

**The breeding success of
Dark-bellied Brent Geese in 2001,
as assessed in the UK**

A WWT/JNCC Partnership Report

This report should be cited as: Hearn, R.D. (2002) The breeding success of Dark-bellied Brent Geese in 2001, as assessed in the UK. WWT Report, Slimbridge. 9 pp.

Richard Hearn

The Wildfowl & Wetlands Trust
Slimbridge
Gloucestershire
GL2 7BT

August 2002



SUMMARY

A total of 123,672 Dark-bellied Brent Geese *Branta bernicla bernicla* was aged at 21 estuaries and coastal areas in Great Britain between September 2001 and March 2002. The overall proportion of juvenile birds present was 6.2%, varying between 0.6% in September and 12.0% in March. The mean brood size per successful pair was 1.80 young.

INTRODUCTION

Great Britain has long been a major wintering area for Dark-bellied Brent Geese. The UK Government has a special responsibility to safeguard this population under various international directives, agreements and conventions (Stroud *et al.* 1990): it is listed on category B2b of the African-Eurasian Waterbird Agreement, Appendix II/2 of the EU Birds Directive and Appendix III of the Bern Convention. As part of ongoing surveillance in the UK, information is gathered on the abundance and distribution of Dark-bellied Brent Geese wintering in Britain (e.g. Musgrove *et al.* 2001) and the breeding success (age ratios) (e.g. Hearn 2001), through which estimates of annual recruitment can be made.

METHODS

For the seventeenth consecutive winter, experienced voluntary observers assessed the breeding performance of Dark-bellied Brent Geese. Young Brent Geese (those in their first-winter) have obvious white edging to the wing coverts, which the adults lack. Using a telescope in good light conditions, ageing is feasible at distances of up to 400 m. To determine brood size, distinct groups composed of two adults and one or more juveniles that could be recognised by behaviour or spatial separation from other geese, were regarded as a family. Sample sizes were variable and determined by flock size and field conditions. Data were collected between 26 September 2001 and 28 March 2002. Observers were asked to note the location, date, time and habitat for all observations and the size of flocks, number aged, total number of young and brood sizes, although not all information was provided for all samples.

Counters were encouraged to check flocks whenever possible and no emphasis was placed on obtaining a co-ordinated census that avoided double-counting. Therefore, counts conducted at the same estuaries on different dates will have undoubtedly recorded some birds more than once.

RESULTS

Brent Geese were aged at a total of 121 localities within 21 estuaries or coastal areas on the English east and south coasts from north Lincolnshire to Dorset (Figure 1, Table 2). Of 372 flocks assessed, 2.4% were in September, 20.4% in October, the majority in November (40.9%), 21.8% in December, 8.3% in January, 4.3% in February and 1.9% in March. A total of 123,672 geese was aged (an increase of 35% on the number aged during 2000/01 and 43% on the 5-year mean). The largest numbers were aged at Langstone Harbour (36,817), the Blackwater Estuary (27,571), Chichester Harbour (21,178), the Thames Estuary (7,364), the Crouch Estuary (6,961) and The Wash (6,562). Sample sizes at all other estuaries were less than 4,000 birds. The overall proportion of young birds was 6.2% and, of 1,883 broods recorded, the mean brood size was 1.80 young per successful pair.

