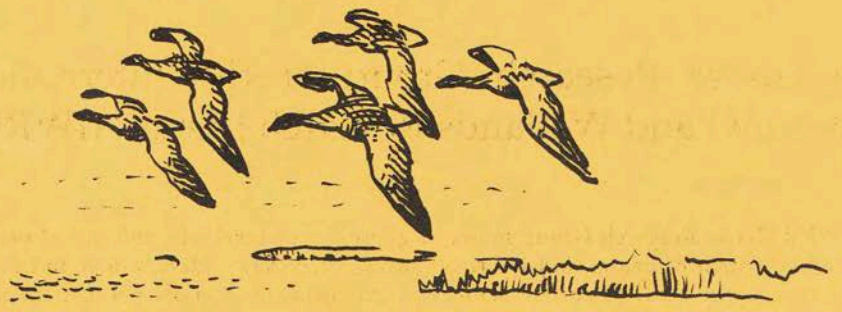

IWRB Goose Research Group Bulletin

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Ministry of the Environment

National Environmental Research Institute

No 5, November 1994

IWRB

The Goose Research Group of the International Waterfowl and Wetlands Research Bureau (IWRB)

The IWRB Goose Research Group monitors goose populations with the aim of providing reliable population estimates and information on goose trends, distribution and breeding success. The Group reviews current status and management of goose populations and encourages studies of population dynamics and habitat ecology.

The Group has a coordinator for the Western Palearctic, Eastern Palearctic/Oriental and North America, respectively, and a steering committee for the work done in the Western Palearctic. In addition, in each Western Palearctic country, the Group has one national coordinator who is responsible for organising and reporting the annual, international goose counts on the days designated by the Group. These counts are stored in a centralised database: the IWRB Western Palearctic Goose Database.

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Editorial

Dear colleagues and readers,

We are still here....

It is now more than a year since the appearance of the previous Goose Research Group Bulletin. Our silence is certainly not due to a lack of anything to write about! However, we have been heavily burdened with other work and have had to break several internal deadlines for editing the bulletin.

For this reason, we have now set up an internal editorial team with devolved responsibilities. Hopefully, this arrangement will ease the job in future. Tony Fox joins the team to pull together and brush-up the contributions and Preben Clausen will in future compile the reference list; please forward all titles to him for future listings. Jesper Madsen and Stefan Pihl will contribute news from the Goose Research Groupand the Western Palearctic database, while Austin Reed and Alex Andreev will provide us with news from the North American and Eastern Palearctic Regions, respectively. We also welcome Helle Jensen onto the editorial team.

This issue brings you up to date on the status of the Western Palearctic goose database. We present recent population estimates for Pink-footed Geese, Brent Geese and Greenland Barnacle Geese, and you will find a list of recent literature references on geese. We are also pleased to present several original contributions and progress reports, for example, on the diet of Dark-bellied Brent Geese in Taimyr, recent changes in goose numbers on the Kanin Peninsula, news about the conservation and monitoring of Greenland White-fronted Geese, as well as a progress report of an ongoing PhD project on grassland management and Barnacle Geese.

We hope to be able to produce the next issue of the bulletin early in 1995. This will focus on the outcome of the ANATIDAE 2000 Conference, which will be held in Strasbourg, 5-9 December this year. At the conference there will be workshops devoted to the global status of geese and to Action Plans for Red-breasted Geese and Lesser White-fronted Geese. The Goose Research Group has been involved in the preparation of an Action Plan for Lesser White-fronted Geese in the European Community and in Europe as a whole, to be presented and discussed at ANATIDAE 2000. You will hear more about this in the next issue.

Status report

IWRB Western Palearctic Goose Database

International Counts

Many thanks to the National Coordinators for arranging goose counts and providing data to the Goose Database. The updated list of material submitted to us is presented in Table 1. Thanks in particular to Slovakia for establishing a network of sites and sending in data back to 1991, and to the Ukraine for conducting extensive goose counts in 1994.

The former Yugoslavia will continue to appear in Table 1 until the borders between the new republics have been agreed upon.

The Goose Database currently contains 1256 sites from 24 countries. As a result of the Anatidae 2000 Conference in December, the annual report for the Western Palearctic 1994 is going to be somewhat delayed this year. Data which are to be included in the annual report must be sent to the Goose Database before 15 December. If the data cannot be provided in a site-based form a national total for each of the goose species would be very helpful.

Coordinators update

We welcome Dr. Alsbeta Darolová as the new national coordinator for Slovakia. We also welcome Djahida Boukhalfa as the new coordinator for Algeria. Djahida takes over from Chalabi Boucid. We appreciate the important work Chalabi has carried out in Algeria.

Check of the Goose Database contents

The Goose Database coordinator has started sending out diskettes to the national coordinators, containing the information in the database from each country. The diskettes contain database files in various formats giving both site and count data, which the national coordinators are asked to check up on. At the same time we present the database setup and provide an opportunity for the national coordinator to enter data directly into a database system.

So far, diskettes have been sent to Austria, the Czech Republic, Estonia, Portugal, Rumania, Slovakia, Spain and Sweden. We hope to complete this task before the end of 1995.

Funding

IWRB Goose Research Group is grateful to acknowledge the following organisations for their support to the Goose Database: Bestuur Jachtfonds (The Netherlands), the National Forest and Nature Agency (Denmark) and Dept. of Wildlife Ecology of the National Environmental Research Institute (Denmark).

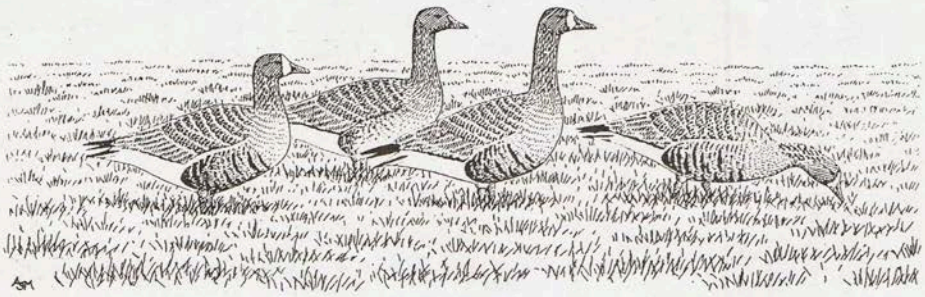

Table 1. Status of January goose count data, 1986 to 1994 inclusive, from Western Palearctic countries. Data from the Goose Database (site-based records) are marked with an asterisk (*); data from other sources are marked +; parentheses indicate incomplete coverage of sites or species; a blank indicates that no data are available.

		Nat. cor.	No of Sites	1986	1987	1988	1989	1990	1991	1992	1993	1994
Algeria		+	9	*	*	*	*			*	*	*
Austria		+	2	*	*	*	*	*	*	*	*	*
Belgium		+	29	+	+	+	+	+				
Bulgaria		+			+	+	+			+	+	
Czech Repub.		+	10		+	+	+	*	*	*	*	*
Denmark		+	115	+	*	*	*	*	*	*	*	*
France	(Brent)	+	36		+	+	*	*	*	*	*	*
	(Anser sp.)	+	24	+				*				
Germany	(West)	+	228	+	+		*	*	+	+	+	
Germany	(East)	+	139			+	+	*	*	*	*	
Greece		+	21	*	*	*	*	*			+	
Hungary		+	24	(*)	*	*	*	*	*	*	*	
Ireland		+	98								+	
Italy		+	4		*		*				+	
Latvia		+									+	+
Lithuania		+									+	+
Luxembourg		+	1	*	*	*	*	*	*	*	*	*
Morocco		+		+	+	+	*	*	*		+	
The Netherlands		+		+	+	+	+	+			+	
Norway		+									+	
Poland		+	55			+			*	*	*	*
Portugal		+	1	*	*	*	*	*	*	*	*	*
Rumania		+	19			*	*	*	*	*	*	
Slovakia		+	34						*	*	*	*
Spain		+	2	*	*	*	*	*	*	*	*	*
Sweden		+	148	*	*	*	*	*	*	*	*	*
Tunisia		+	4	+	+	+	+	*		+	+	
Turkey			30	*	*	*	*	*	*	*	+	
The Ukraine		+								+	+	+
United Kingdom		+	93	+	+	+	+	+	+	+	+	
Former Yugoslavia		+	46	*	*	*	*	*		+	+	

Status report

Recent population status of Brent Geese

Three populations of Brent Geese winter in the Western Palearctic: the nominate race, Dark-bellied Brent Goose *Branta bernicla bernicla*, wintering along the Atlantic coast, the Svalbard population of Light-bellied Brent Geese *Branta bernicla hrota*, wintering in Denmark and northeast England, and the northeast Canadian population of Light-bellied Brent Goose, wintering in Ireland. In The Goose Research Group Bulletin No. 1 (February 1991) we gave an overview of the population status of the three populations for the period 1986-89. Here, we present a short update on the status of two of the populations, the Dark-bellied Brent and the Svalbard Light-bellied Brent. In a later report, we hope to give an update of the situation of the Canadian/Irish Light-bellied Brent.

Table 1. Population totals and annual breeding success of the Dark-bellied Brent Goose, 1991-92 and 1992-93, including a national breakdown of counts. 1) The proportion of juveniles is calculated as weighed means of British and Dutch estimates, based on age counts carried out in November-December (The Wildfowl & Wetlands Trust, unpublished reports; Bart Ebbinge, unpublished).

