DISTRIBUTION AND NUMBERS OF NEW ZEALAND OYSTERCATCHERS

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ABSTRACT

The mainland New Zealand species of oystercatchers have overlapping winter ranges, but their distribution within these ranges is very different. South Island Pied Oystercatchers *(Haematopus ostralegus finschi)* are concentrated in large flocks on major harbours and estuaries. Variable Oystercatchers *(H. unicolor)* have a scattered distribution with flocks never exceeding 150 birds. Black phase Variable Oystercatchers are numerically dominant to pied or intermediate phases throughout New Zealand, although the frequency of the former increases southwards. Intermediate-plumaged birds occur where black and pied phases are sympatric. The rare Chatham Islands Oystercatcher *(H. chathamensis)* is restricted to those islands.

In the breeding season, *H. ostralegus finschi* and *H. unicolor* are reproductively isolated by their mutually exclusive breeding dispersions. They are also largely separated in their winter ranges. Variable and Chatham Islands Oystercatchers have probably maintained their present numbers over the past 100 years. The decline that occurred in the numbers of South Island Pied Oystercatchers over the period 1870 to 1940 was arrested by the prohibition of shorebird shooting in 1940, from which time a spectacular irruption has occurred. At the current rate of increase, the numbers of this species will probably come under density-dependent control in the next few decades. This density effect may be alleviated for some time if the species expands its recent tendency to remain inland at breeding localities throughout the year, and adopt a terrestrial mode of feeding.

INTRODUCTION

In contrast to its paucity of land birds, New Zealand has a relative abundance of shorebirds, though many are seasonal migrants. Conspicuous amongst the residents are the oystercatchers, of which three species are recognized by the Annotated Checklist of New Zealand birds (OSNZ 1970). Two of these, the South Island Pied Oystercatcher *(Haematopus ostralegus finschi)* and the Variable Oystercatcher *(H. unicolor)* occur in mainland New Zealand, whereas the Chatham Island Oystercatcher *(H. chathamensis)* is endemic to the Chatham Islands.

Preparatory to a broader study on the systematics and affinities of New Zealand oystercatchers, the ranges of the taxa involved had to be determined, and the distribution and numbers of birds within

these ranges analyzed. Such an analysis can provide critical information on differential species distributions within coincident ranges, and thus indicate separate species status.

New Zealand oystercatchers gather into easily located coastal flocks or small groups which are especially suitable for census purposes. Although many population counts have accumulated in recent literature, no attempt to synthesize them into a coherent whole has yet been published. This paper presents an analysis of censuses made throughout New Zealand, and compares the distribution and numbers of the three species of oystercatcher.

METHODS

Records of distribution and estimates of abundance were extracted from several sources: (i) the early literature of ornithological discovery in New Zealand; (ii) Classified Summarised Notes (in *New Zealand Bird Notes* and *Notornis);* (iii) the Recording Scheme of the Ornithological Society of New Zealand; and, (iv) personal records and communications. Whenever possible all population estimates were based on figures for 1970-71. When these were not available the next most recent data were used. To minimise discrepancies in counts due to seasonal fluctuations in populations, most figures for South Island Pied Oystercatchers were taken from censuses made in the winter months of May, June and July, by which time post-breeding dispersal and migration had ceased. Unfortunately, winter counts were not available from some locations, so summer records had to be used in lieu of them. Since Variable and Chatham Islands Oystercatchers are non-migratory and tend to remain paired in their territories or localized in small flocks, census figures for these species have lessened seasonal bias. Hence both winter and summer census data were used, but in general, censuses were restricted to a particular season for discrete localities. In this way, errors due to local movements of birds between two census localities were reduced.

Personal records were obtained by counting individual birds in flocks at high water roosts. Large flocks were counted several times and mean figures accepted only if the error between successive counts was less than 5% of the total. For the Variable Oystercatcher it was necessary to ascribe sightings to the three colour phases in a standard way. Although Falla (1939) considered that northern black phase birds in his *H. reischeki* assemblage might differ in plumage characters from southern black birds, spectrophotometric analysis of feather samples did not support this view (Baker 1972). Thus in censuses all black birds were lumped together as the black phase. The pied phase was defined by the absence of distinguishable black markings in the white areas of the breast and belly. The remainder were classified as the intermediate phase.

