

I. INTRODUCTION AND DESCRIPTION OF COCKLESHELL GULLY RESERVE

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Cockleshell Gully Reserve (Reserve No. 15018) is in the Jurien Bay district, approximately 230 km north of Perth, Western Australia. It has an area of 18312 ha and extends 22 km from the Gairdner Range near Mt Lesueur to the coast near Green Head. It was gazetted for horse breeding in 1913 and this status is still current. Three physiographic units are present within the Reserve, a circumstance which greatly enhances its potential as a wildlife sanctuary. It was examined by a sub-committee of the Reserves Advisory Council on 12 May 1965 which recommended that it be incorporated with other blocks as an A Class reserve vested in the Western Australian Wildlife Authority. The Conservation Through Reserves Committee included it within System Five, Northern Sandheaths (Anon., 1974).

Three other nature reserves are contiguous with Cockleshell Gully Reserve. One (No. 24496 of 71,498 ha) incorporates an unnamed saltlake and wetland complex, herein referred to as Lake Leeman, which extends parallel to the coast east of Leeman. Another small reserve (No. 24275 of 789 ha) incorporates Mt Lesueur and is used by the University of Western Australia for educational purposes. Drovers Cave National Park (No. 31302 of 2,680 ha) joins the south boundary of Cockleshell Gully Reserve. The relative positions of these reserves are indicated in Fig. 1.

The Jurien Bay district is of considerable interest because it is close to the northern boundary of the western coastal limestone with its characteristic vegetation and cave systems. These caves are of scientific interest and some palaeobiological research has been done; for example Lundelius (1960) and Archer and Baynes (1973). Cockleshell Gully is also near the northern limit of some plant distributions, e.g. Marri (*Eucalyptus calophylla*), Tuart (*E. gomphocephala*) and *Bossiaea eriocarpa*. The lateritic mesas of the Gairdner Range including Mt Lesueur and Mt Peron carry a distinctive flora with a high degree of endemism (Gardner 1947). The district is also of botanical interest because it is close to the intersection of the Stirling, Avon and Irwin botanical districts of Gardner and Bennetts (1956).

