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LOCAL DISTRIBUTION AND FEEDING HABITS OF BULLER'S SHEARWATER (Puffinus bulleri)

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ABSTRACT

Observations from 15 years of voyages in coastal New Zealand waters are analysed. There is evidence for a continuing increase in numbers of Buller's Shearwater. The population pressure in northern waters is thought to be such that the extra birds are forced southwards to feed. The suggestion that the southern birds are non-breeders may be true but it is pointed out that as the total population increases so do the numbers of breeding birds which then have to forage further afield. Distribution maps showing seasonal movements and numbers including areas to the east and west of New Zealand are given. The three main feeding methods observed are described.

INTRODUCTION

The following notes on distribution and feeding habits have been collected over the last fifteen years on voyages in the coastal waters of New Zealand. Since all these passages (Fig. 1) were in merchant vessels on commercial voyages, areas away from the trade routes were not visited at all, whilst other areas, i.e. Auckland - Bluff and Auckland - Cape Reinga were crossed many dozens of times. The region to the east of N.Z. clear of coastal waters was not visited though the Tasman Sea approaches were reasonably well covered. No attempt has been made to plot the area between Greymouth and Puysegur Point owing to lack of records. It is realised that this coverage is very far from the ideal, but since most recording now and in the future must be made from merchant vessels, it is at least a start, and could provide a possible basis to show any changing patterns of distribution over the years.

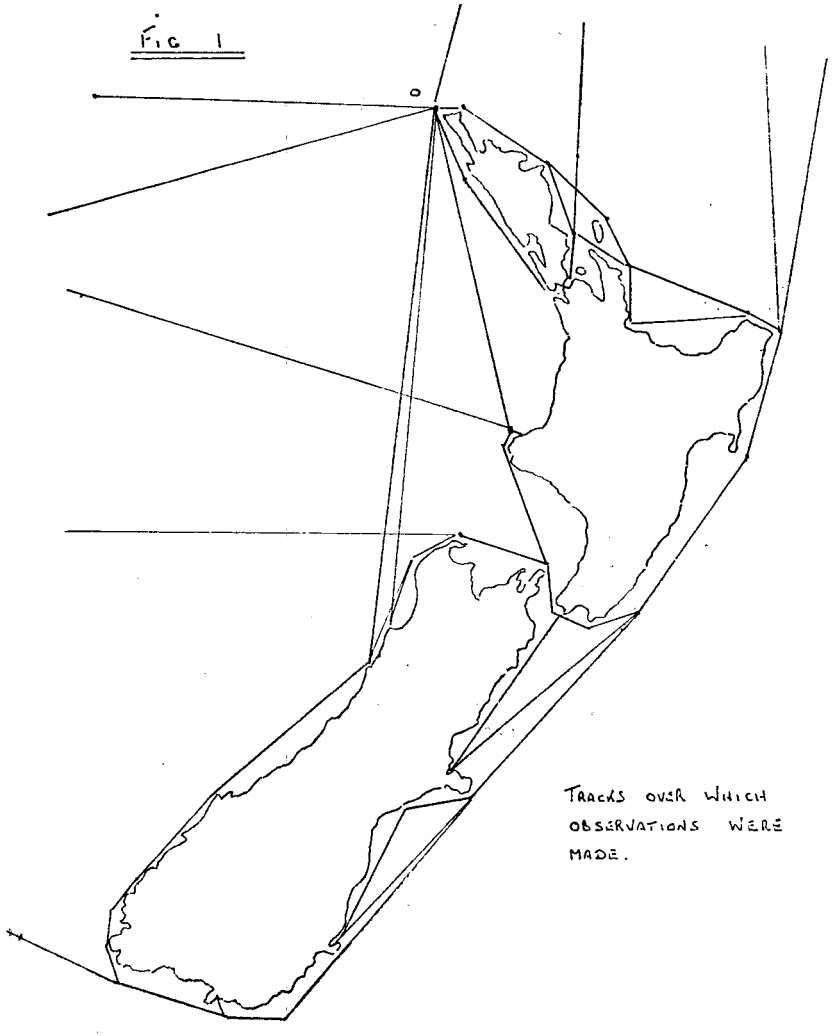

FIGURE 1 — Ship's tracks over which observations were made.