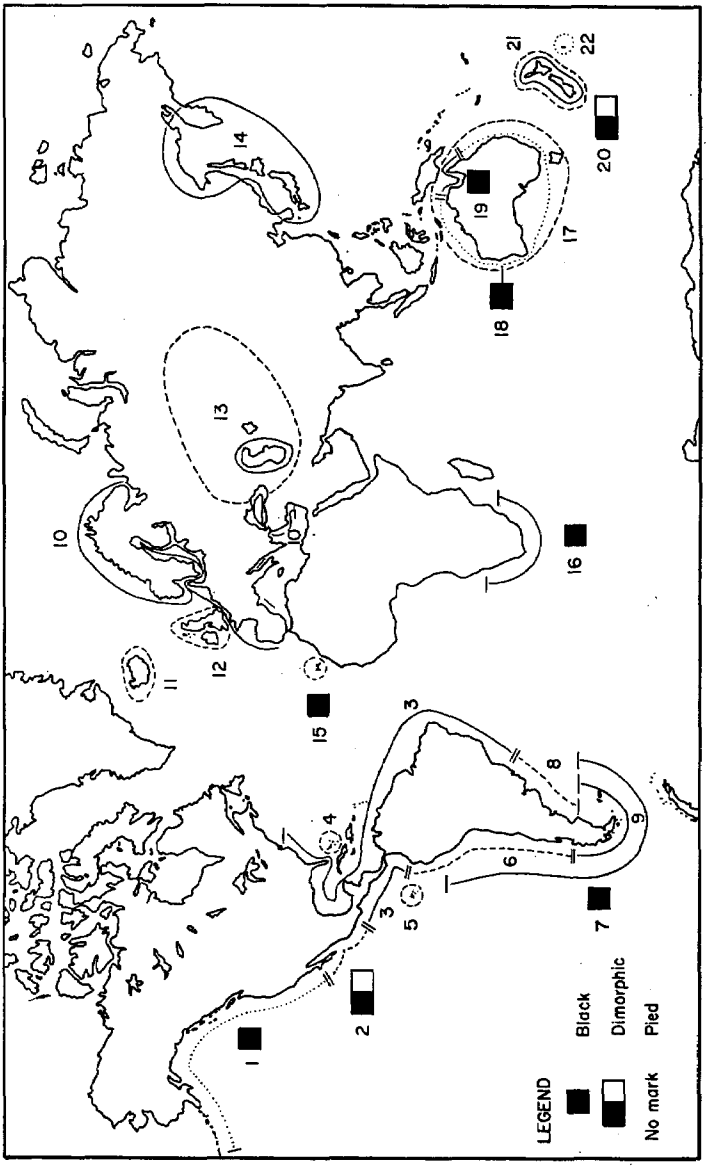

FIGURE 1 — World distribution of oystercatchers (Adapted from Larsen, 1957). Key to species:

1. *Haematopus bachmani*
2. *H. palliatus frazari*
3. *H. p. palliatus*
4. *H. p. pratti*
5. *H. p. galapagensis*
6. *H. p. pitanay*
7. *H. ater*
8. *H. p. durnfordi*
9. *H. leucopodus*
10. *H. ostralegus ostralegus*
11. *H. o. malacophaga*
12. *H. o. occidentalis*
13. *H. o. longipes*
14. *H. o. osculans*
15. *H. moquini meadewaldoi*
16. *H. m. moquini*
17. *H. o. longirostris*
18. *H. fuliginosus fuliginosus*
19. *H. f. ophthalmicus*
20. *H. unicolor*
21. *H. o. finschi*
22. *H. chathamensis*

DISTRIBUTION AND NUMBERS

Distribution Related to World Pattern:

Oystercatchers are widely distributed throughout the world, being present on most continental sea coasts. They are absent from the polar regions and remote oceanic islands excepting the Galapagos and Chatham Islands. Their range is most extensive in the breeding season, when they occur from northern Russia in the north to Cape Horn in the south. Although the majority of species are confined to a littoral distribution, some Old World forms have moved inland up the valleys of great river systems. The world distribution of oystercatcher species is shown in Figure 1.

Ranges of New Zealand Species:

The winter ranges of the two mainland species of oystercatcher broadly overlap (see Figs 2, 3, 4 and 5). In the breeding season, however, they occupy mutually exclusive ranges, as South Island Pied Oystercatchers move inland to breed (see Fig. 6) whereas Variable Oystercatchers breed at or near their wintering haunts. The Chatham Islands Oystercatcher is geographically isolated from the mainland species, being restricted to the Chatham Islands approximately 800 km east of New Zealand (see Fig. 7).

Distribution and Numbers of New Zealand Species:

The distribution patterns of the New Zealand species of oystercatcher are quite different. Although both mainland species are widely distributed throughout the country, South Island Pied Oystercatchers occur at fewer localities. A feature of the winter distribution of South Island Pied Oystercatchers is the occurrence of large flocks of birds at major harbours, bays and estuaries. These flocks result from the well developed gregarious behaviour in this species, and such flocks can only exist at localities where adequate food supplies are present. Smaller flocks occur around the coast, usually where rivers discharge into the sea, forming small estuaries in which bivalve molluscs are locally abundant (Fig. 2). South Island Pied Oystercatchers are notably absent or scarce in regions where rocks predominate in the littoral zone, e.g. Coromandel Peninsula, the east coast of the North Island from East Cape south, and Fiordland.

Variable Oystercatchers have a much more scattered distribution than their smaller pied congener. Larger flocks of these birds, nowhere exceeding 150 individuals, occur in the parts of their range where they are either allopatric with or numerically dominant to South Island Pied Oystercatchers. Small widely dispersed flocks occur in regions where the littoral zone is characterized by rock platforms. Variable Oystercatchers exclusively occupy parts of Northland, Coromandel Peninsula, and Fiordland. Where the two mainland species coexist, Variable birds occur only in small numbers. The marked

