



Status and distribution of  
Icelandic-breeding geese: results of  
the 2014 international census

**Wildfowl & Wetlands Trust Report**

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Goose & Swan Monitoring

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## Summary

The 55th consecutive annual census of Greenland/Iceland Pink-footed Geese and Iceland Greylag Geese took place during autumn and early winter 2014. Sites holding Pink-footed Geese were primarily checked in October and November, whilst those holding Greylag Geese were checked primarily in November. Some sites in the UK were also counted during late August and September in order to estimate the numbers of Greylag Geese from the British population present prior to the arrival of Icelandic migrants. Coverage in Britain was very good, with the majority of the key sites covered. Count data were also received from Southwest Norway, Ireland and Iceland, the latter based on ground counts. Weather conditions were generally considered favourable during the census periods with very few sites reporting underestimated counts.

Maxima of 387,260 Pink-footed Geese and 119,853 Greylag Geese were counted in October and November, respectively. These figures were adjusted to account for major sites that were not counted and for the number of British Greylag Geese counted prior to this census, resulting in population estimates of 393,170 Pink-footed Geese and 89,668 Iceland Greylag Geese. Compared to the previous year, the 2014 figures represent an increase of 5.7% in the Pink-footed Goose population and a small decrease of 1.2% in the Greylag Goose population.

The breeding success of Pink-footed Geese was similar to the mean for the previous decade at 19.4% young (mean percent young 2004–2013: 18.4%). The mean brood size of successful pairs was 2.01 goslings, which was slightly lower than the mean recorded during the preceding ten years (2.08). The breeding success of Iceland Greylag Geese was also similar to the mean for the previous decade with flocks containing 22.3% young (mean percent young 2003–2012: 22.6%), and the mean brood size of 2.70 goslings per successful pair was slightly higher than the most recent ten-year mean (2.28) although the latter measure was based on a small sample size.

# 1 Introduction

The Pink-footed Goose *Anser brachyrhynchus* population which breeds in Iceland and east Greenland winters almost exclusively in Britain (Mitchell 2002), while Greylag Geese *Anser anser* breeding in Iceland principally winter in Britain, with small numbers in Ireland and Southwest Norway (Swann & Brockway 2002). Large concentrations of both species occur in autumn, particularly in East Central Scotland, Southwest Lancashire and Norfolk (Pink-footed Goose) and North Scotland (Greylag Goose), notably in Orkney. As winter progresses, redistribution to other parts of the wintering range occurs and, hence, an estimation of the size of these populations is most effective in autumn (Mitchell & Hearn 2004, Hearn & Mitchell 2004).

The Icelandic-breeding Goose Census (IGC) is undertaken annually and aims to assess the size, distribution and breeding success of Greenland/Iceland Pink-footed Geese and Iceland Greylag Geese. Two coordinated counts have been undertaken each year since 1990, the first in October and the second in November. These are timed to coincide with periods when these geese are most concentrated after their arrival in Britain. Pink-footed Geese arrive earlier than Greylag Geese and are therefore usually best counted in October. The November count allows for the later migration of Greylag Geese to be completed. However, due to the late departure of both species from Iceland in some years (e.g. Worden 2006) a third coordinated count in December was introduced in 2005. After a review of the results of carrying out the extra December count, it was decided that adequate monitoring of the population of Iceland Greylag Geese could be achieved through concentrating greatest volunteer counter effort throughout the flyway in a mid- November count (Mitchell 2013). Therefore, special emphasis is now placed on counting sites holding Pink-footed Geese in October and November and sites holding Greylag Geese in November.

This report presents an overview of the 55th consecutive annual census and an update on the population size and breeding success of Pink-footed and Iceland Greylag Geese following the 2014 breeding season.

## 2 Methods

Counts were conducted by a network of volunteer observers and professional conservation staff over the weekends of 18/19 October and 15/16 November 2014. An additional early spring count was conducted over the weekend of 28 February/1 March 2015 in order to assess distribution at this time of year. In some cases, counts made close to these dates were included in the coordinated 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 were flying in, or at dawn, as they departed to feeding areas. Dates of the coordinated counts were chosen to avoid periods of full moon as far as possible (8 October, 6 November and 5 March), thus minimising the likelihood of geese remaining in feeding areas overnight. In a small number of areas where roost sites were 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. For the purpose of analysis, counts from Caithness, the Solway Firth, Orkney, Shetland, Southwest Lancashire, Southwest Norway, Faroe Islands and Iceland are treated as consolidated sites.

Three types of adjustment could be applied to the count totals in order to generate the population estimates. In some cases, where a count was not undertaken, an estimate of the number of geese present was provided by local counters. For regularly monitored sites (those counted in at least three of the previous five years) that were not counted during the 2014 census, and no estimate was provided by a local counter, numbers were estimated from the mean of the counts made during the relevant month during the previous five years (2009–2013). Estimated numbers (from either source) 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 British Greylag Geese made during August/September, and in some cases early October, before the arrival of Icelandic migrants, were subtracted from the IGC count at some sites to improve the estimate of the number of Iceland Greylag Geese present at that time.

To assess breeding 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 collected during late September to early December were used to determine the proportion of young and the mean brood size of successful pairs.

## 3 Results

### 3.1 Coverage and conditions

Coverage throughout the range of both species during late 2014 was good. The number of sites covered in each month is shown in Table 1.

**Table 1.** The number of sites counted and the number of sites holding Pink-footed and Greylag Geese in October and November 2014 and February/March 2015.

	October	November	February/March
Number of Pink-footed Goose sites counted	124	122	116
Total number of sites holding Pink-footed Geese	75	74	58
Number of Greylag Goose sites counted	-	102	90
Total number of sites holding Greylag Geese	-	52	37

Outwith Britain, no aerial survey was possible in Iceland but information from hunters provided an estimate of goose numbers there (see Discussion). Data were also received from the Faroes in November 2014 and several sites in Southwest Norway in January 2015. In Ireland, full coverage of sites was not possible (as had been carried out in autumn 2007) but counts from six sites thought to hold Iceland Greylag Geese were provided for November.

