Black Swan, Cygnus atratus.
Falcon (or Bush Hawk), Falco novaeseelandiae.
Black Oystercatcher, Haematopus unicolor unicolor.
Southern Skua, Stercorarius skua lonnbergi.
Black-backed Gull, Larus dominicanus.
Red-billed Gull, L. novaehollandiae scopulinus.
White-fronted Tern, Sterna striata.

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COUNTS OF GULLS ON OTAKI BEACH, NORTH ISLAND OF NEW ZEALAND

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Observations made in recent years and the extensive banding of both the Black-backed Gull *(Larus dominicanus)* and the Red-billed Gull *(Larus novaehollandiae)* as reported in the Annual Reports of the Banding Committee, Ornithological Society of New Zealand, and the classified summarised notes in *Notornis,* have provided much information on the distribution and movements of these species. Little is known, however, about their numbers. This note provides some information on the distribution and numbers of the two species in the southern part of the west coast, North Island.

TECHNIQUE USED

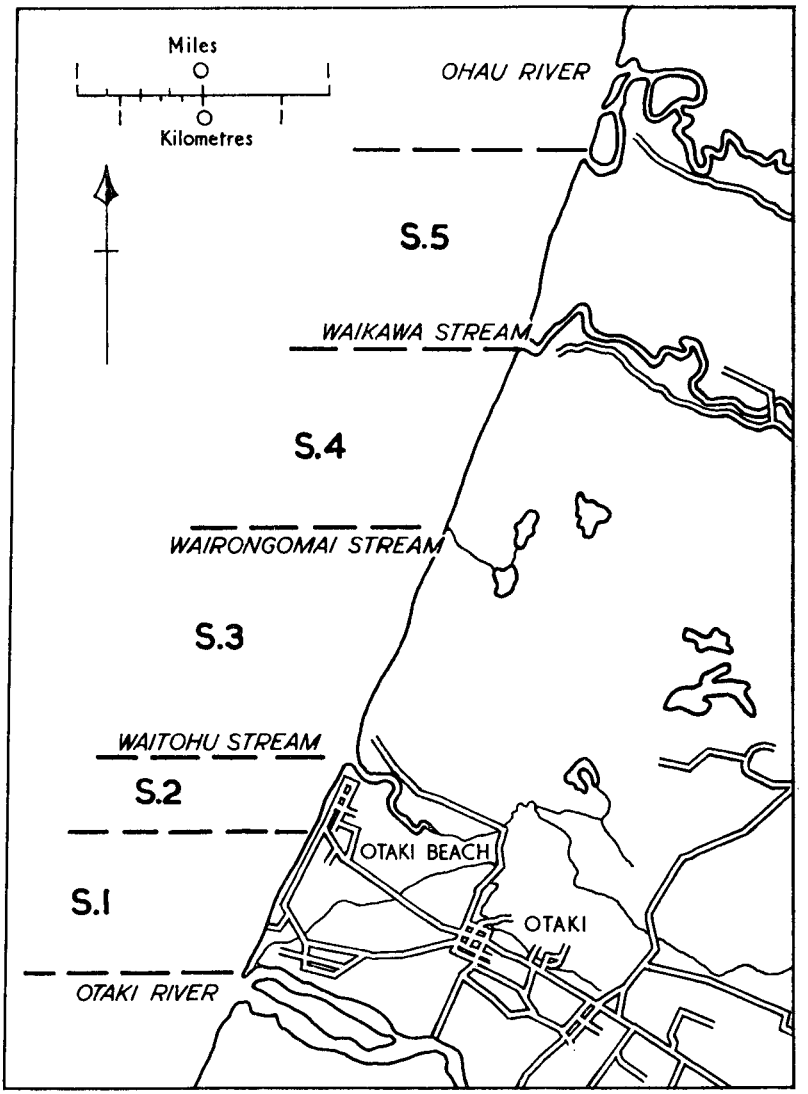
Eleven counts of gulls were carried out between the estuaries of the Otaki and Ohau Rivers, from 20 to 29 March, 1961. The weather throughout this period was mostly fine with light to moderate winds and mild temperatures. A total distance of about seven miles of beach was covered, the area being divided into five sectors (Fig. 1): from the Otaki River estuary to Otaki Beach — one mile, from Otaki Beach to Waitohu Stream — three quarters of a mile, from Waitohu estuary to Wairongomai Stream — two miles, Wairongomai estuary to Waikawa stream estuary — one and two-third miles, and from Waikawa stream to Ohau River estuary — one and a half miles. More counts were made on Sectors 1 and 2 than on the others. When making the counts, the observer walked at a steady pace taking care to avoid double counting. Separate records were kept of Red-billed Gull and adult and juvenile Black-backed Gulls. Gulls at estuaries were also counted separately. Full details of all the counts are deposited in the files of the Animal Ecology Division, D.S.I.R.

RESULTS

Distribution

Gulls in this part of the coast are concentrated at the estuaries with much smaller numbers scattered along the beach. Table 1 shows the mean numbers of gulls observed at Otaki and Waitohu estuaries.