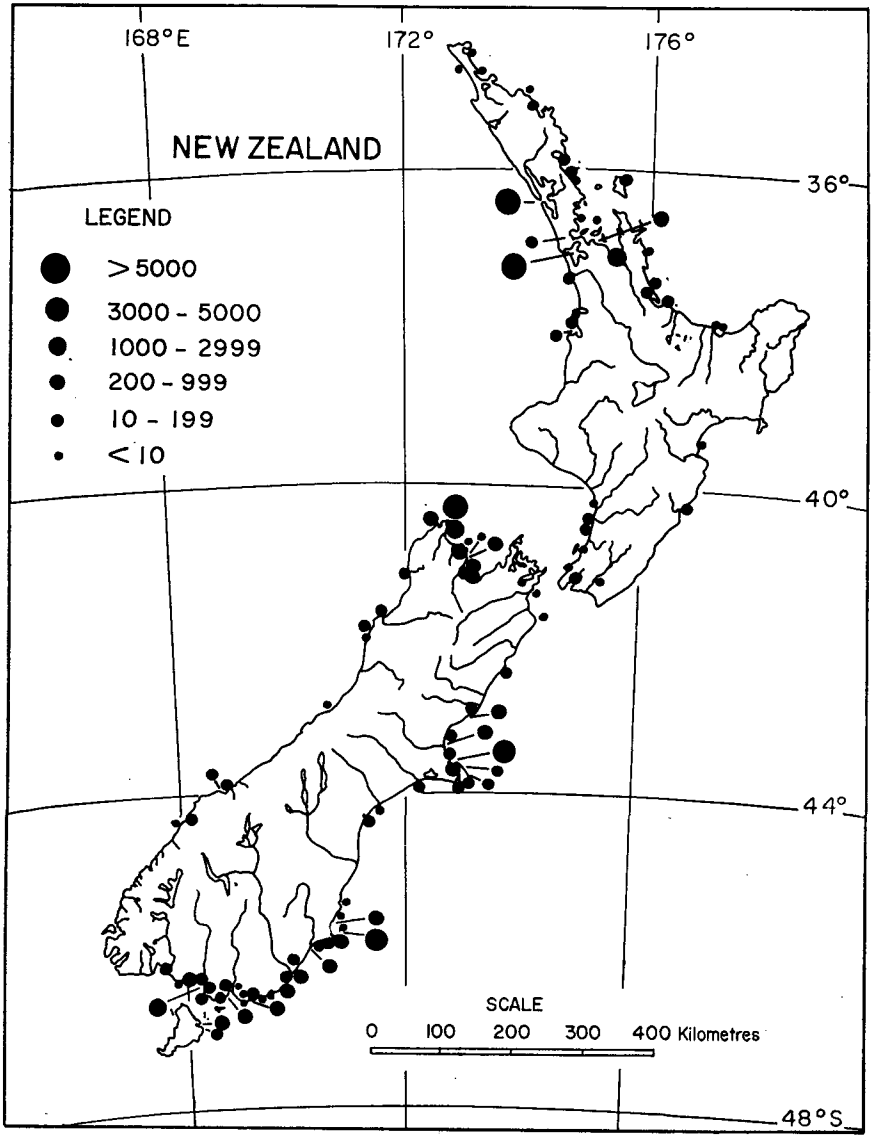

FIGURE 2 — Winter distribution and numbers of South Island Pied Oystercatchers in New Zealand.