	Jan 1992	Jan 1993	May 1993	Source
Denmark	3,000	3,200	12,100	NERI
Germany	1,700	2,200	104,900	H.U. Rösner, P. Südbeck
Netherlands	51,600	50,300	108,800	B. Ebbinge
Britain	132,000	104,000	6,300	Wildfowl & Wetlands Trust
France	116,000	101,000	0	R. Maheo
Total	**304,300**	**260,700**	**232,100**	
% juveniles[1]	31.2	<0.1		

Dark-bellied Brent Goose

The monitoring of the population has traditionally been based on the international January censuses, supplemented by a special Brent count in the first half of May. Age counts have been carried out systematically in Britain (by The Wildfowl & Wetlands Trust) and in the Netherlands (by IBN-DLO, Bart Ebbinge). From 1990-91 until 1992-93, we only managed to achieve a complete May coverage in 1993. Table 1 presents a national breakdown of the full censuses carried out in the two most recent seasons and Table 2 gives the estimated population sizes, 1987-88 to 1992-93. In 1991-92, the estimated population size reached the highest peak so far, for the first time exceeding 300,000 individuals. This followed two consecutive good breeding seasons (Table 2). In 1992, there was an almost complete breeding failure on the North Siberian breeding grounds, and consequently the estimated population size decreased to approximately 261,000 individuals in the following winter. In May 1993, 232,000 individuals were counted, which is probably an underestimate of the true numbers. The spring was very dry and the growth of the saltmarsh vegetation was hampered. Flocks of Brent were more dispersed than usual, and some odd flocks may well have been missed in the counts.

Svalbard Light-bellied Brent Goose

In recent years, mid-monthly synchronised censuses of the population have been carried out in Denmark and northeast England. In Britain, Steve Percival from Sunderland University and the local English Nature warden of the Lindisfarne National Nature Reserve have carried out counts; in Denmark, Preben Clausen, NERI, has coordinated the counts. Age counts have also been carried out in both countries.

In recent years the estimated population size has fluctuated without showing any significant trends (Table 3). A peak of 5,800 individuals was reached in 1993-94, following an exceptionally good breeding season in the summer of 1993.

Table 2. Population totals and annual breeding success of the Dark-bellied Brent Goose 1987-88 to 1992-93.

Season	Pop. estimate	% juveniles
1987-88	182,000	0.1
1988-89	235,000	40.0
1989-90	219,000	<0.1
1990-91	224,000	34.0
1991-92	304,300	31.2
1992-93	260,700	<0.1

Table 3. Population totals and annual breeding success of the Svalbard population of Light-bellied Brent Goose, 1987-88 to 1992-93.

Season	Pop. estimate	% juveniles
1987-88	4,500	12.2
1988-89	5,600	24.5
1989-90	4,400	3.0
1990-91	5,150	22.0
1991-92	4,200	14.3
1992-93	4,000	6.7
1993-94	5,800	34.0

IWRB Goose Research Group
(edited by Jesper Madsen)

Status report

Status of the Pink-footed Goose, 1990-1993

This report gives an update on the recent status and breeding success of the two populations of Pink-footed Goose *Anser brachyrhynchus*, i.e. the population breeding in Iceland and Greenland and wintering in Britain, and the population breeding in Svalbard and wintering in Denmark, the Netherlands and Belgium. A review of the status of the populations for the period 1985-89 was given in Newsletter No. 3 of the Goose Research Group (June 1990).

Svalbard population

In recent years increasing efforts have been put into an effective census of the population and its breeding success. Each winter, the National Environmental Research Institute (NERI) undertakes two special counts of the population: one count in early November when the population is concentrated in Friesland in the Netherlands, with small flocks still staging in Denmark, and one count in April, when the population is concentrated in western Jutland, Denmark.

The Friesland counts have proved to be very effective. The primary aim of the 'intrusion' of Danish goose researchers on Dutch territory is to record the breeding success of the neck-banded segment of the population (see below). During a 2-3 week period, 3-4 counts of the total numbers of Pinkfeet in Friesland are carried out, and the breeding success (age and brood counts) of the population is recorded. In April, the population is counted from the air during one day. In recent years, it has been attempted to take photographs of every single flock encountered, allowing an accurate count based on the slides. During the last three seasons, when both November and April censuses were

Table 1. Population totals and annual breeding success of the Svalbard population of Pink-footed Goose, 1990-93. Source: NERI, unpubl.

Season	Population estimate	Month	% juv.	N	Brood size	N
1990-91	26,000	4	12.4	1,148	-	-
1991-92	32,500	11	22.2	8,443	2.30	119
1992-93	32,000	11	6.2	7.484	1.80	107
1993-94	34,000	11	18.1	6,030	2.10	79

carried out, the November counts consistently resulted in the highest population estimate. The spring counts have not exceeded 30,000 birds. Mortality during winter may account for a large part of the difference in numbers.

From 1990/91 to 1993/94 the population varied between 26,000 and 34,000 individuals. As the 1990/91 count is based on a spring count only, it underrepresents the autumn population size. The proportion of juveniles varied between 6 and 22%. The population estimate has increased slightly from 23,500-31,000 in the 1980s to the present level. Even though most censuses during the 1980s were carried out in spring, autumn counts did not yield population estimates above 30,000. Therefore, the current high numbers most likely reflect a genuine population increase.

Since 1990, Pinkfeet have been caught and neck-banded in Western Jutland during late winter and spring. The overall aim of this NERI coordinated project is to describe individual migration strategies and life histories, to interpret at the individual level the highly dynamic movements of the population between sites and regions within the wintering range and during spring staging, as well as analysing the impacts of different habitat selection and migratory tactics on subsequent breeding success and survival. During five seasons a total of 510 individuals have been marked. We aim to keep the level of marked individuals at app. 1%. In recent years, we have entered between 12,000 and 18,000 resightings into the database each year. This is achieved through the very active engagement of collaborators throughout the winter range of the population: in Belgium (Eckhardt Kuijken and Christine Verscheure), in the Netherlands (primarily Fred Cottaar and others), in Denmark (NERI and others) and in Norway (Per Ivar Nicolaisen, Bjørn Røsshag, Tor Bønes and collaborators).

Icelandic/Greenland-British population

There have now been 34 consecutive censuses of Pink-footed Geese in Britain organised by The Wildfowl & Wetlands Trust (WWT), so there are considerable data relating to their numbers and distribution. In most areas, counts are now carried out, usually by volunteers, at dawn or dusk at known roost sites, leaving only a few areas, where daytime counts of feeding birds are made because locations of roosts are less well known. The main change in census technique has been the addition of an early season count, with an autumn count introduced in mid-October to supplement the traditional mid-November one used since the scheme was started. Many counters consider the increase in numbers of Pinkfeet to have led to birds passing through, and dispersing from, autumn staging areas in Scotland earlier than in previous years. In fact, 1991 was the first year when the October estimate (233,000) exceeded that in

November (179,000), and clearly showed the value of the extra coverage, since no known major sites were missed during the latter count and there were no obvious causes for missing more than 50,000 birds.

Numbers of Pink-footed Geese have increased from 195,000 in 1990 to 233,000 in 1991, but dropped back to 225,000 in 1993. Totals fell from the 1991 peak after a relatively poor breeding season that year, in which many Western Palearctic goose populations had a very poor breeding season (Table 2). Assessment of the proportion of young present amongst flocks in autumn and the average brood size per family have been carried out by experienced counters at a number of sites throughout northern Britain during late October and early November. Samples in 1992 showed only 10% young in autumn with a mean brood size of 1.67 (Table 2), less than average and perhaps falling below the level at which the numbers of young returning to the wintering grounds balances adult mortality.

A study of the population dynamics of this population is currently being undertaken by WWT under a contract to the Scottish Natural Heritage, the government agency responsible for goose conservation policy in Scotland.

During the 1950s, Peter Scott, Hugh Boyd and the then Severn Wildfowl Trust undertook an extensive ringing programme in Iceland and northern Britain, capturing and marking over 25,000 geese in 10 years. A new WWT project, using engraved plastic leg rings started in 1987. The main purpose of the current project has also been to describe individual migration patterns to help interpret numerical changes in terms of individual wintering strategies of geese. Some results of this work have just been published (Fox *et al.* 1994), and work continues concentrating on the estimation of survival rates from capture/resighting histories of birds. More recently, trials with neck-bands have proved highly successful in improving resighting rates, and this opens up new

Table 2. Population totals and annual breeding success of the Icelandic/Greenland-British population of Pink-footed Goose, 1990-93. Sources: 1) Kirby & Cranswick, 1991; 2) Cranswick & Kirby, 1992; Mitchell & Cranswick, 1993; 4) Mitchell, 1994.

Season	Population estimate	Month	% juv.	N	Brood size	N
1990-91	195,000[1]	11	21.5	12,716	2.22	370
1991-92	233,000[2]	10	18.1	12,210	2.10	355
1992-93	200,000[3]	10	9.7	17,447	1.67	276
1993-94	225,000[4]	10	18.1	19,510	2.18	391

possibilities for the future. The results of these projects will feed into the population modelling process in the future to provide a better understanding of the ecology of the species in Britain and hopefully form the basis of effective conservation management strategies for this important British Red Data Book species.

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Carl Mitchell, The Wildfowl & Wetlands Trust, Slimbridge, Gloucester, GL2 7BT, United Kingdom.

