

# AERIAL SURVEYS IN DELAWARE BAY: CONFIRMING AN ENORMOUS SPRING STAGING AREA FOR SHOREBIRDS

by Pete Dunne, David Sibley, Clay Sutton and Wade Wander

During Spring of 1981 and 1982 the Cape May Bird Observatory conducted aerial ground surveys of shorebirds along the shores of the Delaware Bay, in New Jersey, US (Fig.1). Our work revealed a staging area of remarkable proportions, one largely unknown to the scientific community and comprised mostly of Red Knot *Calidris canutus*, Sanderling *C.alba*, Semipalmated Sandpipers *C.pusilla*, and Ruddy Turnstones *Arenaria interpres*.

In 1981 we made 5 aerial surveys between 13 May and 11 June (Table 1). The survey route extended 95 km from Cape May Point, New Jersey (38°56'N, 74°57'W) to the vicinity of the Salem Nuclear Generating Plant (39°28'N 75°33'W). This project was directed by Wade Wander, Research Associate at the New Jersey Audubon Society (Wander & Dunne 1981).

In 1982 we flew 3 flights between 21 May and 3 June (Table 2). Our route on the New Jersey side matched that of 1981, but we added a 65 km length of coast in Delaware from just north of the Smyrna River (39°25'N 75°35'W) SSE to Cape Henlopen (38°48'N 75°06'W) (Fig.1). Poor weather prevented us from censusing between 22 and 26 May, a period which (judging by ground observations) was probably the peak of migration. For this reason, and also because the 27 May flight occurred at high tide (again because of weather), we suspect the counts for 1982 were low.

Three observers conducted the surveys. One counted total flock size, one estimated the percent composition by species of each flock, and the third navigated, noting landmarks, locations and flocks. All flights were in a low-wing Piper Warrior II flying at an average airspeed of 80 km/hr. We flew parallel to the beach at ca. 40m altitude and ca. 50m distance out from the water line.

Censuses during both years revealed large numbers of shorebirds staging in the Delaware Bay (Tables 1 and 2), amounting in total to almost 500000 individuals in single day counts. Given that we recorded over 350000 at the peak of migration in 1981 counting only half the Bay, and given that we missed the peak in 1982 (see above) we estimate a minimum of 700000 birds can be in the Bay at once.

Comparable numbers are found on both sides (Table 3) but the species compositions differ markedly. On the western shore, Semipalmated Sandpipers made up an average of some 75% of all individuals counted during 1982. On the eastern side, Red Knots predominated, except during the 3 June census. By then most Red Knot and Ruddy Turnstones had departed.

The relative abundance of Semipalmated Sandpipers on the western shore must relate ultimately to the extensive mud flats that characterize the habitat on that side. Red Knots, Sanderlings, and Turnstones, by contrast, appear to prefer the sandier substrates of the eastern shore. Horseshoe Crabs *Limulus polythemus* deposit their eggs along the upper edge of these sandy areas during high tide, and the shorebirds feed on them extensively, when the tide falls.

Of particular interest in both years was the abundance of Red Knot. These peaked at over 67000 for one side of the Bay in 1981, and over 95000 for both sides in 1982. A recent estimate for the total New World population of *C.c.rufa* comprised only 300000 individuals (Morrison et al. 1980). New estimates, incorporating our 1981 counts, and other, additional, field work, now place the total between 150000 and 200000 (L.Leddy, pers. comm.). Whether or not this new figure must ultimately be raised further, the Knots in Delaware Bay during late May must represent a significant fraction of the total New World population. The critical importance of this staging area for Knots, and for other North American waders, cannot be underestimated.

## Acknowledgements

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## References

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Table 1. Totals for the principal shorebird migrants along the Delaware Bay shore of New Jersey as recorded on five aerial surveys, Spring 1981. (from Wander & Dunne 1981)

Species	13 May	20 May	27 May	3 June	11 June	Totals	
Semipalmated Sandpiper	<i>Calidris pusilla</i>	NC	32000	126000	36400	1200	195600
Ruddy Turnstone	<i>Arenaria interpres</i>	3860	52700	106000	39750	775	203085
Red Knot	<i>Calidris canutus</i>	11600	67350	67450	5500	110	152010
Sanderling	<i>Calidris alba</i>	12700	NC	50800	NC	500	64000
Dunlin	<i>Calidris alpina</i>	7200	14900	NC	0	0	22100
Short-billed Dowitcher	<i>Limnodromus griseus</i>	NC	6100	NC	0	0	6100
<b>TOTALS:</b>		35360	173050	350250	81650	2585	642895

NC = no count though individuals present

Table 2. Totals for the four principal shorebird migrants along the Delaware Bay shore of New Jersey and Delaware as recorded on three aerial surveys, Spring 1982.

Species		21 May	27 May	3 June	Totals
Ruddy Turnstone	<i>Arenaria interpres</i>	90360	82600	19757	192717
Red Knot	<i>Calidris canutus</i>	95530	46050	3009	144589
Semipalmated Sandpiper	<i>Calidris pusilla</i>	174233	123764	134764	432840
Sanderling	<i>Calidris alba</i>	27940	11760	38529	78229
"Peep"*		28150	19620	0	47770
Dowitcher	<i>Limnodromus griseus</i>	2150	0	0	2150
Dunlin	<i>Calidris alpina</i>	2400	0	0	2400
TOTALS:		420763	283794	196138	900695

\* "peep" as recorded on 21 and 27 May were mostly Sanderling

Table 3. A comparison of shorebird totals for the Delaware and New Jersey sides of Delaware Bay, Spring 1982.