The most obvious change in distribution over the study period may have been caused by the evident increase of Buller's Shearwaters which are seen in our coastal waters. I commented on this up to 1969 (Jenkins 1969) and I am sure that this increase is continuing at the present time. There can be no other explanation for the increasing numbers of birds seen about the South Island without any decrease taking place about the North Island. In my opinion, the

northern waters have all the Buller's Shearwaters they can support and the extra birds are being forced southwards to feed. It has been suggested (Cunningham 1948: 190) that these southerly birds are the non-breeders without the need to return regularly to the only known breeding colony at Poor Knights. This could well be true but, as the size of the total population increases, so does the number of breeding individuals and there comes a time when even the breeding birds have to forage further afield. Bartle (1968: 80) stated that the Buller's burrows on Aorangi Island have increased from practically nil in 1925 when wild pigs were present, to about 100,000 in 1964, twenty-eight years after the pigs were exterminated. It would be interesting to know if this increase has continued and, if it has as sea observations seem to indicate, whether the extra consumption of available food has affected the numbers of other petrels breeding about northern New Zealand ?

DISTRIBUTION

Figure 2 shows the average number of birds to be seen on crossing a particular area during the summer months December to February, but it is in no way an indication of the total number of birds about the coast.

It can be seen from the map that these birds tend to concentrate off capes and peninsulas. This, I believe, is to enable them to have reaonably calm water over which to feed. The best example of this is around the North Cape area where during strong west or south-west weather virtually all the birds will be found on the eastern side of the Cape and in easterly weather down the western side. The wind force and consequent sea state will, therefore, vary the distribution pattern considerably, but it is a consistent variation and it is predictable.

As is to be expected, most birds are found in the coastal waters from Whangarei around North Cape and down the west coast (see Fig. 4). Over the years of these observations it has become obvious that there is a definite pattern to this feeding movement. The birds are always in the highest numbers between Poor Knights and Cape Reinga during the early part of the day, i.e. between dawn and about 0800 hrs. At this time they are spread out over the sea surface in the typical shearwater feeding pattern and are seen to be drifting northwards along the coast towards the Cape. During this early period many thousands of birds are in sight at all times; however after about eight or nine a.m. the numbers decrease rapidly and during the afternoon most birds seen are in rafts on the surface. The rafts can contain several hundred birds but are more usually about fifty individuals. Whilst these rafts contain great numbers of birds, it is known that many more have passed around North Cape and Cape Reinga. Therefore, providing the weather on the west coast is reasonable, it can be concluded that these birds extend down the west coast probably towards the convergence zone off the Kaipara Coast.

