

schemes used by members could also be readily ascertained. I am willing to provide such information, as long as the demand does not become overwhelming. The information presently available is limited by the number of members that has responded to the questionnaire: those who have not are encouraged to submit one to me at the address below. If you have not received a questionnaire, or have misplaced it, please request another. If this system proves to be interesting and useful enough to members, we can consider expanding it to include members of the original Wader Study Group and starting a computerised information file. All comments and suggestions are welcome.

#### Summary of Wader Study Group (North American Section) Questionnaire and Responses from Members

1. What is your professional level of interest in shorebirds?  
(a) Amateur (37) (b) Student (11) (c) Professional (36) (d) Other (explain) (2).
2. What is the nature of your work on shorebirds?  
(a) General interest (45) (b) Conservation (27) (c) Banding (only) (7) (d) Research (11)  
(e) Research administration (3) (f) Other (0).
3. If you are banding shorebirds, please indicate the approximate number of species and individuals banded per year:  
Species: 1 (7) 2-5 (12) 6-10 (8) more than 10 (3)  
Individuals: less than 100 (11) 100-500 (13) 500-2000 (2) more than 2000 (4).
4. If you are conducting research, please indicate the disciplines in which you are currently active (with an x) and those in which you have a particular interest but are not presently involved (with an o):  
(a) Ageing-sexing (22) (b) Molt (19) (c) Feeding ecology (57) (d) Breeding biology (33)  
(e) Population ecology (34) (f) Social behavior (28) (g) Migration (64) (h) Systematics (13)  
(i) Morphology (10) (j) Other (0).
5. If you are color-marking birds in your work, explain briefly the species marked and the type(s) of markers used:  
19 members are color-marking shorebirds.
6. In what geographic area(s) are you observing or studying shorebirds?  
(a) Canada: East coast (15) West coast (5) North coast (4) Interior (11)  
(b) U.S.A.: East coast (32) West coast (7) Interior (19) Alaska (4)  
(c) Other: Caribbean (2) Central or South America (4).
7. On the reverse, please present a narrative summary (less than 100 words) of your interests and activities.

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#### NATIONAL GEOGRAPHIC MINI-EXPEDITION TO SURINAM, 1978

by R.I.G. Morrison and A.L. Spaans

#### Introduction and Background

In September 1978, the National Geographic Society funded a mini-expedition to Surinam to obtain photographic material on shorebird migration for a forthcoming article on 'Bird Migration' (currently scheduled to appear in the August 1979 issue of National Geographic Magazine). Two large-scale shorebird banding projects that would illustrate migration between North and South America were chosen for coverage. The projects were those organised by the Canadian Wildlife Service in James Bay, Canada, and by the Surinam Forestry Service in Surinam. In James Bay 38,504 shorebirds were captured between 1975 and 1978 (Table 1), and in Surinam 16,607 between 1970 and 1977 (Spaans 1979), resulting in the exchange of some 30 banded birds between the two programs.

A National Geographic photographer, Jonathan Blair, visited the banding operation in James Bay in August 1979, and subsequently travelled with Guy Morrison and Arie Spaans to Surinam in early September. The main objective of the mini-expedition was to obtain pictures illustrating shorebird migration between North and South America by photographing colour dyed birds that had been marked in James Bay. In addition, a valuable opportunity was created to extend scientific studies through (a) sightings of marked birds, (b) collaborative banding studies enabling future integration of previously collected biometric data from James Bay and Surinam, and (c) exchange of ideas and information. This report outlines briefly the results that were obtained.

#### Study Areas

Areas visited on the coast of Surinam are situated at about 6°N and 54-57°W (Figure 1) and have been described by Spaans (1978, 1979). Most work was carried out at Krofajapasi between 11 and 18 September 1978, based at the camp of the Foundation for Nature Preservation in Surinam (STINASU) in the Wia-Wia Nature Reserve. Local shorebird habitat included sandy beaches, muddy creek banks and coastal lagoons, providing excellent opportunities for photography and scientific work. Weg naar Zee was visited six times between 10 and 23 September to look for colour dyed birds along the coastal mudflats. Arie Spaans visited the mudflats at Coronie and Nickerie in western Surinam on 21 and 22 September.

In James Bay, banding operations in 1978 were carried out during July and August principally at North Point (51°29'N 80°27'W), 17 miles NE of Moosonee, Ontario. A smaller camp was operated at Longridge Point (51°49'N 80°42'W) from 1-12 August (Figure 1). Shorebird banding operations in James Bay and some of the results obtained have been described by Morrison (1976, 1978).

