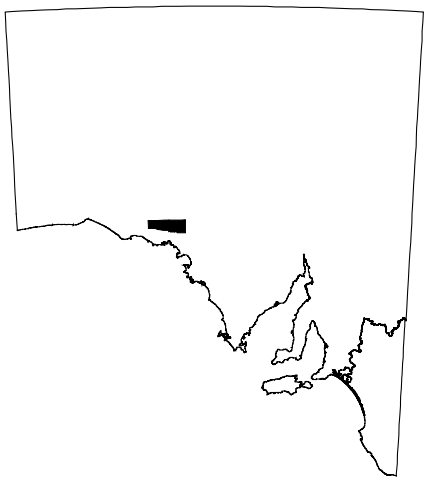
A BIOLOGICAL SURVEY OF YUMBARRA CONSERVATION PARK SOUTH AUSTRALIA IN MARCH 1995



by

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CARTOGRAPHY AND DESIGN

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Cover Photograph

Typical mallee covered sand dunes with an understorey of spinifex, a habitat typical of much of Yumbarra Conservation Park.

Photo: A.C. Robinson

Abstract

A two week survey of the vegetation and vertebrate fauna of Yumbarra Conservation Park and surrounding areas was undertaken in March 1995. Within the boundaries of Yumbarra Conservation Park the following were recognised:

- Eight plant communities with 215 plant species (11 introduced)
- Seventeen mammal species (4 introduced)
- One hundred and one bird species (1 introduced)
- Forty six reptile species

The vegetation survey also included the areas surrounding Yumbarra Conservation Park. In these areas another four plant communities were recognised, bringing the total to twelve for the entire study area.

The survey provided additional biological information which supports the great conservation and wilderness significance of the Yellabinna dunefield area.

The discovery of a geologically interesting area of basement rock beneath Yumbarra Conservation Park, which resulted in the present biological survey being carried out, presents the Government of South Australia with a series of management decisions. These are discussed under the headings of: Conservation Value, Wilderness, Cultural Values, Reproclamation Proceedures and the Impact of Mineral Exploration.

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People Involved

Unlike most previous biological surveys in this series the data contained in this report was collected over a two week period of field work in response to the need by DENR to acquire some biological information to enable the Department to better assess the potential conservation impact of proposed mineral exploration and possible future mining development on the wilderness value of Yumbarra Conservation Park. To carry out this work a small team of people was developed under the supervision of the survey coordinator, Helen Owens. Each made a notable contribution in their field of expertise to the overall effectiveness of this short survey.

Fieldwork

Vegetation Survey
Personnel for this stage were; A. Robinson and T. Hudspith.

Vertebrate Survey
The survey had a representative biologist in three taxonomic groups, birds (B), mammals (M), reptiles (R).
They were; D. Armstrong (R), L. Pedler (B) and H. Owens (M).

Thanks to the Ceduna National Parks and Wildlife Office, in particular Pia Richter, Albert Zepf and Craig Welbourn, for their support during the reconnaissance and the survey and for providing practical information on the Yumbarra study area.

Thanks also to Lloyd Offshore Helicopters Pty Ltd for providing helicopter assistance to this project at short notice and to pilots David Schultz for his flying skills during the initial site selection survey on 9-10 March 1995 and to Simon Lovell for efficiently ferrying and landing the survey teams during the biological survey on 26-31 March 1995.

Specimen Identification

Plants: People nominated above and P. Lang with final determinations provided by the staff of the State Herbarium.

Mammals: H. Owens and L. Queale at the S.A. Museum.

Reptiles: D. Armstrong and A. Edwards and M. Hutchinson at the S.A. Museum.

Computing

Thanks to Sandy Kinnear and Keith Casperson for assistance with computer mapping and running the PATN analysis. Thanks also to Lee Davidson who digitised all the extra tracks and the vegetation ploygons.

AUSLIG provided the basic digital topographic map data for the study area from their 1:100 000 map series.