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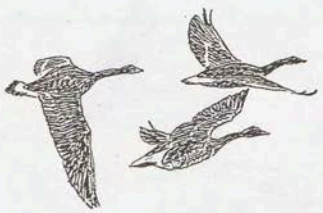
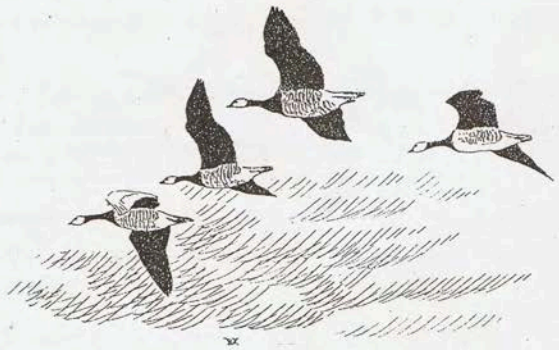


Status report

Greenland Barnacle Goose Aerial Census

The aerial census of the Greenland population of Barnacle Geese took place in late March of this year, again involving The Wildfowl & Wetlands Trust in Scotland and the National Parks and Wildlife Service in Ireland. The full reports of the survey will be published elsewhere, but *provisional* totals (which may be subject to modification in due course) were 30,300 in Scotland and 8,200 in Ireland. In Britain, Simon Delany reports from Slimbridge that there has been an increase on Islay (ground count of 25,622) and Coll and Tiree (ground count of 1,275), apparently at the expense of outlying offshore islands. This appears to be a continuation of the trend witnessed over the last ten years, which probably results from the recent requirements to dip sheep twice a year for sheep scab which has reduced the attractiveness of grazing remote offshore islands. As a result, short maritime turf on islands traditionally used by the geese has been lost, and sites have become less attractive. On Eilean Hoan, on the north coast of Scotland, the Royal Society for the Protection of Birds has ensured adequate grazing which has maintained numbers there in contrast to many other resorts. Orkney was the only farmed/inhabited part of the range which had not experienced an increase in wintering numbers. In Ireland, the count from Oscar Merne and Alyn Walsh is the highest ever count there, although it is not clear at present whether this is due to displacement from Scotland, improved productivity or a combination of both factors.



Regional news

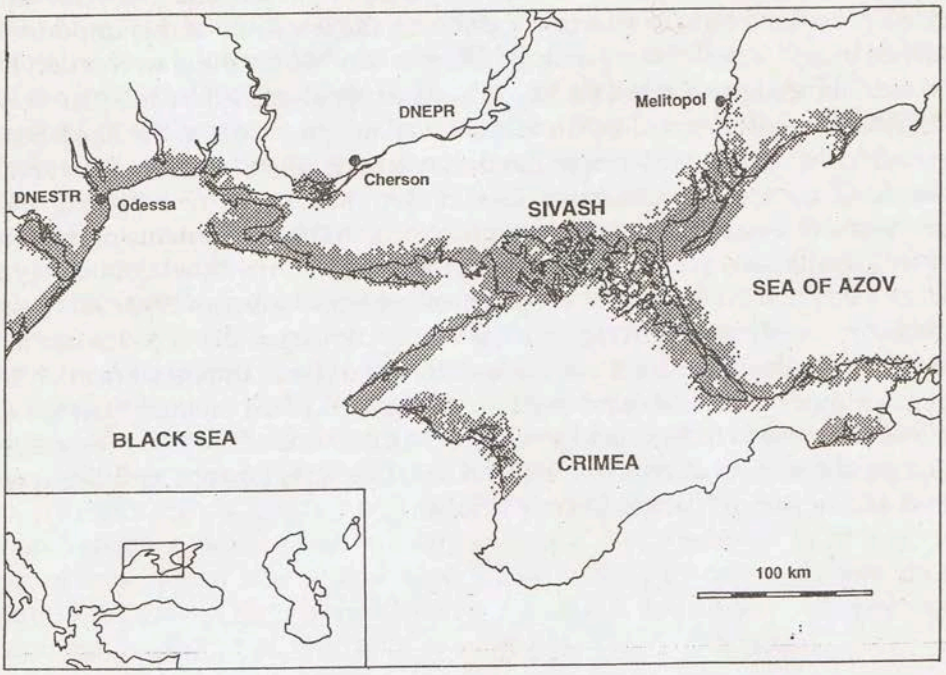
Black Sea Counts

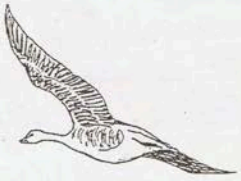
In October 1993, IWRB held a workshop in Odessa in the Ukraine to discuss the importance of and how to effectively conserve the wetlands of this important drainage basin. A preliminary action plan was drafted for the conservation of wetlands in the region. One of the key priority areas identified by the plan was to establish inventories and monitoring of wetland resources in the Black Sea, identifying the urgent need to appraise the wetland wildlife interest of the area. Waterfowl counts are, of course, one of the vital means of assessing the importance of wetlands, as well as contributing to the assessments of overall flyway population estimates. In the Black Sea region, wildfowl counts have been carried out for a number of years. During the past winter (1993/94) these have been coordinated throughout the entire Ukrainian Black Sea coast by Tatiana Ardamatskaya. Such extensive coverage of these important wetlands is of great importance, and the team are to be congratulated on their efforts. Of particular interest to *Bulletin* readers were the total counts of 333,000 grey geese in the north-western Black Sea, Sea of Azov, Dneister, Danube and Dneiper Deltas and northern Crimea (Figure 1, Table 1).

Table 1. Cooordinated counts of goose species along the Ukrainian coasts of the Black Sea and Sea of Azov, January 1994.

Species	Count Total
Branta ruficollis	3,038
Anser anser	50,910
Anser albifrons	281,576
Anser fabalis	681

Figure 1. Extent of coordinated counts carried out in the Black Sea and Sea of Azov region, January 1994. Data coordinated by T. Ardamatskaya, with thanks to I. Belachov, P. Gorelov, A. Grinchenko, V. Popenko, I. Chernichko, V. Kinda, I. Falko, A. Korzyukov, O. Potapov, O. Yaremchenko, A. Rudenko, M. Zhmud, D. Vangeleuwe, I. Rusev, I. Gerik, I. Shegolev and V. Serebryakov.





Regional news

Central European Bean Geese

Our understanding of the numbers and distribution of Bean Geese remains far from complete. The species is very well counted in many countries, but some parts of its known winter range have not been covered with such regularity. However, at a reservoir roost site in southern Moravia (the Czech Republic), Lukas Simec and Karel Hudec have compiled excellent counts for many recent years, and have detected a dramatic increase in numbers of birds present during the 1994 international count, with nearly 53,000 present in January 1994 (Table 1). More White-fronted Geese were also using the area than in previous winters. This area is quite close to the Austrian border, and the geese disperse over arable land to feed by day and return to roost on the reservoir at night.

From neighbouring Slovakia comes more news about Bean Geese, where A. Darolová counted no less than 40,000 White-fronted and Bean Geese (predominantly the latter species) using arable farmland as feeding areas, south of Bratislava, very close to the Austrian and Hungarian borders in the Danube Valley. It is a well-established fact that the Danube valley is of considerable importance for the species, but only few goose counts have been submitted from the area within the present borders of Slovakia, and its distance from the Czech sites suggests that different birds are using the two sites. The proximity to national border of such large numbers of geese could potentially pose counting problems and emphasises the need for international collaboration in coordination of goose count coverage.

Table 1. Recent annual goose counts from southern Moravia, Czech Republic during 1990-1994.

	Anser fabalis	*Anser albifrons*
1990	16,830	2,970
1991	11,000	1,100
1992	20,000	5,000
1993	13,000	1,000
1994	52,700	9,300

Regional news

Introduced and Escaped Geese in Britain

Simon Delany (Delany 1993) has just completed an analysis of the survey of introduced and escaped geese carried out during the summer of 1991 by The Wildfowl & Wetlands Trust at Slimbridge. The findings show 15 species of free-flying introduced geese, totalling 85,400 birds, although the majority were Canada Geese (63,600) and Greylag Geese (19,500 excluding the remnant "native" population of north and west Scotland). Populations of more than 50 Barnacle, Egyptian, Snow, Pink-footed, Bar-headed and White-fronted Geese were also found, together with 338 hybrids of at least 15 identifiable forms! Simon points out the need to restrain the release of any further geese into the wild, since the problems associated with the expansion of the Canada Goose populations in Britain and Scandinavia are well known (Madsen & Andersson 1990, Owen *et al.* in press).

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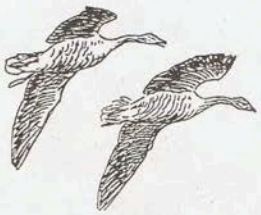


Progress reports

Rose and Scott (1994) Waterfowl Population Estimates

Summarising the population size and status of all of the world's 833 waterfowl species, this important IWRB Special publication has now been completed and is available from the IWRB at Slimbridge (see the back cover). The work was presented in draft form to the conference of contracting parties to the Ramsar Convention in Kushiro, has received considerable support from experts throughout the world and was the subject of a small workshop held at Kalø in Denmark during 11-13 January 1994. The workshop unaminously agreed modifications necessary to make full use of the document in western Europe and proposed a two-tier system of review of population estimates. A three-year-cycle of revision was suggested for Western Palearctic waterfowl (i.e. for every Ramsar Conference of contracting parties) and a nine year cycle of revision of 1% thresholds for Western Palearctic waterfowl (i.e. every third Ramsar meeting). In undertaking these reviews, it was agreed that two stage models be adopted, with taxa reviews (drafted principally by research groups and other to an agreed format) and a global summary report drawing upon the more specific taxa reviews. The meeting noted the importance of ensuring one set of internationally agreed set of population estimates for use by Ramsar and Bonn Convention, as well as all the other users of these estimates. The initial estimates are now well documented, but Paul Rose (IWRB, Slimbridge) would welcome any ideas and comments concerning the future of this work. Jesper Madsen (NERI, Denmark) is currently in the process of reviewing the goose population estimates for a global analysis for presentation on behalf of the IWRB Goose Research Group at the ANATIDAE 2000 meeting in Strasbourg in December 1994. He would welcome any input, comments and ideas to that process.

