

## SEABIRD ISLANDS

## No. 111

## Carnac Island, Western Australia

**Location:** 32°07'S., 115°39'E.; 8 km off the lower west coast and 10 km south-west of Fremantle, W.A.

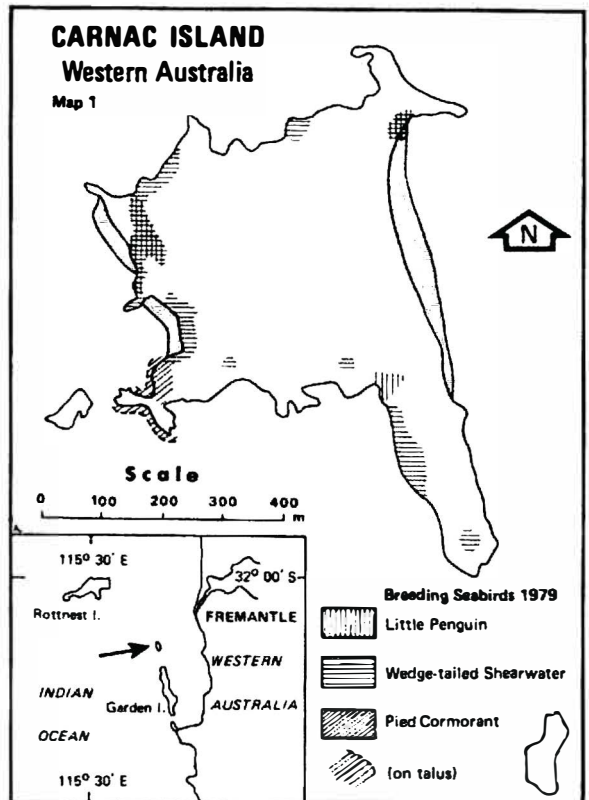
**Status:** Class A reserve vested in the W.A. Wildlife Authority.

**Description:** 17.2 ha; 730 m by 430 m; maximum elevation 20 m. From 50-150 m offshore are a few stacks and islets, the largest being Flat Rock. All land masses are composed of calcareous sandstone, which is covered to varying depths by sand. The main island is an undulating plateau 10-15 m above the sea; the only substantial break in the cliffs is the 250 m long beach on the central-east coast. Annual rainfall is about 800 mm, mostly falling between late April and October.

Trees are absent, and the vegetation is dominated by shrubs. In relatively sheltered places with deep dune sand there are stands of *Acacia rostellifera* and *Olearia axillaris*. On the plateau areas, where the soil is shallow, there is a low heath of *Rhagodia baccata*. In rookery areas subject to heavy manuring and trampling, the low shrubs are replaced by coprophilous shrubs such as *Lavatera plebeia*, *L. arborea* and *Malva parviflora* and by herbs particularly *Senecio lautus*. In the salt spray zone *Rhagodia* is replaced by cushion-like *Frankenia pauciflora* shrubs. The cliffs and talus slopes of the main island and Flat Rock are vegetated with Nitre bush *Nitraria schoberi* and pigface *Carpobrotus virescens*. Nearly 100 plant species were recorded by I. Abbott<sup>2</sup>.

**Landing:** Access is easy onto the beach on the eastern coast.

**Ornithological History:** In 1921 W. B. Alexander knew that the Wedge-tailed Shearwater and the Bridled Tern nested on Carnac Island: Presumably he learnt this during his cruises with Messrs Justice Burnside and McMillan. One-day



visits were made by D. L. Serventy and C. F. H. Jenkins on 19 May 1934, the Royal Society of Western Australia on 30 March 1935, D. L. Serventy and V. N. Serventy on 2 February 1951, B. Phillips on 10 March and 4 September 1956, J. A. L. Watson on 22 February 1957, and G. M. Storr *et al.* on 30 March 1958; the data from these visits were summarised by Watson<sup>6</sup>. Since then, Storr and Mary Gillham visited the island on 14 October 1959, and in 1972-73 C. A. Nicholls carried out her research on the Silver Gull. I. Abbott made a number of visits in 1974 and 1975, while



