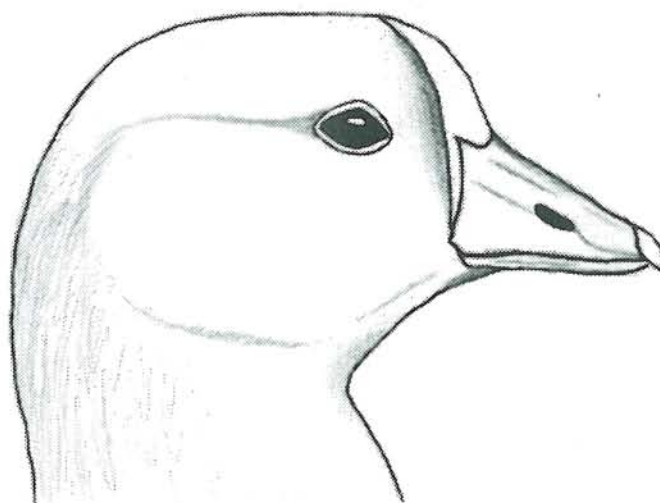


Tomas Aarvak, Ingar Jostein Øien & Szabolcs Nagy

The Lesser White-fronted Goose Monitoring Programme

Annual Report 1996



Norwegian Ornithological Society



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Tomar Aarvak, Ingar Jostein Øien & Szabolcs Nagy

THE LESSER WHITE-FRONTED GOOSE MONITORING PROGRAMME

Annual Report 1996

**NORSK ORNITOLOGISK FORENING (NOF)
KLÆBU 1996**

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PREFACE

This report describes the activities on NOFs Lesser White-fronted Goose monitoring programme in the period October 1995 - October 1996. The satellite telemetry part, has been carried out in co-operation with Svein-Håkon Lorentsen from the Norwegian Institute for Nature Research (NINA).

A number of persons have contributed to the project in different ways. Special thanks are due to Torkjell Morset at Statskog, Mountain Service in Lakselv for his outstanding logistic- and personal assistance during the field work. We also appreciate the help from Rune Haugen who participated in the field work in Norway and Halvar Ludvigsen who participated as our cannon-nett expert in Hungary. The Lesser White-fronted Goose is a secretive species and difficult to distinguish from the White-fronted Goose *Anser albifrons*. The information gathered on the Lesser White-fronted Goose in this report could not have been presented without the involvement of a lot of enthusiastic persons. We appreciate the help and good co-operation from all the co-operation partners and contacts listed in appendix 2.

We appreciate the good co-operation we have had with the team behind the Lesser White-fronted Goose documentary "*Man, my worst enemy...*", Kåre Tannvik and Ulf Berntsen who have travelled together with us and the geese in many countries.

We are further indebted to lieutenant-colonel Lyng, captain Sulland and captain Pettersen at the Porsangmoen division of the Norwegian Army for loan of equipment, and to lieutenant Morten Blom at Banak Air Force Station for various help. We also appreciate the help of Gunder Gabrielsen at Gabriel Elektro for assistance with the electric fire system of the cannon nets.

Special thanks goes to Sandor Farago, Zsolte Kalota's, Ga'bor Kova'cs, Michael Vegh, Gabor Horv'ath, Janos Tar, Gabor Magyor, István Major and Lajos Varga for all help and good co-operation during the work in Hungary.

We would also like to thank Barb Lamprecht Håland and Andreas Tveteraas at Stabbursnes Nature Centre for various help and good co-operation.

Financial support is provided by: Department of Environmental Affairs - Office of the County Governor of Finnmark, the Directorate for Nature Management and Porsanger municipality - Finnmark. The satellite telemetry part of the project and the following up work is funded by the Norwegian Ministry of Environment with the Norwegian State Pollution Control - Eastern Europe Secretariat through a program for environmental collaboration between Hungary and Norway.

Trondheim, November 1996

Tomas Aarvak

Ingar Jostein Øien

Szabolcs Nagy

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ABSTRACT

This report contains the results from the work on The Norwegian Lesser White-fronted Goose monitoring programme which is run by the Norwegian Ornithological Society (NOF), in the period October 1995 - October 1996. It also contains the results from the satellite telemetry project run together with the Norwegian Institute for Nature Research (NINA) and the Hungarian Ornithological and Nature Conservation Society (MME / BirdLife Hungary)

Monitoring of the staging area Valdak, in the Porsangen Fjord in Finnmark county, was conducted, both in the pre-breeding period and in autumn subsequent to the moulting. In spring, a minimum of 56 individuals were staging of which there were 23 pairs and 10 juveniles, as estimated from a method of individual identification by belly patches. In autumn a total of 39 birds was registered, distributed in 16 adults and 23 immatures.

With the use of satellite transmitters autumn and winter migration of four individuals of Lesser White-fronted Geese were mapped. The Finnish Lesser White-fronted Goose project (WWF-Finland) fitted one individual with a satellite transmitter. The migration route went from the breeding areas to the Valdak Marshes staging area where the birds spent about two weeks. The Finnish goose staged at the Sjøholmen island in the Varanger Fjord. The migration then went directly to the Kanin Peninsula where they staged for 3-4 weeks. Later three of the individuals went towards southeast (including the Finnish goose), where the Norwegian individuals were shot in the Ob valley in Russia. The Finnish Goose disappeared in north Kazakhstan. The other two geese moved southwestwards, through East Germany were one were lost, and the last individual continued to Hungary and Greece. The last signals were received in February. This individual was resighted at the Valdak Marshes in May 1996.

Through the International co-operation the following countries were surveyed for staging and wintering geese: Azerbaijan, Kazakhstan, Greece, Hungary and Russia.

SAMMENDRAG

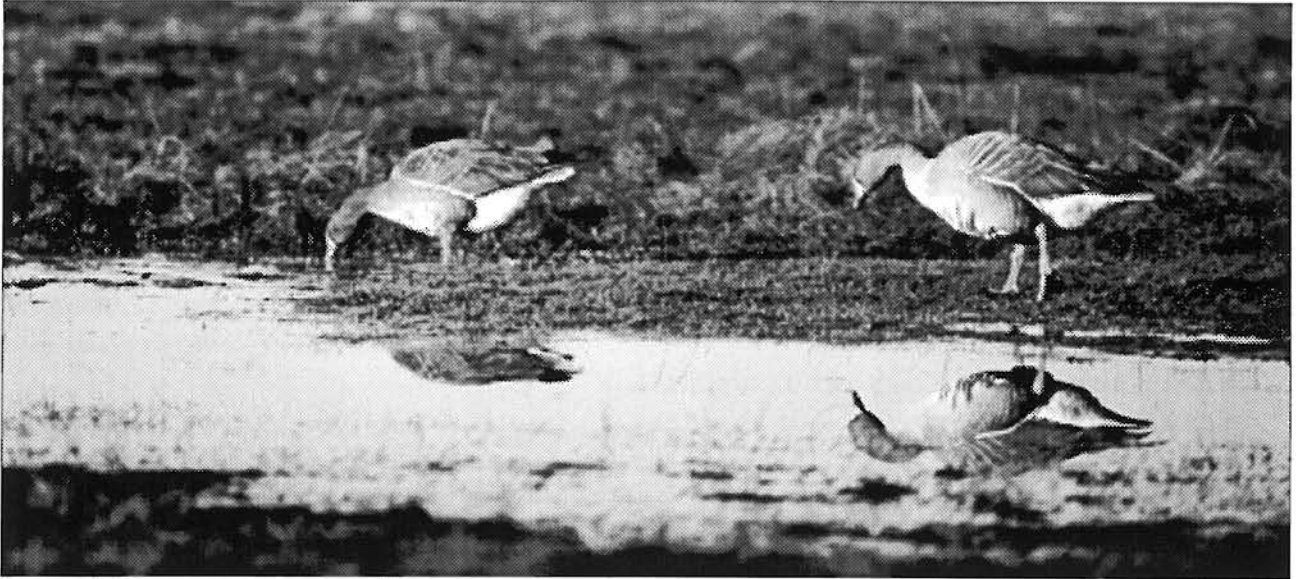
Denne rapporten inneholder resultatene fra NOFs dverggås prosjekt. Rapporten inneholder også resultatene fra satelitt telemetri prosjektet som har vært gjennomført i samarbeid med Norsk Institutt for Naturforskning (NINA) og MME/BirdLife Hungary.

Overvåking ble gjennomført på rasteplassen på Valdak i Porsangerfjorden i Finnmark fylke, både på våren og høsten. På våren ble totalt 56 individer registrert, fordelt på 23 par og 10 ungfugler, estimert på bakgrunn av det karakteristiske bukflekkmønsteret hos hvert enkelt individ. På høsten ble kun 39 individer registrert, fordelt på 16 voksne og 23 ungfugler.

Høsttrekkrutene, rasteplassene og vinterområdene ble kartlagt ved hjelp av satelitt telemetri på fire individer, fanget under vårtrekk og myting. Ett femte individ ble fanget på WWF-finland under myting i Finland. Etter gjennomført myting ankom de fire norske individene Valdakmyra, mens den finske fuglen rastet på Sjøholmen i Varangerfjorden. Fra Finnmark trakk de alle rett østover til Kanin halvøya hvor de rastet i tre-fire uker. Derfra delte trekket seg i to ruter: To individer trakk mot sørvest gjennom tidligere det tidligere Øst-Tyskland, hvor en fugl forsvant, og videre gjennom Ungarn til Hellas hvor det gjennværende individet ble til signalene stoppet i midten av februar. Dette individet ble sett igjen på Valdak våren 1996 med en ny make, men uten satelittsenderen. De tre andre individene trakk sørøstover. De to norske fuglene ble skutt i Ob dalen i Russland, mens det finske individet forsvant nord i Kazakhstan.

Gjennom det internasjonale samarbeidet har en rekke land blitt undersøkt innenfor rapporteringsperioden. Disse landene er utførlig beskrevet i rapporten. De undersøkte landene er Azerbaijan, Kazakhstan, Hellas, Ungarn og Russland

1. INTRODUCTION



A pair of Lesser White-fronted Geese at the Valdak marshes in May 1995.

The Lesser White-fronted Goose *Anser erythropus* is more threatened than ever. A review of the wintering populations of the Lesser White-fronted Goose (Lorentsen et al. MS_b) concludes that the rapid population decline continues. This fact implies that the Lesser White-fronted Goose is rapidly facing extinction, probably within a time scale of 10-15 years. This is not only a result of a population that in steady decline, but also a result of over-estimates of the total population in former years due to generally poor knowledge about both the breeding and wintering populations and areas. As information is gathered and the knowledge increases, the population estimates shrinks. The world population of Lesser White-fronted Geese has traditionally been divided in three meta-populations, the Fennoscandian, the Central Russian and the Far Eastern. The core population with an estimated 110.000 individuals in Taymyr (Martynov 1983, cited in Vinogradov 1990) was based on data extrapolated from questionnaires. This estimate was considered to be too high by Rogacheva (1992) and Øien & Aarvak (1993). Later Morozov (1995) estimated the total Russian population to be 30.000-50.000 individuals. Even this new estimate, is now thought to be too high,

and it has not been confirmed by winter counts in recent years. Lorentsen et al. (MS_b) now estimates the world population to be about 15.000 individuals. In Fennoscandia the population was estimated to be more than 10.000 individuals in the first half of the century (Norderhaug & Norderhaug 1984). From the 1950's until the beginning of the 1980's the population declined by 90-95 %, and the range by at least 50 %. In the period 1980-1996 the decline has continued and at present the population counts about 1 % of its former size. This represents approximately 30-50 breeding pairs.

As the population estimates have shrunken the species have appeared on the international red lists of threatened birds, even though the Lesser White-fronted Goose appeared on several national red lists earlier. In Norway the Lesser White-fronted Goose is listed as threatened in the Norwegian Red List (Størkersen 1992, 1996).

