

The 2004 Icelandic-breeding Goose Census

Wildfowl & Wetlands Trust Report

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August 2005



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This publication should be cited as:

Rowell, HE. 2005. *The 2004 Icelandic-breeding Goose Census*. Wildfowl & Wetlands Trust Report, Slimbridge.

This report was produced under the Goose & Swan Monitoring Programme (GSMP). This programme monitors numbers and productivity of geese and swans in the UK during the non-breeding season. GSMP is organised by the Wildfowl & Wetlands Trust (WWT) on behalf of WWT and the Joint Nature Conservation Committee.

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Goose & Swan Monitoring

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Summary

The 45th consecutive census of Greenland/Iceland Pink-footed Geese and Iceland Greylag Geese took place during autumn and early winter 2004. Two discrete counts were undertaken, one in October and another in November. Some sites were also counted during September. Coverage was good, although some important sites were not surveyed, and was again extended beyond Britain and Ireland, with comprehensive coverage achieved in the Faroe Islands; an estimate of the number of Greylag Geese present in Iceland in November was also made.

Weather conditions were generally considered favourable during the counts. Maxima of 271,934 Pink-footed Geese were recorded in October and 110,534 Greylag Geese in November. These figures were adjusted to account for major sites that were not counted and for the number of Greylag Geese from the Re-established and NW Scotland populations in the UK counted prior to this census, resulting in population estimates of 292,154 Pink-footed Geese and 107,207 Greylag Geese. Both estimates were higher than those calculated for 2003: the Pink-footed Goose estimate represents an increase of 4.0% and that for Greylag Goose, an increase of 32.1%. The large increase in the Greylag Goose population estimate is largely due to an estimated 20,000 birds counted in Iceland in November. Although an estimate of the number of Greylag Geese present in Iceland has been included in previous years (*eg* 175 in 2001), the number of birds estimated in 2004 is much higher at 20,000. If the Iceland estimate is excluded, the Greylag Goose population estimate becomes 87,207, which represents an increase of 7.5% on that of 2003.

Pink-footed Geese had a reasonable breeding season in 2004: autumn flocks contained 19.4% young, slightly above the recent average of 18.4%, although the mean brood size of 2.1 goslings per successful pair was slightly below the recent mean. Breeding success in Greylag Geese was good, with both the proportion of young (28.2%) and mean brood size (2.8 goslings per successful pair) both above the recent means (17.8% and 2.6, respectively).

1 Introduction

The aim of the Icelandic-breeding Goose Census (IGC) is to estimate the size and monitor the distribution of Greenland/Iceland Pink-footed Geese *Anser brachyrhynchus* and Iceland Greylag Geese *A. anser*. The methods used followed those of previous censuses (eg Rowell & Hearn 2005), with two co-ordinated counts being undertaken, the first in October and the second in November. These are timed to coincide with the periods when these geese are most concentrated after their arrival in Britain from Iceland. Pink-footed Geese arrive earlier than Greylag Geese and are therefore usually best censused in October. The November count allows for the later migration of Greylag Geese to be completed. This report provides an overview of the results of the 45th consecutive census.

2 Methods

Counts were conducted by a network of largely volunteer observers over the weekends of 16/17 October and 13/14 November 2004. In a few cases counts made close to these dates were included in the co-ordinated census if there was no reason to suspect they duplicated other counts. Most counts were of roosting geese, made either at dusk when the birds are flying in or at dawn as they depart to feeding areas. They were timed to coincide with the new moons (14 October and 12 November), thus minimising the likelihood of geese remaining in feeding areas overnight. In a small number of areas where roost sites are poorly known, inaccessible or infrequently used, daytime counts of feeding birds were made. Consequently, in this report the term site is applied to a range of geographical areas. Most are individual waterbodies where a goose roost occurs, whilst some are feeding areas around known roosts, and others are a mixture of these two. All sites are, however, areas to which an individual count can be attributed.

Two types of adjustment were applied to the peak count totals in order to generate population estimates. For regularly monitored sites (those counted in at least three of the previous five years) that were not counted during the 2004 census, numbers were estimated from the mean of the counts made during the relevant month during 1999-2003. Estimated numbers that exceeded 0.5% of the current IGC peak count total were added to this peak count to give the adjusted population estimate. In addition, counts of UK Greylag Geese (*ie* birds from the Re-established or NW Scotland populations) made during September, before the arrival of Icelandic migrants, were subtracted from the IGC count at some sites to calculate the number of Iceland Greylag Geese present at that time.

To assess reproductive success, experienced observers made assessments of the proportion of young (first-winter birds are separable from older birds by differences in plumage characteristics) in goose flocks and of brood size during the autumn. Data were collected between mid September and mid November and used to determine the proportion of young and the mean brood size of successful pairs.

3 Results

3.1 Coverage and conditions

A total of 172 sites were covered during the two counts: 124 (72%) of these were counted in both months, 20 only in October and 28 only in November. This is an increase of 9% in the number of sites counted compared to the 2003 census. Outside Britain, several sites in the Faroes were counted, and an estimate of the number of Greylag Geese remaining in Iceland around the November count weekend was included. However, this estimate was not based on complete counts, but was from rough estimates based on the reporting of sightings from many individuals including hunters, birdwatchers and farmers (A. Sigfússon pers. comm.).

In all, one site not counted during October 2004 met the criteria for the calculation of an estimated count for Pink-footed Geese, West Water Reservoir (mean 1999-2003: 20,220). For November, estimates of Greylag Geese were calculated for two sites: Bute (1,133) and Haddo House Lakes (943).

Counts of UK Greylag Geese during September were received from 20 sites and these were used to adjust the co-ordinated October and November counts at eight sites or regions: Orkney Islands (-4,000), Branton Gravel Pits (-249), Holywell Pond (-109), Upper Strathspey goose feeding areas (-100), Holyrood Park Lochs (-50), Island of Bute (-50), Tweed Estuary (-34) and Grindon Lough (-16).

Supplementary counts, made in addition to the co-ordinated IGC counts, were received from 72 sites, most notably Carlungie, Carsebreck and Rhynd Lochs, Gartmorn Dam, Great Cumbrae, Holyrood Park Lochs, Linlithgow Loch, Loch of the Lowes, Loch of Skene, Loch of Strathbeg, Montrose Basin, the north Norfolk roosts, Southwest Lancashire, and the Upper Strathspey goose feeding areas.

Weather conditions and disturbance levels were reported by counters as good at 65% of sites (conditions were not reported at 31% of sites), although poor weather conditions were reported from a couple of sites during the November count weekend. This, however, is not considered to have appreciably affected the census results. Low counts (where counters felt they had underestimated the number of birds, for example, because of poor visibility) were reported from four sites during October and five sites during November, mainly due to poor visibility, or to having not covered all of the count area. Of the latter, one – Southwest Lancashire – held important numbers of Pink-footed Geese (28,273).