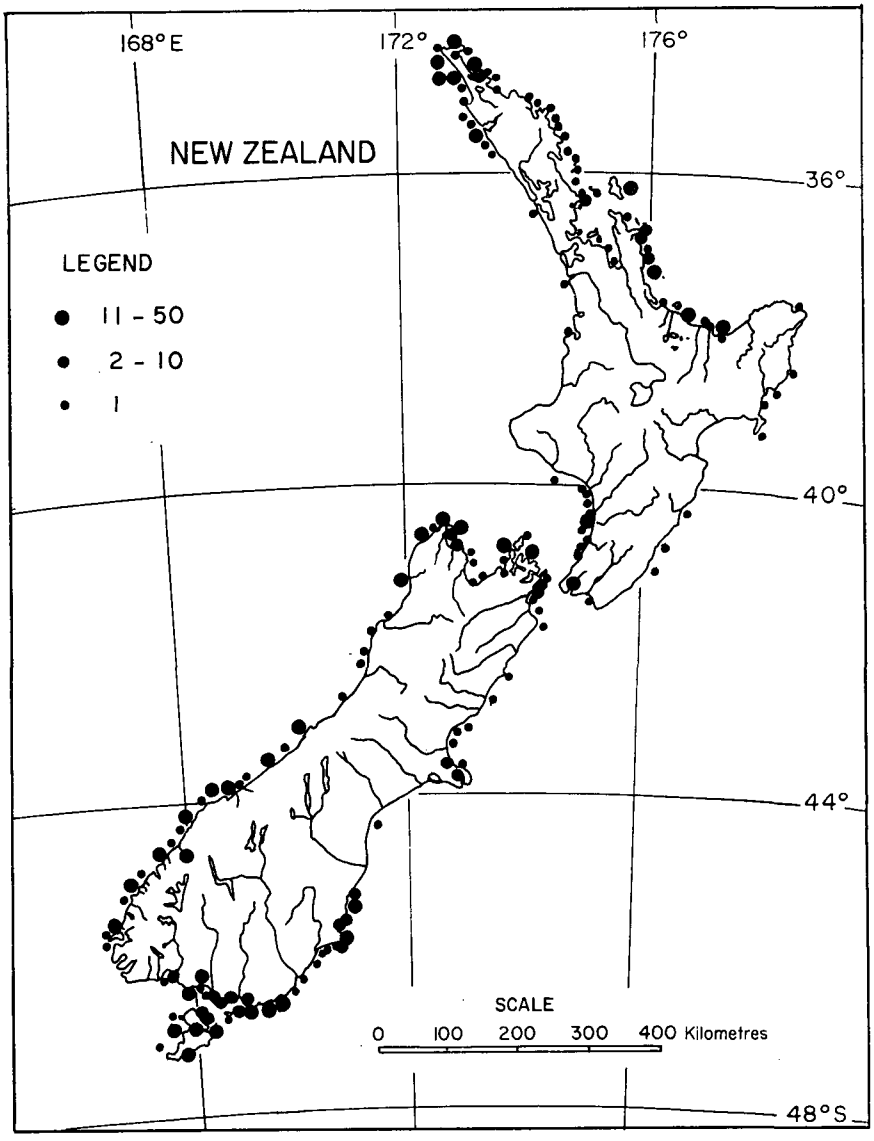

FIGURE 3 — Distribution and numbers of black phase Variable Oystercatchers in New Zealand. To facilitate the plotting of numbers in areas where dense concentrations of census figures occurred, the figures were pooled and plotted as single locality values. See Appendix II for separate locality figures.

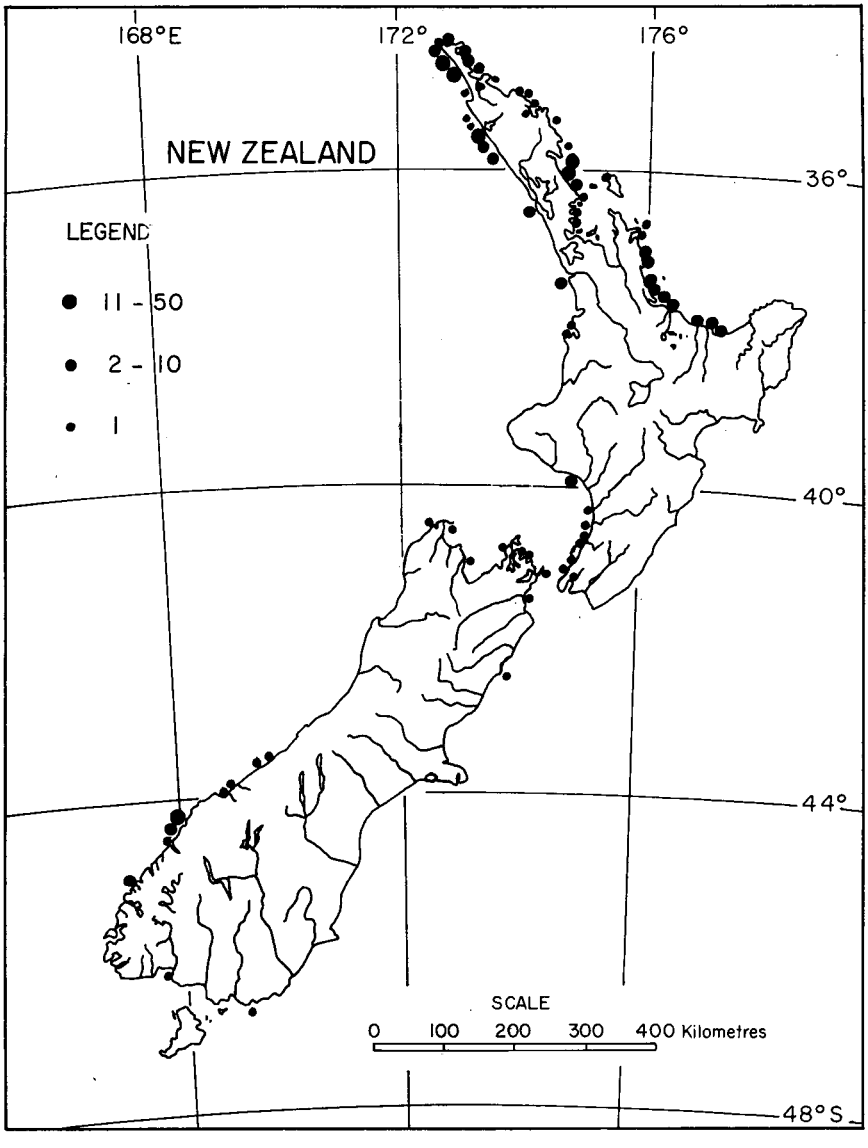

FIGURE 4 — Distribution and numbers of pied phase Variable Oystercatchers in New Zealand. In some localities pooled census figures were plotted as in Figure 3. See Appendix III for separate locality figures.

