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NUMBERS OF BULLER'S MOLLYMAWKS BREEDING AT THE SNARES ISLANDS

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ABSTRACT

In March 1992, we counted Southern Buller's Mollymawks *Diomedea b. bulleri* breeding on the Snares Islands. A total of 7683 occupied nests was counted and a further 777 estimated, giving a total of 8460 breeding pairs. The number of occupied nests counted in 1992 is 78% higher than the number counted in 1969. Although more breeding pairs were present in 1992 than in 1969, with only two counts 23 years apart, it is not possible to determine the current population trend in relation to fisheries activities.

KEYWORDS: *Diomedea bulleri*, albatross, bycatch, population change

INTRODUCTION

The incidental capture of seabirds in the New Zealand subantarctic, particularly by vessels involved in the squid trawl and tuna longline fisheries, has resulted in the deaths of high numbers of albatrosses. Up until 1993, many White-capped Mollymawks (*Diomedea cauta steadi*) were killed after becoming entangled in fishing gear used by Soviet squid trawlers in shelf waters around the Snares and Auckland Islands; for example, Bartle (1991) estimated that 2300 White-capped Mollymawks were killed in this way in 1990 alone.

Substantial mortality of albatrosses, especially Southern Buller's Mollymawks (*D. bulleri bulleri*) was also reported by fisheries observers on trawlers fishing for hoki (*Macruronus novaezelandiae*) in the Puysegur Trough west of Stewart Island during 1989 and 1991 (Bartle 1991). Albatross mortality also occurs on southern bluefin tuna (*Thunnus maccoyi*) longline

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vessels which fish in New Zealand waters between March and October. Besides Wandering Albatross (*Diomedea exulans*), Southern Buller's Mollymawks were the most commonly caught albatross in this fishery between 1989 and 1993. Details of this fishery and associated seabird mortality are contained in Murray *et al.* (1993).

Southern Buller's Mollymawks breed only in the New Zealand region with major colonies at the two Solander Islands and the Snares Islands. With a possible world population of about 10 500 breeding pairs (Cooper *et al.* 1986), Southern Buller's Mollymawks are rare compared to most other Southern Hemisphere albatross species.

A count of nesting Southern Buller's Mollymawks on the Snares Islands in February 1969 gave an estimated total of 4750 pairs ± 10% and confirmed that these islands are a major breeding location for the species (Warham & Bennington 1983). No other complete count of Southern Buller's Mollymawks on the Snares Islands has been made. Given the mortality of these albatrosses in fisheries nearby, we considered that a reassessment of the Southern Buller's Mollymawk population at the Snares Islands was needed urgently.

STUDY AREA AND METHODS

The Snares Islands consist of North East Island (280 ha), Broughton Island (90 ha) and numerous islets and rock stacks (Figure 1). The count on North East Island was made between 5 and 13 March 1992 and on Broughton Island on 17 March 1992. Sea conditions prevented counts of the seaward aspects of Alert Stack, Rocky Islet and the Daption Rocks, and so only those areas of these islets which are visible from North East Island were covered. The count was made during the incubation period, well after laying had finished, and hatching was noted on North East Island from 15 March.

We generally followed the procedure used during the 1969 census. The islands were divided into sections, based on maps prepared from aerial photographs. Most areas were searched systematically on foot. Birds and nests in inaccessible areas such as steep slopes and cliffs were counted systematically from convenient vantage points using binoculars. Only nests with sitting birds were counted as occupied, whereas the 1969 count also included single birds and pairs of birds standing alongside or obviously associated with nests. We considered that at the time of our count the birds standing by empty nests were most likely to be non-breeders because failed breeders usually abandoned the nest within a short time of losing their egg (Warham & Bennington 1983) and so should not be included in a count of breeding pairs. Unoccupied nests were counted only in areas inspected on foot.

Ground searches were usually made by one person being responsible for covering a specified area. Counts made from vantage points were made by two or more independently. In areas with <100 occupied nests the independent counts from vantage points had to be within 2% of one another or were repeated until they were. For counts of >100 occupied nests the independent counts had to be within 5% of one another or were repeated.

