tables 3.17.3 and 3.17.4, Figure 3.17.2)

The overall productivity of black-legged kittiwakes in Britain and Ireland in 2006 from 49 colonies averaged 0.54 (s.e. ± 0.04) chicks fledged per breeding pair, below the mean for 1986-2005 of 0.68 (s.e. ± 0.03) recorded at between 30 and 61 colonies annually. A comparison of 39 colonies monitored in both 2005 and 2006 found no significant difference between the two years. As usual, these productivity estimates contain marked regional variation.

Mean productivity in **Shetland** in 2006 was 0.59 chicks per AON, less than that recorded in 2005 but not significantly so. The number of pairs building nests increased at each colony except Fair Isle. Success at Fair Isle, Hermaness and Foula was low with few broods of two noted (respectively, 18% 6% and 0% of nests). As in 2005, Burravoe, Ramna Geo, Noness and Sumburgh Head were the most successful colonies in Shetland fledging 0.87, 0.90, 0.71 and 0.70 chicks per nest, respectively, values which were also above the colony average for each. Success was also relatively high, and above the long-term average, on Noss (0.66) after a poor season in 2005. Many pipefish were noted being fed to chicks, or lying around nests, at Burravoe, Ramna Geo, Noness, Sumburgh Head (Heubeck 2006) and Fair Isle (Shaw *et al.* 2006) although at Hermaness sandeels were considered to be abundant (Kilgour 2006). An apparent shortage of food, with resultant starvation of chicks, was noted at Noss during the first two weeks of July (Sykes and Bliss 2006). Predation of chicks was considered to have lowered success at Hermaness and Foula (Kilgour 2006; Gear 2006).

In **Orkney**, the overall mean breeding success of kittiwakes was 0.41 chicks per nest. Breeding success was lower than in 2005 at all seven colonies monitored and also lower than the long-term means for each. Thus, a significant difference was recorded between the two years. The colony on Papa Westray raised only three chicks from 58 nests (0.05 chicks per nest). Most nests at that colony were abandoned at the end of June and it was noted that, although terns and auks caught sandeels, kittiwakes mostly caught pipefish. Adults were seen on the cliffs with pipefish jamming their throats, nest sites were littered with discarded ones and kittiwakes were still seen feeding on them in August (Hulsman 2006).

Table 3.17.3 Black-legged kittiwake breeding success, 2005-2006, grouped regionally: estimated number of chicks fledged per occupied, well-built nest at sample colonies (superscript n = number of colonies). Figures are presented as the mean and standard error of the average number of chicks fledged per nest for individual colonies. Changes in breeding success are indicated for colonies studied in both years (significant changes, as indicated by t-test: n.s.-not significant, ***P<0.001).

Region	2005 chicks fledged/nest				2006 chicks fledged/nest				2005-2006 change	
	Nests ⁿ	Range	Mean	+s.e.	Nests ⁿ	Range	Mean	+s.e.	Mean ⁿ	+s.e.
SW Scotland ^a	140 ¹	-	0.64	-	138 ¹	-	0.14	-	-0.50 ¹	-
NW Scotland ^b	973 ³	0.00-0.32	0.18	±0.09	957 ³	0.01-0.54	0.34	±0.16	+0.16 ³	±0.20 n.s.
Shetland ^c	1,284 ⁸	0.26-1.18	0.64	±0.11	1,282 ⁸	0.21-0.90	0.59	±0.09	-0.04 ⁸	±0.08 n.s.
Orkney ^d	740 ⁷	0.04-0.76	0.56	±0.11	717 ⁷	0.05-0.59	0.41	±0.07	-0.15 ⁷	±0.04***
N Scotland ^e	73 ¹	-	0.00	-	45 ¹	-	0.11	-	+0.11 ¹	-
NE Scotland ^f	723 ³	0.53-1.08	0.83	±0.16	785 ³	0.72-0.96	0.80	±0.08	-0.03 ³	±0.17 n.s.
SE Scotland ^g	1,415 ³	0.83-0.96	0.89	±0.04	793 ²	0.27-0.47	0.37	±0.10	-0.48 ²	±0.12 n.s.
NE England ^h	1,095 ⁴	0.52-1.08	0.73	±0.12	1,494 ⁵	0.57-1.37	0.91	±0.13	+0.19 ⁴	±0.08 n.s.
E England ⁱ	132 ¹	-	0.73	-	154 ¹	-	0.70	-	-0.03 ¹	-
SW England ^j	No data	-	-	-	248 ³	0.00-0.76	0.46	±0.23	-	-
NW Eng./I. of Man ^k	21 ¹	-	0.00	-	No data	-	-	-	-	-
Wales ^l	1,547 ⁵	0.17-1.01	0.55	±0.15	1,639 ⁶	0.00-0.99	0.42	±0.14	-0.24 ⁵	±0.16 n.s.
NE Ireland ^m	88 ¹	-	0.46	-	76 ¹	-	0.26	-	-0.20 ¹	-
SE Ireland ⁿ	838 ²	0.05-0.99	0.52	±0.47	838 ³	0.64-1.14	0.83	±0.16	+0.15 ²	±0.44 n.s.
SW Ireland ^o	No data	-	-	-	692 ¹	-	0.72	-	-	-
NW Ireland ^p	1,032 ¹	-	0.89	-	1,715 ⁴	0.16-0.65	0.41	±0.12	-0.32 ¹	-
Total	10,102 ⁴¹	0.00-1.18	0.60	±0.05	11,573 ⁴⁹	0.00-1.37	0.54	±0.04	-0.08 ³⁹	±0.05 n.s.

Colonies: ^a Ailsa Craig; ^b Canna, Handa, St. Kilda; ^c Noness, Hermaness, Burrae, Foula, Noss, Ramna Geo, Sumburgh Head, Fair Isle; ^d Papa Westray, Rousay, Marwick Head, Row Head, Mull Head, Gultak, Costa Head; ^e North Sutor; ^f Bullers of Buchan, Sands of Forvie, Fowlsheugh; ^g Isle of May, Dunbar (2005 only), St. Abb's Head; ^h Farne Islands, Coquet Island, Gateshead (2006 only), Marsden Cliffs, Saltburn; ⁱ Lowestoft; ^j North Hallsands, Towan Head, Rinsey (all 2006 only); ^k Peel Hill (2005 only); ^l Bardsey, Elegug Stacks, Skomer, Ramsey Island, Great Orme; ^m Isle of Muck; ⁿ Dunmore, Ram Head, Rockabill (2006 only); ^o Cliffs of Moher; ^p Horn Head, Dundawoona Point, Aughris Head, Downpatrick Head.

Kittiwake productivity was equally variable in other regions adjacent to the North Sea. In **north Scotland**, breeding success was again below average at North Sutor (0.11 chicks fledged per nest) probably because of increased predation by great black-backed gulls due to low food availability (Swann 2006). In 2004 and 2005 no kittiwakes fledged at this colony and in 2003 fledging success was only marginally higher, at 0.18 chicks per nest. In **north-east Scotland**, overall breeding success was close to that recorded in 2005 and above the long-term means at each of the three colonies monitored. The number of nests built increased at two colonies, especially at Bullers of Buchan (by c.25%) although this was the only colony in the region where success was lower than in 2005, falling from 1.08 to 0.72 chicks fledged per nest. In both colonies monitored in **south-east Scotland** breeding success was lower than in 2005 (and below their respective long-term means) and fewer pairs built nests. Success was particularly low at St. Abb's Head (0.27 chicks fledged per nest) for unknown reasons. On the Isle of May, where productivity was 0.47 chicks per nest, the timing of breeding was very late with only 2005 a later season. The first egg was seen on 27 May, three days earlier than in 2005 (median first egg date 1989-2004 10 May, range 27 April-24 May). The condition of chicks at fledging appeared to be very poor due to a rapid deterioration in feeding conditions at the end of the season which coincided with a dramatic increase of pipefish; again large numbers of adults and chicks were seen with pipefish hanging out of their bills and nests were littered with discarded pipefish. Brood neglect was also high at this time measuring 66% for broods of one and 90% for broods of two (Newell *et al.* 2006). Of 53 food samples collected during the chick-rearing period 79% contained sandeels, with 0-group fish predominating, at 63% by mass; the remainder mostly comprised of clupeids (42% of samples and 28% by mass). However, in line with casual observations, pipefish were found in 43% of samples but formed little value in terms of biomass. Contrastingly, mean success in **north-east England** was higher than in 2005. The number of nests in study plots

increased at each colony except on the Farne Islands where success was also the lowest recorded in the region; predation by large gulls was a problem in some sub-colonies (Walton 2006). The most successful colony in the UK in 2006 was Coquet Island, where kittiwakes fledged 1.37 chicks per nest, well above the long-term mean even for this atypical colony, where productivity has not fallen below 1.10 chicks fledged per nest since 2000. Colonies at Marsden Cliffs (0.92 chicks fledged per nest), Saltburn (0.82) and Gateshead (0.85) were relatively successful in UK terms in 2006 although at the latter site productivity was below average. In **east England**, success at Lowestoft was similar to 2005 but below the long-term mean. Unusually, many nests were destroyed early on by foxes *Vulpes vulpes* (pers. comm. T Brown). Excluding these nests from the analysis would increase success from 0.70 to 1.10 chicks fledged per nest.

Table 3.17.4 Breeding success of black-legged kittiwake (fledglings/AON) 2005-2006 and 1986-2005 at selected colonies. Figures in parentheses under 2005 and 2006 are the number of nests from which the estimates of success were derived.

Region/site	2005	2006	1986-2005		
			Mean	±s.e.	No. of years
SW Scotland					
Ailsa Craig	0.64 (140)	0.14 (138)	0.50	0.07	19
NW Scotland					
Handa	0.22 (561)	0.01 (534)	1.22	0.08	19
Canna	0.00 (244)	0.46 (265)	0.65	0.06	20
St. Kilda	0.32 (168)	0.54 (158)	0.43	0.05	19
Shetland					
Nones	0.73 (26)	0.71 (28)	0.37	0.14	10
Hermaness	0.44 (126)	0.38 (135)	0.21	0.05	11
Foula	0.26 (103)	0.21 (119)	0.56	0.10	19
Noss	0.45 (360)	0.66 (312)	0.26	0.05	20
Ramna Geo	0.67 (92)	0.90 (105)	0.49	0.10	13
Burraoie	0.99 (71)	0.87 (87)	0.85	0.15	2
Sumburgh Head	1.18 (115)	0.70 (148)	0.49	0.11	20
Fair Isle	0.41 (391)	0.26 (348)	0.66	0.11	20
Orkney					
Mull Head	0.73 (97)	0.46 (90)	1.01	0.07	20
Papa Westray	0.04 (82)	0.05 (58)	0.70	0.11	17
Rousay	0.28 (83)	0.27 (59)	0.75	0.10	17
Costa Head	0.69 (172)	0.49 (164)	0.96	0.11	13
Gultak	0.71 (57)	0.59 (64)	0.82	0.07	20
Marwick Head	0.76 (130)	0.54 (165)	1.01	0.07	20
Row Head	0.69 (119)	0.46 (117)	0.97	0.07	20
N Scotland					
North Sutor	0.00 (73)	0.11 (45)	0.60	0.09	16
NE Scotland					
Bullers of Buchan	1.08 (235)	0.72 (295)	0.60	0.09	16
Sands of Forvie	0.53 (121)	0.73 (137)	0.44	0.08	16
Fowlsheugh	0.89 (367)	0.96 (353)	0.72	0.08	18
SE Scotland					
Isle of May	0.83 (675)	0.47 (613)	0.56	0.08	20
Dunbar	0.96 (542)	-			
St. Abb's Head	0.88 (193)	0.27 (180)	0.69	0.07	19
NE England					
Coquet Island	1.08 (127)	1.37 (162)	1.10	0.07	13
Farnes	0.63 (590)	0.57 (568)	0.86	0.08	18
Gateshead	-	0.85 (311)	1.07	0.05	16
Marsden Cliffs	0.69 (131)	0.92 (155)	0.69	-	1
Saltburn	0.52 (247)	0.82 (298)	0.81	0.07	20
E England					
Lowestoft	0.73 (132)	0.70 (154)	1.05	0.06	20

Table 3.17.4 (cont.)

Region/site	2005	2006	Mean	1986-2005	
				±s.e.	No. of years
Wales					
Bardsey	0.55 (365)	0.68 (358)	0.73	0.10	18
Ramsey Island	0.73 (120)	0.29 (201)	0.60	0.14	8
Elegug Stacks	0.17 (48)	0.00 (44)	0.29	0.06	15
Skomer	1.01 (879)	0.30 (781)	0.68	0.05	20
Great Ormes Head	0.31 (135)	≤0.28 (79)	0.53	0.05	17
St. Margaret's Island		0.99 (176)	0.17	0.17	2
Isle of Man					
Peel Hill	0.00 (21)	No data	0.33	0.10	10
SW England					
North Hallsands	No data	0.00 (78)	1.25	0.14	3
Towan Head	No data	0.76 (67)	No data	-	-
Rinsey	No data	0.61 (103)	No data	-	-
NE Ireland					
Isle of Muck	0.46 (88)	0.26 (76)	0.83	0.17	4
SE Ireland					
Rockabill	No data	1.14 (138)	1.06	0.12	9
Dunmore	0.99 (634)	0.70 (565)	0.67	0.04	20
Ram Head	0.05 (204)	0.64 (135)	0.46	0.07	13
SW Ireland					
Cliffs of Moher	No data	0.72 (692)	0.63	0.19	2
NW Ireland					
Horn Head	No data	0.16 (429)	No data	-	-
Dundawoona Point	No data	0.27 (229)	No data	-	-
Aughris Head	No data	0.65 (190)	No data	-	-
Downpatrick Head	0.89 (1,032)	0.57 (867)	0.93	0.08	4

On the west coast of Britain and in Ireland breeding success was equally variable both between and within regions. In **north-west Scotland**, overall success was lower than the UK mean. Almost complete failure was recorded on Handa (0.01 chicks fledged per nest) but Canna and St. Kilda were both more successful than in 2005, fledging 0.46 and 0.54 chicks per nest, respectively, although only at the latter site was success above the long-term mean. On Ailsa Craig (**south-west Scotland**), kittiwakes had their poorest breeding season since 1990 fledging only 0.14 chicks per nest. It was considered that food became scarce at a vital period during chick rearing; chicks appeared to be in fair condition in mid-July, albeit still at the downy/half grown stage, but subsequently most died in just over a week (Zonfrillo 2006).

In **Wales**, mean breeding success was 0.52 chicks fledged per nest. Colonies monitored in both 2005 and 2006 indicated a non-significant decline in success between years. The number of nests built declined at all colonies, except Ramsey Island. Bardsey was the only colony where kittiwakes were more successful than in 2005, fledging 0.68 chicks per nest, but St. Margaret's Island was the most successful colony in the region (not monitored in 2005) and the only site where productivity was higher than the long-term colony mean. Breeding success on Skomer (0.30 chicks fledged per nest), Ramsey (0.29) and at Great Ormes Head (≤0.28) were among the lowest values recorded in each colony since monitoring began; predation of chicks by great black-backed gulls was thought to be a major factor depressing productivity on Skomer (Brown and Darke 2006). Complete failure was recorded at Elegug Stacks. In **south-west England**, breeding success was below the UK mean for 2006. Data were received from three colonies, two of which were monitored for the first time; success at Towan Head and Rinsey was 0.76 and 0.61 chicks fledged per nest, respectively. Complete failure was recorded at North Hallsands; no data had been collected there since 1997 hence the rather high colony mean (pers. comm. H. Booker).

In **north-east Ireland**, breeding success on the Isle of Muck was lower than in 2005 and well below the colony average, although few years of data have been collected. Colonies in **south-east Ireland**

were more successful than other Irish colonies, with mean productivity of 0.83 chicks fledged per nest although fewer nests were built than in 2005 at two sites. Breeding success was above the respective means at all three sites monitored although only just so at Dunmore (0.70 chicks fledged per nest), where kittiwakes were less successful than in 2005. Rockabill (1.14 chicks per nest) was the most successful colony in the region and one of only two UK and Ireland colonies (the other being Coquet) to record success above one chick per nest in 2006. After two poor breeding seasons, birds at Ram Head had a better than average year fledging 0.64 chicks per nest. Colonies in **north-west Ireland** had low overall success compared with most other regions. Although few year's data have been received the normally productive colony at Downpatrick Head had low breeding success in 2006; however, 0.57 chicks fledged per nest was still similar to the overall UK and Ireland mean. Elsewhere in the region, data were received from Aughris Head, Horn head and Dundawoona Point for the first time. Breeding success was poor at the latter two sites but above the UK and Ireland mean for 2006 at Aughris Head. At the Cliffs of Moher (**south-west Ireland**), where data were received for the first time since 1992, kittiwakes were also quite successful compared with the 2006 mean, fledging 0.72 chicks per nest.