One site met the criteria for the calculation of an estimated count due to lack of coverage. In Angus, Loch of Lintrathen was not counted in October, although birds were known to be roosting there, and an estimate of 5,910 Pink-footed Geese was added. No counts of Iceland Greylag Geese were undertaken during November in Southwest Norway, however, 1,570 birds (the number counted there in January 2015) was used as an estimated count for the November census period. This approach has been adopted for several years; guidance from local counters in Southwest Norway suggests that the winter influx of Iceland migrants arrive in late October or early November and remain there throughout the winter.

An attempt was made to account for the presence of British Greylag Geese in areas where Iceland Greylag Geese were also known to winter. Treatment of the principal locations was discussed in the 2009 IGC report (Mitchell 2010) and involves Lough Swilly (c. 300), Shetland (c. 5,000), Orkney (19,186 birds, see Discussion), Caithness (c. 1,000) and Highland (c. 750). British Greylag Geese also occur throughout south Scotland and north England and where counts were thought to involve British birds these have also been deducted (see Discussion).

Weather conditions were reported as good or reasonable for most sites in all three survey periods. At sites holding Pink-footed Geese, poor visibility affected counting at three sites in October and at four sites in November and in the spring. For sites holding Greylag Geese, poor visibility affected four sites in November and two sites in the spring. Overall, poor visibility was not thought to have adversely affected the counts at principal sites.

### 3.2 Total numbers

#### 3.2.1 Pink-footed Goose

Totals of 387,260 and 334,971 Pink-footed Geese were counted in October and November, respectively (Figure 1, Table 2). These represent an increase of 4.1% and 23.4%, respectively, compared to the unadjusted total counts in the same months in the preceding year. Coverage was good and only one estimated counts needed to be added to the unadjusted total and so the peak winter total in October 2014 was used to derive a population estimate of 393,170 geese. This represents an increase of 5.7% compared to October 2013, when a total of 372,074 individuals was estimated. In autumn 2014, 86.5% of the October count (unadjusted) was counted in November (Table 3).

#### 3.2.2 Greylag Goose

In November 2014, 119,853 Greylag Geese were counted (Figure 1, Table 2). The unadjusted November count was 2.1% higher than that recorded in the previous year. Following adjustments for British Greylag Geese and the addition of estimated counts, the count total in November 2014 was used to derive a population estimate of 89,668 Iceland Greylag Geese. This represents a small decrease of 1.2% compared to the previous estimate of 88,577 geese recorded in 2013.



**Figure 1.** Peak (unadjusted) counts of Pink-footed Geese (circles) in October (filled) and November (open) and Iceland Greylag Geese (triangles) in November (filled) and December (open) counted during the Icelandic-breeding Goose Census, 2005 to 2014.



**Table 2.** Totals of Pink-footed Geese and Iceland Greylag Geese by country and region in October and November 2014, and spring 2015. Raw counts are shown with adjustments for non-Icelandic birds [-x] and estimated counts given in brackets [+x]. Figures in parentheses indicate the number of sites counted.

Region/Area	October 2014	November 2014		Spring 2015	
	Pinkfoot	Pinkfoot	Greylag	Pinkfoot	Greylag
Iceland*	3,500 (1)	nc	32,000 (1)	nc	nc
Norway*	nc	0	1,570 (1)	nc	nc
Faroe Islands*	nc	11 (1)	1,036 (1)	nc	nc
Ireland	nc	112 (2)	1,726 (6)	nc	nc
			[-300]		
Shetland*	nc	134 (1)	4,751 (1)	nc	nc
			[-4,751]		
Orkney*	119 (1)	1,107 (1)	65,067 (1)	nc	nc
			[-19,186]		
Caithness	nc	25 (1)	3,270 (1)	5,489 (1)	6,570 (1)
			[-1,000]		[-1,000]
Highland	31,797 (11)	44,889 (15)	4,719 (10)	24,529 (15)	1,202 (9)
			[-750]		[-750]
Moray	1,840 (1)	3,040 (1)	123 (1)	4,450 (1)	28 (1)
Aberdeenshire	31,015 (6)	73,275 (5)	731 (6)	16,859 (6)	36 (4)
Angus/Dundee	81,140 (2)	36,062 (2)	545 (2)	3,221 (2)	470 (2)
	[+5,910]		[-545]		[-470]
Perth & Kinross	29,855 (12)	16,126 (12)	797 (11)	5,160 (13)	966 (12)
			[-797]		[-966]
Stirling/Falkirk/Clackmannan	7,234 (4)	3,255 (4)	64 (4)	9,061 (6)	151 (4)
			[-64]		[-151]
Fife	3,929 (22)	8,555 (24)	530 (21)	6,459 (21)	156 (19)
			[-530]		[-156]
Argyll & Bute	1,100 (1)	1,633 (1)	1,162 (2)	5,506 (1)	1,848 (1)
			[-500]		[-500]
Clyde	nc	nc	nc	nc	nc
Ayrshire	nc	nc	nc	nc	nc
Dumfries & Galloway **	12,080 (7)	11,402 (7)	203 (6)	9,348 (8)	162 (6)
			[-203]		[-162]

Region/Area	October 2014	November 2014		Spring 2015	
	Pinkfoot	Pinkfoot	Greylag	Pinkfoot	Greylag
Cumbria **	2,688 (5)	4,160 (5)	6 (5) [-6]	9,900 (3)	0 (3)
Lothians	26,964 (17)	6,616 (12)	803 (16) [-803]	182 (16)	141 (17) [-141]
Borders	37,610 (11)	11,373 (12)	725 (13) [-725]	3,855 (11)	1,168 (11) [-1,168]
Northumberland	6,134 (3)	4,040 (3)	25 (1) [-25]	0	400 (1) [-400]
Lancashire & Merseyside	65,116 (7)	41,876 (7)		1,410 (1)	
N Wales/Dee Estuary	1,644 (2)	1,200 (2)		1,050 (2)	
Humberside	14,900 (2)	7,380 (2)		884 (2)	
Lincolnshire	1,610 (2)				
Norfolk	26,985 (8)	56,700 (9)		10,296 (7)	
<i>Raw total counts</i>	387,260	334,971	119,853	117,659	13,347
<i>Adjustment for non-Icelandic birds</i>	n/a		[-30,185]		[-5,913]
<i>Estimated counts</i>	5,910				
<b>Population Estimate</b>	<b>393,170</b>		<b>89,668</b>		

