

Staging and wintering goose populations in South Sweden 1977–78 to 1986–87

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Introduction

Intensive census work on resting and wintering goose populations has been undertaken in most European countries during recent decades both as international counts promoted by the International Waterfowl and Wetlands Research Bureau (IWRB) and as parts of national projects. In Sweden, intensive studies of the goose populations have been undertaken since 1977. In 1975 a joint Nordic Goose Research Group was set up under the Nordic Council for Wildlife Research to study especially the populations of Bean Goose *Anser fabalis* and Lesser White-fronted Goose *Anser erythropus* in the Nordic countries, from 1976 to 1980 (Nilsson and Fog 1984). Part of the work continued on a national level. Then in 1984, a new Nordic goose project was launched, this time concerning the Greylag Goose *Anser anser*. Even though both these Nordic projects were mainly concerned with the study of movement patterns with the aid of neck-banded geese, censuses were included as an important element, to monitor population changes.

Thus, in Sweden monthly goose counts were initiated in October 1977 and have since been undertaken from October to March for the ten year period up to 1986–87. Details of the counts will be found in other reports (Nilsson 1979, 1981, 1984, 1986, 1988; Nilsson and Persson 1984).

Methods

The main aim of the Swedish goose counts has been to cover the Bean Goose population. The counts were accordingly organised to include all localities of importance for the species every month during October – March. Data were also obtained from some localities for September and April. The geographical position of the different resting areas are found in Figure 1. Detailed maps of the feeding and sleeping areas of Bean Geese in the different resting areas are found in Nilsson and Persson (1984).

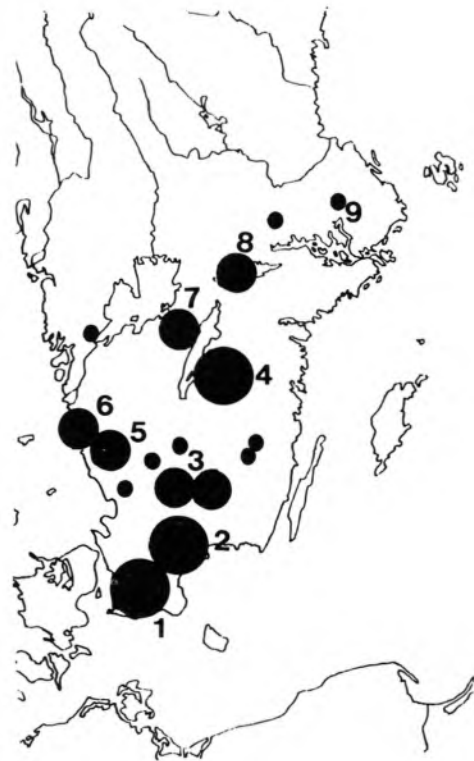


Figure 1. Areas holding Bean Geese in south Sweden. Large circle = normally more than 10,000 at maximum, medium circle = normally more than 1,000 and small circle = other localities. 1. SW Skåne, 2. NE Skåne, 3. Åsnen, 4. Tåkern, 5. Veselången, 6. Kungsbacka, 7. Östen, 8. Kvismaren, 9. Hjalstäviken.

The coverage of the other species has varied somewhat. White-fronted Geese (*Anser albifrons*) use the same localities as the Bean Geese and have thus been fully covered. The Canada Goose *Branta canadensis* is well covered in mid-winter with the present counting scheme, whereas the population is too widespread at other times of the year to make national counts meaningful. The Greylag Goose leave Sweden mainly in October. Special September counts were accordingly organised within the Nordic Greylag Goose programme.

Counts in all areas except SW Skåne were undertaken on the weekend nearest to the

fifteenth in each month as far as weather conditions permitted. In SW Skåne the counts were made on successive days as close to this weekend as possible. The counting methods in the three main areas differed somewhat due to differences in the local distribution of the geese (see Nilsson and Persson 1984). The counts were generally undertaken by the same observers or teams of observers during the entire ten year period.