Species		21 May		27 May*		3 June	
		Delaware	New Jersey	Delaware	New Jersey	Delaware	New Jersey
Ruddy Turnstone	<i>Arenaria interpres</i>	25680	64680	15442	67185	10700	9075
Red Knot	<i>Calidris canutus</i>	41440	54090	10425	35625	495	2514
Semipalmated Sandpiper	<i>Calidris pusilla</i>	116583	57650	105655	18109	87330	47513
Sanderling	<i>Calidris alba</i>	1400	26540	-**	11760	6339	32190
Dunlin	<i>Calidris alpina</i>	2400	-	-	-	-	-
Dowitcher sp.	<i>Limnodromus griseus</i>	-	2150	-	-	-	-
Peep***		-	28150	-	19620	-	-
TOTAL:		187503	233260	131522	152299	104864	91152

\*Flight conducted on a high tide resulting in fewer birds which might otherwise have been seen on a low tide.

\*\*Heavy fog prevented flight over the southernmost portion of the Delaware side of the Bay. Most of the state's Sanderling are concentrated at Cape Henlopen, the southernmost point on the survey route.

\*\*\*Mostly Sanderling

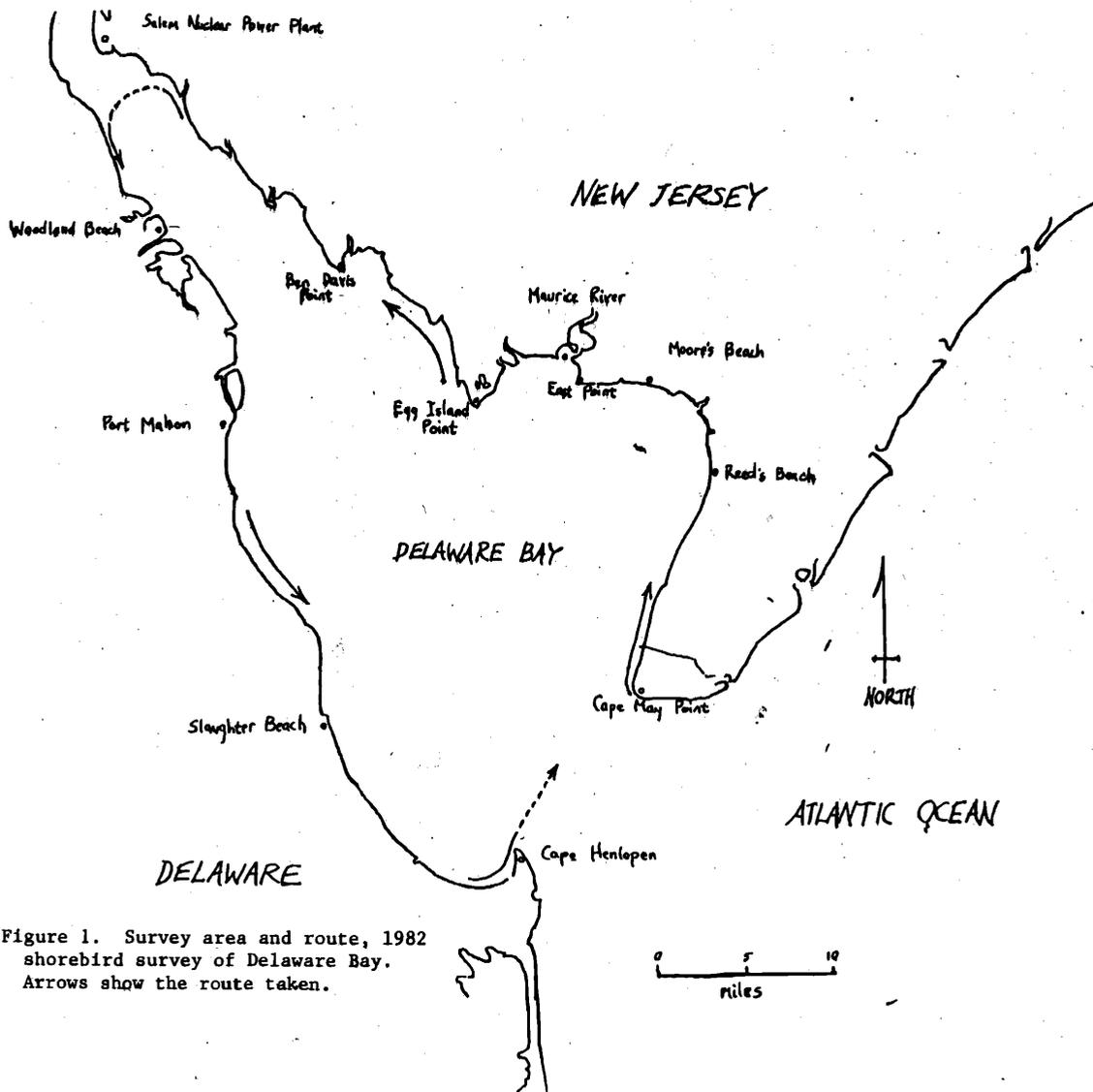


Figure 1. Survey area and route, 1982 shorebird survey of Delaware Bay. Arrows show the route taken.