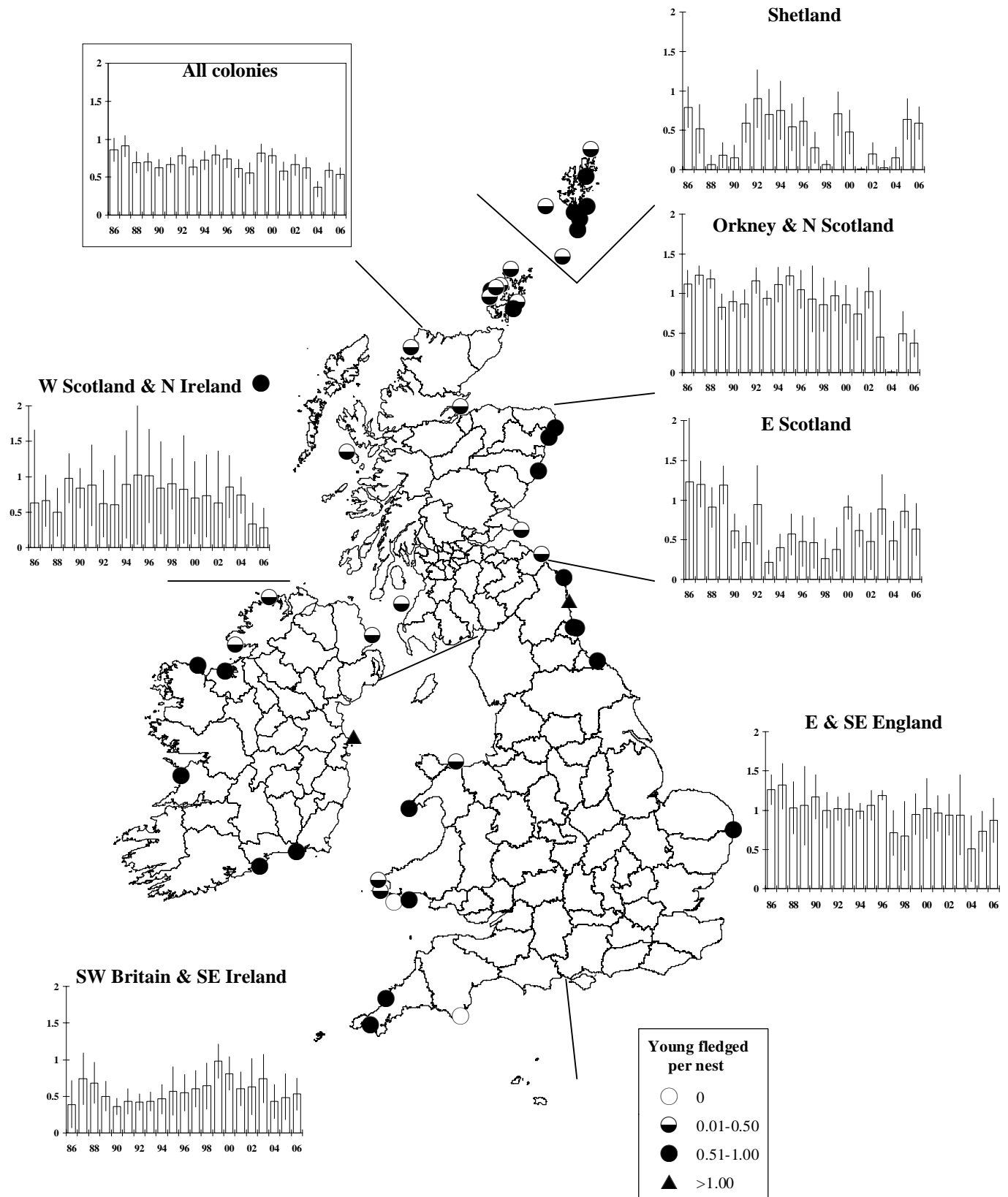


Figure 3.17.2 Breeding performance (chicks fledged per well-built nest) at black-legged kittiwake colonies during 1986-2006, showing regional and annual variation. Symbols on map represent 2005 data for individual colonies; histograms show annual averages (with 95% confidence limits) for the regions indicated. A histogram for SW and NW Ireland, where prior to 2006 only one colony was monitored, has been omitted.

3.18 Sandwich tern *Sterna sandvicensis*

In 2006, numbers breeding were slightly lower than in 2005, mainly due to decreases in NE Ireland and NE England which were not compensated by increases in other regions. Productivity varied between regions: it was highest in Wales and lowest in NE and NW England.

Breeding numbers (Tables 3.18.1 and 3.18.2)

In **Orkney**, 13 pairs were recorded at Muckle Skerry (Meek 2006). No counts had been received from this site since 300 individuals were seen there in 1995.

The Sands of Forvie was the only site in **east** and **north Scotland** in 2006 where breeding Sandwich terns were recorded. The colony increased almost to the level of 2004, and numbers were well above the long-term average for the colony.

Table 3.18.1 Regional population changes at monitored Sandwich tern colonies, 2005-2006 (breeding pairs). Superscript = number of colonies counted in both years. Note that British and Irish totals are only for the sample of colonies monitored in that year and not the entire population.

Region	2005	2006	2005-2006 % change
NE Scotland	571	814	+42.6 ²
SE Scotland	3	0	-100.0 ¹
NE England	3,163	2,400	-24.1 ⁴
E England	3,553	3,450	-2.9 ³
SE England	1,179	>1,432	>+21.5 ⁴
SW England	249	215	-13.7 ²
NW England	300	300	0.0 ¹
Wales	1,155	1,273	+10.2 ²
NE Ireland	3,005	2,428	-19.2 ³
NW Ireland	575	377	-34.4 ³
SE Ireland	1,122	1,310	+16.8 ²
Britain and Ireland	14,893	>13,999	<-6.00²⁸

Substantial declines of breeding Sandwich terns occurred in **north-east England**, where overall numbers were the second lowest in 38 years. The region's largest colony at the Farne Islands decreased to its lowest level since recording began in 1969, and numbers at Coquet fell to almost half the long-term colony mean.

In 2006, only two sites in **east England** reported nesting Sandwich terns (3 in 2005, 4 in 2004) and a small overall decline in numbers occurred in the region. An increase at Scolt Head compensated for a decline at Blakeney Point.

Overall numbers in **south-east England** reached a new peak, following a small decline between 2004 and 2005. Large increases occurred at Rye Harbour and Pitt's Deep-Hurst; numbers at both sites were the highest since records began. Although declines of between 20% and 25% occurred at Burntwick Island and Langstone Harbour, numbers at both colonies remained well above their respective long-term colony means.

At Brownsea Island (**south-west England**), a moderate decline occurred, following the highest number on record in 2005. However, the 2006 figure was still twice the long-term colony average. Two breeding pairs were recorded on the Isles of Scilly.

Table 3.18.2 Changes in Sandwich tern breeding pairs 2005-2006 and 1986-2005 means at selected sites in Britain and Ireland.

Region/Site	2005	2006	2005-2006 % change	1986-2005	
				Mean (\pm s.d.)	No. years
NE Scotland					
Sands of Forvie	570	814	+42.8	517 (438)	20
NE England					
Coquet	1,250	759	-39.3	1,505 (283)	20
Farne Islands	1,913	1,635	-14.5	2,345 (592)	20
E England					
Scolt Head	c.1,900	2,500	c.+31.6	1,672 (1,312)	20
Blakeney	1,650	950	-42.4	1,917 (1,238)	20
Havergate	3	0	-100.0	74 (89)	20
SE England					
Burntwick Island	632	504	-20.3	327 (225)	6
Rye Harbour	200	>500	>+150.0	78 (92)	20
Chichester Harbour	0	0	0.0	8 (14)	20
Langstone Harbour	271	204	-24.7	55 (77)	20
North Solent NR	0	0	0.0	168 (81)	20
Pitts Deep - Hurst	76	224	+194.7	57 (53)	16
SW England					
Brownsea	248	213	-14.1	109 (68)	20
Wales					
Anglesey	1,155	1,272	+10.1	699 (322)	20
NW England					
Hodbarrow	300	300	0.0	273 (151)	17
NW Ireland					
Lower Lough Erne	156	65	-58.3	59 (33)	20
Lough Swilly	340	c.292	c.-14.1	176 (80)	20
Mulroy Bay	79	c.20	c.-74.7	81 (82)	20
NE Ireland					
Green Is., Carlingford	1,125	826	-26.6	509 (375)	20
Larne Lough	788	465	-41.0	272 (199)	20
Strangford Lough	1,092	1,137	+4.1	997 (509)	20
SE Ireland					
Lady's Island Lake	1,122	1,309	+16.7	1,084 (287)	20

Numbers at Anglesey (**Wales**) started to recover from a decline between 2004 and 2005, increasing to their second highest level on record. One pair was recorded at a second site in Wales.

At Hodbarrow (**north-west England**), numbers remained stable at above average following a decline of 29% between 2004 and 2005.

Sandwich terns at monitored colonies in **north-east Ireland** declined by almost 20%, following record high numbers in 2005, but numbers were still the fourth highest since 1986. At Green Island, Carlingford, and Larne Lough around 300 fewer pairs each nested than in the previous year, but numbers at both sites remained well above their respective long-term averages. In contrast, a small increase occurred at Strangford Lough, bringing numbers there to the second highest total in 16 years. Overall numbers at monitored colonies in **north-west Ireland** declined to fewer than 400 pairs, after two years of record high levels of well over 500 pairs. Proportionally large decreases occurred at two smaller sites: Lower Lough Erne and Mulroy Bay. In contrast, numbers at Lady's Island Lake (**south-west Ireland**) increased by 17% between 2005 and 2006. One pair nested on Rockabill (Baer *et al.* 2006).

Breeding success (Tables 3.18.3 and 3.18.4)

Mean productivity of Sandwich terns across 12 sites in Britain and Ireland in 2006 was 0.77 chicks per pair, above the 1986-2005 mean of 0.71 (s.e. ± 0.03) recorded at between six and 20 colonies annually.

At least 133 young fledged at the Sands of Forvie (**north-east Scotland**), but a prolonged hatching period and rapid post-fledging dispersal made it difficult to assess the actual number. Counts of the ratio of ringed to unringed juveniles suggested a productivity of between 0.92 and 1.02 chicks per pair (Drysdale 2006).

Productivity on Coquet Island (**north-east England**) was lower than in 2005 and well below the long-term average. No productivity data were available from the region's largest colony, on the Farne Isles. Six pairs at Teemouth fledged one chick between them (0.17 chicks per pair).

In **east England**, breeding success at Blakeney and Scolt Head was similar and overall productivity was above the long-term average for this region (1986-2005 mean 0.74 chicks per pair, s.e. ± 0.06).

Breeding success in **south-east England** was generally high. Productivity at Rye Harbour was again high, although the actual number of fledged young was difficult to assess. Moderate to high numbers of young are thought to have fledged at Pitt's Deep-Hurst and Burntwick Island, although no counts were made (P. Durnell, M. Ellison, pers. comm.). In contrast, at Langstone Harbour, predators decimated eggs and chicks resulting in the lowest productivity for four years (C. Cockburn, pers. comm.).

Table 3.18.3 Sandwich tern productivity, 2005–2006, grouped regionally: expressed as number of chicks fledged per breeding pair at sample colonies (superscript = number of colonies). When more than one colony was sampled in a given region, the overall figure given is the total number of fledglings divided by the total number of breeding pairs across all colonies. Note that the same colonies have not necessarily been monitored in each region each year and that the numbers of pairs given here are sample sizes (and do not necessarily indicate population changes between years).

Region	2005 chicks fledged/pair			2006 chicks fledged/pair		
	Pairs ⁿ	Range	Overall	Pairs ⁿ	Range	Overall
NE Scotland	571 ²	0.00-0.04	0.04	814 ¹	-	>0.16
SE Scotland	3 ¹	-	0.33	0	-	-
NE England	1,250 ¹	-	0.46	765 ³	0.00-0.33	0.33
E England	3,553 ³	0.00-0.87	0.72	3,450 ²	0.80-0.86	0.82
SE England	471 ²	0.23-1.50	c.0.77	>704 ²	0.04->1.00	c.0.72
SW England	249 ²	0.00-0.46	0.46	215 ²	0.00-0.62	0.61
Wales	1,155 ¹	-	0.99	1,273 ²	1.00-1.12	1.12
NW England	300 ¹	-	0.67	300 ¹	-	0.13
NW Ireland	419 ²	0.41-0.84	0.76	c.312 ²	<1.02-<1.20	<1.03
SE Ireland	1,122 ¹	-	0.91	1 ¹	-	0.00
Total	9,093 ¹⁶	0.00-1.50	0.69	>7,834 ¹⁶	0.00-1.20	c.0.72

On Brownsea Island (**south-west England**), productivity was moderate and just below the long-term average. The two pairs on the Isles of Scilly failed to produce any young.

Productivity was again high at the main colony in Anglesey (**Wales**), as in the previous four years, and the single pair at a second site fledged one young. At Hodbarrow (**north-west England**), depredation of chicks by lesser black-backed gulls depressed productivity to well below average (S. Peter and D. Blackledge, pers. comm.).

The breeding season at Lough Swilly and Mulroy Bay (**north-west Ireland**) was late with birds still laying on 16 June, but productivity was higher than in 2005 (A. Speer, pers. comm.). No productivity figures were available from the colonies in **north-east Ireland**, nor from Lady's Island Lake (**south-east Ireland**). The single pair on Rockabill failed to fledge any young (Baer *et al.* 2006).

Table 3.18.4 Productivity of Sandwich terns expressed as chicks per pair 2005-2006 and 1986-2005 at selected sites. (- indicates no data available)

Region/site	2005	2006	1986-2005	
			mean (\pm s.e.)	No. of years
NE Scotland				
Sands of Forvie	0.04	>0.16	0.56 (0.11)	16
NE England				
Coquet	0.46	0.33	0.60 (0.06)	16
E England				
Scolt Head	c.0.87	0.80	0.69 (0.10)	16
Blakeney	0.55	0.86	0.69 (0.08)	16
SE England				
Rye Harbour	1.50	>1.00	0.57 (0.16)	15
Langstone Harbour	0.23	0.04	0.47 (0.11)	9
SW England				
Brownsea	0.46	0.62	0.67 (0.09)	19
Wales				
Anglesey	0.99	1.12	0.87 (0.07)	15
NW England				
Hodbarrow	0.67	0.13	0.48 (0.12)	16
NW Ireland				
Lough Swilly	0.84	<1.02	1.03 (0.07)	20
Mulroy Bay	0.41	<1.20	0.92 (0.11)	13
SE Ireland				
Lady's Island Lake	0.91	No data	0.80 (0.10)	7

3.19 Roseate tern *Sterna dougallii*

The total number of roseate terns breeding in Britain and Ireland was almost a fifth higher than in 2005, mainly due to a substantial increase at the largest colony, Rockabill, SE Ireland. Overall, productivity was high but slightly lower than in 2005.

Breeding numbers (Table 3.19.1)

In 2006, the UK and Irish population of roseate terns numbered 1000 pairs, the highest in 30 years. A small increase, of 3.8%, from 104 to 108 pairs was noted in the UK between 2005 and 2006.

At the largest colony, in Rockabill (**south-west Ireland**), numbers increased by 21% compared with 2005. Approximately 77% of the nesting pairs bore rings. A sample of those, whose origins were identified, showed that 92.2% were recruited from Rockabill, and the largest cohort (15.6%) was ringed in 2000 (Baer *et al.* 2006). At Lady's Island Lake numbers increased by over 25% compared to 2005, the highest total in 4 years. Only one pair remained at a third site after numbers there peaked at

c.12 pairs in 2004. Two pairs were discovered at a new site in **south-west Ireland**. At Larne Loch Island (**north-east Ireland**) numbers declined to less than half the long-term mean (1986-2005 mean 11 pairs, s.d. ± 10).

Table 3.19.1 Roseate tern numbers (breeding pairs) at most colonies in Britain and Ireland 1996-2006.

Region Site	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2005-2006 % change
E Scotland												
Inchmickery	0	0	0	0	0	0	0	0	0	0	0	
Forth B	7	8	8	9	10-11	1	2	8	4	4	5	+25.0
Forth C	1	0	0	0	1	1	0	0	0	0	0	
New colony	0	0	0	0	1	0	0	0	0	0	0	
NE England												
Farne Islands	2	3	3	4	1	1	1	0	0	1	1	0.0
Coquet Island	24	25	29	34	34	42	57	70	73	91	94	+3.3
New colony A	14	2	3	0	0	0	0	0	0	0	0	
New colony B	0	0	0	0	0	0	1	0	0	0	0	
Wales												
Anglesey A	1	2	3	3	2	7	7	0	0	0	1	
Anglesey B	0	1	0	0	0	0	0	0	0	0	0	
Anglesey C	0	0	2-3	0	0	0	0	2	0	0	1	
NE Ireland												
Larne Lough	13	7	3	10	4	6	4	19	8	7	5	-28.6
Carlingford L.	0	2	0	0	0	0	0	0	0	0	0	
SE Ireland												
Rockabill	557	602	578	611	618	605	588	638	677	657	796	+21.2
Lady's Island	120	48	80	116	>78	46	96	77	66	74	93	+25.7
Colony C	0	0	0	0	0	0	0	5	12	2	1	-50.0
Total*	744	703	712	788	>750	709	758	821	c842	837	1000	+19.5

(* includes pairs noted at other sites in the UK and Republic of Ireland.)

The colony at Coquet Island (**north-east England**), the largest in the UK, continued to increase, reaching the third highest level since recording began in 1969. On the Farne Islands, roseate terns kept a foothold with one nesting pair.

One pair more than in 2005 was recorded at the only site in **east Scotland** (1981-2005 mean 7 pairs, s.d. ± 6). As in 2005, only one pair nested in **south-east England**. The species returned to **Wales**, with one nesting pair each at two sites after an absence of two consecutive years.

Breeding success (Table 3.19.2)

Breeding success in the UK and Ireland was high for an eighth consecutive year and productivity, at 1.32 chicks per pair, was slightly above the 10-year mean of 1.29 (s.e. ± 0.06).