3.2 Total numbers

3.2.1 Pink-footed Goose

The October count total of 271,934 is a decrease of 2,660 (1%) on the previous year (Figure 1). However, a count was not received from one of the most important sites in the UK, namely West Water Reservoir. After the inclusion of estimated counts, the adjusted population estimate is 292,154, an increase of 11,156 (4.0%) on the previous estimate. In November 2004, 251,950 Pink-footed Geese were counted (Figure 1), 92.7% of the October count.

3.2.2 Greylag Goose

The November count total of 110,534 is an increase of 30,391 (37.9%) on the previous count in November 2003 (Figure 1). After adjustments and the inclusion of estimated counts, a population estimate of 107,207 was derived, an increase of 26,076 (32.1%) over the previous adjusted estimate. If the estimate for the number present in Iceland is excluded, the November count total becomes 90,534, an increase of 13.0% on the 2003 November count total, and the population estimate becomes 87,207, an increase of 7.5% over the 2003 estimate.

Pre-adjusted counts in October suggest that the arrival of Greylags at wintering areas in autumn 2004 was a little later than usual, with 33.2% of the November count recorded during that month. It should be noted, however, that the timing of each census is not precisely synchronous with previous censuses, as it is based mostly on the phase of the moon, and fewer sites supporting Greylag Geese are counted during October than in November.

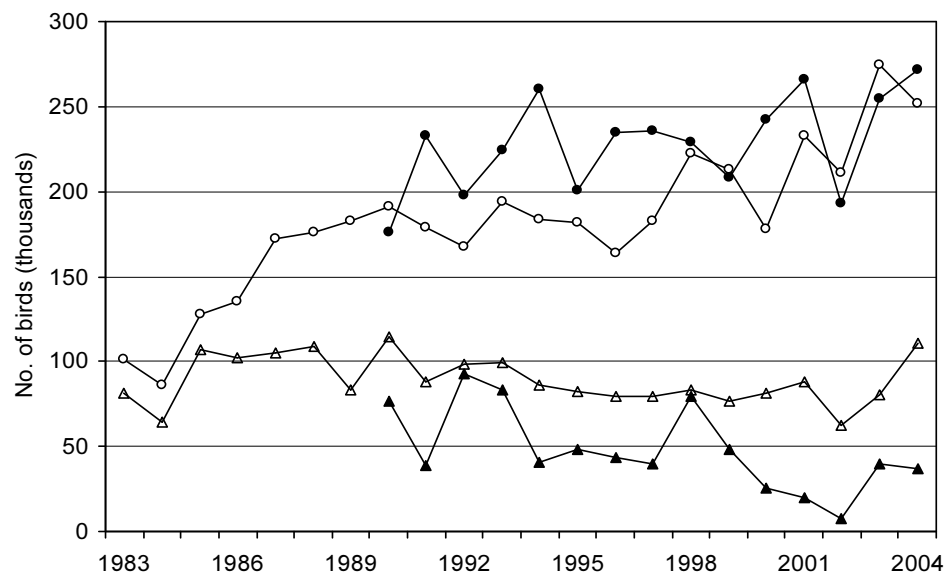


Figure 1. Peak counts of Pink-footed Geese (circles) and Iceland Greylag Geese (triangles) counted in October (filled) and November (open) as part of the Icelandic-breeding Goose Census, 1983 to 2004.

Table 1. Regional totals of Pink-footed Geese and Iceland Greylag Geese in October and November 2004. Figures in square brackets show adjusted or estimated totals.

Region	October			November		
	Sites	Pinkfoot	Greylag	Sites	Pinkfoot	Greylag
Iceland ⁺	0	nc	nc	1	nc	20,000
Norway	0	nc	nc	0	nc	nc
Faroe Islands	5	0	1320	5	2	514
Ireland	0	nc	nc	7	0	2,768 [-800]
Shetland ⁺	11	16	441	6	0	586
Orkney	15	568	21,480 [-4,000]	15	571	42,697 [-4,000]
Caithness ⁺	1	43	1,068	1	40	11,755
Sutherland	2	1	990	2	1	770
Ross & Cromarty	10	120	5,030	10	275	9,451
Inverness/Nairn	2	0	0	2	4,700	50
Badenoch & Strathspey	3	0	647 [-100]	3	0	2,816 [-100]
Moray	2	20,000	678	2	41,500	2,100
Banff & Buchan	1	30,570	0	1	19,340	223
Gordon/Aberdeen	2	27,160	540	2	10,570	2,880
Kincardine & Deeside	1	0	230	[1] 2	0	[+943] 597
Angus/Dundee	4	40,825	395	4	14,700	540
Perth & Kinross	11	25,776	1,034	14	19,070	4,048
Stirling/Falkirk/ Clackmannan	6	9,087	10	4	2,862	526
Fife	17	3,698	666	21	17,432	4,102
Argyll & Bute	3	0	508 [-50]	2 [1]	0	83 [+1,133]
Glasgow area*	1	0	7	1	0	0
Clydesdale	1	73	0	0	nc	nc
Stewartry/Wigtown	2	7	488	1	67	681
Annandale & Eskdale/Nithsdale**	7	832	64	9	4112	166
East/Midlothian	5	19,212	136	5	7,598	196
Edinburgh/West Lothian	3	0	320 [-50]	3	0	576 [-50]
West Borders/ Tweeddale/East Borders***	5 [1]	8,951 [+20,220]	75	4	1,610	739
NE England****	15	9,900	527 [-437]	17	5,542	1,670 [-453]
Humberside	1	5,600	0	1	3,800	0
Cumbria**	1	0	0	1	0	0
Lancashire & Merseyside ⁺	1	37,968	0	1	28,273	0
Lincolnshire	0	nc	nc	0	nc	nc
Norfolk	6	31,527	0	5	69,885	0
Totals	144 [1]	271,934 [+20,220]	36,654 [-4,637]	152 [2]	251,950	110,534 [-5,403] [+2,076]
	145	292,154	32,017	154	251,950	107,207

* includes Bearsden & Milngavie, Clydebank, Cumbernauld & Kilsyth, Cumnock & Doon Valley, Cunninghame, Dumbarton, East Kilbride, Eastwood, Glasgow City, Hamilton, Inverclyde, Kilmarnock & Loudoun, Kyle & Carrick, Monklands, Motherwell, Renfrew and Strathkelvin

** counts from the Solway Firth are included in the Annandale & Eskdale/Nithsdale total even though some birds roost and feed on the Cumbrian side of the estuary

*** includes Ettrick & Lauderdale, Roxburgh and Berwickshire

**** includes Tyne and Wear, Durham, Northumberland, North Yorkshire, South Yorkshire and West Yorkshire

⁺ several feeding sites consolidated

nc no count received

¹ estimate of Re-established birds greater than November count, therefore adjusted count taken as zero

3.3 Regional distribution

3.3.1 Pink-footed Goose

The regional distribution of Pink-footed Geese during autumn 2004 was typical (Table 2), with key concentrations during October in northeast and east-central Scotland. Higher than average proportions were also present in west and east England at this time. By November, the proportion found in east England (principally Norfolk) had increased to over one quarter. Other key areas were again northeast and east-central Scotland, although numbers in east-central Scotland had shown the greatest decline over this time (Table 2 and Figure 2). In both months, the proportion found in southeast Scotland/northeast England was below the average for the previous five years.

