SEABIRD ISLANDS No. 188

Penguin Island, Shoalwater Bay, Western Australia

Location: 32°17′S., 115°41′E.; a coastal limestone island situated 42 kilometres south-west of Perth, W.A., and 600 metres west of Mersey Point in Shoalwater Bay, Shire of Rockingham.

Status: An A-class Reserve (A17070) managed as a National Park (i.e., for public recreation and conservation) by the Department of Conservation and Land Management. Until recently about two-thirds of the area was leased to a resort operator, Penguin Island Pty Ltd.

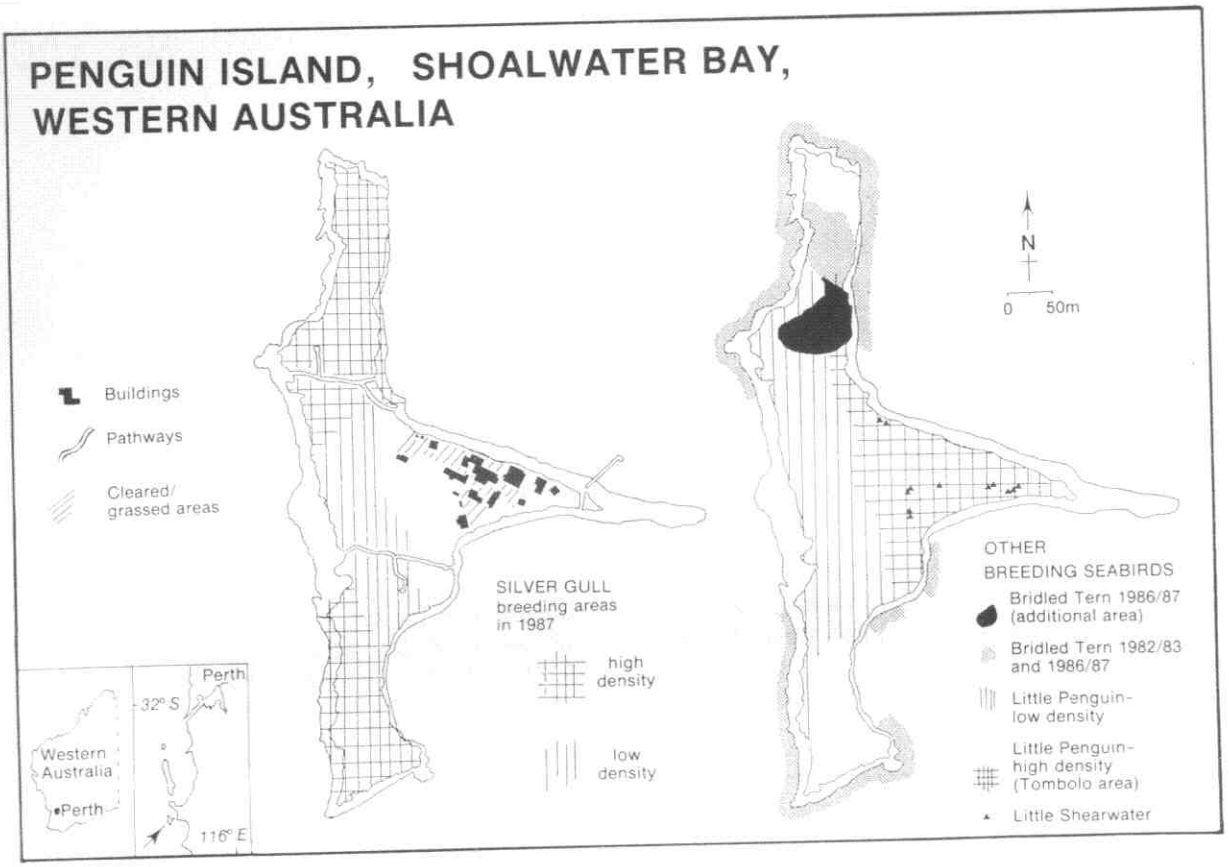
Description: 12.5 ha; 800 m × 360 m; maximum elevation 20 m. The largest in a linear chain of islands and rocks of aeolianite limestone, the remnants of a former dune ridge, Penguin Island is an elongate island oriented north-south and parallel to the coastline. On the sheltered eastern side, a tombolo reaches towards Mersey Point on the adjacent mainland shoreline. The sand bar which connects these features can be waded across during much of the year and is totally exposed by the spring low tides. The northern and southern ends of the island are limestone plateaux reaching 10 m above sea level and overlain by a thin layer of sand. The bounding limestone cliffs are undercut beneath the travertinized lip of the plateaux and erosion has produced slopes of talus and scree.