At Tåkern large numbers of geese sleep in different parts of this large (17 square km) lake and disperse to widely separated feeding areas in the morning. Counts here were undertaken on the morning flights by teams of observers simultaneously covering the whole lake and counting their respective sectors. The feeding grounds were later checked for the occurrence of marked Bean Geese and rare species. Due to the extensive feeding areas, only small parts of the area could be covered each time and accordingly rare species such as Pinkfeet *Anser brachyrhynchus*, impossible to separate in the massive flights, were underestimated here.

In SW Skåne the counts were all undertaken by Hakon Persson and the author and were combined with checking for marked geese. Counts were mainly undertaken in the feeding grounds with checks on morning and evening flights as often as possible. All regularly used feeding areas were covered each month. Moreover all potential areas were searched if the flocks from one known roosting area was not found in the usual feeding areas. The geese in SW Skåne use a number of widely scattered sleeping areas so this method was the only practical one. Counts in NE Skåne were undertaken in a similar way. Most counts in the other resting areas were undertaken on the feeding

grounds but in some cases counts on the morning flights were also used.

During the course of the census period a total of 156 Bean Geese were marked with neck collars in SW Skåne during 1976–1980; 469 were marked in Finland 1978–1987 and 18 in Norway in 1979. The occurrence of marked geese was regularly checked in connection with the counts. In many areas checks for the occurrence of marked geese were undertaken weekly or for some periods even more intensively (cf. Nilsson 1984b; Nilsson and Pirkola 1986).

The occurrence of trends in the counts was tested using Spearman rank correlation analysis.

Results

Monthly mean values for the different species are found in Table 1. The Bean Goose was clearly dominating on south Swedish goose resting and wintering areas followed by the feral Canada Geese. Greylag Geese and White-fronted Geese were common on some sites in autumn, whereas other goose species were rare. The species are discussed more fully below.

Bean Goose

This species is the most abundant goose in Sweden during the non-breeding season. The year by year fluctuations are set out in Table 2. The most important resting places are Lake Tåkern and areas in SW and NE Skåne (Figure 1). Tåkern dominates markedly with more than 40,000 counted in autumn in recent years. SW and NE Skåne on the other hand include a number of roosts with their feeding areas, each flock normally having a maximum of around a

Table 1. Mean numbers counted of the different goose species at the monthly counts in Sweden in 1977–78 to 1986–87.

Species	Oct	Nov	Dec	Jan	Feb	Mar
<i>Anser albifrons</i>	1903	2240	1094	408	50	414
<i>Anser anser</i>	1050	310	169	13	13	201
<i>Anser brachyrhynchus</i>	34	23	13	6	7	6
<i>Anser caerulescens</i>	0	1	1	2	1	1
<i>Anser erythropus</i>	4	2	1	0	0	0
<i>Anser fabalis</i>	49058	36653	21796	12344	1136	18545
<i>Branta bernicla</i>	197	6	0	1	0	0
<i>Branta canadensis</i>	3407	3296	8761	7208	5008	3848
<i>Branta leucopsis</i>	76	57	12	5	3	5

Table 2. Total number of Bean Geese counted in south Sweden at the mid-monthly counts.

Season	Oct.	Nov.	Dec.	Jan.	Feb.	March
1977-78	46851	41869	22431	24415	17058	23022
1978-79	49682	59978	25833	12492	1590	15976
1979-80	48611	41337	23243	12634	1293	15460
1980-81	40015	28501	15550	13809	16383	16731
1981-82	36780	30283	7947	186	4346	26874
1982-83	57716	35488	26171	19511	26457	24345
1983-84	46879	45581	25677	24712	23478	22172
1984-85	49270	29273	29021	7845	8404	18575
1985-86	56514	25259	17406	7945	13600	16477
1986-87	59122	31699	24591	303	1659	8985

few thousand individuals. Five other resting places regularly hold more than 1,000 Bean Geese and a number regularly hold a few hundred individuals each year. For details see Nilsson and Persson (1984).

