GREENLAND WHITE-FRONTED GOOSE STUDY

REPORT OF THE 2000/2001 NATIONAL CENSUS OF GREENLAND WHITE-FRONTED GEESE IN BRITAIN

Final report – May 2002

Tony Fox & Ian Francis
c/o Department of Wildlife Ecology
National Environmental Research Institute
Kalø
Grenåvej 12
DK-8410 Rønde
Denmark

SUMMARY

Due to the outbreak of Foot and Mouth Disease in 2001, only one complete census of Greenland White-fronted Geese was achieved in the season 2000/2001, covering all known wintering haunts and finding 21,148 birds in autumn 2000. These comprised 118 in Wales, 13,281 on Islay and 7,749 in the rest of Scotland. Counts were missing only from Jura in autumn. Regression models were used to predict the spring count 2001 on Islay from that of the autumn (11,508 ± 1680 birds, 95% confidence intervals) and for the rest of Britain (8,289 ± 1073, 95% confidence intervals). Hence, the total British spring count was estimated to be 19,797. Breeding success was well below the average for the last 15 years at 9.1 % young (n = 6,914 aged), mean brood size was 3.4 (n = 139 broods). Because the count from Lismore was omitted from the Benderloch local totals in the census from 1999/2000, this report also includes a corrected version of the census totals from that season. The new totals were 20,660 in autumn 1999 and 19,257 in spring 2000. Hence, the estimated count from spring 2001 represents a 2.8% increase over the previous year, rather more than the 1.8% increase in the autumn counts, which may reflect the method of calculation rather than a genuine increase in the population.

INTRODUCTION

The 2000/2001 survey was the nineteenth annual census of Greenland White-fronted Geese carried out in Great Britain by the Greenland White-fronted Goose Study. As usual, full censuses were attempted in autumn and spring to coincide with the International counts made concurrently in Northern Ireland and the Republic of Ireland and co-ordinated there by the National Parks and Wildlife Service from Dublin. Due to the outbreak of Foot and Mouth Disease in Britain, it was not possible to cover all the known sites in the spring of 2001. Hence, for the first time during this run of census counts, it was not possible to assess the numbers and distribution of Greenland White-fronted Geese in Britain or Ireland based on field counts.

Given that almost full coverage of all the known wintering sites was achieved in Britain in the autumn of 2000, we felt was very important that we made some attempt to generate an estimated population size for the spring of 2001. This is because in recent years, we have been convinced that we achieve fuller coverage during the spring count than in autumn, since geese tend to be more concentrated in spring. We also know from marked individuals that some geese may not arrive to their ultimate wintering site until late November or (more rarely) well into December. For this reason, we have used the spring count by preference as the point of reference for monitoring change in the population. Given the very high correspondence between the autumn count and the following spring counts in any one winter, we decided to use the historical relationship between these two measures to create an estimate for the spring 2001 count (see below). This proved a better method than the predictive power of modelling spring numbers on the preceeding spring total allowing for variations in breeding success in each year.

Table 1 shows the most recent total census data available to the present (based on the internationally co-ordinated counts from 1998/9, 1999/2000 and 2000/2001). The omission of counts from Lismore, Benderloch (Argyll) from the counts from 1999/2000, the full count database for that year is appended to this report, showing the modified correct values for that season. We cannot fathom how this count was omitted from the table, but apologise to all concerned for the error.

Table 1. Autumn and spring census totals for Greenland White-fronted Geese 1998/9, 1999/2000 and autumn 2000. The British total for spring 2001 (missing because of the outbreak of Foot and Mouth Disease) has been estimated based on the relationship between spring and autumn counts from previous seasons (see text for details). At the time of compilation, collation of count coverage for the rest of Ireland was incomplete, hence values in brackets use data substituted from 1998/99 to generate provisional global populations totals. Since numbers had declined on the previous winter in all other areas, this likely represents an overestimation of the true total. *Note the corrected value for the spring 2000 count due to the earlier omission of the Lismore count.