On the plateau surfaces the vegetation consists of mats of *Carpobrotus virescens* and *Frankenia paucifolia* on the exposed western side (northern plateau) or of low succulent heath of *Rhagodia baccata* where there is sufficient soil depth. The coprophilous shrubs *Lavatera* spp. occur in patches within the dense gull colonies. Winter annuals such as *Senecio lautus* and a range of exotic herbs and grasses occupy scalded open areas. The talus slopes are dominated by Nitre Bush *Nitraria billardierei* and the trailing succulent *Threlkeldia diffusa*.

Deep sand dunes reaching 20 m in height occupy the central section of the island. Their relatively stable eastern slopes are vegetated with low thickets of Dune Wattle *Acacia rostellifera*. The dune crests, the much eroded western slopes and the western foredunes are poorly vegetated. Recent rationalization of people movement across the island and rehabilitation efforts have improved the vegetation cover in these areas.

The low-lying deep sands of the tombolo area are vegetated with cushion-like bushes of *Rhagodia baccata* and trailing *Tetragonia decumbens* and *Threlkeldia diffusa*. A large part of this area has, however, been cleared for resort buildings, grassed or otherwise disturbed.

Landing: There is ready boat access to the beaches on the eastern side. A ferry operates from Mersey Point on weekends and during holiday periods except for the winter months. Many people wade across the connecting sandbar.



Ornithological History: The first account of the birds of the islands in Shoalwater Bay was provided by Sedgwick in 1940[4]. During 1940, 1941 and 1942, A. Poignant, E. H. Sedgwick, V. N. Serventy and S. R. White made a number of visits to Penguin Island and the other islands and rocks of Warnbro Sound. The published account by these observers is the only substantial historical record[5].

Research conducted by Murdoch University into the biology of seabirds on the islands near Fremantle began in 1977 and included visits to Penguin Island from 1979 onwards. The breeding biology of Crested Terns and Silver Gulls was studied by J. N. Dunlop between 1978 and 1984[2]. In 1982, D. Montague investigated the vocal behaviour of Little Penguins on the island, and in 1982/83 S. Soans examined the diurnal and seasonal activity patterns of Silver Gulls. The breeding biology and foraging ecology of Little Penguins was studied by N. I. Klomp in 1986/87. Bridled Terns were banded in the 1982/83, 1986/87 and 1987/88 breeding seasons (see Banding).

Breeding Seabirds and Status

Eudyptula minor Little Penguin — On Penguin Island, Little Penguins do not excavate burrows but nest under low, dense bushes of *Tetragonia decumbens* and *Rhagodia baccata*, as well as under buildings and in limestone crevices. Most of the island contains penguin nest-sites, the highest density occurring in the tombolo area (see map). Laying begins in April and continues until October or November. The main peak of egg-laying in June is followed by a smaller peak in September resulting from later breeding, egg-replacement and double-brooding in some pairs. Chicks can be seen on the island from late June to December.

• *Talus slopes on the north-eastern side of Penguin Island. Little Penguins, Silver Gulls and Bridled Terns nest in this area.*

Photo: N. I. Klomp

Little Penguins return to the island in December and January to moult, a process which takes 2-3 weeks and must be completed on land. Many birds return to moult in, or close to, their nesting burrows.

Based on monthly retrap rates of marked individuals in 1986/87 (overall mean retrap rate = 53%) the number of Little Penguins frequenting the tombolo area on Penguin Island in the 1986 breeding season was estimated to be 600-650 adults. Incidental observations from other parts of the island suggested that the breeding population during this period was about 1 000 birds.

Puffinus assimilis Little Shearwater — First discovered breeding on Penguin Island by D. Montague in 1982. It is not known how long this colony of 10-20 pairs has been established, but it is possible that these birds are descendants of a group which disappeared from Rottnest Island in the 1930's. It is more likely, however, that these birds were overlooked in the past. The island was only visited at night by ornithologists in September 1940 and May 1942[5]. Little Shearwater burrows are scattered throughout the tombolo area of the island (see map), their entrances generally concealed by *Tetragonia decumbens* or *Rhagodia baccata* bushes.