Productivity at Rockabill (**south-east Ireland**), was high for the eighth consecutive season, although slightly below average (1990-2005 mean 1.41 chicks per pair, s.e. ± 0.05). Clupeids were the most common prey items (over 80%) presented to chicks, whereas sandeels (c.11%) were only a minor component of the chicks' diet (Baer *et al.* 2006). At Lady's Island Lake, productivity was slightly below that in 2005 but well above the colony average (1990-2005 mean 0.94, s.e. ± 0.12). Breeding success was not recorded at the newly discovered site in **south-west Ireland**. At Larne Lough Island (**north-east Ireland**), two chicks fledged from five pairs.

Productivity at Coquet Island (**north east England**) was similar to that in 2005 and just above the colony average (1991-2005 mean 1.02 chicks per pair, s.e. ± 0.05). Sandeels seemed abundant around the island but pipefish were also found at some of the nests (P. Morrison, pers. comm.). Predation was assumed to have caused the failure of the only roseate tern nest in **south-east England**.

Table 3.19.2 Productivity of roseate terns 2005-2006; number of chicks per breeding pair.

Region/Site	2005		2006	
	Pairs	fledged/pair	Pairs	fledged/pair
E Scotland				
Forth B	4	1.00	5	1.60
NE England				
Farnes	1	1.00	1	1.00
Coquet	91	0.98	94	1.05
SE England				
Colony A	1	0.00	0	-
Colony B	0	-	1	0.00
Wales				
Anglesey A	0	-	1	1.00
Anglesey C	0	-	1	1.00
NE Ireland				
Larne Lough	7	0.57	5	0.40
SE Ireland				
Rockabill	657	1.47	796	1.36
Lady's Island Lake	74	1.48	93	1.33
Colony C	2	2.00	1	2.00
Total	837	1.41	998	1.32

3.20 Common tern *Sterna hirundo*

Overall, breeding numbers were slightly higher than in 2005. Increases were largest in Wales, NE and SE Ireland and SE Scotland, while a substantial decline occurred in west Scotland. Common terns were generally more productive than in 2005. Particularly high productivity figures were recorded in N Scotland, SE Ireland and Wales, but predation depressed productivity at several sites across Britain.

Breeding numbers (Tables 3.20.1 and 3.20.2)

In **south-** and **north-west Scotland**, fewer pairs were present at sample colonies than in 2005. Although several colonies in both regions, such as those at Sgeir na Caillich and Eilean nan Gabhar (396 pairs in 2006, 90 in 2005), increased substantially, this could not compensate for the absence of breeding pairs on Glas Eileanan, where over 700 pairs nested in 2005.

The colony at Hoy, **Orkney**, increased 4-fold to c.120 pairs (30 in 2005). In **Shetland**, 24 pairs nested at five sites compared with 20 pairs at six sites in 2005.

A small overall decline in **north Scotland** was partially due to the site at Alness Point having been abandoned in favour of an inaccessible site within the Port Authority area, where birds cannot be monitored. The site at McDermott's/Barmac's was not occupied for the first time since 2000. In contrast, numbers at Invergordon Docks, a colony found in 2003, increased to 70 pairs, a 75% increase compared with 2005. The colony at the Avoch Fish Farm increased by 7 %, following a decline in 2005, but remained below the peak number of 160 pairs in 2004.

Numbers in **north-east Scotland** were notably higher than in 2005, owing to a large increase at Loch of Strathbeg. A warehouse rooftop at Westhill, where at least nine pairs bred in 2005, was netted off, preventing common terns from nesting in 2006 (I. Francis, pers. comm.). Six pairs bred at the Sands of Forvie, after being absent in 2005.

Table 3.20.1 Regional population changes at monitored common tern colonies, 2005-2006 (breeding pairs). Superscript = number of colonies counted in both years. Regional samples of fewer than 100 pairs not included.

Region	2005	2006	2005-2006 % change
SW & NW Scotland	1,437	1,187	-17.4 ²⁸
N Scotland	272	257	-5.5 ⁸
NE Scotland	171	242	+41.5 ⁷
SE Scotland	949	1,093	+15.2 ⁴
NE England	1,831	1,815	-0.9 ¹²
E England	963	963	0.0 ¹²
SE England	578	716	+23.9 ⁸
SW England	370	423	+14.3 ⁴
Wales	942	c. 1,151	+22.2 ⁴
NW England	207	217	+4.8 ⁴
NE Ireland	2,096	2,359	+12.5 ⁷
SE Ireland	1,632	1,949	+19.4 ³
Britain and Ireland	11,448	12,372	+8.1¹⁰¹

A moderate increase occurred at monitored sites in **south-east Scotland**, where numbers at Leith Docks reached the highest ever recorded. The colony at the Isle of May continued to recover from a nadir in 2002 but, at Forth, numbers declined by 23.3% from 120 in 2005 to 92 in 2006.

Overall numbers in **north-east England** remained broadly stable. Declines at the Farne Islands and the Teesmouth colonies were largely compensated by an increase at Coquet Island.

At Rye Meads (**central England**), 48 pairs bred, more than in 2005 and above the colony's long-term average.

In **east England**, total numbers remained stable. Declines of up to 15% at three of the main north Norfolk colonies, Scolt Head, Blakeney and Holkham, were compensated by increases at several smaller sites and at Minsmere, Suffolk. Numbers at the latter site increased from 81 pairs in 2005 to 93 pairs in 2006, the second highest total since 1986 (1986-2005 mean 35 pairs, s.d. ± 29). A small increase was also recorded at Breydon Water, where 202 pairs nested on rafts, the highest count at this site since 1968.

Overall, numbers at sample colonies in **south-east England** were higher than in 2005. The largest increase occurred at between Pitt's Deep-Hurst where 371 pairs bred, the second highest count since 1986. Numbers at all other sites monitored in the region, except one, increased or remained stable.

Numbers at all colonies monitored in **south-west England** were higher in 2006 than in 2005. The most notable increase occurred at Lodmoor, where numbers were the highest since recording began. In **Wales**, all colonies remained stable or increased. The most substantial increase was at Shotton, where numbers were the highest on record. There was little overall change in **north-west England**. Numbers at Hodbarrow increased from 20 pairs in 2005 to 28 in 2006, which is just above the long-term average for the colony (1987-2005 mean 25 pairs, s.d. ± 14).

Overall numbers in **north-east Ireland** increased for a third consecutive year. The largest increase was at Larne Lough, where numbers were highest since recording began, more than compensating for the 12.9% decline at Strangford Lough.

Colonies in **south-east Ireland** continued to increase. The largest increase was at Rockabill, where numbers were more than three times the colony's long-term average and the highest since recording began. At Dublin Port, at least 347 pairs nested (207 in 2003). A further 78-90 pairs were discovered at two new sites in **south-west Ireland**.

Table 3.20.2 Population changes of common tern breeding pairs 2005-2006 and 1986-2005 at selected sites.

Region/Site	2005	2006	2005-2006 % change	1986-2005 Mean (\pms.d.)	No. years
SW Scotland					
Sgeir na Caillich	194	350	+80.4	171 (125)	19
G.Eileanan, Sd Mull	727	0	-100.0	558 (236)	21
N Scotland					
Alness Point	20	0	-100.0	105 (75)	18
Avoch, Ross	140	150	+7.1	103 (42)	6
Barmac's	52	0	-100.0	148 (139)	18
NE Scotland					
Loch of Strathbeg	85	128	+50.6	90 (34)	19
St. Fergus	5	27	+440.0	130 (76)	19
SE Scotland					
Isle of May	65	99	+52.3	145 (111)	20
Leith Docks	764	900	+17.8	499 (183)	17
NE England					
Coquet	1,155	1,226	+6.1	812 (199)	20
Farnes	160	122	-23.8	212 (90)	20
Teemouth	477	433	-9.2	404 (114)	8
C England					
Rye Meads	39	48	+23.1	42 (4)	15
E England					
Scolt Head	240	230	-4.2	173 (79)	20
Blakeney	150	135	-10.0	197 (65)	20
Breydon Water	197	202	+2.5	150 (50)	17
SE England					
Pitts Deep - Hurst	256	371	+44.9	155 (95)	19
Langstone Harbour	151	154	+2.0	82 (55)	20
Rye Harbour	153	169	+10.1	80 (32)	20
SW England					
Brownsea	240	248	+3.3	160 (45)	20
Lodmoor	40	60	+50.0	33 (14)	8
Wales					
Shotton Pools	c.587	722	+23.0	362 (165)	20
Cemlyn	72	126	+75.0	65 (25)	18
NW England					
Seaforth	175	170	-2.9	81 (70)	20
NE Ireland					
Larne Lough	480	743	+54.8	365 (207)	18
Carlingford Lough	341	398	+16.7	366 (136)	17
Strangford	1,104	962	-12.9	616 (157)	20
SE Ireland					
Rockabill	1,099	1,407	+28.0	448 (329)	20
Lady's Island Lake	c.471	c.484	+2.8	317 (99)	16

Breeding success (Tables 3.20.3 and 3.20.4)

Productivity in Scotland was similar to that in 2005 and particularly high in the north. Colonies in England were generally more productive than in 2005. Productivity in Wales and Ireland was very high.

In **south-west Scotland**, overall productivity was lower than in 2005. This was largely due to depredation of chicks by otters *Lutra lutra* at Sgeir na Caillich, the largest colony in the region (Craik 2006). Overall productivity in **north-west Scotland** was also lower than in 2005. At Eilean nan Gabhar, heavy depredation by otters reduced productivity (Craik 2006). Productivity was above one chick per pair at two sites where mink were controlled. No young fledged from 26 pairs at Eilean an Ruisg, where a specialist herring gull took eggs and chicks.

In **Shetland**, 19 pairs fledged a total of 12 young at three sites (20 pairs, 6 young, 5 sites in 2005). At least 35 young fledged at Hoy by mid-July (**Orkney**).

Breeding success in **north Scotland** was very high. Productivity at the Avoch fish farm, the largest colony in the region, was almost twice the colony average. At Invergordon Docks, 70 pairs raised 61 young, a productivity of 0.87 chicks per pair. Productivity at three small colonies of 12 pairs each was between 1.42 and 2.5 chicks per pair.

Quantitative data was only available from two small sites in **north-east Scotland**: 15 pairs at River Spey failed to fledge any young, and at a second site *c.* 16 pairs raised eight young to fledging. At least 98 young fledged at the Loch of Strathbeg, but accurate numbers were difficult to quantify (S. Paterson, pers. comm.).

Few quantitative data were available from sites in **south-east Scotland**, with the exception of the Forth, where productivity was well above the long-term average for the colony. On the Isle of May, depredation of chicks by large gulls depressed productivity, although no quantitative data were available (Alampo and Lamont 2006).

Overall productivity in **north-east England** was more than twice that during 2005. All colonies were very productive, with the exception of three small sites of less than 10 pairs each, which failed to fledge any young. However, at Coquet, the largest colony in the region, it was noted that a large number of fledged/fledging chicks died from late July due to starvation (P. Morrison, pers. comm.).

Common terns in **east England** were overall considerably more productive than in 2005. Productivity at the north Norfolk colonies was higher than in the previous season. At Blakeney, productivity was well above the colony's average, following two years of near-total breeding failure. At Holkham and Snettisham, however, productivity has been at or close to zero since 2002. In Suffolk, productivity at Minsmere, Breydon Water, Alton Water and Trimley Marshes was above one chick per pair at each site, but depredation of chicks by large gulls lowered productivity at Havergate Island, as in 2005 (K. Coates, pers. comm.).

Table 3.20.3 Common tern productivity, grouped regionally, 2005-2006: expressed as number of chicks fledged per breeding pair at sample colonies (superscript = number of colonies). When more than one colony was sampled in a given region, the overall figure given is the total number of fledglings divided by the total number of breeding pairs across all colonies. Note that the same colonies have not necessarily been monitored in each region each year and that the number of pairs given here are sample sizes (and do not necessarily indicate population changes between years).

Region	2005 chicks fledged/pair			2006 chicks fledged/pair		
	Pairs ⁿ	Range	Overall	Pairs ⁿ	Range	Overall
SW Scotland	1,167 ¹²	0.00-0.87	0.67	498 ⁹	0.00-1.18	0.52
NW Scotland	244 ⁸	0.00-1.88	0.59	666 ¹¹	0.00-1.35	0.45
N Scotland	272 ⁶	0.00-0.73	0.40	257 ⁶	0.87-3.00	1.40
NE Scotland	142 ⁴	0.00-0.67	0.47	34 ³	0.00-1.0	0.32
SE Scotland	225 ³	0.03-1.17	0.67	92 ¹	-	1.29
Total Scotland	2,065³⁶	0.00-1.88	0.63	1,547³⁰	0.00-3.00	0.68
NE England	1,660 ⁵	0.00-2.35	0.57	1,683 ¹⁰	0.00-2.28	c.1.24
C England	39 ¹	-	<1.59	48 ¹	-	No data
E England	865 ⁸	0.00-<1.33	0.30	979 ¹¹	0.00-1.71	0.69
SE England	318 ⁵	0.00-1.31	0.73	340 ⁴	0.05-1.18	0.64
SW England	370 ⁴	0.10-1.60	0.32	423 ⁴	0.12-1.50	0.57
NW England	204 ³	0.00-0.54	0.47	212 ³	0.14-0.53	0.47
Total England	3,494²⁷	0.00-2.35	0.50	3,637³²	0.00-2.28	0.92
Wales	688²	1.35-1.60	1.38	971³	0.57-1.48	1.32
NE Ireland	172 ³	0.83-1.60	1.00	9 ¹	-	1.44
SE Ireland	1,161 ²	0.81-1.44	1.41	1,832 ³	0.34-1.86	1.74

Overall productivity in **south-east England** was slightly below the region's long-term average (1986-2005 mean 0.69 chicks per pair, s.e. ± 0.07). The Rye Harbour colony was the most productive in the region: more than 200 young fledged and productivity was above the site's high long-term average for a sixth consecutive year. In contrast, at Langstone Harbour predation depressed productivity to well below the colony's average (C. Cockburn, pers. comm.). At Keyhaven (Pitt's Deep-Hurst), it was thought that common terns had a fairly successful season, but no quantitative data were available (P. Durnell, pers. comm.).

In **south-west England**, overall productivity was higher than in 2005. At Lodmoor and Chesil Fleet, productivity was above the respective sites' high long-term averages (Chesil: 1986-2005 mean 1.25 chicks per pair s.e. ± 0.23). At Brownsea Island, the region's largest colony, productivity was below the long-term average for a third consecutive year. Productivity at the Isles of Scilly was low, owing to tides inundating the main colony at a late incubation/early chick stage.

For a fifteenth consecutive season, common terns in **Wales** were very successful and productivity was well above the region's long-term average (1990-2005 mean 1.18 chicks per pair, s.e. ± 0.10). The colony at Cemlyn, however, was less successful than the three other colonies and productivity was similar to the long-term average for the site.

In **north-west England**, overall productivity was the same as in 2005, but the smaller colonies at Rockcliffe Marsh and Hodbarrow were more successful than in the previous season despite depredation of chicks by large gulls at the latter site (D. Blackledge, pers. comm.). Productivity at Seaforth was below average due to bad weather and food shortage (S. White, pers. comm.).

Table 3.20.4 Productivity of common terns expressed as chicks per pair 2005-2006 and 1986-2005 at selected sites. (+ indicates young fledged but no quantitative data were available)

Region/site	2005	2006	1986-2005	
			mean (\pm s.e.)	No. of years
SW Scotland				
E an Ruisg, L Feochan	0.87	0.00	1.82 (0.21)	8
Sgeir na Caillich, L Melfort	0.77	0.57	0.67 (0.26)	7
G. Eileanan, Sd Mull	0.69	No data	0.53 (0.20)	7
N Scotland				
Avoch Fish Farm	0.71	1.47	0.77 (0.23)	6
NE Scotland				
St Fergus	0.00	No data	0.15 (0.05)	12
SE Scotland				
Forth	c.1.17	c.1.29	0.91 (0.11)	12
NE England				
Coquet	0.60	1.03	1.03 (0.14)	20
C England				
Rye Meads	<1.59	No data	1.53 (0.13)	10
E England				
Hoveton Great Broad	0.50-1.00	0.83	1.26 (0.13)	5
Snettisham	0.02	0.02	0.28 (0.10)	14
Holkham	0.00	0.00	0.40 (0.13)	15
Blakeney	0.01	0.78	0.44 (0.13)	13
Breydon Water,	0.64	1.04	0.99 (0.07)	13
SE England				
Pitts Deep – Hurst	+	+	0.37 (0.11)	8
Langstone Harbour	0.21	0.05	0.54 (0.13)	18
Rye Harbour	1.31	1.18	1.05 (0.16)	20
SW England				
Brownsea Is	0.10	c.0.37	0.59 (0.07)	17
Lodmoor	1.00	1.50	1.46 (0.18)	8
Wales				
Shotton	c.1.35	c.1.42	1.30 (0.12)	17
Cemlyn	0.51-2.14	0.57	0.59 (0.24)	9
NW England				
Seaforth	0.54	0.53	0.61 (0.07)	20
Rockcliffe	0.00	0.14	0.11 (0.05)	13
NE Ireland				
Belfast Lough	>1.00	No data	1.35 (0.14)	5
SE Ireland				
Rockabill	1.44	1.86	1.59 (0.12)	15

Quantitative data were only available from the smallest colony in **north-east Ireland**: at Lower Lough Erne nine pairs fledged 13 young (5 pairs fledged 8 young in 2005).