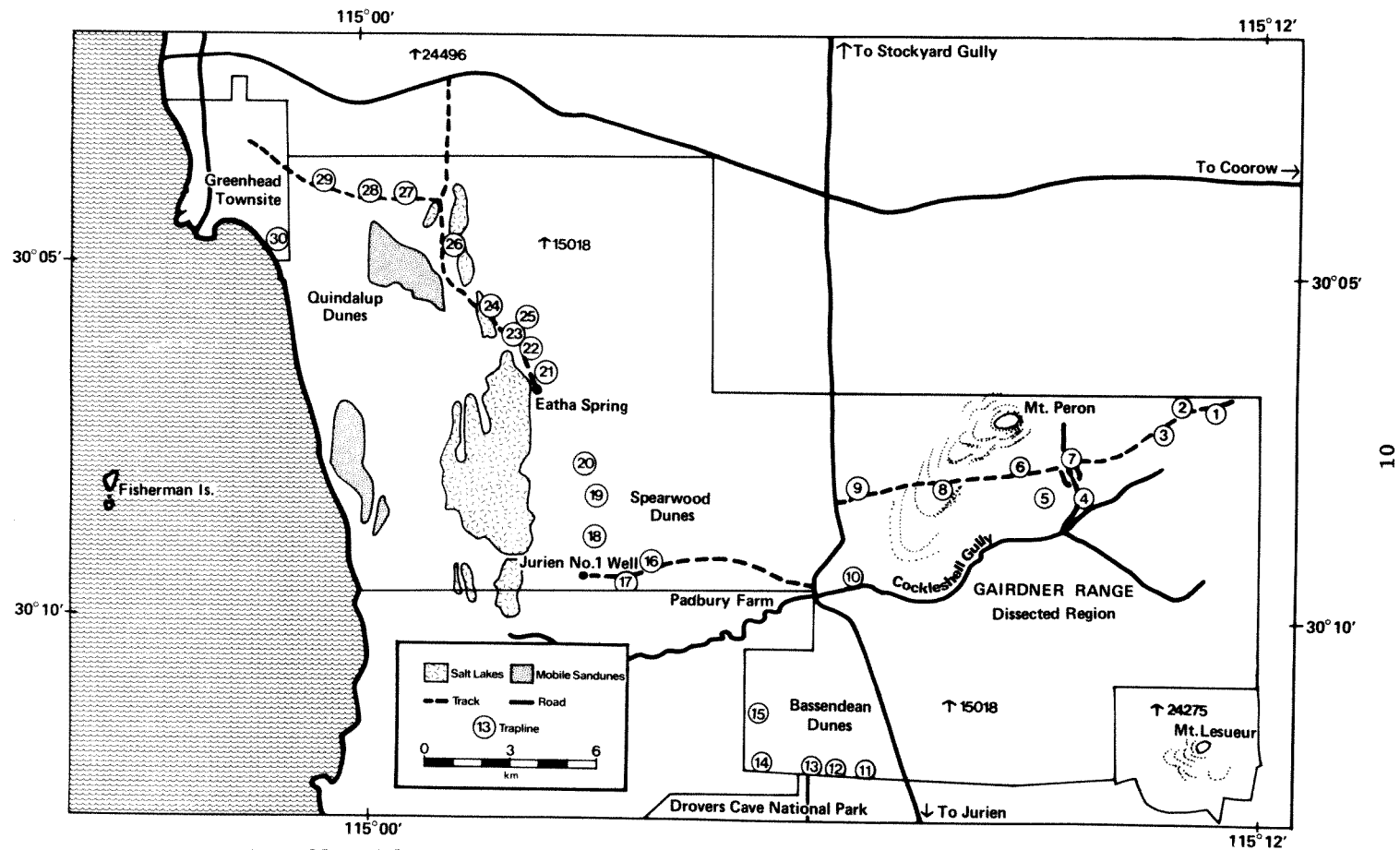


Fig. 1. Map of Cockleshell Gully Reserve showing position of traplines, roads and tracks and major physiographic features. Terminology after McArthur & Bettenay, (1960).

The Western Australian Museum undertook a vertebrate survey of Cockleshell Gully Reserve to supplement work currently being done in the wheat-belt (see Kitchener, 1976) because many vertebrate species are common to both areas. Furthermore the Department of Fisheries and Wildlife was interested in obtaining information to make a case for changing the purpose of the Reserve to conservation of flora and fauna.

Between 22 October and 11 November 1973, D.J. Kitchener, A. Chapman, J. Dell and J. Henry examined the Reserve. A repeat survey was undertaken between 12-29 May 1974 by A. Chapman, D.J. Kitchener, J. Dell, R. Stannard and A. Page. These surveys were organized so that approximately six days were spent each season working from three different campsites situated to allow convenient access to main physiographic and vegetational types within the Reserve.

This report comprises three separate papers on the mammals, birds, reptiles and frogs of the Reserve. The bird and mammal papers also include data on sea birds and the Australian Sea Lion, *Neophoca cinerea*. These were gathered by R.E. Johnstone from the Fisherman Islands ca 10 km south of Green Head at 30°08'S, 114°57'E.

Physiography and vegetation

The geology of the district including Cockleshell Gully Reserve has been described by Lowry (1974). The area incorporates three distinct physiographic units which trend north-south within the Swan Coastal Plain. These are the Coastal Belt, the Bassendean Dune System, and the Dissected Region. These are indicated in Fig. 1, and are briefly described below.

The Coastal Belt

The western boundary of the Reserve includes ca 8 km of coastline with narrow sandy beaches and unconsolidated dunes extending to high water mark. Extending inland are two Quaternary dune systems named by McArthur & Bettenay (1960) the Quindalup Dune System of fixed and mobile dunes and the Spearwood System of dunes lithified to limestone. The Quindalup Dune System is collectively referred to as the Safety Bay Sands by Lowry (1974). The dune vegetation is similar to that described by Smith (1973); see also descriptions of traplines 27-30 in Appendix III. There are large areas of mobile dunes on the Coastal Belt with small seasonal freshwater lakes within the dune system. Some of these lakes are without associated vegetation but others have sedges at their margins. A prominent feature of the Coastal Belt is a narrow chain of salt lakes which are lagoonal deposits of clay, silt and marl. The salt lake margins exhibit a characteristic vegetation transition with samphire, *Arthrocnemum halocnemoides*, or reeds; *Juncus maritimus*, bordering low woodland of *Casuarina obesa*, see descrip-

tions of traplines 21-26. Eatha Spring is a permanent upwelling of fresh to brackish water on the eastern side of one lake. It is used as source of water for stock.