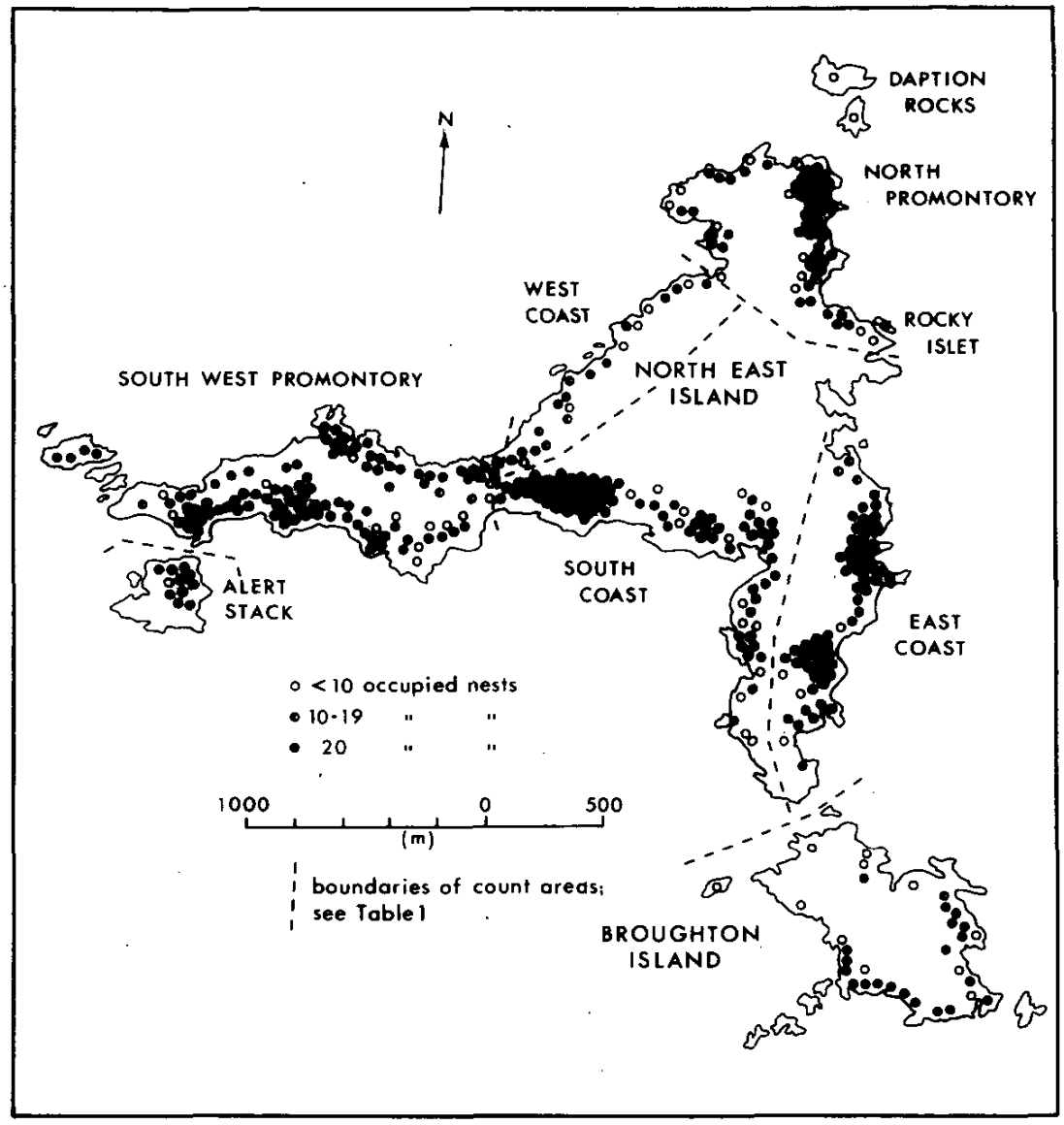

FIGURE 1 – Distribution and numbers of occupied Buller's Mollymawk nests on the Snares Islands, March 1992.