Between the estuaries Black-backed Gulls were distributed along



the surf line, occasionally in small flocks but usually one or two birds every 100-200 yards, and sometimes family groups with a juvenile still attached to its parents. Larger numbers were found on the north end of Sector 1 and on Sector 2 (Fig. 1). Here the relative abundance of shells of Ringed Dosinia *(Dosinia anus),* Kaikaroro *(Spisula aequilateralis),* Tuatua *(Amphidesma subtriangulatum)* and smaller examples of Kuhakuha *(Mactra discors),* all of which are known to be taken by Black-backed Gulls (Dr. R. K. Dell, *in litt.*), would explain

the presence of larger numbers of this gull in these sectors. This was particularly observed at outgoing tide when gulls would break these molluscs by dropping them from the air. On calm mornings Black-backed Gulls would fly past the breakers and appeared to feed together with Red-billed Gulls on passing shoals of fish.

TABLE 1 — Numbers of Black-backed and Red-billed Gulls

Sector	Miles	Mean No. of Gulls Black-backed	Mean No. of Gulls billed Red-	Mean No. per Mile Black-backed	Mean No. per Mile Red-billed
Estuary	—	69	14	—	—
1 Beach	1	22	11	22	11
Mean Sector 1		45	11		
Estuary		31	27	—	
2 Beach	0.75	39	26	52	35
Mean Sector 2		53	40		
Estuary 3 and beach	2.50	20	16	8	6.4
Beach and 4-5 part of estuary	2.75	25	27	9	9.8
Total Beach and Estuary	7	206	121	29	17

The distribution of Red-billed Gulls was in many ways similar. The main differences were smaller numbers congregating at the estuaries, and more gulls found on beaches near settlements where they are often fed by people; in this case they often flock from a few hundred yards. On other sectors single Red-billed Gulls were seen feeding at the edge of the surf.

Age Ratio

Immature birds of both species were seen, but only the young of Black-backed Gulls were recorded separately. Table 2 shows the numbers of both adult and young Black-backed Gulls counted on each sector.

The percentage of gulls in juvenile plumage (i.e., less than three years old) counted in various sectors ranged from 18 to 27 per cent., but at the estuaries and in the total population immature birds amounted to about one quarter of the total population counted.

Numbers of Both Species

Table 1 shows the numbers of Black-backed and Red-billed Gulls counted on various sectors and the mean density per mile in each sector. The counts show that large numbers of gulls congregate at estuaries, particularly at the larger ones and this affects the mean number of gulls per mile of beach. There are also substantial differ-

ences between various sectors of the beach: however, this may not be signficant due to the small number of counts carried out on Sectors 3 to 5.

The Black-backed Gull with an average density on both beach and estuary of 29 birds per mile appeared to be more numerous than the Red-billed Gull with an average density of 17 birds per mile.

TABLE 2 — Age Ratio of Black-backed Gulls

	Total No. of Gulls Counted on Sector					
	1	2	4	4-5	All Sectors	Estuaries
No. of Adult	287	440	66	42	835	344
No. of Juvenile	79	160	14	9	262	108
% Juvenile	22	27	18	18	24	24

DISCUSSION

The observations described give an indication of the distribution and density of the Black-backed and Red-billed Gulls on the west coast of the North Island between Otaki and Ohau Rivers.

The congregation of large numbers of both species throughout the year at the Waikanae River estuary was described previously (1): in late March 1942 and 1943, 200-365 Black-backed and 30-100 Red-billed Gulls were counted. In 1961 the numbers of gulls congregating at estuaries appeared to be proportional to the size of the river and extent of its tidal flats: thus at the Otaki River estuary which is larger than Waikanae River but has less extensive tidal flats 82-133 Black-backed and 30-100 Red-billed Gulls were counted; at the much smaller Waitohu River which also has tidal flats, about 60 Black-backed and 30-40 Red-billed Gulls were counted; and at the small Wairongomai Stream (Fig. 1) only three to four gulls were recorded.

Along the beaches the density of the population of both species varied from sector to sector from eight and six to 52 Black-backed and 35 Red-billed Gulls per mile respectively. The availability of various molluscs, other foods (e.g., refuse) and of fresh water required for bathing are among the important factors determining the local density of both species.

Black-backed Gulls in juvenile plumage amounted to about a quarter of the population. In comparison it is of interest to quote Barnes' (2) results of eight independent counts of the Lesser Black-backed Gull *(Larus fuscus)* carried out in northern winter on the eastern coast of England: the proportion of immature birds varied from nine to 21 per cent., the average being 15 per cent.

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SUMMARY

Eleven counts of Black-backed and Red-billed Gulls were carried out in March, 1961, on a seven miles long beach between the Otaki and Ohau rivers. Juvenile Black-backed Gulls amounted to a quarter of the population and the overall density was estimated at 29 Black-backed and 17 Red-billed Gulls per mile.