\* several feeding sites consolidated

\*\* counts from the Solway Firth have been split between birds counted in Dumfries & Galloway and Cumbria

nc no count received

n/a adjustment not applicable

### 3.3 Regional Distribution

#### 3.3.1 Pink-footed Goose

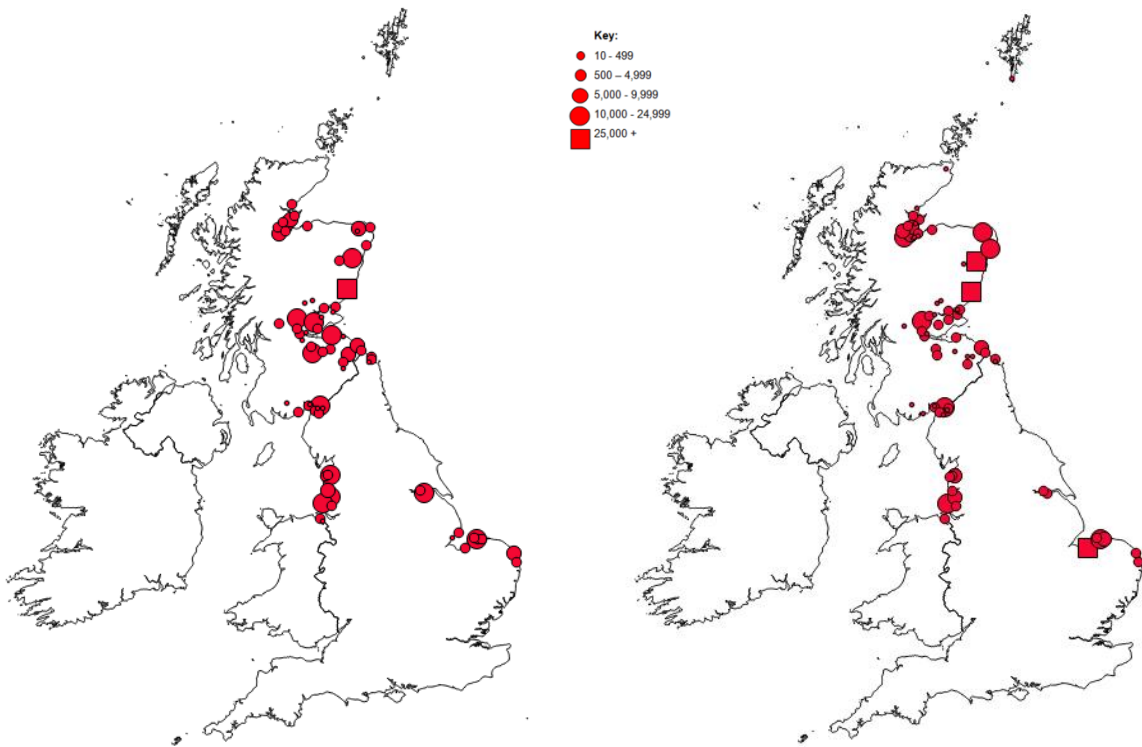
A mass arrival of Pink-footed Geese into Britain occurred just before the October 2014 count weekend (see Discussion). Nearly one third of the population had arrived in East Central Scotland and just under a fifth in Southwest Lancashire and Southeast Scotland/Northeast England by the middle of the month. By November, there had been a re-distribution with the number of geese notably increasing in North and Northeast Scotland (Figure 2).

#### 3.3.2 Greylag Goose

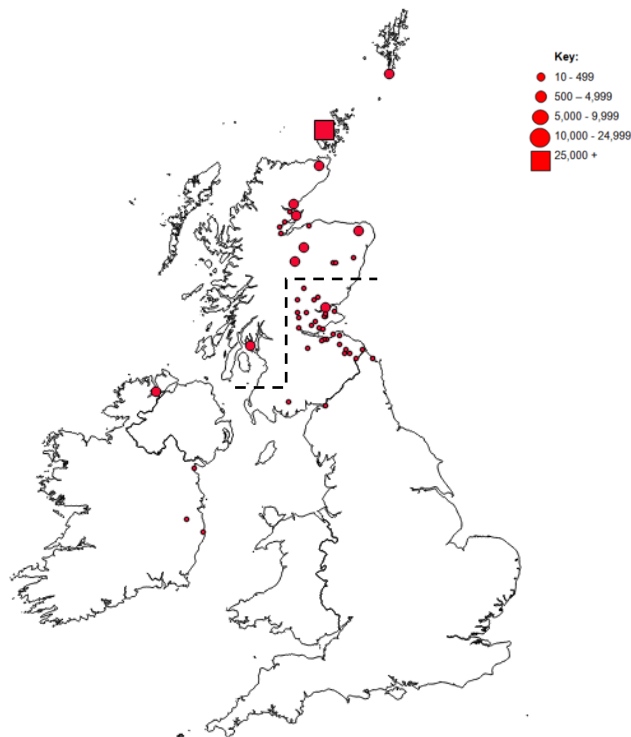
During November, just over a fifth of the population was still in Iceland and nearly three quarters were present in North Scotland, principally in Orkney (Table 3, Figure 3). It is doubtful now that any Greylag Geese encountered south of the Moray Firth in November are of Icelandic origin (but see Discussion).

