

# XXI. *BRANTA BERNICLA* IN THE WADDEN SEA WITH SPECIAL REFERENCE TO THE NORTH FRISIAN SECTION (SCHLESWIG-HOLSTEIN)

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## Introduction

The Wadden Sea on the North Sea coast of Denmark, the Federal Republic of Germany and the Netherlands at certain times of the year holds up to 95% of the total population of *Branta bernicla bernicla* (Ebbingé et al., 1981). The following abstract gives information about the phenology and distribution pattern in the Wadden Sea, the population development and how this affects the situation in Nordfriesland (Schleswig-Holstein).

## Phenology and distribution pattern

Within the annual living range of *Branta b. bernicla*, the Wadden Sea area plays its most important role in spring and autumn (Fig. 1). While the distribution pattern in autumn (Fig. 2) reflects to a great extent the position of *Zostera* fields (mainly *Zostera noltii*) on the mudflats, the spring pattern depends essentially on the occurrence of saltings in the supralittoral zone (Fig. 3). Whereas in the northeast part of the Wadden Sea (Nordfriesland), we observe equal peak numbers in October and in April/May, there is a much less obvious autumn peak in the southwest (Dutch Wadden Sea) with only 30–40% of the April numbers. On the other hand we do find – apart from the main real wintering grounds in England and France – many more Brent Geese in the relatively warmer Netherlands (mean temperature in January around 4 °C) than in the colder Schleswig-Holstein area (0–1 °C) in midwinter (Fig. 4). In all parts of the Wadden Sea its function as the migration to the USSR (compare Ebbingé et al.) seems to be the most important to the geese.

For four years the IWRB – BRENT RESEARCH GROUP was able to organise, in addition to the international January population count, a second check of the total population by having a synchronised count in April or May in England, the Netherlands, the Federal Republic of Germany and Denmark. These counts proved that we were able to find in winter and spring, mostly with different teams of observers (due to the different distribution of the geese), more or less the same total population of *Branta b. bernicla*. The totals of these two checks each year varied from each other in a range of only  $\pm 10\%$ .

It became obvious that about 95% of all Dark-bellied Brent Geese are present in the Wadden Sea during April/May and only about 10% in midwinter (e. g. Tab. 1). In April/May Brent Geese can be seen all over the Wadden Sea area. Still they do not disperse quite homogeneously. The highest