Introduction

BACKGROUND AND AIMS

For some years now the South Australian National Parks and Wildlife Service and the South Australian Museum have been carrying out a series of systematic surveys of the vegetation and vertebrate fauna of large regions of South Australia. Previous surveys have been conducted or are currently in progress for the States Offshore Islands (excluding Kangaroo Island) (1971 - 1982), the South-East Coast (1982 - 1983), Cooper Creek (1983, 1991), the Nullarbor Plain (1984), the Gawler Ranges (1985), the Yellabinna area (1987), Kangaroo Island (1989 - 1990), Strezelecki Dunefields (1988 - 1992), Murray Mallee (1990 -1991) Anangu Pitjantjatjara Lands (1991 -), the South Olary Plains (1991 - 1992), Diamantina River Area (1994) and the Stony Deserts (1994 -). With the exception of the Offshore Island surveys, the regional boundaries of these surveys have been based on the Environmental Regions and the Environmental Associations described and mapped for South Australia (Laut, Heylingers, Keig, Loffler, Margules, Scott and Sullivan, 1977). In addition to these vegetation and vertebrate surveys, vegetation sampling, analysis and mapping only has been completed or is in progress for the following areas:- South Mount Lofty Ranges (1986), Tallaringa Area (1988), Murray Mallee (1990), South-East (1991), Western Murray Flats (1991), Mid-North (1992), Burra Hills (1994) and Yorke Peninsula (1994).

A recent development in the biological survey programme differs somewhat from those listed above in that they have been carried out in response to a need for biological information relating to a particular development proposal. The first of these development oriented biological surveys was carried out in 1994 at Messent Conservation Park in order to adequately assess the possible impacts of a surface water drain proposed to be cut across the south east corner of the park as part of the Upper South East Dryland Salinity and Flood Management Plan. The present survey of Yumbarra Conservation Park and surrounds is the second in this series of development oriented biological surveys. Although it is a special purpose survey with more intensive sampling than the regional surveys conducted previously, the Yumbarra Biological Survey utilised the standard sampling, analysis and presentation techniques developed as part of the Biological Survey of South Australia. It can therefore be considered as something of a model for the gathering in the future of more detailed biological information on relatively small and discrete areas such as conservation reserves, in a systematic way which is completely compatible with existing biological survey information.

The Yumbarra Conservation Park (Fig. 1) was set aside in 1968 to conserve a significant representative area of the western Eyre Peninsula mallee ecosystems outside of the dog fence. The park is a relatively small portion of the extensive area of largely undisturbed mallee covered sand dunes collectively known as the Yellabinna region. In 1987 the then South Australian Department of Environment and Land Management carried out an extensive biological survey of this vast area of over 43 000 square kilometres of largely trackless wilderness. This survey (Copley and Kemper, 1992) described 23 plant communities supporting 686 plant species, 35 mammal species, 121 bird species and 78 species of reptiles (and even one frog). It also clearly demonstrated that there was a significant south to north biological gradient across the area with the more arid northern areas being biologically very different from those in the south such as Yumbarra Conservation Park.

Underlying the whole of the Yellabinna region are the ancient rocks of the Gawler Craton which were laid down 2 600 million years ago. In recent years, developments in aerial geological survey have allowed us to ‘see through’ the thick cover of geologically much more recent sand dunes and get a clear picture of the surface features of these ancient rocks. Close examination of these spectacular images (Fig. 2) revealed a vertical cylinder, pipe or funnel shaped body beneath the area that is now covered by the Yumbarra Conservation Park. Geologists consider that this most likely represents what they call an ‘intrusive complex of Gawler-Hiltaba age’. These rocks are between 1500-1700 million years old and have been found to be highly mineralised elsewhere in the Gawler Craton, the best known example being the Olympic Dam ore body being mined by Western Mining at Roxby Downs.

In an effort to learn more of the conservation value of the Yumbarra Conservation Park a biological survey was carried out from 19 - 31 March 1995. During the second week, a helicopter was used to get access to the un-tracked areas around the geological anomaly which meant that the survey work had absolutely minimal impact.

The location of Yumbarra Conservation Park is shown in Fig. 1. The location of the park boundary, the present study area, and tracks within and around the conservation park are shown in Fig. 3. The field work covered 34 vegetation sample *quadrats* thirteen of which were also sampled for vertebrates. The location of both the vegetation and the vegetation and vertebrate sample

quadrats is shown in Fig. 3. A visual impression of the mallee covered dunefield wilderness that covers much of the study area and the impact of one of the relatively few existing tracks are shown in Figs. 4. and 5.

Yumbarra Conservation Park is in the Yellabinna Environmental Association of Laut *et al*. (1977) (Fig. 1). It is described as 'Plains with closely spaced easterly-trending dunes and occasional rock outcrops. The cover is open mallee scrub with a chenopod shrub or grass understorey. Examples of the range of environments in Yumbarra Conservation Park are shown in Figs. 6-10.