**Table 3.** National and, within Britain, regional distribution of Pink-footed Geese and Iceland Greylag Geese counted during October and November 2014, expressed as a percentage of the maximum count for each species. Estimated counts not included.

	Pink-footed Goose		Greylag Goose
	October	November	November
Iceland	0.9		21.3
Faroes			0.7
Norway			1.0
Ireland			1.4
North Scotland	8.2	11.9	69.0
Northeast Scotland	8.5	19.7	0.6
East Central Scotland	31.5	17.0	2.6
Southwest Scotland/ Northwest England	4.1	4.4	1.4
Southeast Scotland/ Northeast England	18.3	5.7	2.1
West England	17.2	11.1	
East England	11.2	16.5	
<b>Total</b>	<b>100</b>	<b>86.5</b>	<b>100</b>



**Figure 2.** Distribution of Pink-footed Geese in Britain and Ireland in October (left) and November (right) 2014. Estimated counts are not shown.



**Figure 3.** Distribution of Iceland Greylag Geese in Britain and Ireland in November 2014. Where the status is unknown, the mapped counts do not differentiate between Icelandic and British birds. It is unlikely that any Iceland birds are present south and east of the dashed line in November (see also Table 2).

## 3.4 Principal concentrations

### 3.4.1 Pink-footed Goose

Pink-footed Geese were recorded at 75 sites in October and 74 in November (Table 1). The number of sites holding more than 1% of the 2014 population estimate (3,932 birds) was 28 in October and 21 in November. Twelve sites held over 10,000 birds in October, and ten in November. Combined counts from the 28 sites exceeding 1% of the population estimate accounted for 85.8% of the total October count and numbers at the top five sites alone held 37.9% of the population estimate (Table 4). The most recent peak IGC counts from the two sites holding the two highest counts in 2014 (Montrose Basin, Angus and Martin Mere, Southwest Lancashire) are shown in Figure 4.

Traditionally, counts of Pink-footed Geese in Southwest Lancashire have been reported as a single consolidated site. This was partly because some counts were being undertaken during the day in feeding areas. However, since 2010, efforts have been made to count the geese using the roosts in the area (Table 5). Counts are therefore reported at the individual site level. However, in order to maintain continuity, the total count for Southwest Lancashire will also continue to be reported. In autumn 2014, the consolidated counts for Southwest Lancashire were 65,116 (October) and 41,876 (November).

In October, high numbers were recorded at Montrose Basin, Angus, which held 20.1% of the population estimate, WWT Martin Mere, Southwest Lancashire, (4.9%), West Water Reservoir, Borders (4.5%), the Alt Estuary, Southwest Lancashire (4.2%) and Carsebreck & Rhynd Lochs, Perth & Kinross (4.1%). It appears, therefore, that there was an influx of large numbers of Pink-footed Geese into northern Britain in the weeks prior to the mid-October count weekend.

### 3.4.2 Greylag Goose

In November, Greylag Geese were counted at 58 sites (Table 1), only eight of which held numbers exceeding 1% of the population estimate (897 birds) (this considers Faroes, Orkney, Iceland, Caithness, Shetland and Bute as single consolidated sites). The total unadjusted count of 65,067 Greylag Geese in Orkney in November was similar to that counted in the same month in 2013. Subtracting an estimated 19,186 summering British Greylag Geese (see Discussion) from the total counted on Orkney in November gives an estimated 45,881 Iceland migrants, or 51.1% of the flyway population estimate. Fewer Iceland Greylag Geese are now wintering in Scotland south of the Moray Firth, reflecting the redistribution to wintering sites in North Scotland.

**Table 4.** Sites that supported >1% of the (a) Pink-footed Goose (>3,932) and (b) Iceland Greylag Goose (>897) population estimates in October and November 2014, respectively. Note that 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 3,720 for Pink-footed Goose and 1,070 for Iceland Greylag Goose (Wetlands International 2015). Greylag Goose counts are unadjusted (*i.e.* British birds have not been deducted).

## a) Pink-footed Goose

Site	October count	Percentage of population estimate	Five-year peak mean 2009–2013 <sup>1</sup>
Montrose Basin, Angus	78,970	20.1	40,007
Martin Mere, SW Lancashire	19,200	4.9	13,110
West Water Reservoir, Borders	17,800	4.5	19,792
Alt Estuary, SW Lancashire	16,710	4.2	14,284
Carsebreck & Rhynd Lochs, Perth & Kinross	16,300	4.1	16,250
Morecambe Bay, SW Lancashire	16,020	4.1	20,641
Aberlady Bay, Lothians	15,966	4.1	10,330
Solway Firth (consolidated)	14,762	3.8	18,678
Loch Leven, Perth & Kinross	13,285	3.4	11,446
Read's Island Flats, Yorkshire	13,160	3.3	4,499
Loch of Skene, Aberdeenshire	12,000	3.1	15,341
Burnham Norton, Norfolk	10,750	2.7	1,424
Middlemuir, Aberdeenshire	9,620	2.4	11,980
Hule Moss, Borders	7,000	1.8	4,931
Cromarty Firth: Udale Bay, Highland	7,000	1.8	1,880
Bogbank, Borders	6,900	1.8	-
Cromarty Firth: Nigg Bay, Highland	6,900	1.8	4,010
Beaully Firth, Highland	6,500	1.7	7,113
Ribble Estuary, SW Lancashire	6,476	1.6	14,284
Horse Mere, Norfolk	5,700	1.4	2,428
Westfield Flood, Borders	5,000	1.3	-
Harperrig Reservoir, Lothians	5,000	1.3	803
Holkham (field counts), Norfolk	4,850	1.2	22,119
Fala Flow, Lothians	4,756	1.2	5,754
Loch of Strathbeg, Aberdeenshire	4,359	1.1	19,519
Meikle Loch, Aberdeenshire	4,260	1.1	10,878
Inner Cromarty Firth: Dingwall bay	4,145	1.1	1,877
Goswick Sands, Northumberland	4,000	1.0	-

<sup>1</sup> Mean derived from any IGC count (*i.e.* from any month, October, November or December).