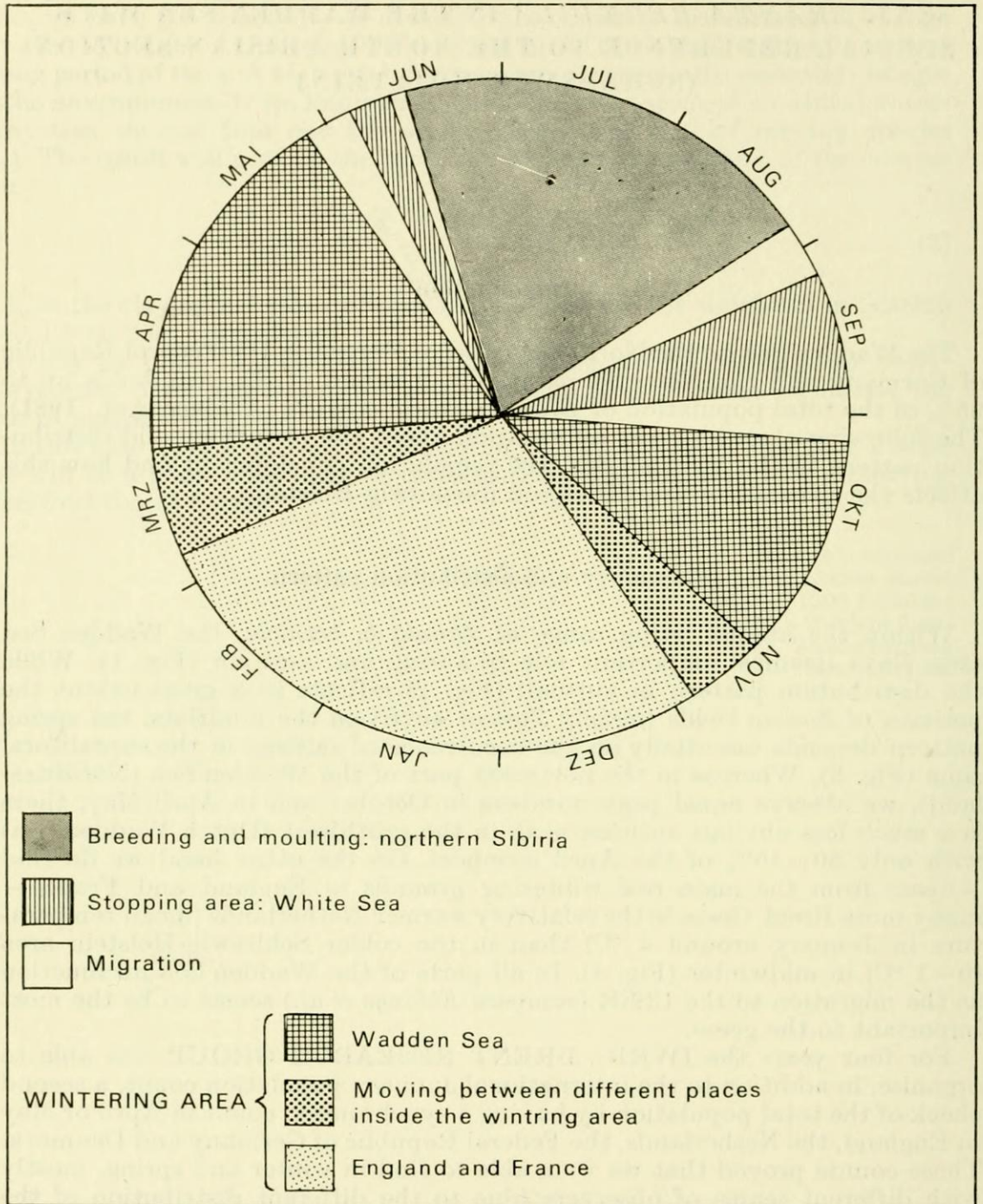


Figure XXI/1: Temporal occurrence of *B. b. bernicla* within its annual living range (from Prokosch, 1981)