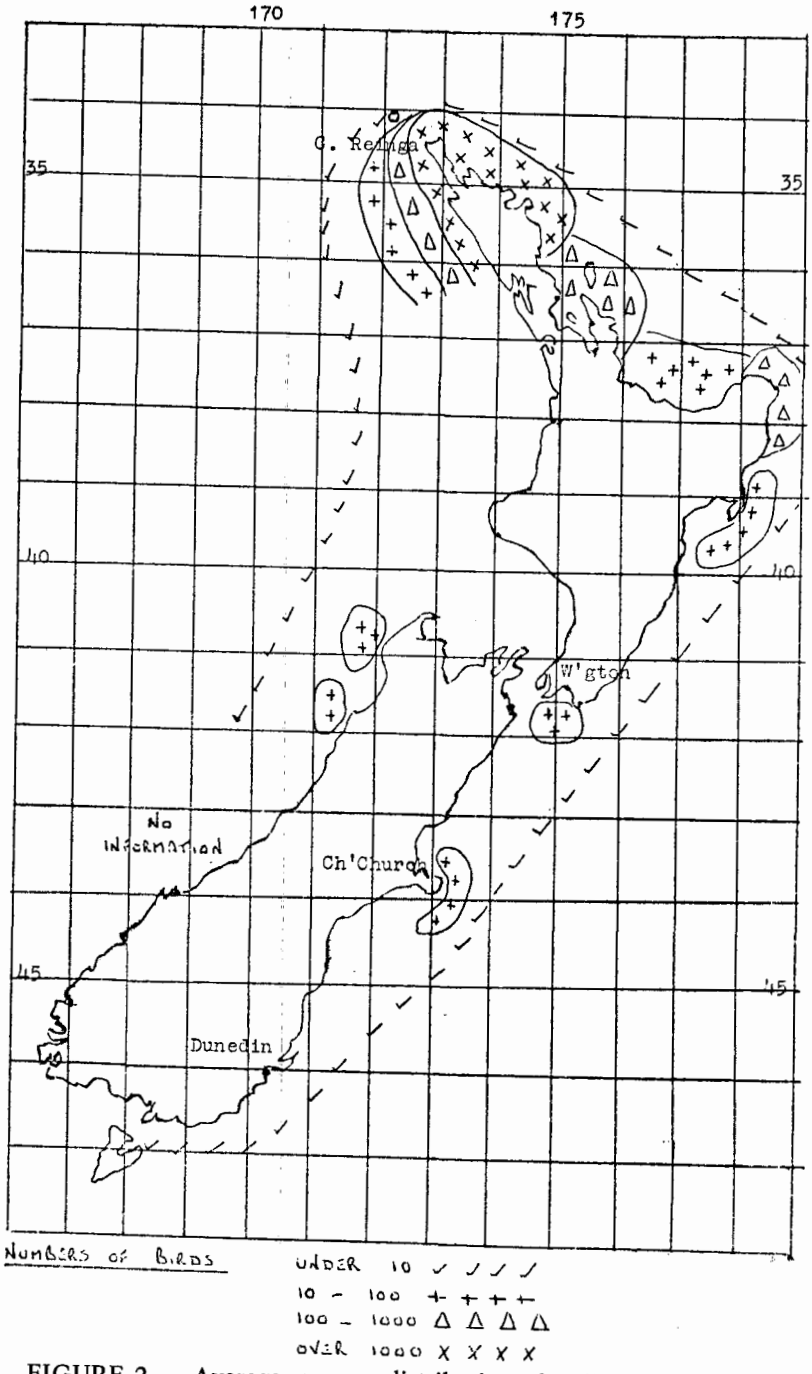

FIGURE 2 — Average summer distribution of Buller's Shearwater.