PREVIOUS BIOLOGICAL STUDIES

There have been three other biological surveys which included some similar habitats to those represented in the Yumbarra study area. The most similar was the Yellabinna Survey (Copley and Kemper, 1992), but there were some similar *quadrats* sampled on the Nullarbor Survey (McKenzie and Robinson, 1987) and the Gawler Ranges Survey (Robinson, Casperson, Canty and Macdonald, 1988). The Nature Conservation Society of South Australia conducted a biological survey in Pinkawillinie Conservation Park, but the results are unfortunately not available in published form. Other information on the flora and fauna of Yumbarra Conservation Park is summarised below.

Vegetation

The five vegetation *quadrats* sampled within Yumbarra Conservation Park during the 1987 Yellabinna Biological Survey, represented, until this study, the most detailed documented information available on the vegetation of this relatively remote park. Several other plant collections have been made from this area and lodged at the State Herbarium, but most of this information wasn't accessible within the time-frame for this study as the herbarium records are not yet computerised. Nevertheless, there were a number of unpublished surveys for which plant lists were available. Davies (1983) provided a good summary of the major plant communities and dominant species. Graham Carpenter (1987) made an incomplete list of some of the more notable species observed within Yumbarra Conservation Park. Kingsley Turner provided more extensive lists for a visit in 1984 and a more detailed visit in 1990. The latter was part of an extensive but incomplete regional survey conducted by the then Department of Lands. A large number of plant records were compiled by Kingsley from his field notebooks for many sites visited within the park at this time. In November 1993, under the Native Vegetation Management regulations, Darrell Kraehenbuehl made an inspection of Section 95, Out of Hundreds, which abuts the southern boundary of Yumbarra Conservation Park. The plant data compiled from these extraneous sources includes a number of important records that require verification.

Overall the floristic data for this reserve still lacks many of the annual and ephemeral plant species that would be expected to occur in the district. Unfortunately this was not rectified by the present survey due to the particularly dry preceding seasons. All species records for the park are listed in Appendix II.

Vertebrates

Several visits have been made to Yumbarra Conservation Park, however most have been brief and have concentrated on accessible areas only. Birds have been surveyed in the greatest depth with twelve sources being identified since 1968. Records for mammals, reptiles and amphibians are restricted to a few observations with a limited amount of trapping effort. The Yellabinna survey carried out in 1987, and to a lesser degree, the survey by Bird and Sinclair in 1980, are the only surveys within the park which attempted to look at all vertebrate groups in a systematic way and tried to define community groups. Most of the available vertebrate information was collected by experienced biologists targeting the vertebrate group in their area of interest. This has resulted in reliable records although there are still many gaps in the data. The vertebrate data available for the park prior to the current survey is therefore limited and far from comprehensive. The full range of vertebrate records now available for Yumbarra Conservation Park are listed in Appendix III to V.