## b) Greylag Goose

Site	November count <sup>1</sup>	Percentage of population estimate	Five-year peak mean 2009–2013 <sup>2</sup>
Orkney Islands (all sites)	65,067	72.5	74,273
Iceland (lowlands)	32,000	36.6	23,962
Shetland	4,751	5.3	6,045
Caithness	3,270	3.6	10,488
Ireland (all sites)	1,726	1.9	2,542
Lower Strathspey, Highland	1,120	1.2	936
Loch Fleet, Highland	1,086	1.2	1,543
Loch Eye, Highland	1,036	1.2	1,623

<sup>1</sup> Unadjusted counts (see text and Table 2)

<sup>2</sup> Mean derived from any IGC count (*i.e.* from any month, October, November or December)

**Table 5.** Counts of Pink-footed Geese at roost sites in Southwest Lancashire in October 2014.

Count site	SPA	October 2014
Martin Mere	Martin Mere SPA	19,200
Alt Estuary	Ribble/Alt Estuaries SPA	16,710
Morecambe Bay	Morecambe Bay SPA	16,020
Ribble Estuary	Ribble/Alt Estuaries SPA	6,476
Simonswood Peat Moss		3,800
Wyre Estuary	Morecambe Bay SPA	2,350
Cockers Dyke		560
<b>Total</b>		<b>65,116</b>

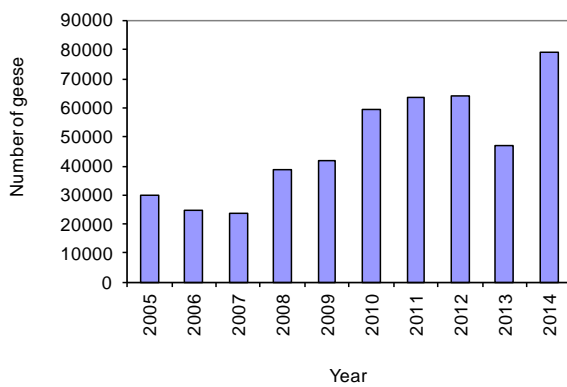
For the purposes of this report, Orkney is treated as a consolidated site, although Table 6 shows the individual totals for the islands. Twelve of the count areas in Orkney held numbers exceeding 1% of the population estimate in November (897 birds), although these individual counts are not adjusted for the presence of Greylag Geese breeding in Orkney (thought to number *c.* 19,186 birds, but see Discussion). As in 2009 to 2013, East Mainland and West Mainland held more than 10,000 birds.

**Table 6.** Greylag Goose counts at individual sites in Orkney in November 2014 (counts have not been adjusted to take into account the number of British Greylag Geese in Orkney). Five-year peak mean derived from counts from 2009 to 2013.

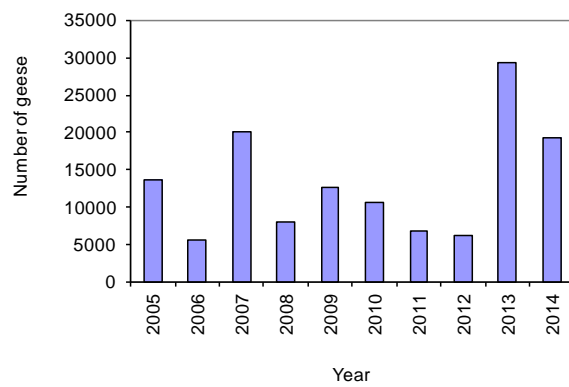
Site	November count	% of population estimate	Five-year peak mean
West Mainland	26,290 <sup>1</sup>	29.6	30,137
East Mainland	10,044	11.3	14,076
Stronsay	3,556	6.0	5,285
Shapinsay	4,951	4.7	3,864
South Ronaldsay	4,154	5.6	4,044
Sanday	6,087	4.5	3,755
Eday	1,641	1.4	1,457
Papa Westray	1,437	1.5	1,263
Rousay	1,168	1.2	1,069
Egilsay	210	0.5	452
Westray	1,883	1.8	885
North Ronaldsay	1,142	1.0	660
Hoy and Walls	907	1.3	405
Wyre	99	0.3	245
Burray	790	0.1	289
Flotta	442	0.5	207
Graemsay	266	0.0	70
<b>Total</b>	<b>65,067</b>	<b>71.0</b>	

<sup>1</sup> includes a count of 265 Greylag Geese on Gairsay

a) Montrose Basin, Angus

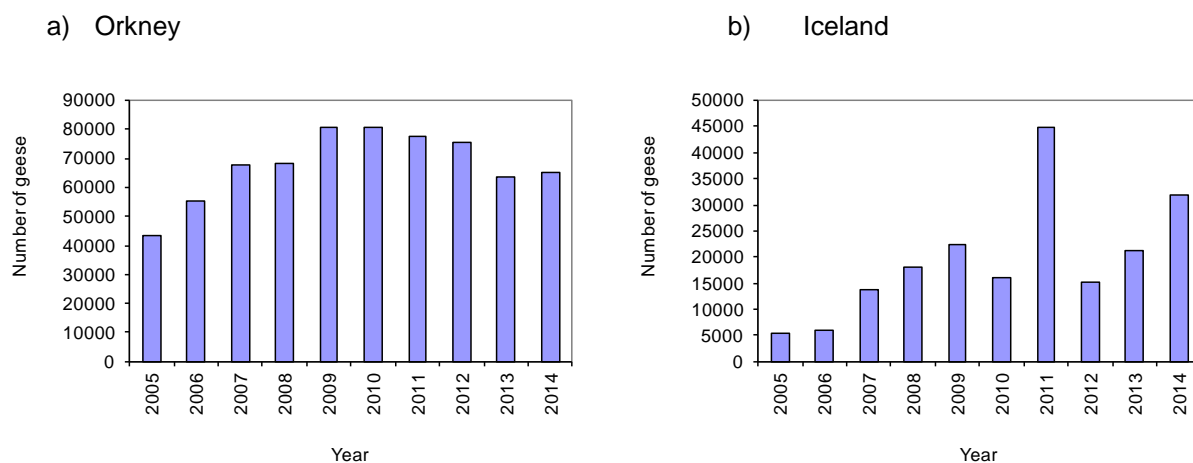


b) Martin Mere, SW Lancashire



**Figure 4.** Peak IGC counts of Pink-footed Geese at a) Montrose Basin, Angus and b) Martin Mere, SW Lancashire, 2005 to 2014.