3.3.2 Greylag Goose

The autumn distribution of Greylag Geese was also typical, with a low proportion present in Britain during October (Table 2). Those birds found were in the typical arrival area, north Scotland. By November, more than half the population was in north Scotland, with most of the remainder in northeast and east-central Scotland (Table 2 and Figure 3).

Table 2. Gross regional distribution of Pink-footed Geese and Iceland Greylag Geese in Britain and Ireland during October and November 2004, expressed as a percentage of the maximum count for each species.

Area*	Pink-footed Goose		Greylag Goose	
	October	November	October	November
Ireland	0	0	0	1.9
North Scotland	0.3	2.1	24.3	60.9
Northeast Scotland	28.6	26.3	1.4	5.5
East-central Scotland	29.2	19.9	2.0	8.8
Southeast Scotland/ northeast England	14.0	5.4	0.7	2.6
Southwest Scotland/ northwest England	0.3	1.5	1.0	0.9
West England	13.9	10.4	0	0
East England	13.7	27.1	0	0
Total	100.0	92.7	29.4	80.6¹

- * areas defined as follows:
 Ireland: all regions
 North Scotland: Shetland, Orkney, Western Isles and Highland
 Northeast Scotland: Grampian (Aberdeenshire & Moray)
 East-central Scotland: Tayside (Perth & Kinross), Central (Stirling) and Fife
 Southeast Scotland/ northeast England: Lothian, Borders and Northumberland
 Southwest Scotland/ northwest England: Strathclyde, Dumfries & Galloway and Cumbria
 West England: Lancashire and Merseyside
 East England: Humberside, Lincolnshire and Norfolk

¹ Does not equal 100% because some birds were also present in other countries (Faroe Islands and Iceland)

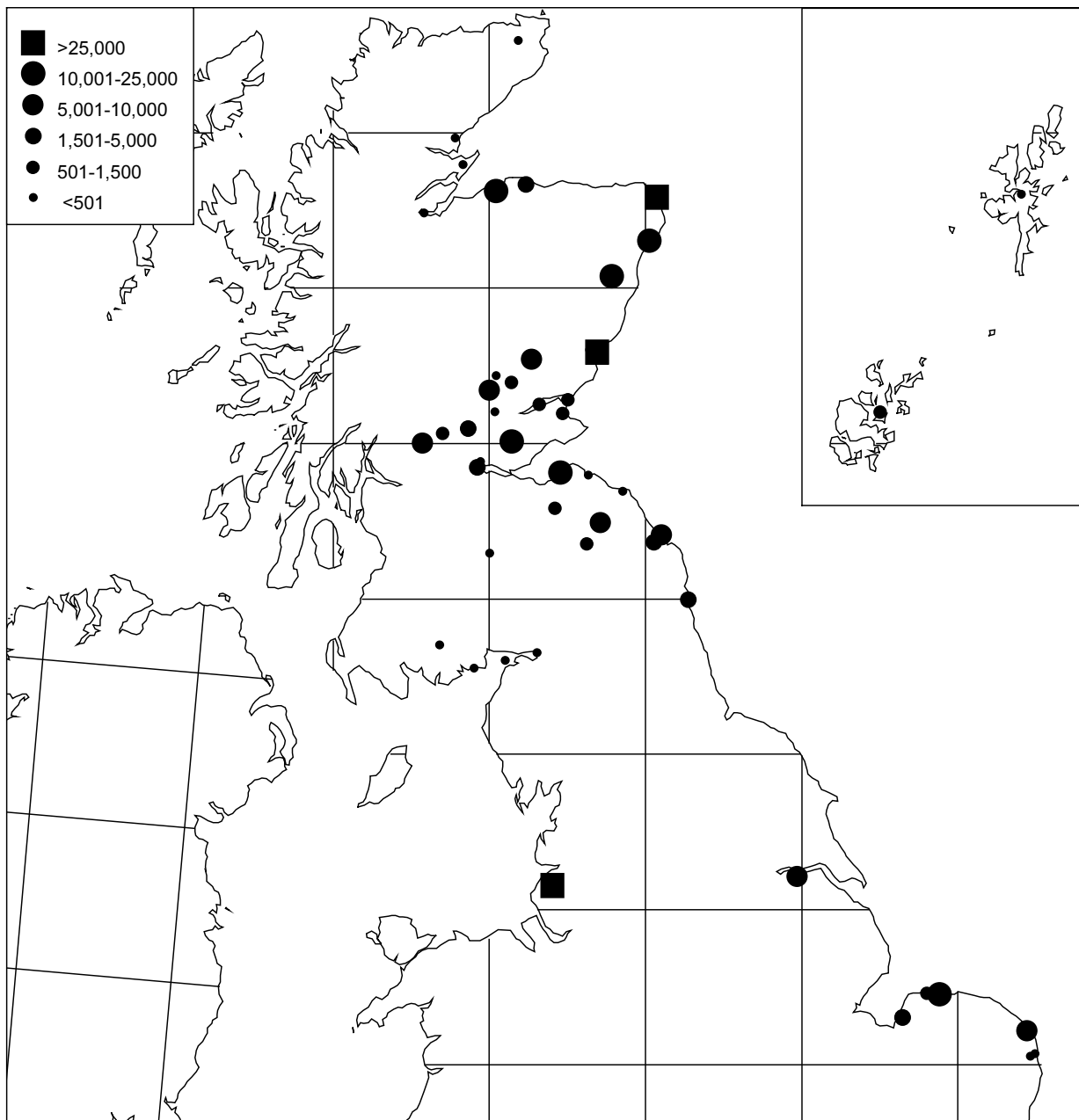


Figure 2a. The distribution of Pink-footed Geese counted in Britain in October 2004.