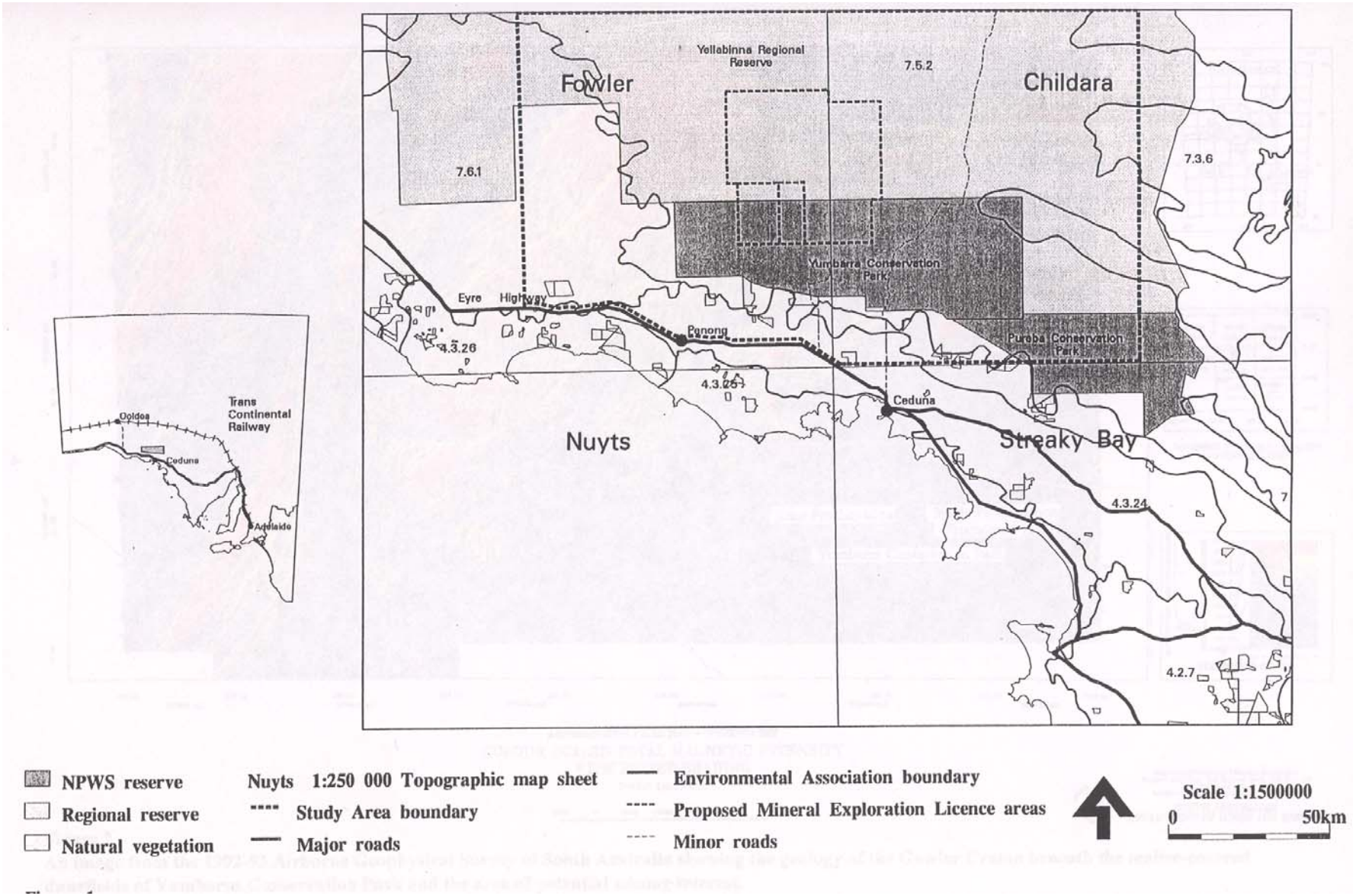


Figure 1
The location of Yumbarra Conservation Park showing other areas of natural vegetation and the Environmental Association boundaries of Laut *et al.* (1977).

