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THE STATUS OF SOUTHERN GIANT PETRELS *Macronectes giganteus* AT THE FRAZIER ISLANDS, WILKES LAND, EAST ANTARCTICA

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Censuses of the Southern Giant Petrel colonies on the Frazier Islands, Wilkes Land, recorded 140 nests on the three islands in November 1983 and an estimated 174 in December 1989. The population declined from approximately 200 nests in the mid 1950s to only 53 chicks in 1982/83, but an increased number of nests and chicks reported from the 1983/84 season onwards suggest that the population is presently increasing in numbers, with over 120 chicks fledging in 1984/85 and 1989/90.

INTRODUCTION

The Southern Giant Petrel *Macronectes giganteus* is known to breed at only four sites around the coastline of Greater Antarctica. Three of these breeding sites are within the Australian Antarctic Territory (AAT) near the Australian stations of Mawson (67°36'S, 62°53'E), Davis (68°35'S, 77°58'E) and Casey (66°17'S, 110°32'E), (Woehler and Johnstone 1990). The fourth site is near the French station, Dumont d'Urville (66°40'S, 140°01'E) in Terre Adélie. The species also breeds on the Antarctic Peninsula and on Subantarctic islands (Watson 1975).

The current breeding populations at Giganteus Island, 15 km west of Mawson, and Hawker Island, 7 km south-west of Davis, have declined from those reported from the 1950s and 1970s.

The population at Giganteus Island declined from 24 nests in 1956 to two nests in 1985, and the population at Hawker Island declined from 90 nests to 21 nests between 1970 and 1983 (Woehler and Johnstone 1990). Similarly, the breeding population at Dumont d'Urville has also declined, from 69 nests to 14 nests between 1956 and 1985 (Thomas 1986).

Southern Giant Petrel census data from the Frazier Islands near Casey station in Wilkes Land, collated by Murray and Luders (1990), show a decline between the late 1950s and the late 1970s, although marked fluctuations were evident. To determine if the decline was continuing at this breeding site, we censused all Southern Giant Petrel colonies in the Frazier Islands in November 1983 and December 1989.

METHODS

The Frazier Islands (Nelly, Dewart and Charlton) were visited by helicopter on 28 and 29 November 1983 by MRM. A count was made of nests with eggs in each Southern Giant Petrel colony on the islands. Nelly Island was revisited on 26 January 1984 and a count of chicks was made. Dewart and Charlton Islands were not revisited during the 1983/84 season.

All three islands were visited between 2300 h local (GMT +8) on 23 December and 0200 h on 24 December 1989 using 'Zodiac' inflatable rubber boats. All birds sitting on nest were counted by EJW, but no attempt was made to determine the nest contents. In many cases eggs or chicks were observed when birds stood up, however, birds sitting on empty nests were also reported, and an estimate was obtained of the relative proportion of empty nests.

The locations of the breeding colonies were mapped during the 1983 visit. The presence of sub-colonies on Dewart and Nelly Islands was noted during the 1983 visit, but their locations were not mapped until the 1989 visit (Figs 1 and 2).

RESULTS

Observations 1983

The total number of active nests (i.e., with an egg) was 140 (Table 1). These were distributed as follows:

Charlton Island: The smallest of the three islands was visited first. Nine nests with eggs were found at the western end of the island, in two colonies; one of two and the other of seven nests.

Dewart Island: A total of 68 nests with eggs was seen. These were divided into two colonies; one on the northern side of the island with 25 nests and the other on the southern side with 43 nests.

Nelly Island: A total of 63 nests with eggs was counted in four colonies. There was one colony at the western end of the island and three colonies on the northeastern side of the island.

Inactive Nests: Nests without eggs were seen on all islands. Many of these were obviously old nests as they were covered by snow. However, on both Dewart and Nelly Islands, there were several nests which had been occupied recently. On Nelly Island, six nests without an egg were located; these were occupied by one or two birds which quickly left when approached. All of these birds had the dark head and neck characteristic of immature birds, and were much more timid than incubating adults. It is likely that they were pre-breeding sub-adults, beginning to develop nesting behaviour. Eggs are typically laid between late October and early November (Johnstone *et al.* 1973), although Murray and Luders (1990) recorded egg laying as late as mid-November at Casey.

White Phased Birds: One white phase adult was seen flying over Charlton Island. This was the only sighting of a white phased individual; none of the incubating birds were white phase.

