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## BIRDS, MAMMALS AND FLORA OF GOOSEBERRY HILL: GENERAL INTRODUCTION

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The natural heathland of Gooseberry Hill has persisted in its original condition since early settlement of the Darling Range, largely because the area is too steep for housing. Representative of the Helena Landform, it has unique conservational and scientific value in that it forms part of the only remaining unfragmented catena extending from the Darling Plateau (Dwellingup Landform) to the Swan Coastal Plain (Forrestfield Landform) (Churchward & McArthur 1980) and has a documented fire history since 1957 (Brooker 1998). It has therefore provided an ideal site for the study of birds and plants.

Prior to 1984, the Gooseberry Hill area had experienced a number of man-made changes. The surrounding area was first settled in 1880s when a small holding was cleared for farming (Quicke 1979). By 1891, the Zig-Zag Railway had been constructed to connect the timber concession at Canning Mills with the main line at Midland (Steele 1993). The line was closed down in 1949, after which the present-day one-way scenic

drive took its place. On the study area, power-lines and a pipe-line were installed, and tracks were cut to act as firebreaks and access routes to the power-lines and pipe-line. The north-western side of the area was grazed by cattle and horses and a large, fenced section in the north-east was grazed by sheep until 1975 (Hussey 1993).

Since 1984, further tracks and a horse-trail have been constructed. Grazing was discontinued on the north-western edge of the area in 1985. Trees beneath the power-lines are regularly felled, and most of the tracks are graded once a year. Early-summer control burns on the north-west section have ceased. Recently, dieback has eliminated *Banksia grandis* from one area and probably reduced the number of *Macrozamia riedlei*.

While grazing in the past has meant that some areas are more open than was previously the case and the high fire frequency has altered vegetation structure and reduced the number of logs and dead trees, the area still



supports a diverse native flora of over 500 species, as well as an ever-increasing abundance of encroaching exotics. The diversity of habitats on the Darling Scarp, the uniqueness of many and the pressures on them from urbanizations and other alienations have previously been highlighted by Dell (1983).

In the spring of 1973, Ian Rowley started colour-banding a population of Splendid Fairy-wrens on Gooseberry Hill on the south side of the Helena River opposite the then CSIRO Wildlife Laboratory at Helena Valley. In 1984, I joined his team and, with the help of many other colleagues, most notably Graeme Chapman, Joe Leone, Lesley Brooker and Belinda Cale, expanded the study to include other bird species and a survey of the vegetation.

A full list of scientific papers and other articles relating to Gooseberry Hill is given in the Bibliography.

## STUDY AREA

The study was carried out on a 120 ha area of natural heathland extending 1.5 km from a spur of the Darling Plateau to the Helena River, 200 m below (Figure 1). The area comprises steep north-facing slopes and deeply incised gullies, with numerous rock outcrops (Figure 2). The broad geological classification is Archaean; "Granite", coarse-grained and igneous rocks (Biggs et al. 1980). The soils are derived mainly from laterite, granite and dolerite and vary considerably in depth. The vegetation of the area is dominated by heath species, mainly from the families Proteaceae and Myrtaceae, with a variable overstorey of Marri *Corymbia calophylla* and Wandoo *Eucalyptus wandoo*. Balgas (grasstrees) *Xanthorrhoea*

*preissii* are widespread and Flooded Gums *E. rudis* grow along the Helena River. Most of the area is currently "Regional Open Space" under the control of the State Planning Department and the Shire of Kalamunda.

Prior to 1984, the Australian Government Survey Office installed surveyed pegs at 100 m intervals throughout the area, providing a useful numbered reference grid. Most of the tracks and roads on Gooseberry Hill have a north-south orientation, running up and down gullies or ridges and thereby providing easy access. However, vegetation transects that were walked throughout the study ran east-west.

Wildfires were frequent (Brooker 1998), with a total of 22 fires in the 41 years from 1957 to 1998. Nine that affected Gooseberry Hill during the period 1984-1998 are shown in Table 1. They occurred in 1985, 1987, 1988 (2), 1990, 1993, 1994, 1995 and 1998.

While the great majority of observations were made on the Gooseberry Hill Study Area (hereafter simply Gooseberry Hill) (Figure 1), some data were collected at four adjoining sites:

- **Lab** refers to the CSIRO laboratory grounds (Figure 1, site 1), comprising 15 ha of citrus orchard and pasture grazed by sheep, with mature Marri trees, Wandoo and Flooded Gums but few native shrubs. Exotic trees and shrubs had been planted around the buildings;
- **Picnic Area** (Figure 1, site 5) contained vegetation similar to that on Gooseberry Hill but with more Flooded Gums and open grassland;
- **Farrant's Paddock** refers to the grazed paddocks owned by the late John Farrant (Figure 1, site 9), an area of open native woodland grazed



