

NUMBERS OF BREEDING SEABIRDS ON PELSAERT ISLAND, HOUTMAN ABROLHOS, WESTERN AUSTRALIA

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In December 1986, we visited Pelsaert Island, Houtman Abrolhos, Western Australia, and estimated 49 000 occupied breeding burrows of the Wedge-tailed Shearwater *Puffinus pacificus*, 76 000 current nests of the Common Noddy *Anous stolidus* and 30 000 current nests of the Lesser Noddy *A. tenuirostris*. It was not possible to count the Sooty Tern *Sterna fuscata* colony because breeding was too far advanced. It occupied nearly 12 ha and probably included at least as many nests as the Common Noddy colony.

INTRODUCTION

Pelsaert (formerly Pelsart) Island (28°56'S., 113°58'E.) is a very important seabird breeding island in Western Australia, both in numbers of species (17) and individuals. Information to 1981 was summarized by Fuller and Burbidge (1981), and a more recent summary of all Abrolhos birds was provided by Storr *et al.* (1986).

Pelsaert Island is low, rising only a few metres above high water mark. It is composed of coral boulders and shingle, limestone and sand. Areas of coral shingle are virtually bare of vegetation, or have very low, perennial and annual herbs and grasses. On deeper soils, especially near the southern end, is a dense low heath of shrubs, especially *Nitraria billardieri* and *Atriplex cinerea*. Samphire *Halosarcia* spp. is found in salt marsh areas and White Mangrove *Avicennia marina* forms dense low forests along sheltered parts of the northern shore, around salt lakes and in some moist low lying areas (Fuller and Burbidge 1981).

Of particular importance are the large colonies of Wedge-tailed Shearwater, Common Noddy, Lesser Noddy and Sooty Tern. However, no accurate counts of the number of breeding pairs have been reported. The figures reported here are, therefore, baseline data essential for detecting future changes in three of the four most abundant seabirds on Pelsaert Island.

METHODS

We visited Pelsaert Island from 9-15 December 1986.

Wedge-tailed Shearwater burrows and Common Noddy nests were counted in 5 m × 5 m quadrats scattered throughout the colonies. Quadrats were selected by a person picking a point about 50 m away and using it as the north-east corner. Wedge-tailed Shearwater burrows were fairly even in their distribution and 24 quadrats were counted, while the density of Common Noddy nests varied considerably, leading us to count 32 quadrats. Small Wedge-tailed Shearwater colonies were not surveyed; the estimate was calculated from quadrat data from the main southern one.

Large Lesser Noddy colonies were counted by running transects through mangrove stands and counting nests 2 m either side of each 5 m of transect (i.e., quadrats of 20 m²). Sixty-two quadrats were counted; the number in each colony is given in Table 1. Transects were selected to pass through areas judged to be representative of the colony. In small colonies we counted every nest and rounded the count to the nearest ten. Counts of Noddy nests included empty nests judged to be under construction or to have been used during the current breeding season.

Sooty Tern breeding was well advanced with almost all eggs hatched. The egg is laid in an unlined scrape in bare sand and the chicks quickly leave the nest to hide in vegetation or shearwater burrows, so counting was not possible.

The boundaries of the breeding colonies were plotted onto 1:5 000 colour air photographs (date of photography 1 April 1982), and the area occupied calculated by counting 25 mm² squares on a transparent overlay. The whole island was traversed and all nesting colonies were plotted onto the air photos. Numbers of nests of other species were estimated by actual counts for small colonies or partial counts and extrapolation on an area basis for larger ones. The total number of nests of each species was calculated by multiplying the mean density of nests in a quadrat by the total area occupied by the colony.

RESULTS

Wedge-tailed Shearwater *Puffinus pacificus*.

Burrows were constructed in sand and shell grit. In the main colony at the southern end of the island (Fig. 1) burrow densities were as high as 28 per 100 m². About 20 burrows were examined and all contained one egg. At the time of our visit, about 49 000 nest burrows were in use (Table 1).