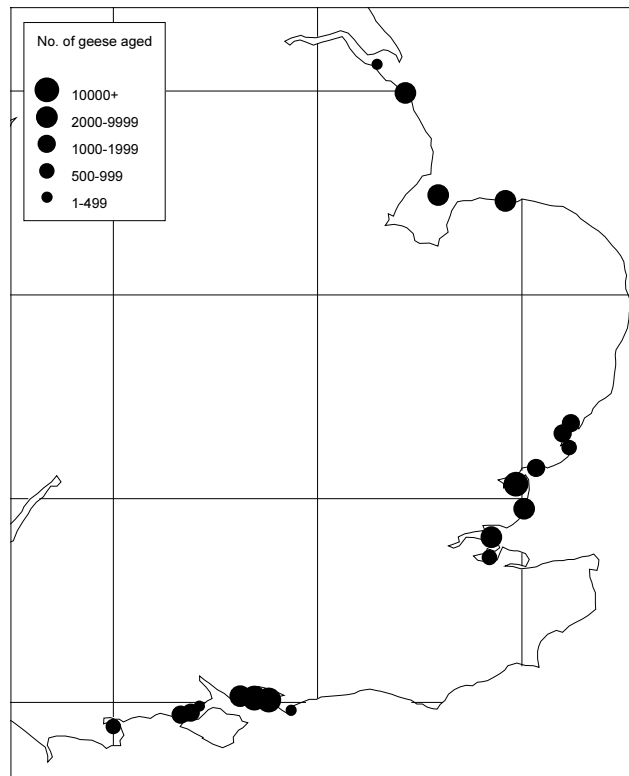


Figure 1. Sites at which Dark-bellied Brent Geese were aged during winter 2001/02 (Jersey not shown).

The average proportion of young present in flocks increased as the winter period advanced, from 0.6% in September to 2.7% in October and 6.0-7.5% between November and February, before rising to 12.0% in March (Table 1, Figure 2). During this period, the mean brood size of successful pairs varied little, although declined slightly between October and December, before increasing to a January peak of 2.2.

Table 1. The proportion of young and mean brood size of Dark-bellied Brent Geese in different months during winter 2001/02.

Month	Proportion of young (%)		Mean brood size		
	overall	n	mean	S.E.	n
Sep	0.6	2,078	1.9	0.40	7
Oct	2.7	15,393	2.1	0.09	158
Nov	7.0	47,913	1.9	0.04	938
Dec	6.3	35,710	1.6	0.03	651
Jan	7.4	12,710	2.2	0.15	73
Feb	6.4	7,906	1.6	0.11	57
Mar	12.0	1,962	-	-	-
Overall	6.2	123,672	1.8	0.02	1,884

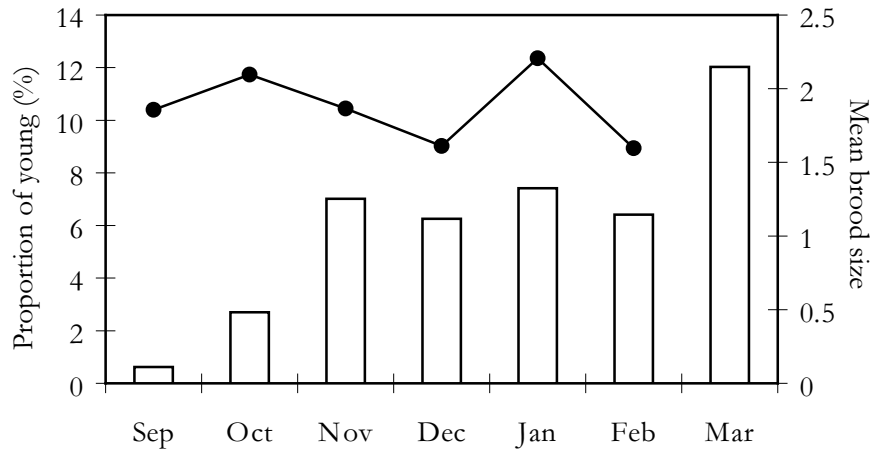


Figure 2. The proportion of young (bars) and mean brood size (dots) of Dark-bellied Brent Geese in different months during winter 2001/02.

Table 2. Numbers of Dark-bellied Brent Geese aged at British estuaries and coastal areas in winter 2001/02 and the distribution of flocks across habitats.