In Norway the Directorate for Nature management published an action plan for the management of geese this year. This plan discuss the present knowledge and outlines the main goals and means

in the management of the goose species in Norway. It will be an important incentive to the work in the forthcoming years. The main goals for the Lesser White-fronted Goose are:

- The Lesser White-fronted Goose shall be managed as a particularly vulnerable species which need to be managed with special care. The consideration for the species' continued survival in Norway require special attention and particular actions both on the species and the habitat level.
- Norway should actively work to reach the goals set by the International Action Plan for the Lesser White-fronted Goose.
- It is important to protect both existing and former staging, breeding and moulting areas for the geese.

Internationally the Action Plan for the Lesser White-fronted Goose have finally been published by the Council of Europe (Madsen 1996). In connection with the international meeting of Wetlands International's Goose Research group in Poland in November 1995, a workshop was held on the implementation of the Action Plan. Up-to-date reports on the distribution and population numbers of the species ended in recommendations in an *Urgent Action Plan* (Madsen & Lorentsen 1996) for the conservation of the Lesser White-fronted Goose. The most alarming conclusion from the meeting was that there is a continuing rapid decline in numbers throughout the species entire range, and even disappearance from former important breeding areas in Northern Russia. Only some few thousand individuals can be accounted for in the Western Palearctic range, and the existing population estimate of 25.000-50.000 individuals is judged to be far too optimistic (Madsen & Lorentsen 1995).

The detailed *Urgent Action Plan* covered the period January 1996 to January 1997, and consisted of six activities (the ranking indicates the chronology and not the priority):

- 1) Search for wintering geese in Azerbaijan
- 2) Search for wintering geese at the Azov Sea, Russia

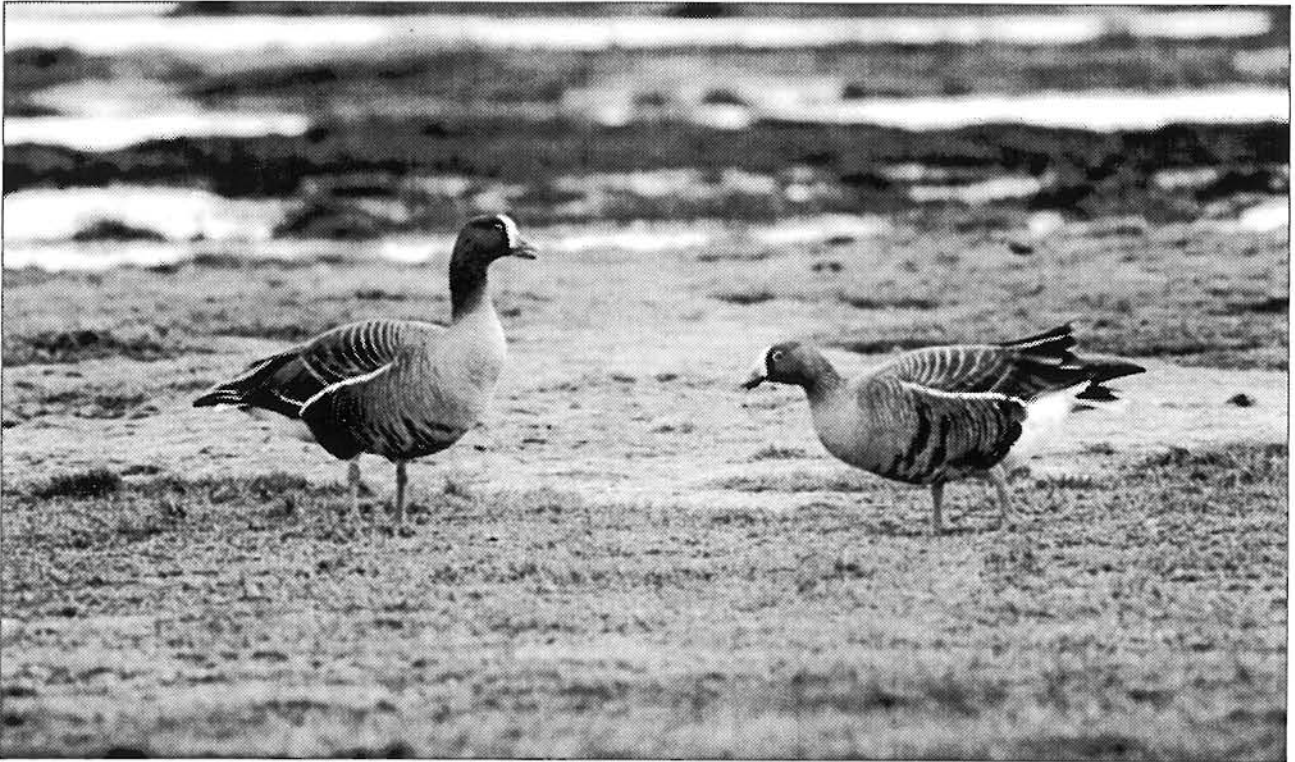
- 3) Search for breeding geese in Taymyr, Russia, and satellite tracking of individual geese
- 4) Assess autumn staging areas on the Kanin Peninsula, Russia
- 5) Follow-up on staging areas located in Germany and Hungary
- 6) Co-ordination and reporting

Another important conclusion and recommendation from the meeting was: *The workshop recommends that the most urgent and effective conservation measure to be implemented is the creation of shooting-free zones in key staging, wintering and breeding areas of Lesser White-fronted Geese.*

In April 1996 the Nordic Lesser White-fronted Goose Group met in Sweden. National summaries were given, as well a thorough discussion on the status of the implementation of the *Urgent Action Plan* made. The meeting could rejoice at the fact that many of the activities already had been carried out during the winter. Only activity 2 and 3 had not been carried out, but concrete plans have been made by Vladimir Morozov for the Jamal area for 1997 and a joint Russian/Finnish/Norwegian survey and satellite tracking project is planned on Taymyr in 1997. A major conclusion from the meeting was that the accumulation of new data had taken place so quickly that both the *Urgent Action Plan* and the more comprehensive *International Action Plan* for the Lesser White-fronted Goose should be updated quite soon. It was also stated that in an updated *International Action Plan*, the whole distribution area should be implemented, comprising the whole Palearctic region including the Far East breeding areas in Yakutia and the wintering areas in China.

Through the work of the Lesser White-fronted Goose Monitoring Programme several of the actions has been implemented, and are reported here. In 1997 and 1998 the project will continue the work on reaching the goals in the *International Action Plan*, the *Urgent Action Plan* as well as in the Norwegian Directorate for Nature Management's *National Action Plan*.

2. MONITORING IN NORWAY



A pair of Lesser White-fronted Goose at the Valdak marshes in May 1995. The male at right.

2.1 STAGING GROUND AT VALDAK FINNMARK

The Valdak Marshes (70½09'N24½54'E) are situated in the Porsangen Fjord in Finnmark County in Norway. It is part of the Stabbursnes Nature Reserve, which is a Ramsar site and a BirdLife International *Important Bird Area* (Norwegian IBA 010, Grimmet & Jones 1989). The Valdak Marshes are one of the largest salt- and brackish marshes in Northern Norway. A more thorough description of the staging ground is given in Aarvak et al. (1995). See also section 2.1.5.

2.1.1 Methods

The staging Lesser White-fronted Geese were monitored from the headland Stabbursnes with telescopes (20-60X magnification), with the aim to determine the progress of migration and the total

number of geese staging in the area. As in former years the individuals were identified by the individual uniqueness of belly patches. A more thorough description of method is given by Øien et al. (1996). In 1996 the monitoring period lasted from the 13 May until the 12 June. The number of staging individuals and staging time for the pairs (turnover rates) were monitored. In addition, daily activity of individuals and flocks, food preferences, tolerance of disturbance, habitat use, flying activity and migratory movements have been registered.

2.1.2 Spring staging

The first three Lesser White-fronted Geese were seen on the 14 May. Thereafter the number of geese increased, reaching a peak at May 31 with a total of 31 birds, and subsequently decreasing until

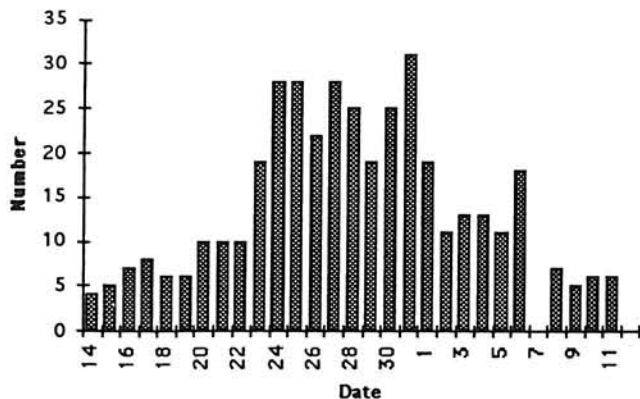


Figure 1. Maximum daily numbers of Lesser White-fronted Geese observed in the period 14th May - 12th June 1996.

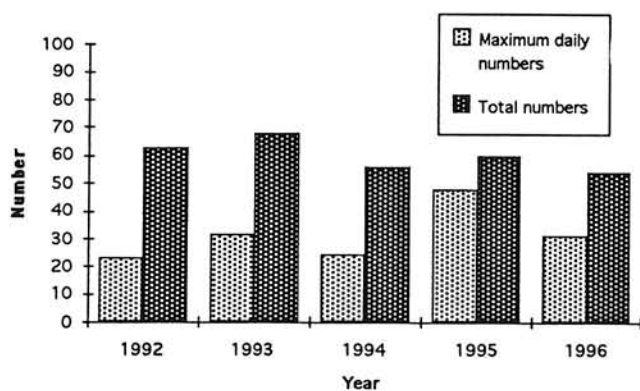
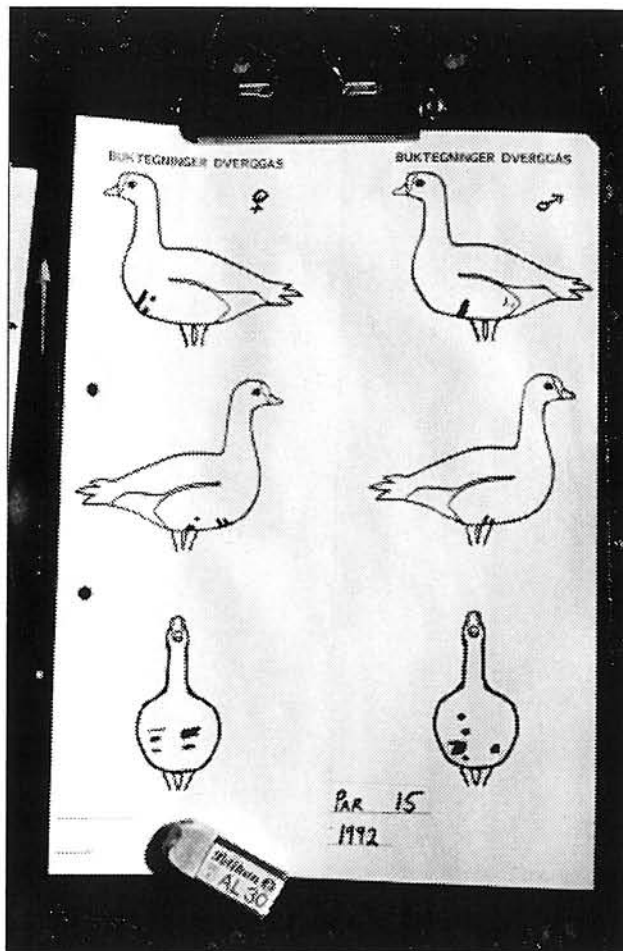