White-faced Storm-petrel *Pelagodroma marina*.
One group of about 25 burrows was located but the breeding stage was not determined.

White-bellied Sea-eagle *Haliaeetus leucogaster*.
Breeding was complete and two flying young birds were seen.

Osprey *Pandion haliaetus*.

Two nests on Pelsaert contained fully-fledged, non-flying young (one plus two). About five other nests appeared to have been used during 1986, and the young from these were flying. One nest on each of nearby Arthur and Jon Jim Islands contained a single fully-fledged, non-flying juvenile.

Silver Gull *Larus novaehollandiae*.

Breeding was finished and chicks were flying. Isolated nests, totalling about 20, were scattered throughout the island.

Pacific Gull *Larus pacificus*.

Breeding was almost complete; most chicks were flying, one was almost ready to fly. About five pairs had bred and nests were scattered throughout the island.

Common Noddy *Anous stolidus*.

Nests were built from twigs and seaweed and some were decorated with small shells and pieces

TABLE 1

Area of nesting colonies and numbers of nests on Pelsaert Island, December 1986.

Species	Colony	Area (ha)	No. of quadrats	Mean	SE	Total
Wedge-tailed Shearwater	Main	26.710	24	44 551	4 167	
	Small	2.914	0	4 861	455	49 412
Common Noddy	Main	13.355	32	76 124	13 462	76 124
Lesser Noddy	1*	1.631	24	13 456	1 876	
	2	0.994	25	8 598	994	
	3	0.194		20		
	4	0.200		110		
	5	1.050	6	7 439	1 691	
	6	0.094	7	597	182	
	7	0.012		30		
	8	0.106		0		
	9	0.038		0		
	10	0.244		0		
		4.563				30 250
Sooty Tern	Main	11.898				

*for colony locations see Fig. 1.

of coral. Some were placed on soil with little or no added material; most were on vegetation, including *Sarcocornia blackiana*, *Atriplex cinerea* and *Nitraria billardierei*. Nest density was highest in *Sarcocornia* around saltpans where densities as high as 254 per 100 m² were noted. Breeding was not synchronized, some birds were constructing nests, some had the usual single egg, and young were at all stages to flying. About 76 000 nests were in use or had recently been used at the time of our visit (Table 1).

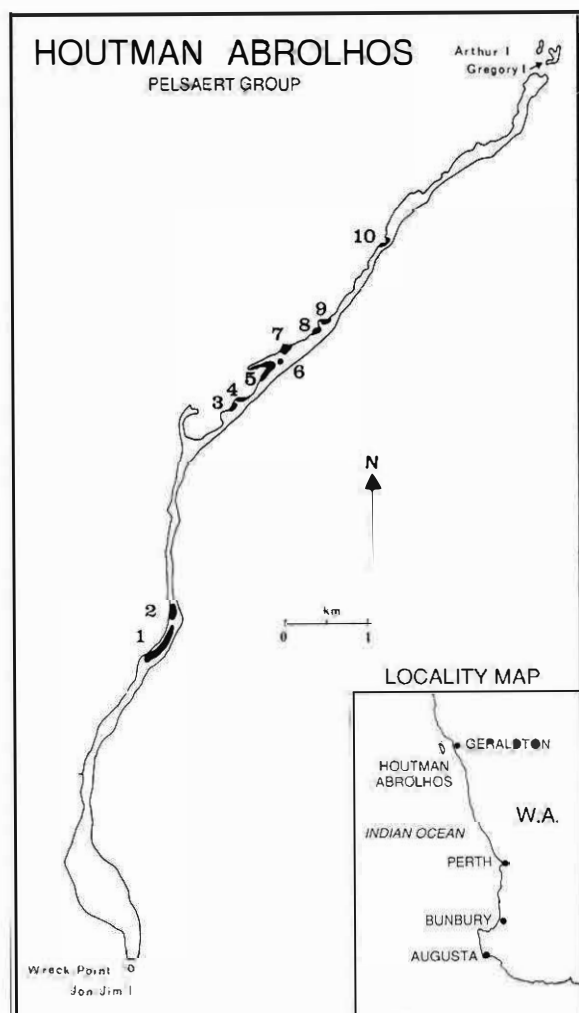


Figure 1. Pelsaert Island. Numbers show location of Lesser Noddy nesting colonies (see Table 1).

