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## Summary

Further to the 'traditional' autumn grey goose counts, additional co-ordinated counts of Greylag and Pink-footed geese were carried out in January and March 1994. These counts were designed to highlight changes in the distribution of grey goose populations in Britain throughout the winter and spring. The January count recorded totals of 41,645 Greylag and 160,812 Pink-footed geese, under reasonably good weather conditions. The March count recorded totals of 34,031 Greylag and 83,320 Pink-footed geese, under poor weather conditions.

## Introduction

A complete census of the Greylag and Pink-footed goose populations wintering in Britain has been organised, by WWT, since 1960. This census has involved a co-ordinated count of roosts in November each year, and in 1990 a supplementary autumn count was introduced in October, in order to investigate the optimal time to census each species (Kirby & Cranswick 1991). These counts are timed to take place just after the geese arrive in Britain, while they are gathered in large numbers around well known roost sites. However, these large autumn flocks soon break up and the geese become much more widely dispersed. Monthly Wetland Bird Survey (WeBS) counts provide some information on the eventual destination of a proportion of these birds but the WeBS counts usually take place mid-morning, long after roosting geese have departed.

A spring count of Greylag and Pink-footed geese was carried out from 1982 to 1986, and from 1988 to 1990. Results were variable and, at least in the last few years, found only 50% of Greylag and 60% of Pink-footed geese estimated population totals (as established by the previous autumn count, *e.g.* Kirby & Shimmings 1990).

Late-winter and spring are important times for geese, and they feed vigorously, storing the nutrient reserves required for successful migration and breeding. It is therefore important to have counts outwith the autumn period, particularly mid-winter and spring, if we are to establish where the bulk of the grey goose populations feed and overwinter.

## Methods

The additional co-ordinated counts were carried out on the weekends of 15/16 January 1994 (mid-winter), and 12/13 March 1994 (spring). These additional counts were conducted in the same manner as the traditional autumn counts (Mitchell 1994), with the majority of observations conducted by volunteers, usually made at dusk or dawn at known roost sites. In a few areas, where the locations of roost sites were poorly known, daytime feeding counts were made.

The counts did not attempt to cover every known goose roost in the country, rather to ensure coverage of the important roosts in each area. In some areas it was simply impossible to cover all roosts on the count dates, and observations made up to five days either side of the count weekend were included in the count total.

## Results

### Mid-winter count

Around 15/16 January 1994, conditions were reasonably good for counting and visibility was recorded as good in most cases. It was generally cold and overcast, the wind swinging from south-westerly to north-westerly, with rain, hail or snow-showers in some places. Coverage was reasonably good and totals of **41,654** Greylag geese and **160,812** Pink-footed geese were recorded (Table 1, Figures 1 & 2).

An obvious feature of this count was the relatively low number of Greylag geese recorded, approximately 42% of the total population as established by the autumn (November) count. Notable concentrations in January 1994 were found in North-east and East-central Scotland, together accounting for 60% of the count total (Table 2). South-east Scotland and North-east England showed the lowest number of Greylags, with only 8.6% of the count total.

A greater proportion of Pink-footed geese were recorded, with 72% of the total population as established by the autumn (October) count. A large concentration of Pink-footed geese was recorded in Norfolk, some 68,560, a new record count for the area. This represents 43% of the total counted in January, and 30% of the total population as established by the autumn count. Pink-footed geese were also concentrated in North-east Scotland, and to a lesser extent in East-central Scotland, together representing 38% of the count total (Table 2).

### Spring count

Around 12/13 March 1994, weather conditions were generally adverse for counting, and visibility was recorded as poor to reasonable in most cases. It was cold, with strong north-westerly winds and most areas suffered heavy rain, with sleet and snow-showers in places, together with widespread flooding. Coverage was reasonably good, despite the conditions, and a total of **34,031** Greylag geese and **83,320** Pink-footed geese were counted (Table 1, Figures 3 & 4).