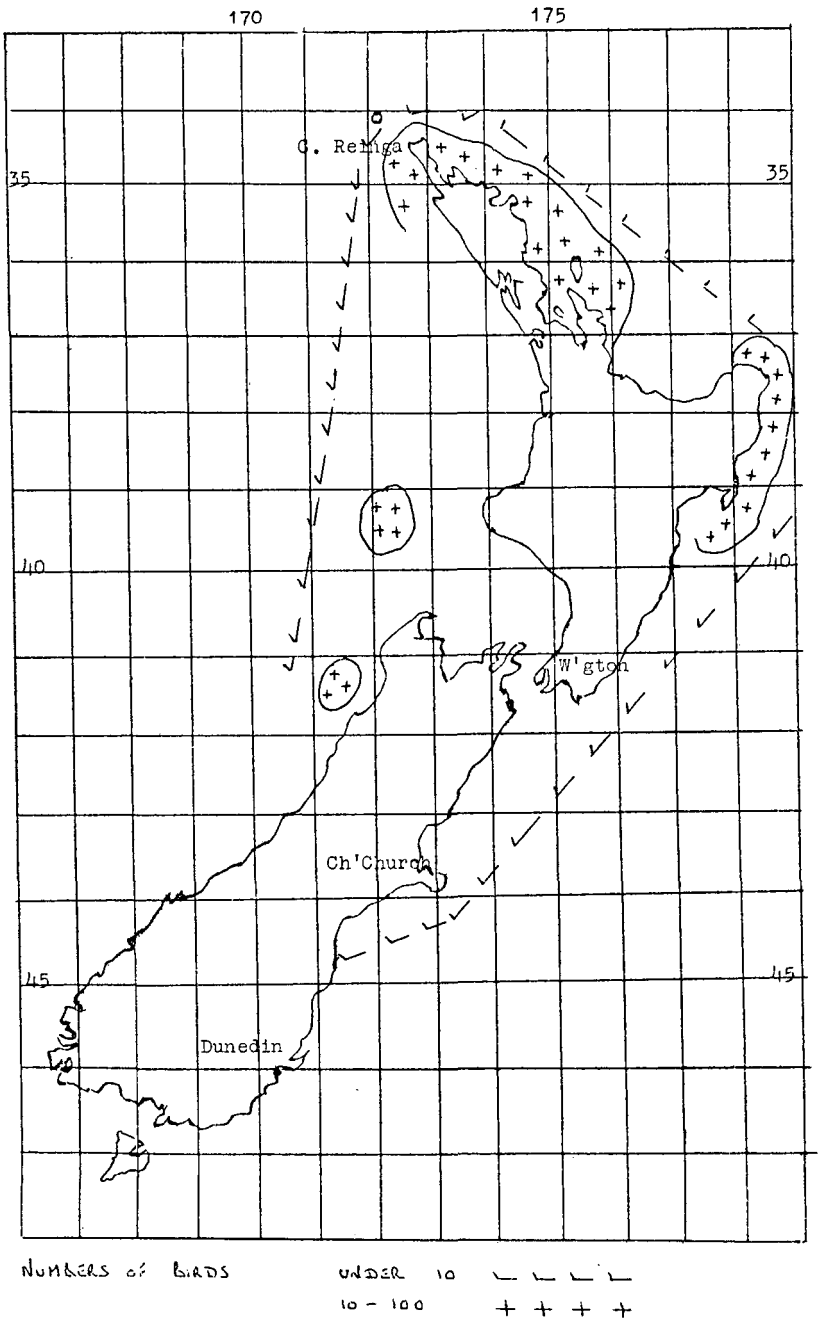

FIGURE 2A — Average May distribution of Buller's Shearwater.

