

## Abstract

The Kurnalpi-Kalgoorlie Study Area is situated in the eastern central part of the Eastern Goldfields region of Western Australia. Rainfall is unreliable in this semi-arid climate with its hot summers and cool winters.

The Study Area consists mainly of undulating plains over greenstone and broad valleys over granite. Sandplains, isolated breakaways, granite exposures and hills, and features associated with salt lakes, punctuate these landforms. Soils vary widely from deep sands to cracking clays. However, a wide range of landforms have hard lime at depth.

The main vegetation is woodland and low woodland transitional between the Southwestern Interzone (dominated by *Eucalyptus*) and the Austin Botanical District (dominated by *Acacia aneura*). There are limited areas of tall shrubland, mallee over hummock grass, and low shrubland. Many vegetation types feature the medium-high tree *Casuarina cristata* although its occurrence varies from very scattered to dominant. A total of 45 vegetation types were recorded from the Study Area.

The known vascular flora consists of three species of ferns, two species of conifers and 486 species of flowering plants. The main phytogeographic significance of the Kurnalpi-Kalgoorlie Study Area lies in the "mulga-eucalypt" line, a boundary between the *Acacia* low woodland with scrub and *Triodia* hummock grass of Eremaean affinities, and the *Eucalyptus* woodland and associated tall shrubland of Southwestern affinities. Although this "line" is a gradient rather than a sharp demarcation, the vegetation in the southern part of the Study Area differs from that in the north. It is believed that climatic factors are mainly responsible and operate partly through their effect on the soil.

Only 10 of the 45 vegetation types recorded in the Study Area were sampled for vertebrates. Twenty native mammal, 3 amphibian, 45 reptile and 97 bird species were recorded during the survey; a total of 34 mammal, 66 reptile and 161 bird species have now been recorded from the Study Area since the time of European settlement. These are a mixture of Eyrean and Bassian species. Results of the vertebrate survey are presented in tabular form, along with some preliminary analyses of the vertebrate assemblage data correlating vertebrate species richness to plant species richness, vegetation structural diversity and surface stratigraphy. The quadrats were also classified in terms of their vertebrate species composition. This analysis revealed the influence of stratigraphy on species composition.

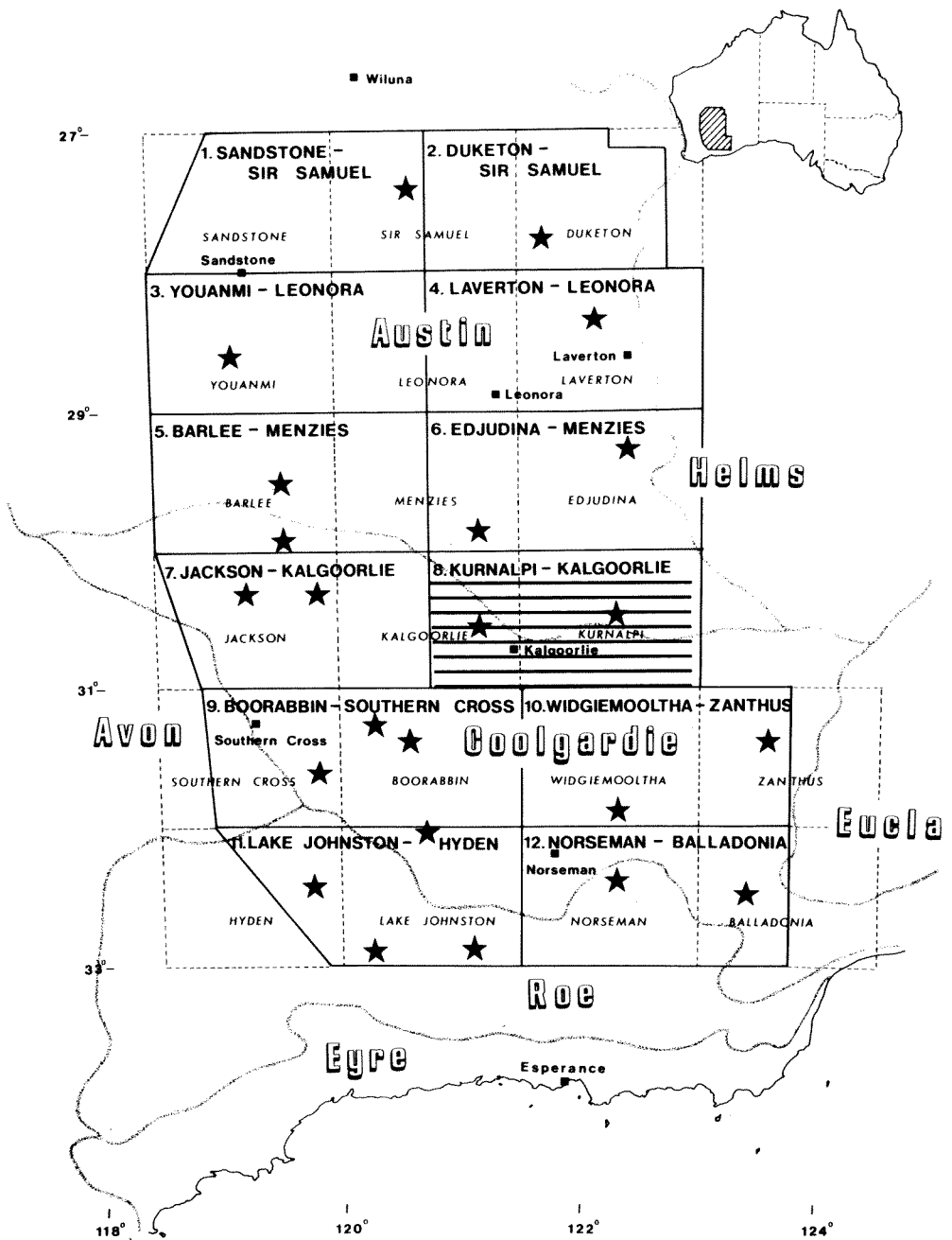
The only extensive conservation reserve in the Kurnalpi-Kalgoorlie Study Area straddles its northern border. This reserve represents only a few of the Study Area's landforms and vegetation types in areas too small to represent its flora and fauna.

