

# Numbers and distribution of Knot *Calidris canutus islandica* during spring migration in north Norway 1983 - 1989

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Knots of the *islandica* subspecies use two main spring staging sites in northern Norway: Balsfjord near Tromsø, and Porsangerfjord, c. 250 km away to the northeast. Knots usually arrive between 12 and 16 May, and leave the area to the west or northwest between 25 and 28 May. Numbers present at either site fluctuate about threefold from year to year, but total numbers appear to be more stable, between 60,000 and 80,000 Knots. Resightings of colour-ringed birds indicate that individuals may stage in the two different fjords in different years. The relative attractivity of each staging site is suggested to relate to the extend of ice-cover of good feeding sites in Porsangerfjord.

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## INTRODUCTION

In the late 1970s and early 1980s large flocks of migrating Knots *Calidris canutus* were discovered in Porsangerfjord (70°20'N, 25°06'E), north Norway (Berg 1979; Håland & Kålås 1980). In 1983 another staging area for spring migrating Knots was discovered in north Norway (Strann 1984, 1985). This area is in Balsfjord (69°22'N, 19°18'E), c. 250 km southwest of Porsangerfjord.

This paper summarizes existing knowledge about the spring migration phenology of the Knot in north Norway. A co-operative venture between Durham University, U.K., and Tromsø University, studied the species at Balsfjord in May 1985 - 1987. Information from these studies is supplemented by observations collected since and elsewhere.

## METHODS

In May 1983 a large flock of Knots was observed by members of Tromsø Ringing Group in Sørkjosen, Balsfjord. In 1984 the same group counted Knots in Balsfjord at two different mudflats, Sørkjosen and Kantornes (Figure 1). The flocks were counted in the field and black-and-white photographs were taken of the flying flocks to allow them to be counted later (Strann 1984, 1985).

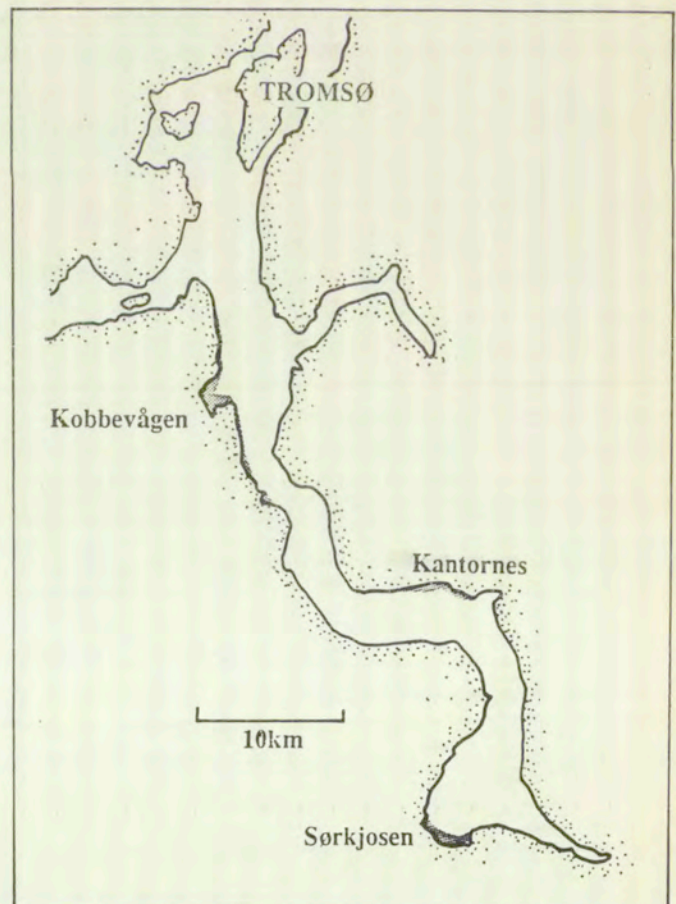


Figure 1. Location of feeding areas used by Knots in Balsfjord, north Norway.