Productivity at Rockabill (**south-east Ireland**) was the highest since 1996 and well above the high long-term average for the colony. Clupeids were the most common prey items presented to chicks and, during the later stages of chick-rearing, the proportion of gadoids in the diet increased (Baer *et al.* 2006). At Dublin Port, productivity was also high at 1.52 chicks per pair (1.24 in 2002, no data 2003-2005).

3.21 Arctic tern *Sterna paradisaea*

Between 2005 and 2006, substantial increases were recorded in Shetland and NE Ireland, whereas large declines occurred in other regions of Scotland. All other regions remained broadly stable. Productivity was highest in Wales, but most other regions were less or only slightly more productive than in 2005. Food shortages, some of short duration, depressed productivity in Orkney and SW Scotland and caused high post-fledging mortality on Coquet.

Breeding numbers (Tables 3.21.1 and 3.21.2)

Only 324 pairs of Arctic terns nested at 11 sites counted as part of the Mink-Seabird project in **west Scotland**, compared with 524 at twenty sites in 2005. The largest colony of c.200 pairs was found on Fladda, Sound of Luing, and the species returned with 32 pairs to Eilean Glas, Lismore (none in 2005, 45 in 2004, 33 in 2003). Elsewhere in the region, 11 sites on Tiree held at least 281 pairs. This is less than half of the 601 pairs recorded in 2004 (450 in 2005). However, the colony at The Reef on Tiree remained broadly stable at 123 pairs (127 in 2005). For the first time in three years, no Arctic terns nested on nearby Gunna (80 pairs in 2005).

Table 3.21.1 Regional population changes at monitored Arctic tern colonies, 2005-2006 (breeding pairs). Superscript = number of colonies counted in both years. Regional samples of fewer than 100 pairs not included.

Region	2005	2006	2005-2006 % change
SW & NW Scotland	1,215	796	-34.5 ³¹
Shetland	1,142	1,550	+35.7 ⁷
Orkney	4,869	4,876	+0.1 ³¹
N Scotland	387	244	-37.0 ⁷
NE Scotland	647	472	-27.0 ⁷
SE Scotland	610	515	-15.6 ²
NE England	4,719	4,859	+3.0 ³
Wales	2,663	2,726	+2.4 ⁴
NE Ireland	1,197	1,699	+41.9 ⁵
SE Ireland	453	493	+8.8 ⁴

In **Shetland**, an overall increase of more than a third between 2005 and 2006 was attributable to the large increase at Fair Isle. Most other monitored sites experienced varying rates of decline. On Foula, 120 individuals were present but did not breed. On Mousa, numbers declined by 32.4% from 287 pairs in 2005 to 194 in 2006. No birds nested at Hermaness, compared with 66 in 2005. Elsewhere in the region, at least 480 pairs nested at 11 sites compared with c.950 pairs at five sites in 2005.

Overall numbers of nesting Arctic terns remained stable in **Orkney**. Although several colonies held fewer birds than in 2005, other colonies increased. At the North Hill reserve on Papa Westray, almost 200 more individuals were observed than in 2005, but it was thought that only 529 pairs nested (Meek 2006). On Auskerry, 1,290 individuals were recorded in three sub-colonies compared with none in 2005 and 840 in 2003 (no data were available for 2004). In contrast, only 70 individuals were counted on Muckle Skerry, compared with 1,100 in 2005.

Numbers at sample sites in **north Scotland** declined by 37% between 2005 and 2006, largely due to a 68% decrease at Portgower from 150 pairs to 48. Nigg in Easter Ross, which formerly hosted the largest colony in the region, was unoccupied for a second consecutive year. Pairs at Brora declined by 26.4% to 64 pairs (87 in 2005). In contrast, the colony at Ardullie, established in 2003, almost doubled between 2005 and 2006.

Table 3.21.2 Population changes of Arctic terns 2005-2006 and 1986-2005 at selected sites. (P = pairs; I = individuals; + indicates that birds were present but no quantitative data were available).

Region/Site		2005	2006	2005-2006 % change	1986-2005	
					Mean (\pm s.d.)	No. years
SW Scotland						
Fladda, Sd Luing	P	c.150	200	+33.3	81 (107)	11
NW Scotland						
Isle of Eigg	P	49	33	-32.7	56 (48)	19
Shetland						
Fair Isle	P	40	818	+1,945.0	776 (713)	19
Foula	P	107	0	-100.0	622 (452)	19
Fetlar	P	537	486	-9.5	507 (339)	15
Orkney						
North Hill	I	1,050	1,230	+17.1	3,026 (1,858)	18
Rousay	I	+	122	-	380 (387)	4
N Scotland						
Ardullie	P	50	91	+82.0	33 (19)	3
NE Scotland						
Sands of Forvie	P	45	39	-13.3	83 (66)	17
St Fergus	P	451	339	-24.8	334 (133)	18
SE Scotland						
Isle of May	P	609	515	-15.4	492 (234)	20
NE England						
Coquet	P	1,112	1,168	+5.0	690 (184)	20
Farnes	P	2,380	2,250	-5.5	2,525 (935)	20
Long Nanny	P	1,227	1,441	+17.4	660 (638)	18
Wales						
Skerries	P	2,035	2,126	+4.5	960 (513)	20
NW England						
Foulney	P	40	41	+2.5	42 (12)	19
NE Ireland						
Strangford Lough	P	582	663	+13.9	198 (135)	20
Big Copeland	P	c.575	c.975	+69.6	435 (273)	14
SE Ireland						
Rockabill	P	204	209	+2.5	56 (66)	20

In **north-east Scotland**, declines occurred at all the major sites. At Kinloss, numbers decreased by 42.3% to 60 pairs following a substantial increase between 2004 and 2005. Although numbers at St Fergus declined by a quarter between 2005 and 2006, this about equalled the long-term colony mean. In **south-east Scotland**, nesting Arctic terns were only recorded at the Isle of May. Here, numbers declined for a second consecutive year but remained above the long-term average for the colony.

In **north-east England**, overall numbers increased for a third consecutive year. A small decline at the Farne Islands was more than compensated by increases at Long Nanny and Coquet. A count of 95 pairs was the highest ever recorded at Lindisfarne (A. Craggs, pers. comm.). In **east England**, 14 pairs were recorded at three sites on the Norfolk coast (8 pairs at one site in 2005 and 8 pairs at two sites in 2004).

In **Wales**, breeding numbers were only marginally higher than in 2005. The count on the Skerries, the largest colony in the region, was the highest recorded at the site. Numbers changed little at Foulney (**north-west England**), where they remained just under the colony's long-term average. On the **Isle of Man**, c.12 pairs nested compared with 13 in 2005 and 15 in 2004.

Increases were reported from all four colonies sampled in **north-east Ireland**. Numbers at Big Copeland returned to 2004 levels, following a substantial decline in 2005. At Strangford Lough, numbers were the highest since recording began. Colonies in **south-east Ireland** remained broadly stable. After being absent for four years, 27 pairs of Arctic terns returned to Dublin Port. Around 238 pairs nested at Lady's Island Lake (*c.*232 in 2005).

Breeding success (Tables 3.21.3 and 3.21.4)

As in previous years, breeding success in Wales was high. With the exception of north Scotland, productivity in most other regions was around or below average. Temporary, localised food shortages and predation were the main factors depressing productivity.

Productivity in **south-west Scotland** was the lowest for 20 years. This was partially due to a food shortage that was particularly notable on Tiree and Coll, where birds were late to settle and many nests were subsequently abandoned (J. Bowler and S Wellock, pers. comm.). On Fladda, however, mink caused the failure of all ground-nesting birds and the *c.*200 Arctic terns there fledged possibly only two young (Craik 2006). In contrast, 24 pairs fledged 30 young on Eilean Coltair, where mink were controlled. Quantitative data were available from only two sites in **north-west Scotland**. On the Isle of Eigg, all Arctic terns deserted their nests soon after laying following a spell of severe weather in mid June (J. Chester, pers. comm.). At Eilean Glas, a site visited as part of the Mink-Seabird Project, 20 young fledged from 32 pairs with losses due to depredation of some chicks by an otter (Craik 2006).

Overall productivity in **Shetland** was low, as in 2005. Nesting started late (Luxford and Smith 2006, Okill 2006b). However, Arctic terns on Fair Isle had their most productive year since 2000, and were more successful than at most other sites in the region. Productivity on Fetlar continued to be very low, although slightly higher than in 2005. Food did not seem to be scarce there, although prey items other than sandeels were regularly fed to chicks, including large numbers of snake pipefish which were also reported from other sites in the region (Luxford and Smith 2006, Okill 2006b, Shaw *et al.* 2006). On the Scalloway and Burray islands, 119 chicks were ringed in early July at eight sites holding a total of *c.*216 pairs. The largest chicks were still a week away from fledging. The main prey items were saithe or pollack, while no sandeels were seen (Okill 2006b).

Breeding success in **Orkney** was only marginally better than in 2004 and 2005, which were some of the worst seasons on record. At the North Hill colony, Papa Westray, 112 young fledged from 529 pairs, an improvement on the previous three years of breeding failure. However, elsewhere on Papa Westray, seven colonies with *c.*197 pairs failed to fledge any young. On Shapinsay, productivity was *c.*0.11 from *c.*180 pairs. At Loch Park on North Ronaldsay, a colony of *c.*300 pairs failed almost completely, although 30 young fledged from an unknown number of pairs at another colony on the island. At Muckle Green Holm, where 153 pairs bred, many dead chicks were found on the east side of the colony, but good numbers of fledged young were seen on the north side of the island. Similarly, at a colony of *c.*233 pairs at Burray Haas, many chicks were flying on 12 July but many dead chicks were found. At Faray, a colony of around 540 pairs, 243 chicks were ringed but the outcome was unknown. It is thought that a temporary food shortage caused the failure of many of the colonies (P. Higson, cited in Meek 2006).

Overall productivity in **north Scotland** was the highest since 1992 and more than twice the long-term average for this region. This was largely due to high productivity at Arduillie, while the 48 pairs at Portgower and 30 in Caithness failed to fledge any young. Productivity at Brora was 0.39, close to the colony's long-term average but higher than in 2005 (1986-2005 mean 0.38 chicks per pair, s.e. ± 0.17).

Few quantitative data were available in **north-east Scotland**. At the River Spey, 20 pairs failed to fledge any young, and at Kinloss and the Sands of Forvie, only a few young were thought to have fledged (M. Cook and A. Drysdale, pers. comm.). Depredation of chicks by large gulls depressed productivity on the Isle of May (**south-east Scotland**), but no quantitative data were available (Alampo and Lamont 2006).

Table 3.21.3 Arctic tern productivity, 2005-2006, grouped regionally: expressed as number of chicks fledged per breeding pair at sample colonies (superscript = number of colonies). When more than one colony was sampled in a given region, the overall figure given is the total number of fledglings divided by the total number of breeding pairs across all colonies. Note that the same colonies have not necessarily been monitored in each region each year and that the number of pairs given here are sample sizes (and do not necessarily indicate population changes between years).

Region	2005 chicks fledged/pair			2006 chicks fledged/pair		
	Pairs ⁿ	Range	Overall	Pairs ⁿ	Range	Overall
SW Scotland	1,056 ¹⁵	0.00-1.86	0.47	560 ⁸	0.00-1.25	0.14
NW Scotland	50 ²	-	0.00	65 ²	0.00-0.63	0.31
Shetland	1,125 ⁶	0.00-0.70	0.23	1,550 ⁵	0.08-2.00	0.28
Orkney	2,114 ⁹	0.00-0.30	0.02	1,249 ⁶	0.00-0.41	0.16
N Scotland	307 ⁵	0.00-0.88	0.49	244 ⁵	0.00-1.52	0.69
NE Scotland	540 ³	0.03-0.23	0.05	20 ¹	-	0.00
SE Scotland	610 ²	-	0.17	515 ¹	-	No data
NE England	4,719 ³	0.75-1.13	0.87	4,859 ³	0.56-0.90	0.66
E England	8 ¹	-	0.00	14 ³	0.00-0.20	0.14
Wales	2,035 ¹	-	1.20	2,186 ²	0.38-c.1.53	c.1.50
NW England	40 ¹	-	0.48	41 ¹	-	0.34
SE Ireland	221 ²	0.52-1.06	0.56	209 ¹	-	>0.24<1.03

In **north-east England**, overall productivity was close to the long-term average (1986-2005 mean 0.65 chicks per pair, s.e. ± 0.07), but lower than in 2005. On Coquet, productivity was well above average, but a considerable number of fledged chicks died of starvation (P. Morrison, pers. comm.). At Long Nanny, poor weather, predation and tidal inundation resulted in productivity below the colony's long-term average. Furthermore, 105 Arctic/common tern pairs at Lindisfarne fledged only 27 young owing to depredation of chicks by a kestrel (A. Craggs, pers. comm.). In **east England**, 14 pairs fledged two young.

Overall productivity in **Wales** in 2006 was higher than in the other regions. At the Skerries, productivity was 1.53 chicks per pair (sample of 30 nests), well above the colony's long-term average.

Productivity at Foulney (**north-west England**), the only site in the region where Arctic terns nest, was about average for the colony. At least two young fledged from c.12 pairs on the **Isle of Man**, but the outcome was unknown.

At Big Copeland (**north-east Ireland**), productivity was c.0.51 chicks pair (c.0.56 in 2005, 0.05 in 2004 and 0.06 in 2003). No quantitative data were available from Strangford Lough, the second largest colony in the region.

Productivity at Rockabill (**south-east Ireland**) was between 0.24 and 1.03 chicks per pair. No quantitative data were available from Lady's Island Lake, the region's largest colony.

Table 3.21.4 Productivity of Arctic terns expressed as chicks per pair during 2005-2006 and 1986-2005 at selected sites. (+ indicates that young fledged but no quantitative data were available).

Region/site	2005	2006	1986-2005	
			mean (\pm s.e.)	No. of years
SW & NW Scotland				
The Reef, Tiree	0.01	0.05	0.03 (0.03)	6
Isle of Eigg	0.00	0.00	0.12 (0.06)	8
Shetland				
Foula	0.11	N/a	0.14 (0.05)	17
Fair Isle	0.00	0.39	0.23 (0.08)	17
Fetlar	0.06	0.14	0.13 (0.05)	15
Orkney				
North Hill, Papa Westray	0.001	0.21	0.16 (0.09)	12
N Scotland				
Ardullie	0.88	1.52	0.78 (0.11)	2
NE Scotland				
Sands of Forvie	0.04	+	0.26 (0.08)	15
Kinloss	+	+	0.16 (0.07)	11
St Fergus	0.03	+	0.09 (0.03)	13
SE Scotland				
Isle of May	0.17	+	0.31 (0.08)	12
NE England				
Farnes	0.75	0.61	0.57 (0.11)	10
Coquet	1.13	0.90	0.77 (0.08)	16
Long Nanny	c.0.87	0.56	0.66 (0.12)	16
Wales				
Skerries	1.2	1.53	1.08 (0.10)	16
NW England				
Foulney	0.48	0.34	0.35 (0.05)	20
SE Ireland				
Rockabill	0.52	+	0.87 (0.12)	10

3.22 Little tern *Sternula albifrons*

Small to moderate increases occurred in two-thirds of the regions, but declines were noted in SW Scotland, SE England and NW England. Productivity at many sites across the regions was reduced by predation, bad weather and tidal inundation. Additionally, localised food shortages depressed productivity in SW Scotland and at sites in E England.

Breeding numbers (Tables 3.22.1 and 3.22.2)

Overall numbers in **south-west Scotland** declined for a second consecutive year. On Coll, numbers declined by two-thirds, following two years of increase. On Tiree, a minimum of 38 pairs nested, the lowest total since 1998. However, for the first time in 20 years, little terns nested at a former breeding site on mainland Argyll. Of the 28 adults recorded at this site, some may have been failed breeders from Coll or Tiree (S. Wellock, J. Bowler pers. comm.). Thirteen pairs nested in **north-west Scotland** (15 in 2005, 16 in 2004 and 14 in 2003).

Three pairs nested in **Orkney**, two more than in 2005. In **north Scotland**, 20 pairs nested at three sites compared with 14 at two in 2005. Numbers at Dalchalm doubled from 2005 but remained below the colony's long-term average.

Overall numbers in east Scotland increased from 31 pairs in 2005 to 41 in 2006. Despite a small increase, numbers at the Sands of Forvie (**north-east Scotland**) remained low. A site in **south-east Scotland**, first occupied in 2005 by seven pairs, increased to 13 pairs.

Overall numbers in **north-east England** were the highest since recording began. Most colonies increased or remained stable. Numbers at Easington almost doubled from 2005 to the colony's highest level since 1999. Numbers were the highest recorded at Gibraltar Point and Lindisfarne, and those at Long Nanny were just below their peak in 1992. In contrast, numbers at the Teesmouth colonies were amongst the lowest ever recorded. Eight pairs returned to Donna Nook after being absent in 2005.

In **east England**, overall numbers of nesting little terns increased for the first time since 2000. The most substantial increase was at Great Yarmouth, where numbers were the highest since recording began. A decline at Scolt Head was offset by an increase at Holkham. Despite a small increase, numbers at Blakeney were the second lowest in 25 years. Declines of little terns were reported in Suffolk, with 49 pairs at three colonies (62 pairs at seven colonies in 2005).

Table 3.22.1 Regional population changes at monitored little tern colonies, 2005-2006 (breeding pairs). Superscript = number of occupied colonies counted in both years. Regional samples of fewer than 50 pairs are excluded.