Progress Report

Diet of Dark-bellied Brent Geese (*Branta b. bernicla*) in the Piassina delta, Taimyr, Siberia

Introduction

Food selection, quality and its impact on winter survival and pre-migratory fattening in *Branta* geese has been studied by several investigators (e.g. Boudewijn 1984, Owen *et al.* 1992, Prop & Deerenberg 1991, Summers & Critchley 1990). Food resources are of major importance in understanding population dynamics of arctic breeding geese (Ebbinge & Spaans 1992). Feeding ecology of Brent Geese in the arctic breeding areas has been studied to a certain extent (Kiera 1984, Madsen *et al.* 1989). Little has been written, however, about the diet of Brent breeding in arctic Siberia, since the observations of Dementiev & Gladkov early this century that they feed on 'grasses and mosses' (reported in Owen 1980).

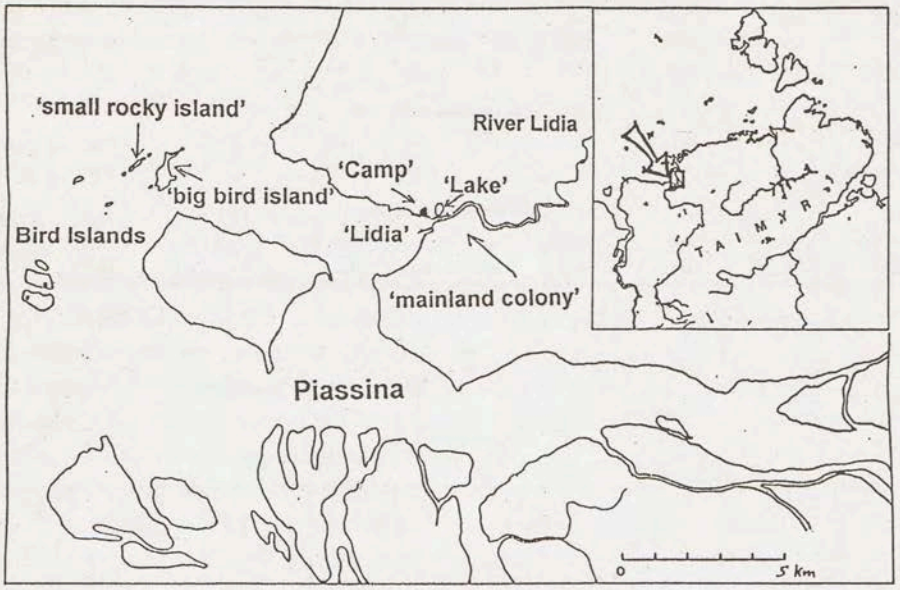
This paper reports the results of microscopic analyses of faeces collected in a breeding area in the Piassina delta, western Taimyr (74°07'N, 86°50'E) in 1990. The area has been visited by international expeditions organised by the Russian Academy of Science, the World Wildlife Fund for Nature and the Netherlands Research Institute for Nature Management (IBN-DLO) (Nowak 1990). Most of the results of the 1990 expedition have recently been published and will not be discussed here (see Spaans *et al.* 1993).

Study Area

The Taimyr peninsula is an important breeding area for Dark-bellied Brent Geese (Bergmann *et al.* 1994), classified as 'typical tundra' (Chernov 1985). Two hundred and sixty-four pairs of Brents nested near the river 'Lidia' and on offshore islands. Most breeding territories were established on islands, only 10 pairs bred on the mainland. Base camp and sample site locations are shown in Figure 1. 'Camp' and 'Lidia' refer to two wet marshes at a river near the base camp and at the mouth of the river Lidia. The dominant vascular-plant vegetation on both sites, as well as on 'Big Bird Island' and at the 'Lake', consisted of *Dupontia psilosantha* (Rupr.), *Carex aquatilis* (Wg.), *Arctophila fulva* ((Trin.) Anderss.), *Eriophorum scheuchzeri* (Hoppe) and *Puccinellia spp.* (Spaans *et al.* 1993). These plants were embedded in an moss carpet and their cover seldom exceeded 40 % (Chernov *et al.* in Roswall & Heal 1975). Mosses were very abundant, with 100% cover in almost all but the barren places (Chernov

1985). Some Brent breeding territories were on rocky islands, where mosses and lichens were almost the only vegetation to be found (see Spaans *et al.* 1993).

Fig. 1. Study area at the Piassina delta with sample sites as mentioned in the text.



Material & Methods

Between 11 June and 26 July 1990, 329 droppings of adult Brent Geese were collected and stored in 5% formaldehyde solution. They were pooled into 49 samples according to date (before, during and after incubation) and site to simplify analysis. Fewer samples were collected during nesting and after hatching to avoid disturbing birds, but 56 droppings from juvenile geese were combined into 9 further samples. Plants from the study area were collected as reference material. Epidermal characteristics were identified microscopically (Owen 1975). Samples were suspended in water, thoroughly mixed and Methylene-blue was added to increase the contrast of epidermal fragments. Part of the homogeneous mixture was spread on two slides and covered with a 24 x 50 mm coverslip. Fragments were sampled microscopically in a grid of 10 horizontal and 40 vertical lines, 400 points per slide. The frequency of fragments of each food plant on slides was used as an estimator of the relative leaf area of food items consumed, despite the limitations of this method (see Owen 1975).

Table 1. Contents of 58 faecal samples (388 droppings). Values represent mean area percentages ± standard deviation.

Site	Monocotyles				Dicotyles	Mosses	Insects	others	undetermined	sample size
	Poaceae	Cyperaceae		Juncaceae						
		Carex sp.	*Eriophorum sp.*							
before incubation (6/11 to 6/20):										
"Camp"	26±17	38±16	9±8	<1	3±3	<1	0	<1	23±6	13
"Lidia"	62±17	12±9	4±7	<1	1±1	1±2	0	<1	19±10	17
other sites	41±21	36±25	3±2	1±2	<1	1±1	0	<1	16±1	5
during incubation (6/27 to 7/16)										
islands	29±19	31±23	3±2	1±2	<1	12±10	<1	<1	14±3	7
mainland coast	4±2	27±34	38±26	0	8±14	1±1	0	0	22±6	3
after incubation (7/18 to 7/26)										
adults	71±1	8±9	<1	<1	2±3	1±1	0	<1	15±8	4
juveniles	38±24	4±6	<1	<1	26±23	1±1	9±13	3±3	18±8	9

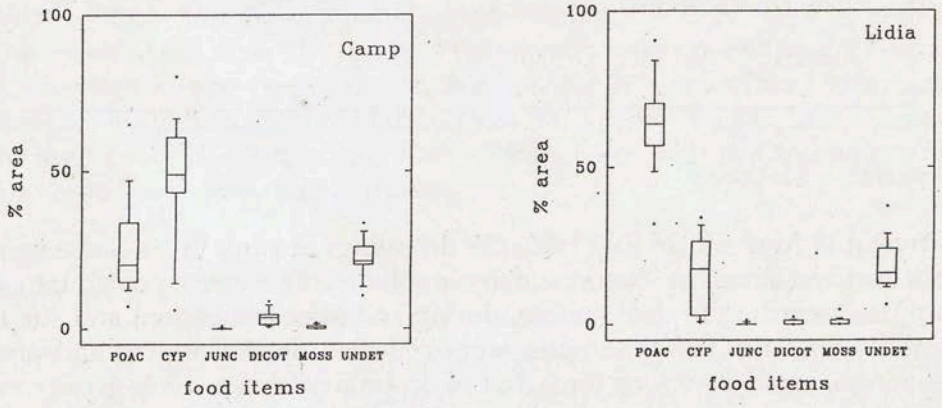


Fig. 2. Contents of 13 faecal samples collected before incubation at Camp site (left) and of 17 samples from the Lidia site (right). POAC = Poaceae, CYP = Cyperaceae, JUNC = Juncaceae, DICOT = Dicotyledons, MOSS = mosses, UNDET = undetermined.

It proved impossible to identify all material to species level in faecal samples, so the data were combined into taxanomic groups whose features were unambiguous. Unidentified fragments were treated as a separate group.

Field observation of dietary selection by a hand-raised, one week old gosling was carried out during three bouts in natural habitats on 25 July. Every single peck was recorded, food items identified in the field and the subsequent droppings collected and included in the analysis.