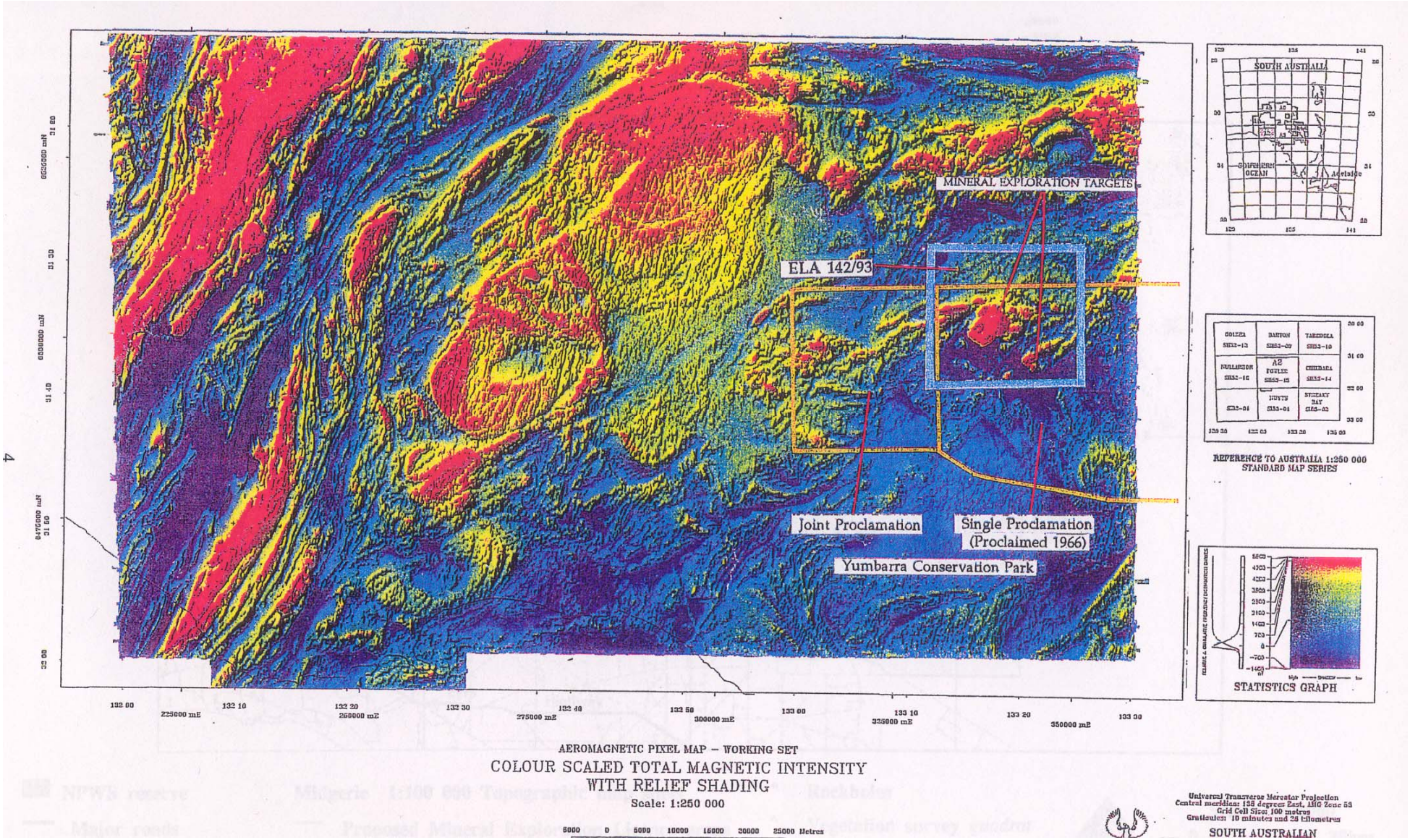


Figure 2
An image from the 1992-93 Airborne Geophysical Survey of South Australia showing the geology of the Gawler Craton beneath the mallee-covered dunefields of Yumbarra Conservation Park and the area of potential mining interest.