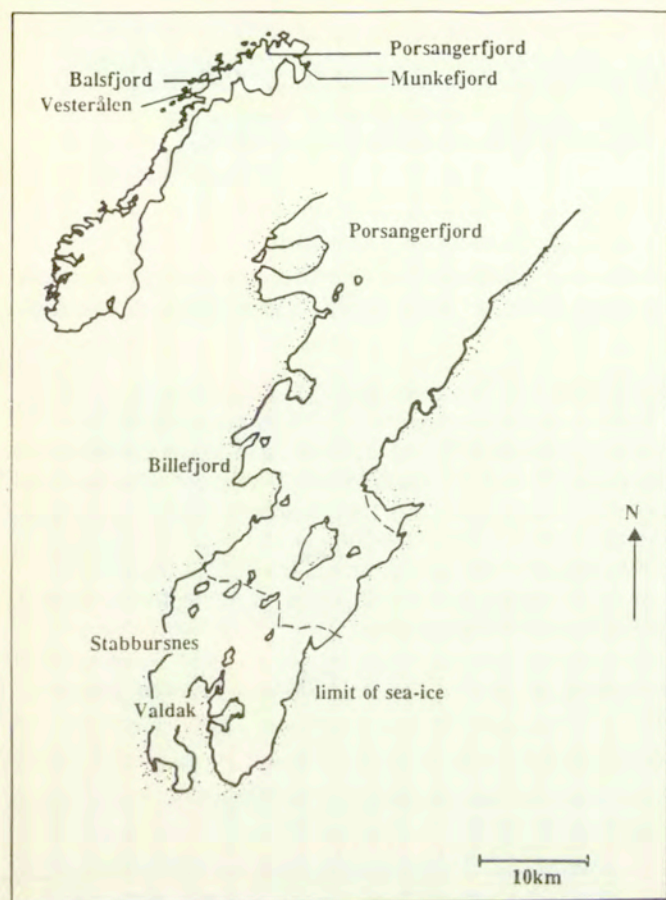


Figure 2. The location of sites used by Knots in north Norway during spring migration, and the most important feeding areas in Porsangerfjord. The dashed line is showing the limits to the extent of sea-ice in Porsangerfjord during winter.

In 1985 and 1986 the Durham/Tromsø team counted all staging Knots in Balsfjord, and in 1986 also in Porsangerfjord (Figure 2), from suitable vantage points around the fjords using 20-60 x telescopes. Since 1987 the same methods have been used by Tromsø team for both Balsfjord and Porsangerfjord.

Almost 2,300 Knots were caught by cannon-netting in Balsfjord in 1985 and 1986. Biometrics and weights were taken of all these birds and this established their identity as belonging to the Nearctic *islandica* subspecies. In 1986 497 Knots were ringed with permanent orange colour-rings (Uttley *et al.* 1987). Another 20 birds were caught at Porsangerfjord in 1987 and also given an orange ring. After 1986, searching for colour-ringed Knots was intensified both in Balsfjord and Porsangerfjord.

Data on the amount of sea-ice in Porsanger in the period 1983 - 1989 was collected from the weather station on Banak Airbase, Lakselv, situated in the innermost part of Porsangerfjord.

## RESULTS

### Balsfjord

The fact that large numbers of Knots use Balsfjord on spring migration was discovered in May 1983. During a visit to Sørkjosen on 14 May a flock of 2,800 birds was feeding intensively on the mudflat. On 21 May an even larger flock was feeding at the same site.

The first Knots are usually seen in Balsfjord in the first week of May, but most arrivals take place between 12 and 16 May (Table 1). The total numbers of Knots staging in Balsfjord have varied almost threefold between years, from a maximum of 28,000 in 1984 to only 9,500 in 1989 (Table 1). Departure dates are very consistent in Balsfjord; nearly all birds leave in the period 25 to 28 May (Table 1).

