



## An assessment of breeding success in the Dark-bellied Brent Goose *Branta b.bemica* in 1994

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### SUMMARY

The proportion of juvenile Dark-bellied Brent Geese present in Britain in autumn 1994 was 5.8%, thus revealing a low level of breeding success. Between September and December 1994, some 85,310 geese were aged at 17 estuaries in Britain. Average brood size was just over 2 juveniles per pair overall.

### INTRODUCTION AND METHODS

Britain has long been a major wintering area for the Dark-bellied race of the Brent Goose *Branta b. bemica* and therefore has a special responsibility for these geese under international legislation (Stroud *et al.* 1990) and as a Red Data Book Species (Batten *et al.* 1990). Information is gathered not only about the abundance and distribution of Brent wintering in Britain (e.g. Mitchell & Cranswick 1994) but also on age-ratios (e.g. Mitchell & King 1994) through which estimations of the annual recruitment and survival can be made.

For the eleventh consecutive autumn, the breeding performance of Brents was assessed by experienced voluntary observers. First year (young) Brent Geese have white edges on the wing coverts which is lacking in older birds. With a telescope and under good light conditions ageing is feasible from 400m. Sample sizes are variable being determined by flock size and field situations. To determine brood size, distinct groups, composed of two or sometimes one adult plus one or more juveniles, recognised, for example, by spatial separation from other birds or a common activity such as walking or swimming together have been regarded as a family. Counts were made between 14 September and 2 December. Observers were asked to note the location, date, time, and habitat for all observations and the sizes of flocks, number aged, total number of juveniles and brood sizes.

### RESULTS

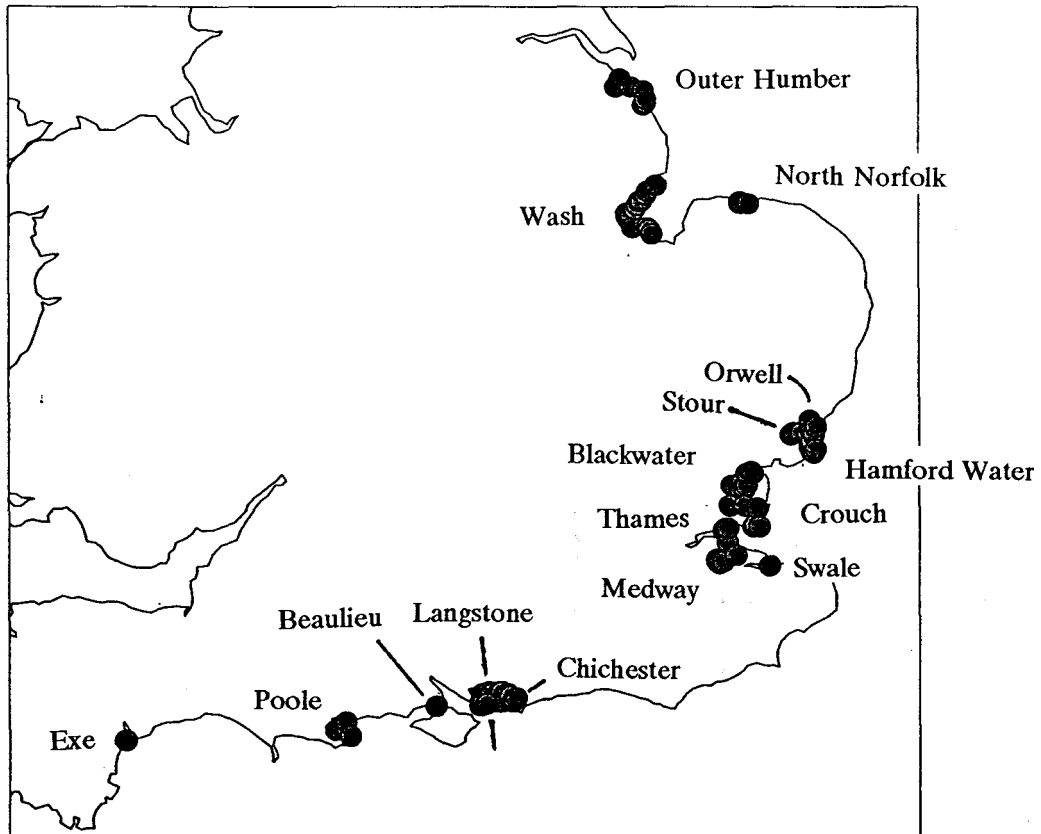
The aged samples are summarised overleaf on a site by site basis (Table 1). Of 273 counts made, nine were made in September, 29% made in October, with the majority (67%) being recorded in November and one count made in December. Including multiple observations (e.g. double counts) a total of 115,347 geese were counted and, of these, 85,310 were aged (an increase of over 50% compared with 1993). These contained 4,925 young, a proportion of 5.8%. Geese were aged on 273 occasions at 95 coastal localities within 17 estuarine sites from Humberside to Devon (Figure 1).