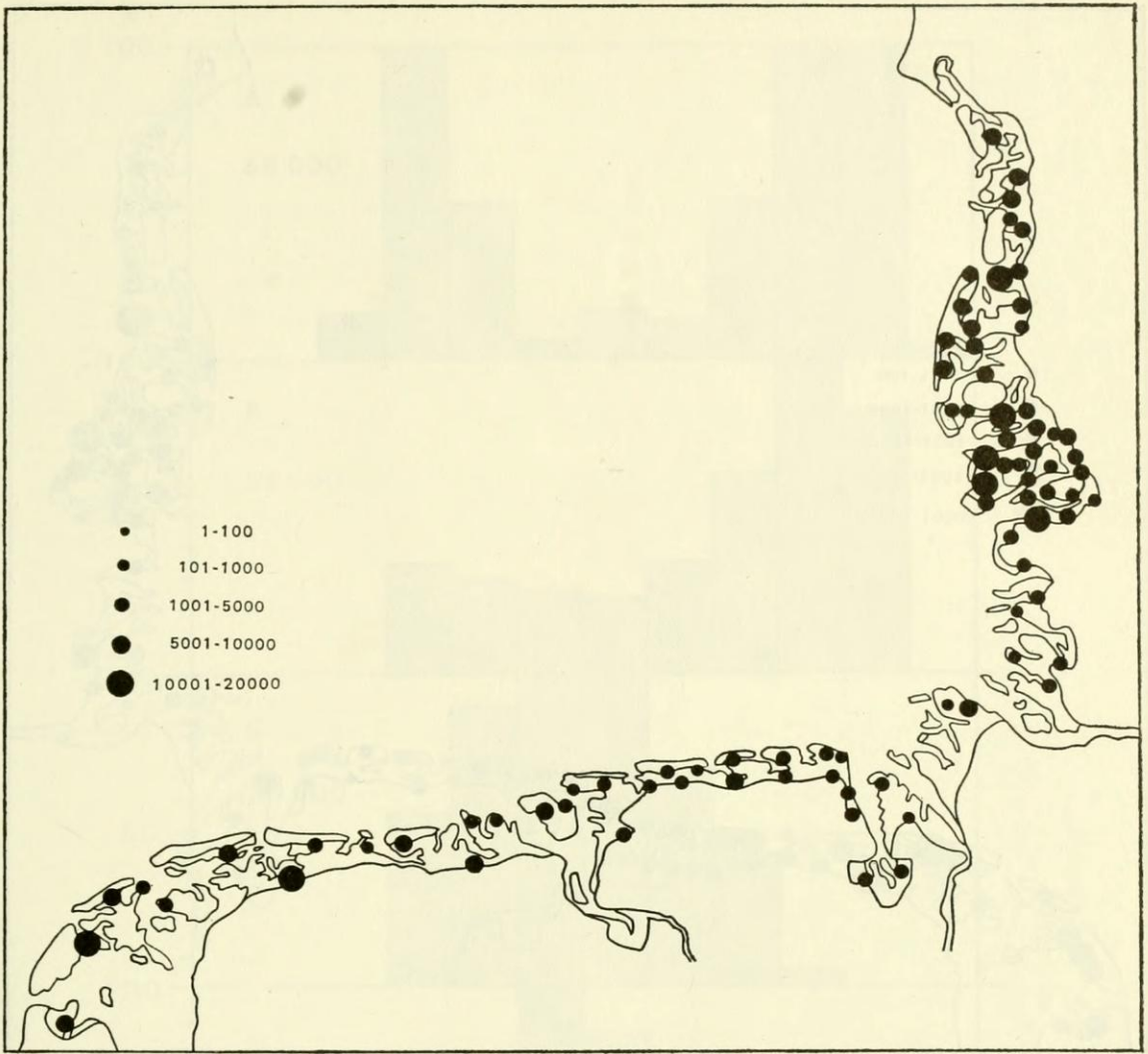
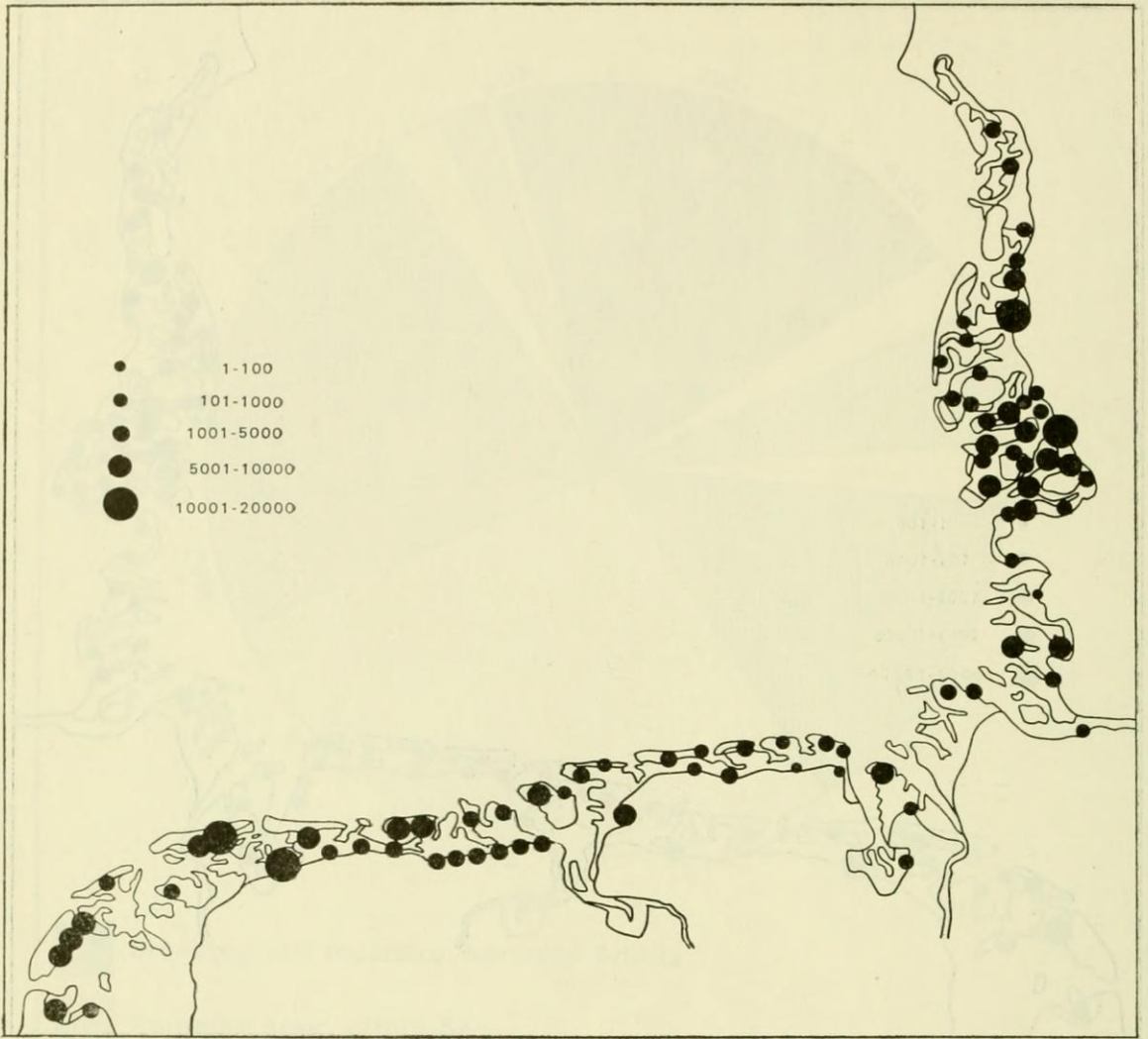


Figure XXI/2: Autumn (October) distribution of Brent Geese in the Wadden Sea (from Ebbingse et al. 1981)



*Figure XXI/3: Spring (April-May) distribution of Brent Geese in the Wadden Sea (from Ebbingse et al. 1981)*