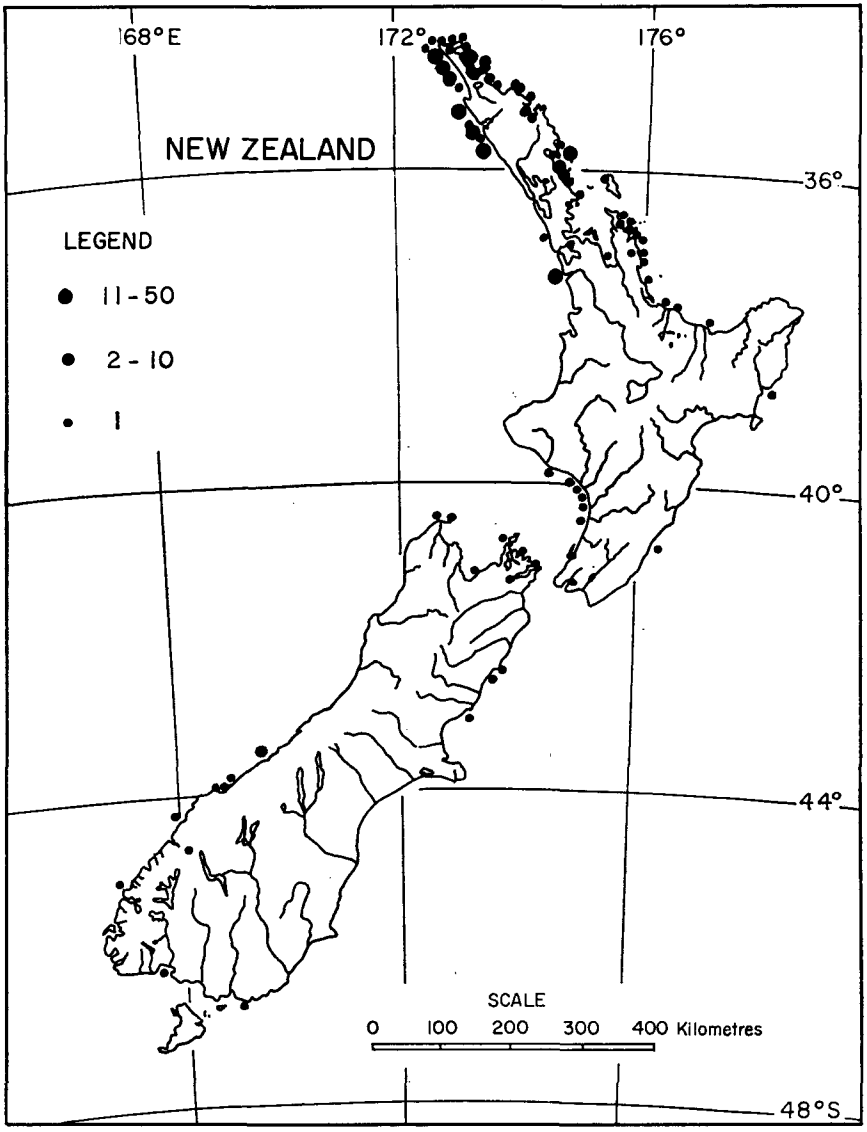

FIGURE 5 — Distribution and numbers of intermediate phase Variable Oystercatchers in New Zealand.