A noticeable feature of the 1994 spring count was the relatively low numbers of grey geese recorded, approximately 35% of the Greylag goose population, as shown by the autumn (November) count, and 37% of the Pink-footed goose population, as shown by the autumn (October) count.

Greylag geese appeared to be slightly more dispersed in March 1994, than in January 1994, with an 10% increase in the proportion of the count total recorded in North Scotland (Table 2). A corresponding decrease (10%) was recorded in North-east Scotland and East-central Scotland. An increase of 5% in the proportion of the count total was also recorded for South-east Scotland and North-east England, with a similar decrease (5%) recorded in South-west Scotland and North-west England.

A striking feature of the 1994 spring count was the large concentration of Pink-footed geese recorded in North-east and East-central Scotland, 88% of the count total (Table 2), and 33% of the total population as shown by the autumn (October) count. A small proportion was recorded in North Scotland (5.8%) and South-west Scotland & North-west England (4.2%), while South-east Scotland showed a very small proportion (1.86%) of the spring count total.

*Table 1: The numbers of Greylag and Pink-footed geese recorded in Britain in January and March 1994. The number of sites counted in each District/Region is also given.*

District/Region	January 1994			March 1994		
	sites	Greylag	Pink-footed	sites	Greylag	Pink-footed
Shetland	nc			nc		
Orkney	7	3166	0	7	4810	55
Western Isles	nc			nc		
Caithness	+	1125	12	+	1894	260
Sutherland	3	1379	0	3	724	105
Ross & Cromarty	7	711	32	8	929	3463
Inverness/Nairn	3	560	150	3	700	954
Badenoch & Strathspey	nc			nc		
Moray	4	3283	0	4	950	300
Banff & Buchan	1	450	19600	1	20	13500
Gordon/Aberdeen	4	5700	4500	4	5600	24951
Kincardine & Deeside	1	3526	0	1	245	263
Angus/Dundee	4	240	8180	3	48	3560
Perth & Kinross	10	8330	16541	12	6529	18709
Central	nc			2	330	1675
Fife	6	3135	2985	10	3064	10472
Argyll, Bute & Arran	3	1094	2	3	544	399
Glasgow	2	516	0	2	652	0
Clydesdale	nc			1	0	
Stewartry/Wigtown	4	3976	455	3	933	11
Nithsdale/Annan & Eskdale	3	637	8756	2	300	3088
East/Midlothian	7	211	2044	9	820	466
Edinburgh/W Lothian	1	0	0	1	720	0
Borders (east)	7	530	110	7	1730	4
Tweeddale	2	0	1600	2	0	1100
Northumberland	2	2965	1600	2	1497	5
Cumbria	4	120	0	4	864	0
Lancashire & Merseyside	4	0	25685	nc		
Humberside	nc			nc		
Lincolnshire	nc			nc		
Norfolk	3	0	68560	nc		
<b>Total</b>	<b>97+</b>	<b>41,654</b>	<b>160,812</b>	<b>94+</b>	<b>34,031</b>	<b>83,320</b>

Table 2: Gross regional distribution of Greylag and Pink-footed geese in Britain in January and March 1994, expressed as a percentage of the count total.

Area	Greylag goose		Pink-footed goose	
	January	March	January	March
North Scotland	16.7	26.6	0.1	5.80
North-east Scotland	31.1	20.0	15.0	46.82
East-central Scotland	28.1	29.4	17.2	41.30
South-east Scotland & North-east England	8.9	14.0	3.3	1.86
South-west Scotland & North-west England	15.2	10.1	21.7	4.20
East England	-	-	42.6	-

Areas are defined as follows:

*North Scotland:* Shetland, Orkney, Western Isles, Highland

*North-east Scotland:* Grampian

*East-central Scotland:* Tayside, Central, Fife

*South-east Scotland:* Lothian, Borders

*North-east England:* Northumberland

*South-west Scotland:* Strathclyde, Dumfries & Galloway

*North-west England:* Cumbria

*East England:* Humberside, Lincolnshire, Norfolk

*West England:* Lancashire, Merseyside

## Discussion

### Mid-winter count

The low number of Greylag geese observed in the mid-winter count confirms the difficulties in locating birds expressed by some counters. This is consistent with the general understanding that the large flocks of Greylag observed in autumn become more and more fragmented and dispersed throughout the winter, using many small remote lochs and temporary flooding as roosts.