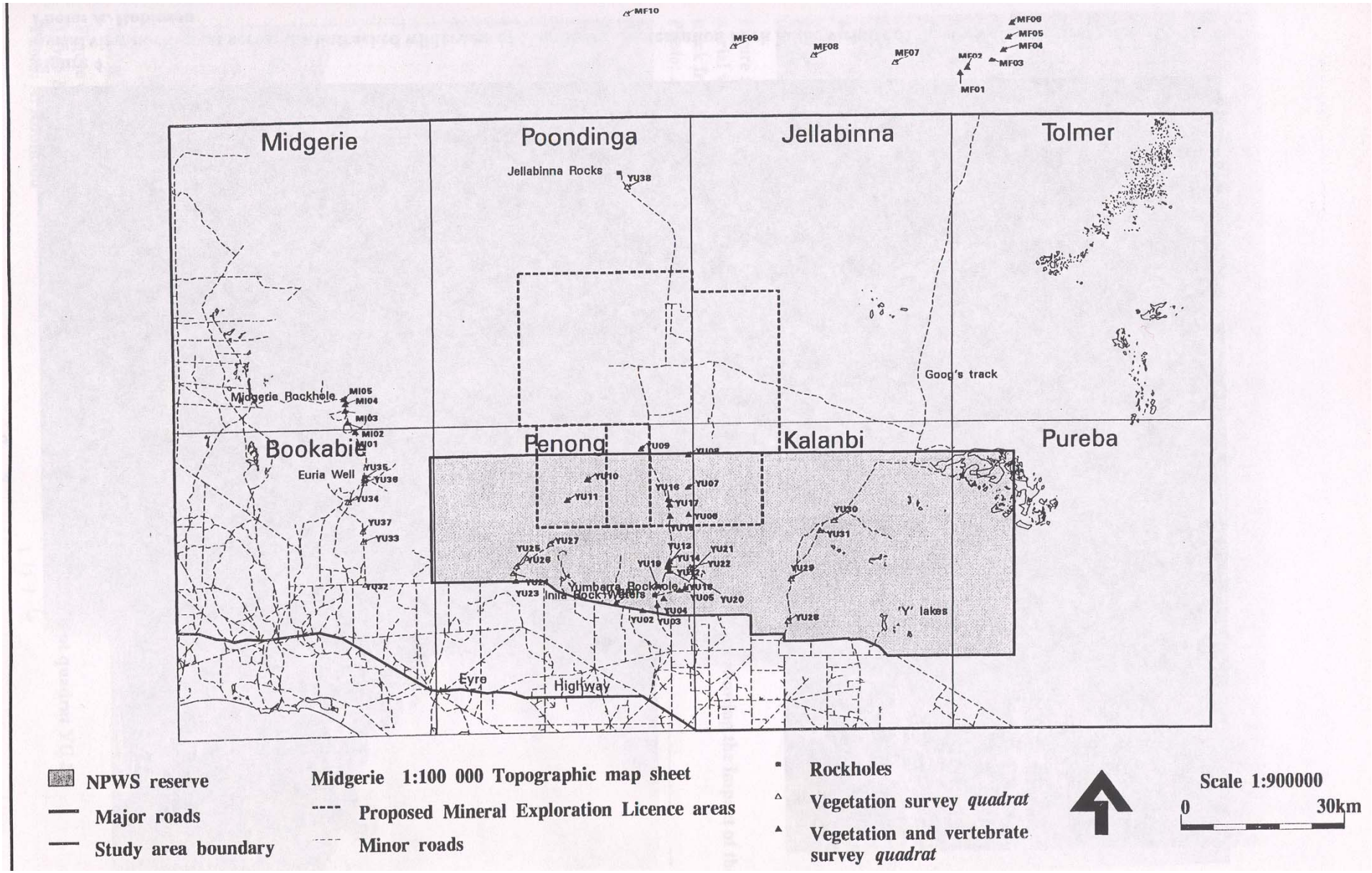


Figure 3
Yumbarra Conservation Park and surroundings, showing the proposed mineral exploration licence areas, existing tracks, all vegetation and vertebrate sampling quadrats sampled as part of this study and the boundaries of the present study area.

Figure 4
Aerial view north-west across the untracked wilderness of Yumbarra Conservation Park in the vicinity of the area of geological interest.
Photo: A. Robinson

Figure 5
Aerial view of the central northern portion of Yumbarra Conservation Park showing the impact of the N - S track from Inila Rock Waters to Jellabinna Rocks and beyond.
Photo: A. Robinson

Figure 6
Large *Eucalyptus oleosa* mallee with an understorey of chenopod shrubs at quadrat YU 14
Photo: A. Robinson

Figure 7
***Eucalyptus socialis* mallee in a sandy loam interdune with a variety of understorey shrubs**
Photo: A. Robinson

Figure 8
A typical dune crest with low *Eucalyptus ceratocorys*, areas of bare ground and typical dune crest understorey vegetation
Photo: A. Robinson

Figure 9
View of a small salt lake and clay pan complex sampled in quadrat YU 22
Photo: A. Robinson

Figure 10
The view NW from Jellabinna Rocks N of Yumbarra Conservation Park
Photo: A. Robinson

Methods

The rationale behind these regional biological surveys has been explained in detail by Copley and Kemper (1992) for combined vegetation and vertebrate surveys in the semi-arid and arid zones and by Robinson and Canty (1984) for the offshore islands surveys. The survey of Yumbarra Conservation Park was carried out in response to the need for detailed biological information on the park, in particular the north central part covered by the proposed mineral exploration licence areas. This resulted in an increase in the concentration of *quadrats* that would normally be used for a general biological survey of an area. Apart from an increase in *quadrat* concentration the aims and methods employed follow that used for previous broad-scale biological surveys, allowing direct comparison between all *quadrat*-based data. The biological survey of Yumbarra Conservation Park was designed with the following aims;

1) To collate all previous information on the vegetation and vertebrate fauna of Yumbarra Conservation Park.

2) To plan and carry out a biological survey in March 1995, of Yumbarra Conservation Park concentrating *quadrats* in and around the area covered by the two proposed mineral exploration licences, using techniques and standards established for the Biological Survey of South Australia.

3) To include appropriately skilled biologists to assist with the field survey.

4) To permanently mark all biological survey *quadrats* to potentially enable them to be used to monitor changes should mining exploration and development go ahead.

5) To provide the South Australian Museum with a set of properly documented voucher specimens of the reptiles and small mammals collected during the survey.

6) To provide the State Herbarium with properly documented voucher specimens of the vascular plants collected during the survey.

