Greenland White-fronted Geese in Scotland

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The Greenland race of the Greater White-fronted Goose (*Anser albifrons flavirostris*) is a distinctive member of the Scottish avifauna. First separated as a race in 1949 by Sir Peter Scott and Christopher Dalgety, it remained little known until Robin Ruttledge and Malcolm Ogilvie documented the number and distribution of wintering flocks in Ireland and Britain in the late 1970s. Their review suggested that global wintering numbers had declined from 17,500–23,000 in the 1950s to 14,300–16,600 by the mid-1970s. Such was the concern raised then that the population was listed on Annex I of the European Union Birds' Directive and protected from hunting from 1982 in Scotland and Ireland.

As their name suggests, the birds nest in west Greenland. In autumn, the whole population migrates through Iceland, using regular staging areas in the south-west of the country, and arrives at wintering grounds in Scotland and Ireland usually in early to mid-October. The two principal sites in winter are Wexford Slobs in Ireland, and the Isle of Islay in the Hebrides, together holding over two-thirds of the population. Other large Scottish flocks are found in Dumfries & Galloway, Kintyre, Tiree and Coll, with around a further 27 or so smaller winter groups, scattered across the west and north of Scotland. The distribution is highly oceanic, linked to ancestral peat bog habitat, and though now they feed most commonly on improved grasslands, there is usually a link to a traditional peat bog or loch roost site. In mid-April, the birds return once more to Iceland, staging there before moving back to the Greenland breeding grounds in May.

In the late 1970s, the Greenland White-fronted Goose Study Group was established, and one of its first actions was to establish a network of counters to cover all known wintering sites in Great Britain, mainly through the efforts of David Stroud. This network has continued to report annually on the numbers of the geese, their breeding success and a great deal more at each known regular wintering site. The annual census is now organised by the authors, and funded via a sub-contract from the Wildfowl and Wetlands Trust as part of their Joint Nature Conservation Committee contract to supply waterfowl monitoring services to government. There is a similar count network in Ireland, where the government National Parks and Wildlife Service has also been cannon-netting geese mainly at Wexford and marking them with neck-collars. This effort, together with geese caught in Iceland and Greenland, and satellite tracking projects in conjunction with the National Environmental Research Institute in Denmark, has greatly contributed to our understanding of the geese over recent years.

Population changes over the last twenty years

Following the removal of hunting mortality, numbers of Greenland White-fronted Geese increased immediately in Ireland and Britain. Thanks also to a run of good breeding years in the 1980s, numbers rose to peak in the late 1990s (Figure 1).

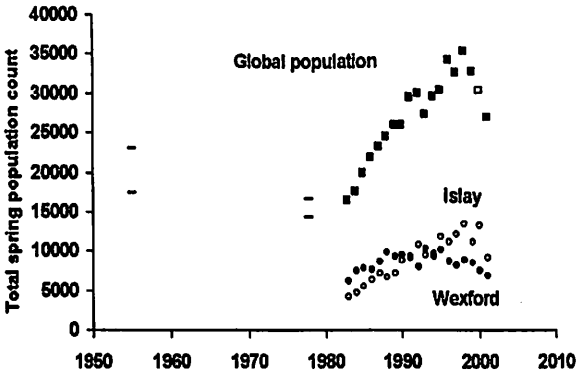

Figure 1. Changes in abundance of Greenland White-fronted Geese since 1950. The values for the mid-1950s and late 1970s are the upper and lower limits estimated by Ruttledge & Ogilvie. Solid squares indicate the annual spring counts from the international census each year since spring 1983 (the open symbol for spring 2000 represents the value estimated from the autumn count in that season following the cancellation of the census due to the Foot & Mouth outbreak). Counts for Wexford Slobs and Islay are shown separately, to highlight the earlier peak and decline at Wexford compared to Islay.

However, after reaching 35,500 at that time, numbers have now fallen back to less than 27,000 in winter 2001/2002, and this recent decline has been abrupt. Numbers on Islay have continued to increase, but show signs of stabilising in the last five winters or so (Figure 1). In contrast, numbers at Wexford Slobs stabilised and started to decline as long ago as the mid-1990s.