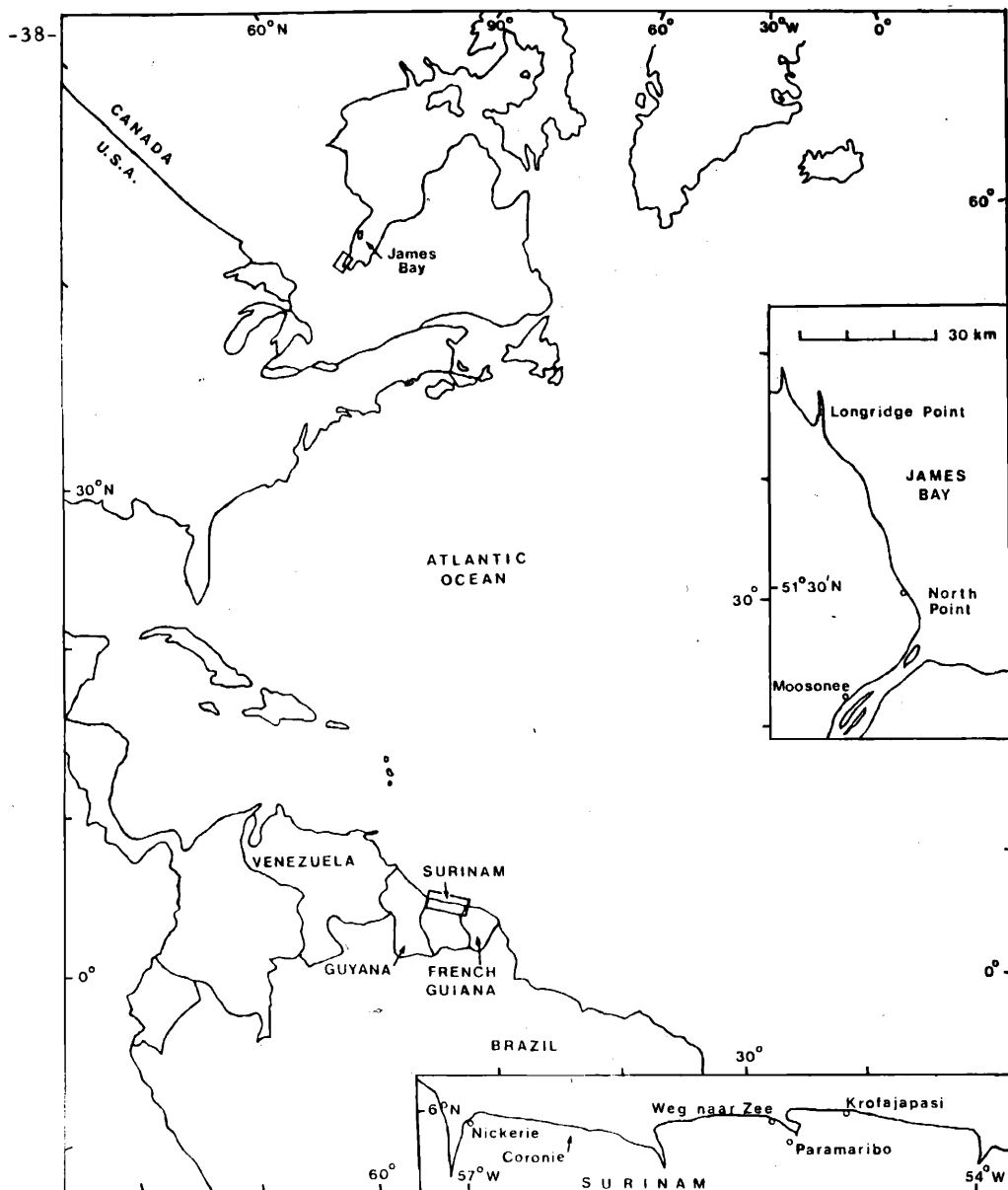


Figure 1. Map showing locations of study areas in James Bay, Canada, and Surinam, South America.