With the large numbers of Pink-footed geese recorded in Norfolk in mid-winter, a record count for that area, it seems likely that many birds left traditional mid-winter haunts to feed at sites further south, possibly due to the severe winter weather conditions in the north throughout December and January.

However, interpretation of one year's data should be viewed with caution, and it is unclear whether the distribution of grey geese in January 1994 was representative of an average year, since few historical mid-winter roost count data exist. The 1994 mid-winter count does represent good baseline data, however, with which to compare future mid-winter counts.

Figure 1. The distribution of Greylag Geese recorded in January 1994

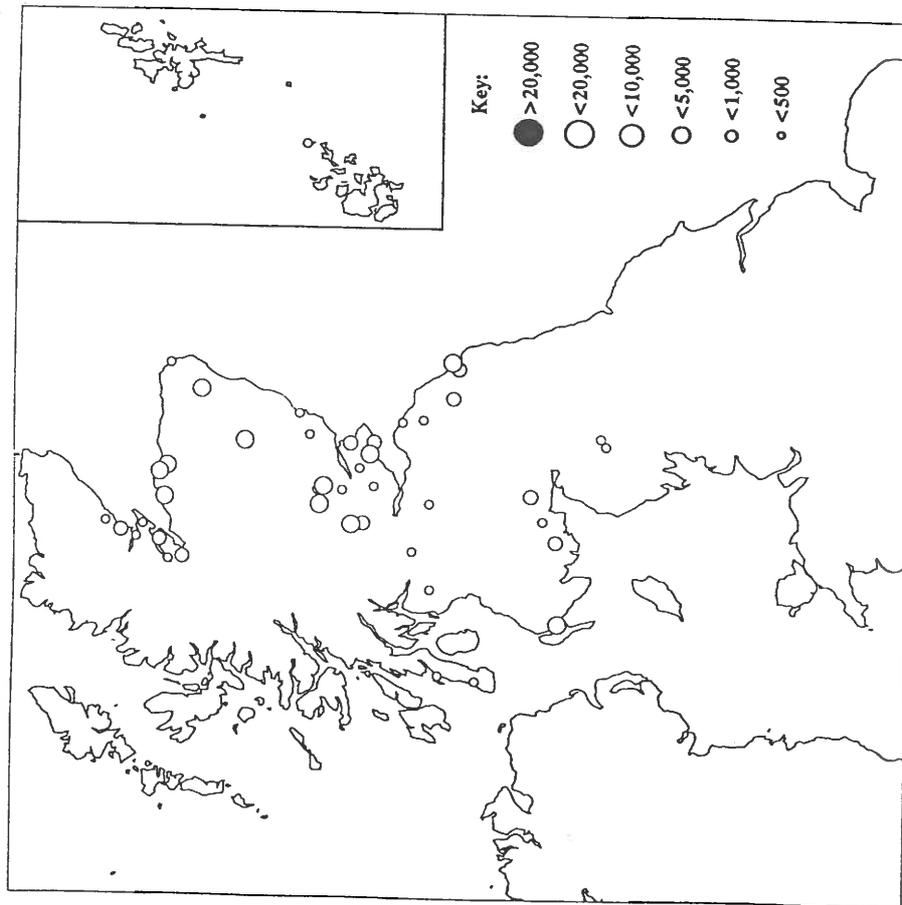


Figure 2. The distribution of Pink-footed Geese recorded in January 1994

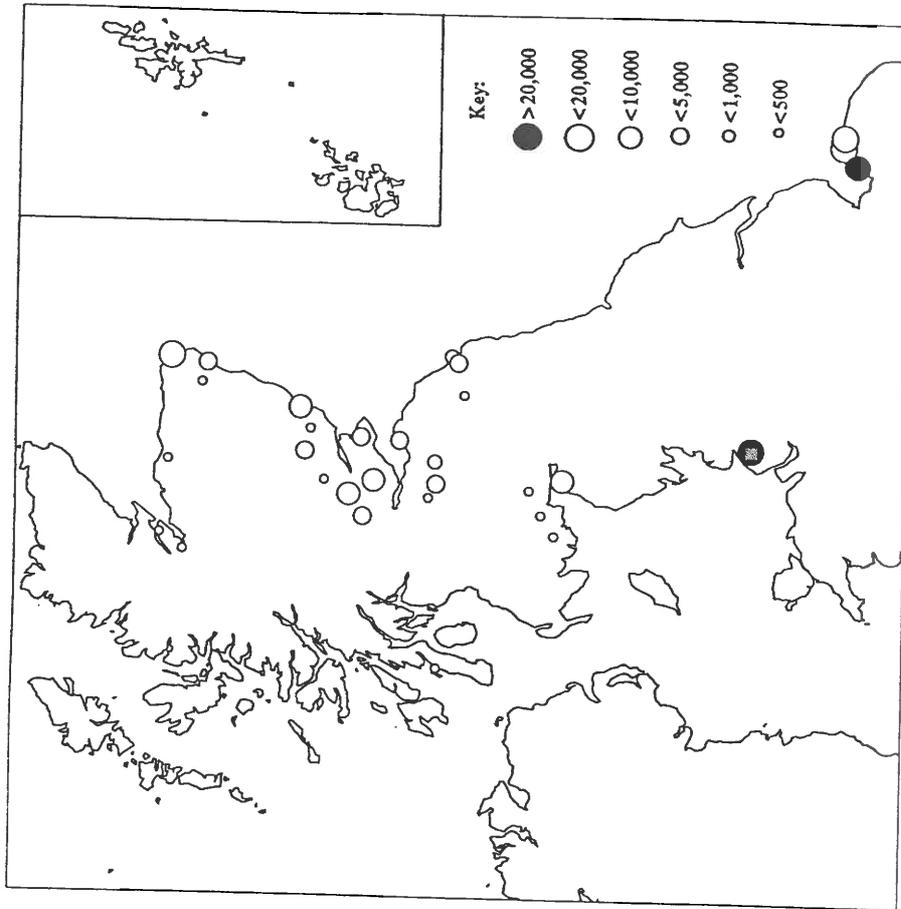


Figure 3. The distribution of Greylag Geese recorded in March 1994

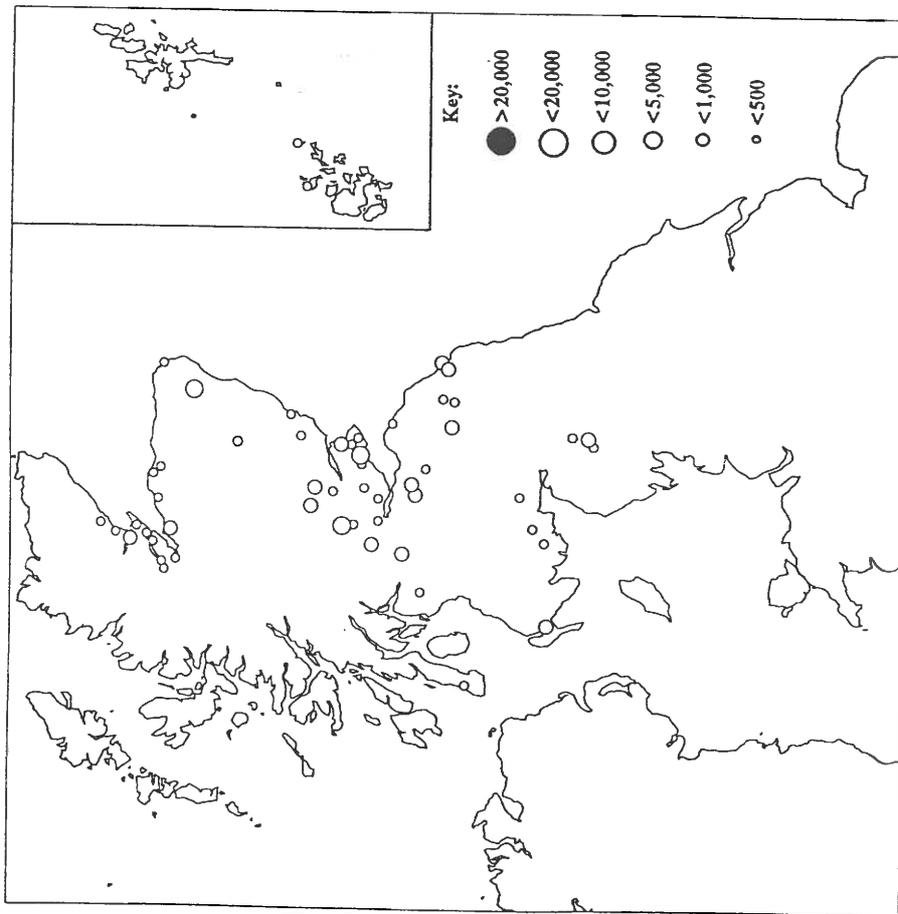
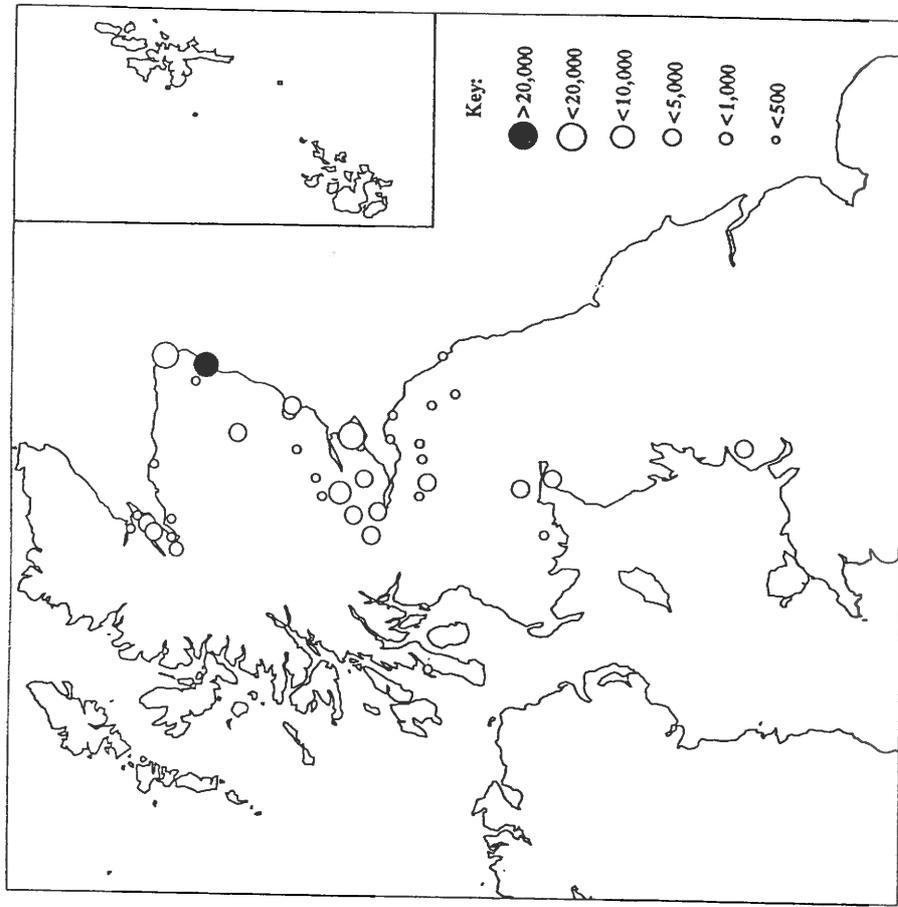