Results

Poaceae and Cyperaceae together constituted more than 70% of the items counted in most samples (Table 1). Although Camp and Lidia areas both comprised 'sedge-moss-tundra', the contents of pre-nesting droppings from the two areas were different (Fig. 2). There was a negative correlation between these components (Fig. 3) probably reflecting different vegetation compositions at the specific sites. Dicotyledons and mosses, although abundant on the tundra, were scarce in the droppings. Fig. 4 compares samples from two breeding pairs on a small rocky island, described in detail by Spaans *et al.* (1993, p.123). Pair A had a good quality territory ('sedge-rich tundra' with 100% vegetation cover) while pair B had a poor one ('spotted polygon tundra' with less than 30% cover). Female B left the island to feed elsewhere, while the male stayed to feed on the sparse vegetation on territory. Female A foraged inside her territory, which was heavily defended by male A (Spaans *et al.* 1993). The diet of male B differed from female B, male B fed more on mosses, which were not taken by female B. Female A ate Poaceae, Dicotyledons and mosses (Fig. 5). While the number of nest recesses per day was similar for females A and B, daily recess-time and mean recess duration was much longer for female B (Spaans *et al.* 1993). The few mainland breeders fed mainly on Cyperaceae, taking little moss and suffered no shortage of food (Table 1). These birds showed reduced mean nest-recess duration (Spaans *et al.* 1993).

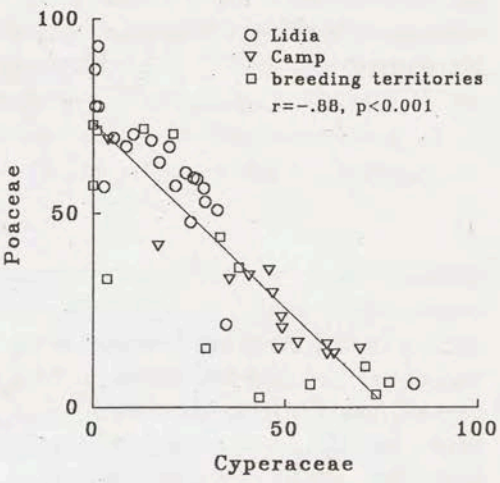


Fig. 3. Relationship between Poaceae and Cyperaceae in the diet of adult Brents. 'Breeding territories' also include 4 samples from the post-breeding period. Values are area percentages on the slides (see text).

After hatching, goose families left breeding territories and moved to riverbanks and tundra lakes. Poaceae increased in the diet, while Cyperaceae declined (Table 1). Gosling faeces contained up to 30% insect fragments and higher levels of Dicotyledons than adults (Fig. 5, Table 1). The results of the feeding trials are given in Table 2. During 122 minutes of feeding, 1094 pecks were recorded.

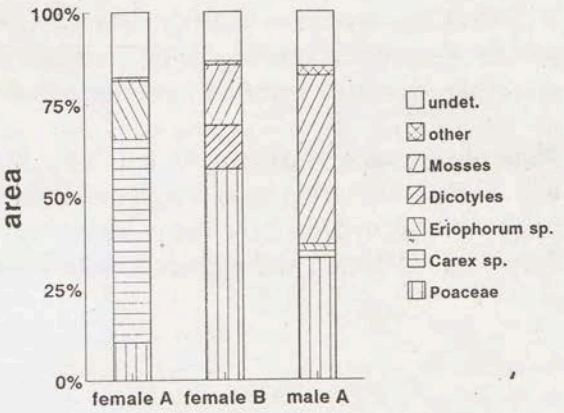


Fig. 4. Diet composition of three individual Brent geese, inhabiting adjacent, but different, breeding territories on a small island in the Piassina delta (see text).

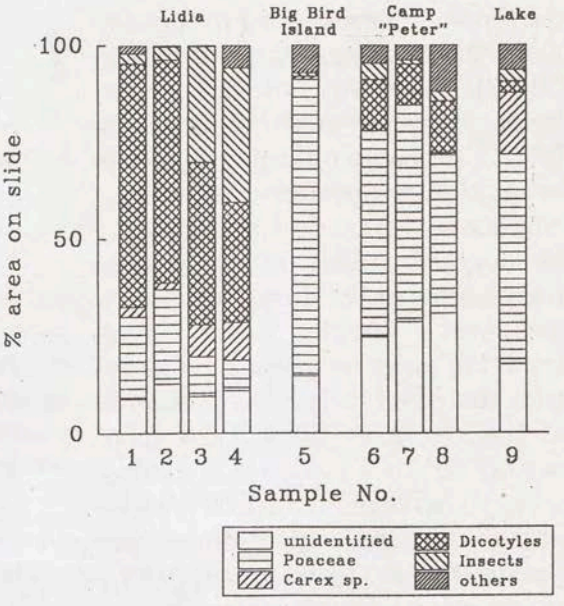


Fig. 5. Diet composition of goslings. Samples are grouped according to sample site. 'Peter' was the name of the hand-raised gosling observed in the feeding trials.

Discussion

Monocotyledons contributed most to the diet of Brent. Poaceae and Cyperaceae were most favoured as found in previous studies of arctic-breeding geese (Kiera 1984, Prop *et al.* 1984, Madsen & Mortensen 1987). Although epidermal fragments could not always be identified to species, *Arctophila fulva* was probably the most important Poaceae selected and is a favoured waterfowl food (Tikhomirov 1969). *Carex aquatilis* and *Eriophorum scheuchzeri* are probably the only Cyperaceae consumed.

Method	Poaceae	Dicotyles	Mosses	insects	others	undet.
percentage of 'pecks'	15	80	0	5	0	0
faecal analysis (% area)	50	12	2	3	5	28

Table 2. Results of feeding trials with a free-ranging gosling. Pecks and ingested food items were recorded. Subsequent droppings were collected and microscopically examined.

C. aquatilis and *Dupontia fisheri* (= *D. psilosantha*, Löve & Löve 1975) are mentioned by Kiera (1984) as important food plants of Brents. Mosses were important during incubation, in contrast to Madsen *et al.* (1989), who found that Svalbard Light-bellied Brent fed mainly on Dicotyledons (*Cochlearia sp., Ranunculus sp. and Saxifraga sp.*) and mosses at that time. Perhaps this was due to habitat differences in the two study areas, since there were no Poaceae and few Cyperaceae in their feeding habitats.

Vascular plants were highly preferred over the more abundant mosses, which have little nutritional value (Madsen *et al.* 1989, Russel 1990). Mosses were almost avoided in 'sedge-moss-tundra' areas, and where Monocotyledonous plants were not available, other higher plants were selected instead. However, adult geese breeding on rocky islands, perhaps to avoid arctic fox (*Alopex lagopus*) predation, made heavy use of mosses. Elsewhere on Taimyr, Brents bred on the mainland close to fox-dens, perhaps benefitting from the presence of snowy owls' territories (Underhill *et al.* 1993).

Intraspecific competition for breeding territories takes place on the islands. Poor quality sites provide insufficient food supplies for the female, which forces her to take prolonged recesses to reach adequate feeding grounds, or to use poor quality foods such as mosses. Future research should address the selection of feeding habitats in relation to reproductive activities. Food quality, phenology and availability may greatly influence reproductive output.

The abundance of Dicotyledons and insect fragments in goslings' faeces indicate the use of different food resources and feeding techniques by the young. Barry (1956) observed four young Canadian Black Brant (*B. b. nigricans*) feeding on mosquitoes, arthropod larvae and Dicotyledon flowers. Insect biomass on the tundra can be high (Kistchinsky 1982), so it would seem advantageous to goslings to make use of it. Without morphological specialization for harvesting insects efficiently, insect food may only supplement their diet on the tundra. On several occasions we observed pulli catching Tipulid

imagines (Diptera), but when insect activity was low during bad weather, they fed only on plants. However, even occasional animal food could improve diet quality. Sedinger (1984) stated that inefficient incorporation of plant protein into goose tissue might be due to deficiency of some essential amino acids (cystine and methionine). Animal food, even in small amounts, could compensate for dietary inadequacy and enhance their utilisation of plant protein.

Gosling food choice differed from the faecal analysis (Table 2, Fig. 5) This may partly be explained by differences in leaf morphology in the Monocotyledons versus Dicotyledons. However, the large magnitude of the difference suggests differential breakdown of leaves during digestion. Some authors attempted to correct for different fragmentation (Owen 1975) and different surface to weight ratios (Prop & Deerenberg 1991), but we were unable to do this for our data. It is clear that items of different structure, such as Monocotyledons and insects, cannot be directly compared on the basis of frequency in the droppings. Hence, our results may underestimate the role of Dicotyledons, although we have no means of compensating for this.

Acknowledgements

We are grateful to B. Ebbinge, B. Spaans and A.K.M. St Joseph for help in collecting the droppings. Prof. Klaus Dierssen, University of Kiel, FRG, is acknowledged for assistance with the identification of herbarium material from Taimyr. Mike Bell and an anonymous referee from the Wetland and Wildfowl Trust, Slimbridge, GB, commented on an earlier draft, which resulted in great improvements. Dr. A. Kellerman, NPA Tönning, FRG, kindly corrected our English.

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Progress report

Changes in the Goose Status on the Kanin Peninsula

The Kanin peninsula protects the eastern side of the entrance to the White Sea at 45°E. Virtually all of the peninsula lies north of the Arctic Circle, and relatively few biologists have visited the site in recent years. The following observations result from an expedition to explore the western coast of the Kanin Peninsula during 11 June -12 July 1993, ranging between the Shoina river in the south to the Thorna river in the north. Much of the area comprises coastal flats, raised tundra areas and dune systems.

Four species of geese were found to occur commonly, namely Brent, Barnacle, Bean and White-fronted Geese. In addition, local people said that Lesser White-fronted Geese were common in summer during the 1950s (perhaps as moulting birds in this area), but that this species now only occurs rarely on the eastern side of the peninsula.