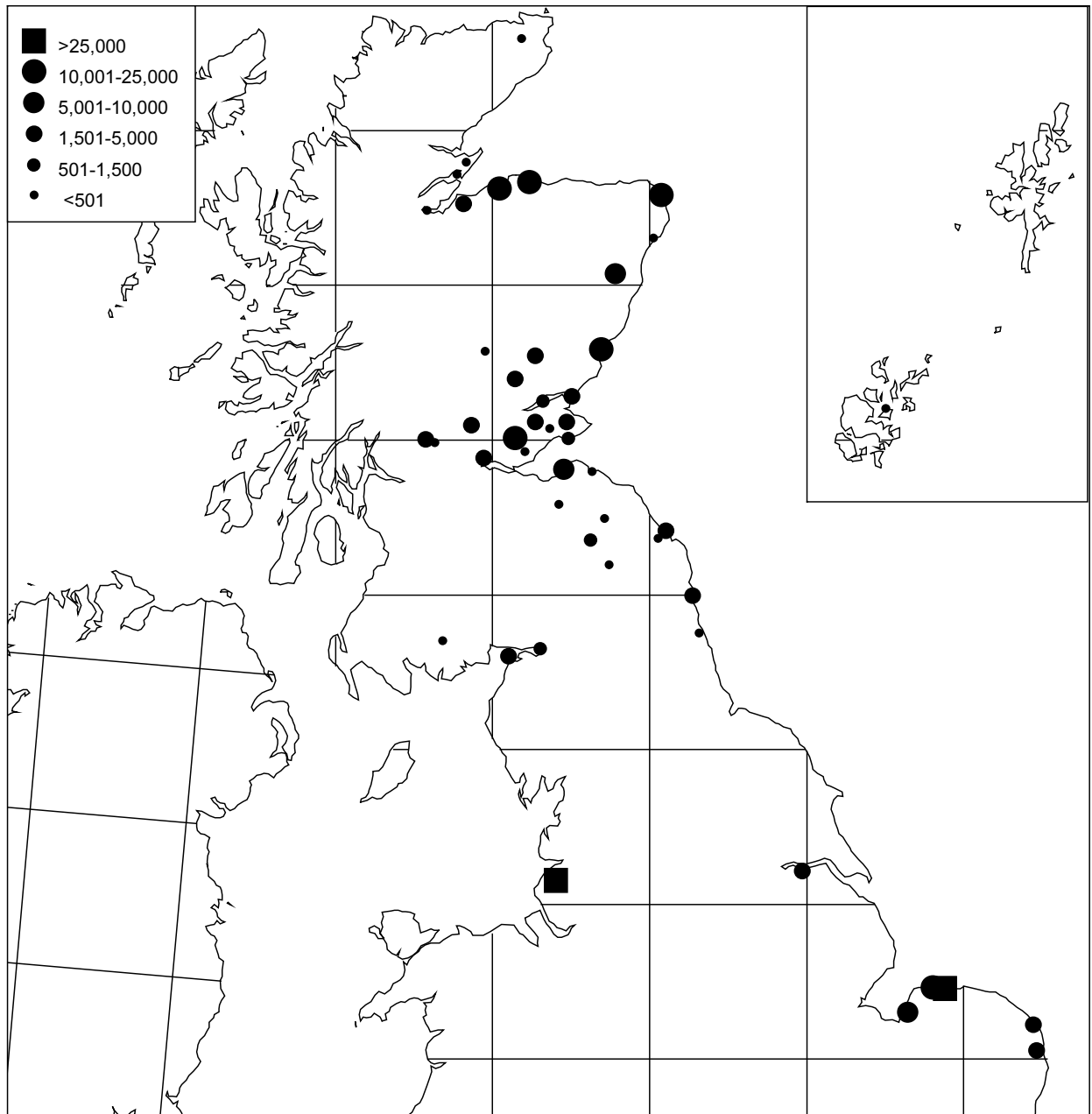


Figure 2b. The distribution of Pink-footed Geese counted in Britain in November 2004.

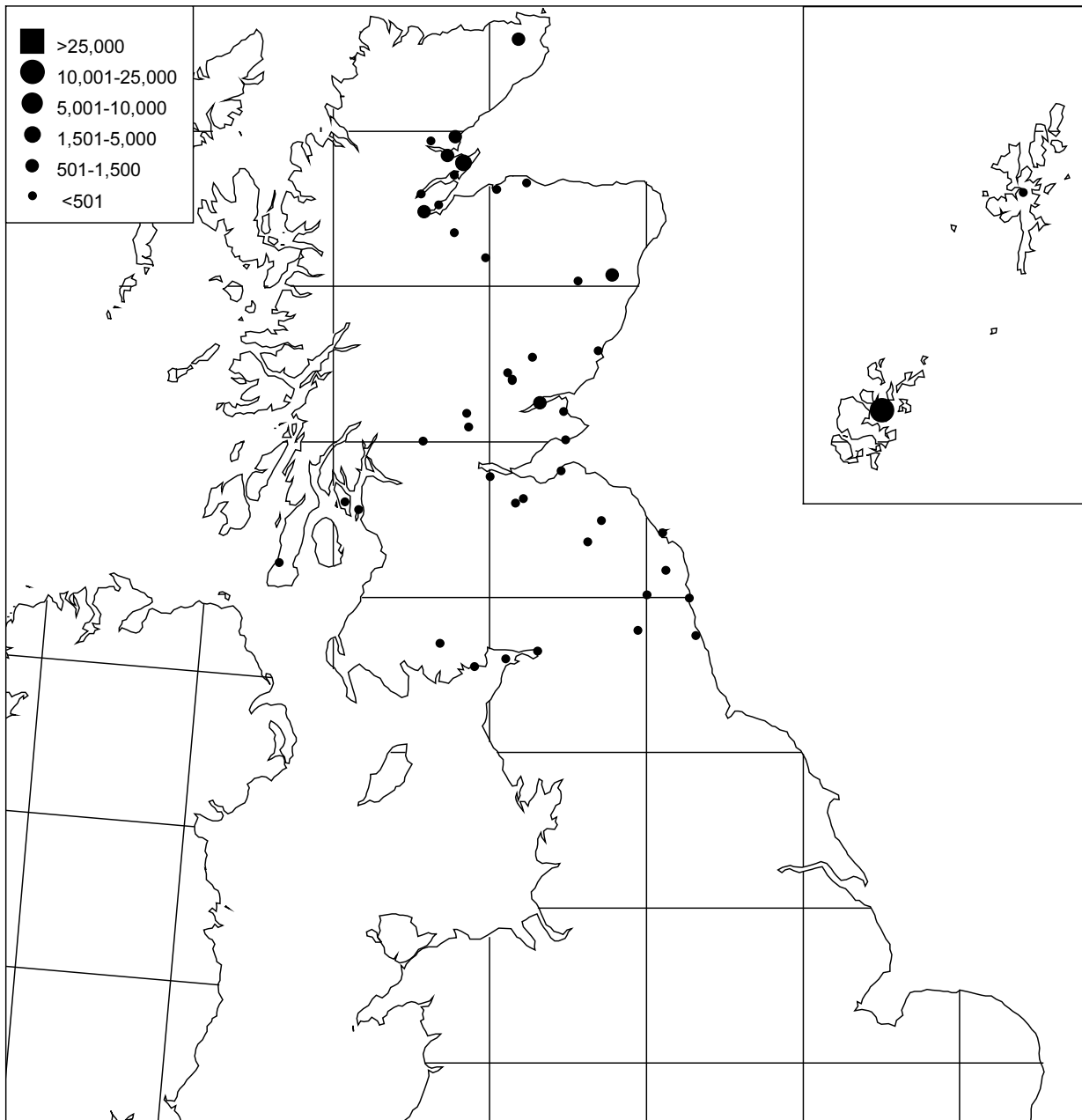


Figure 3a. The distribution of Iceland Greylag Geese counted in Britain in October 2004.