The number of occupied nests recorded was the average of the individual counts for a particular area, rounded to the nearest whole number.

Estimates were also made of the numbers of occupied nests that could not be viewed – either on foot or from a vantage point. Such nests were usually hidden from view on the far side of offshore islets, or among large rocks or dense *Hebe elliptica* bushes on steep slopes. In these areas the presence of flying birds or others on the ground indicated the presence of nests. Estimates of the numbers of occupied nests in such areas were made by multiplying the area hidden from view (estimated from aerial photographs) by the density of occupied nests which could be seen in adjacent areas. All such estimates were recorded separately from counts, so the records show the numbers of occupied nests counted and those estimated.

The location of each nest or group of nests was marked on a large scale map. Records of the number of birds clearly unattached to any nest were also kept.

RESULTS AND DISCUSSION

Numbers of occupied nests

We counted a total of 7683 occupied nests – 7144 on North East Island and associated islets, and 539 on Broughton Island and associated islets. A further 758 and 19 occupied nests were estimated on North East Island and Broughton Island respectively in areas not viewed and not covered on foot, giving an estimated 8460 pairs with nests. There were 810 unoccupied nests in the areas covered on foot.

In 1984, other main colonies of Southern Buller's Mollymawks at the Solander and Little Solander Islands, were estimated at 4300 to 5300 breeding pairs (Cooper *et al.* 1986). Thus the total world breeding population of this subspecies could be as many as 13 760 pairs.

In February 1969, Warham & Bennington (1983) counted 3934 occupied nests and estimated a further 820 for a total of 4750 occupied nests on the Snares Islands. Our total of occupied nests (counted + estimated) is 78% higher, if only the numbers of counted nests are compared, our total is 95% higher. However, Warham & Bennington did not visit Alert Stack and Broughton Island, but relied upon rough estimates from visits made to these islands in 1976 and 1977 by P.M. Sagar, when no specific count of occupied Southern Buller's Mollymawk nests was made. Consequently, a more reliable comparison of numbers using figures for only North East Island gives a 64% increase, from 4552 (3912 counted and 640 estimated) breeding pairs in 1969 (J. Warham, pers comm.) to 7459 (6951 counted and 508 estimated) in 1992. If the estimated figures are excluded, our total of occupied nests is 78% higher.

We counted 587 birds that were not breeding and 262 of these were away from the breeding colonies, mostly in groups on open tussock of headlands. This situation is similar to that recorded in 1969 when about 475 birds were scored as not breeding, and most of these were away from the colonies (Warham & Bennington 1983).

Differences between the 1969 and 1992 counts

Differences in the dates of counts and number of observers used are not thought to have affected the results significantly. Our census was completed 2-3 weeks later than that of Warham & Bennington and they considered that a few eggs might have been laid after their count and a few pairs might have already lost their egg and deserted before counting began. However, 95 pairs had already laid in an intensively studied colony by the time their counting began and only three pairs started later, but seven of the 95 pairs lost their egg during the 8-day census period and these birds soon left the colony. Therefore, in 1969 more eggs were lost than were laid during the census period. Departure of failed breeders will have had more effect in 1992 than in 1969 because of the later census period, and so the 1992 census will have underestimated the total number of occupied nests more than in 1969.

Only 325 non-breeders were counted in the breeding colonies during 1992. Most of these birds were associated with nests, and so counting only nests with sitting birds as occupied also slightly underestimated the total compared to the 1969 count when all nests with birds associated with them were counted as occupied.

By using four observers in 1992, compared to one (S.L. Bennington) in 1969 we should have improved the accuracy of counts made from vantage points. A consistent error (either over- or under-counting) may be made by a single observer when making repeat counts of nesting mollymawks from a vantage point. However, it would be unusual for all four observers to make the same error when counting nests in the same area. It is not possible to estimate how the change in the number of observers may have affected the census in 1992. Counts made on foot by four observers are unlikely to differ much from those obtained by a single observer, unless the areas covered by the four observers overlapped; care was taken to avoid this happening. The main difference would be in the time taken to complete the count; four observers taking a shorter time than a single observer.

