

NORTH AMERICAN SECTION No. 12



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IMPORTANT NOTICE TO ALL MEMBERS LIVING IN CANADA AND THE UNITED STATES

A new system of subscription payment is now introduced with immediate effect. After extended discussions between the North American Steering Committee and WSG officers, it has been decided (with our Banker's agreement) that North American members send their subscription in dollars directly to the UK. WSG will open suitable dollar accounts (for both US and Canadian dollars) so that money can be transferred easily and cheaply to fs sterling as required. This method will save transfer fees and ensure that central listing of members is more easily kept up to date. We expect the system to increase efficiency ... it is also simple!

Subscriptions are now due (at new rates - see page 1 of this Bulletin), and should be sent with the enclosed form to the Group's Secretaries, N. & J. Clark, as soon as possible. In future, any changes of address should be sent to the Secretaries. Up-dated lists of North American members will be sent at regular intervals to the North American Steering Committee. Further information can be obtained from Ted Miller or Pete Myers - addresses inside front cover.

NOTICE

Colonial Waterbirds

The Executive Council of The Colonial Waterbird Group has established a policy that will allow unsolicited manuscripts to be considered for publication in the new journal, Colonial Waterbirds. Formerly, only papers presented at the annual meeting were eligible. Preference will be given to those authors able to pay page charges but these will not be mandatory. This policy change takes effect immediately, with the next volume (no.6) expected to be published in the summer or early fall 1983. For details concerning manuscript preparation, consult volume 5 of Colonial Waterbirds or the Editor, Dr. Herbert Kale II, Florida Audubon Society, 1101 Audubon Way, Maitland, FL 32751, USA.

ABSTRACT OF SHOREBIRD PAPER AT THE MEETING OF THE AMERICAN ORNITHOLOGISTS UNION, CHICAGO, OCTOBER 1982

Migration of Knots *Calidris canutus rufa*

by Brian A. Harrington, Linda E. Leddy and R.I.G. Morrison, Manomet Bird Observatory, Manomet, MA 02345 (BAH & LEL) and Canadian Wildlife Service, Ottawa, Ontario (RIGM).

Data from the International Shorebird Surveys, literature, banding and color-marking, and feeding studies at key migration stopover areas are used to show the strategies which Red Knots use in migrating between wintering grounds in Tierra del Fuego and western Florida, and breeding areas in arctic Canada. Knots typically migrate in a series of long, non-stop flights, a strategy which strongly depends upon their being able to use key staging areas for refueling along the way. Staging areas are used traditionally, and where studied, cropping of food resources at stopovers is extensive. Knots are unusually vulnerable to loss of habitat at key migration stopover areas.

ARE WADER FLOCKS RANDOM GROUPINGS? - A KNOTTY PROBLEM

by Brian A. Harrington and Linda E. Leddy

In a recent WSG Bulletin article, Furness and Galbraith (1980, WSG Bull. 29: 22-23) described a non-random distribution of color-marked waders and speculated on the possible causes of their observations. We found an analogous situation during three brief surveys of Red Knots *Calidris canutus* on the Florida west coast in 1981 and 1982, and speculate on the significance of our observations with respect to population estimates based upon sightings of color-marked waders, and with respect to non-random association of Knots within and between flocks.

We captured and color-marked 238 Red Knots (all adults) from a flock of 450 resting at Sands Point, Longboat Key near Sarasota, Florida on 6 January 1981 by using a rocket net (60 x 40 feet, 1 inch square, knotless nylon net) propelled by four rockets. All birds were processed at the capture site immediately following capture, marked with a saturated solution of picric acid and 95% ETOH, and were released within six hours of the capture time. The birds were marked also with colored leg-flags. Subsequently we censused flocks of Knots in the Sarasota region from 7-9 January 1981, 9-16 October 1981, and 18-21 January 1982, concentrating our work in places where we knew knots were gathering to rest at high tides or to feed along beach fronts on falling tides.

Table 1. Frequencies of Red Knots banded at Sands Point on 6 January 1981 and subsequently found in flocks at various locations.

