

## ABSTRACT

The Boorabbin-Southern Cross Study Area lies between 31° and 32° South, and 119°00' and 121°30' East and covers an area of 27,780 km<sup>2</sup>. It has an arid climate with cool winters, hot summers and irregular, mainly winter rainfall.

Six landform units are recognized in the Study Area. The most extensive are the Sandplains, fringed by small areas of Breakaways in some places. Broad Valleys are also widespread throughout, and include extensive tracts of Salt Lake Features as well as numerous isolated Granite Exposures. Undulating Plains are significant only in the north-eastern and north-western corners of the Study Area.

The entire Study Area is situated south of the mulga-eucalypt line, in the South-western Phytoecographic Interzone (Coolgardie Phytoecographic District). Low woodlands of *Eucalyptus* species dominate the Broad Valleys, Undulating Plains and Breakaways. Mallees and Tall Shrublands dominate Sandplains, the aprons around Granite Exposures, and aeolian surfaces of Salt Lake Features. *Halosarcia* Low Shrublands occur on saline alluvia of Salt Lake Features.

The known vascular flora comprises 8 species of ferns, 3 gymnosperms and 1073 taxa of flowering plants, including 386 from Boorabbin National Park and 309 from Jilbadgi Nature Reserve. Exhaustive floristic lists for 42 sample sites, representing most of the Study Area's surface lithologies, are included as an appendix. Five species of Declared Rare Flora were recorded within the Study Area.

Vertebrate species were surveyed in three areas. The 5 quadrats sampled in the Jilbadgi survey area, and 3 of the 4 sampled near Boorabbin, represent surface types high in the landscape. The 5 quadrats sampled in the Woolgangie survey area, and the fourth Boorabbin quadrat, represent surfaces lower in the landscape.

A total of 20 native mammal, 54 reptile, 3 frog and 92 bird species were recorded. The known vertebrate fauna of the Study Area is listed, and discussed in terms of the sampling strategy and post-European changes. Ten mammal species are now extinct or very much rarer in the Study Area. It is an interzone fauna, including components of the Eyrean Districts to the north and east, and the Bassian Districts to the south and west. Differences in the foraging behaviour of the 8 bat species are tabulated. Preliminary numerical analyses of the quadrat data reveal a relationship between vertebrate species composition and surface lithology, and that species of passerine birds occur on a greater variety of surfaces than do lizards or small ground-dwelling mammals.

Jilbadgi Nature Reserve and Boorabbin National Park are the only substantial reserves in the Study Area that are vested for nature conservation purposes. The existing reserves in the Study Area do not include representatives of several important landforms and vegetation types.