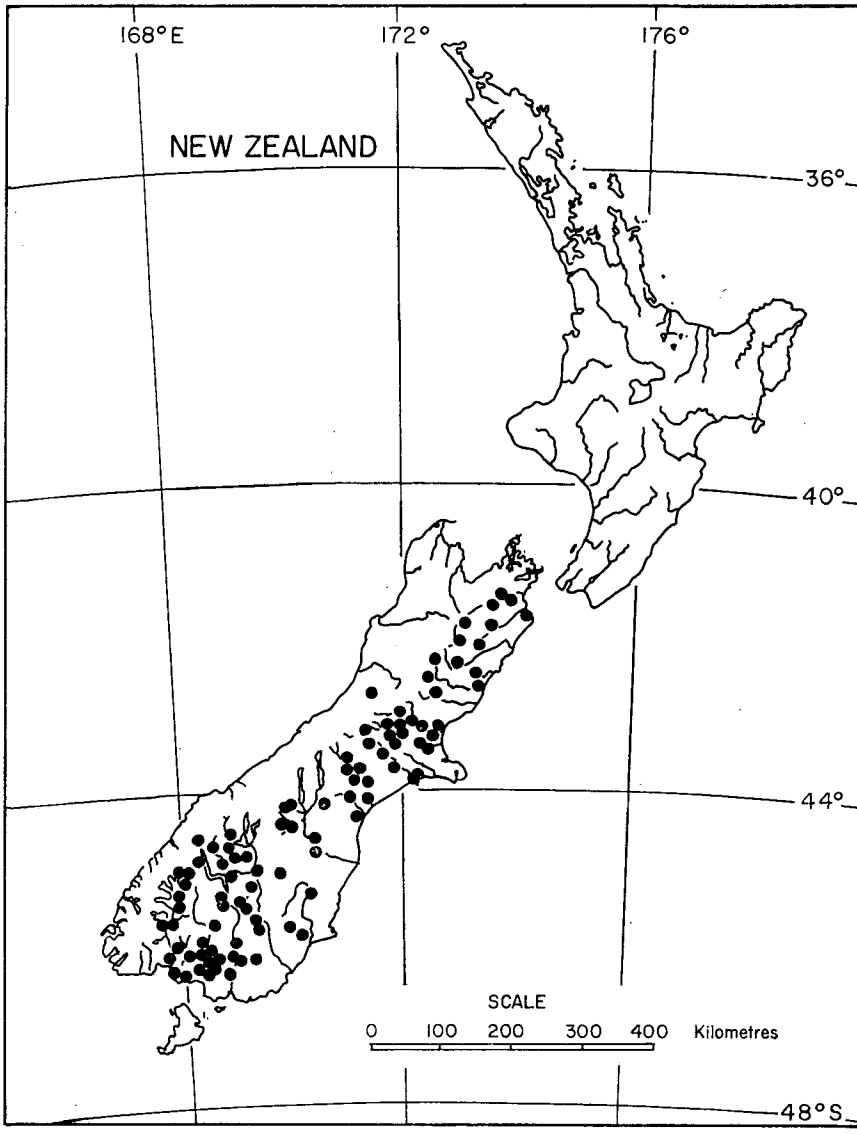

FIGURE 6 — Breeding distribution of South Island Pied Oystercatchers.

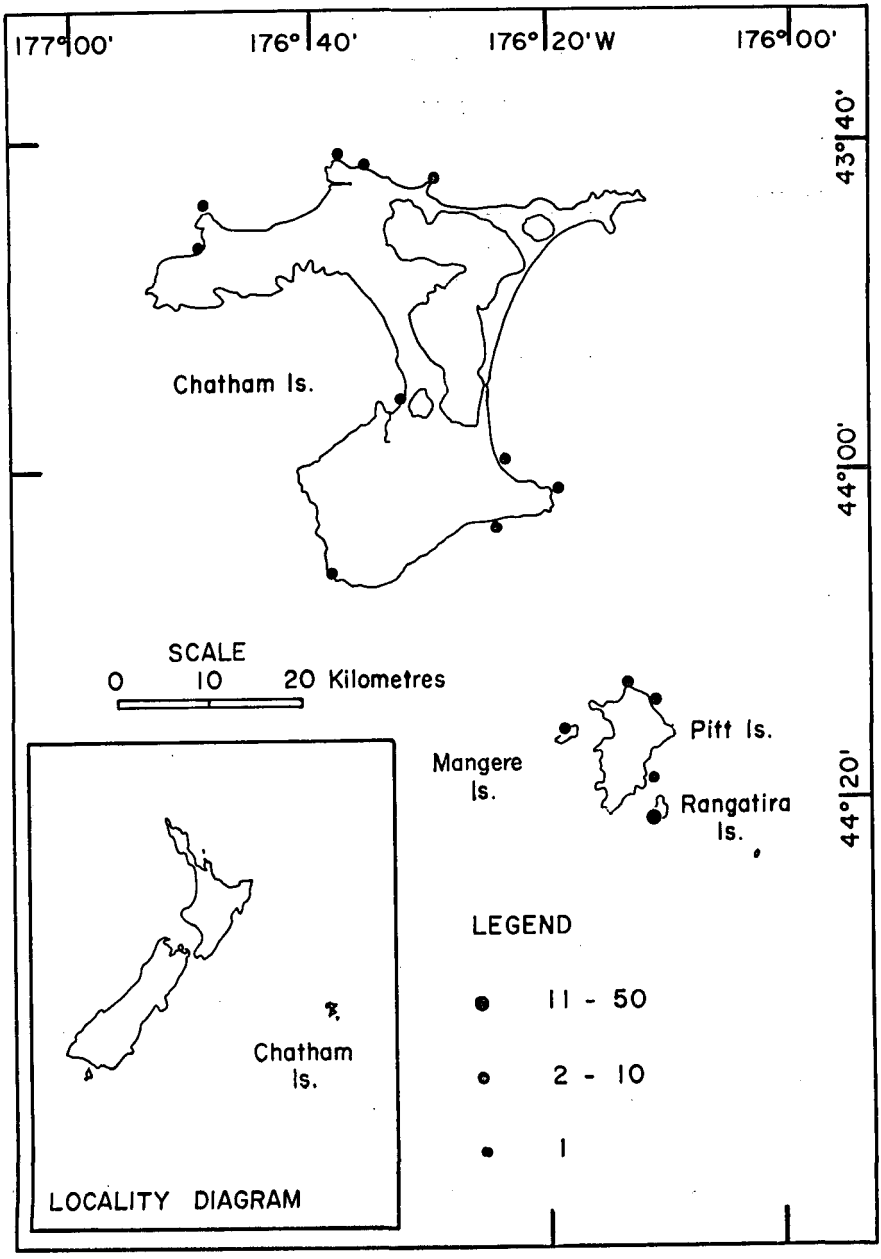

FIGURE 7 — Distribution and numbers of Chatham Islands Oystercatchers.

TABLE 1. Variation in frequency of colour phases of the variable oystercatcher with latitude.

Latitude Grouping	Colour Phase					
	Black		Intermediate		Pied	
	N	%	N	%	N	%
34° - 39°S.	413	42.89	330	34.27	220	22.84
39° - 44°S.	364	84.85	37	8.63	28	6.52
44° - 48°S.	494	93.92	6	1.14	26	4.94

disjunctions which occur in the distribution of the species are directly attributable to unsuitable feeding habitat in the littoral zone e.g. the scarcity of records from the Taranaki coast is due to the barren gravel beaches of this region.