During the period studied, peak numbers counted in the autumn have varied between 37,000 and 60,000 (mean 49,058, Table 1) with the peak in October in all years except 1978, when the November peak of nearly 60,000 Bean Geese was 10,000 higher than the October count (Table 2). September numbers for the species (not given here) are mostly low at most resting areas even though in some years a few thousand individuals have sometimes been counted at Tåkern (Figure 1) in mid-September. Normally the species arrives into the country in larger numbers during the last days of September and early in October (Nilsson and Persson 1984).

The situation during late autumn and winter is highly dependent on the weather situation and especially the snow cover. In some years a marked decrease in numbers was noted between the October and the November counts as in 1985, when numbers at Tåkern decreased from 43,000 at the October count to 3,000 in November; November 1985 was the coldest in south Sweden during the ten year period considered here. In other years this decrease occurred between November and December. This was especially marked in 1978, when after a mild autumn about 30,000 Bean Geese left Lake Tåkern at the first heavy snowfall in late November.

In most years only relatively small changes in numbers were noted in SW Skåne between the counts in mid-October and mid-November, a large proportion of the Bean Geese from Tåkern apparently leaving Sweden without staying in Skåne.

On the other hand about 50% of the neck-banded Bean Geese seen at Tåkern in the autumn were later found in SW Skåne in late autumn and winter (Nilsson 1984b; Nilsson and Pirkola 1986; Nilsson unpubl.). Similar movements were also noted between other resting areas. Observations of neck-banded geese have shown that some individuals stay in SW Skåne for the entire winter, whereas others are only seen on single occasions.

In December virtually all Bean Geese in Sweden are concentrated to the staging areas in south-west and north-east Skåne. In the mildest years small numbers were found further north in December. In all but three years the December population in Sweden (= Skåne) has varied between 22,400 and 29,000 individuals. In December 1981 most Bean Geese left Sweden in early December in response to an unusually early and cold winter.

In mild winters such as 1977-78 and especially 1983-84 the Bean Geese seen in Skåne in December remained the entire winter. In normal winters some geese leave the country and there is also a concentration of the geese in Skåne to the south-western parts and especially to the coasts, where more open fields are available. In the coldest winters most geese leave Skåne to the south-west. In 1979, the majority of the geese apparently went to the Netherlands (Nilsson 1984b), whereas in the last two winters they moved to SE Denmark. In these two winters the total number of Bean Geese in Skåne and SE Denmark has been around 30,000 (Jørgensen and Sørensen 1987; Nilsson 1988). Numbers in February and March have varied in response to the weather situation. Spring numbers (= March counts in normal years) have always been markedly lower than autumn counts.

No marked changes in the total number of Bean Geese in Sweden has been noted over the ten year period within intensive counts (Figure 2). The curve for October indicates a slight (but not significant) increase over the ten year period. However, the autumn peak in 1978 with nearly 60,000 counted was seen in November and taking this into account the population can only be said to have varied between 40,000 and 60,000 individuals. During 82-87 the level has been over 50,000 individuals, taking a few localities which were not covered into consideration.

Even if no trend can be found in the total number of Bean Geese resting in Sweden over the last ten years, there have been marked changes in the autumn distribution of the species within the country (Figure 2, 3). When the counts started, SW Skåne was the most important staging area in the

country, with Lake Tåkern having somewhat lower numbers. During the ten year period numbers in SW Skåne have shown a steadily decreasing trend, whereas the opposite trend was found for the October counts at Tåkern, reaching over 40,000 in October in the last years. The November totals at Tåkern are highly dependent on the onset of frost and have accordingly varied appreciably between years. The decrease in autumn resting numbers has not been seen in all parts of SW Skåne. The decrease was very marked in the important areas around Lake Vombsjön, whereas no decrease was noted at another important area, Lake Krageholmsjön. The lower frequency of neck-banded geese in the latter area indicates different origins of these flocks within the area, where much interchange between roosts was found.