The Bassendean Dunes

This unit is only represented by a small area on the reserve, mainly to the south of Cockleshell Gully. It consists of leached Pleistocene dunes of subdued topography. Low woodlands and scrub with *Banksia menziesii* and *B. attenuata* are present, see descriptions of traplines 11,12. interdunal swamps are also present with *Melaleuca parviflora* trees over dense sedges.

The Dissected Region

This unit, occupying the eastern half of the Reserve, consists of hills of lateritised Mesozoic strata of the Gairdner Range. Mounts Lesueur and Peron are the highest points, the former being 342 m above sea level. The topography is influenced by hard laterite which overlies soft, weathered sedimentary rocks. On the western margin there are large patches of sandplain with colluvial quartz sand overlying laterite. These sands are derived from the weathering of sedimentary rocks in the Gairdner Range. The vegetation is typically heath and shrubland. Prominent species are *Conospermum triplinervium*, *Adenanthos cygnorum* and dwarf *Banksia menziesii* and *B. attenuata*, see descriptions of traplines 5, 9. The pediment vegetation is quite varied, see descriptions of traplines 2, 3, 6, 8. Wandoo, *Eucalyptus wandoo* and Powderbark Wandoo, *E. accedens* woodland is present over some of the Dissected Region. Marri, *Eucalyptus calophylla* and Flooded Gum, *E. rudis* trees are present, the latter restricted to the Cockleshell Gully drainage.

The Fisherman Islands, which although not part of Cockleshell Gully Reserve, are included in this report. Johnstone (in press) records that they consists of two small low-lying aeolian limestone islets, typical of many on the Jurien Bay coast. North Fisherman Island, the larger, is 1.5 ha in area, with dimensions 110 m by 104 m. Vegetation is dominated by *Nitraria schoberi* with *Myoporum insulare*, *Atriplex cinerea* and *Spinifex longifolius* also present. There is a broad sandy beach, otherwise low steep cliffs surround the island, which is joined to the smaller South Fisherman Island by some 280 m of submerged limestone reef. The Fisherman Islands constitute Reserve No. 29256 for the conservation of fauna, vested in the Western Australian Wildlife Authority.

Climate

Climatic data for the district are limited because there are few recording stations, and these only record rainfall. At Jurien, on the coast ca 18 km

south of the Reserve the annual average rainfall is 541 mm, and annual median 604 mm (records for 1960-1975). At Padbury Farm situated on Cockleshell Gully, very close to the centre of the Reserve, the annual average rainfall is 622 mm, and annual median 599 mm (records for 1951-1974). Thus there is an inland increase in rainfall which probably reaches its maximum in the Gairdner Range due to the uplift of moisture laden air. For the district generally, most rain falls during the months May to August. Summers are hot and dry. Table 1 indicates monthly rainfall for Padbury Farm. Of particular interest are the above average rainfalls for winter 1973 and May 1974, which may have affected some aspects of the fauna of the Reserve.

Table 1. Monthly rainfall (mm) for Padbury Farm, Cockleshell Gully

| | Average* | 1972+ | 1973+ | 1974* |
|-----------|----------|-------|-------|---------|
| January | 6 | — | — | 0.1-0.4 |
| February | 10 | — | — | 0 |
| March | 12 | — | — | 20 |
| April | 35 | 16 | 49 | 45 |
| May | 105 | 46 | 85 | 250 |
| June | 146 | 155 | 116 | 130 |
| July | 130 | 109 | 221 | 186 |
| August | 88 | 158 | 95 | 92 |
| September | 39 | 22 | 96 | 23 |
| October | 36 | 38 | 18 | 45 |
| November | 10 | 4 | 13 | — |
| December | 5 | — | — | — |

+ Data from Mrs F.A. Grigson, Padbury Farm, pers. comm.

* Data from Commonwealth Bureau of Meteorology.

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