Lesser Noddy *Anous tenuirostris*.

Nests were built from seaweed and placed on White Mangrove *Avicennia marina* branches. Nest density was as high as 215 per 100 m² (noting that the nests are at different heights). The stage of breeding varied from nest building to flying young. Our counts showed there were about 30 000 nests in use in December 1986 in seven colonies (Table 1).

Caspian Tern *Sterna caspia*.

About six pairs had bred; we saw one runner and all other young were flying.

Crested Tern *Sterna bergii*.

One colony of about 250 nests on coral rock was located on the east side of the island adjacent to the Common Noddy colony. It contained eggs and running chicks up to about three weeks old.

Roseate Tern *Sterna dougallii*.

Three colonies were located containing about 740 nests. Nests were scrapes on coral rock. Some were ready for eggs, most contained one or two eggs, and in a few, eggs had just hatched.

Bridled Tern *Sterna anaethetus*.

Scattered small groups of nests were found throughout Pelsaert Island and on adjacent Arthur and Gregory Islands, usually under rocks or vegetation. Counting was not possible because most nests were concealed.

Sooty Tern *Sterna fuscata*.

Eggs were laid in a bare scrape in sand under a low bush (*Nitraria* or *Atriplex*). Less than 1% of several hundred nests examined contained an egg; almost all eggs had hatched and most runners were about two to three weeks old. The colony covered nearly 12 ha.

Fairy Tern *Sterna nereis*.

Five colonies were located containing about 200 nests. Nests were scrapes on coral rock. A few were ready for eggs but most had one or two eggs. One colony was intermingled with a Roseate Tern Colony.

DISCUSSION

The data reported here include the first systematic counts for three of the four most abundant species that breed on Pelsaert Island. In order to count Sooty Terns a visit earlier in the year would be required.

The Wedge-tailed Shearwater colonies of about 50 000 pairs are probably the largest in Western Australia. Elsewhere in the Abrolhos only West Wallabi Island has a large colony; small colonies occur on Gun and Middle Islands. In Western Australia Wedge-tailed Shearwaters nest on at least 66 islands from Carnac (lat 32°07'S.) northward (Burbidge and Fuller, unpublished data). Tingay and Tingay (1985) reported counts and estimates of burrows on 15 Pilbara islands varying from 90 (Mardie Island) to 6 000 (Serrurier Island). On Rottneest Island there are two colonies with about 2 150 occupied burrows in 1982 (Saunders and de Rebeira 1985).

The Common Noddy colony is the largest in Western Australia. Elsewhere in the Abrolhos there is only a small colony on Wooded Island (Storr *et al.* 1986). In other parts of the eastern Indian Ocean this species has been reported to breed only on Bedout (Serventy 1952, Serventy *et al.* 1971), the Lacepede Islands (Serventy *et al.* 1971), Sandy Islet on Scott Reef (Berry 1986), East Island on Ashmore Reef (Serventy *et al.* 1971), Christmas Island (Dunlop 1987) and Cocos-Keeling Islands, particularly North Keeling Island (Stokes *et al.* 1984). At West Lacepede in November 1986 there was only one nest, with two or three nests on Middle Lacepede, although several thousand birds were present (R. I. T. Prince, pers. comm.). At West Lacepede in November 1987 there were 13 nests and in November 1988 there were three nests. At Middle Lacepede in November 1987 there were four nests and in November 1988 there were 36 nests (PJF, unpublished). On Bedout the species has been recorded breeding only three times: Stokes (1846) recorded "noddy's eggs", J. T. Tunney collected birds on the nest in May 1901 (Hartert 1905, Serventy 1952) and Fletcher (1980) reported breeding in May 1968, but gave no details. Bush and Lodge (1977) reported a flock of "several thousand" in May 1972 and suggested that breeding was imminent. The Department of

Conservation and Land Management has recently eradicated feral populations of Black Rats *Rattus rattus* on both the Lacepede Islands and Bedout Island and these may have affected Common Noddy breeding in the past.