A similar development has been noted

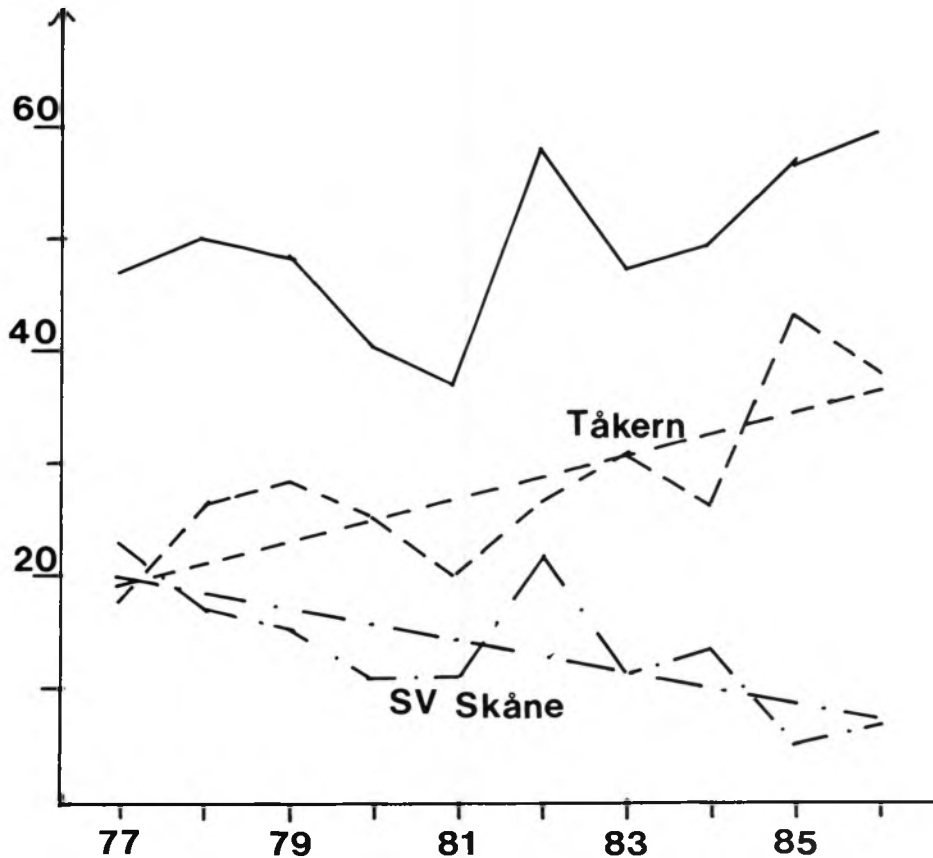


Figure 2. Number of Bean Geese (in thousands) in October 1977-1986 in all Sweden (upper curve) and in the two most important staging areas. The increase for Tåkern is significant ($r=0.75$, $P<0.05$) as is the decrease for SW Skåne ($r=-0.72$, $P<0.05$).

at other, smaller resting places in Sweden as is exemplified in Figure 3. In former years Kvismaren and Östen were only used as staging areas in spring but have developed into important resting places in autumn in recent years. Similarly Hjälstaviken in the same general region has been established as a new autumn resting area since 1980 with about 1,000 Bean Geese in some years. In late autumn and winter Skåne is the only area suitable for Bean Geese in the country.

Detailed data from earlier years are few (Nilsson and Persson 1984) but numbers in SW Skåne were higher in autumn in the early seventies, whereas maximum counts of about 6,000 were noted at Lake Tåkern.

The reasons for the change in distribution are not known. The food base for the geese in areas north of Skåne is good until the first frost and snowfall. They feed first in stubble fields and later in fields with

autumn-sown cereals. The hunting situation might be important. Bean Geese are hunted in Skåne during November 1–21, whereas there is only a very limited licensed hunting at Tåkern and no goose hunting in the other areas. As geese are long-lived and highly traditional this pattern of hunting might be of importance here, the geese staying in the safer areas to the north as long as the weather conditions permit.

