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GooseNews

The newsletter of the Goose & Swan Monitoring Programme
Issue no. 10, Autumn 2011

Goose management in Scotland – future prospects

Scotland hosts a number of migratory and resident populations of wild geese which form an important part of its natural heritage. During the course of a winter, up to 90% of Iceland/Greenland Pink-footed Geese, 90% of Iceland Greylag Geese, 80% of Greenland Barnacle Geese, 100% of Svalbard Barnacle Geese and 60% of Greenland White-fronted Geese will reside in Scotland. Wild geese provide ecological, economic and social value in terms of their natural role in ecosystems and the benefits they bring to the public. All wild geese are afforded protection under nature conservation legislation and some populations are subject to special protection because of their low population size or other aspects of their ecology making them vulnerable to adverse change. However, in some situations the presence of geese can also impose costs in terms of damage to agricultural interests and potentially negative effects on other species and habitats. Nevertheless, Scotland has an important obligation to conserve and support this range of unique and internationally important migratory populations of geese. Current government policy on geese in Scotland seeks compliance with legal obligations under the EU Birds Directive and to facilitate adoption of adaptive management techniques as a means of delivering social and economic sustainability of land management businesses in areas frequented by important goose populations.

The National Goose Management Review Group (NGMRG) oversees the implementation of Local Goose Management Schemes (LGMS) in Scotland in accordance with the National Policy Framework originally set out in the policy report and recommendations of the National Goose Forum in 2000. Policy requires that a review is carried out every five years. The second review was completed in November 2010 and reported to Scottish Ministers. The purpose of the review was to suggest ways of adapting Scotland's LGMS; in terms of their efficacy and cost effectiveness and to make them more responsive to conservation needs. The review covered all aspects of national goose policy including the effectiveness of current national policy; the cost effectiveness of existing LGMS,

Barnacle Geese (Nick Cottrell)

recent changes in abundance and distribution of goose species; current and future funding options and wider considerations relating to sustainable goose management.

The review also looked at how LGMS were operating on the ground and to what extent they were achieving the overall objectives of the three broad policy principles, which are to:

- Meet the UK's nature conservation obligations for geese, within the context of wider biodiversity objectives.
- Minimise economic losses experienced by farmers and crofters as a result of the presence of geese.
- Maximise the value for money of public expenditure.

WWT, along with other stakeholders, was closely involved with the review through involvement with the NGMRG, the Goose Scientific Advisory Group (GSAG), providing a written response to the review and providing demographic data on the populations wintering and breeding in Scotland. Thus, the dedicated efforts of goose counters throughout the UK continue to contribute to shaping goose policy.

The Scottish Government's response to the review recognised that LGMS have helped in improving the conservation status of many important goose populations, but also that challenges lie ahead, notably that there are still a few vulnerable species

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particularly Greenland White-Fronted Goose whose populations are declining. In addition, a lack of equity existed in the schemes, notably some areas experiencing rapidly increasing goose populations have no scheme in place, even though they are experiencing pressures similar to areas which have a scheme. There was also recognition of inflexibility in the existing schemes, which means they are unable to respond to changing populations and pressures and that there were rising costs, as constraints on public expenditure are becoming tighter.

In recognition of the successes and challenges associated with wild geese, the Scottish Government proposed the development of a new scheme which builds on the following principles:

- A three-fold grouping of the goose populations; protected species in unfavourable status and in most need of protective measures; protected species in favourable status and populations of quarry species without special protection.
- The local approach has worked well and should be continued, however, governance and eligibility arrangements should be improved.
- Scheme costs need to be contained and financial intervention should be targeted on the highest conservation species. Alternative mechanisms for managing protected species that are no longer of the highest conservation status should be explored.

These principles will be used by the Scottish Government, Scottish Natural Heritage (SNH) and the NGMRG to develop a new approach, to be implemented by SNH and Scottish Government staff. It is expected that such a scheme will incorporate the following elements:

- Introduction of SNH management agreements for small, dispersed populations of the most vulnerable geese.
- Where there are major impacts on agricultural interests from large numbers of protected populations, to operate local schemes with fixed budgets, tighter eligibility criteria and reduced support for scaring, shooting and monitoring.
- Incorporation of some aspects of goose management into the next Scottish Rural Development Programme (SRDP).
- The development of an adaptive management approach, which would require the robust collection of hunting bag returns but would permit agreed levels of local population management – including a willingness to license control measures where the appropriateness of this is supported by good data.
- Support for the development of sport shooting where appropriate.
- Continued efforts to develop flyway management plans and international collaboration to protect threatened species.

The approach will require changes to current practice and will have to be phased in. Some elements may be dependent on the shape of the wider agricultural support system beyond 2013. Local goose management groups will retain discretion over the design of these schemes but they will be given fixed budgets to work within and guidelines to follow. Pressures on funding for all aspects of rural development are all too apparent, so the guidelines will indicate the areas where the Scottish Government and its advisers think, in accordance with the overall direction of policy, savings can best be found. These include scaring costs, which SNH will cease to fund, fertiliser applications and counting and monitoring activities beyond those needed to maintain adequate information about population sizes, trends and impacts. SNH will at the same time be looking to reduce the costs that it incurs directly, so as to achieve a reduction of about 25% in the total cost of goose management.

The review provided an opportunity to take stock of goose management issues and provide a basis for future management in Scotland. The outcomes of the review were broadly welcomed by WWT, but future progress and developments will be very closely monitored.

Carl Mitchell

GSMP website

Much of the information on the Goose & Swan Monitoring Programme can be found on WWT's website at www.wwt.org.uk/research/monitoring. This includes more detailed information on the results of surveys for all goose and migratory swan populations, and various resources for GSMP fieldworkers, such as recording forms. *GooseNews*, including past editions, is also available to download from the site.

Survey dates for 2011/12

Icelandic–breeding Goose Census

Count forms for the 2011/12 IGC have been mailed to all counters or Local Organisers with this issue of *GooseNews*. If you have not received your forms, or would like to participate for the first time, please contact the Species Monitoring Unit at WWT Slimbridge. The coordinated dates for 2011/12 were complicated by the dates of full moons and conferences, and include a spring count for the first time since the mid-1990s (further details on this are below). After consultation with IGC counters, the following dates were chosen:

1/2 October, 5/6 November, 3/4 December and 25/26 February

Please remember that, ideally, all sites supporting Pink-footed Geese should be covered during the October and November counts, whilst those holding Greylag Geese should be counted in the November and December counts. There are still a small number of sites where both species occur. In these cases, please try to count in all months, but if this is not possible please discuss the best way ahead with your Local Organiser, if you have one, or the National Organiser, Carl Mitchell (see page 28 for contact details).

If you are unable to count on the above dates, please contact either your Local Organiser or Carl Mitchell, so that we may try to arrange for cover of your site by another counter. As usual, we would like to encourage all counters to also carry out a count during September at those sites where British Greylag Geese occur. September counts are not strictly coordinated but should be carried out during the middle of the month, although any counts made during the month will be of value (see page 8 of *GooseNews* 2, for further details – available to download from WWT's website at www.wwt.org.uk/research/monitoring/reports.asp).

Additional 2012 spring census

IGC provides population estimates for both Pink-footed and Greylag Geese during the non-breeding season, but also provides valuable information about the distribution of the geese that helps to ensure adequate networks of protected sites are established. As most IGC data are collected during the autumn and early winter, far less information exists about the distribution of both populations during early spring when the geese are preparing to leave for their breeding grounds. This may mean that protected site networks for the birds at this time of the year are inadequate, particularly given the large changes in autumn and mid-winter distribution that have taken place in the past decade. The last coordinated efforts to monitor this occurred in 1994 to 1996, with the last of these 'spring' censuses identifying east-central and north east Scotland as holding the bulk of the Pink-footed Geese. Given that an increasing proportion of Pink-footed Geese now move south to winter in south west Lancashire and Norfolk, it is timely to determine if the same early spring pattern of movements north persists.

In 1996, fewer Greylag Geese were encountered in spring than in the previous autumn (only 53% of the November count) yet noticeable movements to Caithness and Orkney were recorded. Now that the bulk of the Greylag Goose population are counted on Orkney in November and December it is timely to see if these birds are also present there in spring.

We hope that you are able to contribute to the spring census. If, however, you are unable to count at the end of February, please contact either your Local Organiser or Carl Mitchell, so that we may try to arrange cover of your site by another counter.

Colour-mark reading

All sightings of colour-marked wildfowl, not just geese and swans, can be sent either direct to the relevant project coordinator or to 'Colour-marked Wildfowl' at WWT Slimbridge, or by email to colourmarkedwildfowl@wwt.org.uk.

Further details of other colour-marking projects can be found on the EURING colour-marking website www.cr-birding.be.

Age assessments

Age assessments will continue during 2011/12 as usual. The survey periods vary between species and are shown below.

Population	Period	Notes
Whooper Swan	Oct - Jan	
Bewick's Swan	Nov - Feb	
Iceland Greylag Goose	Oct - mid Nov	care needed with age identification
British Greylag Goose	Aug - Sep	
Pink-footed Goose	mid Sep - mid Nov	
Bean Goose	Oct - Nov	
European White-fronted Goose	Oct - Jan	focus on Jan
Greenland White-fronted Goose	Oct - Jan	focus on Dec
Dark-bellied Brent Goose	Sep - Mar	focus on Oct - Nov
Light-bellied Brent Goose (both populations)	Sep - Mar	focus on Oct - Nov
Barnacle Goose	Oct - Dec	

2010: At last, a good breeding season for Greenland White-fronted Geese!

After several years of very poor breeding success, the Greater White-fronted Goose *Anser albifrons flavirostris* population that breeds in west Greenland finally returned to the Scottish wintering quarters with no less than 22.9% of the aged sample of the geese on Islay being birds of the year, the most since the record breeding season of 1985. Islay holds approximately half of these geese that winter in Scotland, and between 1996 and 2008 they returned with less than average proportions of young in 11 out of 13 seasons (Figure 1). This resulted in the overall population size rapidly declining following the peak in numbers at 35,700 in winter 1998/99.

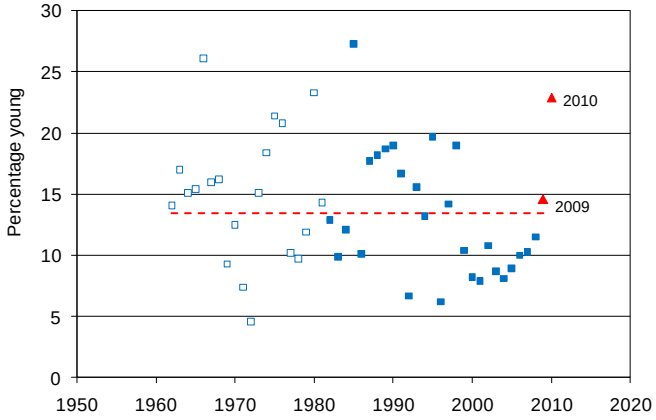


Figure 1. Annual breeding success of Greenland White-fronted Geese sampled amongst flocks on Islay, 1962–2010. Open symbols indicate years before protection from hunting on the winter quarters, solid symbols the years after, with 2009 and 2010 differentiated for clarity; dotted line indicates overall mean value for the entire period.

Declines in the small global population in the early 1980s led to protective legislation enacted to stop hunting on the winter quarters. Following that change in the law, the population increased at approximately 6% per annum until reaching the peak in 1998/99. Since 1983, the population has not been legal quarry on the wintering grounds, although small numbers were still being taken in Greenland and some 3,500 were shot each autumn in Iceland.

Renewed concern for the well being of the population has resulted in considerable activity since the mid-2000s. An international action plan for the species was drafted in 2009 in readiness for adoption by the Range States as a formal single species action plan under the African-Eurasian Waterbird Agreement. Consensus was reached at the drafting workshop for the plan that the demographic cause of the decline was poor reproduction and that conservation actions should also focus on reducing unnecessary sources of mortality.

The population has been protected in Iceland since 2006 and since 2009 in Greenland, so that the Greenland White-fronted Goose only remains legal quarry in Wales (where it is the subject of a voluntary ban by local wildfowlers on the one remaining wintering resort) and in England, where less than 20 birds winter regularly. Under such circumstances, there is little more actively to be done to reduce "unnecessary sources of mortality".

So what was the cause of the poor breeding success since the mid-1990s? Greenland White-fronted Geese already consistently produce proportionally fewer young in relation to the number of potentially fecund adults than do most of the circumpolar populations of Greater White-fronted Geese. Several hypotheses have been put forward to explain the recent particularly low breeding success, including the effects of climate change, disease, enhanced predation rates on nests or young, and competition from Canada Geese *Branta canadensis* which have increased rapidly in abundance on the west Greenland nesting grounds (where the Whitefront was formerly the only numerous goose present in summer).

Weather conditions in west Greenland have been unusual in several springs since 1995. Differences in sea surface temperatures in the northern Atlantic Ocean have deflected frontal systems further north across the Atlantic, tending to deposit more precipitation in west Greenland than was formerly the case. In eight of the years between 1996 and 2008, this meant very heavy snow during April and May prior to the arrival of the geese in spring, resulting in low reproductive success in those years (Figure 2). In contrast, 2009 and 2010 were relatively dry (and warm) compared to most recent years.

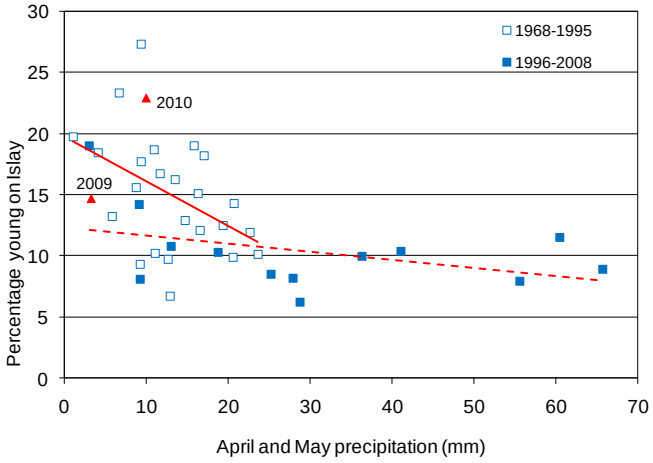


Figure 2. Breeding success as measured by percentage young amongst Greenland White-fronted Goose flocks aged on Islay plotted against the annual amount of precipitation (typically snow at this time) in April and May measured at Kangerlussuaq in central west Greenland, close to the core breeding range of the part of this population that winters in Scotland (updated from Boyd & Fox 2008).Trend lines fitted for 1968–1995 (solid) and 1996–2008 (dashed).

The summers of 2009 and 2010 were also very warm, which is also known to positively influence breeding success, since in years with relatively little spring snow, breeding success on Islay tends to correlate with summer temperatures in central west Greenland (Figure 3).