In Australia, the Lesser Noddy breeds only in the Houtman Abrolhos. Fuller and Burbidge (1981) provided a history of breeding. The only previous estimate of numbers on Pelsaert is a January 1947 count reported in Serventy and Whittell (1951) of 27 000 nests, which apparently referred only to colonies 1 and 2. The authors gave no information on the method of counting.

There is another breeding colony on Wooded and Morley Islands in Easter Group, which Storr *et al.* (1986) state "could hardly support more than 20 000 breeding birds" (p.31). They give estimates of 10 000-15 000 birds nesting on Wooded and 5 000 on Morley in late August 1977 and 6 000-10 000 plus 3 000-4 000 in early October 1981. R. E. Johnstone (pers. comm.) counted 1 739 fresh nests in 49 trees in two transects through the main colony near the western end of Wooded on 22 August 1977. About 200 trees contained nests giving an estimate of about 7 000 nests. Two other smaller colonies contained 188 and about 1 500 nests. On 23 August 1977, Johnstone counted 2 585 nests, a mean of 18 per tree, on Morley Island.

Numbers of Lesser Noddies on Pelsaert may have declined in recent years. The area occupied in 1978-81 (Fuller and Burbidge 1981) was also occupied in 1982 and 1984 during visits by Fuller. In 1986, however, the northernmost three colonies (8, 9, 10; see Fig. 1) had been abandoned and colonies 3, 4 and 7 were considerably smaller with many old nests being visible, suggesting use in recent years.

The Lesser Noddy is a vulnerable species in Australia with a total population of under 100 000 birds and only two breeding stations 35 km apart. It has been declared to be "fauna which is likely to become extinct, or is rare, or otherwise in need of special protection" under the Western Australian Wildlife Conservation Act and is on the Official List of Endangered Vertebrates of Australia (Burbidge and Jenkins 1984). Another subspecies breeds on the Seychelle Islands.

In the Abrolhos, Sooty Terns also breed on Alexander, Morley and Wooded Islands but all these colonies are much smaller than the Pelsaert one (Storr *et al.* 1986). Elsewhere in the eastern Indian Ocean they breed only on East Island, Ashmore Reef (Serventy *et al.* 1971) and North Keeling Island, Cocos-Keeling Islands (Stokes *et al.* 1984). While it was not possible to count Sooty Tern nests on Pelsaert during our visit we believe that there were at least as many as there were Common Noddies, i.e., about 75 000.

The low number of Silver Gulls breeding on Pelsaert is of interest. Unlike many colonies close to centres of human population, the Houtman Abrolhos colonies have not undergone rapid expansion (see also Storr *et al.* 1986). The distance from Geraldton (65 km to Pelsaert) may be too great for birds to make feeding forays from Abrolhos. Fishermen live on islands in all the Abrolhos groups from about March to July each year, but this usage has apparently not led to an increase in Silver Gull numbers. This is fortunate, since a large gull colony would increase predation on eggs and chicks of the noddies and terns.

Caution should be exercised in interpreting estimated numbers of birds in large seabird breeding colonies unless a statistically valid count has been made. The literature contains numerous "estimates" often made during brief daytime visits to colonies when many birds are at sea feeding. Local conditions may also affect numbers. On the morning of 14 December during strong westerly winds there were clearly many more Sooty Terns at the Pelsaert Island colony than on other days during our visit.

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