White-fronted Goose

The White-fronted Goose is a regular visitor to Skåne during the migration periods in autumn and spring (Table 1), whereas only small numbers are found in other parts of the country. Normally, flocks of up to 1,000 individuals are found in one or two localities with smaller numbers intermingled with the Bean Geese on the other resting places in SW Skåne. As the species

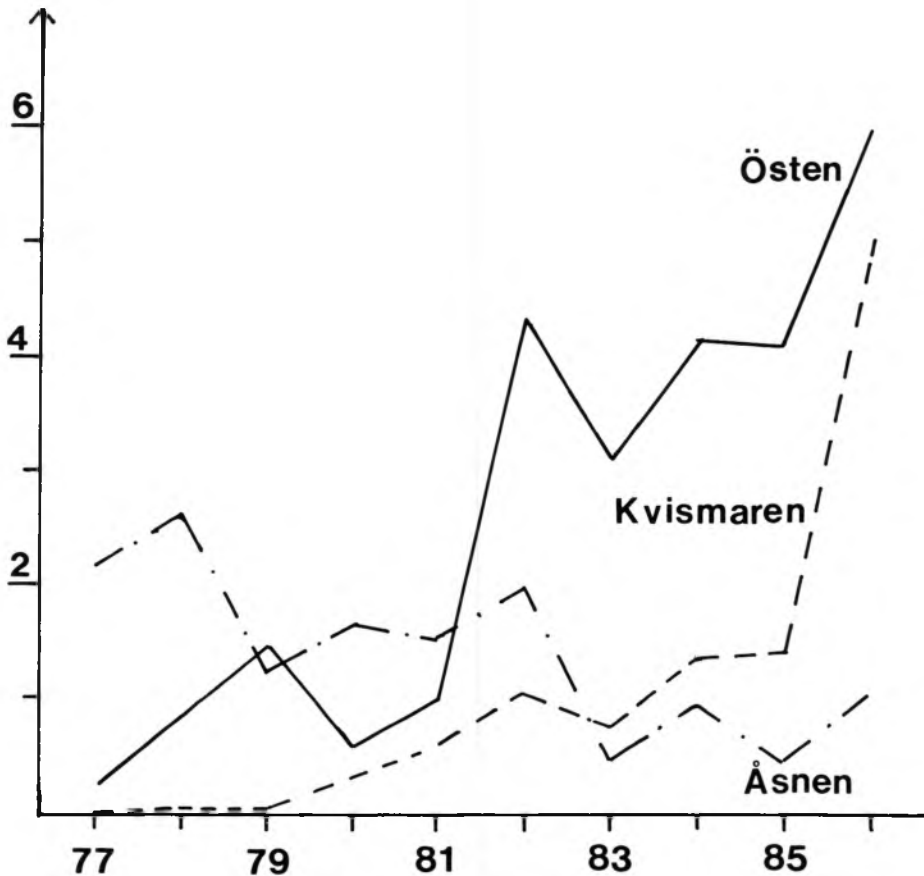


Figure 3. Number of Bean Geese (in thousands) in October 1977–1986 on three staging areas in south Sweden.

use the same habitats as the Bean Geese it is well covered by the counts. Peak counts in the period considered here has generally been around 2,000 individuals, which has been counted either in October or November (Figure 4). 1982 was a marked exception with no less than 6,000 White-fronted Geese in October. This autumn was, however, characterised by extended periods with easterly winds.

In mild years a large proportion remains in December but they leave during winter, only small numbers remaining in milder years. The spring passage is smaller or at least the geese remain for shorter periods and monthly counts do not give an accurate picture.

Greylag Goose

The monthly counts reviewed here will not give an adequate picture of the number of Greylag Geese resting in the country as the

majority leave Sweden before the October count. In the last two seasons October totals have been 4,600 and 3,200, respectively, but numbers were probably higher as all Greylag Goose localities were not fully covered. In November only one locality has held a large flock, Getteron on the west coast, with about 1,000 individuals. In the mild December of 1986, 1,200 remained at Getteron, increasing the mean count for this month from 49 to 169. Moreover one or two hundred stayed in a coastal area in SW Skåne in November. In winter, single Greylag Geese are found in the flocks of other species, notably Canada Geese.