### Porsangerfjord

Before 1986 very few counts from Porsangerfjord covered both sides of the fjord (Figure 2). Most of the numbers presented in different journals are either rough estimates or counts made only on the west side near Stabbursnes and Valdak (Andreasson & Råd 1977; Berg 1979; Håland & Kålås 1980).

There is little information about the timing of the first arrivals, but in 1985 very few birds arrived before 11 May and the majority arrived from the middle of the month to about 20 May (Ivar Johnsen pers. comm.).

Total counts made before 1985 gave estimates of at least 30,000 Knots (Berg 1979; Håland & Kålås 1980), the latter authors suggesting perhaps 50,000 being present in total. Out total counts from 1986 to 1989 show very big differences between years. In 1986 and 1987 the numbers were similar, between

Table 1. The timing of migration of Knots in Balsfjord, north Norway. All values for days (d) are days in May.

	1984	1985	1986	1987	1988	1989
First arrivals (d)	4	8	6	1	2	1
>75% arrivals (d)	12-16	12-15	15-18	13-15	12-14	10-12
max. population size	28,000	15,000	12,000	18,000	22,000	9,500
>75% departures (d)	25-29	25-28	26-28	25-27	25-28	26-27



Table 2. Total numbers of Knot in Balsfjord and Porsanger fjord, north Norway in May 1984 - 1989. ? = numbers unknown.

Year	Number of Knots		Amount of sea-ice in Pors'fjord
	Balsfjord	Pors'fjord	
1983	> 13,000	?	much
1984	28,000	?	much
1985	> 15,000	> 30,000	little
1986	12,000	25,000-30,000	medium
1987	18,000	28,000	much
1988	22,000	42,000	little
1989	< 10,000	> 60,000	none

25,000 and 35,000 birds, while in 1988 and 1989 there were many more Knots: 42,000 and 60,000 respectively (Table 2).

During a 30-40 min period at high tide on 26 May 1989 we observed a number of flocks, totalling more than 6,000 Knots, leaving the fjord heading northwest, climbing higher and higher and forming broad lines. These departing flocks differed in behaviour from the flocks which were left behind in the fjord. The latter formed large, bulky flocks while flying to their roosts on the small islands in the middle of the fjord. Unfortunately we had to leave Porsanger late that night so we have no further information on the departure of the rest of the birds.

#### Other spring staging sites in Norway

Up to now we have found no other major staging sites for spring migrating Knots in north Norway. Small flocks (< 20 birds) are seen in some years on mudflats on the northernmost part of Langøya in Vesterålen (68°55'N, 15°10'E) (Figure 2). Even larger flocks have been seen on mudflats close to Åse, which is situated on the eastern side of Andøya (69°02'N, 15°48'E). On 20 May 1981 one large flock (1,200 birds) and several small flocks, giving a total of 1,500 Knots, were observed feeding on this mudflat for at least two days (Fritz Rikardsen pers. comm.). A number of visits in later years by local birdwatchers have, however, not found such high numbers on either of the sites (Bjørn Røsshag pers. comm.).

According to Andreasson & Råd (1977) and Randa (1976), flocks of Knots have been observed in eastern Finnmark, especially in Munkefjord (69°38'N, 29°30'E) close to the Russian border (Figure 2). A flock of 2,500 was seen there in May 1971, but

accurate counts made in this fjord in all springs since 1983 have not revealed such high numbers. All observations of flocks in this period have been of small flocks, usually well below 250 birds (Hans Dransfeld pers. comm.).

#### Sightings of colour-ringed birds

In Balsfjord a large number of colour-ringed birds have been observed in the flocks every year since 1986, indicating that many birds return to the same spring staging area year after year.

In 1987, however, five orange colour-ringed birds were seen on Iggaldas in Porsangerfjord, before any birds were colour-ringed in this fjord. This indicates that a number of birds choose between these two north Norwegian fjords as a migratory staging area in some years. Five and seven sightings of these orange colour-ringed birds were made in Porsangerfjord in 1988 and 1989. All of them were seen in the Iggaldas area.