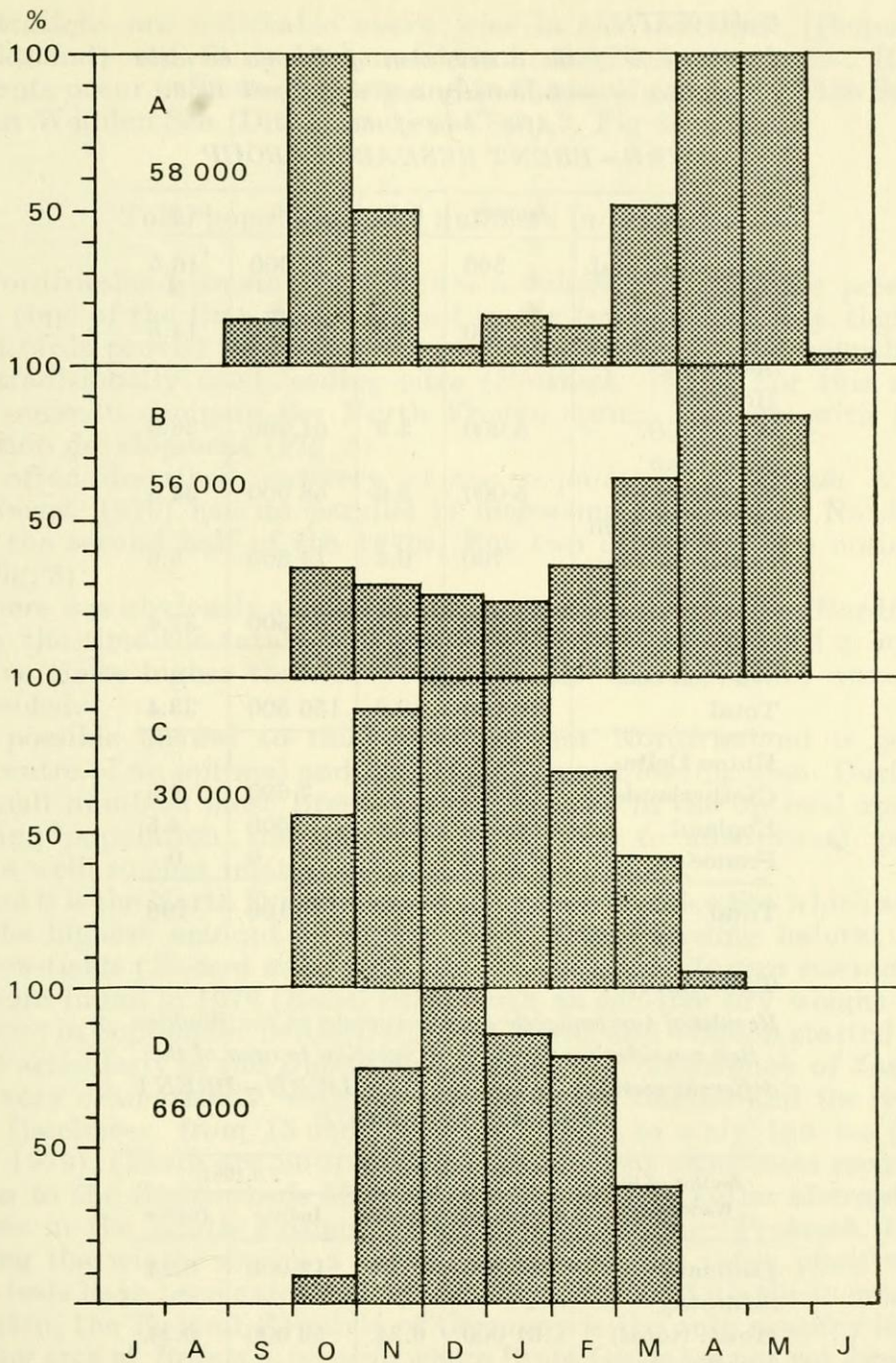


Figure XXI/4: Phenology of *B. b. bernicla* in 4 different parts of the wintering area: N. Frisian Wadden Sea (A: 1974-1978), Dutch Wadden Sea (B: 1974-1978), Essex (England) (C: 1974-75) and France (D: 1979-80, 1980-81). After Ebbinge et al. 1981, Maheo in litt. Prokosch 1981, St. Joseph 1979. (100% = the given maximum number)

Table XXI/1.

Comparison of the distribution of *Branta bernicla*  
*bernicla* in mid-January and mid-April 1980.

After data of the

IWRB - BRENT RESEARCH GROUP

	January	in %	April	in %
Denmark total	300	0.2	28 000	16.5
Danish				
Wadden Sea	300	0.2	24 500	14.5
Schleswig-				
Holstein				
Wadden S.	5 000	2.9	61 000	36.0
N. Frisian				
Wadden Sea	5 000	2.9	58 000	34.3
Wadden Sea in				
Lower Saxony	700	0.4	14 500	8.6
Dutch Wadden				
Sea	12 000	7.1	56 500	33.4
Wadden Sea				
Total	18 000	10.6	156 500	33.4
Rhine Delta				
(Netherlands)	10 500	6.2	7 600	4.5
England	81 000	47.8	1 500	4.5
France	60 000	35.3	0	0
Total	169 500	100	169 100	100

Table XXI/2.

Results of two complete spring surveys in the Wadden  
Sea considering numbers in relation to area of the  
different sections. After data of the IWRB - BRENT  
RESEARCH GROUP

Section of the Wadden Sea	20.4.1980		7.5.1981	
	Individuals	Ind/ha	Indiv.	Ind/ha
Denmark	24 500	0.49	12 000	0.24
Schleswig-				
Holst. (total)	61 000	0.24	59 000	0.24
Nordfriesland				
(part)	58 000	0.36	57 000	0.36
Dithmarschen				
(part)	3 000	0.03	2 000	0.02
Lower Saxony	14 500	0.07	15 000	0.08
Netherland	56 500	0.24	49 000	0.21
Total				
Wadden Sea	156 500	0.21	135 000	0.21

concentrations are noticeable every year in the northeast (Denmark and Nordfriesland) with fairly high numbers in the Netherlands too. Relatively few Brents occur in Lower Saxony and in the southern part of the Schleswig-Holstein Wadden Sea (Dithmarschen) (Tab. 2, Fig 3).