The September counts organised by the Nordic Greylag Goose Study Group will be published later. Preliminary totals for the Greylag in Sweden in September 1984–1986 were: 19,000, 21,000 and 27,000, respectively. According to Andersson (1982) the total number of Greylag Geese in Sweden was at least 12,000 in September 1981.

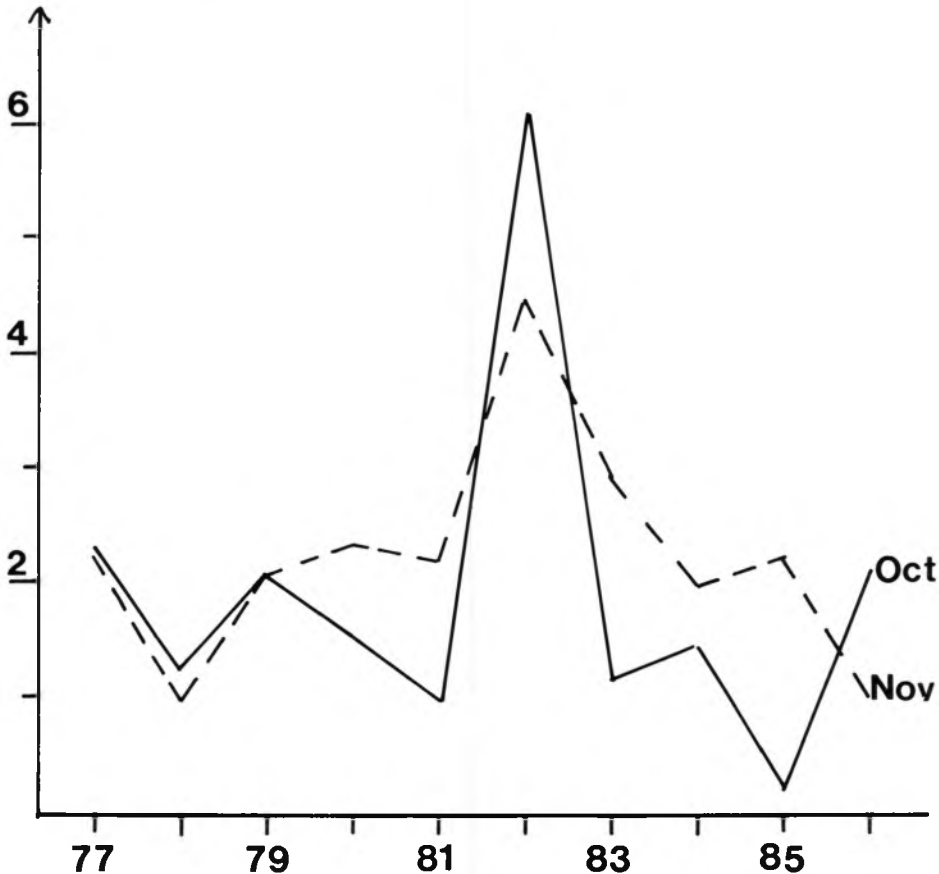


Figure 4. Total number of White-fronted Geese (in thousands) in Sweden in October and November 1977–1986.

Canada Goose

The Canada Goose was introduced into Sweden in the 1930s. In 1982 the population was estimated to be at least 3,000 pairs spread over southern Sweden and along the coast of northern Sweden, and a total population is about 30,000 (Fabricius 1983). It is widely distributed in the country during the non-breeding season though a large proportion of the population migrates to winter quarters in the neighbouring countries (Fabricius 1983; Nilsson 1976). It is therefore not practical to make total counts of the species and numbers recorded here

are much too small, except for the January counts (Table 1).

In January, the Canada Geese are more concentrated, with the largest numbers found in SW and NE Skåne. Some flocks of up to a few hundred individuals are also found on open water in rivers further north in the country. In Skåne the majority of the Canada Geese are found in the NE in mild winters, whereas they concentrate to the SW in colder periods. The number of Canada Geese in Skåne has increased markedly during the period of the counts (Figure 5).

