

THE DISTRIBUTION AND BREEDING OF THE LITTLE PENGUIN ON BOWEN ISLAND, JERVIS BAY

MARK LINTERMANS

A.C.T. Parks and Conservation Service, P.O. Box 158, Canberra, A.C.T. 2601.

Received 20 May, 1988

INTRODUCTION

Bowen Island is a small island of some 50 ha located at the entrance to Jervis Bay in southern New South Wales. It is a reserved area under the A.C.T. Nature Conservation Ordinance, and public access is restricted. A portion of the island is developed for holiday accommodation and until recently was privately leased. The island is composed of sandstone, covered to varying depth by wind blown sand, with precipitous cliffs 25–30 m high on the northern, southern and eastern sides. A more comprehensive description of the island and its vegetation is given in Lane (1976) and Ingwersen (1976).

There are few records of the birds of Bowen Island. Hull (1922) recorded that it was 'formerly the haunt of the Wedge-tailed Shearwater' but when he visited the island found 'nothing worth recording'. Lane (1975) visited the island in April 1975 and in the course of several hours recorded three species of shearwater and the Little Penguin *Eudyptula minor* breeding there. Lintermans (1988) reported two species of shearwater breeding on the island.

This report presents details of daytime visits to Bowen Island by two members of the staff of the A.C.T. Parks and Conservation Service on 9–10 June and three on 26 November 1982.

METHODS

In June 1982 the island (Fig. 1) was inspected to determine the distribution of the breeding colonies of *E. minor*. A 10 m × 10 m area of penguin colony about 200 m south of the jetty was marked and all penguin nest sites within the quadrat were counted. The extent of the colonies was mapped with the aid of airphoto and vegetation map interpretation as well as by ground searching (Fig. 1).

A second inspection was made during the peak penguin breeding time in November 1982 to determine the number of nest sites which were occupied. Three 10 m × 10 m areas of penguin colony were sampled. The number of quadrats was limited to avoid trampling and possible collapse of nesting burrows. The first sample area was a re-examination of the quadrat surveyed in June 1982. The second was located about 40 m south of the first, and the third was on the north-eastern tip of the island (Fig. 1). The vegetation of all three quadrats consisted almost totally of Matrush *Lomandra longifolia*. Further random searching was carried out in areas where *L. longifolia* was not present. A nest was considered occupied when adult birds, chicks or eggs were present. Shearwater burrows were also scattered throughout the penguin colony but could be readily distinguished from penguin nest sites on the basis of their flatter, more oval entrances and greater depth.

RESULTS

During the June inspection, 27 nest sites were recorded in the 0.01 ha quadrat and the total area of penguin colonies was estimated to be 2.93 ha. Assuming the recorded density of nest sites of 27 per 0.01 ha to be relatively constant, it was estimated from this limited sampling that 7 900 nest sites were present in the mapped colonies, with a further 1 000 nest sites scattered outside.

The November inspection recorded four occupied nests in Quadrat 1, six occupied nests in Quadrat 2 and four occupied nests in Quadrat 3. Assuming a constant density of occupied nests of 5 per 0.01 ha in the southern area and 4 per 0.01 ha in the northern area, the estimated number of occupied nests of penguins in the mapped colonies was 1 300 with a further 200 occupied nests scattered outside.

DISCUSSION

The estimate of 1 500 occupied nests on the island must be considered as an approximate figure only and cannot be regarded as an estimate of the total number of breeding pairs on Bowen Island. *E. minor* has an extended breeding season from July through to March with some pairs breeding more than once a season; hence the conversion of numbers of burrows to numbers of breeding pairs is unreliable in this species. However, it is reasonable to assume that at least 1 500 breeding pairs utilize the island which represents a significant increase over the 1 000 pairs estimated by Lane (1976).

It is of interest to note that the distribution of *E. minor* on Bowen Island has changed noticeably since Lane (1976) mapped the island colonies. He recorded a substantial area of penguin colony on the western side of the island, north of the jetty. The present distribution (Fig. 1) shows that only scattered nest sites are found in this area (generally in rock crevices), with the major concentration of nest sites being south of the jetty.

The reasons behind the shift are unclear. One factor which is suspected of affecting penguins at other sites is the presence of Kikuyu grass *Penioxetum clandestinum*. An extensive lawn of Kikuyu has become established in the area indicated by Lane (1976) as being prime breeding habitat. This is part of the formerly leased holiday development. Kikuyu is considered a serious pest species at the Phillip Island Penguin Reserve in Victoria and efforts are being made to remove it (P. Dann, pers. comm.). The effect of Kikuyu on *E. minor* is unclear, but it is likely that the thick mat of horizontal leaves and stems which this plant develops would make it extremely difficult for birds to penetrate to establish burrows. Lane (1978) recorded shearwater deaths at burrow entrances where birds had become entangled in Kikuyu. Priority has been given to eliminating Kikuyu on Lord Howe Island, where it is impeding burrowing in the main muttonbird rookery (New South Wales National Parks and Wildlife Service 1986).