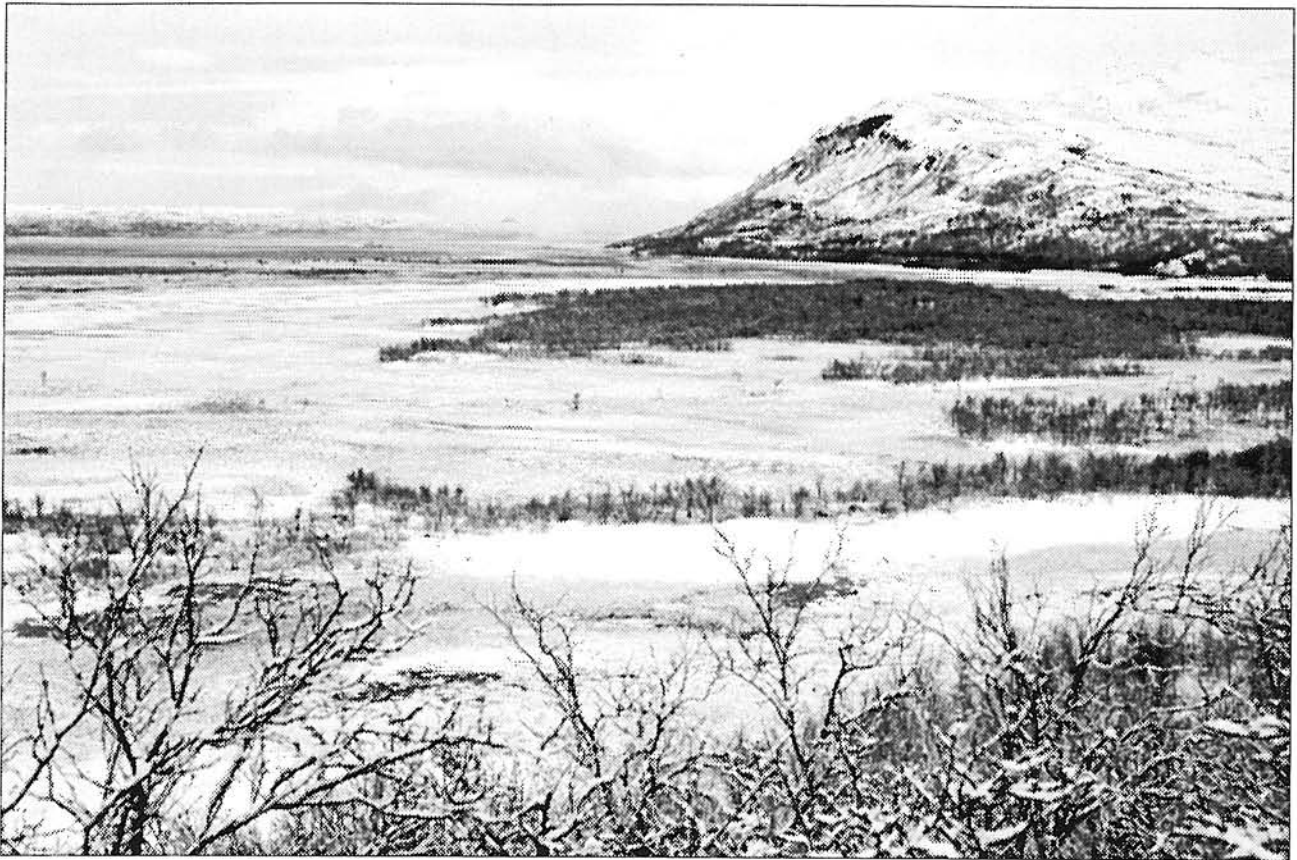
Figure 2. Maximum daily number of Lesser White-fronted Geese and the total number estimated from drawings of belly patches observed at the Valdak Marshes in the years 1992-1996.



Drawings of belly patches of the Lesser White-fronted Goose used as a method for individual identification at the staging area at the Valdak marshes.

Table 1. Overview of numbers of Lesser White-fronted Geese at the Valdak Marshes in the years 1992-96. The table shows the maximum number of staging geese on the best day, distribution of adults in pairs and juveniles, and total number of staging individuals each year.

Year	Maximum on one day	Number of pairs	Number of juveniles	Proportion of juveniles	Total number of individuals
1992	23	25	13	26,0 %	70
1993	32	32	4	6,3 %	68
1994	24	26	4	7,7 %	56
1995	48	• 25	• 10	• 16,7 %	• 60
1996	31	23	10	17,9 %	56



The Valdak marshes viewed from the headland Stabburnes towards south. The picture is from the end of May 1996 — the salt marshes are all still covered by ice and snow.

the 11 June (Figure 1). The total number of 56 geese staging in the area is about the same as previous years (Table 1), as estimated from the method of individual identifiable belly patches (Øien et al. 1996). The proportion of second year birds were relatively high this year due to high production of young in 1995 (Aarvak et al. 1995). The relationship between maximum daily numbers of geese present and total numbers estimated, show no clear trends (Figure 2). It is, however, evident that the total number of geese using the Valdak Marshes shows a slight decreasing trend (Øien et al. 1996).

The geese graze intensively in the area, before leaving for the breeding grounds. In 1996 the mean staging period for the pairs were 8,9 days, which is a little longer than in previous years. The duration of the staging period is estimated through use of the individual recognition by belly patch method (see Øien et al. 1996).

Among the geese observed in spring were also the male which were caught during moult in 1995 (with colour ring Red-Black-Yellow, individual 24678 [see Aarvak et al. 1995]). This is the same male that migrated to Greece (see section 3.1.4). The signals from the satellite transmitter on this bird were lost in the middle of February. When it showed up on the Valdak Marshes on the 24 August the transmitter or antenna could not be seen, and the goose has presumably lost the transmitter. This bird were associated with a female and they stayed at the marshes until 2 September, giving a staging period of 10 days.

2.1.3 Autumn staging

This autumn a total of 39 individuals were registered (16 adults and 23 juveniles) on the Valdak Marshes. The first Lesser White-fronted Geese

Table 2. Mean staging time of Lesser White-fronted Geese at the Valdak Marshes in the years 1992-96 as estimated from the belly patch method (n= number of pairs).

Year	1992	1993	1994	1995	1996
☒	3,4	6,2	7,4	7,9	8,9
n	25	32	26	25	23

Table 3. Distribution of broods (post-moult) on the staging area (Valdak Marshes), and breeding areas (areas C & D) in 1994, area (A & C) in 1995 (Note that there are some corrections from Table 5 in Aarvak et al. 1995). The area codes are not decoded in this publication.

Area	Brood allocation							Mean brood size	±SD	n broods	Year
	0	1	2	3	4	5	6				
Breeding area	3	1	1					2,00	1,41	5	1994
Staging area	1	2	4					2,43 *	0,79	7	1994
Breeding area	1	1	3	1	2			3,25	1,39	8	1995
Staging area		4	3	2	6	2		3,94	1,43	17	1995
Breeding area	-	-	-	-				-	-	-	1996
Staging area	1	3	4	1				2,56	0,88	9	1996

* One flock of 32 individuals (16 goslings) has been omitted, because the distribution of broods are unknown (see also Table 6).

were seen on the 22 August (22 individuals), increasing to 36 individuals on the 25 August, and to 39 individuals on the 26 August. The last observation was from the 5 September when approximately 30-40 individuals were seen at 06⁰⁰ a.m. This yields a staging period for the first arriving geese of 15 days. The 11 individuals that arrived on the 25 August stayed for a period of 12 days, and the last arriving birds stayed at Valdak for 11 days.

The geese utilized the area quite different than during spring-staging, spending more time being alert, and they were extremely shy. Often they could be observed standing alert for 10-15 minutes before flying off to another part of the marshes, or they left the area. The main disturbance factor in autumn seems to be people picking cloudberries *Rubus chamaemorus*, which results in a redistri-

bution of the geese. As a result of disturbance, the geese spend most of their time on the adjacent islands, where they are vulnerable to hunting and less profitable food. In the last half of the staging period, the geese could be observed at the Valdak Marshes mainly at night, and they were rarely present during daylight.

2.1.4 Breeding success and mortality

Monitoring during the post-moulting period gives the best estimate on the production. For the second year we have managed to accomplish counts of families and social groups in the post moulting period in order to estimate brood size, productivity, and proportion of juveniles in the population. Some older information exists from other sources (see Aarvak et al. 1995 and Table 3 and 4). In 1996,

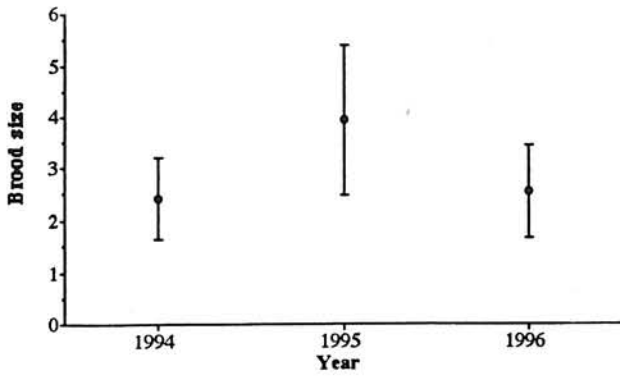
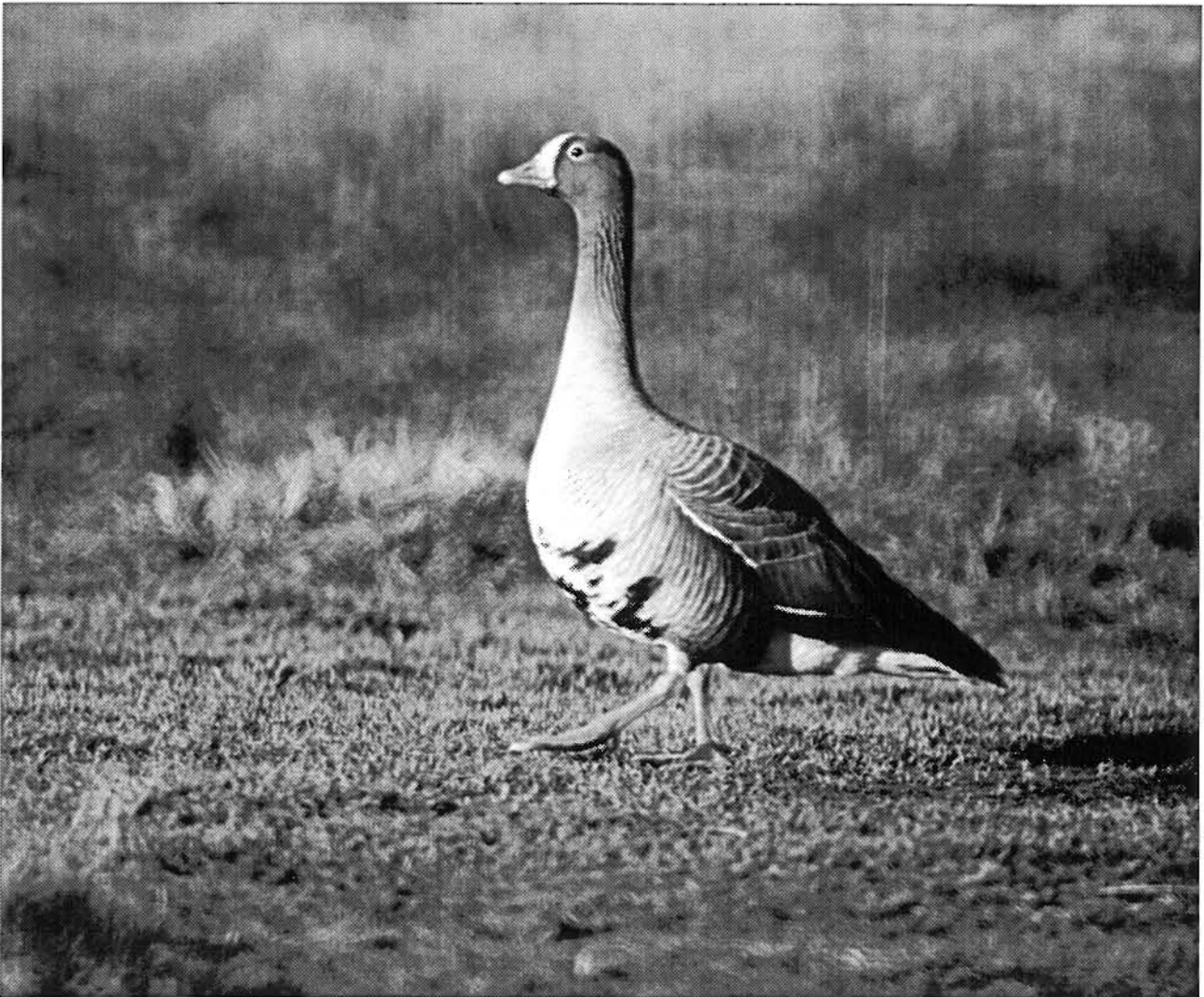


Figure 3. Mean brood size, ± 1 SD during autumn staging at Valdak in 1994 - 1996, based on observed pairs with broods (Mean brood¹ in Table 4).

nine broods were seen during the autumn staging at Valdak, with a mean brood size of 2,6 based on pairs with broods (Table 3). This is considerably less than the mean brood size in 1995 (Table 3, Figure 3). Out of these nine broods, two were associated with only one adult.