Pairs have been observed excavating burrows in February. They are most vocal at night from March to May in what is, presumably, the pre-laying period. As yet there are no breeding data, but elsewhere in south-western Australia laying takes place in June or July[6]. Several nights of renewed calling in August may indicate adults changing over on newly-hatched chicks. Nests on Penguin Island are vacated only briefly during summer.

Larus novaehollandiae Silver Gull — Nesting over the northern and southern plateaux, talus slopes and western sand dune (see map). Laying usually begins in late March or early April with a pronounced peak in fledglings in early June. Breeding continues until November, the majority of pairs participating throughout the season. Individual pairs may lay a series of clutches in response to heavy losses or, if successful early in the season, may rear two broods[7]. The primary moult begins in October whilst some gulls are still incubating but laying ceases shortly thereafter. Many of the breeding gulls roost on the island during the summer months.

From 1940 to 1942 there were apparently no Silver Gulls nesting on Penguin Island. There were small colonies on nearby Shag and Bird Islands and on the rocks in Warnbro Sound, but the overall breeding population was probably no more than 200 pairs. Gulls were breeding on Seal Island in the 1960's (Julian Ford, pers. comm.) and had probably also colonized Penguin Island by this time. Today an estimated 2 500 to 3 000 pairs nest on Penguin Island alone with perhaps 4 000 pairs overall in Shoalwater Bay.

Hydroprogne caspia Caspian Tern — A nest was recorded on the sandspit in the early 1940's[5] but the species does not currently nest on the island. The nearest colonies are on nearby Seal and Bird Islands.

Sterna anaethetus Bridled Tern — A migratory, spring and summer nester using the cliffs and talus slopes at the northern and southern ends of the island and part of the northern plateau (see map). The nest scrapes are concealed in crevices, on ledges, or under slabs of limestone or low bushes.

Although sometimes heard over the island at night in September these terns are not observed in daylight until early October. Initially, they settle in the colony areas at night but, by the middle of October, many are present on their nesting territories until mid-morning, returning again at dusk. The first eggs are laid in early November. Laying, including the replacement of lost eggs, continues into January. Towards the end of February a proportion of the breeding adults begin a post-nuptial moult. The exodus of adults and fledglings takes place in the first or second week of April. A northward, mass movement of Bridled Terns has been observed from nearby Carnac Island at this time.

In the period 1940-42 no Bridled Terns were recorded breeding on Penguin Island, although there were colonies on the smaller Shag and Bird Islands in Shoalwater Bay[5]. W. B. Alexander gave these islands as the southern limit of the Bridled Tern's distribution in 1920[6]. Since that time its numbers in the Shoalwater Bay area have apparently increased, with the occupation of Penguin and Seal Islands and the rocks of Cape Peron. The area occupied by the study colony on the northern plateau of Penguin Island has expanded visibly since banding started in the 1982/83 season (see map). The population of this area, including the talus slopes, was estimated from mark-recapture data in the 1986/87 season as 848 pairs. Overall, the numbers on Penguin Island probably exceed 1 000 pairs.

Factors Affecting Status

King's Skinks *Egernia kingii* probably take deserted eggs of Little Penguins, Silver Gulls and Bridled Terns. A Marsh Harrier *Circus aeruginosus* and a Little Eagle *Hieraaetus morphnoides* regularly visit the island and probably take many Silver Gulls. Two Barn Owls *Tyto alba* were present on the island for several days in 1986 and were probably responsible for the death of a Little Shearwater recorded during that period.

Human disturbance, however, is the most important factor affecting the status of breeding populations of seabirds on Penguin Island. The island is within the Perth metropolitan area and is easily accessible. On weekends during the summer, it is not uncommon for more than 1 000 people to visit the island in one day. Most visitors to the island restrict their activities to the beaches and paths, but direct human interference into the seabird colonies occurs regularly.

The recovery of the three Little Penguins within one day during August 1986 probably resulted from ingestion of oil after an oil-spill. The Little Penguins also generally take the same fish species as the local bait fishermen in Warnbro and Cockburn Sounds (Klomp, in prep.). Hence, marine pollution and depletion of fish stocks are potential threats to the seabird populations on the island. Resort development and dune erosion, both resulting in loss of breeding habitat, also affect the seabird populations but these factors are currently being controlled or reduced.