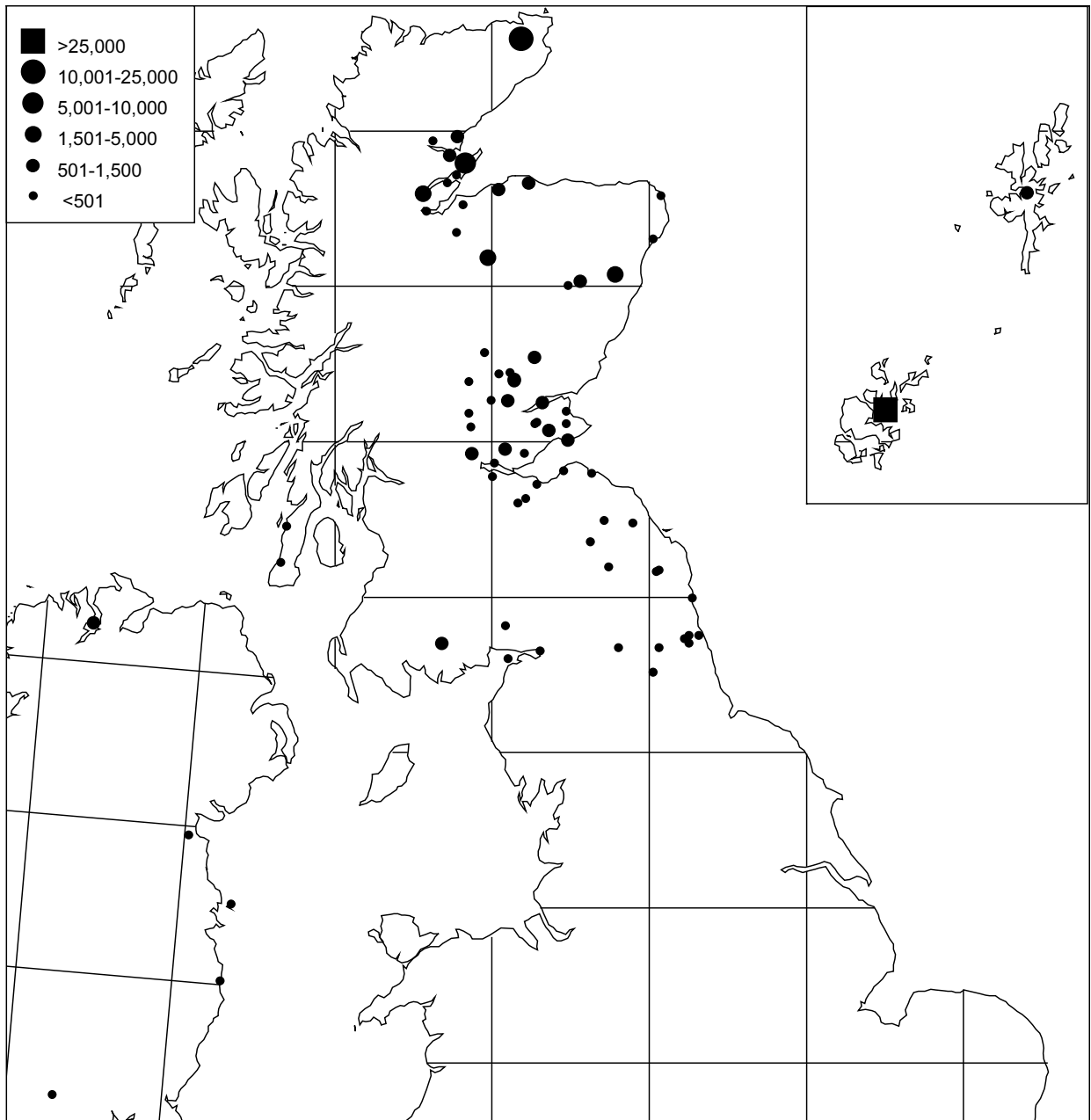


Figure 3b. The distribution of Iceland Greylag Geese counted in Britain and Ireland in November 2004.

3.4 Principal concentrations

3.4.1 Pink-footed Goose

During October, Pink-footed Geese were reported from a total of 56 sites, of which 46 held more than ten birds. Eighteen held more than 1% (2,922) of the population estimate and nine supported 10,000 or more birds (Table 3). The top three sites held over 30% of the population estimate during October. In November, Pink-footed Geese were found at 52 sites, of which 49 held ten or more birds. Eighteen held more than 1% of the population estimate, with 10,000 or more counted at nine of these. The top three sites held 29.7% of the population estimate. In total, Pink-footed Geese were recorded at 68 sites during both counts.

The top two sites in October both held greater than average numbers of Pinkfeet (Table 3), and an atypically large count was reported from Loch Tullybelton. Numbers at both Snettisham and Carsebreck and Rhynd Lochs appeared to be low, but numbers were higher at both sites in November.

3.4.2 Greylag Goose

During October 2004, Greylag Geese were concentrated at typical arrival sites in north Scotland, and the proportion of the population present in Britain (29.9%) was slightly above average for the October count (mean 2000-04: 28.1%). In all, they were reported from a total of 74 sites (including 15 in Orkney), of which 65 held more than ten birds.

By November, Greylag Geese were found at 99 sites (including 15 in Orkney), of which 94 held ten or more birds. Treating Orkney as a consolidated site, 11 of these held more than 1% (1,072) of the population estimate and three held more than 10,000 (Table 3), comprising 65.7% of the total. Within the Orkney total, seven individual sites supported 1% or more of the population estimate (Table 4), although it is not possible to adjust these individual counts to account for the number of Re-established Greylag Geese, because such data are only available for Orkney as a whole.

In all, Greylag Geese were recorded at a total of 120 sites during both counts, nine more than the previous year. A larger than average count was recorded from a number of sites during November, most notably at Caithness, Dingwall Bay and the River Tay at Bloody Inches (Haughs of Kercock). The number on Orkney in November 2004 is just under 1,000 fewer than the record count in November 2003. However, a difference of 1,000 is probably within the limits of counting error when dealing with so many birds, so it is probably safe to assume that there has been very little change in numbers on Orkney between 2003 and 2004 (E. Meek pers comm.).

Table 3. Sites that supported more than 1% of the Pink-footed Goose and Iceland Greylag Goose population estimates in autumn 2004.