**Figure 5.** Peak IGC counts of Iceland Greylag Geese at a) Orkney (includes British birds) and b) Iceland, 2005 to 2015.

### 3.5 Breeding success

Totals of 11,756 Pink-footed Geese (from 27 flocks) and 5,002 Greylag Geese (31 flocks) were aged at various localities primarily in Scotland between 27 September and 15 December 2014. The percentage of birds aged in relation to the estimated size of the population in 2014 was 3.0% for Pink-footed Geese and 5.7% for Greylag Geese. Information on the brood sizes of 268 families of Pink-footed Goose and 40 families of Greylag Goose was also collected during this period.

The breeding success of Pink-footed Goose was similar to the mean for the previous decade at 19.4% young (mean proportion of young 2004–2013: 18.4%  $\pm$  1.22 SE). The mean brood size of successful pairs was 2.01 goslings, also similar to the mean recorded during the preceding ten years (2.08  $\pm$  0.07 SE) (Table 7, Figure 6).

Age counts were taken in several regions, but at different times during the autumn. This leads to differences in the percentage young and mean brood sizes recorded both spatially and temporally (Table 7). Traditionally, all age counts have been collated and an overall figure calculated, but the results from autumn 2014 suggest that there is some variation in age assessments both geographically and temporally and collating all the figures masks these differences.

The breeding success of Iceland Greylag Geese was similar to the mean for the previous decade, with flocks containing 22.3% young (mean 2004–2013: 22.6%  $\pm$  0.76 SE). The mean brood size of 2.70 goslings per successful pair was slightly higher than that of the recent ten-year mean (2.28  $\pm$  0.09 SE) (Table 7, Figure 6), however, the brood size figures were based on a small sample size. Due to their later migration and more limited range, the temporal and spatial distribution of Greylag Geese was limited and age counts were only collected in one region (North Scotland) during early December. The sampling period was later than usual (by up to one month). Although it is harder to age Greylag Geese later in the autumn, the observer felt comfortable that the age assessments were accurate.

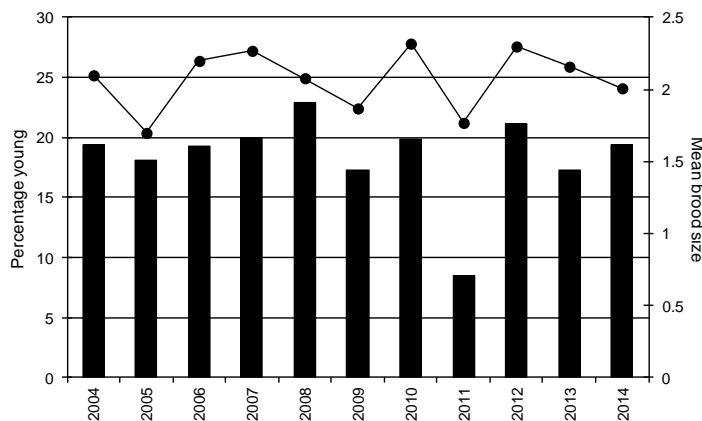
**Table 7.** The percentage of young and mean brood size of Pink-footed and Greylag Geese in 2014.

	Region	Time period	Total aged	% young	No. of broods	Mean brood size
Pink-footed Goose <sup>1</sup>	N Scotland	Late Oct	1,065	21.5	1	2.00
	NE Scotland	Late Sep	1,000	17.0	6	1.80
		Early Oct	1,400	19.2	5	1.63
		Late Oct	600	18.7	3	1.25
	EC Scotland	Late Oct	2,941	20.2	11	2.09
	SE Scotland	Late Oct	910	20.2	4	2.75
	W England	Late Sep	935	23.0	111	2.15
		Early Oct	576	18.6	19	1.68
		Late Oct	1,114	16.3	52	1.85
	E England	Late Oct	1,215	18.4	43	2.09
<b>Total</b>			<b>11,756</b>	<b>19.4</b>	<b>268</b>	<b>2.01</b>
Greylag Goose <sup>2</sup>	N Scotland	Mid-Dec	5,002	22.3	40	2.70
	<b>Total</b>			<b>5,002</b>	<b>22.3</b>	<b>40</b>

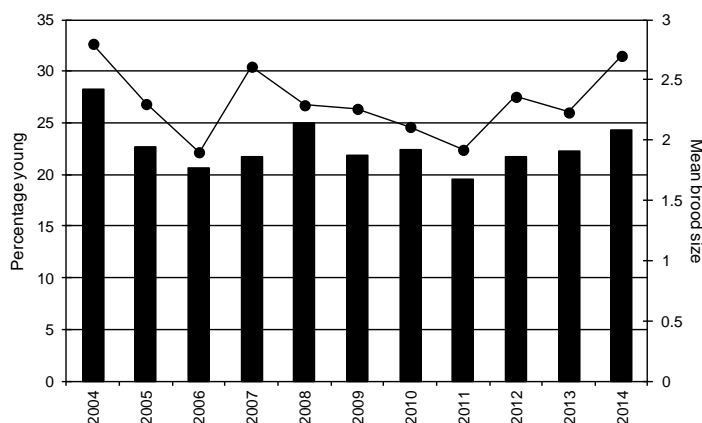
<sup>1</sup> Pink-footed Geese were aged between 27 September and 26 October 2014.