As in the last successful season (1993) there was regional variation. In 1994, this ranged from 2.7% young recorded on the Beaulieu and the Stour to over 16% at Hamford Water and on the Medway although it is worth noting the relatively small sample sizes of geese aged at all of these sites. A juvenile proportion of nearly 43% was recorded at Portsmouth although this was based on a sample of only 28 birds.

Table 1. Numbers of Dark-bellied BrentGeese counted and aged at 17 British estuaries in autumn 1994 and their distribution of flocks across habitats.

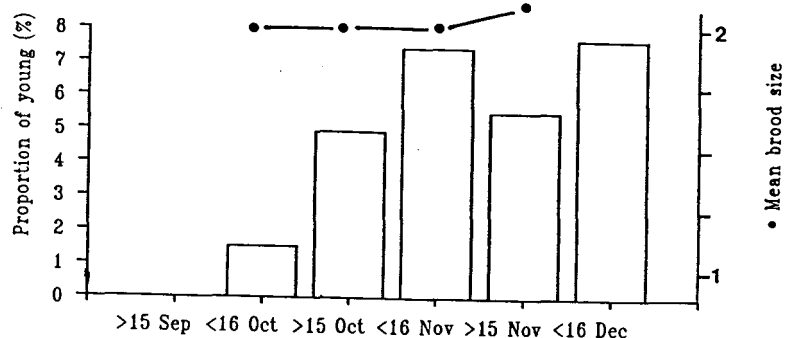
Estuary (see Figure 1)	Counts			No. toea- -lities	Total Count	Total aged	No. young	% Young	Mean Brood size	% Distribution across habitats				
	First	Last	No.							Water	Mud	Marsh	Grass	Cereal
Beaulieu	22 Sep	7 Nov	9	1	1879	1879	50	2.7	-	100				
Blackwater	3 Oct	30 Nov	18	9	28171	22010	1525	6.9	2.09	13	1	86		
Chichester	8 Oct	28 Nov	20	18	8651	8256	405	4.9	1.86	52	0.3	32	0.7	
Crouch	24 Oct	21 Nov	3	3	2115	2115	129	6.1	2.50			40	60	
Exe	25 Sep	9 Nov	3	1	1528	1023	64	6.3	1.71	100				
Hamford Water	14 Sep	25 Nov	10	5	1672	1603	259	16.1	2.36	13	16	9		62
Langstone	8 Oct	24 Nov	16	7	6804	6281	417	6.6	1.92	7.8	37	0.4	54.8	
Medway	7 Oct	24 Nov	5	5	652	565	102	18.1	2.14	28	12	52		8
North Norfolk	6 Nov	14 Nov	3	2	1502	1502	187	12.5	2.45			53		47
OtWell	26 Oct	16 Nov	3	3	703	703	47	6.7	4.5			16		84
Outer Humber	21 Oct	18 Nov	5	6	2142	2142	110	5.1	1.48		3	96		1
Poole	28 Oct	24 Nov	4	5	397	397	33	8.3	3.00		15		85	
Portsmouth	22 Nov	22 Nov	1	1	28	28	12	42.8	2.40				100	
Stour	30 Sep	30 Nov	11	11	2763	1948	52	2.7	1.63	5	89	6		
Swale	24 Oct	21 Nov	3	1	1959	1194	135	11.3	2.13			7		93
Thames	1 Oct	13 Nov	15	6	35306	14894	467	3.1	2.13		100			
Wash	27 Sep	2Dec	16	14	19075	18770	931	5.0	2.46		6	75	5	14
Totals	14 Sep	2Dec	145	98	115347	85310	4925	5.77	2.05	6	32	21	32	9

**Figure 1. The distribution of 9S coastal localities where Brent Geese were aged in 1994. The 17 estuarine sites referred to in the text are also shown.**



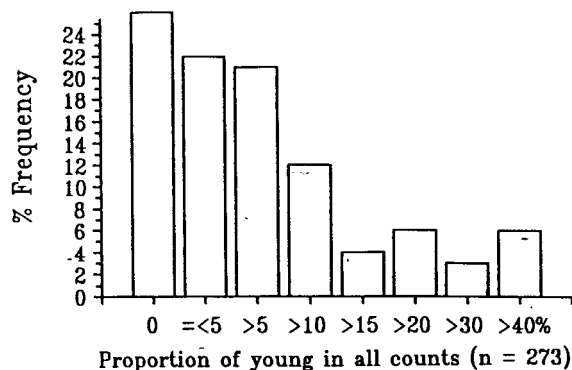
The overall proportion of young present in flocks increased between late October (4.9% young) and early November (7.4%) as would be expected - non-breeding geese tend to arrive in Britain a little ahead of the successful breeders and their young (Figure 2). Note, however, that the proportion of young counted decreased into late November.