PINK-FOOTED GOOSE 2004 population estimate: 292,154	October count	Site count as % of the population estimate ¹	5-year peak mean ²
Southwest Lancashire	37,968	13.0	31,660
Montrose Basin	31,896	10.9	24,427
Loch of Strathbeg	30,570	10.5	50,663
Holkham Bay	18,625	6.4	45,875
Aberlady Bay	18,430	6.4	17,232
Findhorn Bay	18,000	6.2	15,625
Slains Lochs	16,200	5.5	19,625
Loch Leven	14,718	5.0	14,722
Loch of Skene	10,960	3.8	8,593
Loch of Lintrathen	8,921	3.1	6,920
Hule Moss	7,950	2.7	8,336
Loch Tullybelton	6,500	2.2	2,110
Horse Mere	6,420	2.2	6,013
Humber Estuary	5,600	1.9	4,746
Lake of Menteith	5,357	1.8	4,600
Lindisfarne	5,300	1.8	3,000
Snettisham	5,000	1.7	24,302
Carsebreck and Rhynd Lochs	3,055	1.0	12,308
GREYLAG GOOSE 2004 population estimate: 107,207	November count	Site count as % of the population estimate ¹	5-year peak mean ²
Orkney (all sites)	38,697	36.1	27,846
Iceland	20,000	18.7	20,000
Caithness	11,755	11.0	6,331
Loch Eye	5,313	5.0	4,292
Inner Cromarty Firth: Dingwall Bay	3,000	2.8	1,851
Loch of Skene	2,850	2.7	3,976
Loch Garten	2,100	2.0	1,920
Lough Swilly	1,400	1.3	1,237
River Tay: Bloody Inches	1,200	1.1	772
Kilconquhar Loch	1,200	1.1	959
Findhorn Bay	1,100	1.0	965

¹ these values are not the same as the internationally accepted threshold values for these populations that are used to identify sites of national and international importance; currently 2,400 for Pink-footed Goose and 1,000 for Greylag Goose (Wetlands International 2002).

² 5-year peak means are calculated using all available data, thus may appear larger than counts recorded by this census if higher counts are made at other times of the year.

Table 4. Greylag Goose counts at individual sites on Orkney in November 2004 (counts have not been adjusted to take into account number of UK Greylags, as data on numbers of these populations are only available for Orkney as a whole).

	November count	Site count as % of the total November count	5-year peak mean
West Mainland	20,550	18.6	15,170
East Mainland	7,325	6.6	5,776
Island of Shapinsay	3,400	3.1	2,361
Island of Egilsay	2,620	2.4	1,673
Island of Sanday	2,365	2.1	1,573
Island of Stronsay	1,775	1.6	1,710
Island of South Ronaldsay	1,208	1.1	837
Island of Papa Westray	929	0.8	741
Island of Wyre	850	0.8	408
Isles of Hoy and Walls	472	0.4	358
Island of Eday	393	0.4	704
Island of Westray	317	0.3	253
Island of Burray	210	0.2	202
Island of Rousay	165	0.1	202
Island of North Ronaldsay	118	0.1	108
Total	42,697	38.6	

3.5 Breeding success

Totals of 23,041 Pink-footed Geese and 7,846 Greylag Geese were aged at various localities throughout Scotland and England between 20 September and 8 November. In addition, brood sizes were collected for 198 broods of Pink-footed Goose and 116 broods of Greylag Goose.

Pink-footed Goose breeding success was slightly above average for the previous decade at 19.4% young (mean proportion of young 1994-2003: 18.4%, 0.80 s.e.) (Table 5, Figure 4a). The mean brood size of successful pairs was 2.1 goslings (mean brood size 1994-2003: 2.3, 0.05 s.e.) (Figure 4b). Breeding success of Iceland Greylag Geese was also above average, with flocks containing 28.2% young (mean 1994-2003: 17.8%, 1.22 s.e.) (Figure 4a), and the mean brood size was 2.8 goslings per successful pair (mean 1994-2003: 2.6, 0.06 s.e.) (Figure 4b).

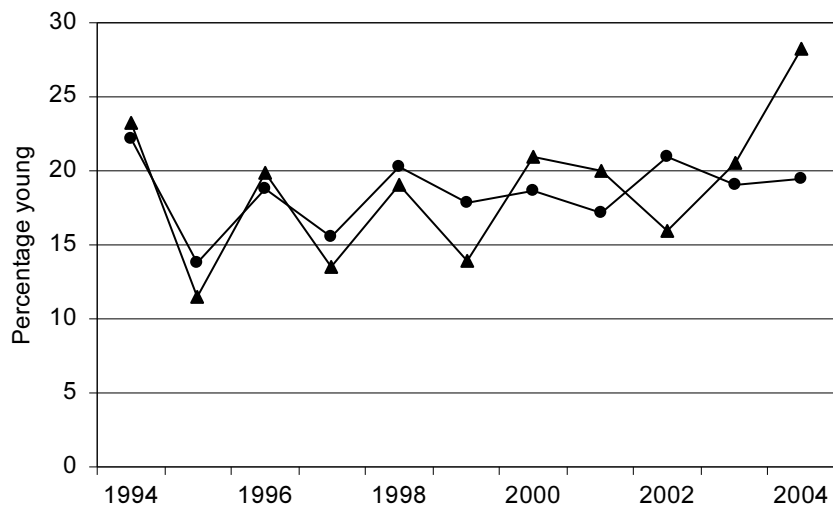
Most Pink-footed Geese were aged in northeast, southeast and east-central Scotland. Only in northeast Scotland was the sample spread throughout the autumn period. The temporal range in other regions was limited and varied between them (Figure 5).

Due to their later migration and more limited range, the temporal and spatial distribution of Greylag Goose age samples was more limited. Samples were collected in three regions between late October and early November, the vast majority in north Scotland during late October (Figure 6).

Table 5. The proportion of young and mean brood size of Pink-footed and Greylag Goose flocks in autumn 2004 (regions defined in Table 2).

	Region	Total aged	% young	No. of broods	Mean brood size
Pink-footed Goose	Northeast Scotland	8,358	21.3	84	2.2
	East-central Scotland	8,415	17.2	44	2.2
	Southeast Scotland	4,734	20.1	49	1.9
	West England	1,534	19.1	21	2.4
	Total	23,041	19.4	198	2.1
Greylag Goose	North Scotland	6,354	28.2	95	2.9
	Northeast Scotland	1,368	28.5	21	2.5
	East-central Scotland	124	23.4	-	-
	Total	7,846	28.2	116	2.8

(a)



(b)