In addition were one pair with five goslings seen on the island Sjøholmen in the Varanger Fjord, by field workers from the Finnish Lesser White-fronted Goose Project (P. Tolvanen pers. comm., WWF, Finland).



Male Lesser White-fronted Goose at the Valdak marshes, May 1995.

Counts made post breeding takes no account of chick mortality after hatching, during moult and until they appear on the Valdak Marshes as their main staging area before autumn migration. Few birds were seen in 1996: only 16 adults and 23 juveniles. The proportion of the population not attempting to breed and the proportion that failed to breed successfully are virtually unknown.

Thus it is easy to assume that the production is high based only on the individuals seen post-moult. In Table 4, three different estimates on brood size is given. The probably best estimate is based on number of juveniles divided by number of pairs seen in spring (potential breeders) before the breeding period (Mean brood³), which yields an estimate for 1996 of 1,0 goslings per pair (Table 4, Figure 4). This estimate clearly shows that the production varies more between years than indicated in Figure 3. It is virtually unknown what the part of the population which do not breed successfully is doing after moult, but it is assumed that they migrate out of the breeding areas earlier than the successful breeders, and it is a possibility that

they use the Valdak Marshes as a staging area during mid-summer.

All adults staging at the Valdak Marshes during spring, which have formed pairs where the female accumulates large deposits of fat (as judged by the abdominal profile; cf. Øien & Aarvak 1993) are assumed to make breeding attempts. Bearing this in mind, we can calculate the number of potentially failed breeding pairs. For 1996, we obtain estimate of 14 pairs (60,9 %) which apparently have failed. The longevity and life-time expectancy and generation time is unknown for the Lesser White-fronted Goose. This complicates any assumptions whether some pairs in a trade-off between current reproductive output and increased life-time expectancy would choose not to breed due to bad weather conditions. The overall production of young were very low in 1996, independent of different estimation techniques. This is presumably caused by the bad weather conditions during June, with high precipitation, inundation of water courses and low temperature in the mountain areas in Finnmark.

Table 4. Autumn age ratio and yearly brood sizes by Lesser White-fronted Geese in the years 1981-1996, based on counts during autumn migration at the Valdak Marshes (See also Table 3 for the distribution of broods and number of pairs with broods).

Year	n adults	n juveniles	n total	% juveniles	n flocks	Mean brood ¹	Mean brood ²	Mean brood ³
1981	10	18	28	64,3	1		3,6	
1982-86no data exists								
1987	10	18	28	64,3	1		3,6	
1988-91no data exists								
1992	24	34	58	58,6	?		2,8	
1993no data exists								
1994	31	33	64	51,6 [†]	3	2,4	2,2	1,27
1995	61	67	128	52,3	3	3,9	2,2	2,68
1996	16	23	39	59,0	1	2,6	2,9	1,00

¹ Counts of pairs with broods in autumn.

² Number of juveniles divided by number of adults (pairs) in autumn.

³ Number of juveniles in autumn divided by number of pairs in spring

[†] Assumed that the observations are three independent flocks.

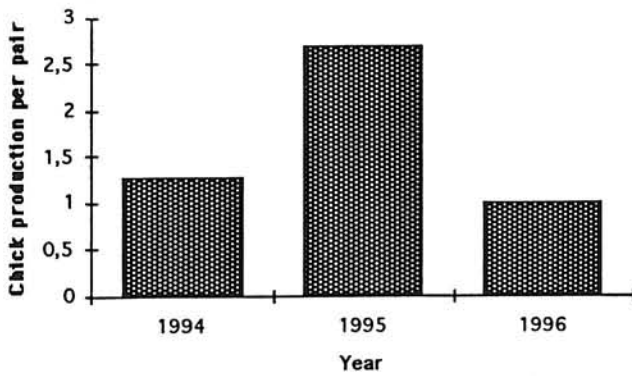


Figure 4. Mean total chick production per pair in the years 1994-1996. Number of goslings seen post moult is divided by number of pairs present (potential breeders) in spring before breeding (data from Table 1 and Table 4 [mean brood³]).

These contrasting estimates on gosling production clearly demonstrates that one should be very careful in the interpretation of such data. Therefore, at present, it is very difficult to compare the last years results with earlier estimates on brood size and production before a more thorough analysis is made on the old material collected by Norderhaug

and Norderhaug (1981, 1984). Overall, the production seems to be generally high, although it varies considerably from year to year probably depending on the weather conditions during breeding.

Due to continuous monitoring during autumn staging in the period 1994-1996, the data collected seems to be very reliable and mutual comparable. It is also likely that the individuals observed on the Valdak Marshes come from a more or less closed population, apparently with no exchange with individuals from the eastern part of the county. The birds breeding in Eastern Finnmark and Northern Finland utilize the Sjøholmen island, while individuals from the western part (core breeding area) stage at the Valdak Marshes. The use of satellite transmitters have, however, revealed that they use the same staging area on the Kanin Peninsula (see section 3.1.4 and Lorentsen et al. (MS_a) for a more thorough description).

Mortality rates for adults are difficult to obtain as very few are ringed. A crude juvenile mortality rate can however be estimated by the difference



The juveniles usually keep together in small flocks during spring staging. The picture shows a flock of juvenile Lesser White-fronted Geese at the Valdak marshes in May 1995.

between the number of juveniles in autumn 1995 and spring 1996. This give an estimated 85,1% mortality for the juveniles. This is assumed to be related to the high hunting pressure along the migration routes and in the wintering areas. Totally six goslings have been ringed in the moulting period, and three of them have been reported shot. This yields a juvenile death rate of 50% based on reported kills (Lahti & Markkola 1995, Aarvak & Øien 1995, J. Markkola pers. comm.).

2.1.5 Feeding ecology

The Valdak Marshes is one of the largest salt- and brackish marshes in Northern Norway and is composed of peat-bogs and salt-marshes with many arctic plant communities. The arctic grass *Puccinella phryganodes* dominates the vegetation and Valdak has probably the largest population of this species in Norway (Elven & Johansen 1982). The area has a very typical zonation with *Puccinella phryganodes* closest to the seashore. The zone is followed by a taller species *Carex subspathacea*, and further inwards *Carex hirta* and *Festuca rubra*. The whole marsh is scattered with small ponds and pools with brackish water, and the vegetation is also here in a clear zonation with *Hippurietum tetraphylla* in the outermost pools, followed by *Carex mackenziei* and *Potamogeton filiformis*.

In the Valdak Bay, the zonation is influenced by a inflow of fresh water from the Valdak Brook, which alter the community somewhat, with a higher density of *Eleocharis uniglumis* close to the seashore.

During spring staging the Lesser White-fronted Goose feeds almost exclusively on *Puccinella phryganodes*. However, in spring 1996 the traditional food plant was covered with ice and snow upon the arrival of the first pairs of geese. The only available food was *Hippurietum tetraphylla* which hardly had started growing in the melt ponds. As the snow and ice melted and protracted from the salt marsh, the geese continued to feed on *Hippurietum tetraphylla* until a sudden shift

back to *Puccinella phryganodes* was noted on the 31st of May. After this time there were only occasional observations of Lesser White-fronted Geese eating *Hippurietum tetraphylla*. Three different males were also observed eating unidentified food items. This food items were found in the mud and ponds by the males after trampling fast in the mud with both feet, and then taking one step backward to eat in this area.

In autumn the geese were feeding on a variety of plant species. In the beginning of the staging period, the geese were seen feeding on *Festuca rubra*, but later on they also utilized species as *Puccinella phryganodes*, *Eleocharis uniglumis*, *Agrostis stolonifera*, *Juncus gerardi* and *Elymus arenarius*.

Especially the arctic grass *Puccinella phryganodes* seems to be a very important food item for the Lesser White-fronted Goose. *Puccinella phryganodes* is a circumpolar species. In the La Pérouse Bay in Northern Manitoba, Canada, the coastal salt marshes is thought to be responsible for the successful colonization of the areas by Lesser Snow Geese *Anser c. caerulescens*. The growing, above ground shoots of leaves of *Puccinella phryganodes* and *Carex subspathacea* provide the major forage for the geese. Her it has been shown that light to moderate grazing by the geese enhances the productivity of the salt marsh by 40-100 % above that of ungrazed control plots (Cooke et al. 1995). The implications of this is that the Valdak Marshes probably can support many more individuals, as it were in former days.

2.2 STAGING GROUND AT SJÅHOLMEN, FINNMARK

The island Sjøholmen in the Varanger Fjord in Finnmark was identified as a staging area in 1994, due to satellite tracking of a male Lesser White-fronted Goose from the moulting area in Finland (Lahti & Markkola 1995, Aarvak & Øien 1994). This male were after some time found dead on the island, and it had probably been preyed upon by a White-tailed Eagle *Haliaeetus albicilla*. This

use of Sjäholmen as staging ground was also confirmed in 1995, when another male were satellite tracked from a moulting ground in Finland to Sjäholmen before it continued to the Kanin Peninsula (J. Markkola pers. comm.). This individual was probably shot in Kazakhstan later in the autumn 1995. This information led our colleagues in the Finnish Lesser White-fronted Goose Project (World Wildlife Fund, Finland) to stay at the island in the autumn in the both staging period in 1995 and 1996.