Although a very common species on spring migration, Brent Geese only colonised this area as a breeding species four years ago, yet the population now numbers 20 pairs and two nests (with clutches of 5 and 6 eggs) were found by the author on the coastal flats, one in the Barnacle Goose colony. Migration of non-breeding geese was evident through the area until 18 June.

Barnacle Geese on migration have always been numerous, but this species has also colonised the area as a nesting species during the last four years. A colony is now well established on the coastal flats between the Shoina and Kambalitza rivers and extends over an area of one square kilometre. During a survey on 11-12 June, the author found nest densities of 10-12 per hectare, with peak densities of 30 nests per hectare at the heart of the colony. The colony numbers 1,000-2,000 pairs, having increased two- to threefold since 1991 (Filchagov & Leonovich 1992). At the time of the survey, egg-laying was still in progress. Elsewhere, other nests were found on the coastal flats, making a total population in the census area of 1,200-1,500 pairs. Local people are of the opinion that in previous times, staging Barnacle Geese used to feed in the area for longer periods before migrating northwards. However, in recent years, with the arrival of the Brent Geese and the development of the nesting Barnacle Goose colony, little vegetation is available in spring and northward moving geese pass through far quicker than in previous years.

White-fronted Geese are common migrants, but are rare as breeding birds, with perhaps 10 pairs present. It is considered to be more common on the eastern side of the Kanin peninsula.

The Bean Goose is common as a migrant in the area, with non-breeding birds moving through until at least 28 June. The impression of local people was again that the species has been forced away from using the area as a major staging site as a result of the increasing numbers of nesting Brent and Barnacle Geese. Bean Geese nest in the raised tundra areas, amongst dunes and on coastal flats. In all, 10 nests were found, 2 of them situated within 15 m of a peregrine eyrie, 5 in dunes and 3 on flats. Of the 7 clutches kept under observation, 1 of 4 eggs failed, perhaps due to the extreme behaviour of the pair which flushed from the nest when approached by humans at 40 m (compared with 3-7 m normally). In all, 150-200 pairs bred in the study area.

Geese are very important to the people of the town of Shiona (67°50'N 44°10'E); large numbers of birds on migration are shot and the meat preserved. Despite protective legislation, local hunters shoot Barnacle Geese and gather their eggs. However, there are few areas outside the wintering grounds where serious numbers of Barnacle Geese can be killed in this way, so it is likely that this harvest has little overall effect on the population, whose numbers have increased fivefold in the area during the last 15 years.

V.G. Vinogradov, Institute of Nature Conservation, Moscow, Russia.

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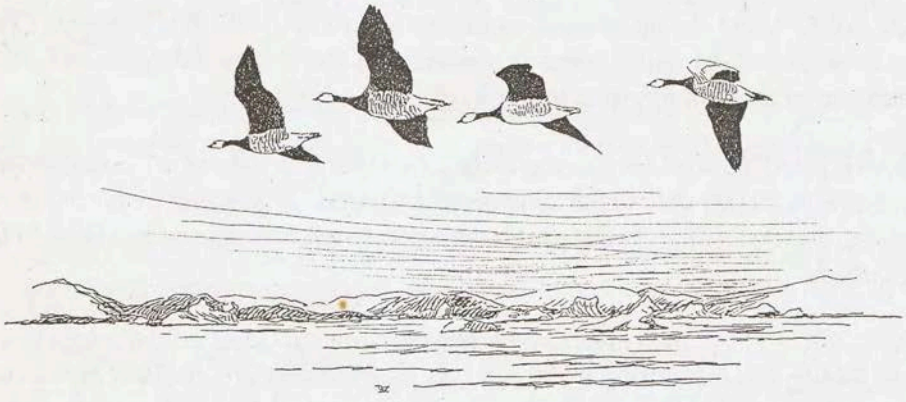


Progress report

The Wexford Declaration on the conservation of the Greenland White-fronted Goose *Anser albifrons flavirostris*

Following a meeting between representatives of the range states of the Greenland White-fronted Goose at the Conference of the Contracting Parties to the Ramsar Convention at Montreux in June 1990, the first International Workshop on the conservation of the Greenland White-fronted Goose was held in Wexford, Ireland, during 4-6 March 1992. The Workshop was organised by the National Parks & Wildlife Service of the Office of Public Works in Ireland in association with the International Waterfowl and Wetlands Research Bureau (IWRB). The Workshop discussed and amended the draft of an international plan for the conservation of the Greenland White-fronted Goose compiled by David Stroud under a contract to the United Kingdom Joint Nature Conservation Committee. The Workshop was attended by 50 specialists, including representatives of governments, international bodies and non-governmental organisations from each of the range states, as well as observers and contributors from as far afield as Canada.

The meeting agreed the following Wexford Declaration as a result of the meeting, printed in full for the benefit of those interested in the process:

REALISING THAT the entire world population of the Greenland White-fronted Goose breeds in Greenland and winters in Ireland and the United Kingdom and that a significant proportion migrates through Iceland;

AWARE THAT the world population of the Greenland White-fronted Goose currently numbers only 30,000 individuals with about two thirds of this total wintering in two localities, and that within the last decade the population has numbered less than 18,000 individuals;

CONSCIOUS THAT individual Greenland White-fronted Geese exhibit a high degree of site fidelity, and that during recent years the disappearance of some local populations have caused a retraction of the traditional range and that other flocks remain vulnerable;

NOTING THAT many natural and semi-natural habitats, used by Greenland White-fronted Geese are threatened by loss, degradation particularly on their staging and on

their wintering areas, and that uncontrolled hunting of the Greenland White-fronted Goose occurs while on migration;

AND FURTHER NOTING THAT the characteristic breeding biology and social behaviour of the Greenland White-fronted Goose, indicates vulnerability compared to other geese;

WELCOMING recent increases in some sections of the population and noting recent ecological adaptability of the bird;

TAKING ACCOUNT of the draft International Conservation Plan discussed at the Wexford Workshop in March 1992;

RECOGNISING THAT Greenland, Iceland, Ireland and the United Kingdom must take joint and equal responsibility for the conservation of the Greenland White-fronted Goose and recognising that farmers, hunters and conservation organisations have a role to play in achieving this objective;

The participants at the Greenland White-fronted Goose Workshop adopted the Declaration and recommended the following actions:

1. *That Greenland, Iceland, Ireland and the United Kingdom agree and implement long-term co-operative measures, including an International Plan for the conservation of the Greenland White-fronted Goose.*

2. *That Greenland, Iceland, Ireland and the United Kingdom develop and implement national conservation plans including site plans or statements for the Greenland White-fronted Goose.*

3. *That Ireland and the United Kingdom take further steps, where necessary, to protect wintering areas and in particular traditional ones, of the Greenland White-fronted Goose.*

4. *That Greenland, Iceland, Ireland and the United Kingdom work to achieve closer integration between environmental policies and human uses, especially agriculture.*

5. *That Greenland, Iceland, Ireland and the United Kingdom ensure that any hunting is carried out at a sustainable and equitable level taking account of the influence of disturbance so that the survival and distribution of the population are not jeopardised.*

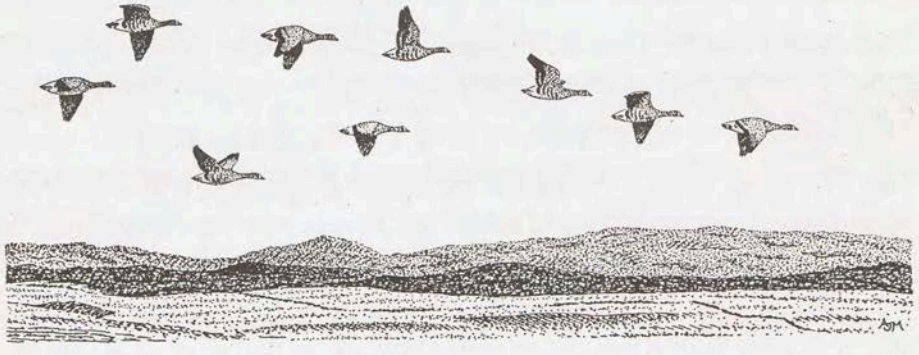
6. *That Greenland be congratulated on the listing of exceptionally extensive areas of the breeding range under the Ramsar Convention.*

7. *That Ireland be congratulated for bringing together the range states and other interested parties and for offering to act as co-ordinator for follow-up action.*

Wexford, 6 April 1992.

Despite complete agreement on the adoption of the Management Plan as drafted by David Stroud over two years ago, the formal signing of an agreement between the four range states has still not occurred. Despite several approaches from government and non-government organisations, the process still appears to be stuck. We very much hope that we may see some signs of movement in this very important process in the near future. It is hoped that such a single-species management plan offers important opportunities for future plans for other migratory waterfowl populations under the Agreement on the Conservation of African-Eurasian Migratory Waterbirds under the Bonn Convention.

However, in the meantime, as a result of the workshop, a major report detailing the results of the first twelve years of internationally coordinated counts has been produced. It reviews the extent and progress of research and conservation plans, provides a site-by-site assessment of the wintering flocks , with country reports from Ireland, Britain, Iceland and Greenland. Copies can be obtained from Tony Fox at the Bulletin Editorial Office. Price: £6.00 plus £1.50 postage and packing - cheques in sterling or Irish pounds payable to "GWGS"



Progress report

Barnacle Goose Grazing and Vegetation Dynamics

A study of feeding site selection of Barnacle Geese (Branta leucopsis) at Loch Gruinart RSPB Reserve, Isle of Islay, Scotland. 1992-1995.