### Total population and numbers in Nordfriesland

In Nordfriesland constant maximum numbers of Brents are present during the time of the first week of April to the last week of May. Sightings of marked birds proved that the same individuals stay for two months on the same, traditionally used feeding sites (Prokosch, 1981). For this reason it makes sense to compare the North Frisian spring numbers with the total population development (Fig. 5).

The often described recovery of the population of *Branta b. bernicla* (e. g. Smart, 1979) has its parallel in increasing numbers in Nordfriesland during the second half of the 1970s. But two differences are noticeable as well (Fig. 5):

1. There was obviously a delay in the increase of the geese in Nordfriesland.
2. By the time the total population in 1979/80 had reached a level more than five times higher than 15 years ago, the North-Frisian numbers had only trebled.

One possible answer to this could be that Nordfriesland is positioned in the centre of an optimal and traditionally used feeding area. During times with small numbers most Brents do concentrate in the optimal zone. With increasing population they have to distribute to suboptimal peripheral zones as well, so that relations of numbers do change.

Indeed it is the North Frisian part of the whole Wadden Sea which at present holds the highest amount of marine Brent Goose feeding habitat: 2600 ha of *Zostera*-fields (*Zostera noltii* with a small amount of *Zostera marina angustifolia*) were found in 1979 (Reise, 1979), with an ash-free dry weight of about 600 – 900 t in September before feeding of Brent and Wigeon started (Schultz, 1980). Particularly in the Dutch Wadden Sea the occurrence of *Zostera* decreased very dramatically, with the disease in the thirties and the reclaiming of the Ijsselmeer, from 15 000 ha (1920–1932) to only 160 ha (1972/83) (Wolff, 1979). (There are no indications of a recent significant recovery.) In addition to the *Zostera* beds 5500 ha of saltings (1981) offer alternative food resources in the North Frisian Wadden Sea in spring (Prokosch, 1981).

During the winter season a change of marine diet takes place when the *Zostera* beds have been eaten out by January (Fig 6). With the increase in the population, the Federal Republic of Germany is the only country left in the wintering area of *Branta b. bernicla* where Brent Geese are not yet forced to use terrestrial feeding sites in numbers worth mentioning. In Britain, France, the Netherlands and Denmark the capacity of the marine feeding resources have already been exceeded during the last years (s. different authors in Smart, 1979).

The expansion of the spring feeding area used in Nordfriesland between 1976 and 1981 is shown in Figs. 7 and 8. We have the impression that not until spring numbers reached 50 000 – 60 000 had the carrying capacity of the saltings been reached in this area. During the last three years, very locally, first inland feeding with up to 2000 birds in total has been observed.