	autumn 1998	spring 1999	autumn 1999	Spring 2000	autumn 2000	spring 2001
Wexford	8568	8958	8019	8330		
Rest of Ireland	4184	4617	(4184)	(4617)		
Islay	12426	13560	13871	11201	13281	11508
Rest of Britain	7813	8438	6789	8056*	7787	8289
Population total	**32991**	**35573**	***(32863)***	***(31964)***		

ARRIVAL/DEPARTURE DATES

There were few very early arrivals in 2000, although the first report was of a single at Loch of Strathbeg on 3rd October. Most first records were in the middle of the month, e.g. 15 at Moine Mhor and 230 on Danna (14th), Benderloch (15th), Lismore (17th), Dyfi (20th) and Stranraer (27th). Last reports were 1st April (Dyfi), 12th April (Benderloch) and 23 April (Lismore).

COUNT TOTALS

As usual, those counts that were carried out presented here are based on the regular coverage of all known regular wintering sites organised by GWGS, but also incorporate counts carried out by Scottish National Heritage. Some data have been incorporated from the WeBS database managed by The Wildfowl & Wetlands Trust from Slimbridge, particularly counts of Greenland White-fronted Geese reported from elsewhere in Britain away from the regular wintering haunts.

A linear regression model of the relationship between spring counts based upon the preceding autumn count on Islay from the winters of 1992/3-1999/2000 explained 96% of the variation in spring numbers ($F_{1,17}$=171.2, P<0.001). On this basis, we estimate that there were 11,508 ($\pm$ 1680 birds, 95% confidence intervals) present on Islay in spring 2001. Similarly, a regression model for the rest of Scotland showed that variation in autumn counts explained 98% of the variance is subsequent spring counts over the same period ($F_{1,17}$=330.4, P<0.001). On the basis of this relationship, we estimate there were 8,289 ($\pm$ 1073 birds, 95% confidence intervals) present in the rest of Scotland in spring 2001. Hence, the total British spring count was estimated to be 19,797.

AGE RATIOS

Breeding success for Greenland White-fronted Geese from the summer of 2000 was well below average, the proportion of young being 9.1% among the aged samples, down on last winter's production figures (Table 2). The overall ratio comprised 8.2% young on Islay (compared with 14.9% average during 1982-1999, and 10.4% last year) and 11.2% in the rest of Britain (compared with 14.6% average during 1982-1999 and 8.0% last year). The mean brood size was 3.35 (see Table 2) based on 139 families sampled from a restricted number of sites. The average on Islay (3.48) was higher than the 1982-1999 average there (3.19). In the rest of Britain the average brood size was 3.24 in 2000.

Table 2. Summary of age ratio determinations and brood sizes for Greenland White-fronted Geese wintering in Britain 2000/2001.

SITE	% YOUNG	SAMPLE	MEAN BROOD SIZE	SAMPLE
Westfield, Caithness	17.4	86	2,5	6
Loch of Mey, Caithness	6.67	120	3,5	4
Coll	3.8	78	1.5	2
Tiree Kenovay	5.5	55	1.5	2
Tiree Balephetrish	14.2	63	4.5	2
Ardentiny, Lorn	0	17	-	-
Danna	8.6	140	2.8	5
Moine Mhor	0	15	-	-
Clachan, Kintyre[1]	8.3	218	3.0	5
Rhunahaorine, Kintyre[1]	13.5	747	4.04	25
Machrihanish, Kintyre[1]	12.9	417	4.15	13
Islay[1]	8.2	4725	3.48	60
Loch Ken	5.7	175	1.57	11
Dyfi Estuary	19.0	58	2.8	4
Scotland excl. Islay	11.15	2189	3.24	79
OVERALL	9.14	6914	3.35	139

[1]Details from Islay and Kintyre courtesy of Dr Malcolm Ogilvie

RESEARCH & CONSERVATION NEWS

Recent reviews of our knowledge had suggested that we knew very little about the autumn migration of Greenland White-fronted Geese. Certainly all the study projects to Greenland have returned home immediately after the birds regain their powers of flight. We therefore

know nothing about pre-migration fattening in Greenland, nor anything about the behaviour and feeding ecology of staging birds in Iceland in autumn. For this reason, we mounted a small reconnaissance expedition to Hvanneyri Agricultural University in western Iceland during 19th September to 5th October 2001 to get some feel for what happens at this, a very important staging area in spring.