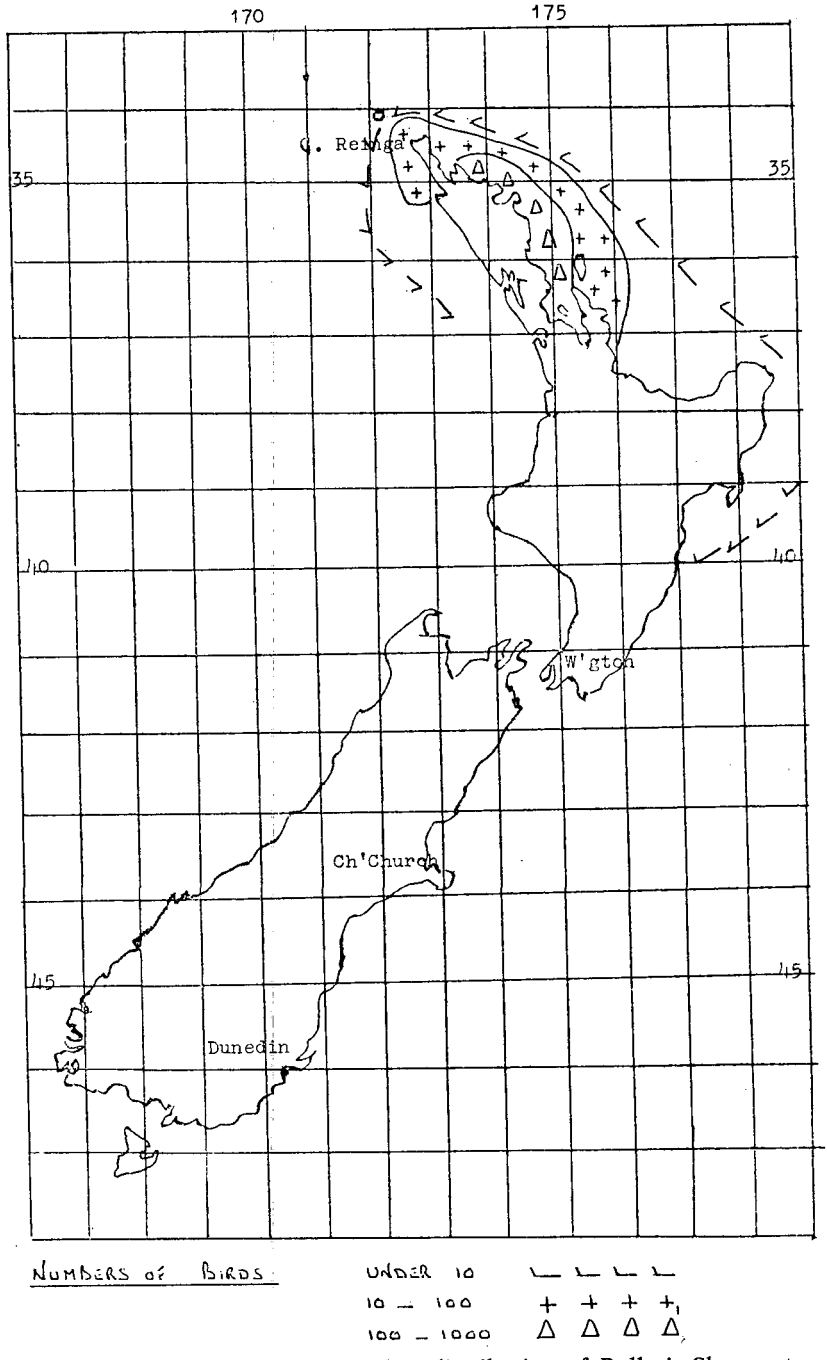

FIGURE 2B — Average September distribution of Buller's Shearwater.

A most noticeable thing is that this morning flight around the north of the island is definitely not followed by a return flight during the afternoon and evening. It is doubtful if the return occurs after dark as this would make it very late in the night before the birds could visit their burrows on the Poor Knights. From this it appears to me that there could well be many birds that over-fly the North Island and return direct to the Poor Knights from the west coast. This habit has been noted for Cook's Petrel *P. cooki* and recorded by Fleming (1950: 184-185). Cook's Petrels were noted by their calls, but since Buller's Shearwater is reportedly a rather quiet bird over the land on the breeding islands (Kinsky & Sibson 1959: 135), this silence could mean it has escaped notice over the mainland.

Fig. 2A shows the distribution in May when probably the bulk of the population has already left on the annual migration as the numbers to be expected in any area are very much reduced (Falla 1934: 251). There are still birds about the West Coast of the South Island and about the East Cape area which tends to disagree with the theory that the birds in these areas in summer are non-breeding, for surely these non-breeders would tend to be the first to leave on migration. Conversely, it could be argued that the non-breeders leave our waters after the main migration of the breeding population. From Fig. 2B, the average September distribution, it can be seen that the birds which return first tend to occupy northern waters and the spread southwards does not seem to start until well into October. A few stragglers excepted, the whole population is in New Zealand waters by the end of November.

During the summer months Buller's Shearwaters do not as a rule concentrate outside the 100 fathom line. They are a comparatively rare bird 60-80 miles to the west of Cape Reinga, and outside the migration times the number drops off much more quickly to the north. Here one is very lucky indeed to see Buller's Shearwaters more than 40 miles north of North Cape.