7) To prepare and digitise 1:100 000 scale vegetation maps of the study area using the best and most recent aerial photography available.

8) To enter all survey data into the South Australian Survey Database.

9) To carry out a PATN analysis of the vegetation data collected on the survey to define plant communities using techniques established by the Biological Survey of South Australia.

10) To prepare a consolidated report on the survey including the community analysis and vegetation map using standards already established for reporting on the Biological Survey of South Australia.

Site Selection and Nomenclature

The fundamental concept behind all the regional surveys conducted as part of the Biological Survey of South Australia to date has been that they are based on intensive sampling at a series of *sites* selected to represent the biological and geographical diversity of the study area. As this survey was designed to assess the potential impact of a mine in the park the site selection process was more restricted than for general survey work. The site nomenclature adopted for this survey is described by Copley and Kemper (1992). Following on from the *site* code used for Yumbarra Conservation Park during the Yellabinna Survey, 1987, all areas chosen were designated with the *site* code YU. Five *quadrats* had been established in the 1987 survey making the next *quadrat* in sequence *quadrat* 06. Each *quadrat* covered an area of 1km by 1km. Where there was a notable change in the vegetation associations within a *quadrat* the area was divided into separate *patches*. When this was necessary a separate set of data sheets was filled out for each *patch* with the predominant association being *patch* 1 in which the vertebrate sampling was carried out.

Given the time available for the survey it was determined that a maximum of 12 vegetation and vertebrate sampling *quadrats* could be established. Access tracks within the park are very limited which restricted selection of *quadrats*. The first week of the survey used two 4WD vehicles and established six *quadrats* along a track in the northern half of the park. Logistics did not allow all of these *quadrats* to fall within the proposed mineral exploration licence areas so they were chosen to represent vegetation associations found within the lease. A helicopter was used for the second week of the survey allowing 6 *quadrats* to be established in more remote areas of the proposed mineral leases. In addition to the twelve new *quadrats*, *quadrat* YU0401, established during the Yellabinna survey, was re-surveyed to provide extra information and give an indication of how *quadrat*-based results varied between years.

An additional twenty one *quadrats* were sampled for vegetation to give a better representation of the map sheets covering Yumbarra Conservation Park and surroundings and the proposed mineral exploration licence area. These *quadrats* were used in the overall vegetation analysis along with the *quadrats* at the MI and MF *sites* from the Yellabinna survey in 1987, and the *quadrats* associated with a camel trip from Mount Finke to Barton in 1989. With appropriate adjustments to the species lists to account for the different times of year, this enabled a floristic analysis of a total of 55 *quadrats* covering a significant part of the total area for which vegetation mapping was done. The location of these *quadrats* is shown in Figure 3.

Data Collection

The vegetation survey required standard data sheets to be filled out recording several attributes of the plant species present within the area of each *quadrat*. Forward (in prep.) details the methods used to describe each attribute. During the vegetation survey a description of the location and physical environment was also recorded. All vascular plants present in the *quadrat* were recorded and a herbarium specimen of each species encountered was collected. All specimens were lodged with the State Herbarium for identification or checking of field identifications and, depending on specimen quality, as many specimens as possible were incorporated into the Herbarium collection.

At each of the thirteen *quadrats* sampled for vertebrates two lines of traps were established, *line* A and *line* B. This follows the standard procedure set up for the biological survey of the State described by Copley and Kemper (1992). These lines fell within the *primary patch type* and were located at least 200m apart. At each *line* a 50 m long line of six fenced pitfall traps was established. (These traps are used to capture small mammals and reptiles and often collect many invertebrates). Traps consisted of a 455 mm x 380 mm sheet of white, high impact polystyrene joined into a cylinder using a slotted H section of plastic (HM12). This resulted in a pitfall trap 125 mm in diameter and 380 mm deep.

A separate line of 15 Elliott traps, used to capture small mammals, was run in association with each pitfall line sampling the same habitat within the *quadrat*. Two possum/cat size traps were placed at each end of the Elliot line. A line of 6 micro-pitfalls consisting of plastic vials measuring 80 X 20mm and filled with 70% alcohol were set adjacent to the main pitfall line to capture invertebrates. Reptiles and mammals were also captured or observed by searching each of the twelve *quadrats* at least once during the survey period.

Birds were recorded for each *quadrat*. An observer spent from one to several hours during the best bird observation times of early morning and evening and recorded all birds within or flying over the *quadrat* during the search period. An attempt was made to put the same amount of search effort into each *quadrat* during the best observation times.