The spring of 2010 was exceptionally mild and snow-free in west Greenland, so geese arrived to good feeding conditions. Exceptionally warm temperatures persisted throughout the summer and probably also contributed to high reproductive success in that year. The population wintering on Islay returned

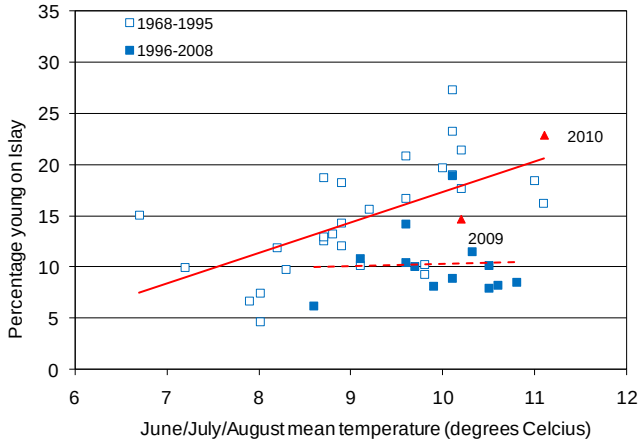


Figure 3. Breeding success as measured by percentage young amongst Greenland White-fronted Goose flocks aged on Islay plotted against the annual mean June/July/August temperature measured at Kangerlussuaq in central west Greenland, close to the core breeding range of the part of this population that winters in Scotland (updated from Boyd & Fox 2008). Trend lines fitted for 1968–1995 (solid) and 1996–2008 (dashed).

in autumn 2010 with the fourth highest proportion of young recorded since records began in 1962.

The cessation of the Iceland autumn hunt may also have contributed. It is known that the hunt there harvested a disproportionate number of young birds, thought to be the result of family parties being more likely to be shot than non-breeders. This meant that successfully breeding adults were also selectively targeted and so as the population declined, the most fecund adults were increasingly being removed, perhaps exacerbating the reduction in overall reproductive output.

Very high proportions of young were recorded at several other wintering resorts in Scotland in winter 2010/11, so the effects were not just confined to Islay. Yet on the Wexford Slobs, the most important wintering site in Ireland, there were only 14.7% young (slightly above the recent average), as was the case elsewhere in Ireland. Stan Laybourne reported no fewer than 30 first winter geese out of 93 aged (32.2% young!) amongst the flock at Westfield in Caithness, and at many other sites more than 20% young were found in the age samples. However, reports from all the wintering haunts have not yet been received so that these details may yet change. Nevertheless, it is encouraging to see that some parts of the population can still perform when the conditions are suitable for breeding.

Reference

Boyd, H & AD Fox. 2008. Effects of climate change on the breeding success of White-fronted Geese *Anser albifrons flavirostris* in West Greenland. *Wildfowl* 53: 55-70.

Tony Fox, Malcolm Ogilvie & Hugh Boyd

How many geese are there in a population?

The abundance of the Iceland Greylag Goose population is monitored through the Icelandic-breeding Goose Census (IGC). The highest counts, which we assume to reflect the best population estimate, have normally occurred in November and the population has numbered approximately 80,000 to 120,000 birds since the mid-1980s (Figure 4). Concern was expressed in the late 1990s and early 2000s that the population was in decline, falling from over 100,000 birds in the late 1980s to a low of 73,000 birds in 2002.

A mandatory hunting bag recording system introduced in Iceland in the mid-1990s indicated that between 1995 and 2002, an average of 35,000 Greylag Geese were being shot annually in that country, the vast majority in the autumn prior to migration. In addition, an unknown number of Iceland Greylag Geese were also shot in northern Britain between October, when the geese started to arrive on their winter quarters, and February. Although there is no bag recording system in place in Britain, it was possible to estimate, through the use of ring recoveries and sightings of marked individuals, that at the end of the 1990s approximately 20,000–25,000 were shot in Britain each winter (Frederiksen 2002). These figures appeared alarming and population decline looked inevitable with the potential for it to be catastrophic. Indeed, the population did decline up to 2002, but has subsequently made a modest recovery back to over 100,000 birds, reaching an estimated 110,000 in November 2010 (Figure 4).

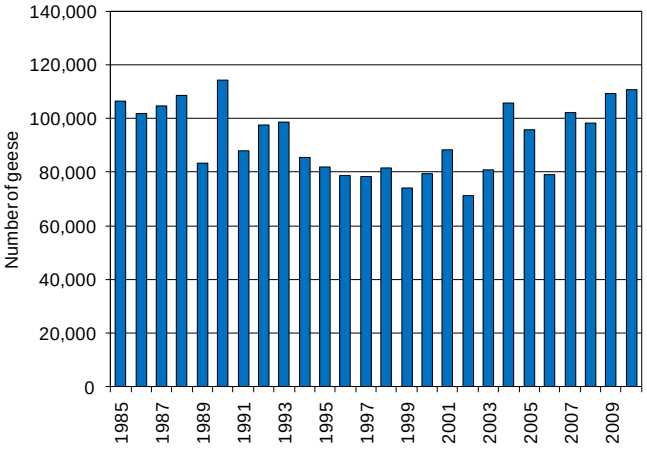


Figure 4. Annual abundance estimates for the Iceland Greylag Goose population, 1985–2010. Data from IGC counts.

Here we re-examine a number of datasets relating to Iceland Greylag Geese to further explore recent demographic trends in this population. We wanted to look at changes in the number of geese in a population during the annual cycle to see if such a largest harvest is sustainable and suggest reasons why the population which appeared to be declining up to 2002 has subsequently recovered.

Two key changes have occurred in the last ten years. Firstly, the number of Greylag Geese shot in Iceland has increased. The mean annual harvest for the last five years (2006 to 2010) was 43,000 geese, with a record 58,182 birds being shot in 2009.

During the same period, the birds have shifted their winter distribution north, with most abandoning east central and north east Scotland to winter in north Scotland, principally on Orkney (see Figure 1 in *GooseNews* 7). In 2009, Orkney held 60,519 Iceland Greylag Geese or *c.* 55% of the population. One of the consequences of this shift north has been a probable reduction in the number of birds shot in Britain during the winter by as many as 8,000 (see Trinder *et al.* 2010). Thus, while the number shot in Iceland has increased, the number shot in northern Britain has probably decreased. The total harvest, therefore, may have been 35,000–60,000 over the last twenty to thirty years.

We examined simple demographic parameters for the population going back to 1995 (when bag recording began in Iceland). Summary data are given in Table 1 showing both the measured variables (autumn population estimates taken from the annual IGC reports and the number of geese shot in Iceland) and potential variables. There are several unknowns for which we have used estimates. Although a reduction in the number of birds shot in northern Britain has been suggested (Trinder *et al.* 2010), the actual number is unknown. Here we have therefore used a bag of 20,000 birds in 2000 (Frederiksen 2002) declining by 600 birds annually to a bag of 12,000 in 2009 (a total reduction of *c.* 8,000 birds as suggested by Trinder *et al.* 2010). Secondly, the proportion of geese arriving back in Iceland in the spring that breed is also unknown. In the absence of any data on this we have assumed that just over one half (0.6) of the birds breed (with no annual variation), with the remainder being second and third calendar year birds (or 'non-breeders'). Thirdly, the mean number of goslings reared per successful pair in Iceland is also unknown (although measures are made on the winter quarters). Patterson & Giroux (1990) reported a mean brood size of 2.65 (n=230) in Iceland in 1988. We have used that figure in this exercise (with no annual variation).

Since 1995, the mean annual proportion of young in the Iceland bag has been 0.428 and annual breeding success (ABS) as determined by age assessments in the field in Scotland, usually in October/November, has been 0.202. The latter is much lower than the former (in all years) presumably due to younger birds being more susceptible to being shot and forming a larger proportion of the bag (*e.g.* Wright & Boyd 1983). With nearly one half of the Iceland bag comprising young of the year, the proportion of young in the population at large decreases as the hunting season progresses, thus the true proportion of young produced each year is somewhere between the proportions recorded in the Iceland hunting bag and in autumn flocks. There was reasonable correlation between the two measures (r^2=0.418, P=0.012; Figure 5).

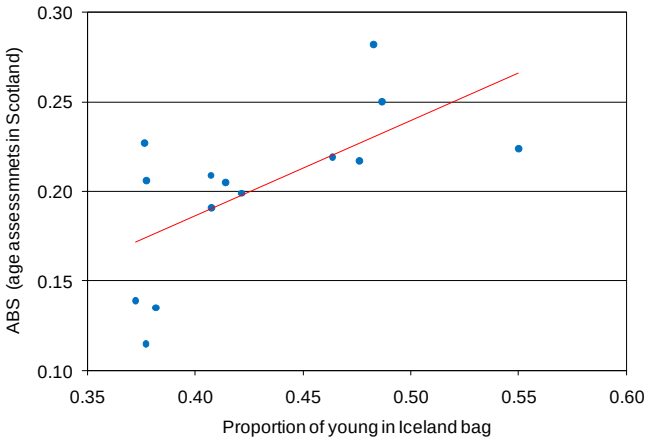
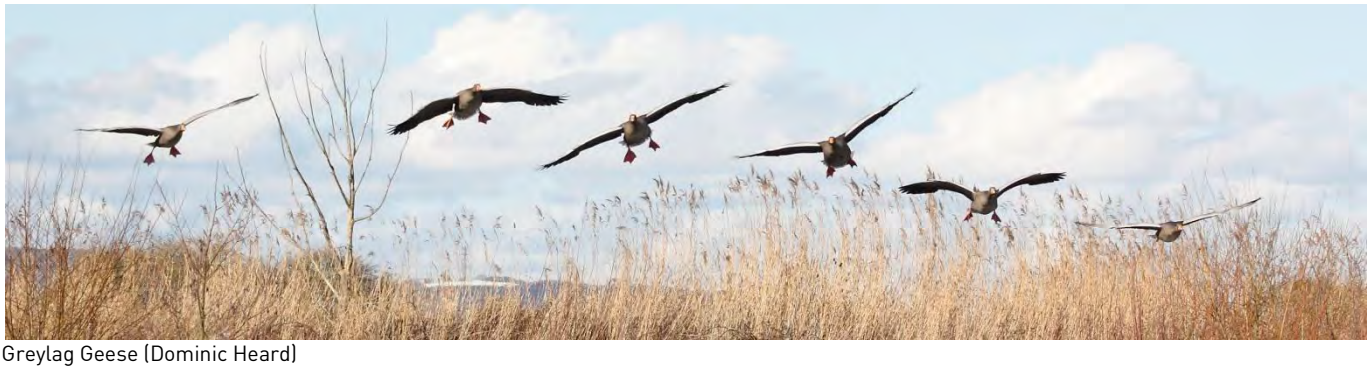


Figure 5. The relationship between the proportion of young in the Iceland Greylag Goose bag (September and October) and ABS made through field assessments in Scotland (October and November). Data from 1995–2010, except 2000 and 2001 where no bag data were available (n=14).

Table 1. Measured and potential demographic variables in the Iceland Greylag Goose population.

	Autumn population estimate	Potential no. shot in Britain over winter	Potential pre-breeding population	Potential no. of breeding pairs	Potential no. of young	Potential post-breeding population	No. shot in autumn in Iceland
Mean (1995–2009)	86,980	15,800	71,180	21,350	56,590	127,770	38,640
Standard Error	3,140	690	3,660	1,100	2,910	6,570	2,040
Maximum	109,500	20,000	97,900	29,370	77,830	175,720	58,180
Minimum	71,100	11,600	55,300	16,590	43,970	99,270	30,350



Greylag Geese (Dominic Heard)

There was broad agreement between the annual number of young estimated using the simple calculations set out in Table 1 and the proportion of young recorded in the bag in Iceland in the following autumn although this failed to reach statistical significance (r^2=0.205, P=0.12; Figure 6)

The figures of interest in Table 1 are the potential post breeding population (mean 127,770) and the subsequent harvests in Iceland (mean 38,400) and northern Britain (unknown, but assumed to be a mean of 15,800). These figures suggest that the hunting bag in Iceland accounts for 30% of the post breeding population reducing the population from 127,770 to 89,370 when the population is counted in November. In 2009, a record 58,180 Greylag Geese were shot in Iceland, yet the potential post breeding population, using the calculation in Table 1, was 175,720 birds in that year; the Iceland bag, therefore, representing a third of the then stock available.

There was a weak correlation between the calculated post breeding population and the Iceland bag the following autumn (r^2=0.246, P=0.07; Figure 7); seemingly the more geese potentially available, the more that were shot.

Thus, the conundrum about the remarkably high harvest rates can, in part, be explained by comparing the harvest with the population estimate just after the breeding season (Figure 8). In this example, hunting takes an annual harvest of approximately one third of the population.

The IGC counts have historically been undertaken in Britain when the geese are more concentrated and a larger pool of volunteer counters is able to assist in the surveillance. However, it is clear that the late autumn 'population estimate' is a snapshot in the annual cycle and reflects one that has seen up to a third of its number removed through hunting in Iceland. In the examples given in Table 1, the population estimate derived from the IGC count (mean 86,980) is approximately two thirds (68%) of the estimated post breeding population (mean 127,770).

The importance of the IGC counts is in its continuity, since they continue to be carried out at the same time each year and provide an adequate measure of between-year changes; however we need to be vigilant to changes in the timing of migration; in the last 20 years Greylag Geese have begun to depart from Iceland later, and changes in winter location; in the last five years, several thousand Greylag Geese have begun to over-winter in Iceland.

Whilst the bag statistics are remarkably high, this population has apparently recently been able to withstand an annual harvest of up to one third of the post breeding population. This appears to be driven in part by the recent relatively high productivity. The proportion of young recorded in the Iceland bag, has been higher than the 1995 to 2010 mean (0.432) in five out of the most recent seven years, and the ABS derived from field assessments in Scotland has, likewise, been higher than the 1995 to 2010 mean (0.199) in all seven of the most recent years.

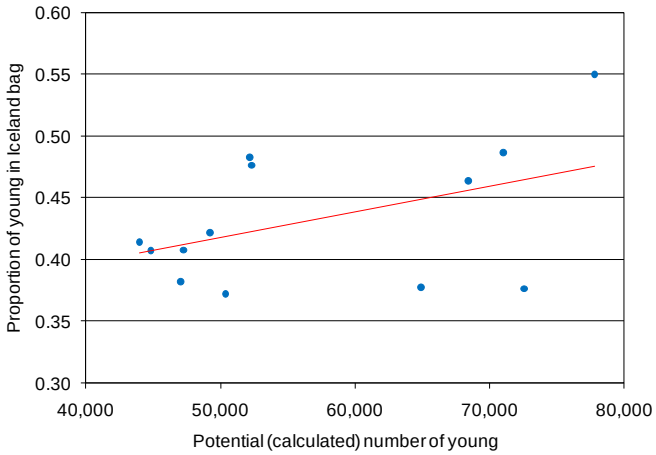


Figure 6. Relationship between the annual calculated number of young (from this analysis) and proportion of young in the Iceland bag. Data from 1995–2010, except 2000 and 2001 where no data were available (n=13).

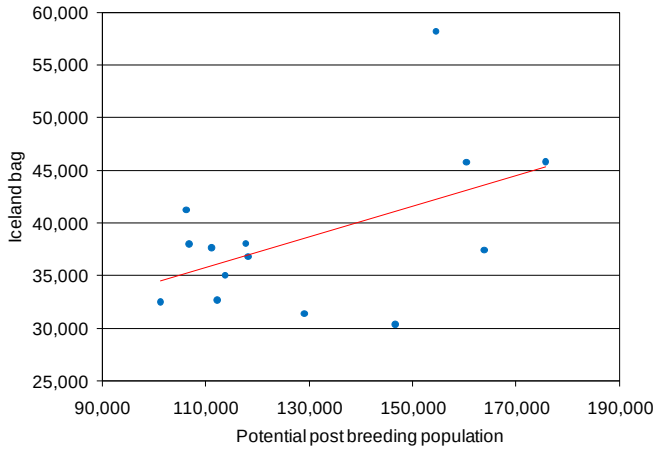


Figure 7. Relationship between the calculated post breeding population of Iceland Greylag Geese (this analysis) and the number of geese recorded in the Iceland bag. Data from 1995–2009 (n=15).