We managed a daily field count of the entire farm at least once per day. Numbers held at 1,000-1,800 for most of the time, but peaked at 2,200 on 3rd October, although roost and day counts in the fields had fallen to 1,400 by the time we left on 5th October. At one stage shortly after the harvest, one single barley field supported over a thousand geese for a few days until the spilled grain was exhausted. Geese were moving about a great deal more than in spring, when they concentrate more upon feeding. Counts were often difficult, especially when the geese were feeding on the spilled barley because of frequent flights to and from the nearby lake to drink. The geese roosted on the adjacent fjord every night, and on almost every day, the birds were counted to and from the roost.

The team generated a remarkable 1100 resightings of 147 collared and 2 leg ringed birds whilst in the field (with probably a few more to come from notebooks). This was a magnificent effort over a short time, especially as this level of detail enabled the identification of arrival times and the rate of change in abdominal profiles in known individuals. It became clear that birds arriving late were thin on arrival but showed similar rates of fattening (based on changes in API scores). This is perhaps the first time we have been able to show that there is such asynchrony in arrival of individuals, yet similar rates of change in API. By the time we left, a number of collared birds had already disappeared. Whether these birds departed for the wintering grounds or slipped elsewhere within Iceland we did not then, of course, know. In fact, Alyn Walsh reported that eighteen Greenland White-fronted Geese had arrived on the Slobs on the night of 4th/5th October, and 25 were there on 7th October, but there were still only 507 by 24th of the month. The big arrivals finally came between 28th October and 2nd November 2001, quite late by recent standards. This was almost certainly due to the run of southerly winds that predominated through October 2001, presenting the geese with mild conditions during their stay in Iceland, but the disincentive of a headwind for making their departures southward.

We caught 76 geese in Iceland in all: 11 on 28th September, 17 on 29th, 26 on 1st October and 22 on 2nd October, the latter catch including a control of H4P, a goose captured first in spring 1999. All credit to Alyn Walsh and John Wilson for marshalling the team and doing such a fine, yet apparently effortless job, of catching, as well as finding time to do all the other things they achieved. Dr Ruth Cromie, from the Wildfowl & Wetlands Trust at Slimbridge, obtained blood and faecal samples from all the captured birds and carried out searches for external parasites as well. Ruth will be undertaking screening of the blood for internal parasites and diseases, so we should be able to compile a health profile for each individual. The capture of individuals again gave us the opportunity to calibrate our field scores of abdominal profiles (a field assessment of the degree of fat stores an individual is carrying) with body weight; this relationship appeared very similar to that we have been able to demonstrate in spring.

We have yet to carry out the final calculations, but the geese seemed to take the autumn staging period in a more relaxed fashion compared to the spring. In spring, the geese spent

81% of time feeding during the 12½-14½ hour day length, again, these are provisional figures, but in the autumn this was c.61% of time feeding during the 11-12 hour day. They spent a much greater time fighting, drinking, preening and sleeping than in spring. This was surely because (i) there is less imperative to get onwards than in spring and (ii) because the carbohydrate-rich foods they exploit to supplement the grass (e.g. the sedge, cotton grass, buttercup roots and barley) gives them a quick calorie fix not so available in spring. The interesting thing is that amongst the families, parental ganders spent 56% alert compared to 23% for females and 11% for the goslings, which spend an amazing 85% feeding. What is striking (er, but only based on n=20) is that the bigger the brood, the more alert the male becomes - this seems a bit counter-intuitive, but may represent a bigger investment to avoid losing, carelessly, young to a gyr falcon perhaps, of which we saw many towards the end. The eagles too, were more in evidence in the latter days, so it may be that the geese do have real problems with predators towards the end of the autumn staging period. It was a real thrill on the last day to watch a gyr falcon mobbing a short-eared owl over Hvanneyri whilst we were packing the cars!