The colour phases of the Variable Oystercatcher are not uniformly distributed throughout their range, their frequency of occurrence varying considerably with latitude as shown in Table 1.

Black oystercatchers predominate in the southern part of the South Island although small numbers of pied and intermediate-plumaged birds also exist at these latitudes. On transition northwards black phases decrease in frequency, whereas intermediate and pied phase birds increase. However, even in the far north, the black phase is still the most abundant. This type of colour phase gradient in which black phases decrease in frequency on transition from colder higher latitudes to warmer lower latitudes is paralleled on the coast of southern California. Black oystercatchers alone occur from Alaska south to southern California, they then merge and interbreed with pied and intermediate birds, and finally on the Mexican coast of the Gulf of California pied birds reach a frequency of 100%. The greater extent of the North American continent has allowed a clearer pattern to emerge, and possibly if the New Zealand mainland extended into lower latitudes nearer the Equator, the pied phase of *H. unicolor* would reach an exclusive frequency.

As Larsen (1957) has pointed out, these two colour phase gradients occur at approximately the same latitudes, representing the northern and southern limits of the palms. He suggested that the distribution of the various colour phases may be correlated with

temperature. This hypothesis has gained support from recent experimental work, in which black plumage (as compared with non-black plumage) has been shown to have three major physiological effects on birds:

(1) increased metabolic economy through increased absorption of radiant energy (Hamilton & Heppner 1967; Heppner 1970);

(2) increased heat stress at high temperatures, as there is little difference in the emission of radiant energy from the integuments of black and non-black homeotherms (Kelly, Bond & Heitman 1954; Hammel 1956); and,

(3) reduced oxygen consumption when exposed to solar radiation at lower temperatures (Lustick 1969).

These effects may explain why black oystercatchers are absent from the vicinity of the Equator, and also why black phases of dimorphic species predominate in colder parts of the range.

However, it is doubtful whether temperature alone accounts for the distribution of black oystercatchers. All black oystercatchers occur either in rocky habitats or in habitats where rocks and sand alternate, suggesting that habitat selection is a potent factor influencing distribution. The selection of rocky habitats by North American Black Oystercatchers *(H. bachmani)* has been attributed to predator selection (Bancroft 1927). This view contended that melanistic plumage gave protective colouration against dark rock backgrounds, whereas white-bellied forms were less conspicuous on sandy beaches. It is doubtful whether this hypothesis can account for the distribution of black phase Variable Oystercatchers in New Zealand. Adult Oystercatchers have very few natural predators, especially in New Zealand; no records of predation were found in the literature. However, Jehl (in litt. 1970) felt it would be unwarranted to consider that plumage has no selective value *per se*. He suggested that there was selection by aerial predators such as the Black-backed Gull *(Larus dominicanus)* for cryptic colouration in the chicks, and that this became apparent in the distribution of adult plumages. This view was based on the assumption that pied chicks are grey dorsally and black chicks brown. In New Zealand oystercatcher chicks the dorsal plumage exposed to predators is similar irrespective of the colour phase involved, although some black chicks have dark heads. Further, where cryptically coloured substrate races occur among animal groups they show exclusive selection for matching substrates. For example, the darkly coloured South African lark *Miafra sabota* is restricted to the dark soils of southwest Africa, while its reddish congener *M. africanoides* inhabits the red Kalahari sand. Substrate selection is rigorous even where the two substrates intermingle, and is thought to result from strong predator selection (Niethammer 1940).

Variable Oystercatchers with plumage intermediate between black and pied phases have an interesting distribution. In all but two instances they occur where black and pied phases are sympatric, and in the two remaining cases they occur well within dispersal range of regions where mixed matings were known to occur (cf Figs 3 and 4). Intermediate-plumaged oystercatchers are nowhere abundant, the maximum number at any one locality never exceeding 50 birds.

The Chatham Islands Oystercatcher is not distributed evenly over the Chathams, but rather is concentrated on the smaller more isolated islands, Rangatira and Mangere (see Fig. 7). It tends to occur in rocky habitats, but does feed on some sandy beaches on Chatham and Pitt Islands.

Of the three New Zealand species of oystercatcher, the smaller South Island pied bird is by far the most abundant. Census figures (deposited in OSNZ library, where they may be consulted as Appendices I-V (pp. i-xxxi) of this paper, " Census Data for . . . oystercatchers ") indicate that the total population of this species approaches 49,000 birds. Black phase Variable Oystercatchers are less numerous (approximately 1300 birds), and pied and intermediate phase birds are scarce (approximately 300 and 400 birds respectively). The Chatham Islands Oystercatcher is rare enough to warrant Red Book listing, as the population totals only about 50 birds. The above census figures are probably conservative estimates of the true population levels, as figures are not available for some localities where oystercatchers are known to occur, and because old records were the only ones available from some localities where population increases have probably occurred.

Recent Trends in Distribution and Numbers:

South Island Pied Oystercatchers have been abundant in New Zealand for at least the last 100 years. Potts (1869) recorded large flocks of pied birds on estuarine mudflats. He later (1885) recalled having seen a flock of " several thousands " of birds at the Heathcote-Avon estuary in 1858, and recorded a large flock at Port Cooper in 1871. Potts (1885) noted a decline in the abundance of South Island Pied Oystercatchers at that time, and attributed it to increasing human disturbance. Oystercatchers were then subject to considerable shooting pressure, as they were considered by many to be a choice table bird (Douglas *in* Pascoe 1969). Buller (1888 and 1905) confirmed that both pied and black oystercatchers were widely distributed but nowhere abundant. Travers & Travers (1872) recorded oystercatchers of pied plumage on the Chatham Islands as " not common."