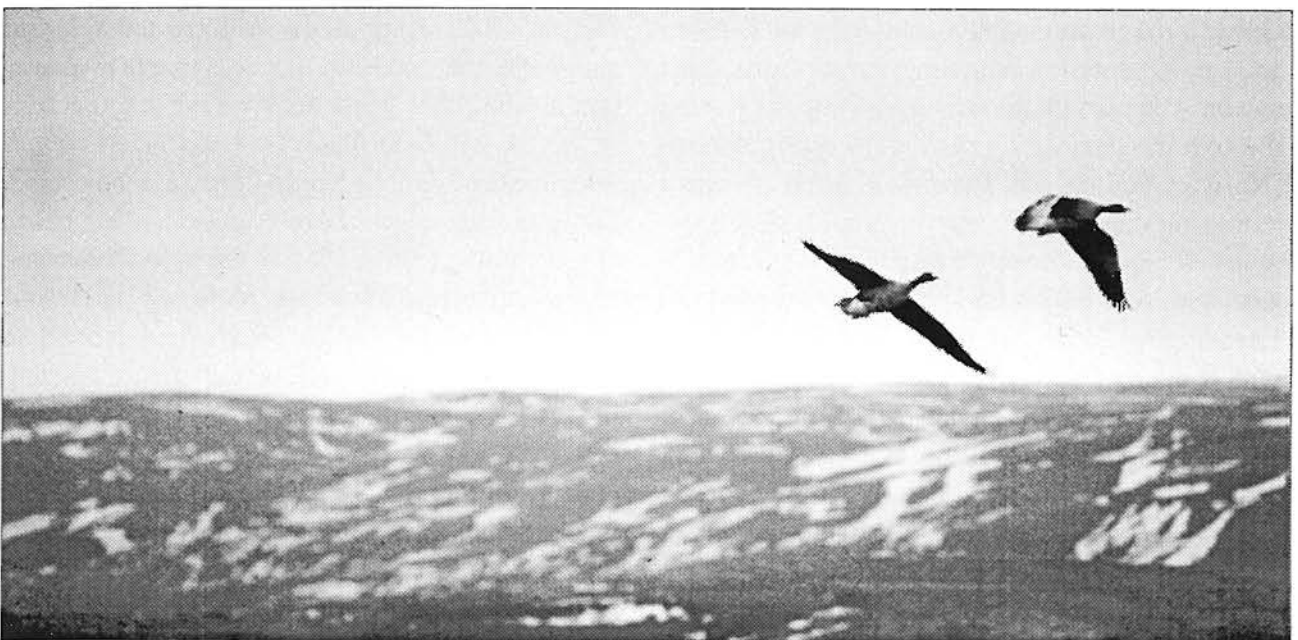
In spring 1996, the island was visited by NOF on the 7 of June in order to make out whether the Lesser White-fronted Goose used the island as a spring staging area and to describe the use of the area based on the amount and distribution of the registered faeces. We came across one pair of Lesser White-fronted Geese, and judged by the amount of faeces registrated, approximately 5 pairs had visited the area this spring. The faeces were found in the saltmarshes and the seashore grass vegetation on the whole western half of the island.

In the period 25 August - 3 September, field workers from the Finnish Lesser White-fronted Goose Project (WWF, Finland) visited the island in order to monitor the number of geese as well as

obtaining a measure on the production. They also mounted one cannon net in order to catch Lesser White-fronted Geese for satellite telemetry. The catching attempt failed. In total eighth adults and five juveniles were observed (P. Tolvanen pers. comm.). The five juveniles were all in one brood, and the female of the brood were identified as the female from the pair that were caught in Finland during moult in 1995. She was banded with colour foot rings and a neck ring, and the male got a satellite transmitter. This male was probably shot in Kazakhstan together with two of their five goslings (see section 3.1.4).

2.3 BREEDING AREAS

No work have been conducted in the breeding areas by the Norwegian Lesser White-fronted Goose Monitoring Programme this year, but NOF joined the Finnish Lesser White-fronted Goose project (WWF, Finland) in their attempt to catch geese during the moulting period in the Norwegian / Finnish breeding areas. No geese were found in this area, neither in other smaller and marginal areas. The main breeding area in Norway were not surveyed this year. For breeding success and mortality se section 2.1.4.



A pair of Lesser White-fronted Geese at the Valdak marshes in May 1995, lifting off towards the breeding grounds.

3. MIGRATION ROUTES AND WINTERING GROUNDS

3.1 SATELLITE TELEMETRY

3.1.1 Background

The Norwegian Ornithological Society (NOF) has since 1987 run the Lesser White-fronted Goose Monitoring Programme. The first years were spent on mapping the breeding and staging areas as well as studies to understand the reasons for the population decline in Norway. These studies revealed that the main causes had to be sought along the migration routes and in the wintering areas. The core problem is that the staging and wintering grounds for the species are virtually unknown. Due to the steady and alarming decrease in the Fennoscandian breeding population of Lesser White-fronted Goose, actions were needed to locate the staging and the wintering grounds. In 1993 NOF started the planning of a project to locate the staging grounds along the migration routes and wintering grounds for the Fennoscandian population.

The overall goal of the project is to turn the negative population trend of the Lesser White-fronted Goose through the establishment of protected sites and implementation of management efforts. This can only be carried out through a joint effort from the countries managing the breeding populations (Norway, Finland and Russia), and the countries managing staging and wintering populations (Germany, Hungary, Greece, Romania, Bulgaria, Kazakhstan, Azerbaijan and probably other eastern European countries as well). The co-operation with Hungary is a prerequisite by the fact that they manage some of the few known staging sites for the species which are important for the Fennoscandian population.

A pilot study was set up in the border areas between Norway and Finland in 1994, where one pair with one gosling was caught during the moulting period. The male got a satellite trans-

mitter, and were tracked to the island Sjøholmen in the Varanger Fjord in Finnmark county, Norway. Here it was found dead, after being taken by a White-tailed Eagle (See section 2.2, Lahti & Markkola 1995, Aarvak & Øien 1994). The gosling were later reported shot on the 19 November 1994 in Kurchanskiy, one of the many lagoon areas on the coast of the Azov Sea, near the city of Krasnodar (Lahti & Markkola 1995, Aarvak & Øien 1995).

3.1.2 Results of the satellite telemetry

In close co-operation with the Norwegian Institute for Nature Research (NINA), NOF caught four Lesser White-fronted Geese in Norway, and one in Finland (by WWF-Finland) in 1995. All individuals were instrumented with satellite transmitters (Lorentsen et al. MS_a, Aarvak et al. 1995). After the breeding, in the end of August, the birds returned to the staging grounds at Valdak and Sjøholmen. In August/September they all migrated eastwards to the Kanin Peninsula in autumn (see section 3.2.2). Since all the instrumented individuals went to the same area, it is reasonable to assume that all the other geese seen on the staging areas at Valdak and Sjøholmen (see section 2) went to the same area. On the Kanin Peninsula they staged for three-four weeks (Lorentsen et al. MS_a), before they migrated further. Two of the individuals went in a southwestern direction, while two individuals together with the Finnish individual moved towards southeast (Lorentsen et al. MS_a). North in the Ob Valley in the Sosnogorsky district the contact were lost with two of the individuals in the end of September. Both were assumed shot, and in December 1995 this were confirmed for one of the individuals. The Finnish individual who had followed the same route, was tracked by the satellite to Northern Kazakhstan in the Kustanai district (see section 3.2.5) before the signals were lost.

Probably it fell for a hunters shot. Two of the goslings belonging to this male were reported shot from the same area (J. Markkola pers. comm.).

The southwestern migration route led the two other individuals along the Baltic coast to the former East Germany where they stopped in the Galenbecker See (German IBA 014) for two weeks (Lorentsen et al. MSa). The German BirdLife partner went out and reported that the birds were observed together with 12 conspecifics. Here the signal from one of the birds was lost. The remaining bird left the area in the beginning of October and migrated to the Hortobágy National Park (Hungarian IBA 016) in Hungary (see section 3.2.4). Here the Hungarian BirdLife partner (MME/BirdLife Hungary) located the goose in a flock of approximately 40 individuals. In early November the goose moved on, and were next located in Lake Kerkini (Greek IBA 012) in Northern Greece together with 43 conspecifics (Lorentsen et al. MSa). Here they stayed for two weeks before they went to the final destination this winter: the Evros Delta (Greek IBA 001) on the border between Greece and Turkey (see section 3.2.2). In mid-February the signals were lost also for this individual (Lorentsen et al. MS_a). However, as the only «satellite transmitter bird», it was seen during spring staging at the Valdak Marshes prior to the breeding period in 1996 (see section 2.1.2). It had returned with a new mate, however without the satellite transmitter.

By this study we have located some of the areas that are important for the Lesser White-fronted Goose during autumn and winter for the Fennoscandian population. However there is a lack in the knowledge about the spring migration as well as the influence of cold weather fronts that obviously plays a major role in the choice of wintering areas. From Azerbaijan it is known that during cold weather there is a further migration southwards (Paynter et al. 1996, own information). In Hungary, a period of cold weather made the geese to continue south from the Hortobágy area already in early November (see section 3.1.4).

Our work on the Lesser White-fronted Goose is part of a ongoing process throughout the world - focusing on the loss of biological diversity. The biodiversity concept, is commonly used to describe the number, variety and variability of living organisms, which often is described in terms of genes, species and ecosystems. Only a small fraction of the earth is protected in parks and reserves, the human population is growing and accelerated extinction of species and habitats continues. Destruction and alteration of habitats leads to reductions in size of breeding populations, loss of genetic diversity and potentially the extinction of species and ecological systems.

The species approach to the loss of biodiversity have often been criticised, especially among theoretical conservation biologists. It is said that the species focus by itself does not directly address the larger problem of habitat loss and degradation of ecosystems, which is the real driving force in species extinction. A piecemeal, species-driven approach to conservation draws attention to only one part of the biodiversity crisis; a more comprehensive perspective must also be taken (see Meffe & Carroll 1994).

The conservation of biodiversity and natural resources, including birds can generally be approached in three ways (Evans 1994):



Night roosts for the Lesser White-fronted Geese — the fishponds at Biharugra in Eastern Hungary in November 1995.



Grazing fields for the Lesser White-fronted Geese in Hortobágy National Park, Hungary, November 1995.

- 1) Protection of species from direct threats, for example direct persecution or unsustainable hunting, harvesting, trading, usually by legislation but sometimes also through active management of populations in the case of globally threatened or highly economically valuable species.
- 2) Protection of sites by designating areas for the conservation of natural resources, and regulating and managing them according to the needs of the biodiversity they contain.
- 3) Protection of the wider environment and ensuring sustainable use of natural resources, by regulating economic activities that modify habitats and landscape (e.g. agriculture, water supply, industry), and by controlling pollution of air, soil and water.

BirdLife International's activities are driven by international priorities set in the global strategy and the regional programmes. BirdLife's European programme has three main themes as its focus:

habitats, sites and species. The IBA programme is aimed at the second approach, while the Lesser White-fronted Goose Monitoring Programme at the first.

Through the satellite telemetry study, a direct connection between the two approaches have been found, demonstrating the importance of action on different levels.

Of the areas used by the Lesser White-fronted Goose using the western route after the Kanin Peninsula, all were designated as Important Bird Areas, demonstrating the strength and value of this approach to the conservation of biodiversity. The eastern route had none. All the satellite tagged birds that used the eastern route were probably killed (Lorentsen et al. MS₄), indicating that the route is more dangerous than the western, and that it is urgently needed to secure protection of the geese along this.

The results have highlighted the need for establishing a network of reserves along the migration route. It is cheering that most of the sites already are BirdLife IBAs. However, the Lesser White-fronted Geese use the IBAs mainly as roosting sites. At daytime they are grazing outside the protected areas. Securing the surrounding areas of these protected sites by establishing buffer zones where hunting is prohibited is vital to ensure effective protection.

The results also indicates that the hunting pressure along the migration routes are one of the most important causes for the population decline (Lorentsen et al. MS_a, see also section 2.3.2).

The results also indicates that the hunting pressure along the migration routes are one of the most important causes for the population decline (Lorentsen et al. MS_a, see also section 2.3.2).

3.1.3 Survey and catching attempts during staging in Hungary

The project have tried to find the staging and wintering grounds for the Fennoscandian breeding population and the Hungarian staging population of the Lesser White-fronted Goose. This work was partly carried out in 1995. Only one of two individuals using the western migration route staged in Hungary before it continued to Greece. To supplement the loss of individuals a catching effort and survey of staging areas were carried out in Hungary in the period 6-16 November 1995.