TABLE 1. TOTALS OF SHOREBIRDS CAPTURED IN JAMES BAY, 1974-1978\*

	1974	1975	1976	1977	1978	TOTAL
Semipalmated Plover	2	54	149	308	145	658
Killdeer	-	3	1	16	1	21
American Golden Plover	-	2	2	3	3	10
Black-bellied Plover	-	1	7	1	4	13
Ruddy Turnstone	-	46	95	114	56	311
Common Snipe	-	2	17	26	10	55
Whimbrel	-	-	-	1	1	2
Spotted Sandpiper	-	2	6	14	4	26
Solitary Sandpiper	-	2	1	13	8	24
Greater Yellowlegs	-	2	12	30	38	82
Lesser Yellowlegs	2	39	65	82	171	359
Red Knot	-	55	32	63	32	182
Purple Sandpiper	-	-	-	-	1	1
Pectoral Sandpiper	-	35	95	60	224	414
White-rumped Sandpiper	17	617	459	599	557	2,249
Baird's Sandpiper	-	-	1	-	2	3
Least Sandpiper	18	76	339	728	198	1,359
Dunlin	24	163	437	280	139	1,043
Short-billed Dowitcher	1	1	6	17	40	65
Stilt Sandpiper	-	-	1	2	-	3
Semipalmated Sandpiper	233	2,881	10,520	11,075	6,533	31,242
Buff-breasted Sandpiper	-	2	-	4	3	9
Marbled Godwit	-	3	5	1	2	11
Hudsonian Godwit	-	6	4	16	25	51
Sanderling	-	29	115	70	14	228
Wilson's Phalarope	-	-	4	2	2	8
Northern Phalarope	-	7	29	11	28	75
	297	4,028	12,402	13,536	8,241	38,504

\* Total includes newly ringed, retraps, recaptures and controls, adults and juveniles.

## Results

A total of 24 'bird days' of sightings of birds colour dyed in James Bay was accumulated between 10 and 23 September, involving at least 16 different birds of three species (Table 2).

Red Knot Of particular interest and importance was the sighting of three dyed Red Knot at Krofajapasi. These sightings constitute the first records of movements from James Bay to South America and substantially increase the number of previous recoveries (5) between the continents. Colour band combinations showed that the birds had been captured in the period 11-20 August in James Bay. Furthermore, banding records showed that only 18 Red Knot were captured during this period, 17 of which were on 20 August when many were at high weight levels. Thus, at least two, and almost certainly all three, of the birds sighted in Surinam had been captured together on 20 August in James Bay, some 23 days previously. One of the previous Surinam records involved a bird colour marked on Sable Island off Nova Scotia in 1971 and seen by Arie Spaans later that year at nearly the same location as the present observations.

Semipalmated Plover One colour marked bird was sighted, which constitutes the first recorded movement between Canada and Surinam. Band data indicated the bird had been captured during the period 12-21 August, a minimum of 23 and maximum of 32 days previously.

Semipalmated Sandpiper Twelve different individual dyed Semipalmated Sandpipers were observed, including five birds on 18 September at Krofajapasi, when an estimated 50,000 Semipalmated Sandpipers were seen moving between feeding and roosting areas. These observations substantially increase the number of sightings of dyed Semipalmated Sandpipers from Surinam. Band information was obtained from two birds indicating they had been caught in James Bay in late July and early August, agreeing well with data from previous exchanges of banded birds between James Bay and Surinam. Dye patterns indicated that 10 of the 12 Semipalmated Sandpipers had been captured in James Bay at North Point, the other two having been trapped at Longridge Point (Figure 1).

In addition to the sightings of birds colour dyed in James Bay, we identified 15 Semipalmated Sandpipers and 5 Least Sandpipers colour banded by Arie Spaans in Surinam during 1976 and 1977, all but one quite near the banding site. The exception was a Semipalmated Sandpiper ringed as an after second calendar year bird at Weg naar Zee during January-May 1977 and observed at Krofajapasi, about 40 km east of the site of banding (see Figure 1). Of the Semipalmated Sandpipers, 10 were marked during January-May 1977 and five in March-May 1976. The total numbers of Semipalmated Sandpipers colour banded in these years were 3795 and 3246, respectively. The sightings suggest an annual adult mortality of 42%, nearly as much as the 47% calculated from sightings outside Surinam.

## Banding Studies/Measurement and Molt Data

A total of 268 birds of 11 species was trapped and banded at Krofajapasi between 14 and 17 September 1978 (Table 3). Measurement data were taken from a large sample by both Guy Morrison and Arie Spaans, thus allowing direct comparison of measuring techniques and enabling integration of the extensive data already collected in James Bay and Surinam. This will be of considerable assistance in determining the breeding origin of populations of Semipalmated Sandpipers wintering in and migrating through Surinam (see Harrington and Morrison 1979, Spaans 1979).