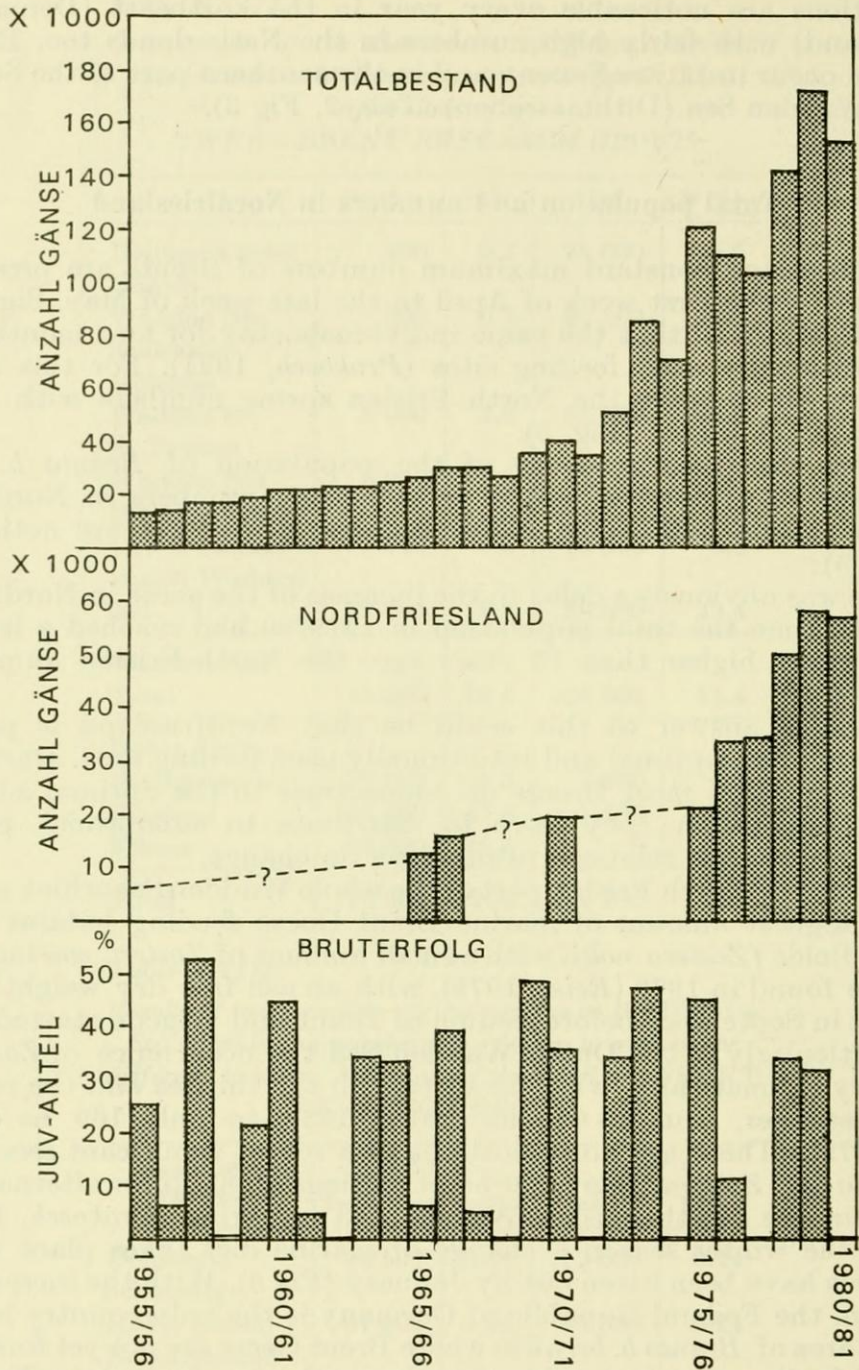


Figure XXI/5: Population development of *B. bernicla* during the period 1955/56 to 1980 (81 top), maximum spring numbers in the N. Frisian Wadden Sea (middle) and annual breeding success expressed as % of juveniles in the wintering flocks (bottom). From Prokosch 1981 after data of the IWRB Brent Research Group