OTHER VERTEBRATES

House Mice *Mus musculus* were introduced to Penguin Island around 1920[5] and are now common. Australian Sea-lions *Neophoca cinerea* land on the island from time to time. The population of King's Skinks *Egernia kingii* is estimated at 1 000-1 500 individuals (P. Arena, pers. comm.). Other skinks recorded on the island are *Ctenotus lesueurii*, *Morethia lineoocellata* and *Hemiergis peronii*, as well as Marbled Geckos *Phyllodactylus marmoratus*. A juvenile Hawksbill Turtle *Eretmochelys imbricata* was recorded on the western side of the island in 1982.

Other Seabirds Recorded

Pelecanus conspicillatus — Australian Pelican
Phalacrocorax carbo — Great Cormorant
Phalacrocorax varius — Pied Cormorant

Roosts on Penguin Island. Between February and July 400-500 pairs nest on Shag Rock 600 m north of the island.

Phalacrocorax sulcirostris — Little Black Cormorant
Phalacrocorax melanoleucos — Little Pied Cormorant
Ardea novaehollandiae — White-faced Heron
Egretta sacra — Eastern Reef Egret
Haematopus longirostris — Pied Oystercatcher
Haematopus fuliginosus — Sooty Oystercatcher
Sterna dougallii — Roseate Tern

Roosts and displays on the sandspit between February and June. Like the Bridled Tern, this migratory species is extending its breeding range southwards along the west coast[2]. In the Fremantle area it was first recorded nesting on Second Rock, 600 m south of Penguin Island, in 1982.

Sterna nereis — Fairy Tern

Roosts and displays on the sandspit between September and April. Another migratory tern, its nearest current nesting station is a sandbank in Safety Bay, 2.1 km ESE of Penguin Island.

• *The northern plateau of Penguin Island looking north-north-east towards Shag Rocks and Point Peron. Silver Gulls and Bridled Terns nest of this plateau.*

Photo: N. I. Klomp

Sterna bergii Crested Tern

The Penguin Island sandspit is a "club" site used by displaying, pre-nesting and eclipse (non-breeding) Crested Terns from a population breeding in the Fremantle area[3]. Colour-banded autumn- and spring-breeding individuals roost and display at the site[3]. Spring-nesting terns breed on Seal Island, 1.1 km north of Penguin Island[1]. Suitable nesting habitat is available on Penguin Island and the species may well have bred there in the past.

Banding

Eudyptula minor Little Penguin — 143 adults* and 30 young† banded in 1980-83; 376 adults* and 78 young† banded in 1986; 54 adults* and 72 young† banded in 1987. Total banded 753. Thirteen penguins retrapped in 1986-87 were at least six years old and another was known to be at least eight years old. Only 3% of marked adults in 1986 were recovered dead but the disappearance rate of adult birds after banding was 30%; presumably actual adult mortality lies between these values. Three marked individuals have been recovered more than 200 km south of Penguin Island, the timing suggesting that Little Penguins may disperse during their brief non-breeding period. During the breeding season Little Penguins apparently do not forage over large distances as all recoveries are from Warnbro and Cockburn Sounds. No data are available on the dispersal of juvenile birds.

Larus novaehollandiae Silver Gull — 67 adults* and 135 young† banded in 1983; 88 young banded in 1986; 11 adults* and 229 young† banded in 1987. Total banded 530. Thirty-one Silver Gulls, all banded as *pulli* on Penguin Island, have been found dead between 1982 and 1986. Most

**includes immature birds.*

†*includes* pulli *and fledglings.*

recoveries were on, or within 10 km of, the island, but four birds were recovered 100-150 km south of Penguin Island.

Sterna anaethetus Bridled Tern — 61 adults* and 19 young† banded in 1982/83; 178 adults* and 55 young† banded in 1986/87; 331 adults* and 134 young† banded in 1987/88. Total banded 778. Four of the 19 Bridled Terns, banded as young in the 1982/83 season were recovered as breeding adults in the same colony area in 1986/87. These results suggest that most Bridled Terns from this population begin breeding in their fourth year or earlier and have strong affinity for their natal colony. Eight of the 61 breeding adults banded in 1982/83 were recovered from the same area in 1986/87 and 1987/88.

Some breeding adults on Penguin Island have been recorded on the same nest-sites, and with the same mates, in successive seasons.

Sterna nereis Fairy Tern — 8 adults banded in 1982.

Sterna bergii Crested Tern — 15 adults banded in 1982.

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