Distribution of nests

As in 1969, nests were concentrated around the coasts of islands (Figure 1), particularly on steep tussock (*Poa* spp.) slopes. In some places colonies extended from cliff edges for up to 150 m inland under the forest (average canopy height 6 m) of *Olearia lyalli* and *Brachyglottis stewartiae*. Usually, there was no understorey within the forest (Figure 2) and birds at such nests were able to walk to and from the cliff edges to take-off and land. In 1992, 61% of occupied nests were in the open (e.g. tussock and rock areas), 34% were under the forest, and 5% were amongst *Hebe elliptica* shrubland. The latter sometimes formed particularly dense vegetation which was difficult for the birds and us to penetrate.

Densities of nests in both 1969 and 1992 were greatest on the south and south west coasts of North East Island, the areas with the highest and steepest cliffs. However, comparison of nest distributions in 1969 and 1992 shows that the greatest increases in the numbers of occupied nests were on the North Promontory, East and West Coasts, and South West Promontory of North East Island (Table 1).

Trends in albatross populations

Although there were more Southern Buller's Mollymawks breeding on the Snares Islands in 1992 than in 1969, it is impossible with only two counts, 23 years apart, to determine whether the population is still increasing. Also, it would be unwise to draw conclusions about population changes in the Solander Islands' colonies from counts on the Snares Islands, because population trends of other Southern Ocean albatross species vary from island to island. For example, the breeding populations of Black-browed Mollymawks *Diomedea melanophrys melanophrys* decreased at Kerguelen from 1962 to 1982 (Jouventin & Weimerskirch 1991), but have apparently