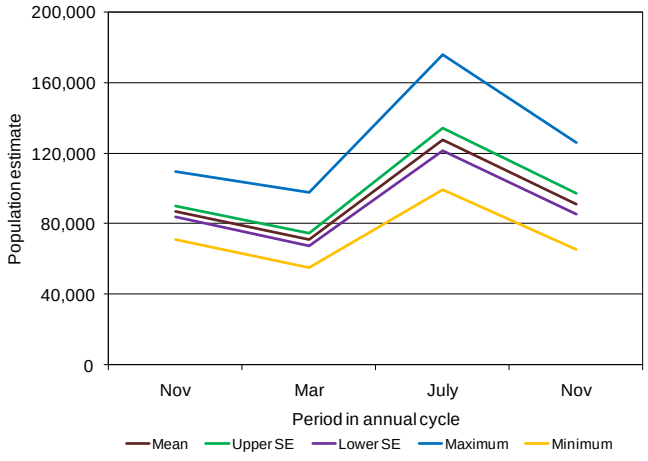


Figure 8. Various estimated population levels for the Iceland Greylag Goose based on pooled data 1995–2010. Periods of hunting are 1 September to 14 February in Britain and 20 August to 15 March in Iceland (although few geese are shot in Iceland after the autumn migration).

The switch from a declining population up to 2002 to one that appears more stable might, in part, be related to an increase in annual breeding success. The mean ABS as measured in Scotland in late autumn was 0.168 for the period 1995–2002 and 22.9 for the period 2003–2010 (Figure 9). Likewise, the mean proportion of young in the Iceland bag has increased from 0.395 in 1995–2000 to 0.453 in 2003–2010.

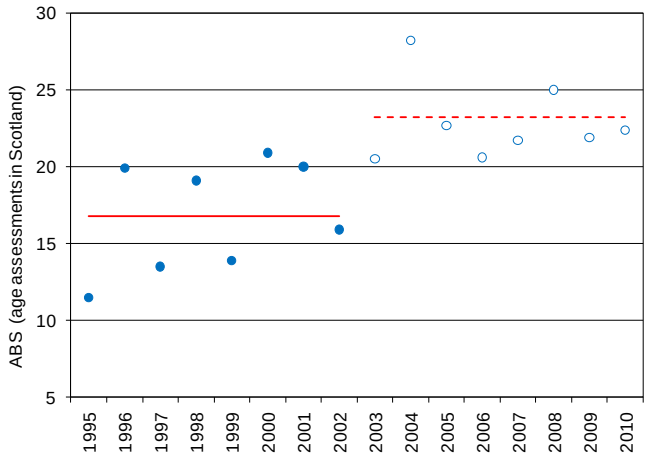


Figure 9. ABS as measured through age assessments in Scotland in late autumn from 1995–2010. Solid line shows the mean value for 1995–2002 and dashed line show the mean value from 2003–2010.

The population has not historically shown such high annual levels of productivity; the longer time series of ABS derived from age assessments in the field in Scotland (1958–2010), reveal that in 15 years, ABS was less than 15% and in two years, ABS was less than 10%. Thus, while the Greylag Geese nesting in Iceland appear to be currently breeding well, the harvest appears to have been sustainable. Trinder *et al.* (2010) demonstrated a significant negative relationship between Iceland Greylag Goose ABS and total precipitation in the preceding March in north Iceland. This may have reflected a relationship between the commencement of breeding and the timing of the spring thaw which may be delayed in years of additional spring snow accumulation, as found in other Arctic breeding geese (*e.g.* Boyd & Fox 2008). Only time will tell how the population estimate will react to such high levels of hunting after a particularly poor breeding season.

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Carl Mitchell & Arnór Sigfússon

International Swan Census, January 2010

In January 2010, Britain and Ireland experienced one of the coldest and snowiest winter periods for many years. Weather conditions left much of the country under heavy snow and the organisers of the International Swan Census wondering whether we might have to postpone until the following year. Luckily, the weather began to warm up just before the census was due to take place and despite many areas still being difficult to reach, coverage was near complete. Surveys were also undertaken in Iceland, where a small number of Whooper Swans overwinter.

Whilst the overall census in Britain, Ireland and Iceland was coordinated by WWT, counts in Ireland were organised by the Irish Wetland Bird Survey and the Irish Whooper Swan Study Group and in Iceland by the Icelandic Institute of Natural History. A big thank you goes to everyone who took part. Without the tremendous efforts of the volunteer networks, local organisers and the census coordinators we would not have been able to undertake such a survey.

Results from the census will provide a population estimate for the Iceland Whooper Swan population and an estimate of thetotal number of Bewick's Swans wintering in Britain and Ireland, which, combined with counts from elsewhere in the flyway, will give us a population estimate for the Northwest European population.

Whooper Swans (Brian Morrell)

The 2010 census of Whooper Swans yielded the highest population estimate to date (Figure 10). A total of 29,232 Whooper Swans was recorded, representing an increase of

10.9% compared with the previous census in 2005 (26,366). Typically, the majority of birds were recorded in the Republic of Ireland, where numbers were slightly above (7.2 % higher) those in 2005, as was also the case in Northern Ireland (6.6% higher). Scotland, however, saw 35.8% fewer birds, whilst England and Wales recorded a 40% increase. This shift in distribution was probably caused by cold weather movements southwards. In Iceland, the total count was 46% higher than in 2005 and reflects an increasing trend for birds to overwinter there (*cf* Iceland Greylag Geese).

The 2010 British and Irish total for Bewick's Swan was 7,079, a decrease of 1.9% compared with the 2005 census (Figure 11). In England and Wales, the total count (6,999) was just a few birds higher than during the previous census, whereas only 79 birds were seen in the Republic of Ireland (compared with 211 in 2005 and 1,500 in 1990) and one individual was recorded in Northern Ireland (compared with 13 in 2005 and 504 in 1990). Numbers in England and Wales have remained relatively stable since the mid-1990s, mainly due to the consistently high numbers at the Ouse Washes, Norfolk/Cambridgeshire. In contrast, numbers in Ireland have fallen markedly.

Only a proportion of the Northwest European Bewick's Swan population winters in Britain and Ireland. If compared with the 2005 population estimate (21,500), the 2010 British and Irish total represents 33% of the total population, which is similar to that recorded in 2000 and 2005. However, overall Bewick's Swan numbers have been declining in recent years (Rees & Beekman 2010) and until the results from elsewhere become available we are unable to tell whether there has been any significant change since the last census.

A more detailed analysis of the data is currently underway and the results will be presented on our website when they become available, along with a summary in the next edition of *GooseNews*.

Reference

Rees, EC & JH Beekman. 2010. Northwest European Bewick's Swans: a population in decline. *British Birds* 103: 640-650.

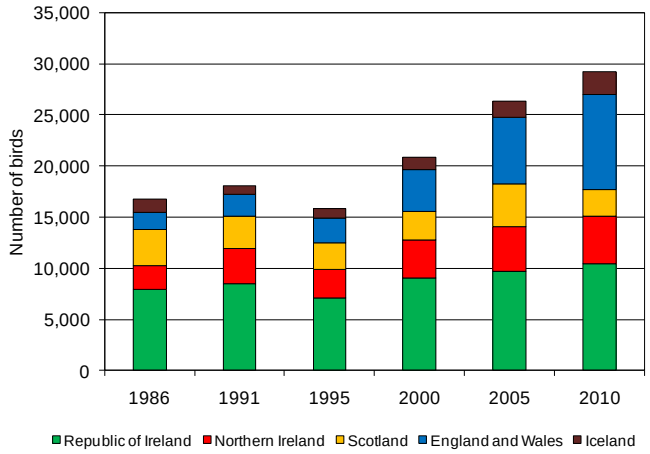

Figure 10. Number of Whooper Swans recorded during the International Census in Britain, Ireland and Iceland, 1986–2010.

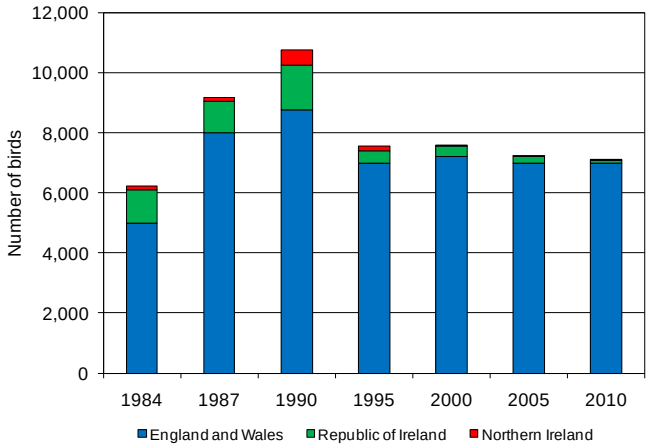

Figure 11. Number of Bewick's Swans recorded during the International Census in Britain and Ireland, 1984–2010.

Colette Hall

Counter profile

Stan Laybourne: Goose count co-ordinator for Caithness

Which area do you count and how long have you been goose counting?
I seem to have spent most of my birdwatching life counting, for one reason or another! I remember, as a boy in the 1950s, watching stubbles on the north side of the inner Solway filling up with Pinkfeet coming in off the saltings, and feeling compelled to count them just to see how many there were. I became involved there with the early days of the Birds of Estuaries Enquiry, counting sections of the shore around Annan. Later, my association with geese became more intimate when I joined North Solway ringers herding flightless Greylag Geese into corrals for ringing on islands in lochs in Wigtownshire. What with the Barnacle Geese at Caerlaverock, not so many then, and the joy of seeing the Greenland White-fronted Geese at Loch Ken and the small Bean Goose flock which wintered then near Castle Douglas, my interest in geese was honed early.

I arrived in Caithness in 1970 and soon became involved with the small group of active birders. We covered several lochs for Wildfowl Counts, as Wetland Bird Survey (WeBS) was then called, with special effort made for the International counts each January. In the summers we tramped the stunning Flows surveying breeding Greylag Geese along with Red and Black-throated Divers, Wigeon, Teal, Common Scoters, Mergansers, Golden Plovers, Dunlins, Greenshanks, (and the odd Wood Sandpiper!), Arctic Skuas and Arctic and Common Terns. We surveyed for Waders in Agricultural Land and, of course for four atlases. I have coordinated both for WeBS and the Iceland breeding Goose Census (IGC) as well as the less frequent Whooper Swan surveys, for about thirty years, and counting!

Describe the roost and counting conditions. Have goose numbers and their distribution, local to you, changed over the years?
There are more roosting lochs than there are surveyors, so as well as attempting some dawn roost counts mainly to establish the directions of movements out from the main roosts, for many years two surveyors have split the farmland areas of Caithness between them and made field counts during the same day, usually the Sunday of the count weekend to avoid hunting disturbance. Our knowledge of the most popular fields, gleaned over the weeks leading up to the count, and knowing the optimum vantage points, means that we hope we get most of the geese. Very little real change has occurred in behaviour and distribution over the years, only that caused by the variation in the positions of the stubble fields each year, and where the hunting has occurred the previous morning.

The species are mainly Greylags and Greenland White-fronts if we can find them! Not many Pink-footed Geese spend time in Caithness in autumn but we see large numbers migrating over in a south-easterly direction heading for Loch of Strathbeg in September. Also in September, flocks of Barnacle Geese are often seen clipping the east coast headlands and flying down the Moray Firth coast, and later small groups of this species are among the Greylags in the counts. We are not sure whether these are Svalbard birds wind drifted west from the Norwegian coast or Greenland birds drifted east.

Have there been any particular changes in recent years, especially since the rapid build up of wintering Greylag Geese in Orkney?
Numbers of Greylags built up during the 1980s to the 2000s and our totals could reach 9,000–12,000 birds in the November counts. Suddenly, in about 2005 our numbers dropped to about half that and any build up was later, into December. We later learned that half of the entire Icelandic breeding population, then some 40,000 birds, were in Orkney and did not seem much interested in moving any further. Our numbers have shown a slight improvement in the last year or two.

Of more serious concern to the geese have been the changes to the Caithness habitat over the years, from the inappropriate planting up with conifers of a huge hectarage of the Flows and the rush to drain much of the marginal land in the 1980s, to the current indiscriminate erection of windfarms on the back of inadequate, environmental statements. And all of these supported by public funds. The Greenland White-fronts are the main species likely to suffer from this, although the other goose species, and Whooper Swans, will be affected as more windfarms are still being proposed. One particular windfarm about to be interposed between roost and feeding area of one of the Greenland White-front flocks, despite clear infringement of Annex 1 of the EU Birds Directive, has been approved by the Scottish Government.

Favourite moment since starting goose counting?
The amazing sound and sight of any large flock of geese in flight is very special, particularly in wild settings such as Pinkfeet over the Solway mudflats when I was a boy or Greenland White-fronts over the Caithness Flows more recently. My absolute favourite, though, was having crawled for *c.* 300 m along a dry stone dyke and found a hole through which I could view with my scope a flock of Greenland White-fronts, the nearest less than 50 m away. Then to sit for about

two hours listening to that wonderful low murmuring of the feeding geese, read a leg darvic and be back at the car while the birds carried on feeding undisturbed.

What do you most enjoy, or what motivates you most about goose counting?

Generally the knowledge that I am contributing to our understanding of these magical birds. Specifically, those infrequent, early encounters with the Greenland White-fronts at Loch Ken must have left a mark, as I have spent the best part of the last forty years passionately bonded to the two apparently discrete flocks of Greenland White-fronts which winter in Caithness. The instant feedback from Tony Fox and the Greenland White-fronted Goose Study (GWGS) undoubtedly acts as a spur but learning about these wonderful birds is what really drives me.

How would you improve the Goose and Swan Monitoring Programme?

In truth, I suspect that it is about as accurate as it can be. Given continuity of method from year to year, changes in the populations and distributions, if not precise numbers, will become apparent. Ideally, allowing for the vagaries of weather, a counter at every roost might give better accuracy but that is not going to happen especially in areas of low human population such as ours in Caithness.

Many thanks for all your help

The greatest strength of the GSMP lies in the tremendous volunteer input from you, the counters, ring-readers and other participants. We hope that you will continue to support the GSMP and, through it, the conservation of swans, geese and wetlands throughout the UK and beyond.

GooseNews is the newsletter of WWT's Goose & Swan Monitoring Programme. It is sent to participants each autumn and is available either as a printed copy or a pdf file that can be sent via e-mail. *GooseNews* is also available to download from the WWT website at www.wwt.org.uk/research/monitoring/reports.asp.

If you would prefer to receive *GooseNews* in an alternative format, please contact the Species Monitoring Unit at monitoring@wwt.org.uk.

Counters are reminded that IGC count forms should be returned to their Regional Organiser (if appropriate) or directly to Slimbridge as soon after the last count date as possible. In winter 2011/12, this means after the February count. This helps speed the collation of counts for the production of web updates and *GooseNews* .