Observations 1989

There were 193 birds sitting on nests on the three islands. Of the birds associated with a nest, none were white phase. The observations from each island follow:

Nelly Island: A count of 73 birds sitting on nests in five colonies was made. The locations of current nest sites closely matched those mapped in 1983, except for one additional small colony on the south-west ridge of the island. Another 72 old nest sites were located during the survey. The condition of these nest sites indicated that they were mostly from the previous breeding seasons, and had not been used during the 1989/90 season. Many of the old nest sites were located adjacent to current nesting sites, but there were 22 old nests located away from the 1989/90 nesting sites. Based on our observations, approximately 10 per cent of the nests were empty, so the number of active nests in 1989/90 was approximately 67. One white phase adult was seen flying from the eastern end of Nelly Island during the count, and was later seen on Dewart Island among a flock of 34 birds roosting on the snow to the east of a melt lake.

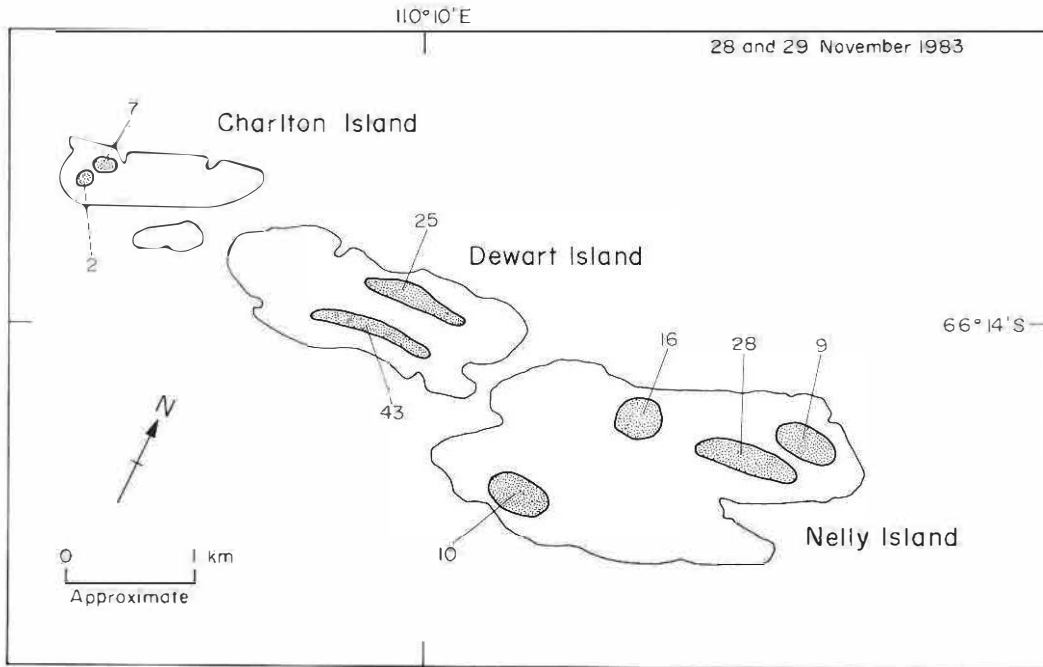


Figure 1. The distribution of Southern Giant Petrel nests on the Frazier Islands, 28 and 29 November 1983.