Estuary	Sample flocks		No. sites	Total aged	% Young	Mean Brood Size	Percentage distribution across habitats of aged samples					
	First	Last					n	Water	Intertidal	Marsh	Grass	Cereal
Beaulieu	27 Oct	17 Nov	2	151	[0]	-	100					
Blackwater	28 Oct	12 Mar	30	27,571	6.8	1.44		5			83	12
Chichester Harbour	6 Oct	7 Feb	49	21,178	3.7	1.89	14	9	4		70	3
Colne	17 Feb	18 Feb	2	1,069	6.8	-			36		64	
Crouch	3 Nov	5 Mar	8	6,961	8.3	1.4		9			38	53
Hamford Water	27 Dec	9 Mar	3	793	10.1	2		50			50	
Humber	27 Oct	14 Nov	3	174	[21.3]	2	62	38				
Jersey	24 Nov	15 Jan	4	202	[33.7]	3.23		34			66	
Langstone Harbour	29 Sep	28 Mar	140	36,817	7.0	2.03	27	12	2		58	1
Lymington	27 Oct	6 Feb	9	1,037	2.4	1.78		73			27	
Medway	22 Nov	22 Nov	1	896	9.5	-					100	
N Lincs Coast	30 Sep	6 Mar	15	2,136	6.1	1.54		60	21			19
N Norfolk	8 Oct	18 Dec	9	2,779	4.2	1.79		4	15		81	
Orwell	12 Nov	8 Jan	3	1,010	4.4	-	-	-	-		-	-
Pagham Harbour	16 Oct	16 Oct	1	28	[17.8]	2.5			100			
Poole Harbour	6 Nov	7 Mar	15	813	12.9	-		33	67			
Portsmouth H/bour	18 Oct	4 Dec	23	3,077	12.2	1.86	11				89	
Stour	27 Sep	6 Dec	23	1,944	1.9	1.61	45	36	1			18
Thames	28 Sep	30 Oct	9	7,364	2.9	2.18		100				
The Solent	3 Nov	6 Feb	8	1,110	11.7	1.98	17	9	7		67	
The Wash	26 Sep	13 Jan	15	6,562	5.5	1.96		6	67			27
Totals	26 Sep	28 Mar	372	123,672	6.2	1.8	12	17	6		57	8

Note: percentage young in square brackets are based on small sample sizes (less than 500 birds aged).

The proportion of young within individual flocks varied greatly (Figure 3), from 0% to 67% (not including a reported 'flock' of one juvenile). Most flocks (47%, n=174) contained less than 5% juveniles, and 66 of these contained no young at all. The number of flocks in each class decreased as the proportion of young increased.

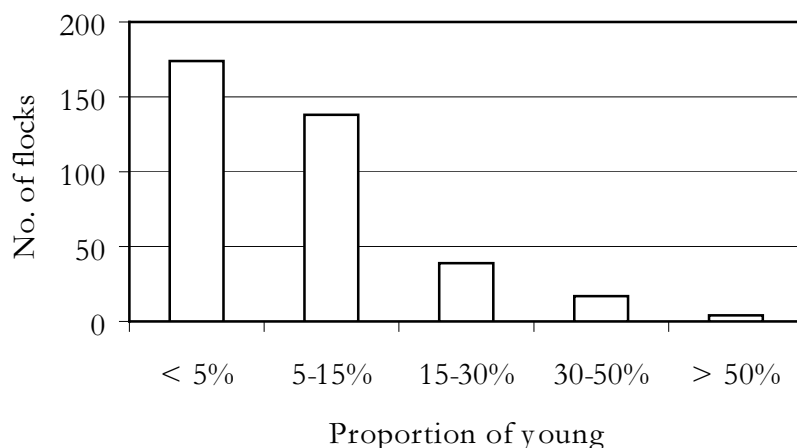


Figure 3. The frequency of the proportion of young in individual flocks during winter 2001/02.

The highest proportion of young (11.7%) was found in flocks of fewer than 100 birds. Larger flocks held 5-7.5% young, with flocks of more than 1,000 birds supporting the lowest proportion of young (Figure 4). This is similar to previous years (e.g. Hearn 2001). In contrast to recent previous years, however, the mean brood size also decreased as flock size increased, from 2.0 to 1.6 goslings (Figure 4).