Breeding success of Bewick's Swans wintering in Britain in 2010/11

Bewick's Swan age counts were conducted at three major wintering sites for the species in Britain during winter 2010/11: WWT Slimbridge (Southwest England), WWT Martin Mere/Ribble Estuary (Northwest England) and the Ouse Washes (East Central England). A total of 4,335 Bewick's Swans was aged. Data from Martin Mere/Ribble Estuary and the Ouse Washes were collected in January 2011 because early arrivals (*i.e.* those present in October and November) tend to be non/failed breeders, whereas age assessments made in January are more representative of the population as a whole. Age counts at Slimbridge, where individual swans are identified daily by their unique bill markings, are recorded there throughout the winter season (October to March). Brood sizes were recorded for 275 families: 235 on the Ouse Washes, 35 at Slimbridge and five at Martin Mere/Ribble Estuary. The low brood count at Martin Mere/Ribble Estuary reflected the relatively few Bewick's Swans now wintering in that part of the country.

With the exception of Slimbridge, data were collected within a four-day window in order to avoid any possible bias that could arise from repeated observations of the same families at certain sites. Age counts were conducted on 15–16 January at Martin Mere/Ribble Estuary and on 18 January on the Ouse Washes. Regional variation in the percentage of juveniles was assessed in order to determine any differences in the geographical distribution of family parties.

Overall, Bewick's Swan flocks contained 10.8% juveniles, and the mean brood size of pairs with young was 1.7 (Table 2). The percentage of juveniles was lower than the ten year mean of 11.2% (± 1.5 SE for 2000/01–2009/10 inclusive), though it showed an improvement for the third year in succession since the exceptionally poor breeding season of 2007 (4.7%; Figure 12).

There was significant variation in the proportion of juveniles recorded in different parts of Britain with the percentage ranging from 10.3% on the Ouse Washes to 17.6% at Martin Mere/Ribble Estuary ($X^2_2 = 9.8$, $P = 0.007$; Table 2 and Figure 13). This reflects the tendency for smaller flocks, such as those recorded in the Northwest, to include a higher proportion of families than the larger flocks, whereas the latter include a higher proportion of non-breeding (or failed breeding) birds.

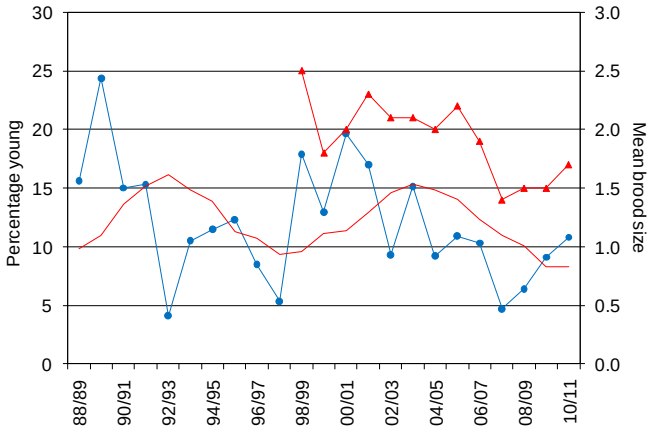

Figure 12. The mean percentage young (blue circles) and mean brood size (red triangles) of Bewick's Swans recorded in Britain, with the rolling five-year mean of percentage young (red line),1988/89–2010/11. Five-year mean values were calculated for the five years preceding the year in question.

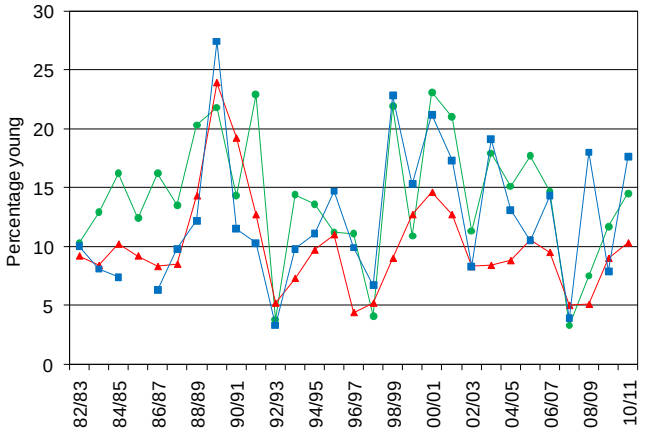

Figure 13. The annual percentage of Bewick's Swan cygnets recorded at WWT Slimbridge (green circles), the Ouse Washes (red triangles) and WWT Martin Mere/Ribble Estuary (blue squares), 1982/83–2010/11.

Regional variation in brood size could not be assessed accurately in 2010/11 because very few broods were recorded at Martin Mere/Ribble. However, the overall mean brood size for all three regions combined (1.7 juveniles per family) equalled the mean recorded for the previous five years (1.7 ± 0.15 SE).

Table 2. The proportion of young and mean brood size for Bewick's Swans at three sites in Britain during winter 2010/11.

Region	Total aged (no. of young)	% young	No. of broods (no. of young)	Mean brood size
WWT Martin Mere/Ribble Estuary	34 (6)	17.6	5 (6)	1.2
Ouse Washes	3,813 (392)	10.3	235 (392)	1.7
WWT Slimbridge	488 (71)	14.5	35 (71)	2.0
Overall	4,335 (469)	10.8	275 (469)	1.7

These data indicate that Bewick's Swan breeding success was again relatively poor in 2010. Although annual breeding success has improved since the particularly poor 2007 breeding season, this is the seventh consecutive year that breeding success has been below the ten year mean and follows successive poor breeding seasons since 2003 where the percentage of juveniles in British wintering flocks has remained less than 15.0%.

A coordinated age count of 7,275 birds wintering at sites in Britain and The Netherlands between 17 and 21 December 2010 found 10.5% young, thus confirming that 2010 was a poor breeding year for the Northwest European population of Bewick's Swan (W. Tijsen pers. comm. 2010).

Conditions on the breeding grounds have important effects on the annual breeding success, in particular weather conditions during the short Arctic summer. In 2010, an early spring (first week of May) thaw in the Pechora Delta region (D. Boiko pers. comm. 2010) likely favoured the onset of breeding for birds there, however, strong wind and rain throughout August may have reduced the post-hatch survival of cygnets, at least in that part of the breeding range.

Bewick's Swans (Dominic Heard)

Special thanks to C. Liggett for information from the Ribble Estuary, to W. Tijsen for reports from the Netherlands and to Jon Smith, Leigh Marshall, Larry Griffin, Mike Burdekin, Paul Harrington, Tom Clare, Chris Tomlinson and Steve Heaven for the Welney, Martin Mere and Slimbridge data.

Julia Newth

Breeding success of Iceland Whooper Swans wintering in Britain and Ireland during in 2010/11

Whooper Swan age counts were conducted in five regions across Britain and Ireland during the 2010/11 winter. Coverage of the population was excellent, with a total of 9,969 Whooper Swans aged, comprising 4,807 in England, 275 in Scotland, 2,540 in Northern Ireland and 2,347 in the Republic of Ireland between 18 December 2010 and 24 January 2011. Brood sizes were recorded for 777 families: 329 in England, 25 in Scotland, 254 in Northern Ireland and 169 in the Republic of Ireland.

For East Central England (WWT Welney/Ouse Washes) and Northwest England (WWT Martin Mere/Ribble Estuary) the percentage of juveniles and mean brood size were derived from age counts conducted on one day (18 January), to avoid possible bias from the inclusion of repeat observations of individual swans at particular sites. In Southwest Scotland (WWT Caerlaverock), breeding success was determined from data collected on 18 December 2010, whilst counts were conducted between 10–23 January in Northern Ireland and between 8–24 January in the Republic of Ireland. Regional variation was assessed in order to determine any differences in the geographical distribution of family parties

Overall, Whooper Swan flocks contained 16.3% juveniles, which is the same as that recorded in Britain and Ireland during the International Whooper Swan census in January 2010 (J. Reed pers. comm.), when coverage was equally comprehensive (Table 3). Mean brood size of pairs with young was 2.1 cygnets (Table 3). The mean percentage young (14.4%) derived from counts at Martin Mere/Ribble Estuary, the Ouse Washes and Caerlaverock, from where data are collected annually, was just below the previous five-year mean (2005/06–2009/10: 14.7%, ± 1.6 SE) (Table 3 and Figure 14) whilst the mean brood size for those three areas (2.1 cygnets per family) equalled the previous five year mean (2.1 ± 0.13 SE).

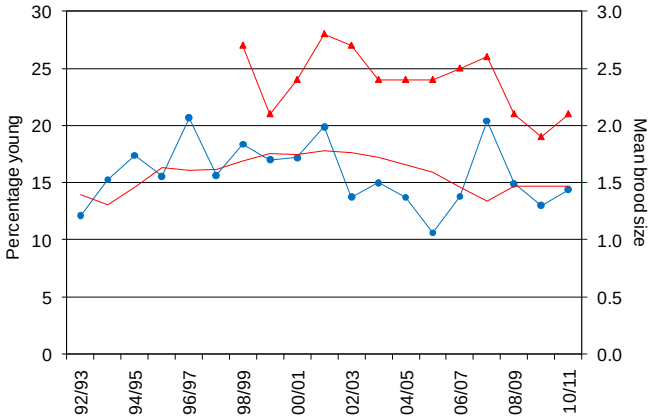

Figure 14. The mean percentage of young (blue circles) and mean brood size (red triangles) of Whooper Swans in Britain at sites in East Central England, Southwest Scotland and Northwest England, with the rolling five-year mean of percentage young (red line), 1992/93–2010/11. Five-year mean values were calculated for the five years up to the year in question.

There was evidence of regional variation in the distribution of families between regions ($X^2_4 = 66.4$, $P < 0.01$; Table 3 and Figure 15) with the highest breeding success found in Southwest Scotland (24.4%) and Northern Ireland (19.0%) and the lowest in East Central England (12.6%) (Table 3 and Figure 15). Regional variation in brood size was also evident, ranging from 1.9 cygnets per family in Northwest England and Northern Ireland to 2.7 cygnets per family in Southwest Scotland (Table 3). Regional variation may reflect a preference for Whooper Swan families in selecting wintering sites closer to their Icelandic breeding grounds, with non-breeding birds travelling further south. Studies have also shown that Whooper Swans ringed in the Suður & Norður-Þingeyjarsýsla regions of

northern Iceland are more likely to winter in England, than those ringed in the eastern region of Norður-Múlasýsla are more likely to winter in Scotland and that birds ringed further west in Skagafjörður are more likely to spend their winter in Ireland (Newth *et al.* 2007; McElwaine *et al.* 1995). Regional variation in the number of families at wintering sites may therefore be linked to variation in key environmental factors within the Icelandic breeding grounds in spring and summer.

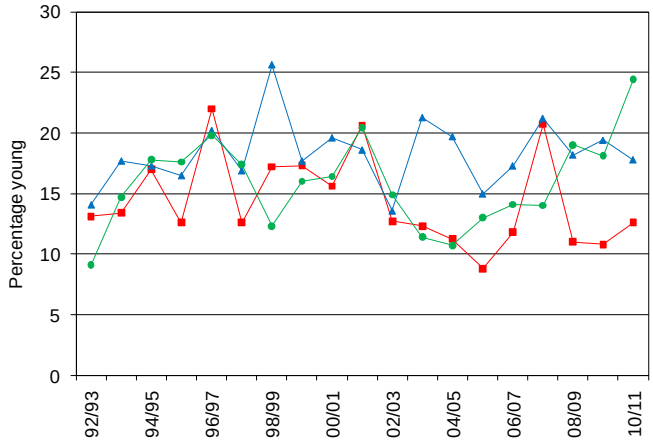

Figure 15. The mean percentage of Whooper Swans cygnets recorded in Southeast England (red squares), Southwest Scotland (green circles) and Northwest England (blue triangles), 1992/93–2010/11.

Special thanks to: C. Liggett for information from the Ribble Estuary, WWT and RSPB staff and volunteers at Caerlaverock (Larry Griffin, Richard Hesketh and Mike Youdale), Welney (Jon Smith, Leigh Marshall, Mike Burdekin and Paul Harrington) and Martin Mere (Tom Clare and Chris Tomlinson), and to the following observers in Ireland: Graham McElwaine, Alyn Walsh, Bernadette McPolin, David Nixon, Grainne Breathnach, George Henderson, Gerry Murphy, Joe Devlin, John Small, Kyle Hunter, Lisa Newth, Michael O'Regan, Margaret Quinn, Neil McCullough, Pat Watson, Seamus Burns and Tony Murray.

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McElwaine, JG, JH Wells & JM Bowler. 1995. Winter movements of Whooper Swans visiting Ireland: preliminary results. *Irish Birds* 5: 265-278.

Newth, J, K Colhoun, O Einarsson, R Hesketh, G McElwaine, S Thorstensen, A Petersen, J Wells, & E Rees. 2007. Winter distribution of Whooper Swans (*Cygnus cygnus*) ringed in four geographically discrete regions in Iceland between 1988 and 2006: an update. *Wildfowl* 57: 98-119

Table 3. The proportion of young and mean brood size of Whooper Swans during winter 2010/11.

Region	Total aged (no. of young)	% young	No. of broods (no. of young)	Mean brood size
Northwest England	1,121 (199)	17.8	105 (199)	1.9
East Central England	3,686 (466)	12.6	224 (466)	2.1
Southwest England	275 (67)	24.4	25 (67)	2.7
Northern Ireland *	2,540 (482)	19.0	254 (478)	1.9
Republic of Ireland *	2,347 (408)	17.4	169 (392)	2.3
Overall	9,969 (1,622)	16.3	777 (1,602)	2.1

* Brood sizes were not recorded for all flocks aged. The total number of cygnets used for the percentage young and the mean brood size estimates therefore differ for the regions indicated.

Julia Newth

The Icelandic-breeding Goose Census 2010

The 51st consecutive census of Greenland/Iceland Pink-footed Geese and Iceland Greylag Geese took place during autumn and early winter 2010. Sites holding Pink-footed Geese were primarily checked in October and November, whilst those holding Greylag Geese were checked primarily in November and December. Count data were also received from southwest Norway, Ireland and Iceland, the latter based on ground counts only. Weather conditions were generally considered favourable during the counts in October and November with very few sites reporting underestimated counts. The count weekend in early December was badly affected by snow and freezing temperatures affecting both the distribution of the birds (many inland waterbodies were frozen) and the ability of counters to travel to count sites. Maxima of 297,798 Pink-footed Geese and 121,280 Greylag Geese were counted in October and November 2010, respectively. These figures were adjusted to account for major sites that were not counted and for the

Pink-footed Geese (Graham Catley)

number of British Greylag Geese counted prior to this census, resulting in population estimates of 297,798 Pink-footed Geese and 110,962 Iceland Greylag Geese (Figure 16). Compared to population estimates in 2009, the 2010 figures represent a decrease of 18.2% in the Pink-footed Goose population and a very small increase of 1.3% in the Greylag Goose population.

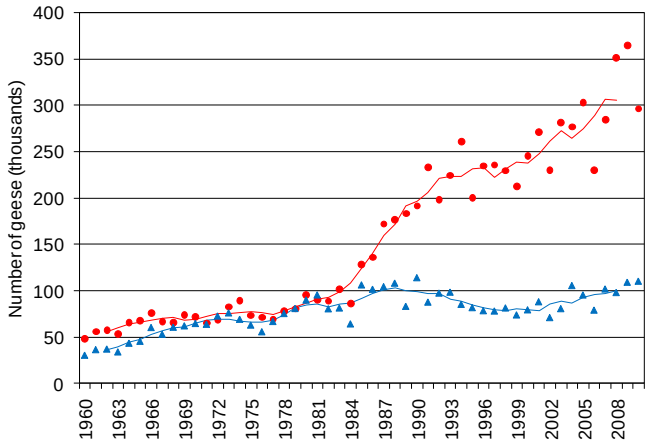


Figure 16. Population estimates for Pink-footed Goose (red circles) and Iceland Greylag Goose (blue triangles), 1960–2010. The five-year running means (*e.g.* mean for 2008 is from population estimates for 2006–2010) are shown as lines.