Fig. 3 shows my records, and those from Norris 1965 and Simon 1967 (*in* Bourne & Dixon 1973:42), amounting to a mere twenty birds over a long period of Tasman crossings, and indicates how little these birds move into the Tasman. It is noticeable that all my records are for the Cape Reinga to Melbourne route, no sightings having been made on the Wellington or Bluff to Melbourne routes. Norris (1965: 91-92) was fortunate enough, however, to sight Buller's Shearwaters well south of my sightings whilst on passage, Bluff to Sydney.

To the east of New Zealand the picture appears to be different. Fleming (1950: 184-185) reported numbers of these birds seen up to 800 miles eastward of the North Island in October, and suggests that these birds could be returning migrants. However, birds seen as far as 168°W in December could well be foraging from the Poor Knights

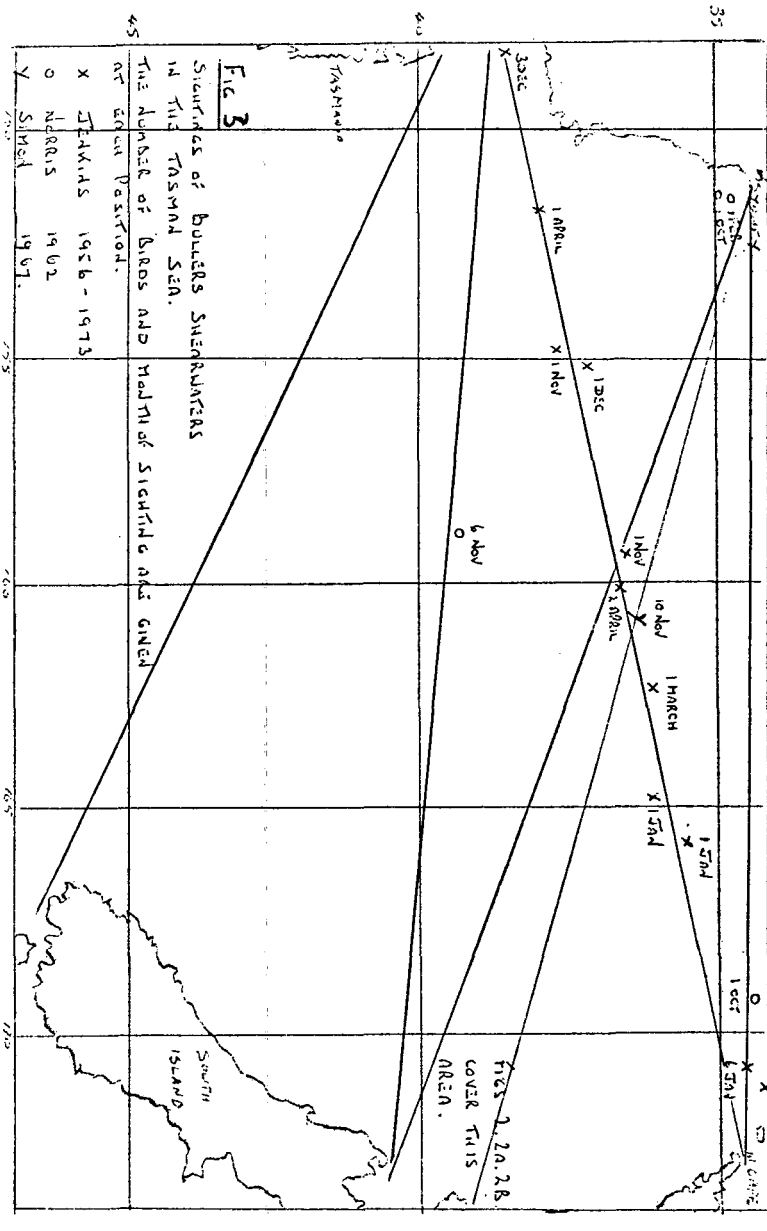

FIGURE 3 — Sightings of Buller's Shearwaters in the Tasman Sea.

and indicate a much greater spread to the eastwards than has been found into the Tasman.