Region	2005	2006	2005-2006 % change
SW Scotland	109	74	-32.1 ¹⁸
NE England	197	260	+32.0 ¹⁰
E England	650	710	+9.2 ¹⁹
SE England	c.183	156	-14.8 ⁷
Wales	c.72	c.111	+54.2 ²
SE Ireland	100	106	+6.0 ¹

Overall numbers in **south-east England** declined to the lowest for 21 years. A moderate decline occurred at all colonies in the region, except at Rye Harbour. Numbers there remained well below the colony's long-term average, although a small increase occurred from to 2005.

Although numbers at Chesil Bank (**south-west England**) were slightly higher than in 2005, the total was the second lowest on record.

Following two years of decline, numbers at Gronant (**Wales**) increased to 110 pairs, comparable to the peak in 2003. For the first time since 1988, one pair nested at an additional site in Wales.

Table 3.22.2 Population changes of little terns 2005-2006 and 1986-2005 at selected sites.

Region/Site	2005	2006	2005-2006 % change	1986-2005	
				Mean (\pm s.d.)	No. years
SW Scotland					
Coll	37	12	-67.6	23 (9)	7
N Scotland					
Dalchalm	5	10	+100.0	12 (12)	17
E Scotland					
Sands of Forvie	19	22	+15.8	31 (22)	20
NE England					
Lindisfarne	35	55	+57.1	19 (15)	20
Gibraltar Point	44	53	+20.5	29 (17)	20
Tetney	3	0	-100.0	27 (32)	20
Crimdon Dene	31	25	-19.4	38 (20)	11
Long Nanny	39	51	+30.8	37 (12)	20
Easington Lagoon	27	51	+88.9	38 (18)	20
E England					
Scolt Head	105	82	-21.9	65 (30)	19
Blakeney	50	56	+12.0	124 (44)	20
Holkham	60	81	+35.0	94 (28)	20
Great Yarmouth	214	369	+72.4	172 (80)	20
Winterton Dunes	9	0	-100.0	96 (92)	6
Benacre	5	40	+700.0	17 (23)	18
SE England					
Rye Harbour	18	21	+16.7	34 (16)	20
Hayling Oysterbeds	45	37	-17.8	55 (52)	9
SW England					
Chesil Bank	30	33	+10.0	61 (23)	20
Wales					
Gronant	c.72	c.110	+52.8	65 (20)	20
NW England					
Hodbarrow	46	16	-65.2	20 (10)	20
Foulney Is	7	26	+271.4	9 (11)	20
SE Ireland					
Kilcoole	100	106	+6.0	41 (23)	19

Numbers at Foulney (**north-west England**) increased to 19 pairs (the highest recorded since 1992), but this failed to compensate for the loss of 30 pairs from Hodbarrow. On the **Isle of Man**, numbers increased by six pairs to 17 in 2006 (15 in 2004 and 21 in 2003).

The colony at Kilcoole (**south-east Ireland**) continued to increase, and numbers were the highest since recording began. In **south-west Ireland**, a new colony of 32 to 40 pairs was discovered.

Breeding success (Table 3.22.3, Table 3.22.4)

Breeding success varied greatly across Britain and Ireland. Productivity was particularly low in Scotland, but was three times higher in England and Wales than in 2005. As in 2005, many sites reported a late start to the breeding season, probably due to the cold and unsettled weather in April and May, although mild weather favoured many colonies later in the season.

Most sites in **north-west** and **west Scotland** failed to produce any young. Breeding started late at Tiree and all nests at the main colony on The Reef failed at the egg stage, most likely due to a shortage of sandeels. A combination of inclement weather and lack of food resulted in a complete breeding failure at Coll, a contrast to the previous two years of high productivity. More than 40 adults were present at the beginning of the breeding season but nests were abandoned quickly. At least two chicks fledged from the new colony in mainland Argyll.

Three pairs fledged one chick at a south isles site in **Orkney** (Meek 2005).

Productivity in **north Scotland** was the highest for seven years. At Dalchalm, productivity was well above the long-term average and 10 pairs at two sites raised 11 young.

In **east Scotland**, six pairs at two sites failed to fledge any young. Complete breeding failure was suspected at the Sands of Forvie, despite apparent food abundance, but this was not confirmed (A. Drysdale, pers. comm.). No productivity data were available from the fourth site in the region.

Overall productivity in **north-east England** was lower than in 2005, but close to the region's long term-average (1986-2005 mean 0.46, s.e. ± 0.05). In addition to periods of bad weather, kleptoparasitism by Arctic terns severely affected breeding success at Long Nanny, resulting in a productivity just below the colony's long-term average (Craigden and Ward 2006). A fox killed chicks at Easington (M. Coverdale, pers. comm.) and a kestrel did the same at Lindisfarne (A. Craggs, pers. comm.). At Gibraltar Point, productivity was the highest since 1999 and well above the colony's long-term average, although breeding started late and clutch size was well below the site's average (K. Wilson, pers. comm.). Productivity at Crimdon Dene was the highest since 1996.

In **east England**, overall productivity was high, largely due to the very successful colony at Great Yarmouth, productivity was the highest on record. Indeed, more chicks fledged from this colony than at all monitored colonies in the rest of the UK and Ireland combined. In contrast, productivity at most other sites was low. Localised food shortages and predation depressed productivity at Scolt Head and Blakeney (N. Lawton, D. Wood, pers. comm.), although the very low breeding success at Holkham could not be explained by these factors (A. Bloomfield, pers. comm.). High tides washed out most nests at Benacre and only two young fledged from this site.

Overall productivity in **south-east England** was close to the long-term average for the region, and only slightly higher than in 2005. Bad weather and predation depressed productivity at Langstone Harbour, Rye Harbour and Hayling Oysterbeds. As in 2005, rats (*Rattus norvegicus*) took eggs at Hayling Oysterbeds but were controlled at an early stage leading to productivity that was the highest for five years, although post-fledging mortality was noted (J. Crook, pers. comm.). At Keyhaven (Pitts' Deep-Hurst), 54 pairs were thought to have been reasonably successful, although no productivity figure was available.

Breeding was delayed at Chesil Bank (**south-west England**) by poor weather. For the fourth consecutive year, depredation of eggs by a fox reduced hatching success, and a period of severe weather at the hatching stage further depressed productivity (D. Moxom, pers. comm.).

At Gronant (**Wales**), productivity was high and well above the colony's long-term average, although kestrels killed up to 12 adults and a similar number of young (G. Robinson, pers. comm.).

Table 3.22.3 Little tern productivity, 2005-2006, grouped regionally: estimated number of chicks fledged per breeding pair at sample colonies. Superscript = number of colonies. When more than one colony was sampled in a given region, the overall figure given is the total number of fledglings divided by the total number of breeding pairs across all 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	2005 chicks fledged/pair			2006 chicks fledged/pair		
	Pairs ⁿ	Range	Overall	Pairs ⁿ	Range	Overall
SW Scotland	105 ¹⁴	0.00-1.16	0.72	50 ¹¹	0.00	0.00
Orkney	1	-	2.00	3 ¹	-	0.33
N Scotland	14 ²	0.00-1.00	0.36	20 ³	0.67-1.10	1.00
E Scotland	31 ⁵	0.00-1.14	0.39	6 ²	0.00	0.00
Total Scotland	150²¹	0.00-1.16	0.63	79¹⁷	0.00-1.10	0.27
NE England	194 ⁸	0.00-1.14	0.60	273 ⁹	0.00-1.48	0.45
E England	c.650 ²⁰	0.00-1.20	c.0.16	696 ¹¹	0.00-1.82	1.10
SE England	183 ⁹	0.00-1.11	0.30	102 ⁵	0.00-0.65	0.33
SW England	30 ¹	-	0.00	33 ¹	-	0.09
Wales	c.72 ¹	-	0.47	c.111 ²	0.00-1.45	c.1.44
NW England/Isle of Man	62 ³	0.00-0.71	0.18	59 ³	0.50-1.29	0.80
Total England and Wales	1,191⁴²	0.00-1.20	0.27	1,274³¹	0.00-1.82	0.89
SE Ireland	100 ¹	-	1.60	106 ¹	-	0.20

At Hodbarrow (**north-west England**), depredation of chicks by large gulls is thought to have caused the low breeding success (D. Blackledge, pers. comm.). Productivity at Foulney was 0.65 chicks per pair, well above the long-term average (1986-2005 mean 0.43, s.e. ±0.15).

On the **Isle of Man**, favourable weather, an apparent abundance of sandeels and little predation allowed a high productivity of 1.29 chicks per pair (0.0 in 2005) (L. Samson, pers. comm.).

Foxes depredated an estimated 148 chicks (=83% of all chicks) at Kilcoole (**south-east Ireland**), so that productivity was low compared to the previous three years (Lynch *et al.* 2006).

Table 3.22.4 Productivity (chicks fledged per pair) of little terns 2005-2006 and 1986-2005 at selected. (+ indicates that young fledged but no quantitative data were available.)

Region/site	2005	2006	1986-2005 mean (\pm s.e.)	No. of years
N Scotland				
Dalchalm	1.00	1.1	0.64 (0.11)	12
NE Scotland				
Sands of Forvie	0.16	+	0.29 (0.08)	18
Lossiemouth	0.00	0.00	0.56 (0.28)	7
NE England				
Long Nanny	1.05	0.53	0.57 (0.11)	20
Gibraltar Point	0.07	0.58	0.29 (0.06)	20
Crimdon Dene	0.06	1.48	0.57 (0.19)	11
Easington Lagoons	1.00	0.08	0.42 (0.10)	20
Lindisfarne	1.14	0.31	0.64 (0.16)	18
E England				
Great Yarmouth	0.05	1.82	0.65 (0.14)	19
Scolt Head	0.24	0.06	0.44 (0.12)	19
Blakeney	0.22	0.30	0.47 (0.10)	19
Benacre	0.00	0.05	0.35 (0.17)	10
Hamford Water	0.40-1.12	c.1.17	0.99 (0.18)	10
SE England				
Chichester Harbour	0.00	No data	0.20 (0.10)	15
Hayling Island, Langstone	0.00	0.65	0.85 (0.33)	8
Langstone Harbour	0.34	0.03	0.36 (0.10)	19
Rye Harbour	1.11	0.43	0.41 (0.09)	19
SW England				
Chesil Bank	0.00	0.09	0.26 (0.05)	20
Wales				
Gronant	0.47	1.45	0.96 (0.15)	20
NW England				
Hodbarrow	0.13	0.50	0.32 (0.08)	20
SE Ireland				
Kilcoole	1.60	0.20	1.01 (0.19)	19

3.23 Common guillemot *Uria aalge*

Between 2005 and 2006, numbers in most regions in Britain and Ireland were stable although declines were noted in whole-colony counts in SW Scotland, Wales and NE Ireland and in sample plots in SW Scotland. While long-term trends, whether measured by sample plots or through whole-colony counts, in most regions are generally upward there appears to have been some decline in numbers in Scottish regions since the early 2000s. Mean productivity in 2006 was, after 2004 and 2005, the third lowest since 1986. Only at North Sutor and the Farne Islands was success close to the colony average. On Handa, it was the least productive breeding season on record.

Breeding numbers (Tables 3.23.1 and 3.23.2, Figure 3.23.1)

Between 2005 and 2006 guillemot numbers were stable in most regions except in a few adjacent to the Irish Sea. In **south-west Scotland**, there was a significant decline recorded in sample plots in a small colony on Colonsay (-39.7%, $t=4.101$, $d.f.=8$, $P<0.01$) between the two years. Whole-colony counts in the region also indicated a decline, of 18.9%; constituent colonies declined by 11.2% at Ceann a'Mhara and by 24.8% at Mull of Galloway, where observer bias may have had an effect, although the 2006 count was similar to that of 2003 and 2004. Despite a downward turn in the regional index in recent years the overall trend remains positive at a highly significant rate of change.

In **Wales**, where the population index, as measured by sample plots, has been steadily increasing since 1986, numbers in plots changed little between 2005 and 2006; however, whole-colony counts recorded 15.9% fewer birds than in 2005. Of seven colonies where sample plots are counted the only significant change was detected at Skokholm (-17.3%, $t=8.054$, $d.f.=17$, $P<0.001$) with changes at the other six ranging from -10% to +1%. For whole-colony counts, moderate sized decreases were recorded at Elegug Stacks, Stackpole Head and Skomer. After two years of large increases numbers on St. Margaret's Island declined, by 53.8% to 396 individuals – a more typical value for the colony over the last decade. Whole-colony counts at Bardsey and Ynsoedd Gwylan were lower than in 2005 but not markedly so. Across the Irish Sea, a decline of 18.7% was recorded in a whole-colony count of the Isle of Muck, the sole colony monitored in **north-east Ireland**, where numbers were at their lowest in the last five years.

Elsewhere in Britain, regional totals in 2006, whether derived from sample plots or whole-colony counts, were little different to those recorded in 2005. In **north-west Scotland**, the between-year difference in sample plots on Handa was less than 1%; numbers have not yet recovered after the large decline recorded at the colony between 2004 and 2005.

In **Shetland**, the overall difference recorded in sample plots was -2.2%. Significant changes were only detected at Burravoe (+24.6%, $t=5.914$, $d.f.=8$, $P<0.01$) and Noss (-10.8%, $t=2.417$, $d.f.=8$, $P<0.05$) with minimal changes at other colonies which ranged from +3.8% to -6.8%. However, after recent declines the regional index is still some 40% lower than in 2000 and the overall trend as measured since 1986 is downward at a significant annual rate. In **Orkney**, numbers in annually monitored plots on Papa Westray increased by 10.9% although this change was non-significant. An additional suite of sample plots at several Mainland colonies monitored on a triennial basis found an overall decline of 14.2% since 2003. Highly significant decreases were recorded at Row Head (-26.0%, $t=7.525$, $d.f.=9$, $P<0.001$), Marwick Head (-16.1%, $t=5.375$, $d.f.=8$, $P<0.001$) and Costa Head (-10.7%, $t=2.761$, $d.f.=8$, $P<0.05$) on the west coast and at Gultak (-24.1%, $t=6.249$, $d.f.=8$, $P<0.001$) on the east coast. At Mull Head, also on the east coast, a small non-significant decrease of 6.9% was recorded. Furthermore, a whole-colony count at Marwick Head recorded 16,817 individuals, an increase of 60.5% since 2004 when low numbers were found although the 2006 count is still some 10,000 fewer birds than was recorded in the colony in 1999. As is the case in Shetland, numbers in sample plots have been declining since at least 2000, although unlike in Shetland the regional trend for Orkney shows numbers have been reasonably stable over the long-term.

Numbers were also stable in **north-east Scotland**, with virtually no change detected in plots at Fowlsheugh for the second successive year. However, a complete count at the same colony recorded 53,100 individuals in 2006, 14.8% fewer than in 1999 although, again, there has been no overall change detected in plots in the same time period. In **south-east Scotland**, plots at St. Abb's Head held 3.9% fewer birds than in 2005 – a non-significant change. Complete counts at several colonies yielded nearly identical counts to those in 2005, although some large changes were recorded at individual sites. On Fidra, numbers fell by 34.7% to 458 individuals, the lowest number there since 1999, and on the Bass Rock, after three successive years of decline, there was a 73.7% increase to 3,230 individuals.

Table 3.23.1 Regional population changes at monitored common guillemot colonies (adults attending colony in first three weeks of June). Trends for 1986-2005 are average annual rates of change shown by sample populations; in Orkney and NE Scotland these are based on colonies monitored triennially. Statistical significance of trends is indicated as: n.s. not significant, * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. Further details of the calculation of trends are given in section 1.2.2.

3.23.1a Counts of adult guillemots in study plots, 2005-2006 (or earlier where monitoring is not carried out annually). Figures are summed means of 5-10 replicate counts of each of the study plots.

Region	2003	2005	2006	% change since previous count	% annual change
SW Scotland ^a		121	73	-39.7	-
NW Scotland ^b		2,127	2,111	-0.8	+0.2 n.s. 1986-2005
Shetland ^c		8,087	7,913	-2.2	-2.0** 1986-2005
Orkney ^d		265	294	+10.9	+0.6 n.s. 1986-2005
Orkney ^e	6,073	-	5,211	-14.2	+0.9* 1986-2003
NE Scotland ^f		3,660	3,614	-1.5	+3.8*** 1986-2005
SE Scotland ^g		1,702	1,636	-3.9	+2.6*** 1986-2005
Wales ^h		15,921	15,776	-0.9	+6.0*** 1986-2005

Colonies: ^a Colonsay; ^b Handa; ^c Hermaness, Burravoe, Eshaness, Noss, Troswick Ness, Sumburgh Head, Fair Isle; ^d Papa Westray; ^e Row Head, Marwick Head, Costa Head, Mull Head, Gultak; ^f Fowlsheugh; ^g St. Abb's Head; ^h South Stack, Lochty, New Quay Head, Skomer, Skokholm, Stackpole Head NNR, Elegug Stacks.

3.23.1b Whole-colony counts of common guillemots. Note that whole-colony counts should be treated with some caution as the numbers of birds attending colonies may vary markedly from day to day. Replicate study plot counts are better indicators of population change. Trends given for south-east Scotland are derived from whole-colony counts on the Isle of May only, those for north-east England are from whole-colony counts on the Farne Islands only; those for Wales are from whole-colony counts at Skomer, Skokholm, Stackpole and Elegug Stacks.