The breeding success of Pink-footed Geese was similar to the mean for the previous decade at 19.9% young (mean percent young 2000–2009: 19.3% ± 0.54 SE) (Figure 17). The mean brood size of successful pairs was 2.32 goslings, which was slightly higher than the mean recorded during the preceding ten years (2.12 ± 0.06 SE). The breeding success of Iceland Greylag Geese was slightly higher than the mean for the previous decade with flocks containing 22.4% young (mean percent young 2000-2009: 21.7% ± 1.0 SE), though the mean brood size of 2.11 goslings per successful pair was slightly lower than that of the most recent ten year mean (2.49 ± 0.09 SE) although the latter measure was based on a small sample size.

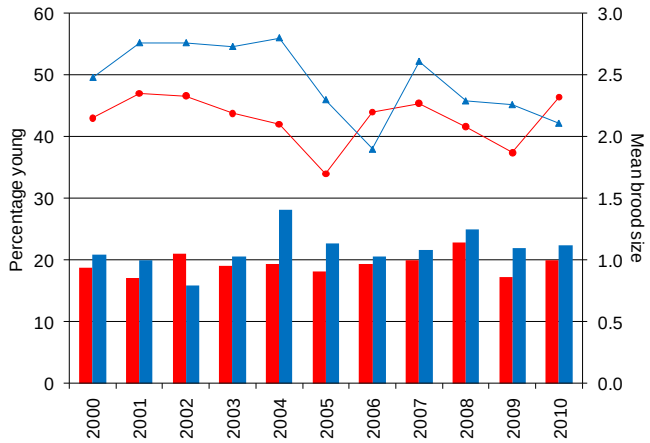


Figure 17. The percentage young (columns: red = Pink-footed Goose, blue = Greylag Goose) and mean brood size (lines: red circles = Pink-footed Goose, blue triangles = Greylag Goose) of Icelandic Breeding geese in Britain, 2000–2010.

Despite the apparent early arrival and good coverage of the main sites in Britain in October and November and counts being undertaken in reasonable conditions, the 2010 population estimate for Pink-footed Goose is nearly one fifth lower than the previous year. Breeding success in summer 2010 was average compared to the 2000–2009 mean (19.3%) and it might have been expected that annual recruitment would have balanced annual losses though hunting and natural mortality. It is therefore highly surprising that the 2010 population estimate is *c.* 60,000 fewer than in 2008 and 2009. Counts from 2006, and possibly 2007, were regarded as underestimates but there is less evidence of an undercount in 2010. Examining the twenty population estimates between 1991 and 2010, there have been between year declines in eight years ranging from decreases of 4,354 Pink-footed Geese (between 2003 and 2004) to 72,651 (between 2005 and 2006). However, in only two years after each between year decline has the subsequent population estimate been larger than the estimate two years previously. This indicates that in the year(s) following a decline, counts don't typically 'bounce back' to previous high counts. More Pink-footed Geese were recorded in Iceland at the time of the October IGC count than normal (*c.* 9,000; Arnór Sigfússon pers. comm.), however, the completeness of counts from Iceland remains difficult to ascertain as this species can remain dispersed at inaccessible areas at this time. Peak counts of Pink-footed Geese have occurred in November in one of the previous five years (in 2006), so the timing of the departure of the species from Iceland clearly varies year to year. It is possible, therefore, that in years when underestimates are recorded, such as 2006, large numbers may still be residing at inaccessible and uncounted areas of Iceland. However, whilst in 2006 the count total increased between October and November, suggesting a late departure of birds from Iceland and therefore probable underestimate, in 2010 there was no such increase between census months, which supports the suggestion that the decrease in total numbers was real, at least to some extent.

The increasing concentration of the Greylag Goose population on Orkney continued, with another record total count (unadjusted) of 80,744 Greylag Geese in December 2010. The survey of the summering stock, carried out in summer 2008, estimated 10,000 birds, but no survey has been made since. It is likely, however, that the number of birds summering on Orkney continues to increase – this is borne out by an increase in the number of broods recorded during annual monitoring carried out by RSPB (Alan Leitch pers. comm.). The adjustment for summering birds on Orkney (10,000 birds) may, therefore, be an underestimate and both the number of Iceland Greylag Geese counted on Orkney, and the number given for the total population estimate may be over-estimated by several thousand birds.

The situation on Shetland also remains complicated. A survey in August 2009 found *c.* 5,000 summering Greylag Geese. However, local counters suggest that fewer birds are present in September (Paul Harvey pers. comm.). There has been no ringing of Greylag Geese on Shetland during the summer, so it is not known if any birds leave the islands after the breeding season. During autumn 2010, no IGC counts were made in

October or November, but *c.* 3800 Greylag Geese were counted in December. This is the largest count from the archipelago but it is still not known if this comprises entirely summer residents, Iceland winter visitors or a mixture of the two. The situation can only be resolved through ringing of summering birds to examine post breeding movements from the islands and annual assessments of summering numbers; the latter being particularly problematic given the high costs involved.

The November goose counts in Iceland are based on a mixture of dedicated ground survey undertaken by the Icelandic Institute of Natural History in two of three main Greylag Goose areas in the southern lowlands together with non-systematic information provided by hunters and local birdwatchers around the country. This suggested that *c.* 16,000 birds were present (Arnór Sigfússon pers. comm.). Once again, *c.* 2,000–2,500 Greylag Geese were also thought to have over wintered in southern Iceland – the third winter in succession that such high numbers have been present (Arnór Sigfússon pers. comm.) and a situation that would well be worth watching more closely.

A more detailed account of the results is available at wwt.org.uk/research/monitoring/species/pinkfoot.asp

Carl Mitchell

Taiga Bean Geese in Britain 2010/2011

During winter 2010/11, monitoring of Taiga Bean Geese was again undertaken at the Slamannan Plateau, Falkirk and the Yare Valley, Norfolk. A peak count of 267 birds was recorded at the Slamannan Plateau, a figure comparable to recent years and slightly higher than the previous ten-year mean (243 ± 12.4 SE) (Figure 18). At the Yare Valley, where the numbers of wintering Bean Geese has been declining since 1993/94, the peak count of 137 was significantly higher than in 2009/10 when a peak of only 87 geese was recorded (Figure 18). However, this is still one of the lowest peak counts in the last 30 years and remains below the previous ten year mean (149 ± 14.4 SE).

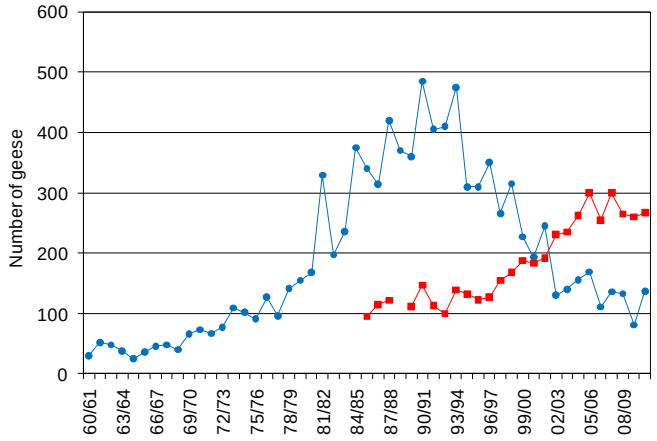


Figure 18. Peak counts of Bean Geese at Yare Marshes (blue circles) and Slamannan Plateau (red squares), 1960/61–2010/11. No data are available for Slamannan Plateau in 1988/89.

Arrival at the Slamannan Plateau was earlier than in previous years, with the first birds arriving in late September. The first count on 28th September recorded 83 geese, increasing to 210 two days later. The flock size increased slightly during October, reaching the peak of 267 in early November. As in 2009/10, numbers dropped dramatically during December, possibly as a result of the severe weather forcing birds to search further afield for suitable feeding sites. However, counts at Slamannan were also more difficult during this period. Numbers recovered to 239 birds by the beginning of January as the weather conditions eased. Migration back to the spring staging grounds took place in mid-February; the last birds being recorded on the 24 February.

At the Yare Valley, the geese arrived later than expected. No geese were recorded in October and the peak November count of 43 was half of the ten-year mean peak count for that month (82 ± 25.1 SE). Numbers of geese reached their peak in January, as is typical for this site, but by 20 February only 16 remained.

Age assessments at the Slamannan Plateau indicated 2010 was a good breeding year for Taiga Bean Geese. Out of flock of 253 birds, 151 were aged, of which 31% were young birds, the highest proportion of young ever recorded for this site (Figure 19). The mean brood size was 2.07 (± 0.25 SE) young per successful pair (n=14 broods). However, this is a very small sample of the total population. Age assessment data were not collected at the Yare Valley.

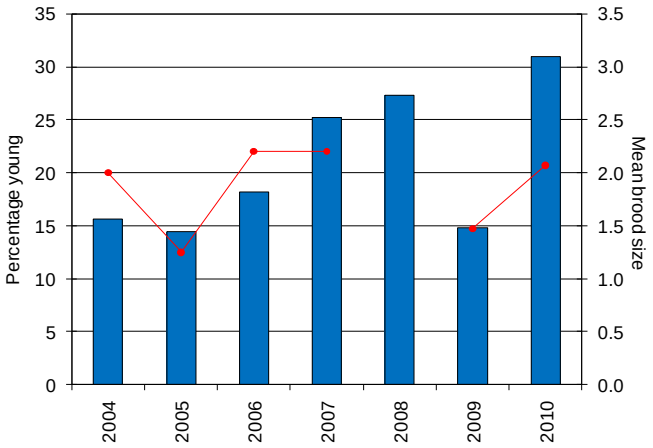


Figure 19. The percentage young (blue columns) and mean brood size (red circles) of Taiga Bean Geese at the Slamannan Plateau, 2004–2010. No brood size data were collected in 2008. Note; the sample size in 2008 was very small hence these data are unlikely to be representative of the population.

Many thanks to Angus Maciver (Slamannan/Bean Goose Action Group) and Tim Strudwick (RSPB) for the information presented in this article.

Jacqueline Reed

Latest monitoring of British Greylag Geese in Northwest Scotland

Annual monitoring of all British Greylag Geese is not undertaken, but annual counts and breeding success estimates are conducted at two key areas within Northwest Scotland where Greylag Geese are actively managed, namely the Uists (Outer Hebrides) and on Tiree (Inner Hebrides).

Between the 1980s and the mid-2000s, the number of birds at these two locations steadily increased, although the number on the Uists now shows signs of levelling and, on Tiree, numbers appear to be decreasing (Figure 20).

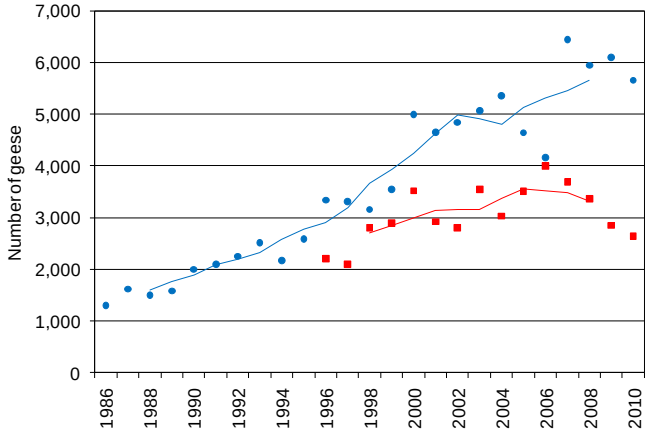
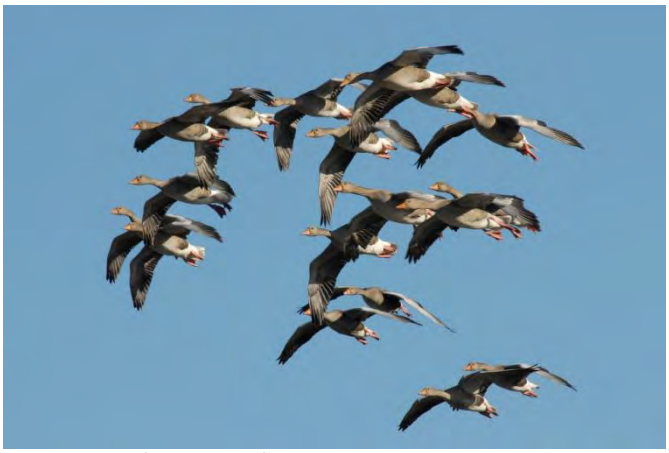


Figure 20. Counts of British Greylag Geese in late August on the Uists, Outer Hebrides (blue circles) and Tiree, Inner Hebrides (red squares), 1986–2010. The five-year running means (*e.g.* mean for August 2008 is from counts for August 2006–2010) are shown as lines. Counts on the Uists in late summer 2005 and 2006 and on Tiree in August 2009, were considered underestimates

A total of 5,658 Greylag Geese was counted on the Uists in late August 2010, a decrease of 7.2% on the August count in the previous year. During February 2011, a count of 4,037 was made, also representing a decrease of 6.6% on the count in February 2010. North Uist held 38% and 53% of the count totals in August 2010 and February 2011, respectively, whilst South Uist held 55% and 41%, respectively. The decline on South Uist, from 3,087 in August 2010 to 1,661 in February 2011 is significant and presumably reflects attempts to limit the population there through shooting under licence. Smaller numbers were counted on Benbecula. On Tiree, an island-wide census in late August 2010 produced a count of 2,639 birds, a decrease of 7.3% on the count in August 2009. Numbers on Tiree are thought to have declined after reaching a high point in 2006 (4,005 birds), presumably also reflecting the increase in the number of birds shot under licence.



Greylag Geese (James Lees)

Productivity data were collected from the Uists, with a total of 425 birds in 23 flocks aged on 21/22 August 2010 and brood sizes collected for 29 families. The percentage of young birds was 27.5% - similar to the mean for the four previous years (mean 2006–2009: 29.2% ± 1.4 SE). The mean brood size was higher than the mean of the previous three years at 3.17 goslings per successful pair (mean brood size 2007–2009: 2.85 ± 0.20 SE). On Tiree, 2,121 Greylag Geese were aged on 18/19 August 2010 and brood sizes were collected for 276 families. The percentage of young birds in this post-breeding August count was 34.2% - similar to the mean for the previous five years (mean 2005–2009: 31.5% ± 3.6 SE). The mean brood size was similar to that recorded in the previous five years at 2.63 goslings per successful pair (mean brood size 2005–2009: 2.54 ± 0.14 SE).

Based on the results of the 2008–2009 survey of summering Greylag Geese in Scotland (see page 6 in *GooseNews* 9), consideration is now being given to treating the Northwest Scotland and Re-established populations as one for management purposes. The geese breed throughout Britain and there is modest interchange of individuals between the two populations making delineation difficult to justify.

Thanks go to John Bowler (Tiree), Ben Jones (Coll) and Martin Scott (Uists) for the provision of data presented here.