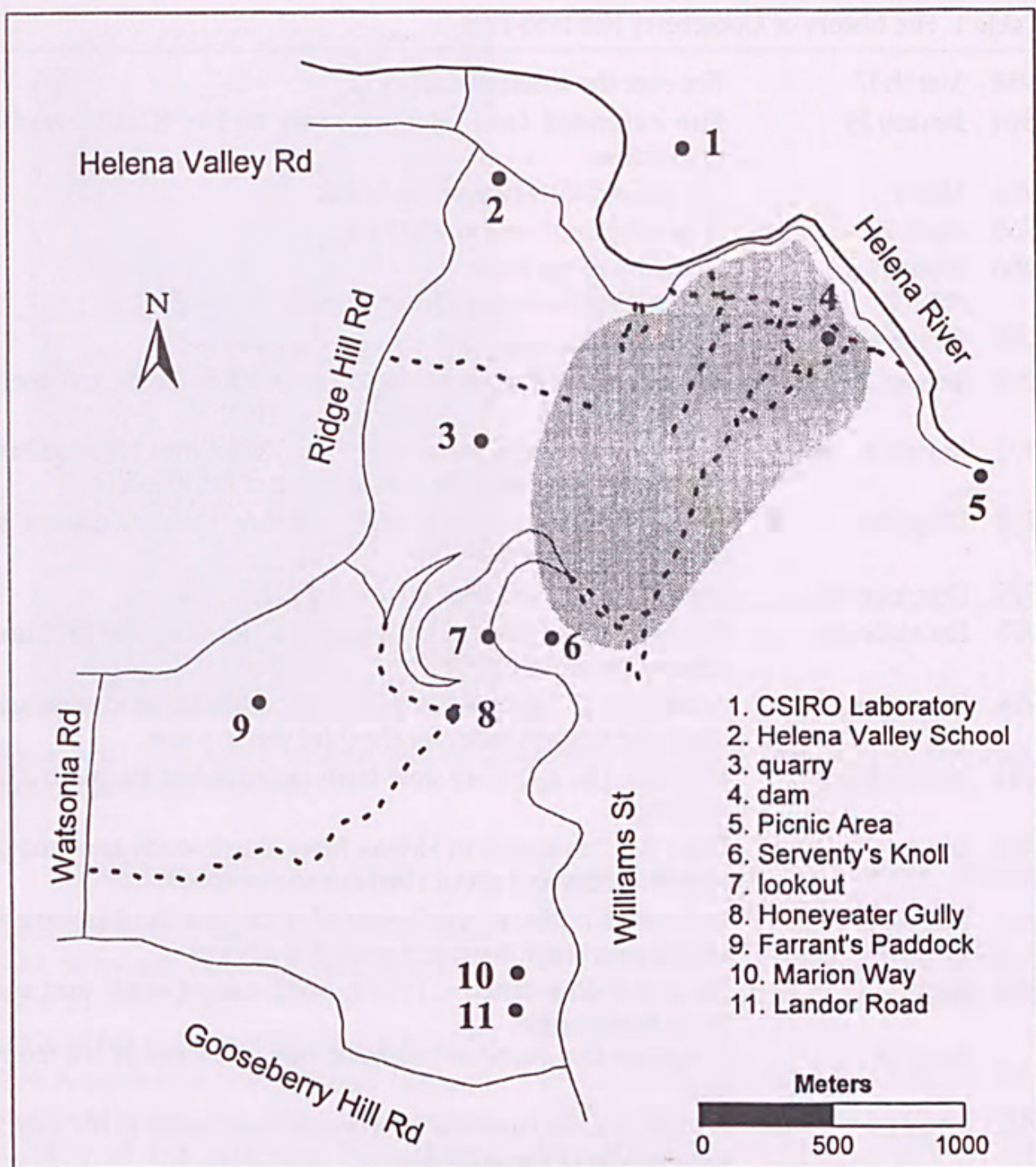


Figure 1. Map of Gooseberry Hill Study Area (shaded) and other locations mentioned in the text.

by cattle with some introduced shrubs;

- **Marion Way** refers to a nearby suburban garden (31° 57' 16" S, 116° 02' 55" E) (Figure 1, site 10), with vegetation similar to that on Gooseberry Hill but in an urban setting with more Jarrah *E. marginata* and introduced species. Weekly

presence/absence records of bird species were kept, resulting in a total 64 species noted during 780 weeks in 15 years. Some of these data are presented below to supplement the Gooseberry Hill observations. Records covering the period 1984 - 1989 are given by Brooker & Brooker (1998)