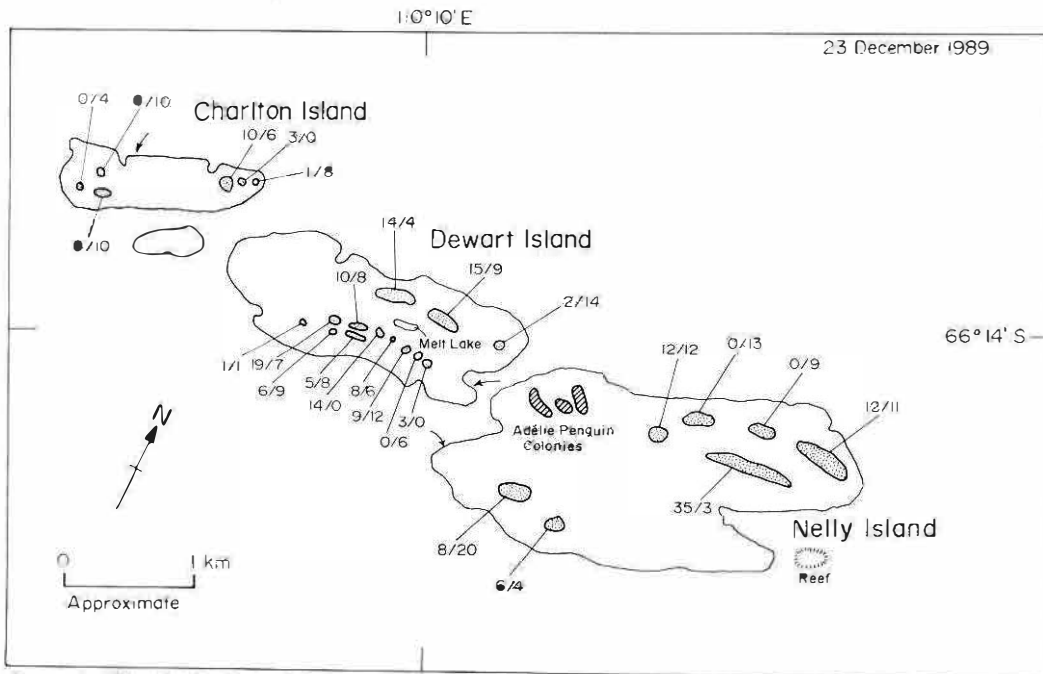


Figure 2. The distribution of Southern Giant Petrel nests on the Frazier Islands on 23 December 1989. The numbers of birds sitting on nests is given before the slash followed by the number of old nest sites. There were no Adélie Penguin colonies on Dewart and Charlton Islands, and the arrows indicate the landing sites used.

Dewart Island: This island had shown the greatest increase in the numbers of birds sitting on nest sites between 1983 and 1989. A total of 12 sub-colonies was located during the visit, and 106 adults sitting on nests, of which approximately 95 were occupied (based on observations that approximately 10 per cent of the nests were empty). A further 84 old nest sites were also located, both adjacent to current nesting sites and at localities not associated with present nesting areas. The locations of nest sites matched those in 1983. Many of the birds roosting on the snow flew off during the count.

Charlton Island: A count of 14 birds sitting on nests was made. All of these birds were present in three small sub-colonies at the eastern end of the island, at the opposite end of the island to where the nests were found in 1983. At least 24 old nest sites were found at the western end of the island, but there were no birds sitting on

nests. The number of active nests was assumed to be 12 for the 1989/90 season. No white phase birds were seen on Charlton Island.

DISCUSSION

Population Status, 1983 and 1989

At the time of the return visit to Nelly Island in late January 1984, there were 52 chicks present from the 63 nests in the four colonies. If no chicks died between this visit and fledging in late March, this represents a potential breeding success of 83 per cent. This figure is higher than the overall breeding success of 70 per cent reported by Hunter (1984) from Southern Giant Petrels at South Georgia. If Hunter's 70 per cent success rate is applied to the total egg count of 140, approximately 100 Southern Giant Petrel chicks would have fledged from the Frazier Islands in 1983/84.

TABLE 1

Census data from Southern Giant Petrel populations at the Frazier Islands, Wilkes Land, Antarctica. 'N' indicates a count of nests, 'A' counts of adults and 'C' counts of chicks. 'ANARE' and 'USARP' indicates unpublished data obtained by Australian National Antarctic Research Expeditions and United States Antarctic Research Program personnel respectively.

Date	Nelly Island	Dewart Island	Charlton Island	Source
21. 22 Jan. 1956	250N	not visited	not visited	Ingham (1959), ANARE
27 Jan. 1959	80-100	20*	not visited	Murray and Luders (1990)
3. 4 Mar. 1959	no data	no data	no data	USARP
15 Dec. 1959	60A	not visited	not visited	R. L. Penney, unpublished data
12 Feb. 1960	46C	not visited	not visited	R. L. Penney, unpublished data
21. 22 Mar. 1961	34C	10C*	no data	ANARE
21 Jan. 1964	10C*	not visited	not visited	ANARE
7 Mar. 1968**	72	no data	no data	Murray and Luders (1990)
20. 21 Jan. 1972	52C	53C	10C*	Murray (1972)
31 Jan. 1974	76+	no data	no data	Murray and Luders (1990)
29 Jan. 1975	not visited	29C	not visited	Murray and Luders (1990)
13, 17 Feb. 1977	37C	33C†	no data	Murray and Luders (1990)
24 Jan. 1978	48C	48C	6C	Murray and Luders (1990)
30 Jan., 2 Feb. 1979	37C†	46C	5C	Murray and Luders (1990)
20 Jan. 1980	44C	55C	no data	ANARE
18 Jan. 1983	43C	10C	Nil	ANARE
28. 29 Nov. 1983	63N	68N	9N	This study
23 to 28 Jan. 1984	52C	not visited	not visited	ANARE
3 Mar. 1985	64C	69C	no data	ANARE
14 Feb. 1986	55C	54C	9C	ANARE
23 Dec. 1989	73N	106N	14N	This study

*Only a subset of the chicks present on each visit was banded and no estimates of the total numbers were made.

**Reported as January in Murray and Luders (1990).

†Reported as 43 and 35 respectively in Murray and Luders (1990).

Since no return visit was made during the 1989/90 season, the estimate of breeding success for the 1989/90 season was based on Hunter's data. The total number of active nests was approximately 174, which could be expected to fledge approximately 120 chicks, based on a success rate of 70 per cent (Hunter 1984). The error component of this estimate is higher than that for 1983.