The first day were spent on meetings with the MME/BirdLife Hungary and the Hungarian Nature Conservation Authority. The expedition were planned to be in the middle of migration of the Lesser White-fronted Goose. The same day as NOF arrived, a cold weather front with snow and minus degrees occurred. The Hortobágy National



Waterfowl hunters in Hungary outside the Biharugra reserve. Overflying White-fronted Geese were shot at shortly after the picture was taken.

Park were surveyed in the period 8-10 November, but one of the wardens told that the Lesser White-fronted Geese had left the area due to the onset of the cold weather a few days earlier. A few weeks earlier 44 Lesser White-fronted Geese were counted in one of the fish-ponds. Of these 17 were juveniles. The satellite tagged individuals were seen among them. In September 14 individuals were seen. The whole area were anyhow surveyed, but resulted only in the location of small flocks of Greylag Goose (500+), Bean Goose (10+) and White-fronted Goose (200+).

The team of Hungarian and Norwegian field workers continued to Biharugra, the other well known area for Lesser White-fronted Goose (see section 3.2.4) on the 11 November. Here the weather had not been as cold as in Hortobágy, but it soon turned out to be no Lesser White-fronted Geese in the area. The fish-ponds were checked carefully, and approximately 10.000 White-fronted Geese were found. One of these had a white neck-ring with a bluish code which was not possible to read. Also Greylag Geese (1.000+), Bean Geese (300+) and two Red-breasted Geese were seen in the ponds. The local ornithologists and wardens told that the fish-ponds were used only for roosting at night. However, the geese would often come back from the feeding areas during mid-day (1200-1300 hours) to drink and rest. Early in the staging period the geese would utilize persistent feeding areas close to the fish-ponds, but due to the heavy hunting pressure, they would later in the staging period fly much further, often as far as 10-15 kilometres. We tried to follow the geese to the feeding areas to locate these as well as trying to find Lesser White-fronted Geese. No Lesser White-fronted Geese were found. When the White-fronted Geese left the fish-pond in the dawn they started out in flocks of 200-500 individuals which eventually divided into smaller flocks of 20-40 individuals. Such flocks were found in the fields as far as 50 km away from the fish-ponds. For a more thorough description of the areas, see section 3.2.4.

3.1.4 Catching attempt during staging at Norway

Due to the fact that all the satellite transmitters went out of function by various causes before the spring migration in 1995, another catching effort were conducted in Norway at the staging area at the Valdak Marshes in spring 1996. This attempt failed as well, due to the weather conditions. When the geese arrived, the marshes were almost covered with snow and ice. The geese then utilized the only available food *Hippurietum tetraphylla* which hardly had started growing in the melt ponds (see section 2.1.5). As the snow and ice melted and protracted from the salt marsh, the geese followed after, utilizing the newly exposed vegetation. The cannon nets could not be moved successively, both due to the rapid change of feeding places but also due to the disturbance this would imply. The nets were moved once, and one shot with the cannons were fired. The net did, unfortunately, not unfold properly. In the autumn the cannon nets were mounted again, but this time the chance of catching the geese were much smaller, because the geese were moving around together in one flock.

3.2 STAGING AND WINTERING GROUNDS

As stated in the *Urgent Action Plan* by Wetlands International Goose Research Group it is important to locate the staging and wintering grounds, and then follow up with thorough surveys to assess the number of geese as well as the status of the area (Madsen & Lorentsen 1995). This section describes the main results of the surveys carried out by NOF and MME/BirdLife, in co-operation with other BirdLife partner organizations throughout the Western Palearctic. A more thorough review of the status (in the species' total range) both for areas and numbers as well as conservation and management policies, is under preparation (Lorentsen et al. MS_p).

3.2.1 Azerbaijan

A winterbird survey was conducted as a part of the programme arising from the 1992 British Petroleum/Statoil - State Committee for Ecology (SCE) protocol in Azerbaijan. Special attention was given to the Lesser White-fronted Goose, for whom the declining numbers in Azerbaijan needed to be confirmed. The surveys were organized by Fauna & Flora International and done by a team made up of field workers from The Wildfowl and Wetlands Trust, Azerbaijan Academy of Sciences and the Norwegian Ornithological Society in the period 26 of January to 13 of February 1996. A detailed account of the findings is given by Paynter et al. (MS). Four areas were surveyed (Figure 5).

Totally 1.058 Lesser White-fronted Geese were registered (58,8% of all Whitefront sp. encountered) in the Kizil Agach Nature Reserve. Several counts on age distribution were carried out. These counts totalled 134 ad and 8 juveniles, giving a total of only 5.63% juveniles. One of these samples (19 ad. and 3 juv.) was however taken from a flock of approximately 500 individuals which contained only 6 juveniles. The sample thus not give a precise

estimate. Taking this into account, we reach a figure of 2,7% young of the total number of Lesser White-fronted Geese. All the observed juveniles were single broods except for one brood of two, giving an average brood size of 1.14 ($n = 7$). Further, Lesser White-fronted Geese were encountered at the Shirvan Nature Reserve, where a pure Lesser White-fronted Goose flock consisting of 27 birds including 3 juveniles (11,1% young) were found grazing in the semi-desert around the main lake.

This gives a count of 1.085 for all sites. The proportion of 2,7-5,6% juveniles is very low. A more normal ratio would be in the order of 10-40%. Years with total breeding failure could lead to a ratio like this, but no information is available from the breeding areas in Russia.

The most important known wintering area has been in Azerbaijan in the Kizil Agach area, and the latest world population estimates have been based on 35.000-40.000 individuals wintering here. This numbers were not supported by the findings during the survey, nor by interviews with local people and staff of the reserves, State Committee for Ecology and Academy of Sciences. Counts carried out in the period 1979-1989 (Tkachenko 1994) shows that the numbers of White-fronted Geese and Lesser White-fronted Geese have been reduced from 17.000-25.000 to 5.000-6.000 even though most of the counts of geese in Azerbaijan has not distinguished between these species.

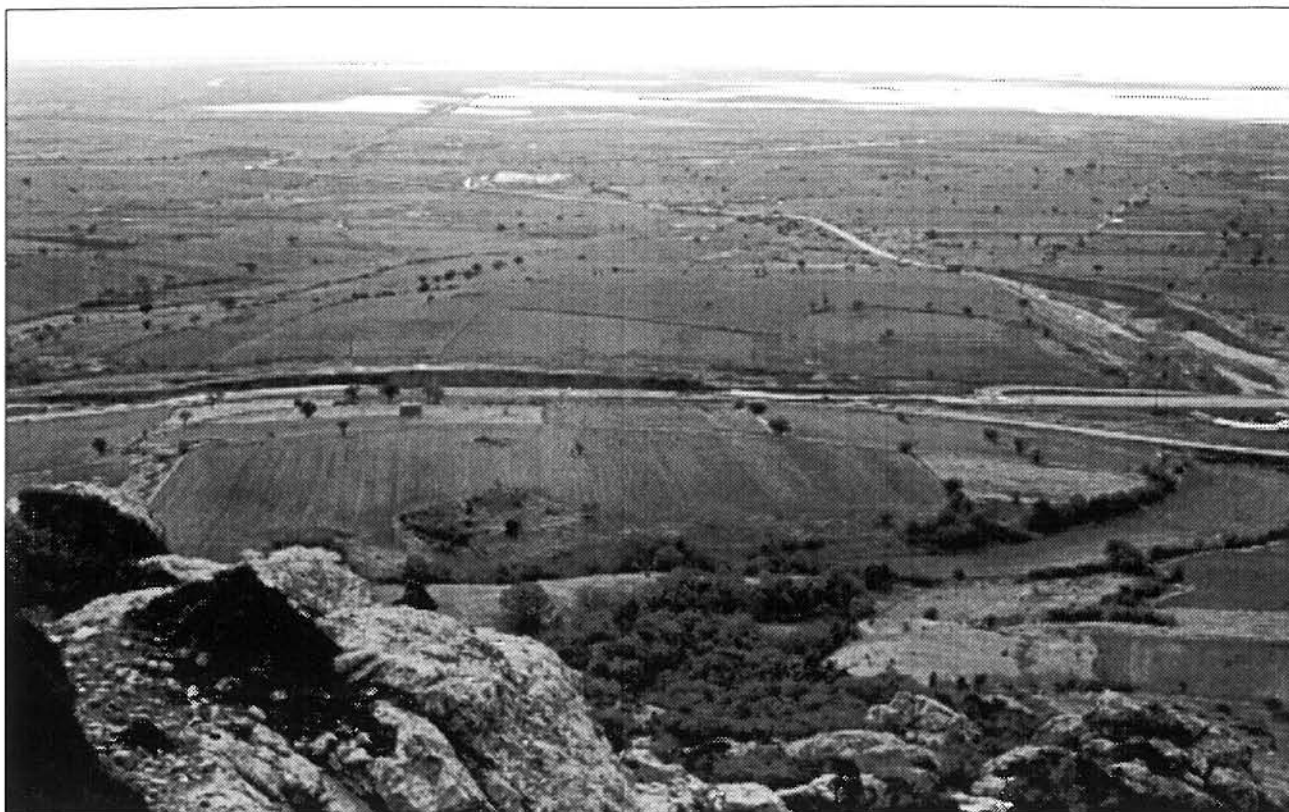
Patrikeev (MS) states that the total number of Lesser White-fronted Geese wintering in Azerbaijan varies probably between 1.500 and 7.000 birds. The implications of these findings makes the earlier statements, that the entire world population is in serious decline, even more clear.



Figure 5. Map of Azerbaijan showing location of surveyed sites (dots) during the winter bird count in 1996.

3.2.2 Greece

The Lesser White-fronted Goose occurs mainly in two areas in Greece: Lake Kerkiny in Northern Greece, and the Evros Delta on the Turkish bor-

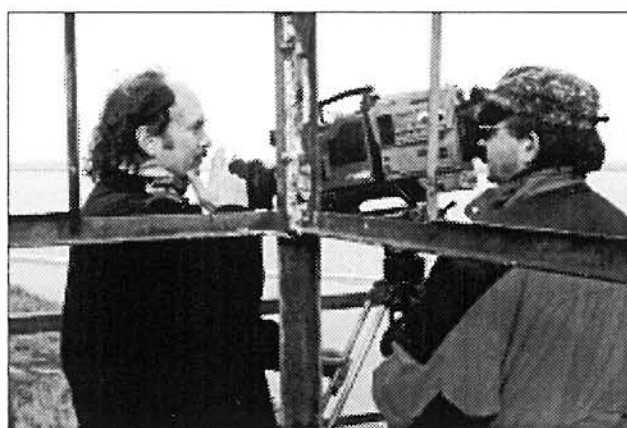


The Evros Delta viewed from the hills west of the delta towards the Turkish border.

der. Lake Kerkiný is a freshwater reservoir used for irrigation and flood control, fed by the river Strymonas. The Evros Delta is a nature reserve with a diversity of habitats as sandy offshore islands, sand dunes, halotypic marshes, saline lagoons, salt pans and scattered freshwater areas fringed with reed-swamp (Grimmet and Jones 1989). Hunting is prohibited in the Evros Delta. However, in the adjacent areas the hunting pressure on waterfowl is considerable, and illegal hunting inside the protected zone is still a problem. Other threats include drainage by farmers and overgrazing by cattle that severely deteriorates the area as a goose habitat.

In the period 10-13 January, NOF and the Norwegian television team visited the Evros Delta where the remaining satellite transmitter tagged Lesser White-fronted Goose spent the winter. Plots from the satellite transmitter were received both before and after the area was surveyed. Approximately 3.000 White-fronted Geese were seen, and 1.500 of these were checked carefully, without positive identification of Lesser White-fronted Geese.