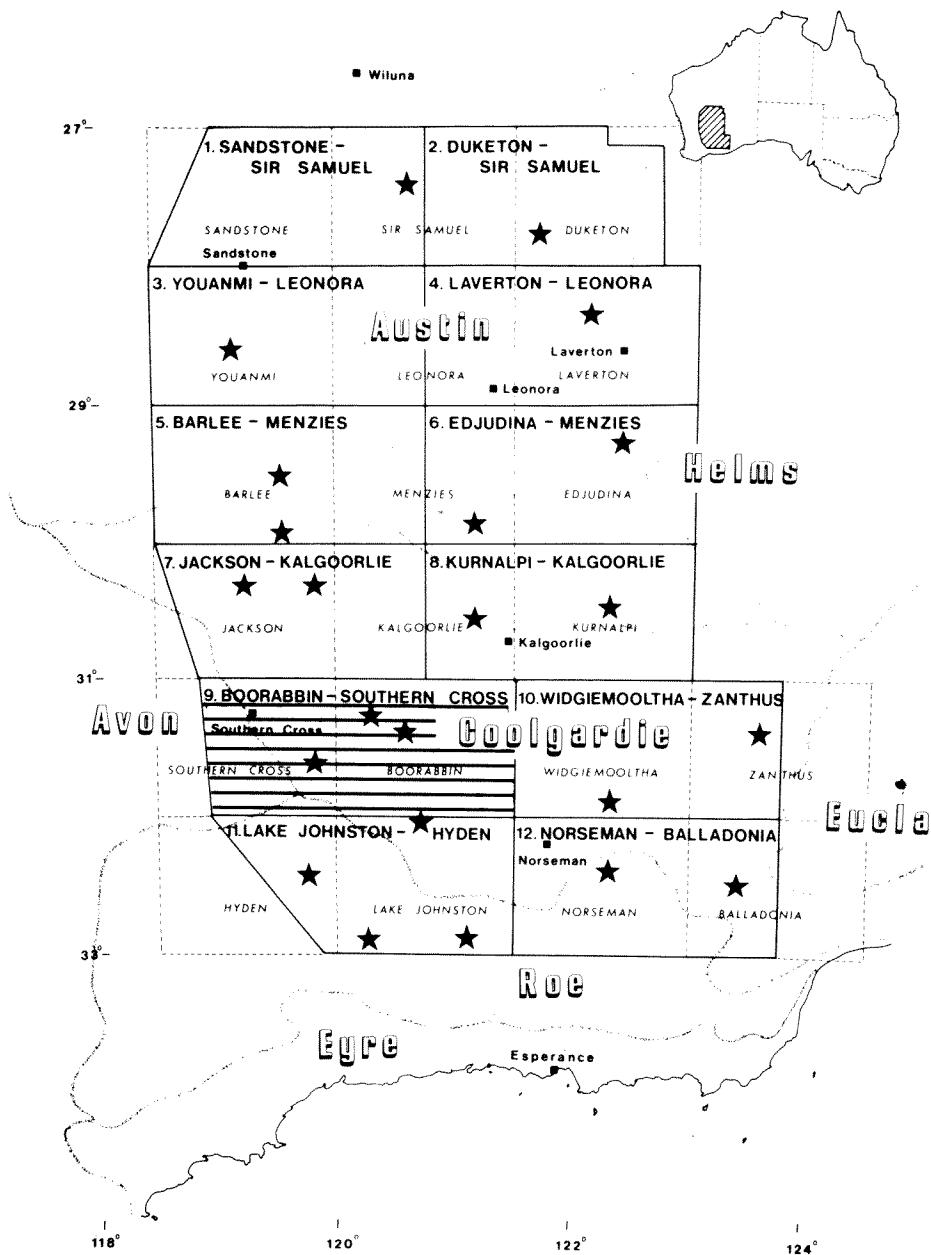
## INTRODUCTION

K.R. Newbey

This report is the eleventh in a series of biological survey reports covering the Eastern Goldfields Region (e.g. Newbey *et al.* 1984, Dell *et al.* 1985, How *et al.* 1988, Dell *et al.* 1988, Dell *et al.* 1992, How *et al.* 1992, McKenzie and Hall 1992, Hall and McKenzie 1993, Hall *et al.* 1994). The philosophies behind the survey, its design and the methods employed are outlined in an earlier report (Biological Surveys Committee of Western Australia 1984).

The region was divided into 12 Study Areas (Figure 1). Herein we document the vegetation, flora and vertebrate fauna recorded during our survey of the Boorabbin-Southern Cross Study Area. This report aims to present data rather than focussing on regional interpretation. The data from all Study Areas will be pooled for analysis, and a quantitative synthesis of patterns in the Eastern Goldfields biota will be published later.

The Boorabbin-Southern Cross Study Area (Figure 1) is almost rectangular in shape, covers



**Figure 1** The extent of the Eastern Goldfields Region, the vegetation districts and the boundaries of the Study Areas included in the biological survey. The shaded portion shows the Boorabbin-Southern Cross Study Area covered by this report.

approximately 27,780 km<sup>2</sup>, and is east of the No. 1 Rabbit Proof Fence. It is covered by two 1:250,000 geological maps: "Boorabbin" (Sofoulis 1963, Hunter 1991) and "Southern Cross" (Gee 1979).