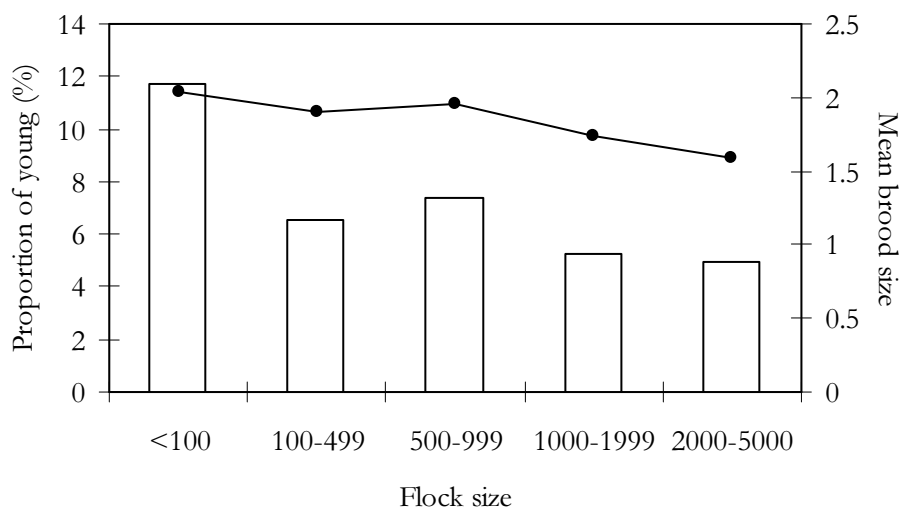


Figure 4. The proportion of young and mean brood size during winter 2001/02.

Geese were recorded in five main habitat types: water, intertidal (including *Zostera* beds), saltmarsh, grass/pasture and cereal fields (including stubble and oilseed rape). A combined total of 34.6% of birds was aged in the first three, which together represent all intertidal habitats, while a further 57.2% were aged in grass fields and 8.2% in cereal fields. As in previous years (e.g. Hearn 2001), a

greater proportion of young was found in flocks foraging on food types with higher nutritional values, such as grass and cereals. Mean brood size was also greater in flocks found in cereal fields (Figure 5).

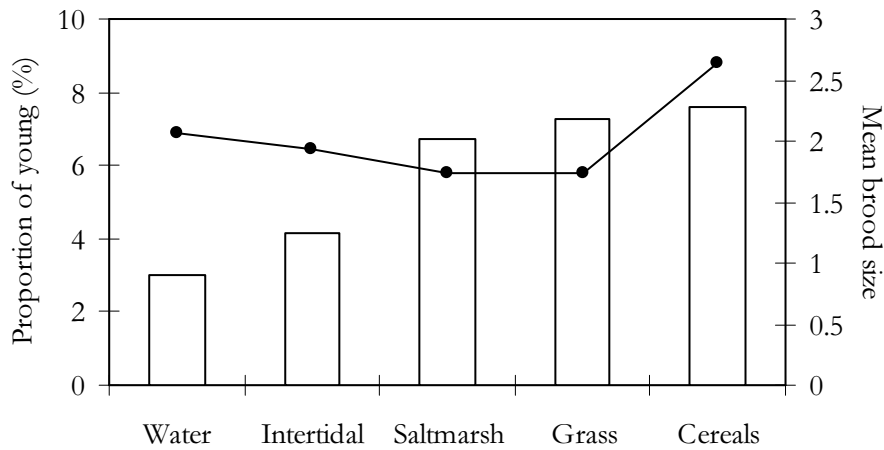


Figure 5. The proportion of young (bars) and mean brood size (dots) recorded in different habitat groups during winter 2001/02.

DISCUSSION

The proportion of young and mean brood size recorded in flocks of Dark-bellied Brent Geese in the UK since 1992 is shown in Figure 6. According to the three-year cycle of good, poor and variable breeding success (Dhondt 1987), 2001 was expected to be a variable year, following the year of peak lemming abundance in 1999. With the disrupted cycle in the mid 1990s, annual productivity in this population has now been below the estimated rate of mortality (15%, Summers & Underhill 1991) in eight out of the last ten years. This is reflected in the short-term trend in the UK, which decreased by 16% in the period 1989/90 to 1999/00 (Gregory *et al.* 2002). The influence of short-stopping on this trend, however, whereby birds spend the winter closer to their breeding grounds (in this case towards the east) due to milder winters, is unknown and it is therefore not clear whether the UK trend is representative of the population as a whole.