The samples of Red Knot and White-rumped Sandpipers obtained during banding operations were particularly interesting. The 37 Red Knot were the first birds of this species ever caught in Surinam and were mostly trapped during darkness in two-panel nets set on a creek bank some 25 metres from the camp. The moult and weight data obtained indicate that the coast of Surinam is an important stopover point on migration, with moult of flight feathers taking place further south on the wintering grounds. An estimated 700-900 Red Knot were present along the firm mud banks of the Krofajapasi creek and adjacent lagoons, representing a possible 3-4% of the world population of the North American subspecies, thus emphasising the importance of the area. Many thousands of White-rumped Sandpipers were present on the lagoons; few are found on areas of soft mud along the coast (Spaans 1978). The 21 White-rumped Sandpipers trapped for banding were nearly double the number caught in previous years and increased significantly the amount of moult and weight information available. No birds were found in wing moult, indicating the species passes through Surinam and delays its flight feather moult until after arrival on wintering grounds in southern South America, like the Red Knot.

In contrast, many adult Least and Semipalmated Sandpipers, which winter in large numbers in Surinam, were moulting their flight feathers. Primary moult scores of Least Sandpipers varied from 0 (all feathers old) to 28 (50 being the maximum score possible with all ten major primaries renewed and fully grown). For the Semipalmated Sandpiper, primary scores varied from 0 to 50. The Semipalmated Sandpipers with high primary moult scores were probably all second calendar year birds (some were still recognisable as such) which had been summering in Surinam (Least Sandpipers hardly summer in the country, see Spaans 1978). We caught three Western Sandpipers (exposed culmen: 24.0, 27.3 and 28.0mm) against 69 Semipalmated Sandpipers, quite a lot for such a small number of peeps handled (see Spaans 1978). This may suggest that this autumn relatively more waders from the western parts of the North American arctic moved in than in other years.

## Acknowledgements

We wish to thank the National Geographic Society for its generosity in funding the mini-expedition to Surinam. Many members of the Society's staff provided enthusiastic and efficient assistance in facilitating many aspects of the trip, particularly Jonathan Blair and Allan Royce. We thank the Foundation for Nature Preservation in Surinam (STINASU, Director Dr. J.P. Schultz) and the Surinam Forestry Service (Director Dr. F.C. Bubberman) for much help in arranging facilities in Surinam.

TABLE 2.

NATIONAL GEOGRAPHIC MINI-EXPEDITION TO SURINAM, 1978

Summary of sightings of birds colour-marked in James Bay, Canada, in Surinam, 10-23 September 1978

Date	No. seen <sup>1</sup>	Age	Species	Place <sup>2</sup>	Place and Period <sup>3</sup> of Banding in James Bay	Total # dyed <sup>4</sup> birds released in James Bay
September 1978						
10	1	Ad	Semipalmated Sandpiper	WnZ	NP 1 -10 August	5,114 Ad
11	1		Red Knot	KC	NP 11-20	32
12	2		Red Knot	KC	NP 11-20	32
	1		Red Knot	KWL	NP 11-20	32
13	2		Red Knot	KC	NP 11-20	32
	1		Semipalmated Plover	KEL	NP 12-21	89
14	1		Red Knot	KC	NP 11-20	32
	1		Semipalmated Plover	KEL	NP 12-21	89
15	1		Semipalmated Plover	KEL	NP 12-21	89
	1		Semipalmated Sandpiper	KEL	NP 22-31 July	5,114
17	1		Red Knot	KC	NP 11-20 August	32
	1	-	Semipalmated Sandpiper	KC	NP -	5,570 Ad + juv
18	5	-	Semipalmated Sandpiper	KC	NP -	5,570
	1	Ad	Semipalmated Sandpiper	WnZ	LR 1 -12 August	248
21	1	-	Semipalmated Sandpiper	N	NP -	5,570
22	1	-	Semipalmated Sandpiper	N	NP -	5,570
	1	-	Semipalmated Sandpiper	C	LR 1 -12 August	248
23	1	-	Semipalmated Sandpiper	WnZ	NP -	5,570

<sup>1</sup> Total sightings = 24 'bird days' - observations indicated that this involved 16 different individual birds (1 Semipalmated Plover, 3 Red Knot, 12 Semipalmated Sandpipers).

<sup>2</sup> Place: WnZ = Weg naar Zee; KC = Krofajapasi, creek and camp area; KEL = Krofajapasi, eastern lagoons; KWL = Krofajapasi, western lagoons; N = Nickerie; C = Coronie.

<sup>3</sup> Determined from colour-band combination and dye pattern on bird. NP = North Point (51°29'N 80°27'W); LR = Longridge Point (51°49'N 80°42'W).