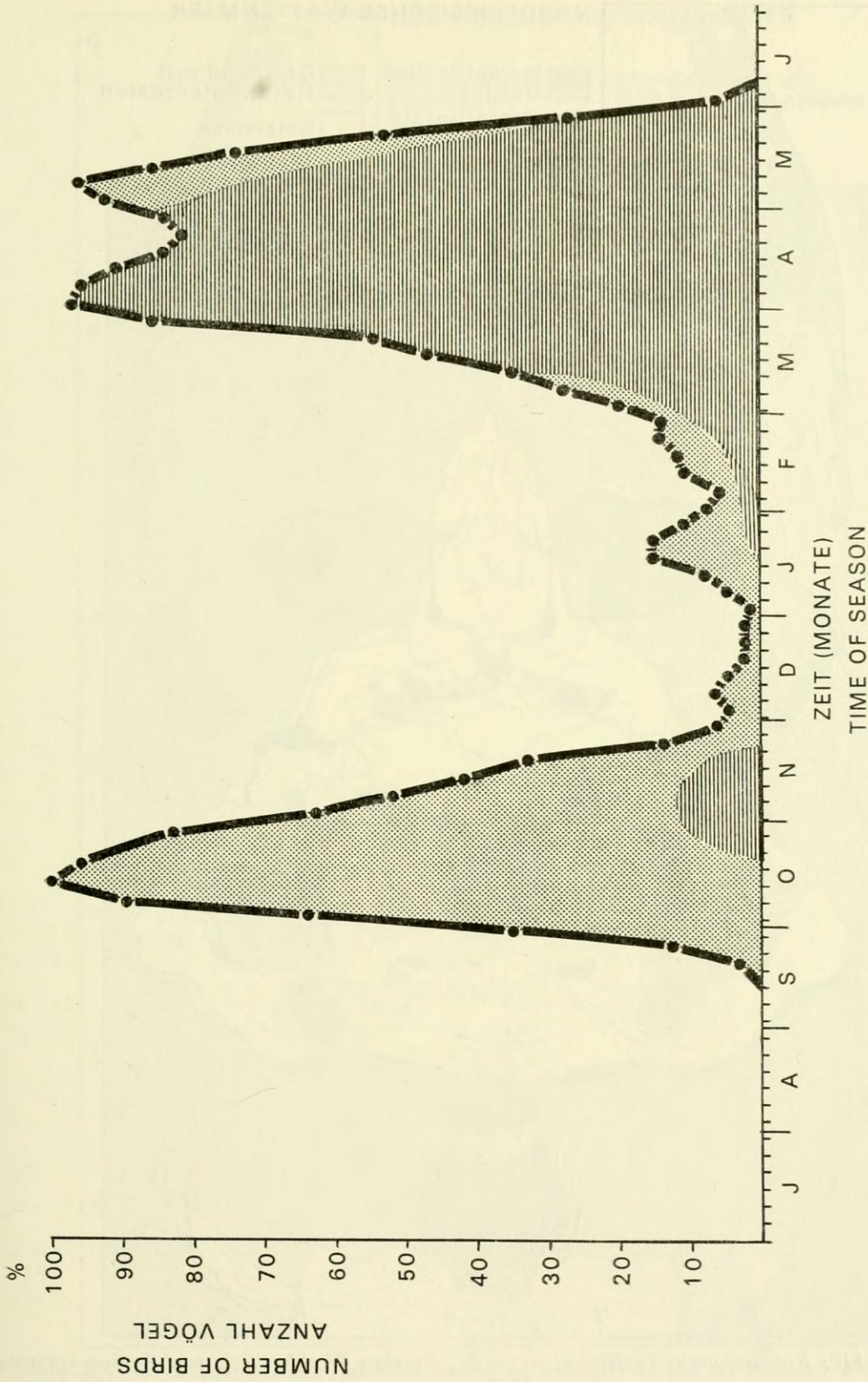


Figure XXI/6: Phenology of *B. b. bernicla* in the N. Frisian Wadden Sea (1974 - 1978) with respect to changing diet. Stippled: feeding in the eulitoral zone (*Zostera*, *Enteromorpha*); hatched: feeding on the supralitoral salttings. From Prokosch, 1981

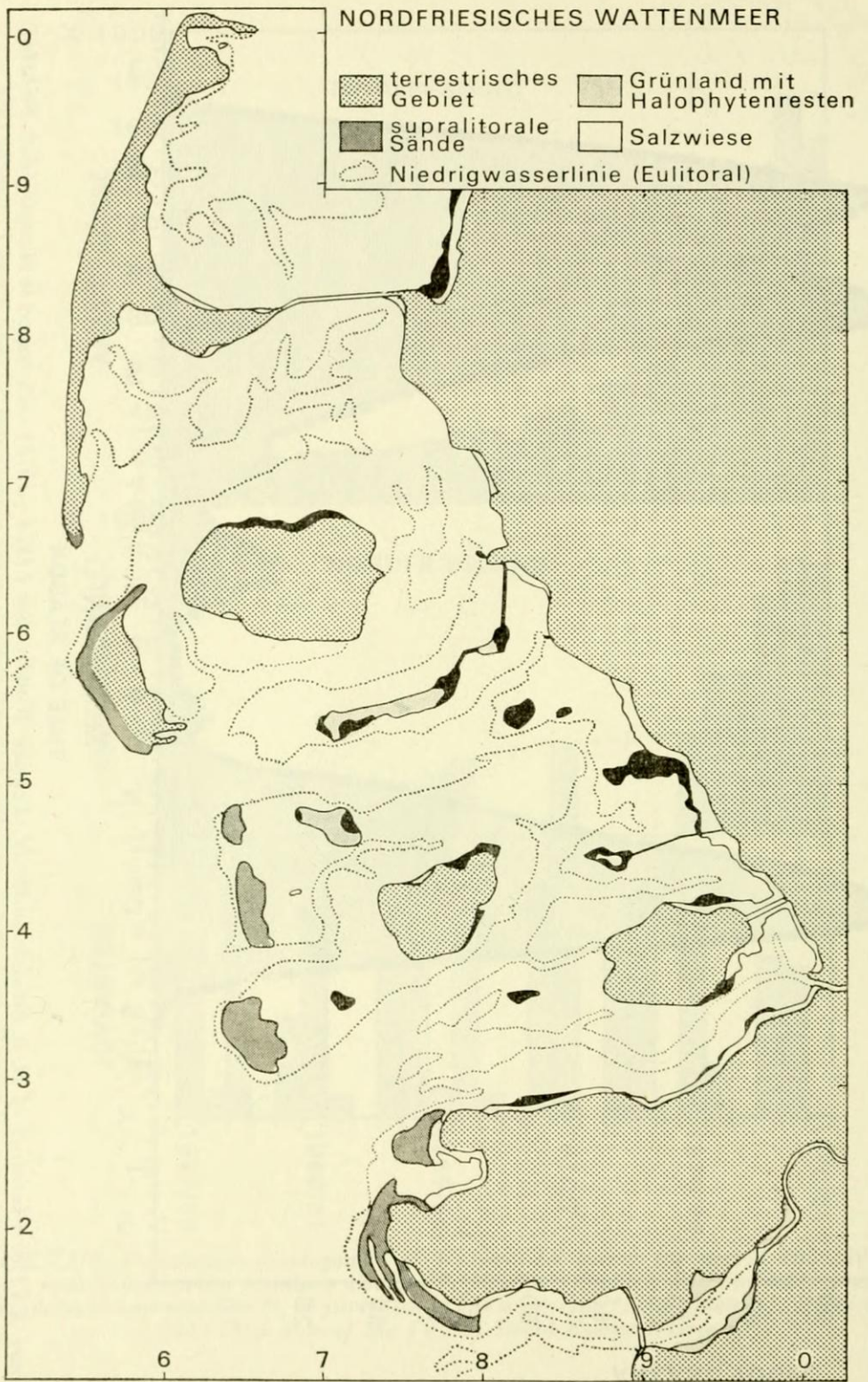


Figure XXI/7: Feeding areas (saltings) in the N. Frisian Wadden Sea used during spring 1976.