The survey was conducted in three parts. The vegetation and flora was documented by a consultant botanist (K.R. Newbey) and the vertebrate fauna was surveyed by staff from the Wildlife Research Centre. The vertebrate fauna of the Boorabbin National Park was surveyed by the Western Australian Museum with assistance from the National Parks Authority of Western Australia and the Wildlife Research Centre (both are now part of the Department of Conservation and Land Management).

The major botanical survey work was carried out by K.R. Newbey during August and September (1979), July and September (1981), and September (1982). Additional sampling of vegetation sites was conducted by G.J. Keighery in September 1993. Field traverses are shown on Figure 2. The western margin has been largely cleared for agriculture and was sparsely sampled.

Staff from the Wildlife Research Centre sampled the vertebrate fauna in the vicinity of two campsites: Boodarding Rock (31°35'43.5"S, 119°49'19.6"E) near the northern boundary of Jilbadji Nature Reserve; and 25 km south-east of Woolgangie (31°23'16.3"S, 120°33'13.9"E) (Figure 2). Each survey area was visited during February 1980, May 1981 and October 1981. The vertebrate fauna of the Boorabbin survey area (in Boorabbin National Park) was sampled during July 1980 and March 1981.

Within the Study Area, bitumen and all-weather graded roads are confined to the western and northern sections. Elsewhere, access is sparse and consists largely of tracks, some graded periodically. Most tracks are impassible following heavy rain. Loose and dry sand is also a hazard in places.

Messrs B.D. Clarkson, C.E.A. Dempster and C. Harper explored for suitable pastoral areas near present-day Southern Cross during 1861. They are believed to have been the first Europeans to visit the Study Area. Hunt's Track, cut in 1865, provided access roughly along the present Great Eastern Highway. Wells were established at suitable granite rocks to provide water for travellers and their animals.

Gold was discovered near present-day Southern Cross and Coolgardie in 1888 and 1892 respectively. Between 1894 and 1896 the railway line was extended from Merredin to Coolgardie, and the Goldfields Water Scheme was officially opened on 24 January 1903.

Mining has been centred on two greenstone areas: gold at Southern Cross and Marvel Loch, and gold and nickel south of Coolgardie. Most operations have been small, by deep shaft, and their level of activity has varied widely in relation to metal prices. During the 1960s, mineral exploration occurred in the Bremer Range, another greenstone area.

The first pastoral leases, granted about 1900, were north-east of Southern Cross and south of Coolgardie. The first wheat was grown near Southern Cross in 1904, but there were no major land releases for agriculture east of Merredin until 1923. Many farms were abandoned during the Depression of 1929-30, but they were finally brought into production during 1945-50. A second major expansion of farmland occurred during the 1960s.

Second only to clearing for agriculture in altering the natural environment was the cutting of timber for mining and power production. Almost all woodlands within 120 km of Coolgardie were cut over during 1900-38, with a further south-western extension during