Background and project aims

Numbers of Greenland Barnacle Geese wintering on Islay have increased from around 5,000 in the late 1950's (Ogilvie 1983) to some 26,000 currently (1994 unpublished SNH count data). A combination of overall population increases and a larger proportion of the population using Islay has led to this change. Agricultural improvement to Islay's grassland over the past few decades has no doubt influenced this trend. Owen and Black (1991) suggest that "Wild goose populations were probably limited by winter food supplies" before large scale grassland improvement.

Despite the large numbers on Islay, the total population of Greenland Barnacle Geese only stands at 38,000 (Delany & Ogilvie 1994). Therefore the species needs protection - a situation recognised by its inclusion in Annex 1 of the European Community's Birds' Directive as a species which requires special conservation measures.

Barnacle Geese on Islay feed primarily on improved grassland and this has led to conflicts between agriculture and conservation. Increasing numbers of geese have caused reductions in grass yield on Islay's farms (Percival & Houston 1992). The consequent conflicts led to increased shooting effort and a decline in goose numbers in the late 1970's. This problem was initially alleviated by the establishment of several refuge areas, designated SSSIs, where farmers undertook a management agreement to allow safe feeding for the geese. In 1983 the Royal Society for the Protection of Birds (RSPB) bought a farm at Loch Gruinart - one of the core areas for Barnacle Geese on Islay - with the aim of managing it as a refuge for geese whilst maintaining it as a viable farm. This now caters for an October peak of 18,000 and a winter average of 6,000 Barnacle Geese.

In autumn 1992 the Islay Goose Management Scheme was launched, which encourages "all agricultural occupiers on Islay to manage their land positively for geese with the help of financial incentives" (Scottish Natural Heritage explanatory leaflet). During the 1992/93 and 1993/94 seasons, payments were made on the basis of average numbers of geese on each holding. This is a

similar solution to that reached in The Netherlands (described in van Eerden 1990).

Goose management related to agriculture - involving refuge creation and/or compensation schemes - is now recognised as a necessity worldwide e.g.. for the Cape Barren Goose in Australia (Dorward, Norman & Cowling 1980), the Barnacle Geese in Estonia (Leito 1991), the White-fronted and Bean Geese in The Netherlands (van Eerden 1990) and the Brent Geese in England (Vickery *et al.* 1994). In order for geese to be persuaded to preferentially use these refuges, the areas must be more favourable than the surrounding habitat. Management of the grassland to maximise its attractiveness to the geese is therefore essential and the most cost effective management methods must be determined.

The present study aims to identify specific management practices which will achieve this at Loch Gruinart within an efficient and environmentally sound farming operation. This is being achieved by monitoring goose use on improved grasslands experimentally manipulated to simulate different agricultural management practices and measuring the response of the sward to goose grazing (thus enabling the consequences of certain management regimes on agricultural returns to be assessed). This work follows on from the extensive study by Percival (1988) of the grazing ecology of the barnacle geese wintering on Islay.

Methods

During winter 1992/93 two fields on the reserve were allocated for experimental manipulation. Both are situated on Gruinart Flats, an area of reclaimed saltmarsh and floodplain now maintained as improved grassland through a re-seeding and fertilising regime. In the first (Experiment 1), sward height was manipulated by differential aftermath cattle grazing during August-September 1992. In the second (Experiment 2), pasture quality was manipulated by the application of different types and quantities of fertiliser in late September. For each experiment four replicates of each treatment were set up using a randomised block design.

During winter 1993/94 Experiment 1 was repeated using a field in the higher and drier part of the reserve. Experiment 2 was run again, using the same layout on the same field, in order to look at re-seed longevity under different fertiliser regimes. In addition to these, differential autumn cattle and sheep grazing was carried out on five pairs of fields across the Flats (Experiment 3), to produce a short and a long sward within each pair.

All experimental plots/fields were monitored for goose use throughout the winter and behavioural data on the feeding geese were collected. In addition, detailed measurements of sward performance were taken fortnightly throughout the winter and up to summer silage cut. These grass data, plus samples collected, will enable calculation of biomass, production and nutritional quality throughout the period. Sward species composition was assessed prior to silage cut on each plot.

An initial look at the data

The data set has not yet been fully analysed, but a quick look at the goose feeding distribution over the experimental plots and fields has shown some general trends.

Initially, tall swards and those with no aftermath cattle grazing, were not favoured. Once preferred pastures had been utilised, these longer swards were tackled.

Autumn fertilised plots initially had greater goose use than unfertilised plots, but this benefit appeared to diminish in the second year of this experiment, possibly due to grass species composition degradation with increasing re-seed age.

In all the experiments, once the initially preferred pasture had been grazed down, the geese moved on to other pastures, with a suggestion of rotational use of the pastures developing as the winter progressed: flocks returning to each field repeatedly to reap new grass growth. To this extent, the geese could be said to be managing their own food resource.

Plans for the final year of study

In conjunction with the ongoing Experiments 2 and 3, one more random block design experiment is being set up for this winter. This will combine the effects of both aftermath cattle grazing and autumn fertiliser application. Is a short, fertilized sward the ideal barnacle goose feeding area? Is a short, unfertilized sward preferable to a long, fertilized one?

It is planned that a detailed model will be constructed of barnacle goose feeding site selection at Loch Gruinart. This work will link with a population model currently being developed by Steve Percival (1992). A more extensive study of feeding site selection and vegetation dynamics on other areas of Islay could

enable the results of this intensive study to be used to predict future trends in the distribution of the geese on Islay in relation to changing land-use and management practices.

Acknowledgements

The project is supervised by Prof. P.R. Evans (University of Durham) and Dr. S.M. Percival (University of Sunderland). Thanks to them and to the other Steering Group members (Bill Sutherland, David Beaumont, Mike Peacock, Iain Bainbridge). The work is funded by BBSRC and carried out on RSPB land. Many thanks to all the RSPB staff and volunteers and other folk who have helped.

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Progress report

Lesser White-fronted Goose Action Plans

This year, the Goose Research Group has been involved in the preparation of two action plans for the Lesser White-fronted Goose. Firstly, a major report was compiled earlier this year by Janine van Vessem for the Commission of the European Communities. It provided a series of actions to prevent avoidable mortality for threatened waterbirds in the European Community, and the Lesser White-front was amongst the taxa considered. Secondly, the IWRB has been commissioned by BirdLife International to prepare a species action plan for the Lesser Whitefront.

The review of available information showed the population to be in a very parlous state in the EU, with regular wintering numbers only in north-east Greece. More worrying, beyond the borders of the European Union only 30,000 birds have been located in the Caspian Sea Region in recent years, a former stronghold (Vinogradov 1990). On the breeding areas, it is considered that there have been major declines in several parts (Rogacheva 1992). In south-west Asia, the Lesser Whitefront has been recorded on only one occasion during 1987-1991, when 35 were counted in Iran in 1989 (Perennou *et al.* 1994). These were reported in areas which regularly supported 4,500-7,500 birds in the early 1970s, but which have been lost as wintering habitat due to rapid rises in the level of the Caspian Sea (Perennou *et al.* 1994). The extreme eastern part of the population has also declined markedly in recent decades, perhaps as a result of over-exploitation by shooting in China (A. Andreev, pers. comm.), where only four sites now regularly hold more than 60 birds (Perennou *et al.* 1994).

It is therefore becoming apparent that the entire population is in serious decline, the population in the Western Palearctic has fallen by more than 90% (cf. Sterbetz 1982, Norderhaug & Norderhaug 1984) and the Far East segment has probably declined to a similar degree. The central Siberia-Caspian Sea element of the population has almost certainly declined, but lack of good count data and conflicting information requires further clarification. There is a very urgent need to address the conservation problems of the species, and it is hoped that participants in the Workshop at the forthcoming ANATIDAE 2000 Conference dedicated to the difficulties faced by this species will be able to offer some effective suggestions. This Workshop will form the basis for the BirdLife International Action Plan.

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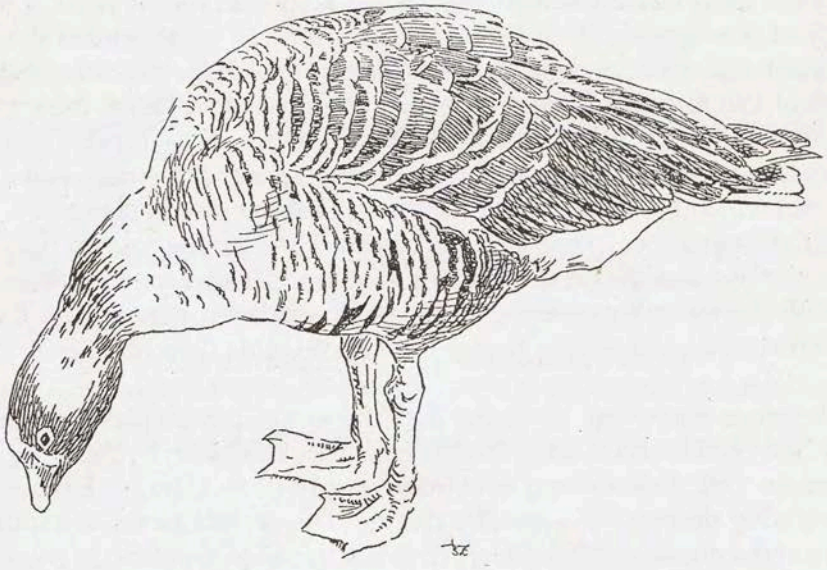

Declaration of the International Workshop on Brent Geese in the Wadden Sea - 23 September, 1994

An international workshop on the Dark-bellied Brent Goose, organised by the Dutch Wadden Sea Society, was held at Leeuwarden in the Netherlands on 22-23 September 1994. More than 80 participants representing different organisations (farmers, nature conservationists, scientists, policy makers and hunters) from Denmark, Germany, the Netherlands, Great Britain and France, met in order to discuss the conservation needs of Brent Geese in the Wadden Sea. The meeting was the first step in the process towards the preparation of a management plan for the Brent Goose, initially for the Wadden Sea, but ultimately for the flyway range as a whole.