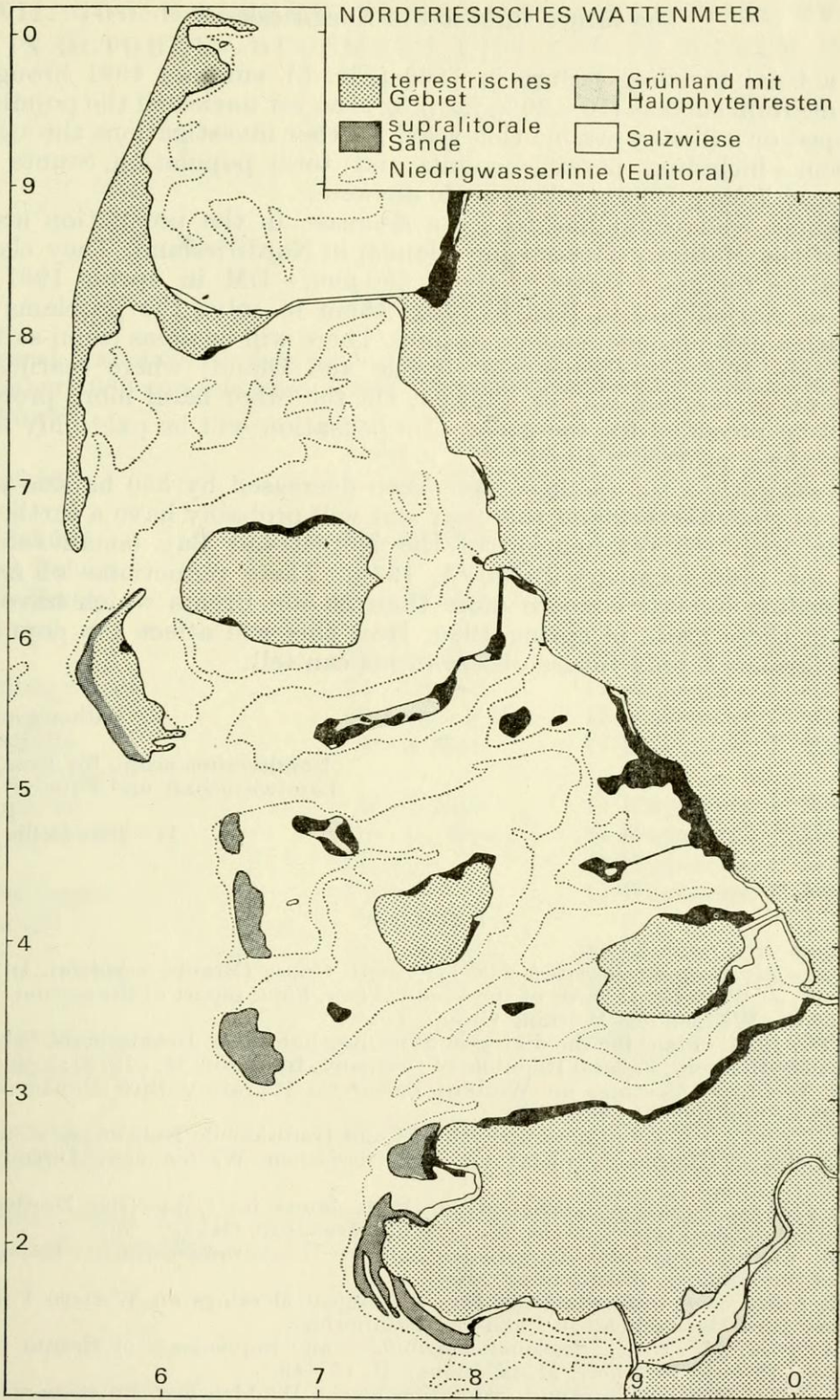


Figure XXI/8: Feeding areas (saltings and semi saltings) in the N. Frisian Wadden Sea used during spring 1981.

## The future situation in Nordfriesland

After a total breeding failure in 1980 (Fig. 5), summer 1981 brought a small to medium success (10–20% juv.). It is as yet unclear if the population has dropped or will stay stable this year. Further investigations throughout this season—including juvenile counts and total population counts on 9 January and 7 May 1982—will provide answers.

The people who would like to see a decrease in the population are the farmers of the Halligen (flat salting islands) in Nordfriesland. They claimed compensation for grass losses of about 200 000,—DM in spring 1981. The Minister of Agriculture in Kiel has told them to solve the problems next spring with a new management program. There will be areas (semi-saltings) on 3 private Halligen (Langeness, Hooge and Oland) where scaring and probably even shooting will be allowed. On the other hand more protected areas will be provided for the geese. Compensation will be paid only to the owners of these protected zones.

At the same time the saltings have been decreased by 550 ha due to the diking in of Rodenas-Vorland this year and will probably have a further loss of 845 ha with the reclamation of the Nordstrand Bay (small solution) planned for 1982 (compare *Prokosch*, 1979). These reductions of natural marine feeding habitat concern more than 20 000 Brents which have been counted in these areas in spring 1980. How this will affect the population (and the farmers?) only future observations can tell.

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