Figure 4. The distribution of Pink-footed Geese recorded in March 1994



## Spring count

Greylag geese were even more difficult to find in spring than in mid-winter, having been further dispersed by widespread flooding across much of the country. Greylag are also known to start the return migration to breeding grounds earlier than Pink-footed geese, however, it seems unlikely that birds would have been able to store enough resources to achieve an early departure in 1994. Nevertheless, the arrival pattern of Greylag in Iceland is poorly described or understood, and monitoring of their arrival in the southern lowlands of Iceland would be extremely valuable in placing the results of spring counts in context.

The spring counts of the 1980s clearly identified North-east and East-central Scotland as the main focus for Pink-footed geese in spring. However, the concentration of birds in these areas in the 1994 spring count was remarkable, and few Pink-footed geese were found elsewhere in the country. Numbers in South-east Scotland were particularly low, with just under 2% of the count total. This area fairly reliably hosted over 10% of the count total throughout the previous spring counts.

The Greylag goose population was shown to be more evenly distributed across Scotland in the 1994 spring count. Like the Pink-footed geese, the bulk of the population, some 50%, was found in North-east and East-central Scotland. However, a notable feature of their distribution in spring was the increase in the proportion of Greylag found in South-east Scotland, approximately 16% of the count total. This area hosted up to only 4% in the previous spring counts. Thus, in spring 1994, the South-east Scotland saw a substantial decrease in the number of Pink-footed geese, and an increase in the number of Greylag geese.

These unusual distribution patterns may simply be the result of the two species reacting in different ways to the same stimuli. Perhaps the severe weather conditions accentuated the different behavioural responses of the two species at this time of year *i.e.* fragmenting Greylag goose flocks into smaller groups and spreading the population wider and wider, and concentrating the Pink-footed geese more and more into their favoured spring feeding areas.

## The Goose Counter Network

Most counters took part in the additional 1994 counts, although some have expressed doubts as to the value of mid-winter and spring roost counts, on the grounds that use of roost sites is unpredictable, and birds can be so widely dispersed, that the final count is inaccurate. However, it is generally accepted that the autumn counts provide an accurate estimate of population totals. The aim of additional counts is to gain a better understanding of changes in distribution, and identify key goose areas through the winter and spring. The focus therefore should not necessarily be on counting every last goose in any one area, rather to establish where the bulk of birds are in an area during the two count weekends.

It is recognised that many roost sites are extremely difficult to reach, particularly in wintry conditions, and WWT hope that counters should never put themselves at risk to achieve a count. Should there be any doubts regarding safety, the count should be postponed and the area organiser informed as soon as possible. Counts made days, or a week either side of the count date are very valuable.

As we fast approach the 1994/95 season, the voluntary goose counter network appears to be in reasonably good shape, with keen new counters taking over at a few sites recently. A few gaps have been identified, however, particularly in the Strathclyde area and around the Firth of Tay, which I hope will be filled for the upcoming season.

WWT would be extremely keen to hear your views on these additional counts, their value, and their future. Each counter plays a vital role in our overall understanding of grey goose populations, and your thoughts on these counts and other goose issues are valued. WWT would also be most grateful for any advice regarding areas that should be included in these counts, or areas that will/won't be covered etc.

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