#### DISCUSSION

Precise identification of the breeding sites of the Knots staging in north Norway in spring has yet to be achieved. All the information so far indicates that these birds are of the *islandica* subspecies with a Nearctic breeding origin (Davidson *et al.* 1986; Uttley *et al.* 1987; Wood *et al.* 1988). Observations by several people show that all departures from both fjords take place in west to northwesterly directions, also implying a Nearctic origin.

The numbers of Knots staging in Balsfjord have been the subject of accurate counts since 1984. These counts show large fluctuations between years. There is no clear link between these variations in numbers and the spring weather and temperatures in Balsfjord alone. However, if one looks at Porsangerfjord and Balsfjord together (Table 2), there may be a possible explanation.

In most winters the innermost part of each open fjord, including the extensive mudflats, is covered with ice. This ice-cover varies a lot between different years (Table 2): after severe winters the ice does not melt away from the mudflats before late May or even the first half of June. Observations made in ice-free springs indicate that many of the mudflats covered with ice in 'icy' springs are among the most important feeding sites, when available.



The Porsangerfjord holds considerably larger areas of suitable mudflat for large wader flocks than Balsfjord, the latter containing no more than 10-15% of the total area of mudflat available in Porsanger.

The distance between the southern (inner) part of Porsangerfjord and Balsfjord is 260 km as the crow flies; although along the coast it is twice as far. It is well within the flying capacity of the Knot to first go to Porsangerfjord to check the ice-conditions, and then decide to stay or return to Balsfjord if the conditions are too bad. Knots arriving at Balsfjord in early May are still carrying considerably more fat than do wintering birds in Britain (Davidson & Evans 1986; Evans 1992). From an energetic point of view, it would cause relatively few problems for the Knots to fly straight to Porsangerfjord even with the risk of having to return to Balsfjord should ice-cover be extensive. Knots sometimes undertake just as long flights during the winter, e.g. from the Wadden Sea to Britain, when most birds are in much poorer condition than they are in spring in north Norway.

I have no direct observations of flocks flying back south from Porsangerfjord in spring to confirm such a theory, but several flocks have been observed flying northwards on the coast north of Balsfjord during May. Very few suitable sites are to be found in this region, and in the last two years all have been checked in the second half of May. No Knots have ever been observed in any of these sites. Therefore, since there seem to exist no other staging sites in the area between Balsfjord and Porsangerfjord I believe that the northward flying flocks head towards Porsanger.

On the other hand, there are several suitable sites south of Balsfjord, especially in the region of Vesterålen. Though some of the sites where Knots have been recorded in earlier years have been checked a few times recently, I feel that the region as a whole has not been satisfactorily searched. There may well be smaller flocks 'hiding' somewhere in this area every spring, but the chance of finding large numbers here (i.e. >2,000 - 3,000) is probably relatively small.

Håland & Kålås (1980) suggested that the total number of Knots using Porsangerfjord may exceed 50,000. The 1989 data show that more than 60,000 Knots were staging in Porsanger in late May. This high number is partly due to the fact that for the very first time we managed to cover the whole fjord (including the extensive mudflats in between

the numerous islands in midfjord) and partly to the fact that in this season no sea-ice was present (Table 2). Along with the very low number of Knots found in Balsfjord in 1989, this suggests that a considerable interchange may take place between these two sites from year to year.

Adding together the total numbers of Knots found in Balsfjord and Porsangerfjord every year since 1985, and taking into account that an important area in Porsanger was not counted until 1989, a likely estimate of total numbers of Knots using staging areas in north Norway varies between 60,000 and 80,000 birds in different years. This is the same value as Davidson & Evans (1986) suggested on the basis of much less information.

The year-to-year fluctuations in the total numbers in north Norway are probably determined by variations in the numbers travelling via Norway from the staging areas in the Wadden Sea, while the variation in the relative use of sites may well be caused by interchange between the two sites in relation to ice-cover of good feeding sites in Porsangerfjord.

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