I have only once been fortunate enough to see the migration of these Shearwaters. That was on 11 September 1967 in a position 32°40'S 175°35'E about 160 miles north of the Poor Knights, when for over two hours from 1630 hrs until after sunset we passed through a continuous stream of Buller's Shearwaters spread out in the typical migration pattern in ones and twos and groups up to about five. Birds were seen out to the limit of visibility on both sides of the vessel's track and all were seen to be heading due south. At least several thousand birds must have passed the vessel during the late afternoon.

WINTER RECORDS

JUNE	26/6/62	1 bird at North Cape
	1/6/63	2 birds at 33°28'S 175°25'E
	2/6/69	4 birds between Poor Knights and mainland
	To be added to the above is Peakall's observation of 1 bird at 31°S 175'E on 2/6/59 (Bourne 1960: 14)	
JULY		NIL
AUGUST		NIL

FEEDING

From field observations three main methods have been noted.

(a) The spread northward from the breeding islands during the early morning where each bird flies low over the sea surface, keeping a careful watch for anything edible and landing immediately on sighting something. Since at this time many thousands of birds are quartering the area, it is doubtful if any but the first few waves of birds obtain much food by this method to the south of North Cape, that is in the east coast feeding area. These early birds are probably the ones that form the rafts seen during the late morning and afternoon between North Cape and Cape Brett. The main area of concentration of these rafts is some 10-20 miles south eastward of North Cape; the remaining birds tend to drift around the north of the land and feed down the west coast. In my opinion, the majority of these birds probably feed in the area of convergence off the Auckland west coast where the West Auckland current meets the Westland current (see Fig. 4). An observation by Neil Cheshire (pers. comm.) seems to support this theory as on 3 November 1973 whilst 4 miles off the Hokianga Harbour he saw c. 1300 Buller's Shearwaters in rafts of up to 100 birds, and also in conjunction with shoals of fish.

(b) During the summer months especially, very many shoals of fish are seen in our coastal waters. In all probability these shoals consist largely of Trevally and Kahawai, and when these fish are being preyed upon by larger fish, patches of the sea boil up with white water and fish. These shoals always have a large attendance

