Numbers of Light-bellied Brent Geese *Branta bernicla hrota* staging in Iceland in spring

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Light-bellied Brent Geese that stage in west Iceland in spring were censused in mid May 1974, 1986, 1990, 1995 and 1996. The results are compared with censuses from the winter range of this population, in Ireland. In 1974 about 7,200 Brent Geese were recorded, in 1986 they totalled at least 15,700, in 1990 13,800, in 1995 15,900 and in 1996 17,400. Numbers each spring were about equally split between the bays Faxafloi and Breidafjördur, but the distribution in Faxafloi shifted considerably south during the period.

Key words: Light-bellied Brent Goose, Iceland, Staging, Migration

Light-bellied Brent Geese *Branta bernicla hrota* have long been known to occur in relatively large numbers along the west coast of Iceland in spring and autumn (Saemundsson 1936, Gardarsson 1975). The subspecies is based on the description of *Anas hrota* from Iceland in 1776 by Müller who used a local Icelandic name, hrota, for the species.

During the past two decades counts of Brent Geese have been made on the west coast of Iceland on several occasions, incidental to other biological surveys, and three aerial surveys have been conducted in spring with the Brent Goose as the main target species.

The purpose of this paper is to outline the distribution and abundance of the Brent Goose on the spring staging grounds in west Iceland. The numerical results are compared with censuses from the winter range of this population, which is almost entirely in Ireland (Maltby-Prevett *et al.* 1975, O'Briain & Healy 1991).

Methods

Brent Geese are well visible from low flying aircraft, as are staging flocks of most goose species. The chief sources of error in this study are: (1) the timing of the surveys in relation to the timing of migration, i.e. birds may be missed because they are still on the winter grounds or in transit to the staging localities (probably none had begun to leave for the high arctic when the censuses took place), (2) geographical coverage in Iceland, (3) birds missed within areas covered, mainly because they flew off at a long distance or rose above the plane, or did not fly up from habitats where the background did not contrast with the geese, and (4) inaccuracy of counts when dealing with very large flocks (as in two localities in 1986); we tried to reduce this by photography and by making repeat counts.

Most of the surveys and censuses took place from low flying aircraft. A variety of high-winged aeroplanes were used, including Supercup in 1974, Cessna 182 Skylane in 1986, Cessna 337 Skymaster in 1990 and 1995, and Partenavia in 1996. The best results for geese were obtained when flying at about 500-800 feet, but flocks were well visible from much higher

altitudes. When flying at about 200 feet, some geese were seen to fly above the plane and it seems likely that such birds were missed.

A preliminary aerial survey of the west coast of Iceland in May 1973 yielded general information on the distribution of Brent Geese, though only about 3,000 birds were recorded. Aerial surveys on 14 May 1974, 8 May 1986, 14 May 1990, 15 May 1995 and 15 May 1996 covered nearly all localities where Brent Geese were known to stage in numbers (cf. **Table 1**). In 1986 the important mudflats Grundarfjördur-Hraunsfjördur were missed. The 1990 survey, which included almost the whole coastline of Iceland, was aimed primarily at waders (Gudmundsson & Gardarsson 1993) and was flown at very low altitudes (50-200 feet). This probably led to low estimates of Brent Geese, at least in some of the Faxafloi localities, and we therefore repeated the counts there on 22 and 24 May and use the latter figures here. In some cases the aerial surveys were supplemented by ground counts. Geese staging at Alftanes and other localities near Reykjavik were always counted from the ground. The timing of staging was established by repeated counts at Alftanes in April-May.

Results

In three years, 1986, 1990 and 1995, the timing of surveys could be compared with repeated counts in the southernmost staging area, Alftanes (**Figure 1**). All three surveys were within the period of peak numbers at Alftanes. Counts in Dublin Bay, Ireland, in 1985 (O'Briain 1986), indicate that almost all the birds had left the wintering area in mid May (**Figure 1**), though it seems possible that as much as 10% of the population might still have been in Ireland at the time that our surveys took place.