Table 1. Fire history of Gooseberry Hill 1958-1998

1958	March 17	Fire over the whole of the Knoll.
1961	January 24	Fire extended from Helena River to the Knoll. Massive destruction.
1962	May 7	Fire around the whole of the Knoll.
1965	April 9	Fire to the north-east of the Knoll.
1966	February 6	Fire north of the Knoll
	April 7	Devastating fire from Helena Valley to the Knoll
1968	February 25-26	Fire in Helena Valley burnt to Zig Zag Road
1969	January 23	Extensive fire from west crossed Ocean View Parade and burnt part of the Knoll
1972	March 31-April 2	Extensive fire from Helena Valley and Kalamunda National Park burnt most of eastern and northern part of the Knoll.
1974	December 16	Fire deliberately lit along valley roadside. Very little wind, so fire spread was gentle.
1976	December 14	Fire ran up the centre valley to the Knoll.
1977	December 12	Fire burnt that portion of study area not burnt in 1976 and reburnt the western valley.
1978	December 27	A fire from the quarry area burnt right up to the study area and burnt the western valley for the third year in a row.
1981	November 11	Fire from the east. Very slow burn extinguished by rain in the evening.
1985	January 30	Major hot fire started in Helena River. Burnt study area (except southern edge) and about 1 km east and west of it.
1987	February 21	Fire started c. 1530 h south-west of study area. Burnt southern edge and central and western parts of study area
1988	April 3	Minor hot fire started c. 1540 h north-east of study area and burnt eastern edge.
	April 14	A separate fire burnt an extensive area to the east of the study area.
1990	January 3	A small, hot fire from the quarry area burnt as far as the south-western edge of the study area
1993	December 22, 24, 25	Three small fires: the first started on southern edge; the other two were flare-ups. A small area of the Knoll was burnt.
1994	February 6	Major hot fire. Burnt most of the study area except southern edge. Extensive areas to the east and west of the study area also were burnt.
1995	January 24	Small hot fire started c. 2330 h to west of study area. Study area not burnt.
1998	November 1	Hot controlled burn along southern edge (firebreak)



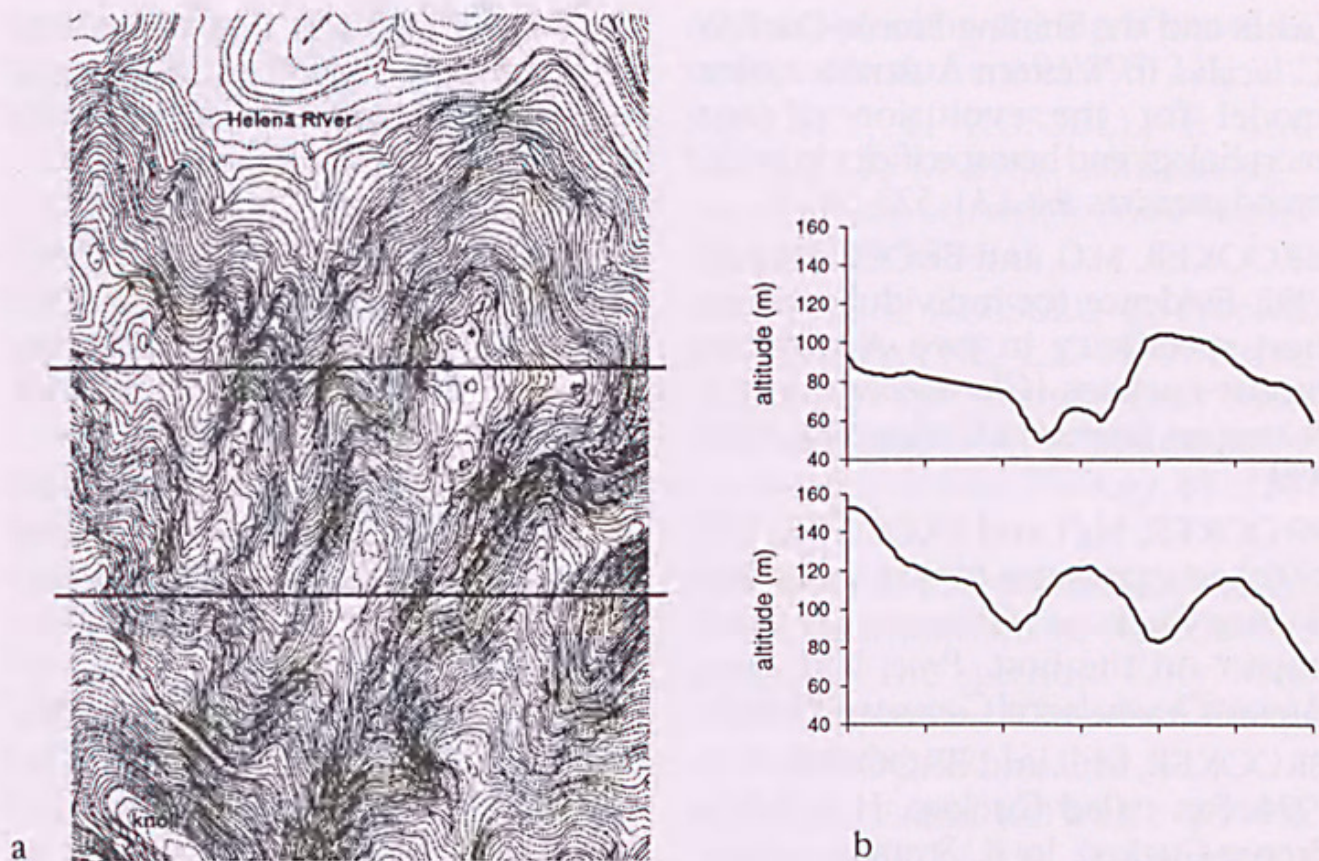


Figure 2. (a) Two metre contour plot of Gooseberry Hill Study Area and (b) two cross-sectional profiles of altitude.

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