	<u>Location</u>	<u>Distance (km) From Banding Site</u>	<u>Flock Size</u>	<u>No. of birds Checked</u>	<u>No. marked</u>	<u>Percent marked</u>
7 Jan 81	Siesta Key	7	4200	1054	90	8.5
8 Jan 81	Sands Point	0	400	400	10	2.5
	Siesta Key	7	2230	1251	96	7.7
9 Jan 81	Sands Point	0	900	659	19	2.9
7 Oct 81	Madeira Beach	62	550	622	15	2.4
9 Oct 81	Sands Point	0	350	735	31	4.2
16 Oct 81	Indian Shores	69	800	1130	9	0.8
18 Jan 82	Manasota Key	42	1125	1906	29	1.5
21 Jan 82	Longboat Key	15	1400	781	31	3.9

In most cases it was not possible to search systematically through complete flocks because birds were often milling about, or in some cases were repeatedly flushed by pedestrians. Our aim in searches was to obtain an estimate of the flock size and a tally of the proportion of the marked birds present. In some cases we were able to search through a flock more than once, resulting in a tally of birds checked that exceeded the flock size, while in other cases it was not possible to check a whole flock.

Whatever the situation, we always tried to collect ratios from representative sections throughout the flocks. It was always possible that marked birds could have been counted more than one time or that some marked birds in flocks were not seen. Consequently, our analyses are necessarily based on frequencies of marked birds seen rather than absolute numbers.

Results

Intra-flock distribution of marked birds.

While counting Knots we noticed that marked birds were not randomly distributed in either foraging or resting flocks. For example, on 7 January (Table 1) a large resting flock was gathered during a storm on the upper beach at the north end of Siesta Key, the only time we found Knots resting at this particular location which normally was heavily used by humans. Siesta Key is about 7km south of Sands Point where the Knots were banded. A count of marked/unmarked Knots in one section of the Siesta Key flock yielded a ratio of 30/535 (=5.6%) whereas the ratio in another section of 60/519 (=11.6%) was significantly higher ($\chi^2 = 10.9, <P 0.01$). Similarly, in one part of a foraging flock on a sandbar next to Siesta Key on 8 January the marked/unmarked ratio was 80/739 (10.8%) while it was 16/512 (3.1%) in another section ($\chi^2 = 23.4, <P 0.01$) of the same flock. The foraging flock took flight several times when disturbed, yet the tendency for marked birds to be concentrated in one section of the flock persisted, even though not necessarily in the same area of the tidal flat.

Non-random distribution between flocks.

Not only was there non-random distribution of marked knots within flocks, but there were also significantly different frequencies between flocks (Table 1). For example, between 7 and 10 January 1981 the proportion of marked birds (29/1059 [2.7%]) found at the banding location (Sands Point) was significantly lower than the proportion (186/2305 [8.1%]) found at Siesta Key, 7km to the south ($\chi^2 = 32.3, <P 0.01$). A non-random distribution persisted 8 and 12 months later (Table 1), after all the birds had completed a pre-alternate and pre-basic molt, and a round-trip migration to their arctic breeding range.

Discussion

The results of non-random distribution of marked Knots have two important implications for wader research. First, the non-random distribution of marked birds within flocks suggest that flocks are not random associations, a curious and unexpected finding. Except as described, the marked birds were not grouped in any way we could see, but instead were distributed amongst unmarked birds. We saw no evidence of segregation according to the presence or absence of dye and/or bands, no unusual aggressive behavior, no evidence of fidelity by marked birds to particular spots, no evidence of territorial behavior, nor did we see any other unusual reaction to marked birds by their neighbors. We are left with the idea that Knot flocks are not random associations of birds, and that there is some sort of social organization to flocks. In contrast, Pete Myers (pers. comm.) did not find that Sanderlings *Calidris alba* in California had complex, within-flock, social organization.

Second, our result of non-random occurrence of marked birds between flocks indicates that care should be used in calculating population estimates using ratios of marked/unmarked birds unless broad, representative sampling is achieved. For example, at Sands Point in January 1981 we found 29 of the 238 marked Knots among 1059 birds checked, giving an estimate of 8691 Knots in the area population. On the other hand, at Siesta Key we found a ratio of 186 marked to 2305 unmarked Knots, leading to population estimate of 2949 Knots. Combining the ratios from both areas gives a population estimate of 3724, much closer to the number we estimated (3875) from counts made in an aerial survey on 31 December 80.

To summarize, ornithologists frequently work on the assumption that birds are randomly associated in their flocks. Our findings with Knots, and those of Furness and Galbraith (1980) with another species of wader, suggest such assumptions may be incorrect.