In 1974 only about 7,200 Brent Geese were recorded in Iceland, in 1986 the total was at least 15,700, in 1990 13,800, in 1995 15,900, and in 1996 17,400 (**Table 1**). The Northwest Breidafjördur was not covered in 1974 and 1986, but this area of many

Table 1. Numbers of Light-bellied Brent Geese seen in May 1974-1995 at main staging localities (cf. Figure 2) in Iceland. Zero-counts are shown with 0, hyphens are used when a locality was not covered.

Year	1974	1986	1990	1995	1996
Date[1] (May)	14	8	14	15	15
Locality					
1. Stokkseyri	–	–	8	–	–
2. Osar	–	–	30	–	2
3. Njardvik	–	–	5	–	0
4. Alftanes-Seltjarnarnes	205	600	931	1064	1334
5. Laxarvogur	0	40	259	60	395
6. Grunnafjördur-Blautos	0	1290	1678	4983	4980
7. Hjörsey-Straumfjördur	2240	950	2793	207	480
8. Tradir-Vogur	570	0	153	100	170
9. Akraos	153	4000	1398	595	730
10. Löngufjörur	390	250	830	16	1280
11. Brimilsvellir	–	–	7	4	0
12. Grundarfjördur-Hraunsfjördur	1042	–	2120	2461	505
13. Hofstadavogur	2015	7310	769	3286	1221
14. Vigrafjördur-Hvammsfjördur	560	1218	2604	3013	6249
15. Northwest Breidafjördur[2]	–	–	250	120	70
Total	7175	15658[3]	13835	15909	17416

1) The date is that on which the main aerial survey took place.
Alftanes and neighbouring areas were counted on the ground within a few days of this date. Laxarvogur was counted on the ground on 21 May 1986. In 1990 the numbers used for Grunnafjördur and Hjörsey-Straumfjördur are from repeat aerial surveys on 22 and 24 May.
2) Coverage of Northwest Breidafjördur was incomplete except in 1990.
3) Total in 1986 was presumably underestimated, since Grundarfjördur-Hraunsfjördur was not covered.

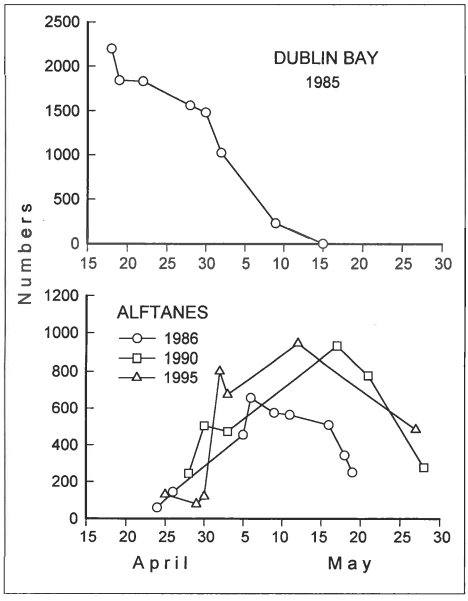

Figure 1. Numbers of Light-bellied Brent Geese in spring in Dublin Bay, Ireland in 1985 (O'Briain 1986) and at Alftanes, Iceland in 1986, 1990 and 1995.

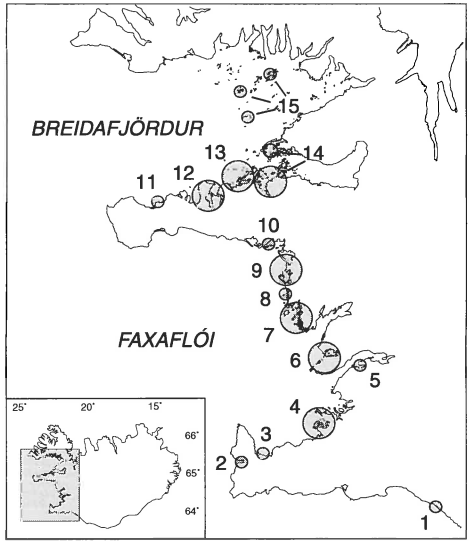

Figure 2. West Iceland, showing localities where Brent Geese were found staging in 1974-1995. Numbers refer to sites listed in **Table 1.**

islands and extensive intertidal areas was unlikely to have held more than 100-300 Brent Geese. In 1986 Grundarfjördur-Hraunsfjördur was omitted and this may have resulted in relatively large numbers (perhaps 1,000-2,500, cf. **Table 1**) being missed in that year.