<sup>2</sup> Greylag Geese were aged between 13 and 15 December 2014.

a) Pink-footed Goose



b) Greylag Goose



**Figure 6.** The percentage young (column) and mean brood size (line) found in flocks of (a) Pink-footed Goose and (b) Iceland Greylag Goose, 2004 to 2014.

### 3.6 Spring 2015 survey

Occasional spring censuses organised by WWT from 1982 to 1996 had normally taken place on dates in mid- March (although in 1995 it was as late as 8 April). Evidence from arrival dates of spring migrants recorded in Iceland suggested that, in recent years, both Pink-footed and Greylag Geese had begun to arrive earlier in the year, by approximately 0.7 to 0.8 days per year between 1988 and 2009, or by up to 16 days over the 21 year study period (Gunnarsson & Tómasson 2011). Although the dates of the 2015 spring census appeared early in the year (end of February/early March) it was for this reason that the dates were chosen.

By the end of February, Pink-footed Geese had already begun to shift their winter distribution northwards. Large numbers of Pink-footed Geese left Norfolk in January (J. Scott pers. comm.) and the sites holding the largest number of geese were generally in northern Britain (Table 8).

**Table 8.** The largest Pink-footed and Greylag Goose counts at individual sites in late February/early March 2015 (no count was carried out in Orkney).

Pink-footed Goose		Greylag Goose	
Loch of Skene, Aberdeenshire	14,490	Caithness	6,570
Solway Firth, Dumfries/Cumbria	11,242	Bute, Argyll	1,555
Loch of Strathbeg, Aberdeenshire	10,474	Greenlaw Pond, Borders	1,080
Carsebreck & Rhynd Lochs, Perth & Kinross	9,350	Dornoch Firth, Highland	876
Wigtown Bay	8,000	Inner Firth of Tay, Angus	470
Snettisham, Norfolk	6,600	Lindisfarne, Northumberland	400
Endrick Mouth/Loch Lomond, Argyll	5,506	Upper Tay sites	389
Cromarty Firth: Udale Bay, Highland	5,500	Endrick Mouth/Loch Lomond, Argyll	293
Caithness	5,489	Crieff area, Perth & Kinross	209
Beaully Firth, Highland	5,130	Loch Fleet, highland	191

Unfortunately, no spring count was carried out on Orkney in 2015. However, the count there in late February 2012 confirmed that Orkney supported large numbers of Iceland Greylag Geese throughout the winter (Mitchell 2012), thus it is highly likely that the majority of the migrants that arrive from Iceland, spend the whole winter there. In spring 2015, typically, Caithness and lochs and firths in the north of Scotland held the highest counts. However, Bute, in Argyll, held 1,555 Greylag Geese confirming that some Iceland migrants head south to over winter (see also Swann *et al.* 2005).

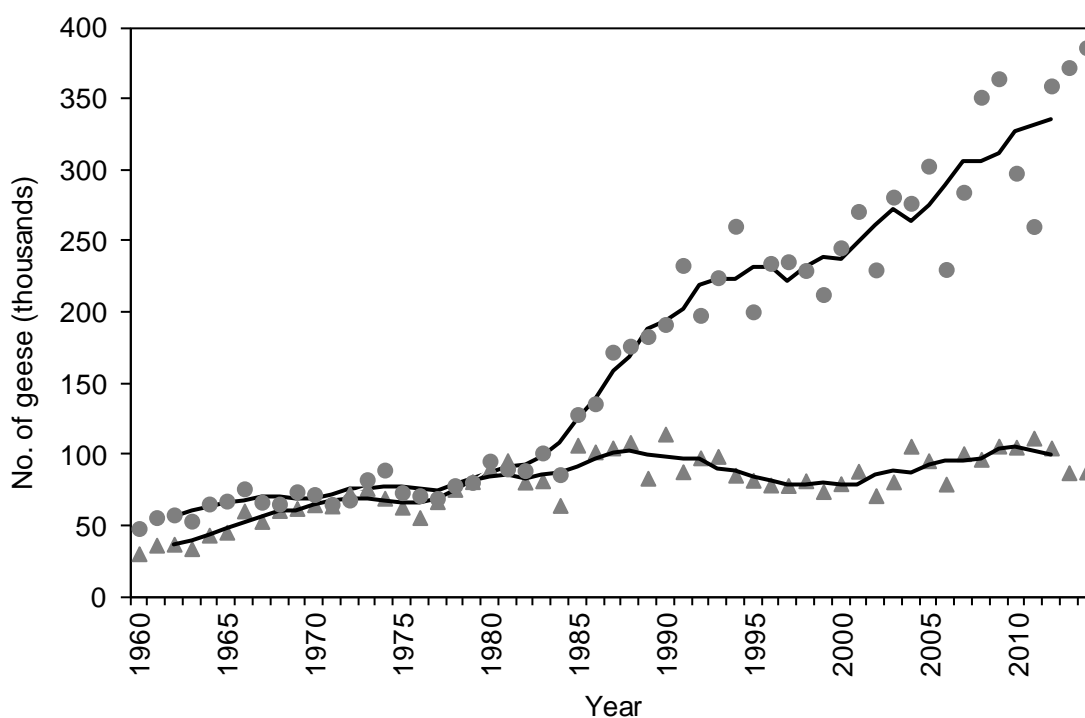
Counts in 1994 to 1996 showed that 38–51% and 34–53% of the autumn population estimates for Pink-footed and Greylag Geese, respectively, were counted in the spring (see Mitchell 1996). The comparable figure for Pink-footed Goose in spring 2015 was 30.4%, but a figure for Iceland Greylag Goose could not be calculated because no count was carried out on Orkney.

Results from the tracking of four Pink-footed Geese marked with Global Positioning System (GPS) tags in winter 2013/14 and 2014/15, showed that, from mid-winter, the geese often roosted on fields, some of which were flooded, and only infrequently used large waterbodies as roosts. This will vary year to year depending on local conditions and food availability. However, this will contribute to the reduced number of geese counted using waterbodies as roosts at the end of winter and in spring.