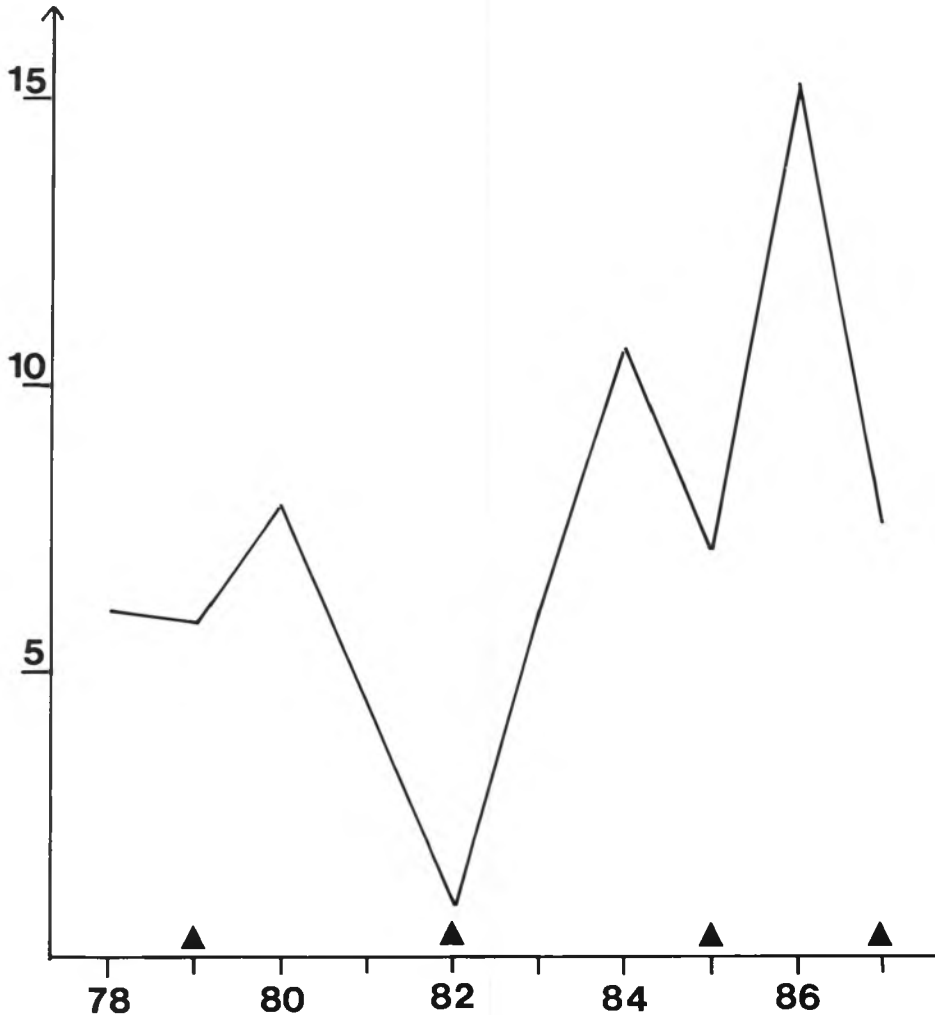


Figure 5. Total number of Canada Geese (in thousands) in Skåne in January 1977–1986. Hard winters are marked with triangles.

Other Species

A number of other goose species are also found on the resting places in smaller numbers (Table 1). The number of Pinkfeet are certainly underestimated in the Swedish counts. The species occurs regularly in the flocks of Bean Geese both in Skåne and Tåkern and has also been seen at the other resting places on several occasions. At Tåkern the geese are counted on the morning flights, when it is impossible to separate the few Pinkfeet in the large flocks of Bean Geese. When special searches (for marked geese) have been undertaken in most feeding flocks of Bean Geese around Tåkern up to 500 Pinkfeet have been seen.