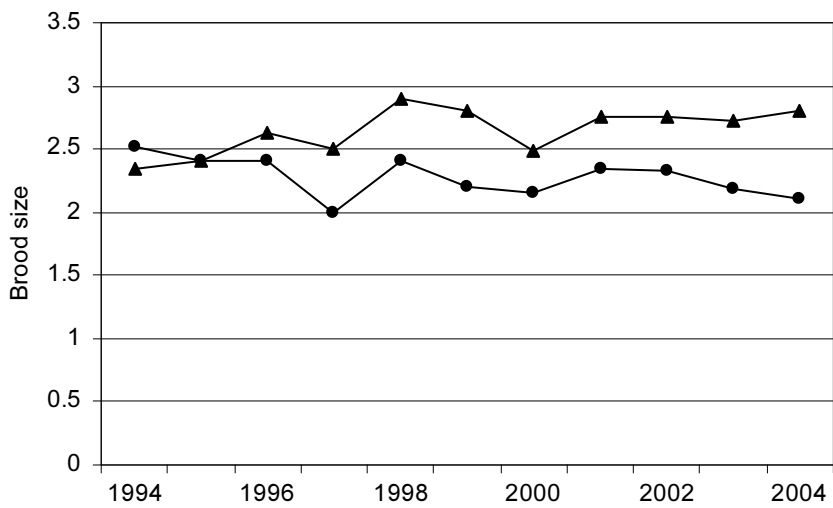


Figure 4. (a) The mean percentage of young Pink-footed Geese (circles) and Iceland Greylag Geese (triangles) in Britain, 1994-2004, (b) The mean brood size of successful pairs of Pink-footed Geese (circles) and Iceland Greylag Geese (triangles) in Britain, 1994-2004.

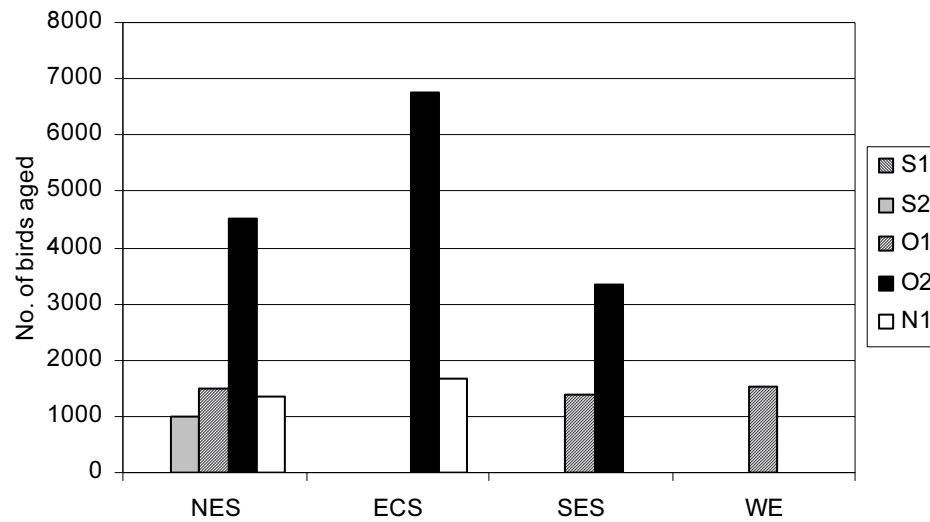


Figure 5. The temporal distribution of Pink-footed Goose age samples in each region during autumn 2004. Periods: S1 = early September, S2 = late September, O1 = early October, O2 = late October, N1 = early November (regions defined in Table 2).

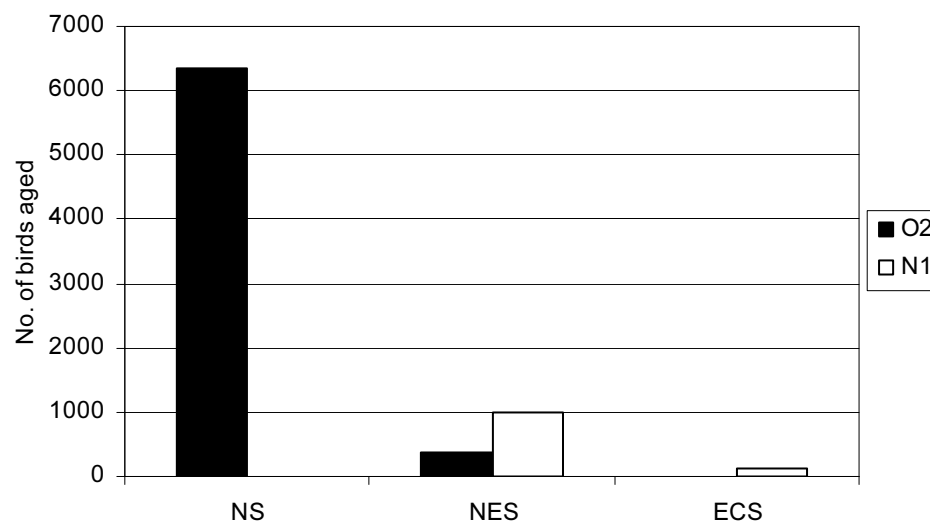


Figure 6. The temporal distribution of Greylag Goose age samples in each region during autumn 2004. Periods: O2 = late October, N1 = early November (regions defined in Table 2).

4 Discussion

The 2004 Icelandic-breeding Goose Census (IGC) revealed increases in the population estimates of both Pink-footed Goose and Iceland Greylag Goose compared to the previous year (Figure 7). Notably, the November count of Greylag Goose was the largest since November 1990 and the third largest since monitoring began. This is largely due to the number estimated to be present in Iceland at that time. If the Iceland estimate is removed, the increase in the Greylag Goose population estimate compared to 2003 is much smaller, at 7.5%. Although Pink-footed Goose numbers recorded by the IGC fluctuated at around 250,000 during the last ten years, large counts have been made during the two most recent censuses, with the 2004 total the largest since regular monitoring began in 1960, suggesting that population growth is continuing.

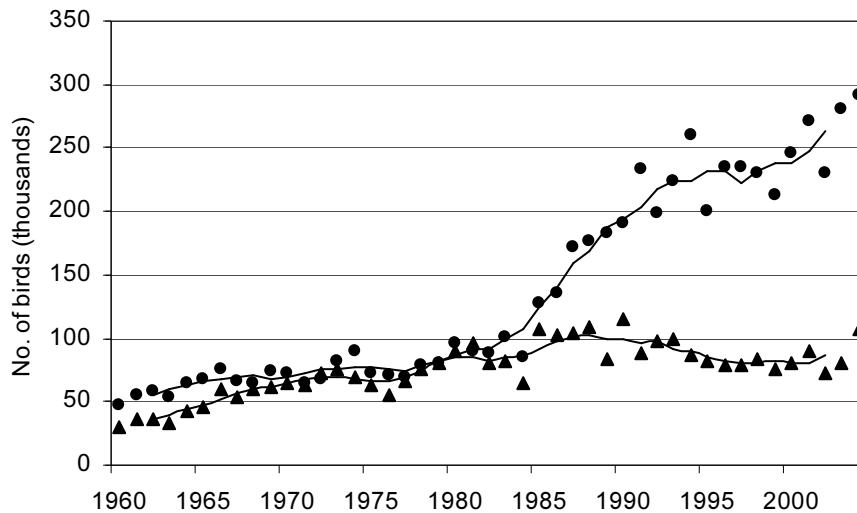


Figure 7. Population estimates of the Pink-footed Goose (circles) and Iceland Greylag Goose (triangles), 1960 to 2004. The 5-year running means (eg mean for 2002 is from population estimates for 2000-04) are shown as lines.