Region	2005	2006	2005-2006 % change	% annual change
SW Scotland ^a	5,038	4,085	-18.9	+4.2*** 1986-2005
SE Scotland ^b	28,277	28,276	<-0.1	+2.6*** 1986-2005
NE England ^c	46,915	47,926	+2.2	+5.4*** 1986-2005
SW England ^d	883	905	+2.5	-
Wales ^e	37,977	31,945	-15.9	+5.8*** 1986-2005
NW England ^f	8,765	9,100	+3.8	+3.2*** 1986-2005
NE Ireland ^g	1,383	1,125	-18.7	-

Colonies: ^a Mull of Galloway, Ceann a Mhara; ^b Isle of May, Inchkeith, Craigleith, Fidra, The Lamb, Inchcolm, Bass Rock; ^c Farne Islands; ^d St. Aldhelm's - Durlston; ^e Caldey, Barafundle-Giltar, Stackpole Head NNR, Elegug Stacks and nearby coast, Skomer, St Margaret's Island, Bardsey, Ynys Gwylan; ^f St. Bees Head; ^g Isle of Muck.

On Craigleith and The Lamb, numbers increased by 10-15% but there was little difference in the largest colony, on the Isle of May (-6.7%). In common with several other regions a decline is evident in the regional trend since 2000, although the overall long term rate of annual change remains positive.

On the Farne Islands, the sole colony monitored in **north-east England**, the small increase detected between 2005 and 2006 was the seventh successive year of increase at this colony; the upward trend in the regional index evident since the early 1990s continues at a highly significant rate.

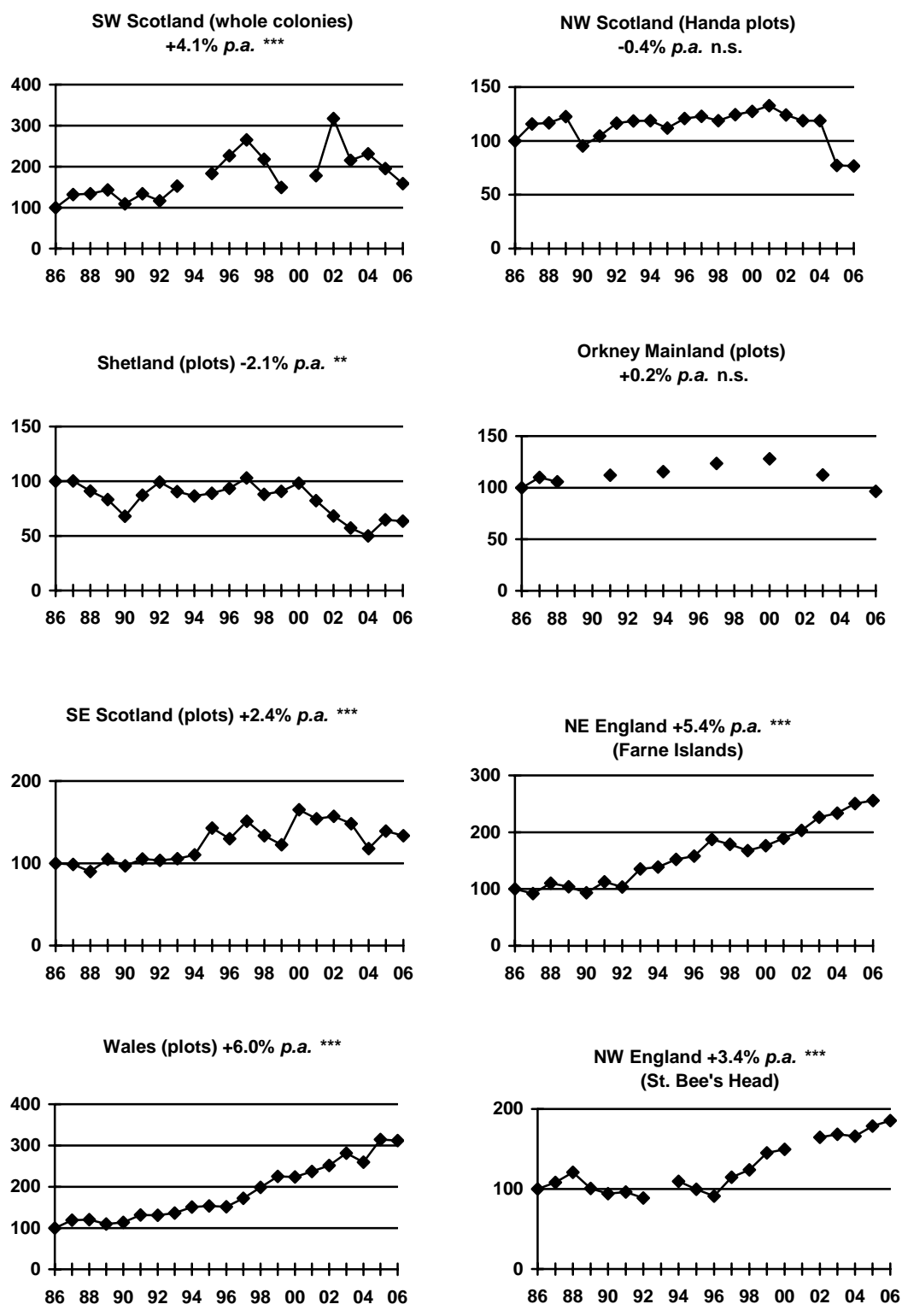


Figure 3.23.1 Regional population indices for breeding common guillemots, 1986-2006 (counts of adults in June). Average annual rates of change were calculated by regression of natural log of index against year (see section 1.2.2. for details). Statistical significance of trends (t-test) indicated as: n.s. not significant, ** $P < 0.01$, *** $P < 0.001$.

Table 3.23.2 Population changes of common guillemots 2005-2006 and 1986-2006 at selected sites. P\W indicates plot or whole-colony counts.

Region/Site		2005	2006	2005-2006 % change	1986-2005		
					Mean	±s.d.	No. years
SW Scotland							
Mull of Galloway	W	2,865	2,155	-24.8	1,764	641	19
Ceann a Mhara	W	2,173	1,930	-11.2	1,489	1,060	8
NW Scotland							
Handa	P	2,127	2,011	-5.4	3,238	469	8
Shetland							
Noss	P	2,121	1,892	-10.8	2,518	405	20
Hermaness	P	2,078	2,093	+0.7	2,670	729	11
Eshaness	P	189	186	-1.6	352	84	20
Troswick Ness	P	287	298	+3.8	327	46	17
Sumburgh Head	P	1,174	1,094	-6.8	1,500	343	20
Burravoe	P	187	233	+24.6	190	37	18
Fair Isle	P	2,049	2,116	+3.3	2,549	524	16
Orkney							
Papa Westray	P	265	294	+10.9	408	287	4
NE Scotland							
Fowlsheugh	P	3,660	3,314	-9.4	3,613	202	7
SE Scotland							
Craigleith	W	1,452	1,672	+15.2	1,780	608	16
The Lamb	W	1,578	1,745	+10.6	2,762	857	19
Fidra	W	701	458	-34.7	344	209	20
Isle of May	W	22,667	21,144	-6.7	21,924	4,186	20
Bass Rock	W	1,860	3,230	+73.7	2,964	704	10
St. Abb's Head	P	1,702	1,636	-3.9	1,561	287	17
NE England							
Farne Islands	W	46,915	47,926	+2.2	29,087	9,312	20
SW England							
St. Aldhelm's-Durlston	W	883	905	+2.5	576	135	17
Wales							
Elegug Stacks	P	4,091	3,901	-4.6	2,171	854	18
	W	12,381	10,235	-17.3	7,466	2,452	13
Stackpole Head	P	482	435	-9.7	406	67	10
	W	1,457	1,149	-21.1	1,011	162	17
Skokholm	P	399	330	-17.3	327	69	3
Skomer	P	4,898	5,038	+2.9	2,803	1,162	20
	W	19,711	16,977	-13.9	10,297	3,868	20
South Stack	P	4,824	4,859	+0.7	3,293	593	20
Bardsey	W	785	744	-5.2	453	225	17
Ynsoedd Gwylan	W	318	294	-7.5	222	103	8
New Quay	P	677	676	-0.1	677		1
Lochtyn	P	551	536	-2.7	531	28	2
St Margaret's Island	W	858	396	-53.8	497	136	13
NW England							
St. Bee's Head	W	8,765	9,100	+3.8	6,051	1,492	18
NE Ireland							
Isle of Muck	W	1,383	1,125	-18.7	1,186	330	7

At Durlston Head (**south-west England**) and St. Bee's Head (**north-west England**) changes were minimal between 2005 and 2006 although counts at both were the highest on record. In the latter region a distinct upward trend is evident since 1996, prior to which numbers had been relatively stable.

Breeding success (Table 3.23.3)

The intensity of monitoring at the colonies listed in Table 3.23.3 varies and this may affect estimates of breeding performance (Walsh *et al.* 1995). Direct comparisons between colonies are therefore inadvisable without prior consultation with the authors.

Table 3.23.3 Breeding success of common guillemot, 2005-2006 and colony averages 1986-2005: estimated number of chicks fledged per site regularly occupied by a pair or per pair laying. Superscript figures for individual colonies are numbers of study plots, figures are mean and standard error across all plots. Statistical significance of between year changes (t-test) indicated as: n.s. – not significant.

Colony	Colony average 1986-2005			2005 chicks fledged/pair			2006 chicks fledged/pair			2005-2006 change	
	Years	Mean	\pm s.e.	Sites ⁿ	Mean	\pm s.e.	Sites ⁿ	Mean	\pm s.e.	Mean	\pm s.e.
Handa	18	0.67	\pm 0.03	143 ³	0.25	\pm 0.08	148 ³	0.04	\pm 0.01	-0.21	-
Sumburgh Head	17	0.60	\pm 0.04	117 ¹	0.56	-	136 ¹	0.57	-	+0.01	-
Fair Isle	19	0.66	\pm 0.05	152 ²	0.23	\pm 0.05	156 ²	0.56	\pm 0.06	+0.33	-
Papa Westray	16	0.61	\pm 0.05	133 ¹	0.24	-	196 ¹	0.36	-	+0.12	-
Marwick Head	19	0.67	\pm 0.03	67 ¹	0.33	-	83 ¹	0.54	-	+0.21	-
Mull Head	16	0.67	\pm 0.04	74 ¹	0.35	-	87 ¹	0.52	-	+0.17	-
North Sutor	12	0.63	\pm 0.05	71 ²	0.43	\pm 0.15	14 ¹	0.64	-	+0.21	-
Isle of May	20	0.75	\pm 0.02	945 ⁵	0.63	\pm 0.02	932 ⁵	0.39	\pm 0.04	-0.24	-
Farne Islands	4	0.74	\pm 0.06	No data	-	-	167 ²	0.72	\pm 0.02	-	-
Durlston	9	0.83	\pm 0.02	61 ¹	0.85	-	No data	-	-	-	-
Skomer	17	0.72	\pm 0.01	297 ⁵	0.70	\pm 0.03	287 ⁵	0.47	\pm 0.07	-0.23	-
Total ^{no colonies}	-	-	-	2,060 ¹⁰	0.46	\pm 0.07	2,206 ¹⁰	0.48	\pm 0.06	+0.04⁹	\pm 0.07 n.s.

Common guillemots had another poor breeding season in 2006. Mean success was 0.48 chicks fledged per pair from 10 colonies in the UK. This was similar to that recorded in 2005 and again well below the overall long-term mean (1986-2005) of 0.69 (s.e. \pm 0.02), recorded from between three and 15 colonies annually. There was no significant difference in success between the nine colonies monitored in both years.

In 2005, breeding success tended to be lower in colonies in the north of Scotland than in those to the south but in 2006 low levels of success were recorded throughout Britain. In **Shetland**, breeding success at Sumburgh Head was similar to that in 2005 at 0.57 chicks fledged per pair laying and just below the colony mean. The first eggs were seen on 8 May and the median laying date was estimated to be 19 May, respectively three days and one week earlier than in 2005 although the latter date is still 17 days later than in 2001 (Heubeck 2006). Most losses (48%) occurred at the egg stage. On Fair Isle, the first-egg was laid on 11 May, five days earlier than in 2005. Breeding success, at 0.56 chicks fledged per pair, although higher than in 2005 was still below the colony average (Shaw *et al.* 2006). On 6-7 July an all day feeding watch revealed that lesser sandeels comprised 41% of feeds with gadoids (26%), clupeids (13%) and pipefish (5%) also recorded. At Compass Head, a sample of 52 chicks on 2 July found that, although smaller chicks were heavier than in 2003-2005, chick weights in general were 10% lighter than during the 1990s (Heubeck 2006; Okill 2006b).

In **Orkney**, breeding success at Papa Westray, Marwick Head and Mull Head was higher than in 2005 although the values recorded were still well below the respective long-term colony means. Provisioning rates of chicks were low at Marwick Head where eight hours of observation spread over four dates saw only six fish delivered: two clupeids, two gadoids and two pipefish (Meek 2006).

On Handa (**north-west Scotland**), breeding success in 2006 was the lowest on record, though no details as to possible reasons for this were available. In **north Scotland**, breeding success at North Sutor, at 0.64 chicks fledged per pair, was close to the long-term mean for the site. However, although common guillemots appeared to have a relatively successful season there compared with other British colonies only a small sub-colony of birds was monitored. It is possible that these birds may not have been representative of the colony as a whole, so some caution should be given to this figure (Swann 2005b).

It was another late breeding season on the Isle of May (**south-east Scotland**), where the first guillemot egg was laid on 2 May, the second latest date yet recorded at the colony (4 May in 2005). Breeding success averaged 0.39 chicks per pair laying, the lowest on record for the colony and almost half that normally expected. The average hatching success was 84%, nearly identical to the long-term mean (83%) but chick success was estimated at 49% whereas 90% would be a typical value (Newell *et al.* 2006). Many chicks were left unattended, a common feature in recent years, which suggests adults were again finding it hard to find food. Resultant mortality was largely due to attacks by adjacent territorial adults or starvation; few chicks were eaten by gulls which visited the nesting ledges to scavenge deserted/addled eggs and fish that had been dropped. Feeding studies indicated very few sandeels (15% of feeds, 4% by biomass) were delivered to guillemot chicks ($\leq 2\%$ by biomass in 2004 and 2005) with clupeids (65% of feeds) and gadoids (20% of feeds) composing the majority of prey items (Newell *et al.* 2006).

The Farne Islands (**north-east England**), was the most successful colony in Britain in 2006 fledging 0.72 chicks per egg laying pair. Birds nesting on the Inner and Outer groups had similar levels of success with 0.70 and 0.75 chicks fledged, respectively (Walton 2006). On Skomer (**Wales**), it was also regarded as a late season with the first egg not noted until 11 May, eight days later than in 2005. Breeding success was the lowest on record at 0.47 chicks fledged per pair with most failures occurring when chicks were 10 days old or more; predation by great black-backed gulls was thought to be the main cause of chick loss (Brown and Darke 2006). Reduced success is obvious over the last seven years; in the period 1999-2005 productivity was above 0.70 only once, yet between 1989-1998 success was only once below that figure.

3.24 Razorbill *Alca torda*

The number of razorbills in sample plots increased in Orkney but in other regions decreased or at least remained stable between 2005 and 2006. Whole-colony counts mostly indicated increases in regions on the east coast of Britain but decreases to the west, except in NW England where a large increase was recorded. Mean productivity was, as it had been since 2003, markedly lower than the long-term average. Breeding success was especially low at colonies in the Northern Isles and Wales but in other regions was close to the respective colony means.

Breeding numbers (Tables 3.24.1 and 3.24.2, Figure 3.24.1)

Tables 3.24.1a and 3.24.1b show overall regional changes in razorbill numbers at sample plots and whole colonies between 2005 and 2006. Generally, multiple plot counts are preferred for monitoring annual population changes in razorbills as they smooth out day-to-day fluctuations in numbers of birds attending breeding colonies. It should also be noted that razorbills are difficult to census, because of their habit of nesting in crevices and under boulders, so there may be considerable variation in counts between individual observers. Note that Table 3.24b contains data from field counts of individuals and of apparently occupied sites; the two should not be compared directly.

Data from whole-colony counts and sample plots indicated that razorbill numbers in many regions in Britain and Ireland were relatively stable between 2005 and 2006 although some large scale changes were detected, particularly in the west. In **Shetland**, numbers in sample plots fell by 18.2% since 2005 with significant declines recorded at Sumburgh Head (25.9%, $t=4.110$, $d.f.=8$, $P<0.01$), Troswick Ness (49.5%, $t=6.034$, $d.f.=8$, $P<0.001$) and Eshaness (36.2%, $t=2.859$, $d.f.=8$, $P<0.05$) (Heubeck 2006). Declines in plots at Burravoe, Noss and Hermaness were non-significant, as was the small increase recorded at Fair Isle. In **Orkney**, the annually monitored plot at Papa Westray indicated a substantial, but non-significant, increase of 31.3% since 2005. Triennially monitored plots at several colonies found little overall change since 2003 although a significant decline had occurred at Marwick Head (15.5%, $t=2.676$, $d.f.=8$, $P<0.05$). The changes at Costa Head (+3.4%), Mull Head (+1.6%), Gultak (-10.8) and Row Head (-18.9%) were all non-significant. The regional trend as measured at these triennial colonies indicates long-term increase at a highly significant rate, in contrast to Shetland where there is no noticeable trend over the long-term.

In **south-west Scotland**, sample plot data from Colonsay detected a decline of 18.8% since 2005, although this too was non-significant. Greater numbers are monitored in the region by whole-colony counts which also indicated a decrease, of 12.0% at Ceann a Mhara, since 2005. Numbers on Lunga appeared similar between the two years but as this colony is counted in late June (slightly later than is recommended) it is possible that between-year variation in the timing of breeding has masked any change. The regional trend as measured from a combination of plots and whole-colony data is generally upward, with a significant annual rate of increase. In **north-west Scotland**, sample plots on Handa held similar numbers to 2005 although data shows one-third of birds have disappeared from plots since 2001. Therefore, it is no surprise that a whole-colony survey on Handa in 2006, which found 12,925 individuals, was 23.9% lower than the previous count in 2001 (16,991). Elsewhere in the region, a partial survey of Mingulay indicated a recent decline too, from 9,430 individuals in 2003 to 8,304. The short-term rates of decline at both colonies are 5.3% and 4.2 % *per annum*, respectively.