Carl Mitchell

Greenland White-fronted Geese in 2009/10

In 2009/10, coordinated autumn and spring censuses of Greenland White-fronted Geese were undertaken in Britain and Ireland for the 28th consecutive winter. Combining the totals from spring 2010, the overall population estimate was 22,844, this being 1.4% lower than in 2009 (Figure 21).

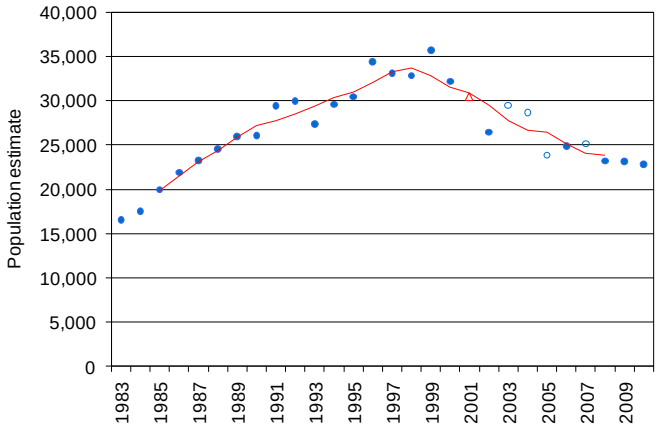


Figure 21. Population estimates of Greenland White-fronted Geese, 1983–2010 (blue circles). The five-year running mean (*e.g.* mean for 2008 is from population estimates for 2006–10) is shown as a red line. The open circles indicate estimated values for years when data were missing from Ireland. The open triangle indicates the estimated value for 2001 when data were missing on account of the outbreak of Foot and Mouth disease that year.

In Britain, the autumn 2009 total was higher than the previous year (13,269 *cf* 12,159) whilst the spring 2010 count was over 5% lower than in 2009 (11,841 *cf* 12,505). The majority of geese, approximately 50%, were seen on Islay, whilst sites in South Argyll held over 25% and the Lochaber/North Argyll area held 13–16% of the total. The difference in the autumn 2009 and spring 2010 totals is mainly due to the number of geese on Islay falling from 7,079 in autumn to 5,744 in spring. It is, however, thought that the spring count may be an underestimate as it seems unlikely that 1,400 fewer geese were on the island at that time compared with the autumn.

Totals of 9,992 and 11,003 were recorded in Ireland during autumn 2009 and spring 2010, respectively; the spring count was slightly higher than in 2009 (10,657). Over 70% of the geese were observed in Wexford, with the next biggest concentration (around 10% of the total) being recorded in Donegal.

Breeding success was the highest recorded for Britain since 1998/99 and only the third time since then to be over 10% (Figure 22). A total of 6,412 birds was aged and brood size was assessed for 128 families. The overall percentage of young was 12.9% and mean brood size was 3.1 young per successful pair. In Ireland, the overall proportion of young, recorded amongst the 4,804 geese aged, was 9.2%. Of the 126 families assessed, mean brood size was 3.01 young per successful pair.

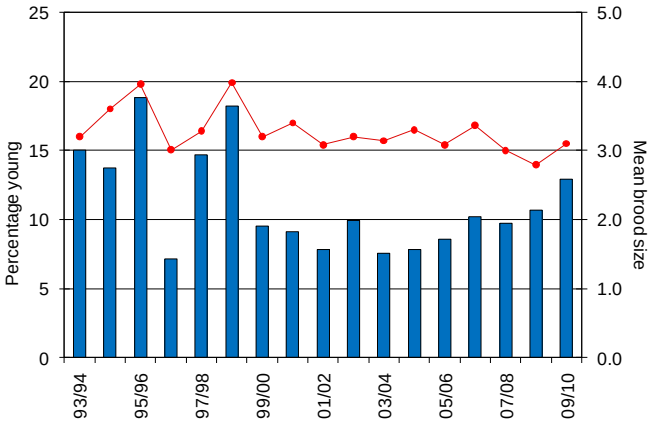


Figure 22. The mean percentage young (blue columns) and mean brood size (red circles) of Greenland White-fronted Geese in Britain, 1993/94–2009/10.

Taken from Fox, AD, I Francis & A Walsh. 2010. *Report of the 2009/10 International Census of Greenland White-fronted Geese.* Greenland White Fronted Goose Study. Kalø.

The full report can be downloaded from www.wwt.org.uk/research/monitoring/reports.asp or www.Greenlandwhitefront.homestead.com

Colette Hall

Breeding success of European White-fronted Geese in 2010

During winter 2010/11 European White-fronted Geese were aged at two localities, WWT Slimbridge, Gloucestershire, and North Warren, Suffolk. In total, 841 geese were aged, the highest number aged since 2007/08. Overall, the percentage of young present in winter flocks was 25.9%. This is very similar to that recorded in the previous winter but remained above the UK mean for wintering European White-fronted Geese (2004/05–2010/11; 24.0% ± 2.66 SE).

The percentage young differed between the two sites. At North Warren, 414 geese were aged of which 21.7% were young birds, while at WWT Slimbridge, 30.0% of the 427 birds aged were young, the third highest recorded there since 1993/94.

Prior to 2004/05, estimates of annual breeding success were only routinely carried out at WWT Slimbridge. A long-term trend, therefore, can only be assessed for this site (Figure 23). The percentage young there in 2010/11 was 11% higher than the previous year and also well above the previous ten year mean (20.4% ± 2.4 SE; 2000/01–2009/10).

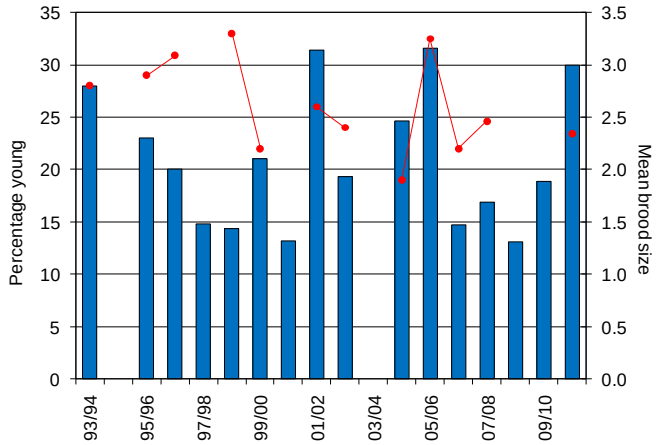


Figure 23. The mean percentage of young (blue columns) and mean brood size (red circles) of European White-fronted Geese at WWT Slimbridge, Gloucestershire, 1993/94–2010/11. No data were collected in 1994/95 and 2003/04. No brood size data are available for 1994/95, 1997/98, 2000/01, 2003/04, 2008/09 and 2009/10.

European White-fronted Geese (James Lees)

In 2010/11, brood size data were only collected at WWT Slimbridge. Brood size was recorded for a total of 44 families and ranged from one to five young. The mean brood size per successful pair was 2.3 young, just 0.1% below the previous ten-year mean (2.4 ± 0.2 SE).

One of the main influences on the breeding success of tundra-nesting geese is the cyclic pattern of lemming populations. Breeding success generally decreases in years of low lemming abundance as a result of predators switching from lemmings to birds. However, during summer 2010 reports from monitoring stations in the Arctic indicated that numbers of lemmings were low during summer 2010, while the percentage of young birds recorded in the UK was high. This anomaly may possibly be because so few European White-fronted Geese now winter in the UK at a limited number of sites, only allowing a small proportion of the population to be sampled. No estimates of breeding success from elsewhere in the wintering range are currently available with which to compare results from the UK. Overall bird breeding success was reported as average for the arctic region (Soloviev & Tomkovich 2011).

Reference

Soloviev, M & P Tomkovich. (Eds.) 2011. *ARCTIC BIRDS: an international breeding conditions survey*. Online database: www.arcticbirds.net/. Accessed 07 June 2011.

Jacqueline Reed

Greenland Barnacle Goose counts, 2010/11

During 2010/11, wintering Greenland Barnacle Geese were counted at seven of the most important sites in Scotland: Islay, Colonsay/Oronsay, Danna, Coll, Tiree, North Uist and South Walls, Orkney. The highest numbers are regularly seen on Islay, where the peak coordinated count of 44,844 in December 2010 was 10% higher than the previous winter. The traditional winter Islay count is the mean of the December and March 'international' counts (where emphasis is placed on obtaining greatest coordinated coverage) and in winter 2010/11, this figure was 40,252 (Figure 24). Four of the other sites had maximum winter counts higher than the previous winter; North Uist (2,546 *cf* 2,392), South Walls (1,862 *cf* 1,600), Tiree (4,190 *cf* 3,729) and Danna (715 *cf* 588), whilst the two other sites had maximum winter counts similar to those recorded in winter 2009/10; Coll (775 *cf* 880) and Colonsay/Oronsay (2,056 *cf* 2,100).

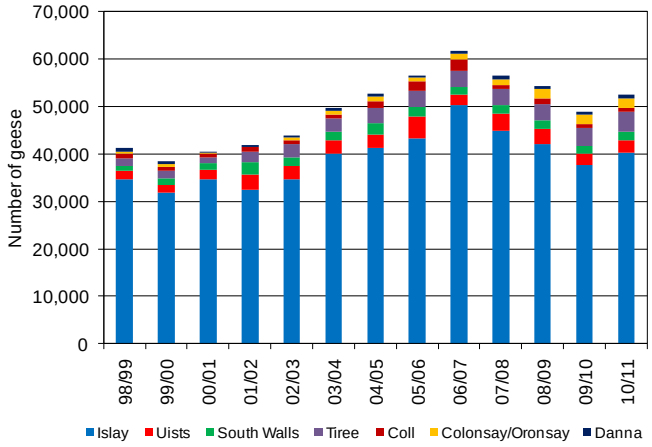


Figure 24. Winter peak counts at seven of the most important wintering sites for Greenland Barnacle Geese in Scotland, 1998/99–2010/11

Greenland Barnacle Geese had a reasonable breeding season in 2010, the best since 2004, and this may, in part, account for the noticeable upturn in numbers at the key sites in Scotland (Figure 24). In total, 11,110 geese were aged on Islay, Tiree (both in Scotland) and Inishkea (Ireland) and brood size was assessed for 307 families (Table 4). The overall proportion of young was 10.4% and the mean brood size 2.04 young per successful pair; both higher than their respective means for the previous ten years, 8.3% (± 1.3 SE) and 1.90 young (± 0.1 SE) (Figure 25, showing Islay data).

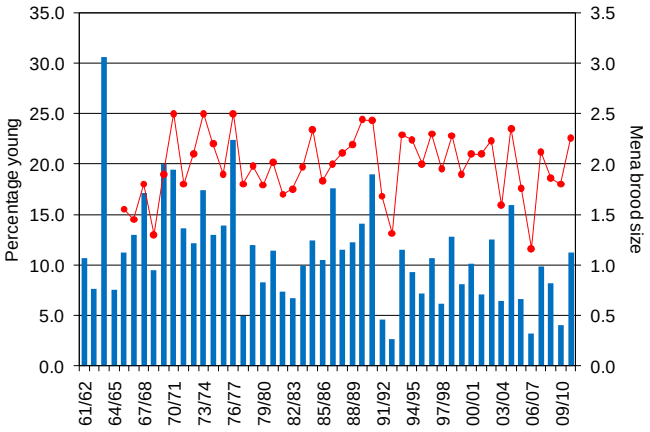


Figure 25. The mean percentage of young (blue columns) and mean brood size (red circles) of Greenland Barnacle Geese recorded on Islay, 1961/62–2010/11.

Following a high rate of increase up to 2006/07, combined counts from key sites suggested a subsequent decrease in the size of the Scottish wintering population up to 2009/10. Breeding success has been low in the last ten years, which has undoubtedly been important in terms of the observed decline in overall abundance, and the increase in 2010/11 no doubt reflecting the better than average breeding season.

Special thanks go to Malcolm Ogilvie, John Bowler and David Cabot for providing age counts. Winter counts at the key sites were provided by Tracey Johnston and Morven Laurie (on behalf of the Argyll goose counts), John Bowler, Pat Batty, Ben Jones, Morven Laurie, Mike Peacock, Martin Scott and Dylan De Silva.

Carl Mitchell

Table 4. The proportion of young and mean brood size of Greenland Barnacle Geese during winter 2010/11.

	Total aged	% young	No. of broods	Mean brood size
Islay	8,960	11.2	151	2.26
Tiree	700	10.0	51	1.39
Inishkea	1,450	5.66	105	2.05
Total	11,110	10.4	307	2.04

Svalbard Barnacle Goose monitoring in 2010/11

The first Svalbard Barnacle Geese recorded on the Solway Estuary were 16 birds on 17 September 2010 on the flood ground of the WWT Caerlaverock reserve. From 29 September to 21 May, 25 coordinated counts were carried out on both the north (from Cummertrees to Wigtown) and south (Rockcliffe to Grune) sides of the estuary.

Total counts rose gradually from 4,720 on 29 September to 5,950 one week later with a bigger influx late afternoon and overnight on 11 October with 12,723 by 12 October and 35,640 by 19 October. Numbers then fluctuated, as in previous years, mainly in relation to count visibility and goose dispersal, especially in relation to the severe freezing conditions and snow present from mid-November to mid-December. The final 223 geese were recorded on the saltmarsh at WWT Caerlaverock on 11 May in a late end to the season for that area after an unprecedented 1,880 had arrived back on the reserve from Rockcliffe Marsh on 7 May (including two satellite tracked birds) after a thunderstorm the night before. At RSPB Mersehead, a flock of 36 remained until 4 May but these were gone by 6 May.

As in previous years, up to half the population was residing on Rockcliffe Marsh, Cumbria by the beginning of May, prior to departure, where up to 7,000 stayed until mid-May. The other half of the population probably departed on migration to Norway between 21 April and 28 April. From 4 May to 6 May, numbers declined from just over 17,000 to 12,000, with further departures by 8 May when almost 7,000 remained with these final birds departing at some time between 11 May and 21 May, after which only 44 remained. Four birds were seen on Rockcliffe Marsh on 25 May and one remained there on 1 June. One of four satellite tagged geese departed late on the night of 13 May whereas the other three departed late night on 18 May, suggesting the final goose departures happened on these dates.

As a precaution against the possibility of some of the birds having been counted twice, an adopted total for the population is usually derived by averaging those counts within 10% of the maximum recorded during the winter. In 2010/11, the counts of 35,640 on 19 October and 36,152 (the maximum count recorded) on 26 October fulfil this criterion and are thus averaged to produce an adopted population total of 35,900 Barnacle Geese (rounded up to the nearest 100). This is an increase of 9% on the adopted population estimate for 2009/10 (32,900) (Figure 26).

The breeding season in 2010 (10.8% young and the mean brood size was 2.5 young per successful pair) was the best recorded since 2007, resulting in another increase in the total size of this flyway population for the fifth consecutive year (Figure 27).