## I Introduction

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This report is the eighth 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). 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. Herein we document the flora and vertebrate fauna recorded during our survey of the Kurnalpi-Kalgoorlie 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.



**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 Kurnalpi-Kalgoorlie Study Area, covered by this report.

The Kurnalpi-Kalgoorlie Study Area (Figure 1) is a rectangle of approximately 26 500 km<sup>2</sup>, covered by two 1:250 000 geological maps: "Kurnalpi" (Williams 1973) and the eastern half of "Kalgoorlie" (Kriewaldt 1969). The Study Area is located between the townsites Coolgardie, Goongarrie, Pinjin and Coonana.

The survey of the Kurnalpi-Kalgoorlie Study Area was conducted in two parts. The vegetation and flora was documented by a consultant botanist (A. V. Milewski) and G.J. Keighery (Department of Conservation and Land Management). The fauna was surveyed by staff of the Western Australian Department of Fisheries and Wildlife (now the Department of Conservation and Land Management).

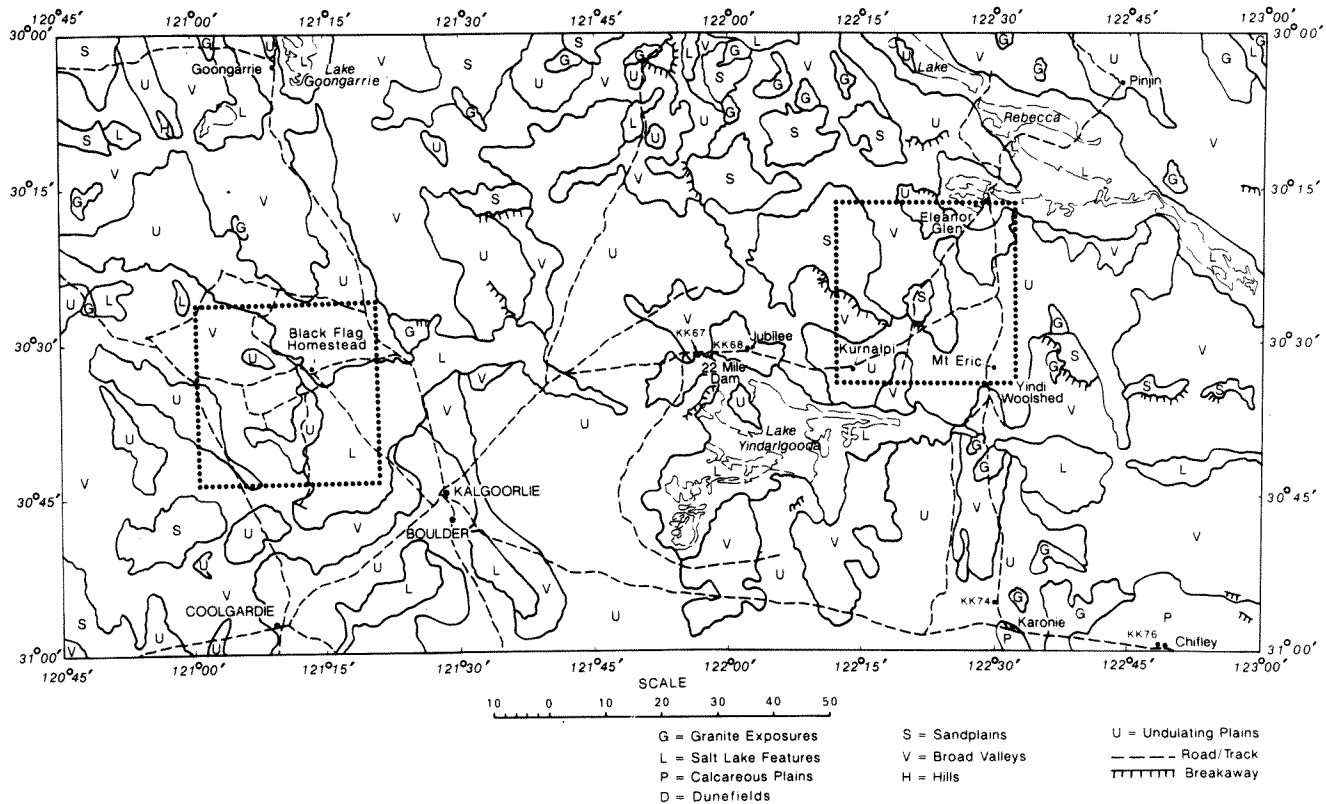
The initial vegetation survey was carried out during several brief visits to the Study Area between January 1980 and August 1983. Subsequent work was conducted by G.J. Keighery. Field traverses and vegetation sample sites were selected to document the vegetation on the main landform units (Figure 2). Most vegetation work was concentrated in two survey areas (Black Flag and Kurnalpi, see Figure 3), chosen to facilitate access to the widest variety of landforms.

Vertebrates were sampled in the vicinity of both the Black Flag and Kurnalpi survey areas during October 1979, August 1980 and February 1981. A total of eleven quadrats were selected to sample relatively homogeneous areas of the most extensive surface types distinguished by Kriewaldt (1969) and Williams (1973) in the Kurnalpi-Kalgoorlie Study Area. The location of these quadrats is shown in Figure 3.