The highest proportional increase in any region was recorded in **north-west England**, and the only region on the west coast of Britain to show an increase. At the sole mainland razorbill colony of St. Bee's Head (colonies on the Isle of Man are currently not monitored) numbers increased by 96.1% from 153 to 300 individuals. However, it should be noted that this colony held an average of 270 birds between 1999 and 2004 so the 2006 figure is more typical of the site. The regional index has fluctuated somewhat over time but the trend has been upward although at a non-significant rate. Across the Irish Sea, there was virtually no change detected in a whole-colony count on the Isle of Muck (**north-east Ireland**), which held 417 birds.

Table 3.24.1 Population changes at monitored razorbill colonies (adults attending colony in first three weeks of June unless otherwise indicated). Regional totals of fewer than 40 birds are excluded. Trends for 1986-2005 are average annual rates of change shown by sample populations; in Orkney, NW Scotland and NE Scotland these are based on colonies monitored triennially. Statistical significance of trends (t-test) is indicated as: n.s. not significant, * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. Further details of the calculation of trends are given in section 1.2.2.

3.24.1a Counts of adult razorbills in study plots, 2005-2006 (or earlier where monitoring is not carried out annually). Figures are summed means of 5-10 (occasionally 4) replicate counts of each of the study plots.

Region	2003	2005	2006	% change since previous count	% annual change
SW Scotland ^a		48	39	-18.8	-
NW Scotland ^b		417	401	-3.8	-
Shetland ^c		468	383	-18.2	+0.3 n.s. 1986-2005
Orkney ^d		32	42	+31.3	-
Orkney ^e	895	-	840	-6.1	+3.7** 1986-2003
NE Scotland ^f		238	239	+0.4	+2.2 *** 1986-2005
SE Scotland ^g		127	129	+1.6	+2.8*** 1986-2005
Wales ^h		3,040	2,730	-10.2	+3.7*** 1986-2005

Colonies: ^a Colonsay; ^b Handa; ^c Hermaness, Eshaness, Burravoe, Noss, Troswick Ness, Sumburgh Head, Fair Isle; ^d Papa Westray; ^e Row Head, Marwick Head, Mull Head, Costa Head, Gultak; ^f Fowlsheugh; ^g St. Abb's Head; ^h Skomer, Skokholm, New Quay, Lochtyn, Elegug Stacks, Stackpole Head NNR, South Stack.

3.24.1b Whole-colony counts of razorbills, grouped regionally. Trends given for Wales are from whole-colony counts at Skomer, Skokholm, Stackpole and Elegug Stacks.

Region	2005	2006	2005-2006 % change	% annual change
SW Scotland ^a	417	367	-12.0	+2.6 * 1986-2005
NE Scotland ^b	31	57	+83.9	-
SE Scotland (birds) ^c	4,109	3,811	-7.3	+3.9*** 1986-2005
SE Scotland (AOS) ^d	525	587	+11.8	-
NE England (AOS) ^e	303	338	+11.6	-
SW England ^f	53	36	-32.1	-
Wales ^g	7,258	5,737	-21.0	+3.0*** 1986-2005
NW England ^h	153	300	+96.1	+0.9 n.s. 1986-2005
NE Ireland ⁱ	415	417	+0.5	-

Colonies: ^a Ceann a Mhara; ^b Sands of Forvie; ^c Isle of May; ^d Inchcolm, Inchkeith, Craigleith, Fidra, The Lamb, Bass Rock; ^e Farne Islands, Boulby; ^f Durlston; ^g Caldey, Barafundle-Giltar, Stackpole Head NNR, Elegug Stacks plus nearby coast, Skomer, St Margaret's Island; ^h St. Bee's Head; ⁱ Isle of Muck.

In **Wales**, a substantial decline of 21.0% was recorded from whole-colony counts but data from plots (often from the same colonies) indicated a decline 10.2%. In sample plots, significant declines were recorded at Elegug Stacks (15.5%, $t=2.316$, $d.f.=8$, $P<0.05$) and Skomer (16.2%, $t=3.691$, $d.f.=14$, $P<0.01$) with a non-significant decline at New Quay (-10.4%) and a non-significant increase at Lochtyn (+19.2%). Virtually no change was detected in plots at Stackpole Head, Skokholm, and South Stack. Whole-colony counts at Elegug Stacks and Skomer also indicated decreases, of 24.2% and 20.8% respectively, which were larger than those recorded from sample plots, and at Stackpole Head the whole-colony count was 13.4% lower than in 2005, despite little change being detected in the plots there. A large proportional decrease on St. Margaret's Island (-44.2% to 126 birds – a typical value for the site) followed a near doubling of numbers between 2004 and 2005 (from 120 birds to 226). The opposite occurred on nearby Caldey, where numbers fell by one-third between 2004 and 2005, but increased by 72.0% between 2005 and 2006. The regional trend, as measured either by plots or by whole-colony counts, generally shows a steady increase since 1990 with a highly significant annual rate of increase. The smaller colony at Durlston (**south-west England**) also decreased between 2005 and 2006, by 32.1% to 36 birds. Elsewhere in the region, razorbills on the Isles of Scilly increased by 16% to 342 individuals since 1999 (Heaney *et al.* 2007).

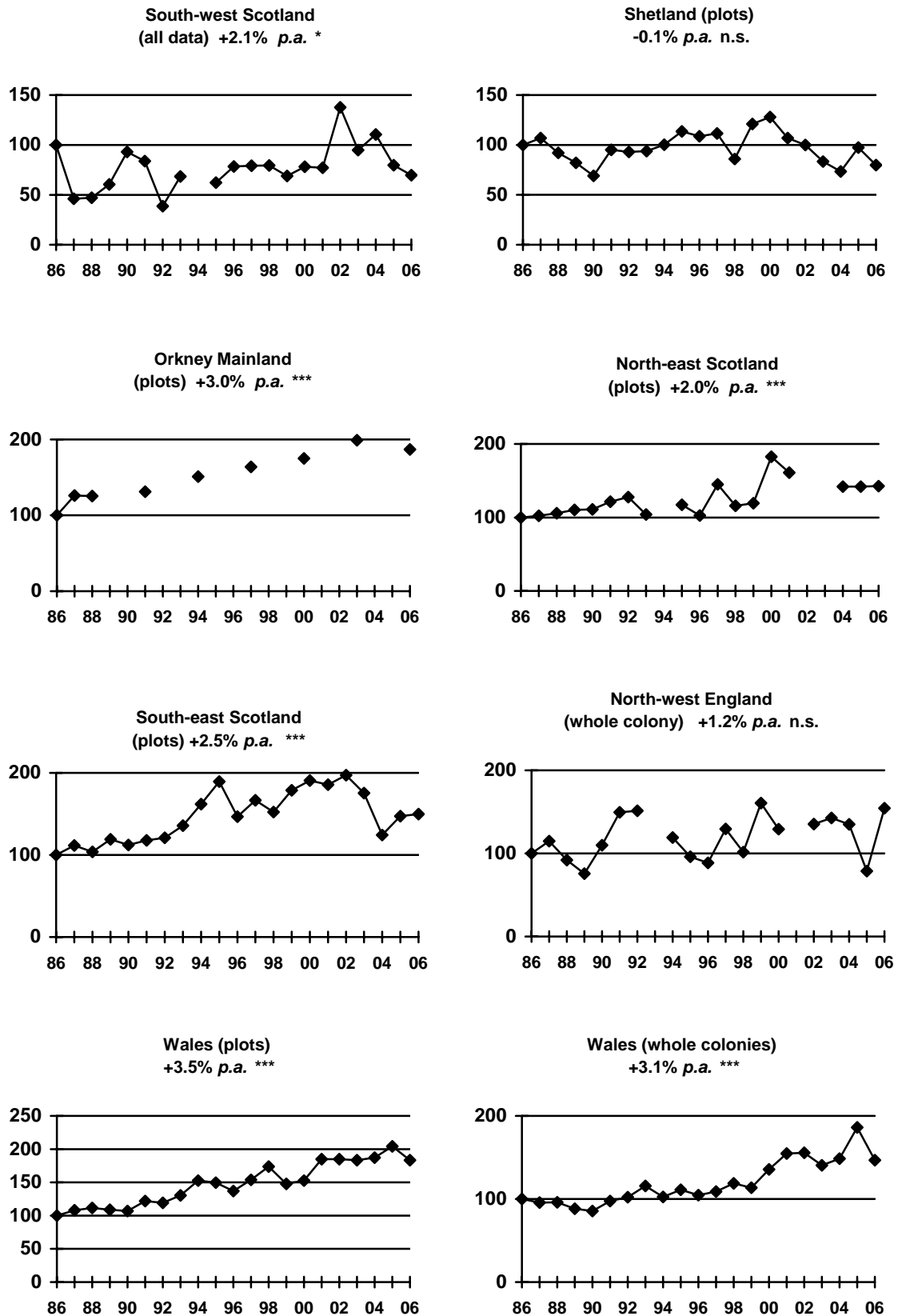


Figure 3.24.1 Regional population indices for breeding razorbills in various regions, 1986-2006 (counts of adults in June). Average annual rates of change were calculated by regression of natural log of index against year (see section 1.2.2. for details). Statistical significance of trends (t-test) indicated as: n.s. not significant, * $P < 0.05$, *** $P < 0.001$.

Table 3.24.2 Population changes of razorbills 2005-2006 and 1986-2005 at selected sites. P\W indicates plot or whole-colony counts.

Region/Site		2005	2006	2005-2006 % change	1986-2005		
					Mean	±s.d.	No. years
SW Scotland							
Colonsay	P	48	39	-18.8	45	9	6
Ceann a Mhara	W	417	367	-12.0	360	95	8
Lunga	W	1,127	1,179	+4.6	1,035	448	14
NW Scotland							
Handa	P	417	401	-3.8	45	9	6
Shetland							
Noss	P	78	69	-11.5	70	15	18
Hermaness	P	30	25	-16.7	56	18	18
Eshaness	P	46	30	-34.8	52	15	20
Troswick Ness	P	18	9	-50.0	18	4	20
Sumburgh Head	P	189	140	-25.9	207	36	20
Burravoe	P	13	10	-23.1	12	3	15
Fair Isle	P	94	100	+6.4	70	12	7
Orkney							
Papa Westray	P	32	42	+31.3	44	35	4
NE Scotland							
Sands of Forvie	W	31	57	+83.9%	30	13	17
Fowlsheugh	P	238	239	+0.4	241	39	7
SE Scotland							
Craigleith	W	132	175	+32.6	104	44	19
Fidra	W	69	123	+78.3	87	24	20
The Lamb	W	73	62	-15.1	56	31	19
Isle of May	W	4,109	3,811	-7.3	3,078	813	20
Bass Rock	W	198	169	-14.6	130	57	11
St. Abb's Head	P	127	129	+1.6	161	26	17
NE England							
Farne Islands	W	277	314	+13.4	190	43	11
Boulby Cliffs	W	26	24	-7.7	13	7	8
SW England							
St. Aldhelm's - Durlston	W	53	36	-32.1	27	15	10
Wales							
Caldey	W	25	43	+72.0	32	26	12
Elegug Stacks	P	431	364	-15.5	316	84	18
	W	788	597	-24.2	630	118	13
Stackpole Head	P	62	64	+3.2	62	11	10
	W	112	97	-13.4	122	56	13
Skokholm	P	172	165	-4.1	163	11	3
New Quay	P	212	190	-10.4	212	-	1
Lochtyn	P	26	31	+19.2	25	1	2
Skomer	P	1,232	1,032	-16.2	867	230	19
	W	5,759	4,561	-20.8	3,550	883	20
South Stack	P	905	884	-2.3	560	147	20
St Margaret's Island	W	226	126	-44.2	140	62	14
NW England							
St. Bee's Head	W	153	300	+96.1	235	51	18
NE Ireland							
Isle of Muck	W	415	417	+0.5	531	210	7

In eastern regions of Britain, the changes detected between 2005 and 2006 were generally smaller than those found in western regions, except in the relatively small colony at Sands of Forvie (**north-east Scotland**) where a whole-colony count found numbers had increased by 83.9% to 57 birds. In contrast, no change was noted in sample plots at Fowlsheugh between 2005 and 2006. However, a whole-colony count there revealed a decline of 35.1%, to 4,132 birds had occurred since 1999, over which time numbers in plots at the site had actually increased by 19.2% (as is shown by the regional trend measured via sample plots).

In **south-east Scotland**, virtually no change was detected in sample plots at St. Abb's Head, where numbers have yet to recover from a steep decline recorded between 2002 and 2004 although the overall trend remains upward at a highly significant rate of increase. A whole-colony count on the Isle of May recorded a decrease of 7.3% to 3,811 birds. However, at six other islands in the region the number of occupied sites (as opposed to individuals) increased overall by 11.8%, among which particularly large proportional increases were recorded at Fidra and Craigleith and moderate decreases at The Lamb and Bass Rock. In **north-east England**, the number of occupied sites increased by a similar amount (11.6%) due mainly to an increase on the Farne Islands where numbers were at their highest since regular monitoring commenced in 1995.

Breeding success (Table 3.24.3)

It should be noted that the intensity of monitoring at the colonies listed in Table 3.24.3 varies and that this may affect estimates of breeding performance (Walsh *et al.* 1995). Direct comparisons between colonies are therefore inadvisable without prior consultation with the authors.

Mean productivity of razorbills across six colonies monitored in 2006, at 0.48 chicks per pair (s.e. ± 0.11) was, as it has been since 2003, markedly lower than the long-term (1986-2005) mean of 0.65 (s.e. ± 0.02) recorded from between one and seven colonies annually. Comparison of the mean productivity across six colonies monitored in both 2005 and 2006 showed no significant difference.

Since 2003, the tendency in Orkney and Shetland has been for razorbills to have low levels of success and this was repeated in 2006. On Fair Isle (**Shetland**), 0.23 chicks fledged per pair was the lowest value recorded at this colony since monitoring began and hence well below the long-term mean of 0.55 (s.e. ± 0.05). In 16 years of monitoring at this site the four years with the lowest breeding success have all occurred since 2003. The number of eggs laid in the study plot was the highest on record but post-hatching chick survival was extremely poor - probably due to a lack of food. Repeat measurement showed low weight gains for some chicks and, as in 2005, cases of weight loss were also recorded (Shaw *et al.* 2006). On Papa Westray (**Orkney**), breeding success in 2006 was the lowest recorded at any UK colony at 0.21 chicks fledged per pair. Monitoring of razorbill success was only instigated at this colony in 2003, and has not exceeded 0.35 chicks fledged per pair.

Breeding success was also low on Skomer (**Wales**), where 0.31 chicks fledged per pair, the lowest value recorded at the colony in 14 years of monitoring. Most losses occurred during the egg or early chick stage (Brown and Darke 2006). The dates of the first egg, first chick and first fledgling indicated the season was 7-12 days later than in 2005 but paradoxically the last chick fledged on 22 July - more than 15 days earlier than in 2005.

Table 3.24.3 Razorbill breeding success, 2005-2006 and colony averages 1986-2005: estimated number of chicks fledged per site regularly occupied by a pair or per pair laying. Superscript figures for individual colonies are numbers of study plots. Statistical significance of between year changes (t-test) indicated as: n.s. – not significant.

Colony	Colony average 1986-2005			2005 chicks fledged/pair			2006 chicks fledged/pair			2005-2006 change	
	Years	Mean	+s.e.	Sites ⁿ	Mean	+s.e.	Sites ⁿ	Mean	+s.e.	Mean	+s.e.
Foula	3	0.35	±0.05	47 ¹	0.45	-	No data	-	-	-	-
Fair Isle	15	0.55	±0.05	102 ¹	0.44		107 ¹	0.23	-	-0.21	-
Papa Westray	3	0.24	±0.10	24 ¹	0.04		29 ¹	0.21	-	+0.17	-
North Sutor	9	0.76	±0.04	17 ¹	0.71		18 ¹	0.78	-	+0.06	-
Isle of May	20	0.66	±0.02	200 ⁴	0.57	±0.05	190 ⁴	0.64	±0.07	+0.07	-
Farnes	10	0.69	±0.04	21 ¹	0.86		56 ¹	0.73	-	-0.13	-
Skomer	13	0.57	±0.03	328 ⁵	0.57	±0.04	418 ⁵	0.31	±0.01	-0.26	-
Total ^{no. colonies}	-	-	-	739 ⁷	0.52	±0.10	818 ⁶	0.48	±0.11	-0.05⁶	±0.07 n.s.

Outside Orkney and Shetland other UK colonies bordering the North Sea were more successful, with productivity apparently close to or above the long-term national mean. At North Sutor (**north Scotland**), the most successful UK colony over the years, breeding success was higher than in 2005 and close to the colony average. On the Isle of May (**south-east Scotland**), mean breeding success at 0.64 chicks per pair was also close to the long-term colony average. Breeding was again later than normal with the first egg laid on 5 May (median first egg date 1996-2005 29 April, range 23 April-4 May). As in 2005, adults appeared to have little difficulty finding food as sandeels, virtually all 0-group, comprised 83% of 912 feeds where fish were clearly visible. Razorbills on the Farne Islands (**north-east England**) also had an above average breeding season fledging 0.73 chicks per site.