The average brood sizes recorded in October and November were similar at about 2 young per successful family (Figure 2) and did not differ significantly between the two months ( $U=1629$ , ns, Mann-Whitney U-test). Most of the pairs recorded with young had either one (41%), two (29%) or three (18%) young with them. Very few large broods were noted - 15 pairs with five young, five pairs with six young and one pair with seven young were the only records.



**Figure 2. The proportion of young and mean brood size recorded during half-months (autumn 1994)**

There was variation in the frequency of the proportion of young recorded (Figure 3) - thus 26% of the age counts contained no young, 43% contained less than 10% young (excluding no young) and only 15% the age counts showed greater than 20% young. Note, however, that these values ignore the *number* of geese aged within each sample.

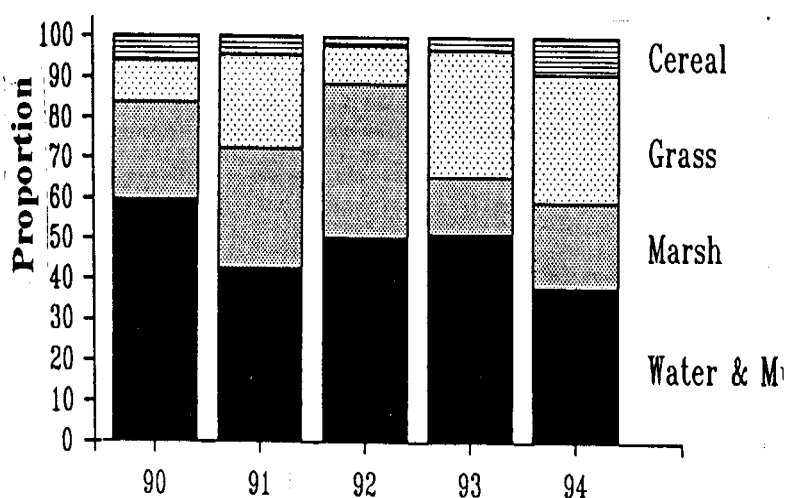


**Figure 3. The frequency of the proportion of young recorded in Brent Goose age counts.**

Geese were recorded in one of five habitat types - either water/sea, inter-tidal mud, marsh, grass fields or cereal fields. Sample sizes and locations varied and there was regional variation. However, nearly 60% were found on the first three categories (representing tidal estuary areas, note that water and mud often represent the same location but are tide dependant). The only areas where geese were found in any number on cereals were the Crouch, Hamford Water, North Norfolk, the Orwell and the Swale although sample sizes were small compared to other count areas.

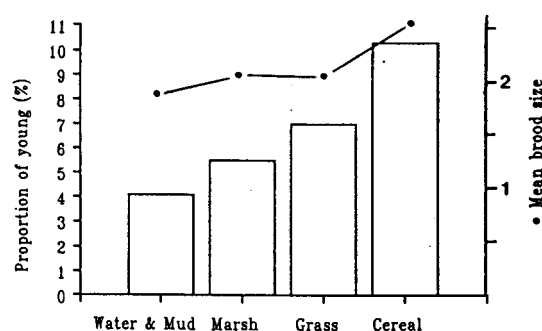
The distribution across habitat types for 1994 was similar to that recorded in 1993 when there were 18% young present. A comparison

between the proportion of Brent Geese on different habitats between 1990 and 1994 is shown in Figure 4. Grass fields appear to be increasingly favoured although few birds are recorded in cereals. Brent recorded on mud and water remain stable at between 35-60% and the occurrence of Brent on saltmarsh has varied between 14% and 38%. Care must be used when interpreting these data, however, since the same areas may not be checked each year.



**Figure 4. The proportion of Brent Geese on different habitats 1990-94.**

The proportion of young and mean brood size also varied with habitat type (Figure 5). Proportionally more young and larger broods were recorded on cereals and grassland compared with more estuarine habitats.