The flock of Fennoscandian breeding birds visiting Lake Kerkiný and the Evros Delta the winter 1995-96 counted 43 birds. In the past the Lesser White-fronted Geese were fairly common in Greece. Large numbers were recorded in 1974 with 487 individuals and 1965 with 1630 individuals



Media coverage has been a priority task in the project in 1996. Here, Stella Kladara from WWF-Greece discusses conservation strategies for the Evros Delta with people from the Forest department (which has the management responsibility for the Evros Delta). A television team is making a news piece for the regional television company.



The main conservation problems in the Evros Delta. On the sign is written: «All hunting forbidden». The sign is anyhow destroyed by hunters. The grazing pressure from cattle destroys the vegetation in the area. January 1996.

(Handrinos 1991). In the period 1980-1990 the records have fluctuated between 30-150 individuals.

3.2.3 Russia, Kanin Peninsula

This area was first described as a staging ground for Lesser White-fronted Geese in 1994 (Vinogradov 1995). The use of satellite transmitters on Fennoscandian geese have, however, revealed that this area is used as a gathering area for probably the whole Fennoscandian post-breeding population (Lorentsen et al. MSa). This area is situated between the mouths of the rivers Mesna and Torna on the western coast of the Kanin Peninsula. The area is a huge marshland (c. 50 km²), comprized of salt tolerant vegetation (called *laidas*) as *Puccinella phryganodes*, *Carex subspathacea*, *Calamagrostis* sp. and *Plantago* sp.

After the satellite telemetry revealed that this was an important staging area for Lesser White-fronted Geese, the Finnish Lesser White-fronted Goose Project (WWF, Finland) visited the area between 24 August and 12 September in 1996. On arrival they found only nine Lesser White-fronted Geese, but the numbers accumulated and when they left the area about 100 individuals were present (Tolvanen 1996a). The geese were mainly feeding in the stands of *Hippuris tetraphylla*, *Puccinella*

phryganodes and *Carex subspathacea*. According to older local hunters the Lesser White-fronted Goose were common here in the 1950's (Vinogradov 1995).

This area has no formal protection, and goose hunting is performed from the village Shoina. Conservation measures are proposed in order to protect a colony of breeding Barnacle Geese *Branta leucopsis*. At present WWF International - Russian Programme is working on the establishment of a protected area (Kaninski Federal Zakaznik) at this site, based on the information from the satellite telemetry study (Lorentsen et al. MS_a) that Lesser White-fronted Geese occurs here in significant numbers.

3.2.4 Hungary

In the first half of the century the Lesser White-fronted Goose used to be present in Hungary in much higher numbers than nowadays. According to Sterbetz (1982) 80.000-120.000 Lesser White-fronted Geese used to stage or winter in Hungary. However, in the period 1971-1980, its numbers amounted only 3-5% of those recorded earlier, and the proportion of the species amongst other geese was as small as 1%. In the mid 1980's the number of staging Lesser White-fronted Geese was only about 400-500 individuals and it has decreased further by the end of the decade up to 120-130 (Farágó et al. 1991). The Lesser White-fronted Goose appears almost exclusive in Eastern Hungary, although, due to more intensive observations, some few individuals were recorded at Lake Fertő (near to the Austrian border and Kelemenszék in the Kiskunság) amongst other geese (*Anser albifrons* and *A. fabalis*). However, the main staging area is on the Great Plain (puszta).

In the 1960's and 1970's Kardoskút Nature Reserve was one of the most important areas for the species. This nature reserve was established in 1965 and it was designated as Ramsar site in 1979. Due to its strictly protected status (waterfowl hunting was banned) waterfowl have accumulated here in huge concentrations afterwards. The Kar-

doskút Nature Reserve is a relatively small area, only 486 hectares. About 100 ha is made up of a natron lake and the rest is mainly grassland or extensive arable land. The nature reserve is situated in the middle of a approximately 6000 ha large complex of saline grasslands and arable lands. An extension of the protected area status on these land are in process.

The annual peaks of Lesser White-fronted Geese have changed according to the water conditions at the patron lake and its surrounding. At Kardoskút the Lesser White-fronted Geese use the natron lake for roosting and the saline grasslands with short vegetation for feeding. In the 1960's and 1970's the peak numbers often exceeded 2.000 individuals. However, in the 1980's it was always under 50 with culmination in November. In the late 1980's, the appearance of the species has become rather sporadic. This decline was caused, on one hand, by the overall decline of the species, on the other hand, by adverse changes in the local ecological conditions due to severe drought in the decade. After the establishment of an artificial water supply system, the species again occur more regularly. However, habitat management according to the requirement of the species is obstructed by a debate on the ecological consequences of this management and by the lack of money for water and fuel for pumps.

Since the 1980's, the Hortobágy became the most important staging area of the species in Hungary. The Lesser White-fronted Goose regularly occur here, mainly on Hortobágy fish-ponds which is a Ramsar site. The Hortobágy fish-ponds is a 1.200 ha large system inside of the Hortobágy National Park. Two ponds are owned by the National Park, the rest by the Hortobágy Fish Farm (HAG), a state owned company. Although the Hortobágy National Park elaborated a management methodology which would provide optimal conditions for the Lesser White-fronted Geese in order to localize them in the protected area, however, it is only a part of a much larger complex of fish-ponds which are not protected. These non-protected ponds are also managed by the HAG, but hunting is not restricted. Important to note, that the highest bag

pro ha is shot in the surroundings of the Hortobágy area. The privatisation of the HAG is in process and there is a threat that, the fish-farming company will be bought by consortiums interested in hunting and tourist development.

The third most important site for Lesser White-fronted Geese is the fish-ponds at Biharugra, although it was intensively used for hunting. This is a approximately 2.000 ha large fish-pond system, managed by a limited company, in which MME/BirdLife Hungary has majority share. The ponds and their surroundings are protected as a part of Biharugra Landscape Protected Area. Since 1992 the hunting of waterfowl is prohibited by the hunting legislation. Although Faragó (1995) refers that the species occurs here in relatively large numbers (100-200 individuals), the regular observations conducted by MME/BirdLife Hungary does not verify this statement.

3.2.5 Kazakhstan

Very little information is available. According to Drobovtsev (1972) the first flocks of Lesser White-fronted Geese and White-fronted Geese appear in the North-Kazakhstan region during spring migration on April 23-25, while the mass transit migration takes place in the first half of May. During autumn migration the first flocks arrive on September 18-23, with mass transit migration in the first half of October. The birds alight to rest and feed, forming large concentrations of up to 4.000-10.000 individuals in the lakes of Maibalyk, B. Tarangul, Shagly-Teniz, Aksuat and others.

The eastern and northern parts of the Kustanaya Oblast in Northern Kazakhstan were visited in the period 4-15 October 1996 by a group from the Lesser White-fronted Goose working group of WWF-Finland. The aim of the expedition was to survey the sites that were revealed by the satellite telemetry project. Totally 280.000 geese were seen in the area, of which the White-fronted Goose were in majority with 106.000 individuals (37,9 %). Numbers of other geese were: Greylag Goose *Anser anser* 78.000 (27,8 %), Bean Goose *Anser*

Table 5. Distribution of goose species observed shot in Kazakhstan, October 1996 (data from Tolvanen 1996).

Species	n shot	% shot	% shot in relation to occurrence
White-fronted Goose	95	86	0,89
Lesser White-fronted Goose	6	5	0,63
Greylag Goose	10	9	0,12
Red-breasted Goose	0	0	
<i>Total</i>	<i>111</i>	<i>100</i>	

fabalis 1, Red-breasted Goose *Branta Ruficollis* 88.000 (31,5 %) and Lesser White-fronted Goose 7.900 (2,8 %). This number is the highest record of Lesser White-fronted Goose since many years in the Palearctic region. Age distribution of a sample of observed Lesser White-fronted Geese were 66,6 % adults and 33,3 % juveniles (Tolvanen 1996b). The group also managed to sample the species distribution shot by hunters in the area (Table 5).

The sample of geese shot shows that all species are shot in relation to their occurrence, except for the Red-breasted Goose which is the only protected goose species in Kazakhstan. Two out of six ringed juvenile Lesser White-fronted Geese were reported shot in Northern Kazakhstan. Also four out of 20 recoveries of White-fronted Geese ringed in Taymyr in 1989 were recovered in Northern Kazakhstan (Mojj 1995), which indicates the importance of these areas for staging geese.

4. MEDIA COVERAGE AND INFORMATION

4.1 PUBLIC INFORMATION ON LOCAL AND REGIONAL LEVEL

In 1993 the project compiled a status report on the Lesser White-fronted Goose in Fennoscandia (Øien & Aarvak 1993). Until this time the project had a very low profile, and the scattered information about the staging and breeding areas were not public accessible. It was considered important to keep the staging and breeding areas secret because of the Lesser White-fronted Goose's status as an endangered species and because the reasons for the population decline were unknown. In 1993 it was quite clear that the main cause for the population decline had to be sought along the migration routes and on the wintering grounds. What also turned out to be clear, was that the remaining population in Finnmark was very vulnerable, also due to potential negative factors on the staging ground at Valdak in the Porsangen Fjord and on the breeding grounds. We realised that in order to make further advances in conservation actions, the local community had to be informed and encouraged to take care of this enigmatic species. This has been done through a lot of interviews on radio broadcasting, in newspapers, and through excursions to the staging area at the Valdak Marshes.

A more formal co-operation is also conducted with Stabbursnes Nature Centre in the Porsangen Fjord. This centre was established in 1990 aiming at informing about the nature and culture in Finnmark, and to promote the conservation of the environment and cultural heritage in this northernmost part of Norway. To promote these aims they have an exhibition on the nature and culture in Finnmark, a conference room, and different courses and excursions. Fieldworkers from NOF's Lesser White-fronted Goose project have been responsible for a birdwatching excursion arranged by the centre each spring with the main focus on Lesser White-fronted Geese on Valdak.

The centre are the responsible for the local information work on the species, and have since 1994 produced regular press releases. They have also planned a travelling exhibition on the species and on the biodiversity in Finnmark in general, to be used by museums and schools.

4.2 NATIONAL AND INTERNATIONAL PUBLIC INFORMATION

In the co-operation with BirdLife International, Wetlands International (Goose Research Group) and especially with MME/BirdLife Hungary, the amount of information brought out to the public is ever increasing. In Hungary the MME/BirdLife Hungary are working with a leaflet to the hunter associations to inform about the Lesser White-fronted Goose and the problems facing it, i.e. identification pitfalls, the probability to shot it by misidentification and its consequences. This is also one of the main conservation priorities as stated by Council of Europe in «*Globally threatened birds in Europe — Action Plans*» (Madsen 1996).



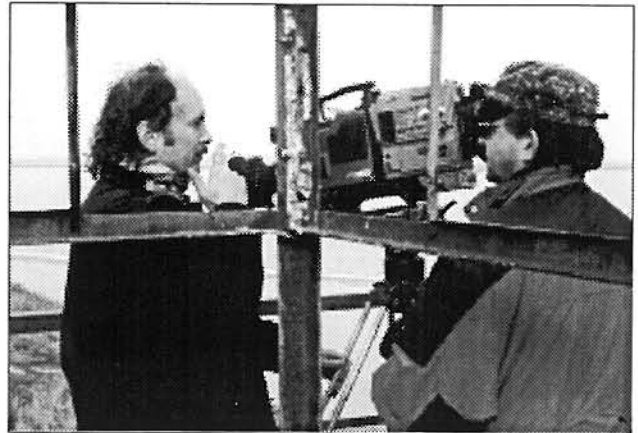
An information campaign addressing the needs for protection of the Evros Delta as wintering areas for the Lesser White-fronted Goose and the Slender-billed Curlew has been implemented by the Hellenic Ornithological Society (the Greek BirdLife partner). The campaign has also reached the primary schools like here in a village close to the Evros Delta.

