

Counts of Nesting Boobies and Lesser Frigate-birds in Western Australia

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During the winter of 1982 we visited all known Western Australian breeding colonies of the Brown Booby *Sula leucogaster*, Masked Booby *S. dactylatra* and Lesser Frigate-bird *Fregata ariel*. Nesting islands have been listed by Serventy (1952), Serventy *et al.* (1971) and Nelson (1978). We also revisited Bedout Island in 1984 and visited White Island in 1986.

Numbers of occupied nests (eggs or chicks) were counted or calculated on each island. On the large Adele Island only the nests of Masked Boobies and Lesser Frigate-birds could be counted; the number of nesting pairs of Brown Boobies was calculated by a combination of counting all occupied nests on beaches and lagoon shores and by counting occupied nests in 250 m² quadrants in *Spinifex* grassland. The same method was used on the densely vegetated but smaller Bedout Island, while on the sparsely vegetated Lacepede Islands it was possible to count every nest. Results are given in Table 1.

These are the first systematic counts of breeding boobies and frigate-birds on Western Australian islands. Bush & Lodge (1977), who visited Bedout Island in May 1972, estimated that there were about 5000 breeding pairs of Brown Boobies, about 400 pairs of Masked Boobies and about 2000 pairs of Lesser Frigate-birds, but they do not provide details of how their estimates were derived. Kolichis (1977) visited Bedout in May 1975 and estimated the

number of breeding birds at about 1000 pairs of Brown Boobies, 270 of Masked Boobies and 900 of Lesser Frigate-birds. Again no methods are given for arriving at the estimates. His visit was not long after the island had been affected by a cyclone.

The estimates of Brown Boobies and Lesser Frigate-birds provided by Bush & Lodge (1977) are close to our 1982 counts. With only these two estimates available, it would be tempting to assume that Kolichis' estimates were unusually low because of the cyclone, and to state that there was a stable breeding population at Bedout over a ten year period. However, our 1984 count of Brown Boobies is much higher and it appears that numbers of breeding birds can change considerably over only two years.

Serventy (1952) reported a communication from S. Fowler that White Island (15°05'S, 124°20'E) was an important roosting place for the Brown Booby. Four to five thousand birds were present in October 1985. We visited White Island, which is a rock of about 3-4 ha in area, on 19 August 1986 between 0700 and 0800 hours and found several thousand Brown Boobies on or immediately adjacent to it. Breeding had taken place and nesting was finished, with about 20-25% of birds in juvenile plumage unable to fly. The youngest bird we saw was about eight to 10 weeks old. There was no vegetation on the island and the few nests still visible were depressions in rock or on

TABLE 1 Actual and calculated numbers of occupied nests (nesting pairs) of Boobies and Lesser Frigate-birds on north-western Australian islands.

Island	Area (ha)	Date	Brown Booby	Masked Booby	Lesser Frigate-bird
Adele	270	19 July-2 Aug. 1982	7500±940 ^a	320 ^b	5700 ^b
West Lacepede	107	1-2 July 1982	7370 ^b	0	2700 ^b
Middle Lacepede	54	3-5 July 1982	10300 ^b	0	0
Bedout	31	5-7 June 1982	5470±550 ^a	120 ^b	2290 ^b
Total 1982			30 640 ^c	440	10 690
Bedout	31	4-7 June 1984	9576±1150 ^a	178 ^b	1113 ^b

a : mean ± standard error b : actual count c : by addition of actual counts plus means.

guano, decorated with coral and feathers. We estimated (not counted) that there were between 2000 and 2500 birds in juvenile plumage, which suggested that the island carried about 2000 breeding pairs in 1986. No Masked Boobies or Lesser Frigate-birds were seen by us at White Island.

Serventy *et al.* (1971) list Swan Island near Cape Leveque as a breeding site for the Lesser Frigate-bird. We visited Swan Island in June 1982 but could find no evidence of breeding.

The number of Lesser Frigate-birds on Adele Island at the time of our count was comparable to the 6000 pairs reported on Aldabra Atoll in the Seychelles by Reville (1983), who stated that Aldabra is the major breeding station in the Indian Ocean for both Greater and Lesser Frigate-birds.

Similarly, an examination of the data in Nelson (1978) shows that all five Western Australian islands have among the largest Brown Booby colonies in the world. The largest colony listed by Nelson is the 5000 to 6500 pairs on Christmas Island (Indian Ocean) in 1938-40, although Nelson does state that other little known but substantial colonies such as St Paul's Rocks (Atlantic Ocean) or Malpelo (Pacific Ocean, off Central America) might exceed this figure. Blakers *et al.* (1984) list the size of some other Australian breeding colonies: Raine Island 12 000 in 1979 and Rocky Island (Gulf of Carpentaria) 20 000 to 30 000 in 1965. These are numbers of birds, not nesting pairs as in our study. The Blakers *et al.* (1984) record of 32 000

birds at Adele in 1982 is based on an inaccurate communication from us. Thus, the Brown Booby colony on the Lacepede Islands (20 000 pairs in 1982) may be the largest in the world. On the other hand, north-west Australian breeding colonies of the Masked Booby are small in comparison with some colonies elsewhere.

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