In all years numbers were about equally split between the two large west coast bays, Faxafloi and Breidafjördur, but on a finer scale the distribution shifted considerably. At the southernmost locality, Alftanes, numbers increased during the period, from 200 in 1974 to over 1,300 in 1996. At the same time Brent Geese were seen with increasing frequency in adjacent areas, such as Kopavogur and Seltjarnarnes. In 1974 no geese were seen in Laxarvogur and Grunnafjördur, including the nearby Blautos, along the southeastern shores of Faxafloi. Flocks of Brent Geese were spotted in Grunnafjördur in spring 1978 and by 1995 the total in these localities had risen to about 5,000. Recently, numbers declined along the northeast coast of Faxafloi (Myrar), from Hjörsey-Straumfjördur to Akraos, from about 5,000 in 1986, to 900 in 1995.

Only small numbers were seen on the extensive shoreline and numerous islands of Breidafjördur north of the nearly continuous area of distribution along the southern shores of the bay (**Figure 2**). The largest flocks were found at Flatey (up to 120, in 1995) and Svefneyjar-Hvallatur (160 in 1990), and 20 birds were found in Bjarneyjar in 1990.

Although Brent Geese are regularly seen on passage in southwest Iceland, south of Alftanes, there are apparently no previous records of their staging there. In 1990, when coverage of the coastline in May was nearly complete, we found eight birds at Stokkseyri, 30 at Osar and five at Njardvik. No Brent were seen in repeated counts at Njardvik in 1996 and it is is not certain that Brent Geese use these localities regularly or for extended periods.

Discussion

The censuses of staging Light-bellied Brent Geese in Iceland in May can be compared in two years, 1974 and 1986, with peak counts in Ireland in the preceding winter. In winter 1973-74 the peak number in Ireland was 16,140 and in 1985-86 it was 24,100 (Hutchinson 1989). Biases are inherent in both sets of total counts, the Irish winter totals are apparently sums of peak numbers and the Icelandic counts may miss birds that arrive late or stage outside the main localities. Furthermore our count in 1986 was probably an underestimate. The difference between total peak counts in Ireland and the May census in Iceland should be interpreted as a result of (1) difference in methods, the Irish counts may lead to an overestimate and the Icelandic counts are probably minimum estimates, and (2) the survival rate from winter to spring. For this reason it is premature to attempt to estimate winter losses of the population from a direct comparison of census results, but this may become a realistic aim of more refined counts in the future.

The counts of staging birds in Iceland, combined with the Irish counts, do not contradict the conventional wisdom that all or nearly all the population of Light-bellied Brent Goose wintering in Ireland stages in western Iceland in May. It would appear that censuses in this area provide a reasonably good index of the size of the population immediately before the birds depart for their high arctic breeding grounds. The Icelandic counts also track peak counts at Strangford Lough: 10,800 in 1973-74, 15,900 in 1985-86 and 12,400 in 1989-90 (Prater 1975, Ogilvie 1986, Kirby 1991).

The distribution of Brent Geese staging in western Iceland in May coincides with areas of large tidal amplitude (Ingolfsson 1975), extensive mudflats with relatively abundant *Zostera,* and large expanses of *Puccinellia* saltmarsh. Moreover the west coast of Iceland is situated relatively close to the breeding grounds in high arctic Canada (Maltby-Prevett *et al.* 1975, Alerstam *et al.* 1990, Gudmundsson *et al.* 1995). Presumably this combination of habitat features determines the distribution of the Brent Geese staging in Iceland.

The reason for the recent shift from Myrar to more southern staging localities in Faxafloi has not been explained. The large bay between Hjörsey and Straumfjördur is a traditional haunt of Brent Geese and Whooper Swans *Cygnus cygnus.* Moulting numbers of the latter, which in some years reach over 2,000 birds, seem to alternate between this area and Vigrafjördur-Hvammsfjördur (Gardarsson, unpublished), and it may well be that both species are responding to local changes in the food supply.

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