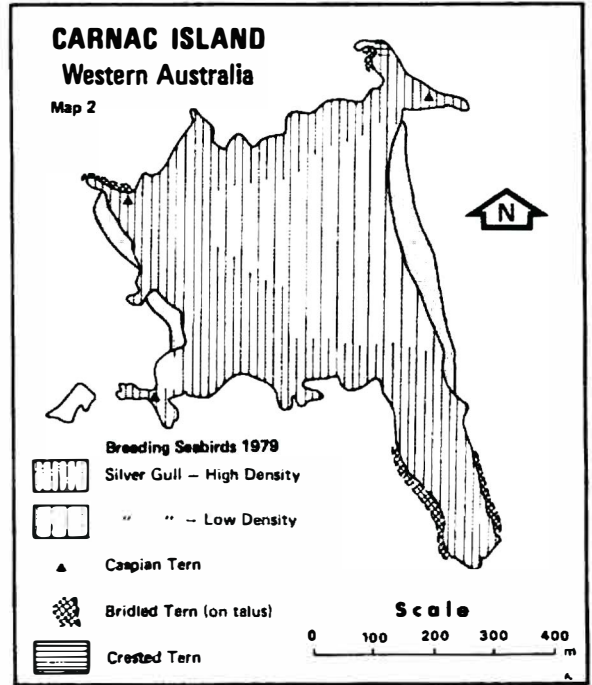
• *The north-western corner of Carnac Island.*  
Photo: J. N. Dunlop

S. G. Lane<sup>2</sup> recorded details of his visit in September 1976. Ongoing research into the breeding biology of Silver Gulls, Crested Terns and Little Penguins, commenced in 1977, is being conducted on Carnac Island by R. D. Wooller and J. N. Dunlop of Murdoch University.

### Breeding Seabirds and Status

*Eudyptula minor* Little Penguin — Carnac Island is the northernmost breeding location of this species in Western Australia. They nest in caves in the limestone and in hollows under bushes. Laying begins in early March, peaks in June and continues through to late November. It is significant that the Little Penguins on Carnac, and probably also Penguin Island (32°18'S., 115°41'E.), have the earliest laying dates and longest breeding season known in the species. A number of other seabirds in the region have prolonged breeding seasons which begin during the autumn, an anomalous situation in such a latitude. In 1980 the colony consisted of 50-80 pairs concentrated in three main areas (see map).

*Puffinus pacificus* Wedge-tailed Shearwater — This is the southernmost breeding station of this species in Western Australia. The burrows are excavated in sandy areas above the cliffs in low vegetation (*Frankenia-Rhagodia*). Small numbers also nest in burrows on the talus slopes and in caves in the limestone. The birds are present renovating their burrows in August/September. Copulations at burrow entrances have been observed during October. Laying probably commences in late November. An estimated 140-200 pairs (1980) nested on the main island and a smaller number on Flat Rock.



*Phalacrocorax varius* Pied Cormorant — On the main island these birds nest on the talus slopes and cliff tops with southerly and westerly aspects preferred. On the slopes, platforms are constructed on flattened Nitre bushes whilst on the plateau the nests are frequently placed on the woody *Acacia* shrubs. Laying begins in early March and continues until late May with the progressive addition of later nesting pairs. About 50 pairs were observed nest-building on Flat Rock on 30 March 1958<sup>1</sup>. Some 500 recently-used nests and some nests with small nestlings were recorded on the main island in September 1976<sup>3</sup>. An estimated 450-550 pairs nested at different locations\* on the main island and on the rocks off Orelia and Currie Points in each year from 1977 to 1980.

*Haematopus longirostris* Pied Oystercatcher — One or two pairs nest on the beaches of the main island in August/September of most years.

*Larus novaehollandiae* Silver Gull — Breeding numbers have been increasing steadily in recent years in response to the spillover of urban waste from the nearby Metropolitan area and the colony is now the second largest in W.A. The birds nest all over the island and on the offshore



- Part of the Silver Gull nesting colony near the western side of the island.

Photo: S. G. Lane



- Pied Cormorants nesting on one of the small satellite islets.

Photo: J. N. Dunlop

rocks. On the main island the greatest densities occur on the northern, western and southern edges and on the southern peninsula. In these areas the vegetation is lower and more sparse than in the central eastern area. Laying commences late in March, peaks in the first or second week in April and then continues through to October or November. Most of the later clutches are replacements, or multiple replacements, for losses sustained to predators (e.g. King's Skinks) earlier in the season<sup>7</sup>. A small proportion of breeding pairs do succeed in raising two broods during the prolonged breeding season<sup>1</sup>. Estimated 3 000-4 000 breeding pairs.

*Hydroprogne caspia* Caspian Tern — Pairs nest singly on the promontories of the island e.g. Fraser Point, Currie Point, South Point and Orelia Point. Laying begins in mid-July and continues through August and September. Some later clutches in October and November are probably replacements for earlier losses. Two or three pairs nest on the main island each year.