3.25 Black guillemot *Cepphus grylle*

Numbers of pre-breeding adults in sampled colonies in Shetland and Orkney were stable between 2005 and 2006. Long-term trends indicate numbers have halved in Orkney since the mid-1980s, with virtually no change in the Shetland sample since then although numbers are almost 16% lower than in 2000. The relatively few data available indicated breeding success was lower than in 2005 except at Auskerry and Rockabill where it was a productive breeding season.

Breeding numbers (Table 3.25.1, Figure 3.25.1)

Unless otherwise stated, all population figures refer to early morning spring counts of individuals in adult plumage (Walsh *et al.* 1995).

In **Shetland**, total numbers along 14 stretches of coast monitored in 2005 and 2006 changed by less than 1.0%, with changes at individual sites generally within ±10.0%, but numbers were 15.8% lower than at the same colonies in 2000 (Heubeck 2006). Although no statistically significant overall change is apparent in the trend for these colonies, there is an indication of a slight decline since the mid-1990s. When examining individual stretches of coast this general pattern is found in many, however, longer-term declines are apparent at some, e.g. Watsness, Aithsetter and Mousa (Heubeck 2006).

Again, no monitoring was carried out in Yell Sound, where numbers had generally been increasing between 1985 and 2002 (Mavor *et al.* 2003).

Table 3.25.1 Population changes at monitored black guillemot colonies, 2005-2006 (adults in breeding habitat in early morning, late March-early May). Trends for periods indicated are average annual rates of change shown by sample populations. Statistical significance of trends (t-test) indicated as: * $P < 0.05$, *** $P < 0.001$. For further details of the calculation of these trends see section 1.2.2.

Region/site	2005	2006	2005-2006 % change	% annual change
Shetland ^a				
Shetland excl. Yell Sound	2,147	2,167	+0.9	-0.6 * 1985-2005
Orkney ^b	843	878	+4.2	-3.2 *** 1983-2005

Colonies: ^a Fetlar (east coast), Lunning, Levaneap, Mousa, Noss, Kirkabister, Aithsetter, West Burra, Kettla Ness, Boddam-Virkie, Hillswick, Tingon (east), Watsness-Dale, Muness, Foula (east coast), Fair Isle (east coast); ^b North Hill, Holm of Papa Westray, North Ronaldsay.

In **Orkney**, overall numbers were also similar between 2005 and 2006 at three colonies sampled. A downward trend is apparent in the region between 1983 and 2000 when the index fell by over 50.0% but numbers have at least stabilised since then. In 2006, 176 individuals were counted at North Hill, the same number as in 2005 but at nearby Holm of Papay numbers had fallen by 13.9% to 87 individuals. In contrast, at North Ronaldsay the count of 615 individuals was 8.7% higher than in 2005; there has been a notable increase at this colony from 369 individuals in 1997 although numbers have fluctuated.

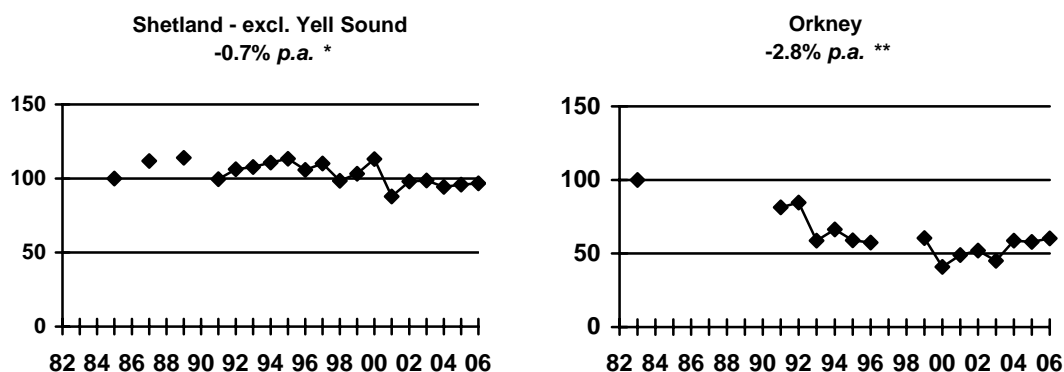


Figure 3.25.1 Regional population indices for breeding black guillemots, 1983-2006. Based on counts of adults in breeding habitat late March-early May. Average annual rates of change were calculated by regression of natural log of index against year (see section 1.2.2. for details). Statistical significance of trends (t-test) indicated as: n.s., not significant; * $P < 0.05$, ** $P < 0.01$.

In the Mink-Seabird Project study area, which stretches from Mallaig to Tarbert (**north-west and south-west Scotland**), black guillemots were seen at 22 sites with breeding confirmed at eight and probable breeding recorded at two further sites. Signs of mink activity were recorded at two sites with this or another predator active at another two (Craik 2006). Elsewhere, on Canna, 49 birds were present in early July although, as this count was conducted well outside the recommended period, it is likely to underestimate numbers. However, comparison with previous data collected in late June/early July indicates a decline, as the 2006 count lies below the 1986-2005 mean (74 birds, s.d. ± 28 , $n=19$) and at least 100 birds were present in each year between 1986-1990 (range 100-137).

Breeding success (Table 3.25.2)

Each year the outcome of several nests at a number of sites remains unknown, but despite these uncertainties black guillemots throughout Britain and Ireland appear to be producing in excess of one chick per pair each year.

In **Orkney**, breeding success at North Ronaldsay and Swona was lower than in 2005, and also below average. Birds on Auskerry were much more successful than usual.

Table 3.25.2 Breeding success of black guillemots, 2005-2006 and 1986-2005. Figures are the number of chicks per active site (where an egg or apparent incubation was recorded). Figures in parentheses are the number of active sites from which the breeding success estimates were derived.

Region/site	2005	2006	1986-2005 mean	
			Mean (\pm s.e.)	No. of years
Orkney				
North Ronaldsay	1.37 (27)	1.15 (48)	1.42 (0.10)	10
Auskerry	1.42 (26)	1.60 (24)	1.31 (0.05)	11
Swona	1.42 (12)	1.00 (10)	1.50 (0.09)	5
NE Ireland				
Old Lighthouse Island	1.31 (26)	1.14 (28)	1.08 (0.07)	16
Mew Island	2.00 (2)	1.00 (2)	2.00 (0.00)	2
SE Ireland				
Rockabill	1.77 (40)	1.77 (54)	1.26 (0.08)	8

In **north-east Ireland**, fledging success on Mew and Old Lighthouse islands was also lower than in 2005 although still above average at the latter site. On Rockabill (**south-east Ireland**) success of 1.77 chicks fledged per nest equalled that recorded in 2005, which was the most successful season on record (previous highest of 1.32 chicks were fledged per nest in 2003).

3.26 Atlantic puffin *Fratercula arctica*

Comparison of counts of apparently occupied burrows in 2006 with previous years' data indicates that numbers increased slightly on Lunga (SW Scotland) but a large increase was noted at the small colony on Ynys Gwylan Bach (Wales) possibly as a result of birds moving from nearby Ynys Gwylan Fawr in response to areas of it becoming overgrown with tree mallow. Spring counts of adults ashore estimated colony size at Skomer and Skokholm, where little change had occurred since 2005. Mean breeding success at colonies monitored in both years was higher than in 2005 but not significantly so. Productivity was low on Fair Isle and on Dun, St. Kilda, although at the latter site birds were more than twice as successful as in 2005.

Breeding numbers

Few colonies were systematically surveyed in 2006, although at a number of other sites counts of adults ashore were again carried out. On Lunga (**south-west Scotland**), the population was estimated at 2,556 AOB plus 539 individuals. Combining units, assuming that one individual corresponds to one AOB (Lloyd *et al.* 1991, Mitchell *et al.* 2004) would suggest a population of 3,095 AOB, a 9.0% increase on the 2005 estimate (2,841). Since 2001, annual estimates of the size of this colony have ranged between 2,100 and 2,800 AOB (except in 2003 when the colony was estimated at 1,154 AOB, attributed to low attendance by puffins that year). On Ynys Gwylan Bach (**Wales**), 122 AOB were counted, which compares with 46 in 2005. A count of AOB on Ynys Gwylan Fawr could not be completed because much of the island was overgrown with tree mallow *Lavatera arborea* which may have resulted in birds moving to nearby Bach and thus explain the large increase recorded there (Stansfield 2006). In the Isles of Scilly (**south-west England**), the population was estimated at 174 pairs, little changed from 1999 when 167 pairs were estimated.

Spring counts of individuals ashore prior to egg-laying, which provide a broad indication of colony size (Walsh *et al.* 1995), were carried out on Skomer and Skokholm (both **Wales**). Numbers on Skomer (10,876) and Skokholm (4,802) were similar to those recorded in 2005 (10,717 and 4,510 individuals respectively) although it is the seventh year in succession that an increase has been recorded on Skokholm. Counts in late June and early July, when a greater proportion of non-breeding birds may be present at a colony, thus further obscuring the true breeding population of a site, were carried out at two colonies. On Noss (**Shetland**), 1,927 individuals were present (1,892 in 1999) and at Inchkeith (**south-east Scotland**) 1,059 individuals were recorded (2,337 in 2001).

Breeding success (Table 3.26.1)

Mean breeding success in 2006, at 0.69 chicks per occupied burrow, was higher than in 2005 but not significantly so. This is slightly below the long-term mean of 0.71 (s.e. ± 0.02), recorded in two to seven colonies annually between 1986-2005.

On Dun, St. Kilda (**north-west Scotland**), breeding success from 74 study burrows was estimated to lie between 0.53-0.61 chicks fledged per egg. This is low in general for puffins in the UK and low compared with the colony mean between 1990-1994 of 0.72 (s.e. ± 0.01) but much improved on 2005 when only 0.26 chicks fledged per egg. Adult birds appeared to find more silver fish than in 2005 but pipefish became more abundant as a prey item as the season progressed. Late in the season at least six small downy chicks in the sample had slow, or non-existent, growth rates and were considered unlikely to fledge although no further visits could be made to confirm this (hence the range of possible success). Furthermore, the relationship between the weight and wing length of all chicks suggested an abnormal growth pattern with steady growth toward fledging weight, rather than the normal peak and subsequent decline prior to leaving, which suggested chicks were experiencing some food-related stress (Money 2006).

Table 3.26.2 Atlantic puffin breeding success, 2005-2006. Estimated number of chicks fledged per egg or occupied burrow (Skomer). Superscript indicates number of colonies.

Colony	2005 chicks fledged/pair				2006 chicks fledged/pair				2005-2006 change	
	Burrows	Range	Mean	\pm s.e.	Burrows	Range	Mean	\pm s.e.	Mean	\pm s.e.
Fair Isle	43	-	0.67	-	66	-	0.47	-	-0.20	-
Dun, St. Kilda	96	-	0.26	-	74	-	c.0.57	-	+0.21	-
Isle of May	184	-	0.70	-	166	-	0.78	-	+0.08	-
Farne Islands	100	-	0.85	-	100	-	0.89	-	+0.04	-
Skomer	94	-	0.84	-	120	-	0.73	-	-0.11	-
Total	517 ⁵	0.26-0.85	0.66	± 0.11	526 ⁵	0.47-0.89	0.69	± 0.07	+0.03⁵	± 0.07 ns

On Fair Isle (**Shetland**), Atlantic puffins had a relatively poor breeding season fledging 0.47 chicks per egg (long-term mean 0.69, s.e. ± 0.03). Only in 2001, when success measured 0.31 chicks fledged per egg, has breeding performance been lower. An all-day feeding watch in mid-July showed lesser sandeels to be the main food item brought back to chicks (0-group 42.5% and 1-group 25.4% of 125 feeds) (Shaw *et al.* 2006). However, as in 2004 and 2005, many snake pipefish were found discarded at the entrance to burrows and food samples obtained between 18 June and 3 August were predominately snake pipefish (41.2% of fish) and gadoids (39.7%) with few sandeels (7.4%) perhaps indicating that sandeels were in short supply at times. The mean weight of samples (4.8g, all fish) was similar to recent years (1998-2005 range 3.3-6.1g) but low when compared with the period prior to this (1990-1997 range 7.6-10.1g).

On the Isle of May (**south-east Scotland**), breeding was again late although not as late as in 2005 when it was estimated to be five days later than in any year since observations started. Timing varied between areas in 2006; for example, on 3 May most pairs in the Kettle had laid but only about 50% of occupied burrows at Lady's Bed contained eggs (Newell *et al.* 2006). Breeding success, at 0.78

chicks per egg laid, appeared much improved compared with 2005 and higher than the long-term mean (0.75, s.e. ± 0.02). However, late mortality was recorded in one area where 13% of chicks classed as 'fledged' were subsequently found dead. Assuming this was typical for the whole colony (given that intensive studies showed that chicks grew very slowly, reached very low weights and had prolonged fledging periods) then a more accurate assessment of breeding success may have been 0.68 chicks fledged per egg (0.78 x 87%) (Newell *et al.* 2006). Sandeels comprised 90% by number and 90% by weight of the diet of chicks, with most of the remainder comprising of sprats. The mean load size (7.9g) was below the long-term average (9.1g) and, as in 2004 and 2005, the number of fish per load (14.6) was double the long-term average. On the Farne Islands (**north-east England**), puffins were highly successful, fledging 0.89 chicks per egg laid, well above the colony mean of 0.74 (s.e. ± 0.05).

In **Wales**, breeding success on Skomer, where it again appeared to be an early season, was lower than in 2005 but still, at 0.73 chicks fledged per occupied burrow, close to the long long-term mean of 0.76 (s.e. ± 0.02). The first adults recorded on land carrying fish were noted on 28 May (1 June on the Isle of May). Feeding watches, in which the number of successful burrows and hence productivity is determined, were thus carried out earlier than usual on 27/28 June and 5/6 July. Between these dates there was a large drop in the number of burrows being fed and the number of feeds delivered although it is unlikely that any chicks fledged during this period (Perrins 2006).

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The New Seabird Colony Register Recording Form

Recorder's name:	Master Site name (if you know it):	Site name:
County or District of colony:	Year of count:	

OS Grid Reference Start:	Grid Reference End																
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Species code	Acc'y	Count	Unit	Mthod	Date	(End date)	Start time	End time	Vis.	Sea	Rain	Wnd	Notes

Species codes (BTO 5-letter codes):

FULMA Northern fulmar MANSH Manx shearwater STOPE European storm-petrel LEAPE Leach's storm-petrel GANNE Northern Gannet CORMO Great Cormorant SHAG. European shag ARCSK Arctic skua GRESK Great skua MEDGU Mediterranean gull	BLHGU Black-headed gull LBBGU Lesser black-backed gull YELGU Yellow-legged gull HERGU Herring gull GBBGU Great black-backed gull COMGU Common gull KITTI Black-legged kittiwake ARCTE Arctic tern COMTE Common tern LITTE Little tern	SANTE Sandwich tern ROSTE Roseate tern GULL Common guillemot RAZOR Razorbill BLAGU Black guillemot PUFFI Atlantic puffin
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Accuracy Codes:	Unit Codes:	AOB Apparently Occupied Burrow
ACC Accurate Count	AON Apparently Occupied Nests	IND Individuals on land at colony
EST Estimated Count	AOS Apparently Occupied Sites	SEA Individuals on sea adjacent to colony
HID Estimate of hidden birds	AOT Apparently Occupied Territory	AIR Individuals flying over colony (NB. puffins only)

Method codes		
1. Northern Fulmar, European shag, great cormorant, black-legged kittiwake, common guillemot, black guillemot, razorbill and cliff-nesting Atlantic puffin or gulls. 1.1 = sea-based counts 1.2 = land-based counts	2. Atlantic puffin (NB if the following methods are used to count puffin, please also send all raw count data with your recording forms): 2.1 = whole colony counts of AOB 2.2 = sample quadrats/transects counts of AOB 2.3 = counts of individuals attending the colony 2.4 = other (please provide full details of the methods used)	3. Gulls (except cliff-nesters and black-legged kittiwake), terns and skuas: 3.1 = counts of Apparently Occupied Territories(AOT)/Nests (AON) from a vantage point 3.2 = foot-based counts of AOT/AON from within colony 3.3 = sample quadrats/transects counts of AON 3.4 = flush counts of individuals 3.5 = aerial counts
4. Northern gannet 4.1 = sea-based counts 4.2 = land-based counts 4.3 = aerial counts 4.4 = foot-based counts of AON from within colony	5. Manx shearwater, European storm-petrel & Leach's storm-petrel (please provide full details of the methods used to JNCC separately): 5.1 = ascertained presence/absence of Apparently Occupied Sites (AOS) 5.2 = count of AOS using tape-playback 5.3 = counts of occupied burrows (using visible signs of use)	

Weather Codes

Visibility: 1 = good, 2 = fair, 3 = poor	Sea State: 1 = flat calm, 2 = small waves, 3 = large waves, 4 = white wave crests, 5. = waves breaking high onto rocks.	Rain: 1 = none, 2 = discontinuous light, 3 = discontinuous heavy, 4. Continuous light, 5 = continuous heavy.
Wind (Beaufort scale): 0, 1, 2, 3, 4, >4. Note, counts generally unreliable above force 4 for fulmar, razorbill or guillemot.		

Please submit completed forms to: Seabird Colony Team, JNCC, Dunnet House, 7 Thistle Place, Aberdeen, AB10 1UZ or email to roddy.mavor@jncc.gov.uk. Phone Roddy Mavor on 01224 655703 or Matt Parsons on 01224 655715.