<sup>4</sup> Represents total number of dyed birds of that species released in James Bay to produce the above sightings:  
 Semipalmated Plover: 89 dyed adults released (28 during period 12-21 August) at North Point.  
 Red Knot: 32 dyed adults released (18 during period 11-20 August) at North Point.  
 Semipalmated Sandpiper: 5,818 dyed birds released - North Point - 5,570 (5,114 ad + 456 juv)  
 Longridge Point - 248 (245 ad + 3 juv)

TABLE 3. NATIONAL GEOGRAPHIC MINI-EXPEDITION TO SURINAM, 1978

Totals of birds banded 14-17 September, 1978

	Adult	Juvenile	Total
Semipalmated Plover	3	1	4
Black-bellied Plover	1	-	1
Ruddy Turnstone	-	1	1
Spotted Sandpiper	1	3	4
Red Knot	37	-	37
White-rumped Sandpiper	21	-	21
Least Sandpiper	29	97	126
Short-billed Dowitcher	-	1	1
Semipalmated Sandpiper	33	36	69
Western Sandpiper	1	2	3
Sanderling	1	-	1
	127	141	268

Notes

- All totals represent newly banded birds.
- All Least Sandpipers colour-banded with two orange bands on the upper left leg, aluminum band on the upper right leg for adults and orange over aluminum upper left leg, orange upper right leg for juveniles.

## References

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## METHODS AND PRELIMINARY RESULTS FOR EXPERIMENTAL STUDIES OF FORAGING IN SHOREBIRDS

by J.P. Myers, S.L. Williams and F.A. Pitelka

The issue of prey availability plagues any study of foraging ecology, be it on waders, pipits, mammals or fish. How does measured prey density correspond to what the foraging animal experiences? We have set out to explore this matter using laboratory experiments with Sanderlings (Calidris alba), focussing on the importance of different factors controlling prey availability. Here we report briefly on our methods and some preliminary results. We hope that by describing our work at this early stage we shall encourage other research groups to attack related problems. Further clarification of these issues is critical to continued and more refined work on shorebird ecology. Sanderlings, surprisingly, are remarkably tractable laboratory animals, and other shorebird species living in open habitats such as beaches and mudflats may prove similar in this respect.

### Methods

Sanderlings were caught in the course of banding operations at Bodega Bay, California. Upon capture, they were banded and placed in a 3x5x1.75 m (tall) indoor aviary where they subsequently have been maintained on commercial catfood, mealworms, and an assortment of natural prey from the field (especially beach crustaceans). Their weights, monitored since capture, have remained at or above weights of Sanderlings caught periodically in the field.

#### Experimental apparatus

The observation chamber for experiments on prey availability is a 1.75x0.5x0.5 m (tall) box with a screened top and plexiglass front. Observers sit behind a black plastic screen hung in front of the cage approximately 50 cm from the foraging bird. The bird forages on a tray of fine wet sand 1x0.5 m. Sand, to a depth of 35 mm, sits in the tray on a porous shelf through which water can be drained or injected into the feeding tray. This allows us to manipulate the water content of the substrate.

The prey used are frozen and thawed Excirolana linguifrons and Excirolana kincaidi, two local beach isopods which figure importantly in Sanderling's diets around Bodega Bay (Myers et al. 1979). The isopods are separated into different size classes before the experiments by sieving them through a stack of Tyler mesh screens. This allows us to present the Sanderlings with a single size class or known mixture of prey size classes.

The tray is divided into 10 25x20 cm units and each unit is divided into a 1.4 cm grid by laying a plastic screen over it with a 1.4x1.4 cm size mesh. Using this grid system we place each individual prey item in a known position on the tray, varying prey density and relative position according to the experiment (see below).

#### Prey placement

With one exception (see proximity experiment below), prey are placed in the tray in a stratified random distribution. Each 20x25 cm tray unit receives the same number of prey; within each unit, prey are distributed randomly relative to one another by selecting coordinates in the 1.4 cm grid randomly, save that only one prey is placed per 1.4 cm mesh unit.

Depth of prey is controlled by using a plunger to make a hole of known depth for each prey item. After each hole is made, we gently press the prey to the bottom and cover it with sand. After all the prey are placed, the plastic screen grid is removed and the tray is slowly filled by percolating water up through the porous shelf. Once saturated, the sand surface is gently but thoroughly reworked with a comb to eliminate all visual clues of prey position. At this point we can manipulate sand penetrability by banging the tray to varying degrees: increased jostling causes increased compacting and makes the sand less penetrable. Substrate penetrability can then be measured using a penetrometer.

The prey do not move throughout this process because they are dead. Moreover, we have verified that they are not displaced by recovering individual prey from the tray.

#### Observations

Birds are allowed to forage on the tray until they eat a predetermined number of prey items. While foraging we monitor total time, the number of foraging events, and the amount of time the bird is actually probing.