One anomaly we were keen to investigate was why many more goslings are shot in Iceland during autumn migration than would be expected given the age ratio in the field. It is conspicuous that there has been an average of 36.5% young in the Icelandic hunting bag wing ratio data (range 25-48%) compared to 10.3% and 13.0% in field ratios at Wexford and Islay respectively (ranges 6.4-14.8; 6.2-19.7) during 1995-2000. This apparent discrepancy needed some explanation. It has always seemed unlikely that the young birds are "inexperienced" and "naive" towards hunters, and are therefore more "vulnerable", since the young are firmly associated with experienced adults, many of which will have experienced hunting first hand in previous seasons. Rather, we suspected that the over-representation of goslings in the bag was a result of the flock structure of the geese, since many families conspicuously feed separate from the very large flocks, which contain higher proportions of non-breeding adults.

It was therefore interesting to see that the geese left the roost on the morning flight in many small flocks, although they tended to return to the roost in the evening in much larger aggregations. Based on the roost counts from the morning of 5th October and the evening of 3rd October, 70% and 48% of all individual flocks numbered less than 9 individuals (we are not sure how representative these last two roost flight counts were, but they do not seem unusual in nature). This means that any hunter shooting at random at flocks coming in on the morning flight is more than twice as likely to fire at groups of less than 9 geese than those larger, simply on the basis of the frequency of encounter. The important thing to remember is that a large proportion of the small groups are family parties, usually parents plus goslings of the year, but often with associated adults (which we know from the collar scheme to be offspring from previous years). Indeed, from a small sample of the data that we have had time to work up, flocks of less than 9 birds contained on average 22% goslings (n=12 flocks) compared to an average of 6% in flocks above 8 birds (n=69). It does not take a genius to realise that if hunters encounter small flocks more often than large ones, and the small flocks contain a greater proportion of young that the larger groups, the family parties are more likely to be killed than would be expected. This is in spite of their general low frequency in the population as a whole.

As if this was not enough, our discussions with the hunters who kindly provided Ruth with her samples were further illuminating. They confirmed that geese are generally more

frequently shot on the morning flight by attracting geese in to decoys - such techniques only work in the morning, although they may be practised throughout the day. They stated that family parties were more likely to approach closely or alight at well placed decoys than larger flocks. Moreover, they stated that, unlike Greylags and Pinkfeet, if a White-front was downed from a small flock, it was very usual for the group to return back towards the hunters, apparently to search for the lost flock member. In this way, it is often possible to take more or all members of one social group. Such an effect would further exacerbate the selection for family members in the bag. In terms of the contribution to the breeding population, the loss of the goslings is of less importance than the loss of associated experienced adults. It would be interesting to speculate and to attempt to model the degree to which this phenomenon causes the loss, wounding or break up of successfully breeding pairs, and the consequences for this for the population dynamics of Greenland Whitefronts.

The project was a great success, and we learned a huge amount in a short time in Iceland. We are extremely grateful to all the participants of the trip and those who assisted at Hvanneyri, namely David Stroud, John Wilson, Alyn Walsh, Hugh Boyd, John Turner, Roy King, Rich Hearn, Ruth Cromie, Andy Douse, Ian Bainbridge, Morten Fredericksen and Carl Mitchell. We are grateful to the Icelandic Institute for Natural History for loan of the cannon-netting equipment and support and permission throughout, especially thanks to Ævar Petersen for all his help and support, Guðmundur Guðmunsson for help with the cannon-nets and Óli Einarsson for help with the catches. Our grateful thanks go to the University of Hvanneyri for the use of the farm and facilities as a base for the project. We especially thank Professor Björn Thorsteinsson for all the arrangements, and to him and Anna Guðrún Þórhallsdóttir for their hospitality, Guðmundur Hallgrímsson, the farm manager, for helping us well beyond the call of duty and to all members of staff for tolerating our presence there.

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