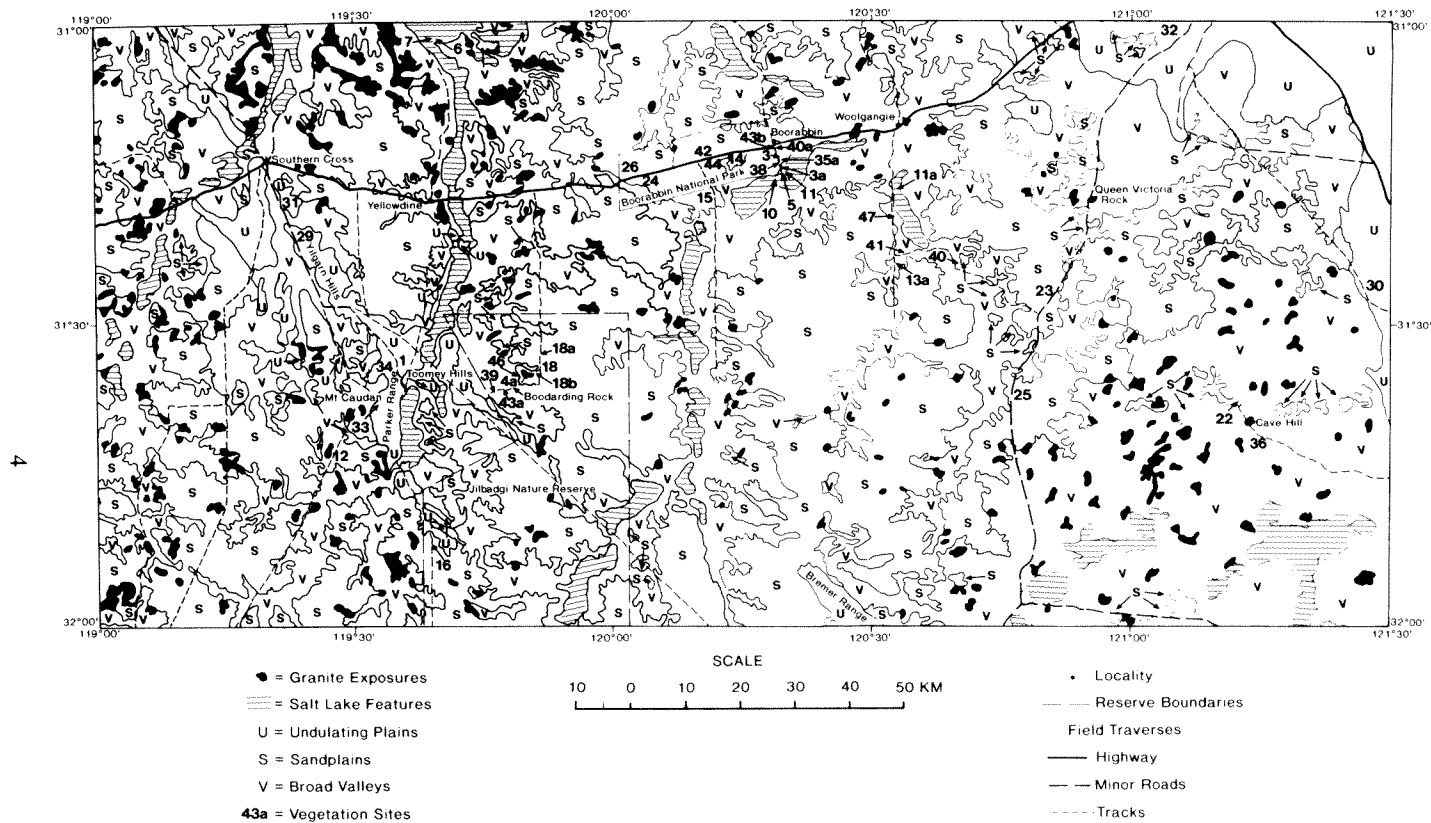


Figure 2 The main landform units of the Boorabin-Southern Cross Study Area. Numbers indicate the vegetation sites described in Appendix 1.

1950-64. Timber was also cut within 70 km of the Great Eastern Highway, mainly for wood-burning stations pumping water from Mundaring Weir to the Goldfields (W. Brennan, pers. comm.).

Mining occurs throughout the Study Area's greenstone belts. There has been a recent increase in mineral exploration and extraction. Most of the original pastoral leases are still in operation although Jaurdi is now vested in the Department of Conservation and Land Management and other leases have been purchased by mining companies. All farmland is being utilised.

There are no indications that pastoral leases will expand as all areas with suitable vegetation and reliable water supplies have been leased. A policy of no further land release for agricultural development was adopted by the Government during the 1980's. However, the Study Area does contain areas identified by an earlier report as "where climate and soils may be suited to agriculture" (RAIC 1979).

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