Brent Geese *Branta bernicla* are occasionally found in flocks on some resting places in autumn, but the species is only a passage migrant in Sweden. Barnacle Geese *Branta leucopsis* are regular in small numbers in south Sweden in autumn and winter and are sometimes found in small flocks on some inland sites. Larger flocks stay for shorter periods in some coastal areas but these sites are not adequately covered. The Red-breasted Goose *Branta ruficollis* was recorded on six occasions at the monthly counts, one each in October 1978, 1982, 1983 and September 1985 and 2 in October and November 1979.

Discussion

The Bean Geese of Europe are generally considered to belong to two different groups: the taiga Bean Goose *Anser fabalis fabalis* in the north-western part of the breeding area and the tundra Bean Goose *Anser fabalis rossicus* to the east of the former. Some authors consider the Bean Geese of Europe to be largely integrating (Litzbarski 1974; Ogilvie 1978; Rutschke 1987), whereas others consider them as separate subspecies (Huyskens 1986; Van Impe 1980a, 1980b; Van Den Bergh 1985). The Bean Geese in Sweden are of the *fabalis* type and geese of the *rossicus* type are only seen in small numbers on a few occasions.

Unfortunately quantitative data on the size of the goose populations in Sweden before the present study are scarce. For the Bean Goose Mathaisson (1963) summarised the available information in the fifties and found that the Bean Geese had slightly

increased in Sweden in the years up to 1950-1960, whereas a general decrease was reported for most parts of western Europe. A count in October 1960 revealed a total for south Sweden of 16,000; 13,000 of those being counted in Skåne (Jensen *et al.* 1962). From the available data it seems that the Bean Goose population resting in Sweden increased from about 20,000 around 1960 to 30,000-40,000 around 1970 and to 50,000-60,000 in the late seventies (see Nilsson and Persson 1984 for further details). In the period considered here there has, however, been no further increase in the number of resting Bean Geese, merely fluctuations.

Data on the development of the resting and wintering populations are not so detailed for the Bean Goose as it is for other species of NW European geese. In late autumn, major concentrations are found in East Germany, Sweden and Poland. From East Germany Rutschke (1987) reports an increase from about 100,000 individuals in the early seventies to about 150,000-200,000 in the early eighties. Large concentrations are also found in Poland at this time of the year but details are lacking. In other north-west European countries such as Denmark, West Germany and the Netherlands numbers in late autumn are low (Ebbinge *et al.* 1986; Madsen 1987; Rooth *et al.* 1981; Fog 1982). The winter population in the Netherlands has shown a marked increase in the years with intensive counts (Ebbinge *et al.* 1986; Rooth *et al.* 1981). In the late seventies the total population in NW Europe was estimated to be in the order of 200,000 to 250,000 individuals (Fog 1982). But the population is now higher and Rutschke (1987) gives an autumn population of between 250,000 and 350,000 for Europe. Huyskens (1986) estimates are however much higher, namely around 500,000.

From the evidence presented it seems clear that all Bean Geese populations of NW Europe have shown increases in recent years. For the Bean Geese resting in Sweden this was the case up to the late seventies, after that the population merely fluctuated. The Bean Geese wintering in the Netherlands and staging mainly in East Germany in the autumn have increased up to the present day.

For the Greylag Goose the few data available on resting numbers show the same increase as has been noted in other NW

European countries and in the Spanish wintering quarters (cf. e.g. Madsen 1987). Similarly, as the breeding population of Canada Geese in Sweden increased, wintering populations in south Sweden also increased. There are, however, no comprehensive data on the development of wintering populations of the species from other countries in NW Europe. The White-fronted Goose, finally, pauses only in small numbers in the autumn. Compared to information available from the fifties and early sixties the species has become more common in Skåne but there has been no changes in numbers during the last ten years paralleling the increases in the vastly greater populations passing south of the Baltic.

Acknowledgements

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Summary

A decade of intensive goose counts in south Sweden from 1977 is summarised. The information relates especially to the Bean Goose *Anser fabalis* with 37–60,000 birds. The smaller numbers of White-fronted Geese *A. albifrons*, generally around 2,600 are also well covered. Data for other species are less satisfactory.

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