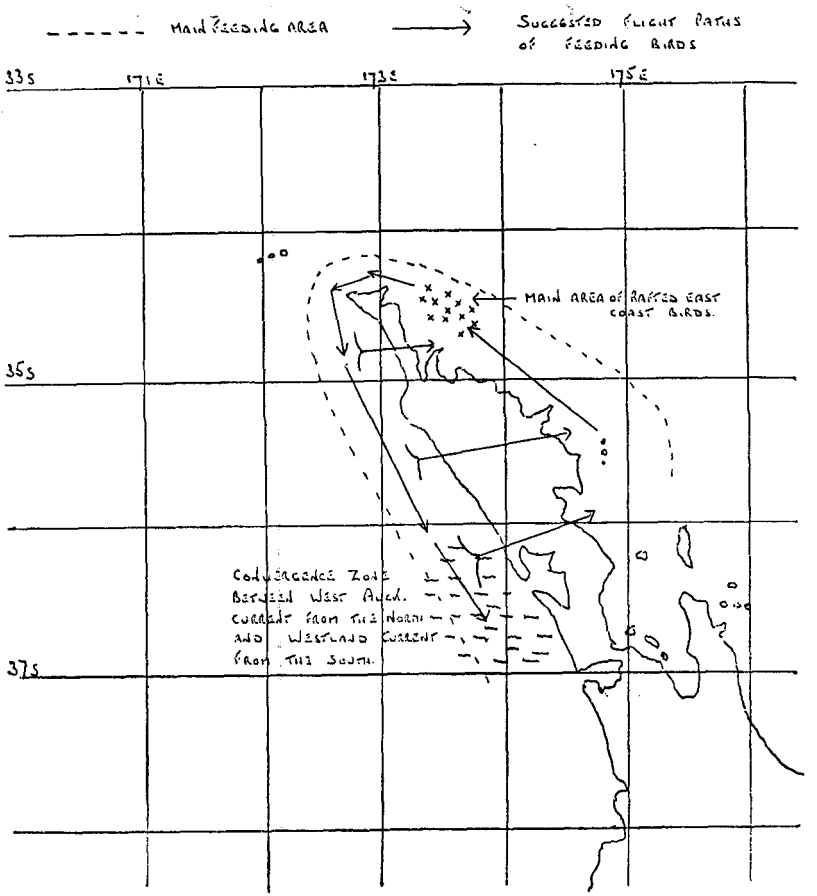

FIGURE 4 — Main feeding areas of Buller's Shearwater.

of birds. Close to the land Red-billed Gulls are in the majority, but further seaward the number of gulls is reduced and the true seabirds take over. In the main, Buller's Shearwaters, like the other shearwaters, do not fly over these areas of boiling water. In fact, the only birds that regularly get right into the shoals seem to be the Gannets. The shearwaters tend to collect on the edges of the shoals and about North Cape where there are strong tidal streams on the down current side of the shoals. From this it would appear that the birds are collecting the remains of the banquet which is being enjoyed by the bigger predatory fish. A specific observation of this type is shown in Figure 5. On this occasion the attendant birds were 10 Flesh-footed Shearwaters, 140 Buller's Shearwaters, 40 Sooty Shearwaters, and 30 White-faced Storm-petrels. Sitting close to the disturbed water were

2 Shy Albatross which appeared to be of the typical race *(Diomedea cauta cauta)*. On this occasion the only bird seen actually amongst the fish was a Sooty Shearwater. The other petrels were seen to be collecting or fighting over bits of food on the surface.

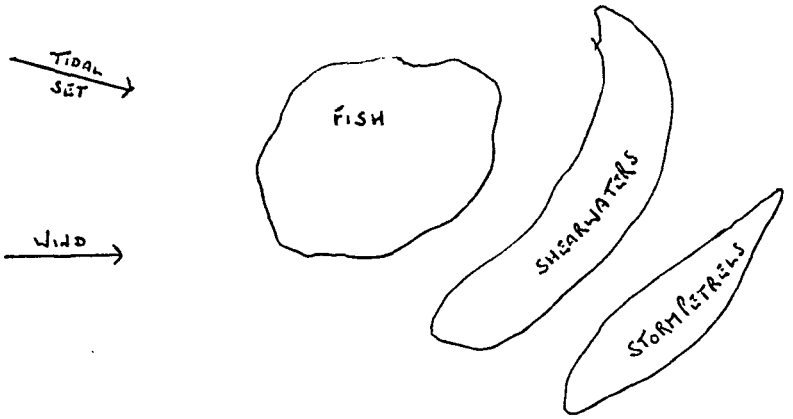

FIGURE 5 — Distribution of birds about fish shoals.

It is interesting to note the very close association between Buller's Shearwaters and Flesh-footed Shearwaters in our northern coastal waters. It is unusual to see a raft of Buller's that does not have a few Flesh-footed sitting around the outside of the raft and equally unusual to see a raft of pure Flesh-footed in coastal waters.

(c) On very calm water Buller's Shearwaters have been seen feeding in the manner of surface feeding ducks, that is with their heads just under the surface and swinging from side to side whilst they were swimming forward. On these occasions, when the weather has been flat calm and I have passed very close to the feeding birds, there has been nothing visible in the water, so it is probable that the food is some form of plankton. The way that Buller's float when at ease, well down in the water, and the comparatively long neck, must aid this type of feeding. On several occasions the birds have been seen to up end in the water, leaving only the rump clear above the surface. I have never seen a Buller's Shearwater dive under the surface though Roberts (1951: 40) reported seeing several diving down to about 20 feet after bait.

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