As the population has increased, so has its distribution on the Solway, although its core feeding areas remain broadly the same. Rockcliffe Marsh at the eastern end of the Solway continues to play a vital role throughout the winter, with its importance further highlighted in late April/early May during a period of rapid turnover when at least 99% of the population

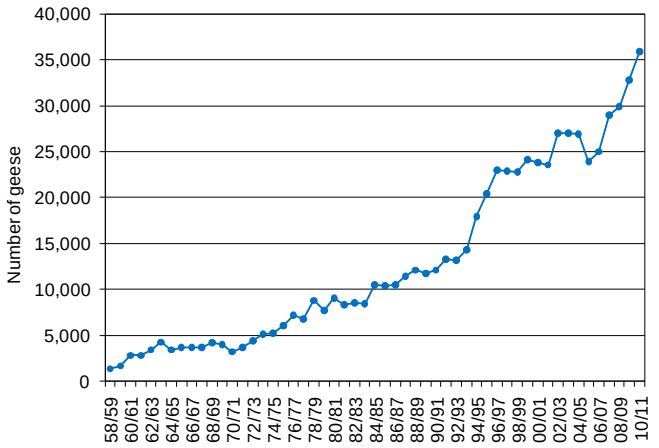


Figure 26. Winter population estimates for Svalbard Barnacle Goose, 1960/61–2010/11 (WWT data).

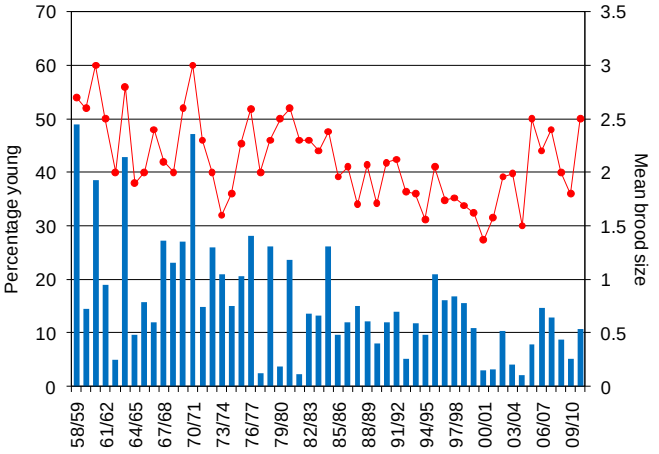


Figure 27. The percentage young (blue columns) and mean brood size (red circles) of Svalbard Barnacle Geese, 1958/59–2010/11.

will visit the site for up to a week or more to feed on the newly accreted saltmarsh vegetation before departing for Svalbard. Rockcliffe Marsh is currently in a phase of rapid growth on its seaward edge, as it has been for the last decade, and is probably supporting increasing numbers of geese each year. This, coupled with an expanding distribution on the Solway more generally, makes it more and more difficult to achieve rigorous population counts with coordinated weekly or fortnightly ground counts that have historically been used. As Rockcliffe Marsh expands it becomes increasingly difficult to cover the ground (safely) on foot and make accurate assessments of goose numbers without disturbing them and thus risking double counting. It is perhaps timely to consider exploring aerial counts coupled with high definition photography of the flocks to assess the true population size at perhaps the start and end of the winter as a comparison to the ground counts.

WWT would like to acknowledge the help of Mike Carrier, Bob Jones, Dave Blackledge, Dave Fairlamb, Peter Williams, Marian & Dave Rochester and Hilary & David Hawker in the collection of the census counts for the different areas of the Solway.

Larry Griffin

Breeding success in East Atlantic Light-bellied Brent Geese in 2010/11

Breeding success of the East Atlantic Light-bellied Brent Geese wintering in Britain was higher than the previous year and the highest recorded since 2007/08 (Figure 28). An early sample of families from Lindisfarne of 885 birds aged on 12 October only found 60 juveniles or 6.8%. Further assessments of a total of 228 geese aged at three locations between November 2010 and February 2011 at Lindisfarne, Northumberland, and Sandilands and Huttoft Pitt (Sea Bank Clay Pits) SSSI on the North Lincolnshire Coast resulted in a much higher juvenile percentage of 30.3%. The overall proportion of young for all data combined was 11.6%. No brood size data were collected. There was a large difference between the first and subsequent samples but it is well known that such high variation in juvenile numbers may exist between individual Brent Goose flocks and habitats.

Britain supports less than half of the total population and only a small sample of these birds were aged. In Denmark, where the remainder of the population normally winters, breeding success was assessed twice, in mid-October which found 30.8% juveniles (n=1,574) and in mid-November which found 25.4% juveniles (n=637).The mean brood size in October was 3.64 (n=11) per successful pair. The largest sample within the shortest time frame was made in October (including the large Lindisfarne and Denmark samples) which gives an overall population breeding success of 22.2%, which is the highest recorded since 1996/97 when combining British and Danish data.

Our thanks go to Andrew Craggs (Lindisfarne NNR) for undertaking the counts.

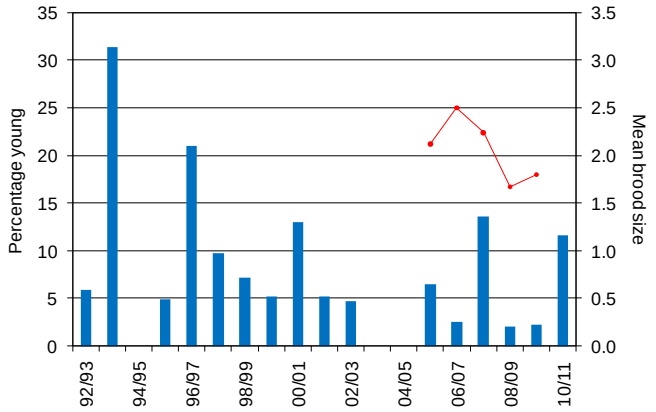


Figure 28. Proportion of young (blue columns) and mean brood size (red circles) in flocks of East Atlantic Light-bellied Brent Geese, 1992/93–2010/11. No data were collected in 1994/95, 2003/04 and 2004/05.

Jacqueline Reed and Preben Clausen

East Canadian Light-bellied Brent Goose autumn 2010 survey

Counts of Light-bellied Brent Geese were undertaken at all main Irish sites and in western Iceland on or about the 16–17 October 2010. In total, 38,216 birds were counted (Figure 29), 85% of which were around the Irish coastline. Aerial surveys of Faxafloi and Breiðafjordur in Iceland revealed just over 5,000 birds. Peak counts in Ireland included Strangford Lough (28,600), Lough Foyle (2,650) and Tralee/Castlemaine (1,066). Numbers at Strangford Lough increased in the week following the census to a peak of over 30,200 birds on 22 October.

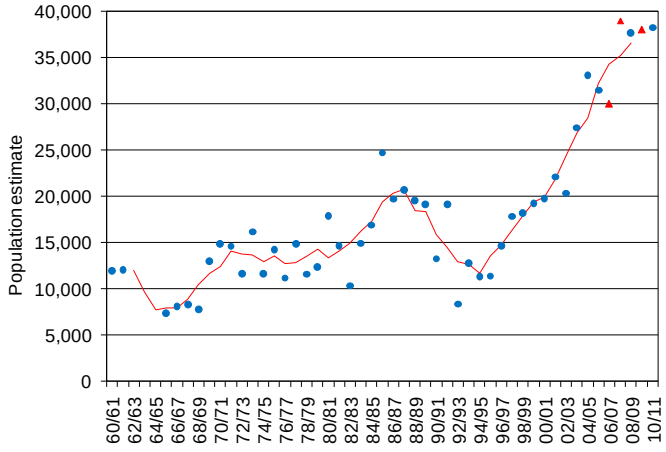


Figure 29. Population estimates of East Canadian Light-bellied Brent Goose, 1960/61–2010/11 (no data for 1962/63–1964/65). The five-year running mean (e.g. mean for 2008/09 is from population estimates for 2006/07-2010/11) is shown as a red line. The red triangles indicate provisional estimates for 2006/07, 2007/08 and 2009/10.

The 2010 breeding season was a relatively poor one (Figure 30); based on an assessment of over 11,670 individuals (*c.* 30% of the total count), just 369 (3.16%) juveniles were counted. The average brood size was 2.13 young per successful pair.

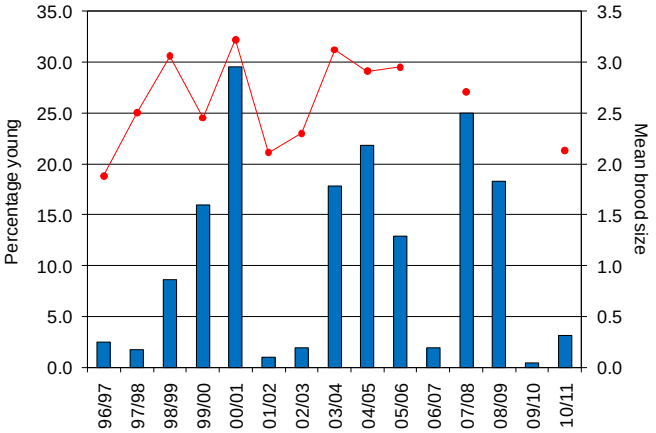


Figure 30. The proportion of young (blue columns) and mean brood size (red circles) of East Canadian Light-bellied Brent Geese, 1996/97–2010/11. No brood size data are available for 2006/07, 2008/09 or 2009/10.

Kendrew Colhoun, Kerry Mackie and Gudmundur A. Gudmundsson

Breeding success in Dark-bellied Brent Geese in 2010/11

For the 26th consecutive winter the breeding performance of Dark-bellied Brent Geese wintering in the UK was assessed by experienced volunteer observers. Between October 2010 and March 2011 47,883 geese were aged at 13 estuaries or coastal sites.

The overall proportion of young was 12.7% and the mean brood size was 2.7 young per successful pair (± 0.06 SE). Figure 31 shows that the proportion of young was higher than the mean of the previous ten years (8.3 ± 2.6 SE), whereas the mean brood size was one of the highest recorded since records began in 1985/86. As with European White-fronted Geese and, to some extent Bewick's Swans (see pages 19 and 12), this Russian tundra breeding species experienced better than average breeding success during a year when rodent numbers were generally low. However, low numbers of predators were also reported at many monitoring stations in 2010 (see www.arcticbirds.net/), and weather conditions were also generally favourable, both of which are known to have a strong positive influence on breeding success.

The proportion of young varied throughout the winter, peaking at 17.4% in March and dipping as low as 9.0% in February. Large variations in the proportion of young were also observed across the areas sampled. The Medway Estuary had the highest proportion of young (47.4%) whereas the lowest proportion was observed at the Stour Estuary (2.6%). However, these two regions had low sample sizes. The highest numbers were aged at the Thames Estuary and Langstone Harbour. Within individual flocks, the proportion of young varied from 0–60%, and flocks of fewer than 100 geese generally had the highest proportion of young.

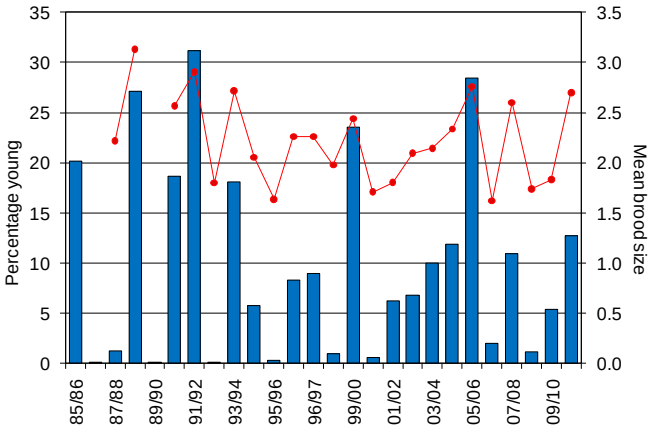


Figure 31. The percentage young (blue columns) and mean brood size (red circles) of Dark-bellied Brent Geese in the UK, 1985/86–2010/11. No brood size data are available for 1985/86, 1986/87 or 1989/90.

A more detailed account of the results is available on our website at wwt.org.uk/research/monitoring/species/dark_brent.asp

Jacqueline Reed

Recent success with capture and marking

During 2010/11, a total of 271 migratory swans were caught by WWT. At WWT Caerlaverock, 146 Whooper Swans were caught (97 newly ringed birds and 49 recaptures); in Norfolk, close to WWT Welney, 19 Bewick's Swans were caught (most with cannon-nets) and included one recapture; at WWT Martin Mere, 76 Whooper Swans were trapped (56 new birds and 20 recaptures); and at WWT Slimbridge, 30 Bewick's Swans were caught (22 new birds and eight recaptures).

Ten Bewick's Swans were fitted with white neck collars (with inscriptions 001T -010T) with Global Positioning Satellite transmitters attached. Six were fitted near WWT Welney and four at WWT Slimbridge. These MicroTraX TSTX GPS dataloggers will provide detailed information on the swans' flight-paths when moving between Britain and The Netherlands. The data will be used to inform the location of wind turbines within the large Round 3 offshore wind farm sites scheduled for development off the coast of East Anglia. Rapid development of wind farms has caused concern regarding their potential impact on birds because of the increased risk of collisions. The swans' large size make them less manoeuvrable than smaller species: flying accidents are known to be a major cause of death for them. Such threats are of particular concern for the Bewick's Swan, whose population has suffered a steep decline since the mid-1990s (from 29,000 birds in 1995 to 21,500 birds in 2005). In addition to the location data that is captured at 45 minute intervals during the main spring migration period (February–March), we have received over 40 'casual' observations of these tagged Bewick's Swans since November 2010.

Bewick's Swan (Winfried Daunicht)

The annual round-up of summering geese by Dartford Ringing Group included 201 Greylag Geese (120 newly ringed and 81 recaptures) and 133 Canada Geese (104 newly ringed and 29 recaptures).

At Loch of Hundland, Orkney, 141 moulting Greylag Geese were caught in July (138 new birds and 3 recaptures) by Orkney

Ringing Group. During the winter, a further 20 Greylag Geese, most likely from the Iceland population, were caught in a field near Binscarth Farm, Orkney. This was the first cannon netting of Greylag Geese on Orkney.

Greylag Geese caught with cannon nets on Orkney (AJ Leitch)

Greylag Geese with neck collars (AJ Leitch)

The Irish Brent Goose Research Group had disappointing results for ringing during 2010/11, in contrast to their average of over 300 new birds per annum for the last ten years. At Strangford Lough, BBC Autumnwatch featured a catch although unfortunately only one bird was caught – not the 26 birds caught shortly after when the cameras weren't there! The sole mid-winter attempt was at a new site on the County Down side of Carlingford Lough. On the catch day, the geese failed to perform in front of the net so the attempt was abandoned. Severe weather in December and January put paid to any attempts at any of the usual sites and at Wexford in spring the geese were too widely distributed. Instead of this, and coinciding with their annual meeting, the group assisted Alyn Walsh with some Greenland White-fronted Goose catching on the Wexford Slobs. Finally, ringing attempts in Iceland were limited to a single catch of ten Brent Geese, due to the irregular pattern of usage of potential sites. Resightings of marked Brent Geese for 2010/11 generated (at the time of writing) a very respectable 9,943 records of 1,971 different individuals, received from 210 observers. Aside from a majority of Irish and Icelandic records, observations were received from Canada, France, Wales, England, Scotland, the Channel Islands and the Isle of Man, together with one from outside the normal flyway range, from The Netherlands. In Ireland, the most impressive result has been the considerable increase in observations from the Dublin sites: for the first winter these exceeded those from Strangford Lough! Kendrew Colhoun and Graham McElwaine would like to thank Stuart Bearhop, Kerry Mackie, Alyn Walsh and Gudmundur Gudmundsson, their associated teams and dedicated team of contributors to the marking scheme and database.