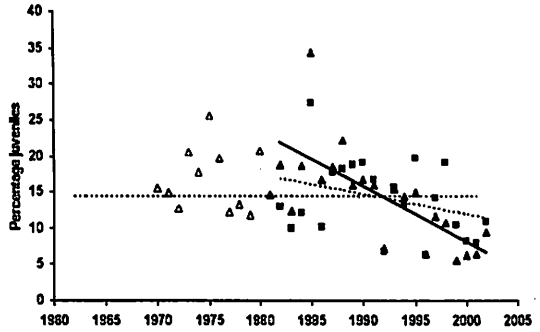

Figure 2. Graph of the percentage of birds of the year sampled at Wexford (triangles) and Islay (squares). Open symbols indicate prior to protection, solid symbols after. The heavy solid line shows the significant regression line that defines the decline in breeding success with time at Wexford since 1982. The trend on Islay is similar (dotted line) but fails to attain statistical significance. Note the percentage of young at both sites falls well below the overall average (horizontal pecked line) in the last four seasons.

So why the recent decline in Ireland? Annual adult survival appears constant, and based on the movements of collared birds, we know that emigration from Wexford to other winter resorts is no higher now than in previous years. As well as just counting the birds, the international monitoring programme samples the proportions of young in the population at as many winter resorts as possible (first-winter birds lack white on the face and black bars on the belly). Analysis of these data show a long-term decline in the percentage of young birds returning to Wexford, and a similar trend (although not statistically significant) on Islay, since protection (see Figure 2). Breeding success among birds which winter at Wexford has been below average in eight out of the last ten years, such that numbers of new recruits fail to replace annual losses in the population in many recent years. Simple mathematics can show that this has caused the stabilisation and decline in numbers at Wexford, and the same general pattern is almost certainly responsible for the decreases throughout the wintering range. Information from the collared birds shows that in the 1980s, known-aged geese captured at Wexford bred on average at just over three years of age, compared with nearly six years in the 1990s. Overall, less than 5% of young birds

hatched in the 1990s survive to breed at all compared to over 20% in the early 1980s. For some reason, it is becoming increasingly difficult for young geese to breed at all.

The reasons for these declines in reproductive success are not clear. One possibility, as has been suggested for Barnacle Geese feeding on improved agricultural habitats in Helgeland, western Norway (en-route to breeding areas in Svalbard), is that they may fail to lay down sufficient nutrient stores for onward migration and successful reproduction because the diet is lacking in essential ingredients. By contrast, Barnacle Geese using semi-natural habitats breed more successfully because their diet does supply adequate nutrition. We know that in the last 20–30 years, many White-fronted Goose flocks have shifted from boglands and semi-natural habitats to feed more and more on autumn stubbles and intensively managed grassland. So could Greenland White-fronted Geese be suffering from the effects of too much 'junk food'? We think not. If you look at the breeding success amongst different wintering flocks during the 1980s and 1990s when the population was expanding, the proportions of young were highest in those flocks associated with intensive agricultural land, and quite clearly lowest amongst bog-feeding flocks.

Another possibility is that after a period of increase in overall number, some finite resource (such as spring staging areas or gosling rearing habitat) is limiting the numbers of geese able to breed successfully - perhaps increasing numbers have now reached some kind of carrying capacity with regard to summer habitat? However, if this were the case, we would begin to see the reproductive success pick up again as the numbers of birds have fallen, but this has not been apparent, so it is hard to be convinced that local density is causing the problem.

Weather also plays a role – geese return with most young following summers with an early spring thaw and warm temperatures. Five out of the last six summers have been cool in west Greenland which has contributed to the run of poor production of young everywhere. However, weather has a greater effect on those geese breeding in the north of range, where the spring is late, and autumn comes earlier, than further south. Satellite tracking and ringing recovery data confirm that birds nesting in the milder south of the Greenland breeding range tend to winter in Scotland. Here, the longer season enables geese to delay laying if necessary in late springs, but still breed successfully. In the north of the range, late springs and a shorter season mean we would expect birds breeding there to suffer more from poor breeding success in late springs than those further south. Since Wexford and southern wintering flocks tend to breed in the north of the nesting grounds, this fits with observations that show that these geese, lacking the buffer of a longer season, have shown earlier and more serious declines in production. However, there have also been some mild springs and summers in very recent years, and yet the population has still bred rather poorly. Indeed, amongst the Wexford flock, the statistical relationship between breeding success and weather conditions on the breeding grounds in June seems to have broken down in recent years (although it still seems to hold for Islay wintering birds). Hence, whereas it did seem in the recent past that spring and summer weather on the breeding grounds was a major