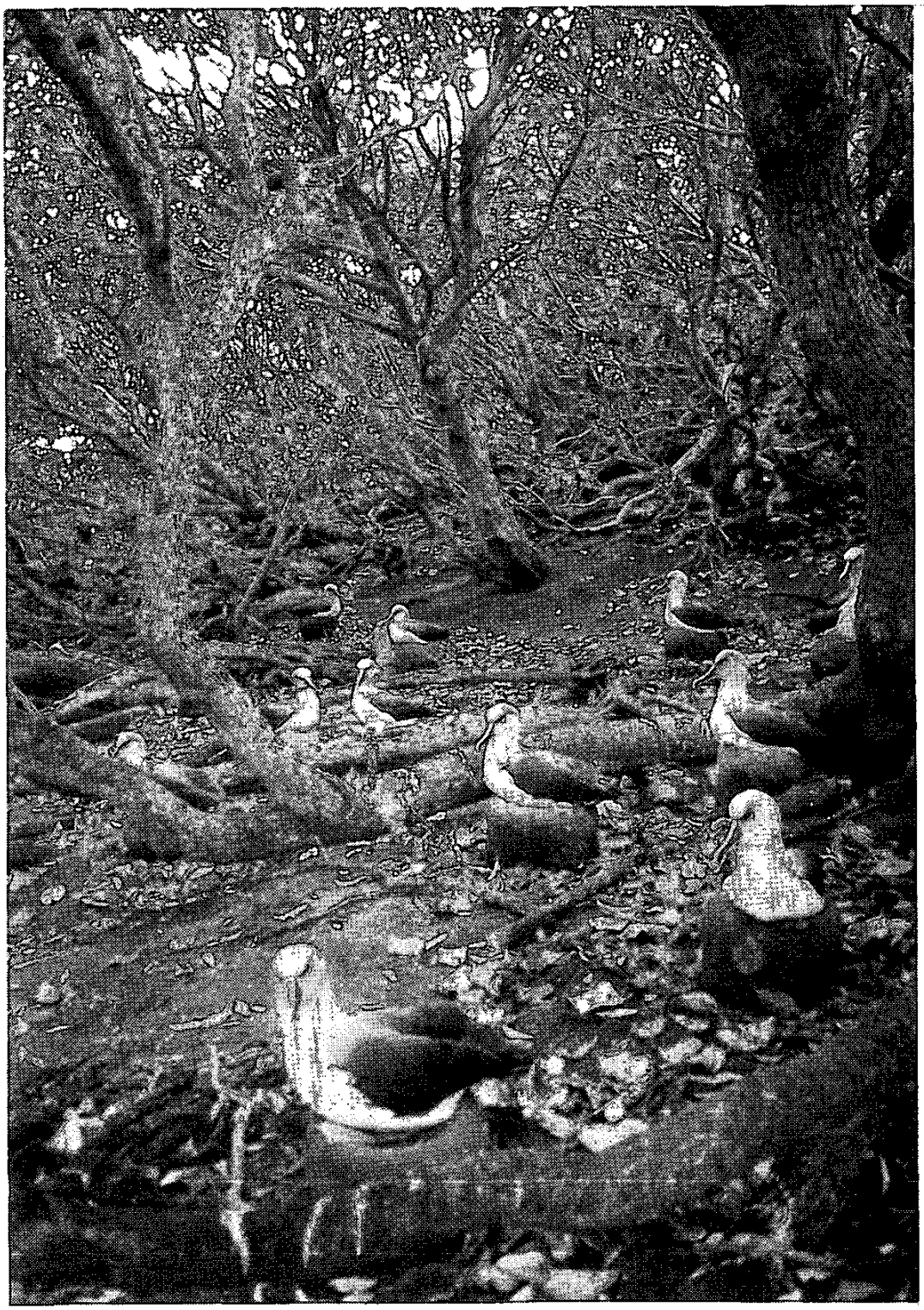

FIGURE 2 – Buller's Mollymawks nesting under the forest canopy on the Snares Islands. (Photo. A.J.D. Tennyson)

TABLE 1 – Numbers of occupied Southern Buller's Mollymawk nests in different areas of the Snares Islands, 1969 and 1992. See Figure 1 for locations of the areas listed. 1969 data provided by Dr John Warham.

Area	Counted		Estimated		Total		
	1969	1992	1969	1992	1969	1992	Percent change *
N Promontory	509	1108	98	17	607	1125	+118
West Coast	121	262	43	25	164	287	+117
SW Promontory	1068	2021	231	225	1299	2246	+ 89
South Coast	1425	2095	160	138	1585	2233	+ 47
East Coast	789	1465	108	103	897	1568	+ 86
Alert Stack	*nc***	193	*nc*	250	*nc*	443	
Broughton I.	*nc*	539	*nc*	19	*nc*	558	

* based on counts only
** NC: not counted

increased at Heard Island from 1947 to 1989 (Kirkwood & Mitchell 1992). In contrst, populations of Wandering Albatross *Diomedea exulans* have decreased substantially at breeding sites on both South Georgia (Croxall 1979, Croxall *et al.* 1990) and the Crozet Islands (Weimerskirch & Jouventin 1987), with mortality associated with commercial fishing operations being identified as the main cause of these declines (Weimerskirch & Jouventin 1987, Croxall *et al.* 1990).

In the New Zealand region, there is sufficient information to determine long-term trends for four albatross populations. In the 1940s there were between 47 000 and 67 000 pairs of NZ Black-browed *D. m. impavida* and Grey-headed *D. chrysostoma* Mollymawks breeding on Campbell Island. Subsequent counts show that by 1988 this population had declined 38%-57% to 29 000 pairs (Moore & Moffat 1991). The Southern Royal Albatross *D. epomophora* population on Campbell Island increased by 6% per annum between 1958 and 1969, and then at the slower rate of 3% per annum between 1969 and 1976 (Dilks & Wilson 1979). Counts made between 1977 and 1982 (Dilks & Grindell 1983), suggest the population had ceased increasing during this period. The longest continuous population study of an albatross in New Zealand is of the Northern Royal Albatross *D. e. sanfordi* colony at Taiaroa Head where Robertson (1993) documents the growth of this small (about 84 birds in 1993) colony from 1937 to 1993 at about 3% a year.

Population trends of albatrosses in the New Zealand region therefore vary considerably between species. However, with the exception of the Campbell Island and Taiaroa Head colonies the trends are based upon few counts many years apart. We recommend that more regular population counts be carried out to determine the current population trends in the prime fisheries bycatch species.

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