The density of occupied nest sites at Bowen Island appears to be higher than reported at other colonies (Table 1). The densities in Table 1 have been extracted from the literature and show minimum and maximum densities where available,

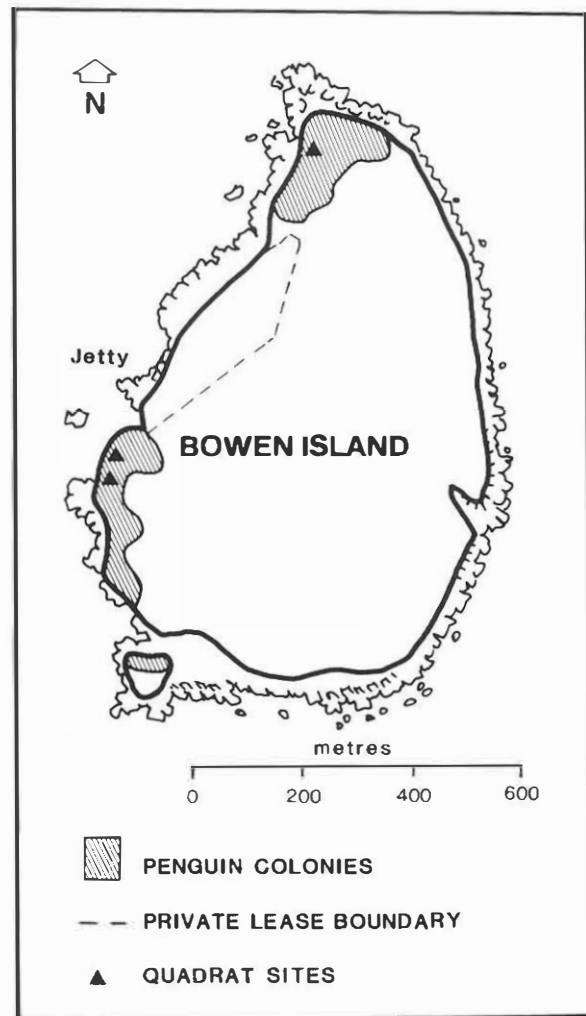


Figure 1. The location of penguin colonies on Bowen Island showing quadrat sites and lease boundaries.

otherwise average densities have been shown. The densities shown are generally based on a single season's observations, consequently the level of annual variation is unknown. The data from Dann (pers. comm.) have been collected over a number of years, but the colony at Summerland Reserve appears to be in steady decline. The higher density on Bowen Island becomes even more apparent when it is realized that other authors have scored burrows with accumulations of droppings or signs of recent

TABLE 1
Breeding densities of *Eudyptula minor* at colonies in Eastern Australia.

Site	Density (occupied nests/0.01 ha)	Source
Point Sambell-Point Grant (Phillip Island)	0.7	Harris and Bode (1981)
Point Grant and eastwards to Summerland (Phillip Island)	2-3	Harris and Bode (1981)
Summerland Reserve (Phillip Island)	0.7-1.4	Harris and Bode (1981)
Summerland Reserve (Phillip Island)	2.7-4.0	Dann (pers. comm.)
Cat Island	Nests seldom less than 10 yds from each other	Warham (1958)
Phillip Island	3.3	Reilly and Balmford (1975)
Bowen Island	4.5-5.0	This paper

digging as being occupied, whereas on Bowen Island only nest sites with birds, chicks or eggs were counted.

Factors which affect the distribution and density of nesting sites on the island are the size and position of the holiday development. The formerly leased area covers about 4.5 ha and is situated on the mid-western shoreline of the island (Fig. 1). The garden, lawn areas and accommodation developments occupy a significant proportion of the available land suitable for penguin nesting and effectively divide the two major colonies. In 1985 the holiday lease expired, and Bowen Island was gazetted under the Nature Conservation Ordinance as part of the Jervis Bay Nature Reserve. However, under a permissive occupancy, vacant possession was not available until March 1989. It is hoped that restoration of the leased land to more natural vegetation will encourage the penguin colony to expand and ensure its future.

ACKNOWLEDGEMENTS

I thank Dr M. Braysher and Mr P. Ormay for encouragement and assistance in the field. Dr K. Williams commented on the manuscript and Ms T. Woolcott prepared the Figure.

REFERENCES

- Hull, A. F. B. (1922). The islands of New South Wales and their birds. *Aust. Mus. Mag.* 1: 139-146.
- Harris, M. P. and Bode, K. G. (1981). Populations of Little Penguin, Short-tailed Shearwaters and other seabirds on Phillip Island, Victoria, 1978. *Emu* 81: 20-28.
- Ingwersen, F. (1976). Vegetation of Jervis Bay Territory. Department of the Capital Territory, Conservation Series No. 3. Australian Government Publishing Services, Canberra.
- Lane, S. G. (1975). Breeding shearwaters on Bowen Island, Jervis Bay, New South Wales. *Aust. Birds.* 9: 100.
- Lane, S. G. (1976). Seabird Islands No. 24. Bowen Island, Jervis Bay, New South Wales. *Aust. Bird Bander.* 14: 24-26.
- Lane, S. G. (1978). Shearwater hazard on breeding island. *Corella* 2: 58.
- Lintermans, M. (1988). Shearwaters breeding on Bowen Island, Jervis Bay Territory. *Corella* 12: 122-124.
- New South Wales National Parks and Wildlife Service (1986). Lord Howe Island Permanent Park Preserve. Plan of Management.
- Reilly, P. N. and Balmford, P. (1975). A breeding study of the Little Penguin *Eudyptula minor* in Australia. In *The Biology of Penguins*, Ed. by Stonehouse, B. London, MacMillan, pp. 161-167.
- Warham, J. (1958). The nesting of the Little Penguin *Eudyptula minor*. *Ibis* 100: 605-616.