Five vertebrate quadrats, each comprising two drift-fences (e.g. 6W-01 and 6W-01A), were established near Black Flag to sample four of the surface types found low in the landscape, and six quadrats were established near Kurnalpi to sample five of the surface types typical of upper levels in the landscape. Two quadrats were positioned on patches of the "Qqs" surface at Black Flag and the "Qqz" surface near Kurnalpi to sample some of the biological variation occurring within these surface types.

The main access to the Kurnalpi-Kalgoorlie Study Area is via the bitumen road from Coolgardie to Kalgoorlie and north through Broad Arrow towards Menzies. This road crosses the western central parts of the Study Area from south to north. Good graded roads reach from Kalgoorlie eastwards towards Zanthus and northeastwards to Kurnalpi and Pinjin. The Study Area also has numerous tracks constructed for mineral exploration and for access to and management of pastoral leases. The tracks vary in condition. Most are impassable after heavy falls of rain, and some have patches of deep sand which is hazardous for travelling when it becomes loose and dry.

An account of early exploration in the Kurnalpi-Kalgoorlie Study Area is given by Beard (1972). The Study Area contains the largest urban centre within the Eastern Goldfields, Kalgoorlie-Boulder (population 35 000). This town relies largely on several large gold and nickel mines in the vicinity. Several other centres appearing on the map, such as Kurnalpi, represent old mining towns no longer inhabited. Pastoral leases, most supporting a sheep grazing industry, cover more than 80% of the Study Area. Most are still in operation today and many have permanent inhabitants. A few prospectors are active and small-scale mining activities are currently being carried out at several localities. In addition, a few sandalwood pullers still operate locally.



**Figure 2** The main landform units of the Kurnalpi-Kalgoorlie Study Area. Field traverses for the vegetation study are indicated with numbers identifying the vegetation sites described. Vertebrate survey areas are detailed in Figure 3.