Quote: «It is a high priority to raise public awareness of the species, particularly amongst hunters and landowners». BirdLife International have through its magazines and newsletters published regular status reports about the project, especially describing the link between species conservation and conservation of Important Bird Areas (IBA's) (see Table 6). This is very valuable in point of view of making the information public available.

In 1994 Gunnar Henriksen at the environmental authorities in Finnmark, initiated a film project focusing on the problems facing this species and the work undertaken in order to saving it from extinction. Kåre Tannvik Film A/S received funding from Nord-Norsk Filminstitutt, and started the production of a documentary in spring 1995. The documentary film was finished in May 1996, and it was shown on Norwegian television Channel 1 (NRK 1), with the title «*Man—my worst enemy...*». The film received positive critics in Norwegian newspapers afterwards (Appendix 3), and have so far been distributed to television companies in the Nordic countries. Field workers from the project were also interviewed about the Lesser White-fronted Goose on Greek regional television in

January 1996 during the field work in the Evros Delta.

Due to the relatively high media profile the last years, a number of popular informative publications have been written about the Lesser White-fronted Goose, both by media and the persons responsible for the project. Those that could be traced, are listed in Table 6 and 7.



The television team making the documentary: «*Man, my worst enemy*» at the fish ponds in Biharugra, Hungary in November 1995.

Table 6. Media coverage on the project and the Lesser White-fronted Goose.

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Salomonsen, S.T. 1996. Siste dverggåsa skutt. Finnmark Dagblad 21 mars 1996. s.11.
Salomonsen, S.T. 1996. Unik film om den siste dverggåsa. Finnmark Dagblad 31 mai 1996. s.4.
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Table 7. *Scientific and popular informative articles and reports from the project since 1995.*

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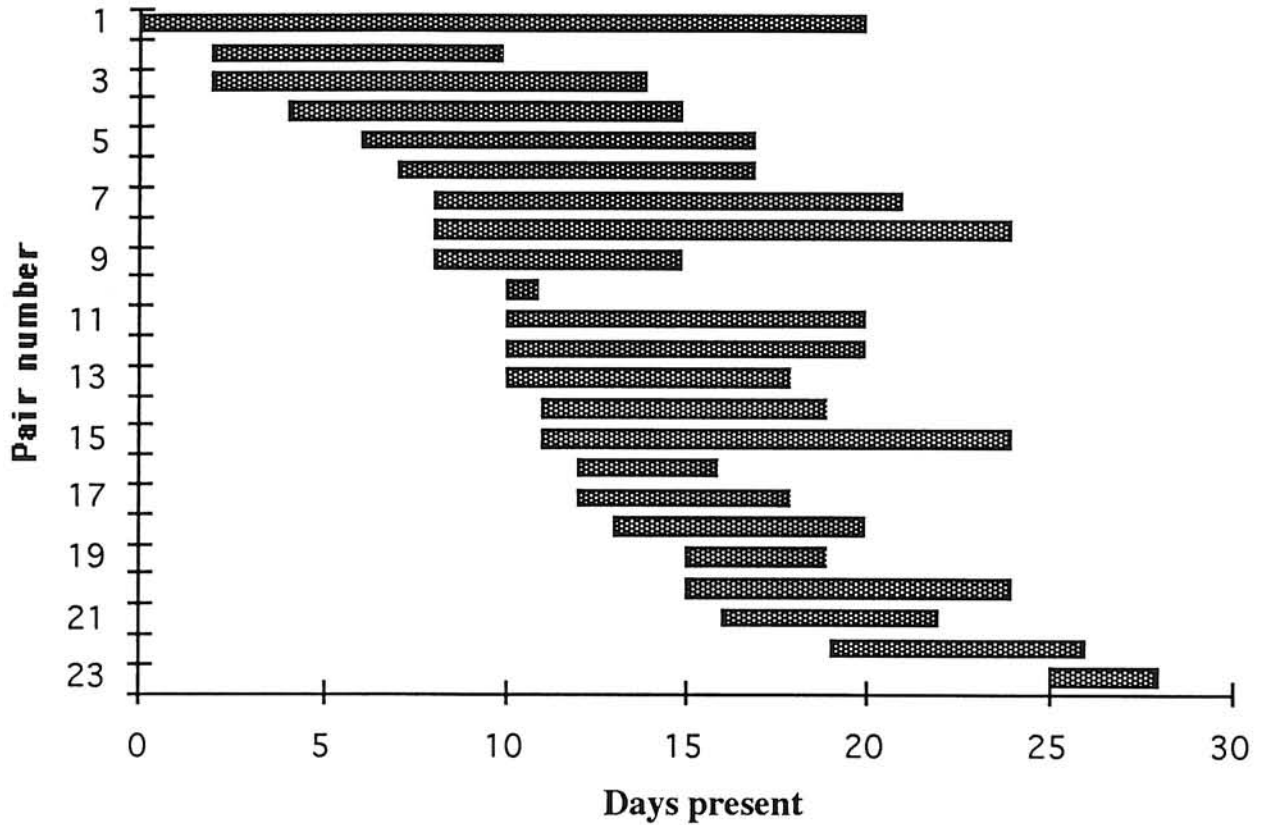
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APPENDIX 1

Overview of identified Lesser White-fronted Goose pairs, the number of days present from first registration to the last, at Valdak in May-June 1995. The days are counted from the 14th of May until the 11th of June.



APPENDIX 2

Co-operation partners and contacts along the proposed migration routes and wintering areas.

BirdLife International

Zoltan Walizcky

Wetlands International

Jesper Madsen

Belarus

Alexey K. Tishechkin

Institute of Zoology, Belarus Academy of Science

Bulgaria

Petar Iankov

Bulgarian Society for the Protection of Birds (BSPB)

Dimiter Georgiev

Bulgarian Society for the Protection of Birds (BSPB)

Croatia

Jasminca Radovic

Dept. of Nature Conservation, Ministry of Civil engineering and Nature

Jelena Kralj

Institute of Ornithology.

Czech Republic

Peter Burgr

Jihocesce Muzeum

Marcel Honza

Institute of Agriculture and Natural Sciences

Jan Hora

Czech Ornithological Society

Estland

Janus Elts

Estonian Ornithological Society.

Aivar Leito

Estonian Forest Research Institute.

Finland

Juha Markkola

World Wildlife Fund, Finland

Petteri Tolvanen

World Wildlife Fund, Finland

Germany

Stefan Krüger

Peter Shubert

Greece

G.I. Handrinos

Hellenic Republic ministry of Agriculture

Hellenic Ornithological Society

Hans Jerrentrup

Society for protection of Nature and Ecodevelopment

Stella Kladara

World Wildlife Fund, Greece

Theodoros Naziridiz

Hellenic Ornithological Society

Kostas Pistolas

World Wildlife Fund, Greece

Hungary

Sandor Farago

Dept. of Wildlife Management, University of Forestry & Wood Science,

Zsolte Kalota's

Hungarian Nature Conservation Authority

Ga'bor Kova'cs	Hortobagy National Park
Scaboles Nagy	Hungarian Ornithological and Nature Conservation Society (MME)
Michael Vegh	Hungarian Ministry of Environment
Gabor Horv'ath	Hungarian Ornithological and Nature Conservation Society (MME)
Janos Tar	Hortobagy National Park
Gabor Magyor	Hungarian Nature Conservation Authority
Istvan Major	Hungarian Nature Conservation Authority
Lajos Varga	Hungarian Ornithological and Nature Conservation Society (MME)
Kazakhstan	
Altai Zhumakan-Uly	Institute of Zoology, Academy of Sciences
Zhatknabayev	
Latvia	
Maris Strazds	Latvian Ornithological Society
Litauen	
Saulius Svazas	Institutas Ecologijias
Gedas Vaitkus	Institutas Ecologijias
Mantas Zurba	Lithuanian Ornithological Society
Gintaras Matiukas	Lithuanian Ornithological Society
Poland	
Magda Remisiewich	OTOP
Romania	
Carmen Gache	SOR Group of Iasi. Dept. of Zoology, University'Al.
Dan Munteanu	Romanian Ornithological Society
Russia	
Dr. Vladimir N. Kalyakin	Russian Institute for Nature Conservation
Vladimir Morozov	Institute for Ecology & Evolution, Russian Academy of Science
Yeugeny Syroechkovski Jr.	World Wildlife Fund International.
Victor Nikiforov	
Slovenia	
Peter Trantelj	Bird watching and Bird study Association of Slovenia.
Slovakia	
Jan Kownan	Slovakian Ornithological Society
Alexander Kurty	Slovakian Ornithological Society
Pavol Kanuch	Slovakian Ornithological Society
Sweden	
Lambart von Essen	Svenska Jägareförbundet
Anders Bylin	Tovetorp Zoologiska forskningsstation
Turkey	
Murat Yerar	Society for the Protection of Nature
Ukraine	
Igor Gorban	Ukraine Ornithological Society
Igor Shilsky	Museum of Natural History

APPENDIX 3

Finnmark
DAGBLAD

REPORTASJE

Fredag 31. mai 1996. Nr. 122. 5



SKUER SISTE DVERGGÅSA? Teamet bak det enestående filmprosjektet kikker etter den siste dverggåsa. Fra venstre, ornitolog Thomas Aarvak, filmograf Ulf Berntsen, produsent og regissør Kåre Tannvik, Ornitolog Ingar Øien og utmarkt tekniker Torkjel Morset.

Foto: Stein Torger Salamonsen

Unik film om den siste dverggåsa

Stabburnes (FD): – Porsanger og Finnmark har grunn til å være stolt av sine få dverggjess, som representerer halvparten av den gjenværende bestand i Europa. Det sier produsent og regissør av filmen «Mennesket - min verste fiende» som nylig ble vist av NRK 1.

FD– Stein Torger Salamonsen

I det de siste representanter for den minste av våre gåsearter har ankommet Valdakmyra i Porsanger for å beite seg opp før hekkingen inne på vidda, avsluttes et enestående filmprosjekt.

Med et budsjett på 700.000 kroner har et filmteam ledet av Kåre Tannvik klart å lage en naturfilm om dverggåsa på under ett år, noe som i seg selv er en prestasjon. Fotograf Ulf Berntsen har oppholdt seg døgnevis i kamuflasjetelt under de mest kummerlige forhold for å få gode bilder av den svært så skyte fuglen.

Resultatet er blitt 18 timer råfilm redigert ned til en halv times fjernsynsbilder som viser enestående biter av den virkelighet dverggåsa er utsatt for på sin ferd fra værbeite på Valdakmyra nord for Lakselv, til grenselandet mellom Tyrkia og Hellas, og tilbake til Finnmark.

Tannvik forteller at hele prosjektet har vært preget av godt

samarbeide og ekte engasjement. – Her har kommune, fjelljenerne, Stabburnes Naturhus, forskere og filmfolk på en utmerket måte trukket lasset i lag, sier han.

Filmen skal selges internasjonalt gjennom NRK, mens fugleorganisasjoner i øst-europa skal distribuere filmen der. – Det er politisk viktig å få vist filmen i de land hvor gåsa opptrer, sier Tannvik og viser til at ting har begynt å skje i kjølvannet av dverggås-prosjektet.

Nå betaler World Wildlife Foundation de russiske myndigheter for å skjermegåsas høstbeiteplasser på Kapp Kanin. Også

i de andre land hvor fuglen mellomander iverksettes det tiltak i håp om å berge restene av bestanden.

– Jeg ble forferdet da vi oppdaget at det ikke er iverksatt tiltak for å skjermegåsepar som benytter områder i Varangerfjorden, sier Tannvik. I EU-landet Hellas flyttet man en bondegård da prosjektet fastslo at dverggåsa har sitt vinterkvarter der.

Tross tiltakene er ikke Tannvik optimist på gåsas vegne. – Jeg tror desverre filmen virkelig viser de siste dverggåse i vår del av verden, sier han.

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