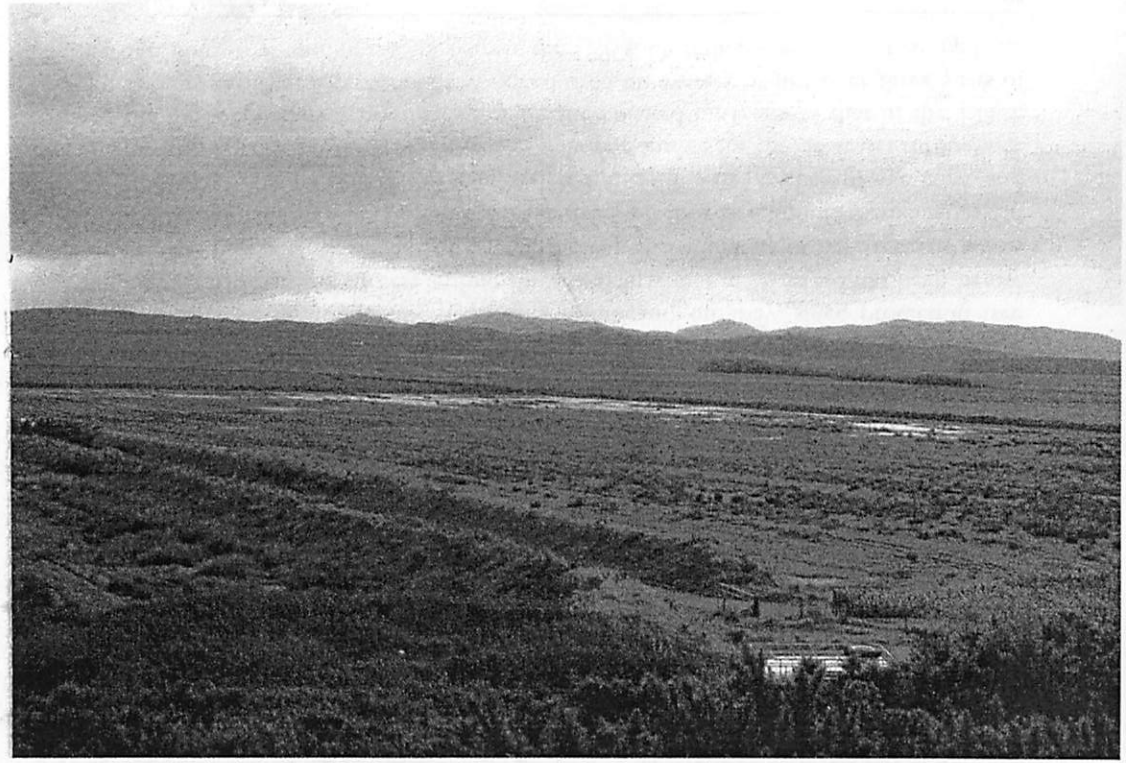

Plate 145. Loch Gruinart RSPB reserve, Islay - a major feeding area also used for roosting (*Ian Francis*).

limiting factor for all Greenland White-fronted Geese, it looks like some other factor may now be exerting a greater influence on limiting reproductive output.

This factor might be the substantial and rapidly increasing number of newly colonising Canada Geese of the *interior* race now breeding in west Greenland. The White-fronted Goose was formerly the only common goose species nesting in west Greenland. Despite the fact that White-fronts and Canadas co-exist throughout parts of the Canadian arctic, studies show that Canada Geese are behaviourally dominant over White-fronted Geese in Greenland; so much so that White-fronted Geese have almost disappeared from one study area where Canada Geese continue to increase. At present, we cannot judge the scale of this effect, but the rapid spread of Canada Geese strongly suggests that inter-specific competition could be contributing to falling breeding success amongst Greenland White-fronted Geese.

We need to carry out more surveys of the west Greenland breeding areas, to repeat the aerial census carried out in 1999 by a consortium from Cornell University and Ducks Unlimited in the US and the National Environmental Research Institute in Denmark. That survey found that the two geese species tended to occur apart more often than was predicted by chance, suggesting for whatever reason, the two species avoided each other. A repeat aerial survey, although very expensive, would confirm whether or not Canada Goose numbers have continued to increase and expand in range at the expense of Whitefronts.

Quite what we can do if it does prove to be the Canada Geese that are affecting White-fronted Goose breeding success, will, of course, be an interesting question! We know from our neck-collaring and satellite tracking studies that the Canada Geese that breed in west Greenland winter along the eastern Atlantic flyway in the US from New York/New Jersey down into Delaware. Hence, any actions will necessitate international co-ordination between Europe, Iceland, Greenland, Canada and the United States. We urgently need the resurrection of the Flyway Management Plan drafted in 1992 by David Stroud with the support of Wetlands International, which specifically aimed to engage all the range states in a collaborative plan to safeguard the population. Hopefully, if we can find the political will, we can try and get the governments back around the table (as happened in Wexford in 1992 at a workshop organised by the National Parks and Wildlife Service). The RSPB has also signalled its strong interest in helping the population, and is developing an approach to the European Union for funding to support conservation of the population, hopefully in the coming year or so. We hope that this difficult conservation problem can be solved, so ensuring the future of one of the world's scarcest populations of geese.