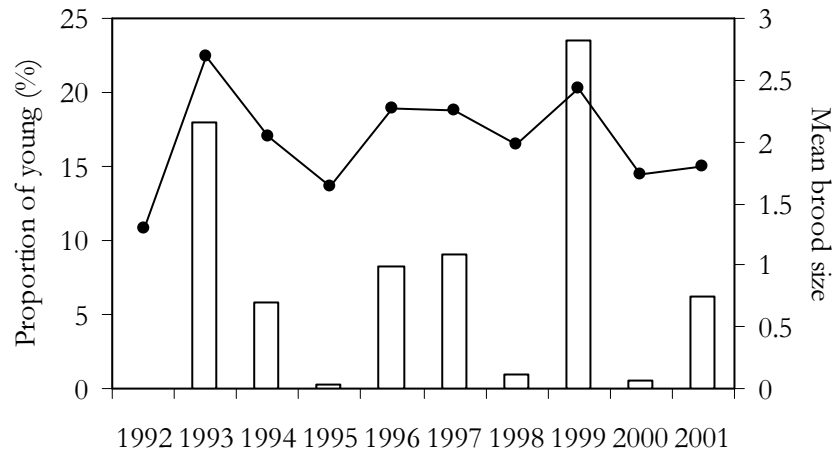


Figure 6. The proportion of young (bars) and mean brood size (dots) of Dark-bellied Brent Geese recorded in Britain, 1992-2001.

In recent years, individual studies of Dark-bellied Brent Geese at some sites in the UK have led to an increase in the number of age assessments being carried out. These additional contributions to the dataset have been beneficial in many ways, but, given current methods of determining the overall proportion of young and mean brood size, they have also increased the problem of pseudoreplication (as they will have inevitably resulted in increased numbers of birds and broods being sampled more than once). This is likely to lead to changes in the relative frequencies of the very common and very rare age and brood size classes.

This problem, and others related to the standardisation of the collection and analysis of productivity data, is currently being examined by the Productivity Task Force of the Wetlands International Goose Specialist Group. This group is working towards the identification of methods of best practice, the development of protocols and the implementation of a standardised international scheme for all Western Palearctic goose populations. Once available, its findings will influence the future way in which productivity data are collected and analysed in the UK and this will be reported to counter networks through appropriate fora, such as *GooseNews* (the newsletter of WWT's Goose Monitoring Programme).

ACKNOWLEDGEMENTS

These observations were organised as part of WWT's long-term Goose Monitoring Programme, which receives financial support from the WWT/Joint Nature Conservation Committee partnership. The continued support of JNCC is much appreciated. I am also grateful to Peter Cranswick and James Robinson for comments on an earlier version of this report.

The biggest thank you goes to the volunteer counters who undertook the fieldwork upon which this report is based. Without their hard work and continued interest in this monitoring programme, there would be no report and we would have a poorer understanding of this population. With apologies for any omissions or misspellings, they are:

John Badley, Chris Cockburn, Giles Cockburn, Barry Collins, Jason Crook, John Davis, Anne de Potier, Michael Dryden, Brian Fellows, John Gowen, Ron Harold, Richard & Kay Heath, Chris

Hudson, Roy King, Russell Leavett, Stephanie Marriot, Ed Mackrill, Tony Martin, Angela Peters, Brian Savage, Jim Scott, Rod Smith, Jenni Tubbs, Ewan Urquhart, Rick Vonk, John Walker, E J Wiseman, Derek Wood and Mick Wright.

REFERENCES

- Dhondt, A.A. (1987) Cycles of lemmings and Brent Geese *Branta b. bernicla*: a comment on the hypothesis of Roselaar and Summers. *Bird Study* 34: 151-154.
- Gregory, R.D., Noble, D.G., Robinson, J.A., Stroud, D.A., Campbell, L.H., Rehfisch, M.M., Cranswick, P.A., Wilkinson, N.I., Crick, H.Q.P. & Green, R.E. (2002) *The state of the UK's birds 2001*. The RSPB, BTO, WWT and JNCC, Sandy.
- Hearn, R.D. (2001) *An assessment of breeding success in the Dark-bellied Brent Goose Branta b. bernicla in the UK in 2000*. WWT report to JNCC. Slimbridge, 7 pp.
- Musgrove, A.J, Pollitt, M.S., Hall, C., Hearn, R.D., Holloway, S.J., Marshall, P.E., Robinson, J.A. & Cranswick, P.A. (2001) *The Wetland Bird Survey 1999-2000: Wildfowl and Wader Counts*. BTO/WWT/RSPB/JNCC, Slimbridge.
- 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 Geese *Branta b. bernicla* between 1955 and 1988. *Journal of Applied Ecology* 28: 574-585.