The recession in numbers of oystercatchers continued until approximately 1940, when wintering populations of the South Island Pied Oystercatcher began a spectacular irruption, especially in northern New Zealand wintering haunts (see Figs 8A and 8B). This population increase has been attributed by Sibson (1966) to the passing of

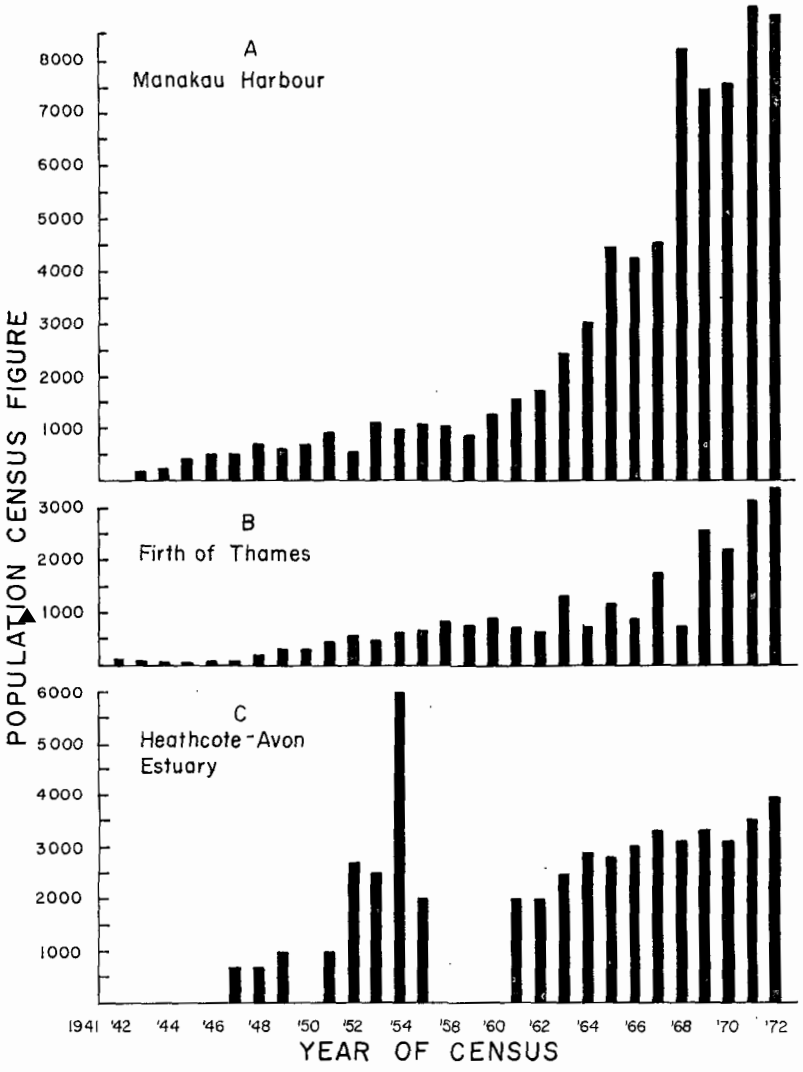

FIGURE 8 — Peak winter census data for South Island Pied Oystercatchers at three major New Zealand wader haunts since 1942.

legislation in 1940 prohibiting the shooting of shorebirds. Population levels at major wintering areas in the South Island have shown smaller increases in comparison with their northern counterparts (see Fig. 8C).

The differential population expansion within wintering haunts can be ascribed to three main factors:

(1) before 1940, northern harbours and estuaries, probably containing vast supplies of food, were not extensively utilized by oystercatchers (Sibson 1966).

(2) also before 1940, southern harbours and estuaries were able to adequately support the smaller populations of birds inhabiting them; and,

(3) ecological pressure from population expansion since 1940 has forced increasing numbers of birds to migrate northward in search of new feeding areas.

As the migratory instinct is best developed in juvenile first-year *H. ostralegus* (Buxton 1957), birds of this age have tended to colonize northern New Zealand (Sibson 1945; Falla, Sibson & Turbott 1966). With population levels of South Island Pied Oystercatchers still rising, saturation of the littoral habitat appears imminent in the next few decades.

In Great Britain, following recent major irruptions of pied oystercatchers *(H. ostralegus)*, increasing numbers of birds have moved inland to breed, exploiting terrestrial habitats as they did so (Buxton 1961; Dare 1966). They have recently begun to utilize coastal terrestrial habitats in certain parts of Britain (Dare 1966; Heppleston 1968), probably in response to increased intraspecific competition for littoral food supplies. South Island Pied Oystercatchers have also responded to increasing population densities by seeking food in coastal fields, and in some instances have become wholly terrestrial. Several pairs have remained at their breeding sites in North Canterbury over the past two years. It seems likely that this habit will increase in future if numbers keep on rising at their present rate.

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