## 4 Discussion

Large counts at some of the principal resorts in mid- October 2014 suggested that there had been a mass arrival of Pink-footed Geese into Britain in the weeks prior to the count weekend. The count of 78,970 Pink-footed Geese at Montrose Basin, Angus, was the largest IGC count ever recorded at a single site and accounted for a fifth of the entire population. A total of 22 sites held over 5,000 geese at the time of the October census. It is well established that some key wetland sites support higher numbers of geese soon after they arrive in northern Britain, and numbers decline as geese move south within Scotland or onto Lancashire and Norfolk.

The 2014 population estimate of 393,170 was 5.7% higher than the figure for October 2013 (372,074) and the highest population estimate ever recorded. Breeding success in 2014 was about average and appears to be easily compensating for annual mortality. The most recent population estimates (from 2012, 2013 and 2014) confirm that the counts of autumn 2011, and probably in 2010 too, underestimated the total number of geese in the population in those years. Despite the year on year variation in counts, the long term trend is one of continued increase (Figure 8). If the undercounts in 2010 and 2011 are not considered, the population has been between c. 351,000 and c. 393,000 since 2008 (an increase of 12% in six years). Given the unpredictability of the timing of departure from Iceland (see Mitchell 2012), it would appear prudent to maintain annual coverage of sites holding Pink-footed Geese in both October and November, and, whenever possible, choose weekend dates near the middle of the month for the census.



**Figure 7.** Population estimates for Pink-footed Goose (circles) and Iceland Greylag Goose (triangles), 1960 to 2014. The five-year running means (e.g. mean for 2012 is from population estimates for 2010 to 2014) are shown as lines. Both population estimates follow revisions set out in Mitchell (2013).

Pink-footed Goose breeding success in summer 2014, at 19.4%, was slightly higher than the long term average of 18.4%. Reports from Iceland suggest reasonable weather during the spring and summer months. The average productivity was also confirmed by the proportion of young in the Iceland bag; at 27.0%, this was just lower than the recent average (29.8% for the ten-year period 2004 to 2013) (A. Sigfússon *in litt.*). Hunting of Pink-footed Geese in Iceland appears stable with 15,291 shot in 2012 (the year for which the most recent data are available). Unfortunately, no comparable data exists for the number shot in the UK.

Surveys undertaken in northern Greenland in 2008 and 2009 revealed a large increase in the number of Pink-footed Geese present, but also a dramatic increase in the geographic range of the species in that country with, for example, over 20,000 geese present in Peary Land (north of 82°N); the northern most land in Greenland (Boertmann & Nielsen 2010).

The November 2014 count of Iceland Greylag Geese was thought to be reasonably comprehensive with sites being covered throughout most of the winter range. After a re-assessment of the value of undertaking two coordinated counts (one in November and another in December) it was decided to concentrate observer effort on one count weekend in mid- to late November from 2014 onwards. This has hopefully proved valuable with the count now firmly in the surveillance calendar of counters throughout the flyway range. Coverage in Ireland was particularly valued, although not complete (compared with an extensive survey carried out there in autumn 2007) and it is possible that the number of geese in Ireland, particularly in Northern Ireland, is greater than reported here.

The population estimate of 89,668 geese is similar to that in 2013 and confirms the recent decline from over 100,000 birds (counted as recently as 2012). Greylag Goose remains a favoured quarry species in Iceland, with 30,000 to 40,000 birds shot there annually and, as reported last year, there has been a dramatic increase in the number of Greylag Geese shot in Orkney in order to reduce the British Greylag Goose population on the archipelago, and it is highly likely that more Icelandic migrants are being shot there too.

Orkney continues to hold the bulk of the wintering population. After deducting the number of Greylag Geese thought to be resident on the archipelago, based on a summer survey carried out in August 2013 (Mitchell *et al.* 2014), and taking account of those shot under a pilot management programme, an estimated 45,881 Icelandic birds were thought to be present in November, 2.5% lower than during the same month in the previous year.

Increasing numbers of British Greylag Geese in core wintering areas for the Icelandic migrants, such as Shetland, Orkney, the Moray Firth, Bute and other parts of Scotland and Ireland means that assessing the abundance of the Iceland population is difficult. Where there are reasonable estimates of the abundance of British Greylag Geese (for example on Orkney) these are subtracted from winter counts (see Table 2). However, up to date information on the abundance of British Greylag Geese south and east of an arbitrary line from Bute east to Aberdeen is largely lacking and, simply as a precaution, any counts obtained through IGC from this area are matched by subtracting that figure (assuming that the majority of birds counted are British). This is unsatisfactory, and is only carried out as a precautionary measure. An analysis of movements of Iceland Greylag Geese based on sightings of individually marked birds in the late 1990s/early 2000s showed that some Icelandic migrants moved south within Scotland to winter (Swann *et al.* 2005). It is not known if this is still the case since ringing of the population stopped in the mid-2000s. It is highly likely that a small proportion of Icelandic migrants do move south to winter in south east Scotland, but since the proportion is unknown, a precautionary approach has been adopted.

Breeding success in the Iceland Greylag Goose population, as measured on the wintering grounds, appeared to be average in 2014 (22.3%), although the figure was based on a small sample size collected slightly later than the ideal period. Due to their later migration and more limited range, age counts were only collected in one region (North Scotland) during early December. Monitoring annual breeding success for this population is also becoming more difficult because of the overlap in main wintering areas between Iceland and British Greylag Geese. The percentage of young in the Iceland bag was 52%, slightly higher than the previous ten-year average of 47% (A. Sigfússon *in litt.*). The population dynamics of this population merit greater study since the population must sustain one of the highest rates of annual mortality through hunting of any goose population and is balanced, presumably, by particularly high rates of breeding success. The long term dynamics of populations that can sustain such mortality would be of particular interest to those wishing to control abundance of goose populations.

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