Map 1. Distribution of wintering Greenland White-fronted Geese in Britain and Ireland.

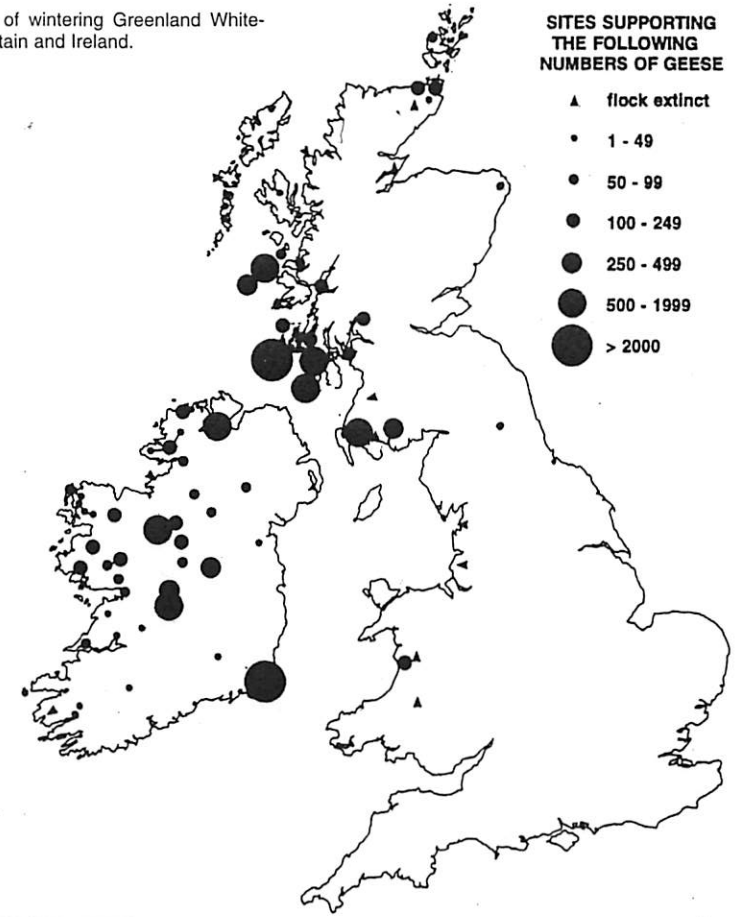

Plate 146. Greenland White-fronts on Icelandic staging grounds (*Ian Francis*).

We are fortunate in having generally good annual coverage of all known British winter resorts, but we always have difficulty covering the island of Muck, several of the Argyll flocks and in very recent years the Mull and Stranraer flocks as well. So if you would like to join the network, or particularly are able to provide counts from these or any other sites, do please get in touch. We welcome any counts at all from any site, and we are very grateful indeed to the network of counters who, over the years, have provided an enormous amount of information. Greenland White-fronts tend to winter in some of the most attractive and interesting parts of Scotland, so we would encourage all birders to go out and find them, enjoy them – and even better, pass on the counts and sightings to us!

Where do Greenland White-fronted Geese occur in Scotland and how can you see them?

The map shows all the locations where the geese are found in Scotland. Most are found on Islay with good numbers on Tiree and Coll, and smaller flocks on several other islands. Some of these are hard to find and count, and the same can be true of small flocks in Wester Ross, such as those on Ardnamurchan and near Plockton, and also further south on Lorn near Oban. In the north, there are scattered flocks in Caithness and two on Orkney, though they are not now present on Shetland or at Loch Eye in Easter Ross. Scattered migrants and irregularly visiting birds can be seen at a number of major goose haunts in the east and north, with Loch of Strathbeg being the most regular. However, perhaps the most accessible sites for most birders are in south-west Scotland, from Danna near Lochgilphead, to Rhunahaorine Point and at Machrihanish (both on Kintyre, where they are easy to find), and at Loch Ken and Stranraer in Dumfries & Galloway. A regular flock of several hundred birds at Endrick Mouth, Loch Lomond can be surprisingly hard to track down.

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