**Figure 5. Proportion of young and mean brood size on different habitats in 1994.**

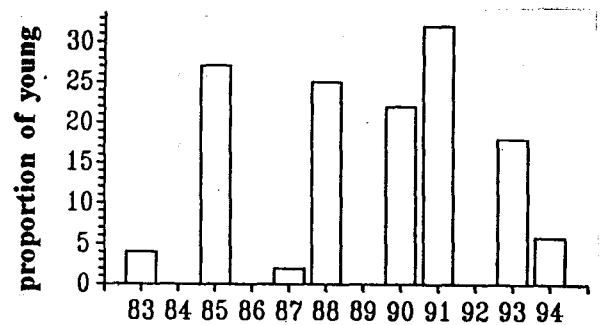
## METHOD LIMITATIONS

Counters were encouraged to check flocks whenever possible and, for sites with multiple records, no allowance has been made for possible repeat counting of individuals. The greatest number of counts from one site was 39 from Langstone Harbour and from one estuarine site being 63, also at Langstone Harbour. Thus, some repeat counting of the same geese is probably inevitable. A quick check was made on the usefulness of including all counts (including duplicates). The largest sample of aged geese was chosen from the 98 coastal localities irrespective of date. This showed an overall proportion of young of 5.2% (n= 34,433), reasonably similar to the value obtained by including all local counts. Thus, we argue that the sampling procedure used at the moment is adequate in estimating age ratios with reasonable confidence.

## DISCUSSION

The proportion of young present in Britain in 1994 is shown in comparison to the proportion recorded in each year since 1983 in Figure 6. The breeding 'failure' years occurring in 1984, 1986, 1987, 1989 and 1992.

The poor breeding success in 1992 was recorded for most other high latitude and Arctic breeding geese that wintered in Britain in 1992/93. Early indications from autumn age counts of other goose species indicate that 1994 was a productive year for some species.



**Figure 6. The proportion of young Brent Geese recorded in Britain in 1983-1994.**

However, in some years Brent Geese do not show a similar breeding success to other high latitude and Arctic-breeding geese. Breeding in 1994 is low compared to other species (e.g. Icelandic/Greenlandic Pink-footed Geese *Anser brachyrhynchus* = 24% young). Other populations of Brent Geese wintering in Europe have also shown low productivity. The Svalbard Light-bellied Brent Goose *Branta bemicla hrota* revealed 3% young (S.Percival pers.comm.) and the Canadian Light-bellied Brent Goose virtually completely failed to breed with only 61 young recorded in 11,269 birds aged (0.5% young, D Andrews & K.Mackie pers. comm.)

Information from the continent confirms our findings. An estimate of breeding success from Dark-bellied Brent Geese checked in The Netherlands indicated 7-10% young in October (B. Ebbinge *in litt.*). Unfortunately comparative data from Denmark is no longer collected (A.D. Fox *in litt.*) largely due to sampling biases associated with the timing of the passage.

The world population of Dark-bellied Brent Geese was estimated to be 298,000 in 1993-94 (I.Madsen, IWRB Goose Research Group), and the maximum British count from the Wetland Bird Survey was 125,000 (42% of world population, from Mitchell & Cranswick 1994). Assuming an average of 15% annual mortality (Summers & Underhill 1991) and 5.8% productivity in 1994 revealed by this study, the 1994-95 world figure should fall slightly to *c.*270,000. Salmon & Fox (1991) estimated that 40-60% of the world population can winter on British estuaries at peak depending on the severity of the winter, especially on the Continent. However, Mitchell *et al.* (1994) have indicated that despite the world population increasing tenfold between the mid-1960s and the mid-1980s the proportion counted in

Britain appears to be significantly declining. Thus the mid-winter 1994-95 count in Britain may well see between c.110,000 and c.160,000 using British estuaries (40-60% of the population) but will probably be closer to the lower estimate.

## ACKNOWLEDGEMENTS

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## REFERENCES

- Batten, L.A., Bibby, C.J., Clement, P., Elliot, G.D. & Porter, R.F. (1990) *Red Data Birds in Britain*. Poyser, London
- Mitchell, Carl, & Cranswick, P.A. (1994) Numbers of dark-bellied Brent Geese in Britain, January/February 1994. Report to JNCC. WWT, Slimbridge, 5pp
- Mitchell, Carl & King, Roy (1994) An assessment of breeding success in the Dark-bellied Brent Goose *Branta b.bemica* in 1993. Report to JNCC. WWT, Slimbridge, 8pp
- Mitchell, Carl, Kirby, J.S., Salmon, D.G., & Cranswick, PA. (1994) Monitoring Dark-bellied Brent Geese *Branta bemica bemica* in Britain 1988-1994. Proc. Int. Workshop Brent Geese in the Wadden Sea. Leeuwarden 1994
- Salmon, D.G. & Fox, A.D. (1991) Dark-Bellied Brent Goose *Branta b.bemica* in Britain 1976-1987. *Ardea* 79:327-330
- Stroud, D.A., Mudge, G.P. & Pienkowski, M.W. (1990) *Protecting internationally important birds sites: a review of the EEC Special Protection Area network in Great Britain*. NCC, Peterborough.
- Summers, R.W. & Underhill, L.G. (1991) The growth of the population of Dark-Bellied Brent Goose *Branta b.bemica* between 1955 and 1988. *J.Appl.Ecol.* 28: 574-585

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