A catch of 36 Svalbard Barnacle Geese, including seven juveniles, was made on 4 March 2011 at WWT Caerlaverock, with orange leg rings in the series FCA–FCZ and FDA–FDZ being fitted. No control birds were caught. Four 30g solar ARGOS GPS satellite tags were deployed on larger males. The adult male weights ranged from 1.7–2.3 kg and females from 1.6–2.1 kg. These weights are fairly typical for the time of year. WWT would like to thank Bobby Smith and the North Solway Ringing Group for their help with the catch.

On 7 March 2011, 10 adult Greenland White-fronted Geese were caught near Crossmichael, Loch Ken, Dumfries & Galloway. The birds were fitted with orange neck-collars and white leg rings bearing inscriptions V7D–V0D and V1F–V5F. The catch included the first recapture (V2D) which had been ringed four years previously also at Loch Ken. Four collars (two on females and two on males) were equipped with GPS tags (solar-powered Bluetooth GPS Microtrax tags – see tinyurl.com/3va9ofz for further information). This will act as a test of this tracking technique as a precursor to a PhD study on this species starting in August 2011. It is hoped that the GPS fixes stored by these data loggers can be downloaded remotely via a Bluetooth connection in winter 2011/12. On 8 March, a second catch was taken at a nearby site. Five adults and a juvenile were caught; including one bird caught the previous day. The new collars fitted included V6F–V0F.

Observations of colour-marked geese and swans are essential to further our understanding of the life histories of individual birds, and population dynamics. In 2010/11 colour-marking of swans generated 3,321 observations of 1,918 different individuals, received from over 250 observers. The total number of observations increased to over 30,000 when the WWT daily site registers were included. Thank you to all those observers who have read and reported colour-marked swans and geese.

Note that observations of colour-marked geese and swans may be reported to colourmarkedwildfowl@wwt.org.uk . Thanks to Kendrew Colhoun, Graham McElwaine, Larry Griffin, Alan Leitch, Julia Newth and Roger Taylor for their contributions to this article.

Steve Roe

Conservation and research news

GSG Goose Bulletin

Goose Bulletin is the official bulletin of the Goose Specialist Group (GSG) of Wetlands International and the IUCN-Species Survival Commission. From February 1991 to November 1996 regular bulletins were mailed to interested goose biologists from the National Environmental Research Institute in Kalø, Denmark. The 8th and last issue appeared in November 1996. During the GSG meeting in Höllviken, Sweden, in October 2009, it was decided to restore this bulletin in a digital form. *Goose Bulletin* appears periodically, but at least once a year, in electronic form. PDF versions (issues 8 to 12) are available to download at www.geese.nl/gsg/ (then click on the *Goose Bulletin* link).

The bulletin aims to improve communication and exchange of information amongst goose researchers throughout the world. It publishes contributions covering goose research and monitoring projects, project proposals, status and progress reports, information about new literature concerning geese, as well as regular reports and information from the Goose Database.

Contributions for *Goose Bulletin* are welcomed from all interested goose researchers and should be sent as a Word file to the Editor-in-Chief. New contributions for the coming 13th issue should be sent to Johan Mooij (johan.mooij@bskw.de or johan.mooij@t-online.de) before 30 September 2011.

Johan Mooij

Follow the autumn migration of Lindisfarne Brent Geese online

Since early May a small group of East Atlantic Light-bellied Brent Geese have been followed with satellite transmitters. The geese were caught on two spring staging areas in Denmark in late April/early May and left Denmark 26–30 May. Four birds surprisingly migrated over the mountains of southern Norway rather than following the coastline (as they did in previous telemetry studies, Clausen *et al.* 2003 in *Oikos* 103: 426–445). Since departure, six birds were followed successfully all the way up to their Arctic breeding areas. Three birds went to Svalbard and three to Greenland via Svalbard. Judged from the birds behavior four birds initiated breeding, but failed, and two birds did not attempt to breed. Five birds settled to moult in Svalbard, and one in Greenland. By mid-July, they had moved on average 4,500 km (range 3,300–5,850 km). We hope to follow all of them back to their autumn staging areas in Lindisfarne or northern Jutland in Denmark. The geese can be followed on *The Brent Goose Blog* at brentgoose.blogspot.com/ where news is posted on a regular basis.

Preben Clausen

Connectivity of spring staging areas

During the spring migration, arctic-breeding geese pause in temperate and sub-arctic staging areas in order to gain body reserves for breeding. Focusing on a single arctic stopover site in West-Spitsbergen, Svalbard, Norway (Vårsolbukta, 77°45'N, 14°24'E), Hübner *et al.* (2010) investigated behavioural strategies of Barnacle Geese. The body condition and presence of individually marked birds was recorded. Individuals using different staging areas earlier along the migration route (Helgeland and Vesterålen on the Norwegian mainland) and heading to different breeding colonies within Svalbard (the close-by Nordenskiöldkysten, and the distant Kongsfjorden) were compared during springs 2003–05. Birds in Vesterålen left the staging area earlier than those in Helgeland and arrived earlier in Vårsolbukta. In Vårsolbukta, females gained body condition at a similar rate regardless of their breeding colony, whereas males from Nordenskiöldkysten exhibited a smaller overall increase in condition compared to males from Kongsfjorden. The Kongsfjorden birds stayed for a shorter period (average 2.8 days) than those from Nordenskiöldkysten (average 4.0 days). Nordenskiöldkysten birds frequently left Vårsolbukta for short periods presumably visiting the breeding area in order to optimise nest initiation with respect to prevailing snow conditions. The date of final departure from Vårsolbukta was correlated with nest initiation date at Nordenskiöldkysten, but no such relationship for the Kongsfjorden birds was found. The authors suggest that the geese adopt a 'hopping' strategy, using a network of stopover sites in Svalbard during spring with a last stopover at a buffer area close to the breeding area. For this vulnerable population it is important to identify the sites forming the links in this chain and to establish their function and utilisation by geese during the vital pre-breeding period.

Hübner CE, IM Tombre, LR Griffin, MJJE Loonen, P Shimmings & IS Jónsdóttir. 2010. The connectivity of spring stopover sites for geese heading to arctic breeding grounds. *Ardea* 98: 145–154.

Carl Mitchell

Protection for Hvanneyri, Iceland

Land near Hvanneyri in Andakíll in Borgarfjördur, west Iceland was declared a bird reserve by the Iceland Minister for the Environment, Svandís Svavarsdóttir, in February 2011. The new reserve was also nominated as a Wetland of International Importance under the Ramsar Convention, an international treaty for the conservation and sustainable utilization of wetlands. Bird hunting will now be banned in the area and drainage will be limited. The site is important for Greenland White-fronted Geese, one of the few European goose populations in decline.

David Stroud

Conservation and research news

13th meeting of the Goose Specialist Group

The Goose Specialist Group (GSG) of Wetlands International and the IUCN-Species Survival Commission seeks to strengthen contacts between all researchers on migratory goose populations in the northern hemisphere. Approximately annual meetings have been held since 1995 and at present about 400 people have joined the group.

The 13th meeting was held jointly with the Goose, Swan and Duck Study Group (GSDSG) of Northern Eurasia in Elista, Kalmykia (Russian Federation) between 24 and 29 March 2011. A report of the meeting is available at www.geese.org/gsg/ and more extensive information at onlinereg.ru/site.php?go=153&lang=ENG (English).

Excursion participants watching White-fronted and Red-breasted Geese near Manych Lake (Barwolt Ebbinge)

The scientific programme was in the capable hands of a team chaired by Aleksandr (Sasha) Kondratyev, and in addition to presentations about the distribution, flyways, abundance and systematics of waterfowl, special symposia were also held on hunting and game management, on waterfowl in arid ecosystems and on the impact of growing biofuels and land use change on waterfowl habitats. During the four conference days, there were 92 oral presentations and 27 poster presentations.

Because many Greater White-fronted Geese and Red-breasted Geese that winter around the Black Sea migrate in spring through Kalmykia to their Siberian breeding grounds, special focus was on these two species. Moreover, smaller but important numbers of Lesser White-fronted Geese also pass through Kalmykia. Problems with illegal hunting were extensively addressed as well as the topic of legal spring hunting and how this could be restricted in order to safeguard the future of migratory goose populations.

It was striking that three independent presentations from three different sites on the Taimyr peninsular all indicated an expansion of the breeding range of Red-breasted Geese, whereas the mid-winter counts of this species show a decline. Here, clearly more research and improved mid-winter surveys are needed to clarify whether indeed Red-breasted Geese are declining, or that simply many Red-breasted Geese are overlooked, because they have shifted their wintering sites once again.

The precarious situation of the seriously declining population of Taiga Bean Geese was also highlighted. Several contributions dealt with the wealth of resightings that are now accumulating through the network of observers that use the website www.geese.org, particularly for neck-banded Greater White-fronted Geese. Finally, a resolution was adopted to address all these topics and call for better protection of migratory geese and improved regulation of hunting in Russia.

Ingunn Tombre announced that the next GSG meeting will be organized by Paul Shimmings and Per Ivar Nicolaisen in Norway from 17-22 April 2012, with a special focus on Svalbard Pink-footed Geese and Barnacle Geese. For further details about the conference see the GSG website at www.geese.nl/gsg/.

Bart Ebbinge

Reproductive costs in long distance migrant geese

It has been known for some time that in many bird species parenthood is a costly business. This is particularly true for many species of waterfowl for which parental care may last for the majority of their juveniles' first year. This is far beyond that shown by most species of birds and it comes at a cost as Inger *et al.* (2010) recently discovered in the East Canadian Light-bellied Brent Geese as part of a long-term study by the University of Exeter/WWT/Irish Brent Goose Research Group/Icelandic Institute of Natural History.

In the autumn, when Brent Geese arrive in Ireland after their long migration from their East Canadian High Arctic breeding grounds they head directly for the vast intertidal areas found at Strangford Lough and other sites around Ireland which are rich in *Zostera*. As the winter progresses the birds deplete this food supply and switch to inland feeding on agricultural and recreational areas such as golf courses and parklands. The timing of this switch is, however, critical as the longer the birds feed on the eelgrass the better. Eelgrass has much higher digestibility and, consequently, the birds end up in better condition.

Up until recently, it has been assumed that the dominant family groups tended to monopolise the eelgrass for much of the winter, although this idea had not been tested. The authors set out to track the diet of the geese throughout the course of the winter using stable isotope analysis from blood samples, which can detect a chemical signature of what the birds have been eating. When the birds were caught for blood sampling, fitting coloured leg rings enabled them to be followed during the winter and to establish if the adults were parents or non-breeders. The results were something of a surprise as the authors found that, for much of the year, especially in mid-winter onwards, the diet of non-breeding birds and singletons contained more eelgrass than parents.

The reason why this seems to be occurring is that as the eelgrass becomes increasing sparse due to goose grazing, it becomes increasing difficult to find, unless you're an

experienced forager. The authors found that adults were able to maintain their intake rates even when the eelgrass became less plentiful. The juveniles however couldn't manage this, so the families switched to more abundant, but lower quality, inland grass earlier that the adults with no goslings.

The end result of all this is that, in general, parental adults end the winter in poorer body condition, and are less well prepared for the upcoming migration and subsequent breeding attempt, than non-breeders. Consequently, only a small proportion of adults breed in consecutive years, and so it seems that the cost of having a family in one year is that parents are less likely to be able to reproduce in the next year. One of the most important aspects of this work is that it highlights that not all habitats are equal for these geese and that it is critical that as much of their natural intertidal habitat is maintained as possible, which is good for the geese, and also local farmers and park keepers.

Inger, R, XA Harrison, GD Ruxton, J Newton, K Colhoun, GA Gudmundsson, G McElwaine, M Pickford, D Hodgson & S Bearhop. 2010. Carry-over effects reveal reproductive costs in a long-distance migrant. *Journal of Animal Ecology* 79: 974-982.

Kendrew Colhoun

Cultural inheritance and site fidelity in long distance migrant geese

Many animals show evidence of site fidelity, where individuals consistently use the same territory over time. Such fidelity can have several advantages, such as allowing individuals to hold a good quality territory or allowing them to inhabit an area where they have a good knowledge of food availability and predation risk. Since the ringing of East Canadian Light-bellied Brent Geese began back in 2000, it has become apparent that some individually marked geese are repeatedly seen in the same areas every year, suggesting that they might show some pattern of site fidelity between years. Harrison *et al.* (2010) set out to investigate the extent to which adult Brent Geese show site fidelity by looking at individual patterns of site use over multiple years. The authors found that the centre of an adult's home range changes very little between years, providing evidence that the geese consistently use the same territories.

As with most endeavours, answering one question usually gives rise to several new questions. In this manner, the researchers were curious about the mechanism that might drive Brent Geese to choose the sites that they use in such a consistent fashion. As with other goose species, Brent Geese show an extended period of parental care whereby the juveniles remain with their parents for their first year of life. The researchers wondered whether juveniles were using information from this first year of life to choose the sites they would use in adulthood. To answer this question, an extensive database of blood samples collected over many years was used to establish family relationships among birds by looking at genetic markers. These markers are inherited from parents and therefore some individuals possess certain combinations of these markers that are unique to a single family, allowing the researchers to assign them as related. The Irish Brent Goose Research Group sightings database was also used to identify family groups from field observations of associated adults and juveniles. Once a candidate set of family groups had been established, patterns of site choice of parents were determined and also that of their offspring once they too were adults (two years old or more) and could theoretically disperse as far or as short a distance as they liked. The results showed that in both the Irish wintering and Icelandic staging grounds, offspring consistently used sites in adulthood that were nearly identical to the sites their parents took them to when they were juveniles. This non-random pattern of site choice provides evidence that site fidelity is a culturally-inherited trait in the Brent, since information about migration routes is transmitted socially from one generation to the next. This has important consequences for the understanding of the migration ecology of the species. Because the pattern has been shown in both Ireland and Iceland, it reveals that migration routes between the two countries show high 'connectivity' - individuals that spend the winter together will also spend the spring staging together too. In doing so, some groups of individuals using one migration route may remain completely separate from another group using a different route. Knowledge of the separation of different sections of a population is vital for conservation efforts, since different groups may be more important in terms of their contribution to population growth and productivity and therefore would represent a priority for investment of finite resources.

Despite the high levels of site fidelity, roughly 10–20% of individuals do not use the sites they used as juveniles, and it is of great interest to discover what drives these birds to depart their 'juvenile sites'. It is often theorized that there should be a sex bias to dispersal in animal systems, where one sex consistently disperses more often, or further, than the other. However this research found no evidence of a sex bias, since both males and females seemed equally likely to leave their juvenile sites. One possibility is that mate choice, where birds form breeding pairs, is responsible. As the majority of the Brent Goose population stage at Strangford Lough at the beginning of the winter in late September/early October, this represents a point in the year where thousands of birds that are usually faithful to different sites around the coast of Ireland, and therefore isolated from one another, are present in the same location. It is possible that when birds pair up at Strangford Lough, one member of this new pair will abandon its juvenile site in favour of its partner's. Future work will focus on these 'unfaithful' individuals to try and determine the forces driving their decision to abandon the sites their parents showed them when they were young.

Harrison, XA, T Tregenza, R Inger, K Colhoun, DA Dawson, GA Gudmundsson, DJ Hodgson, GJ Horsburgh, G McElwaine & S Bearhop. 2010. Cultural Inheritance drives site fidelity and migratory connectivity in a long-distance migrant. *Molecular Ecology* 19: 5484-5496.

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