It must be taken into account that the estimate of Greylag Geese in Iceland in November was not based on complete counts, but is an approximate figure based on the reporting of sightings from many individuals (hunters, birdwatchers and farmers). Although estimates of the number of Greylag Geese present in Iceland have been included in a previous IGC estimates (eg 175 in 2001), the number estimated in 2004 (20,000) is much higher than any other year. However, count coverage in Iceland has generally been poor in previous years, and remains *ad hoc.*, making comparisons with previous years difficult. Nevertheless, it does appear that there were considerably more Greylag Geese in Iceland compared to previous Novembers (eg 3,000 to 5,000 in 2003; A. Sigfússon pers comm.). In order for a more complete understanding of the number of geese in Iceland at the time of IGC counts, however, systematic monitoring is required. The development of such monitoring, including the use of aerial survey, is currently underway.

Anecdotal evidence from Iceland in recent years does suggest that Greylag Geese are remaining there for longer each autumn, and means that there is a need to review the best period in which to census this population. As a result, a third co-ordinated IGC count will be initiated in December 2005, and this will be carried out over the following two winters also (2006-07 and 2007-08). A review will then be carried out to see whether or not this proves to be a better month in which to estimate the size of the Iceland Greylag Goose population, and a decision will be made about when counts should be conducted in the future.

In contrast, it appears that the arrival of Pink-footed Geese at their wintering grounds in 2004 was earlier than in 2003, with the peak count occurring in October. However, in the last two years there have not been any good estimates of the number of Pinkfeet present in Iceland in October, as a ban on Ptarmigan hunting has meant that hunters have not been in the highlands at this time (A. Sigfússon pers comm.). In three of the last five years, however, the peak IGC count has occurred in November, rather than the more usual time of October, and there may therefore also be a need to reassess the best period in which to census this population.

Reproductive success in 2004 was above average for both species, with the proportion of young Greylag Geese in autumn flocks being the highest recorded since 1973. A high proportion of young Greylag Geese was also observed in Iceland, with the ratio of young birds in hunting bags recorded at around 48%, and close to 34% in the field (A. Sigfússon pers comm.). In contrast to the previous two years, the estimates of the proportion of young both increased, although the proportion in the Pink-footed Goose flocks was only marginally higher (0.4%) than in 2003. However, this is as generally expected since productivity in these species has been shown to be largely affected by the same factors (Fox *et al* 1989).

The effect on the efficacy of productivity assessments made in the UK from the apparent changes in the timing of migration is unknown, as little is known about whether families migrate at different times to those birds without young. During 2004, early (September) assessments of the proportion of young Pink-footed Geese often found a very high proportion of young (I. J. Patterson pers comm.), whereas later assessments (late October) found considerably fewer young (R. D. Hearn pers comm.). Whilst some disproportionate losses of young are likely to have occurred, this is not likely to have been sufficient to account for the difference. One possible explanation is that birds with young arrived in the UK before those without young. If this is true, it is essential that age assessments are made after a thorough mixing of the population has occurred. However, for Greylag Geese, this is not possible since young birds are very difficult to separate from older birds by the time the entire population has migrated to the winter quarters. Thus, if the majority of geese that remain for longer in Iceland (until after the age assessment period) are adults without young, an over-estimate of the proportion of young in the whole population may arise, as data are only collected in the UK. Further examination of this important potential bias is therefore needed.

5 Acknowledgements

This census is part of the long-term Goose & Swan Monitoring Programme organised by The Wildfowl & Wetlands Trust and funded by the Joint Nature Conservation Committee and WWT. The support of JNCC is gratefully acknowledged.

This census would not be possible without the support of a large number of dedicated goose enthusiasts. Enormous thanks go to them and the regional co-ordinators for all their hard work and effort, advice and comments on their local goose situations. These include (with apologies for any omissions or mis-spellings):

J. Adair, George Adam, Dave Aiton, Peter Allard, John Allen, Bobby Anderson, Angus Council Ranger Service, Sarah Barratt, Mike Bell, Pamela Black, Geoff & Verity Blackman, Lynnette Borradaile, Graeme Bowman, Ivan Brockway, Allan Brown, Rhys Bullman, Graham Bundy, John Burrow, Billy Butler, John Calladine, Euan Cameron, Mike Carrier, A. Carter, Graham Catley, Richard Cooper, Steve Cooper, Olivia Crowe *et al*, Neville Crowther, Tom Cunningham, Phil Davey, I.S. Davidson, Keith Duncan, Nick Dymond, Richard Eagles, Paul Ellis, Brian Etheridge, Dave Fairlamb, Nigel Fairney, Fife Ranger Service, Peter Fletcher, Derek Forshaw *et al*, Simon Foster, Ian Francis, Catrina Gall, Alexander Gordon, Ron Graham, Martin Gray, Meg Griffiths, Sandra Hacker, Clive Hartley, Paul Harvey, Les Hatton, Bill Hay, Malcolm Henderson, Ben Herschell, Steve Holliday, Norman Holton, Ian Hopkins, Eleanor Hurley, Malcolm Hutcheson, Gordon Huxley, Hugh Insley, Duncan Irving, W. Jamieson, Keith Kirk, Martin Kitching, David Law, Allan Lawrence, Stan Laybourne, Alan Leitch, Stephanie Little, James Lough, Micky Maher, Tony Mainwood, Leigh Marshall, Paul Massey, Wendy Mattingley, Frank Mawby, Chris & Alston McGregor, P. McHugh, Richard Mearns, Eric Meek *et al*, Peter Miller, Rob Minshull, Carl Mitchell, Petur Mortensen *et al*, Andrew Mossop, Donald Muir *et al*, Eddie Nixon, Roger Norman, John Palfery, Scott Paterson, Ian Patterson, Mike Pennington, David Pickett, Katherine Puttick, K. Redgrave, A. Reid, Michael Richardson, Roger Riddington, Alistair Robertson, Martin Robinson, M.B. Ross, Nick Rossiter, Jim Scott *et al*, Alexa Seagrave, Ken Shaw, Roger Sidaway, Arnór Sigfússon, John Smith, Richard Smith, Trevor Smith, Anne-Marie & Chris Smout, Jeremy Squire, Logan Steele, Clive Stoneman, Lyn Strachan, Fraser Symonds, N.W. Taylor, Andre Thiel, Mike Thompson, Ian Thomson, Hugh Tindle, John Wills, Tony Wilson, Jenny Worden and Ron Youngman.

Age assessments were provided by Ian Patterson, Richard Hearn and Jenny Worden. Thanks also to Helen Jewell for helping with the compilation of count data, and to Peter Cranswick, Richard Hearn and Helen Baker for comments on a draft of this report.

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