*Sterna anaethetus* Bridled Tern — Nests each year in crevices on the talus slopes of the main island and on the offshore rocks. The first birds appear in late September, apparently prospecting for nest sites. By the second week of October breeding pairs are settling on their territories at night. Laying begins in early to mid-November. Watson<sup>8</sup> recorded young birds in late down/early feather stage in January "... although one egg and two newly hatched birds were located." Estimated 50-100 breeding pairs.

*Sterna bergii* Crested Tern — These birds nest intermittently at Fraser Point. In 1978 and 1979 laying began in the second week of June and about 200 pairs had nested by mid-September. Colour banded individuals of the early (June) Carnac breeding groups shifted, and in June 1980 were nesting at Lake Herschell on Rottnest Island. Late in the 1980 season (October) 6 pairs nested on Carnac. At Green Island, off Rottnest Island, during the same years, laying began at the end of March and continued until September. Crested Terns in the area off Fremantle use a number of alternative nesting sites including Carnac Island. The breeding season is prolonged with autumn, winter and spring nesting groups within the population. Up to 200 pairs (variable) breed on Carnac Island.

### Factors Affecting Status

King's Skinks *Egernia kingii* are an important predator of Silver Gull's eggs. Pairs in areas of the colony from which King's Skinks had been experimentally excluded had a significantly higher hatching success than those from a similar unprotected area (Wooller and Dunlop, in prep.). A Marsh Harrier *Circus aeruginosus* regularly preys on the gulls. Tiger Snakes *Notechis scutatus* probably feed on seabird chicks as well as on House Mice *Mus musculus*.

Rabbits *Oryctolagus cuniculus* were released on the island in the 1820's and again in 1934 before being exterminated in 1969. During the eradication programme the island's vegetation

was burnt off and today in the central eastern parts of the island stands of *Acacia rostellifera* are still increasing in density. The rabbits apparently have had no lasting effect on the breeding seabirds.

Carnac Island is the nearest seabird island to the Perth Metropolitan area. On weekends during late spring, summer and early autumn it is not uncommon for 30 pleasure craft to be moored or beached along the island's shoreline. Fortunately most people confine themselves to the eastern beach. Australian Sea-lions *Neophoca cinerea* suffer the most serious and persistent disturbance and their numbers have declined on the island in recent years. Also, penguin burrows are continually being trampled on the slopes in the northern corner of the eastern beach.

#### OTHER VERTEBRATES

A small skink *Morethia lineocellata* and a gecko *Phyllodactylus marmoratus* have also been recorded. A pair of Australian Shelduck *Tadorna tadornoides* nested in 1979 and 1980.

#### Other Seabirds Recorded

<i>Puffinus assimilis</i>	Little Shearwater
<i>Phalacrocorax sulcirostris</i>	Little Black Cormorant
<i>Egretta sacra</i>	Eastern Reef Egret
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher
<i>Larus pacificus</i>	Pacific Gull
<i>Sterna fuscata</i>	Sooty Tern
<i>Sterna nereis</i>	Fairy Tern
<i>Anous stolidus</i>	Common Noddy

#### Banding

Species	Year/s	Number Banded	
		Adults	Young
<i>Eudyptula minor</i>	1979-80	74	5
<i>Puffinus pacificus</i>	1958		10
	1980	9	
<i>Phalacrocorax varius</i>	1976		2
<i>Larus novaehollandiae</i>	1972-73	559	29
	1977-80	c.600	c.350
<i>Sterna bergii</i>	1978-80	50	2

Adult Silver Gulls are essentially sedentary with 88% (40) of recoveries from 1977-80 coming from within 40 km and most from the nearby Swan estuary. There is, however, a limited southward movement of adults during the

summer post-breeding period of up to 172 km. No pulli banded on the island have as yet been recovered; however, the results from other banding sites in the region may indicate a wider dispersal of the young. Many birds banded as adults in 1972-73 are still present (1980) indicating that once adult, Silver Gulls are potentially long-lived, surviving for perhaps 14-18 years. A number of pulli banded in the season have now returned to the natal colony as breeding birds whilst evidently a few have been recruited to other sites.

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#### Acknowledgements

David Montague collected much of the data on Little Penguins and Lexie Nicholls provided unpublished information on Carnac seabirds. We gratefully acknowledge the co-operation of David Purchase, CSIRO Australian Bird-banding Scheme, and the W.A. Department of Fisheries and Wildlife.

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