Population Trends

The breeding population of Southern Giant Petrels at the Frazier Islands declined from the late 1950s to the early 1980s (Murray and Luders 1990, and Table 1). Ingham (1959) reported an estimated 250 nests in four colonies on Nelly Island in January 1956 when the island was first visited. This number is almost certainly an overestimate of the actual number of nests, because in late January 1959 there were only 80 to 100 active nests, and it is unlikely that the number could have declined so rapidly in three years. Wilkes Station (66°15'S, 110°31'E) was established in February 1957, but it is unlikely that the activities associated with the station could have disturbed the birds so severely as only two visits to the islands were recorded (Table 1).

The population on Dewart Island has been similar to that on Nelly Island, at least since 1971/72, when accurate and reliable counts were made. Based on these data, we believe that the total breeding population at the Frazier Islands in the mid 1950s was probably in the order of 200 pairs on the three islands, lower than the estimate made by Ingham (1959).

The populations on both Nelly and Dewart Islands remained relatively stable during the 1970s and into the early 1980s, but declined on Charlton Island. The 1982/83 season appears to have been a particularly poor breeding season (Table 1). It is our belief that these visits at least in part contributed to the decline in the breeding population of Southern Giant Petrels at the Frazier Islands. Station-related activities have been blamed for declines in Southern Giant Petrel populations at other Antarctic and Subantarctic colonies (Jouventin *et al.* 1984; Williams 1984; Croxall *et al.* 1984 and Rootes 1988). However, breeding populations have also declined at localities in the absence of human disturbance. Woehler (in press) reported a 43 per cent decline in the number of nests of Southern Giant Petrels at Heard Island between 1951 and 1988. Clearly some natural factor is also at least partly responsible for the observed decline in breeding populations of Southern Giant Petrels, and it is likely that the visits to breeding localities have exacerbated the natural decline.

The breeding population of Southern Giant Petrels at the Frazier Islands has probably increased slightly during the 1980s. However, the irregularity of the data, due to the different dates on which they were collected (between late November and late February), makes it difficult to define population trends. The number of occupied nests will decrease as the breeding season progresses (Johnstone *et al.* 1973). An approximation, however, can be made of the number of chicks fledging in some seasons, when there are complete counts for the islands, based on the times of the visits and Hunter's data on chick fledging rates (Table 2). These data show considerable annual fluctuations in the number of chicks likely to have fledged in each season, despite the limitations to the data. Before 1982/83, the estimated number of fledging chicks was below 93, and was particularly low (40) in 1982/83. However, since 1983/84, the estimated number of chicks fledging has never been below 100, and for two seasons (1984/85 and 1989/90), the estimates are in the order of 120 chicks. These data indicate that an increase in the number of breeding pairs of Southern Giant Petrels at the Frazier Islands may have occurred.

TABLE 2

Estimated numbers of chicks fledging from the Frazier Islands, 1971/72 to 1989/90.

Season	Nelly Island	Dewart Island	Charlton Island	Total
1971/72	40	45	8	93
1976/77	30	30	no data	>60
1977/78	40	40	4	84
1978/79	30	40	2	72
1982/83	35	5	0	40
1983/84	45	50	5	100
1984/85	60	65	no data	>125
1985/86	50	50	5	105
1989/90	50	65	8	123

The effect of the regular census visits, believed to disturb the nesting birds, while impossible to quantify, coincided with an overall decline in the breeding population. In view of the disturbance to the breeding populations by these visits, we believe that a visit every five years is appropriate to monitor future population trends, and that between these five-yearly visits, all other visits to the breeding sites should be prohibited.

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EDITORIAL

Two articles in this issue describe offshore southwestern Australia where the composition of the seabird fauna is greatly influenced by a unique oceanic current, the Leeuwin Current. Future interpretations of changes will require regular monitoring of both birds and sea. The papers from the Antarctic also reveal changes and the value of long-term monitoring. The Adélie Penguins are increasing in numbers, and the Southern Giant Petrel at the Frazier Islands could be increasing in abundance in contrast to the declines occurring elsewhere. This colony is clearly of major importance and will require regular surveillance in the future. Where a bird is long-lived, rears only one chick a year, and only

breeds successfully when several years old, as do many seabirds, long-term monitoring is essential. The current plight of albatrosses has been recognized because of continuing studies at their breeding and feeding sites over 30 years. Such studies need guaranteed support from funding bodies, preferably to groups with a proven record of commitment and the resources necessary to mount such investigations. They cannot be maintained where available funds are determined by current fashions in science or where investigators change their plumage according to the source of funds.

M. D. Murray