The following is a transcript of the Declaration agreed by all participants at the meeting. A technical report from the meeting is under preparation.

The workshop *recognises* that:

- the Brent Goose is a migratory species, breeding in high arctic Siberia, which spends most of its annual cycle along the coasts of western Europe (EU countries). Its conservation is therefore a matter of international responsibility.

- it is the only Western Palearctic goose species that still occurs in its natural habitat throughout its entire winter range. This natural habitat, consisting of intertidal mudflats and natural saltmarshes, requires special protection as an ecosystem of which the Brent Goose forms an integral part, since their natural habitat has been reclaimed to a great extent and former eel-grass beds in the Dutch part of the Wadden Sea have not recovered.

- the Wadden Sea is a key area where the geese in spring build-up body reserves which are vital for subsequent reproduction in the arctic.

- following increasing protection, the Dark-bellied Brent Goose population has recovered from the very low levels in the 1950s. Even though the rate of population increase is levelling off, the population could increase further in the near future.

- Brent Geese are now increasingly using grassland areas for feeding, this has been induced by loss of habitat and population increase. Conflicts with farming interests have escalated due to the intensification of farming practices.

- natural and man-made saltmarshes are the key feeding areas of Brent Geese in spring. These areas show geomorphological differences and thus require different management measures.

- scaring combined with provision of alternative feeding areas and/or compensation for goose damage can solve the goose damage conflict between agricultural and nature conservation interests at a local level.

The workshop is *aware* that:

- the species is generally protected under the EU Birds Directive 79/409.

- the species is also protected under national legislation and hunting is not permitted, except in some local regions.

- there are different approaches for the management of saltmarshes in the three Wadden Sea countries and it is time to prepare a further trilateral agreement.

The workshop strongly *endorses*:

- the conclusions of the international workshop "Farmers and Waterfowl", held in October 1991 in Lelystad, the Netherlands.

GENERAL RECOMMENDATIONS

1. To use the conclusions and recommendations of this Brent Goose workshop and the technical report as the basis for the preparation of a Brent Goose management plan for the three Wadden Sea countries. A plan should be prepared for adoption at the 1997 Trilateral Governmental Wadden Sea Conference.

2. While that plan is being prepared, the governments of the three Wadden Sea countries - involving relevant interest groups - will consult other countries on the flyway of Dark-bellied Brent Geese with the objective of preparing a flyway management plan, consistent with the principals of the AEWA.

SPECIFIC RECOMMENDATIONS

a. The three Wadden Sea countries, striving for an integrated management plan, should take into account the needs of Brent Geese. This includes all areas ranging from mudflats through saltmarshes to embanked pastures, and encompassing the seasonal requirements of the geese. The initiative should be taken by the IWSS.

b. The management of natural saltmarshes such as still occur on parts of some islands should not be changed for the sole purpose of accommodating more

Brent Geese. In particular the introduction of grazing in such systems is undesirable. The nature managers should take this into account.

c. Changes in grazing practices on man-made saltmarshes and the large Hallingen should not be carried out without an appropriate evaluation.

d. Changes in agricultural practices in the Wadden Sea area including the coastal zone of the mainland, may reduce the carrying capacity for Brent Geese. Farmers may work within a financial framework set by agricultural policies.

   Successful efforts to reduce the conflicts between farmers and waterfowl will need to address this framework. Wildlife is an integral part of agriculture, but it is still a negligible part of agricultural policies.

   It is of the utmost importance to broaden the scope of agricultural policies to ensure the conservation of our natural heritage. The ministries of the departments of Agriculture must discuss this with each other and the EU.

e. A dynamic population model should be developed for the Dark-bellied Brent Goose to enable a better prediction of future numbers and impacts of human actions, such as hunting and creation of alternative feeding sites. Such a model requires ongoing monitoring since parameter values are expected to undergo change. The IWRB Goose Research Group should take the initiative for this.

f. The monitoring on saltmarshes (key sites) of vegetation, management practices and goose usage and in the intertidal zone eel-grass in the Wadden Sea, should be intensified. The initiative should be taken by the IWSS.

g. High priority should be given to the protection and restoration of eel-grass beds and the restoration of saltmarshes by removing dykes in the Wadden Sea.

h. When implementing local and regional measures to mitigate the goose damage conflict, such measures should avoid problems in other regions or countries.

i. An international forum should be set up to co-ordinate and tune measures used to solve the current goose damage conflict in the Wadden Sea area. This forum should assess the impacts of such measures and work towards a common approach. The initiative should be taken forward by the Common Wadden Sea Secretariat.

j. Ensure that the governments of the three Wadden Sea countries hold discussions with the EU about the way the financial framework could be set up to encourage farmers to integrate Brent Goose management into farming practice.

Recent Goose References

The following list comprises references concerning geese from throughout the world extending on from that in the last Bulletin. We are especially keen to incorporate references to grey literature and unpublished reports so that researchers are aware of the full information base which is available. Please continue to send suggestions to Preben Clausen at the Bulletin editorial address. Thanks as ever to those who have kindly contributed to the following list:

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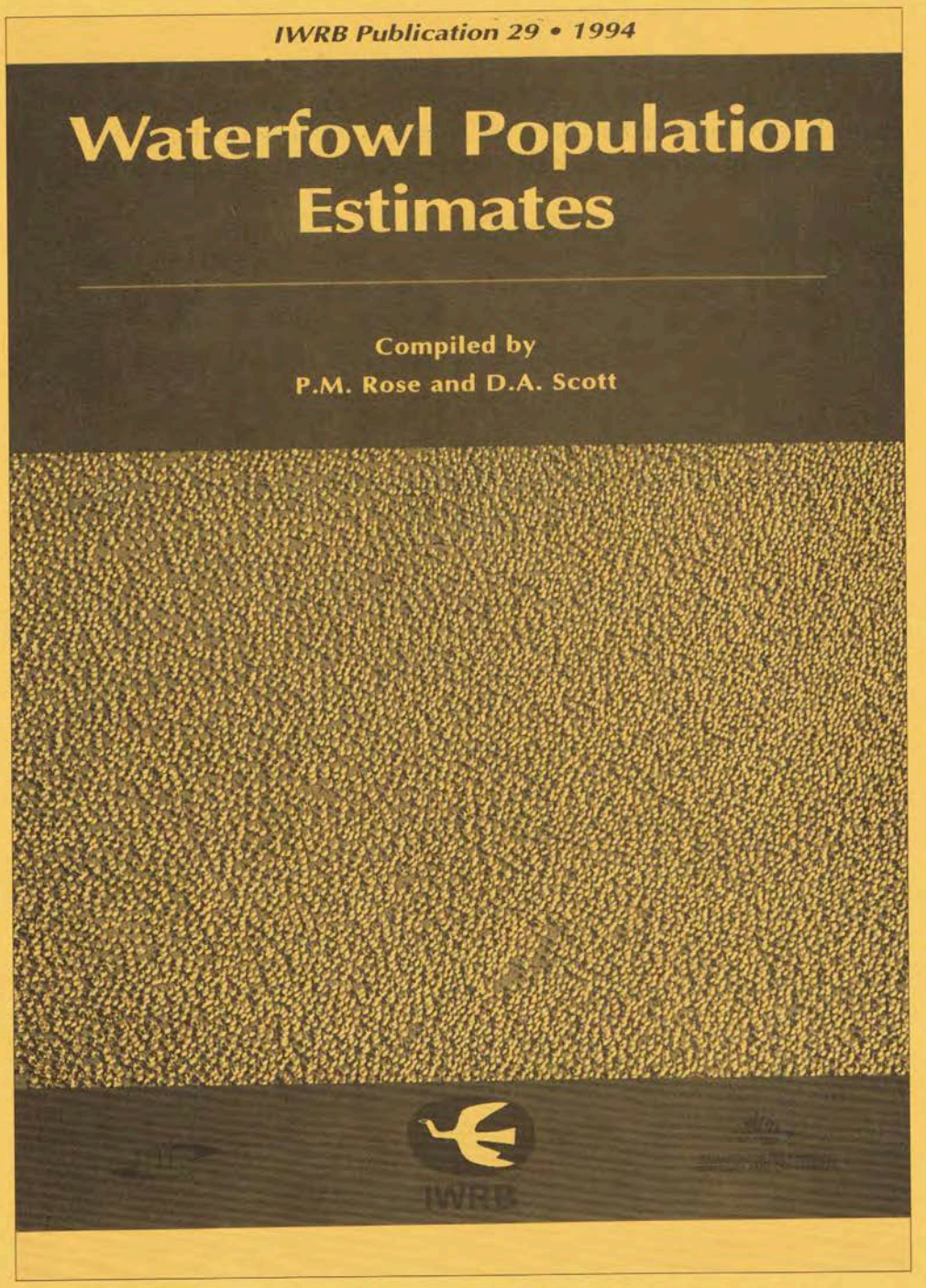

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