All vertebrate data, including secondary observation, ie: tracks and traces, were recorded on standard data sheets.

A permanent photographic monitoring point was established at *line* A in the *primary patch* of each of the twelve vertebrate sampling *quadrats* using two 1.4m long steel posts set 10m apart. The standard photographs are in Appendix I.

Observations of some plants and vertebrates (especially birds and bats) encountered outside *quadrats* were recorded on special 'opportunistic' data sheets.

At least the first specimen of each small mammal and reptile species recorded for the survey area was preserved as a museum voucher specimen. Larger species which had been collected from the general region in the past and did not present any identification problems were not collected.

A small amount of vehicle and foot spotlight searching was carried out on some of the *quadrats* and opportunistically when possible. The lack of vehicle access to all *quadrats* and the demands of specimen processing did not allow spotlighting to be carried out systematically.

Samples of liver tissue were taken from all collected specimens and stored in liquid nitrogen. These tissue samples were lodged with the South Australian Museum.

Invertebrates were collected from the micro-pitfall and larger vertebrate pitfall traps or opportunistically around each *quadrat*. These samples were also lodged with the South Australian Museum.

Maximum and minimum temperatures in the shade and sun were recorded at the campsite each day. These are presented in Appendix VI.

A summary of the sampling effort over the whole survey is given in Table 1.

Table 1
Trapping and spotlighting effort during the Yumbarra Conservation Park biological survey, March 1995.

SITE	Pit Trap Nights	Elliott Trap Nights	Cage Trap Nights	Foot Spotlight Hours	Vehicle Spotlight Hours	Harp Trap Nights	Mist Net Hours
YU0401	60	150	0	1			
YU0601	48	120	16				
YU0701	48	120	16				
YU0801	48	120	16				
YU0901	48	120	16				
YU1001	48	120	16				
YU1101	48	120	16				
YU1201	48	120	16				
YU1301	48	120	16				
YU1401	48	120	16				
YU1501	48	120	16				
YU1601	48	120	16				
YU1701	48	120	16				
OPPORTUNISTIC				1	3	10	45
TOTALS	636	1590	192	2	3	10	45

The total number of observations of plants and vertebrates during the survey are shown in Table 2. It is this data base for the plants, together with additional vegetation *quadrats* sampled from the larger study area during the 1987 Yellabinna Biological Survey, which forms the basis for the vegetation community analysis presented in this report.

Table 2
Numbers of individual observations of plants and vertebrates recorded in Yumbarra Conservation Park during the biological survey, March 1995.

	Quadrats		Opportunistic		Total
	Individuals	No. of Quadrats	Individuals	Reportings	
Plants	865	34	0	0	865
Mammals	83	13	38	29	121
Birds	283	13	336	94	619
Reptiles	180	13	102	50	282
Amphibians	0	13	0	0	0

Data Management

On return to Adelaide all voucher specimens were checked with the South Australian Museum and the State Herbarium. Any corrections were transferred by the respective biologist, to the data sheets before data entry began.

All data collected on the survey was entered on the appropriate database, Survey or Opportunistic, administered by the Biological Survey and Research Section, DENR. Once all the data was entered it was edited via validation reports.

Vegetation Mapping

The best and most recent colour aerial photography, together with black and white photo maps and digital data, was obtained prior to the field trip. Different plant communities are reflected in aerial photography as characteristic 'patterns', identified by differences in tone and texture (Gunn, Beattie, Read and van de Graaff, 1988). Ground checking during the field trip, together with later PATN analysis, identified plant communities and matched them with the different 'patterns' noted on the aerial photography.

Previous field work, particularly the Yellabinna Survey (Copley and Kemper, 1992), was taken into account during the mapping. Indeed, plant communities identified in the PATN analysis closely resembled those identified and mapped for the Yellabinna Survey. Consequently, the floristic group definitions and vegetation maps from the Yellabinna Survey formed the basis for vegetation mapping for this study.

A total of seventeen plant communities, made up of twelve relatively discreet vegetation associations, four mosaics (consisting of a 75-25% mixture of two vegetation associations) and one category of cleared land, were identified.

Due to the uniformity of the study area and the short time frame available, it was decided to map directly on to 1:50 000 and 1:100 000 black and white photo maps. [Two different scales were used as the study area fell within the agricultural zone (where 1:50 000 photo mosaics were available) and the pastoral zone (where only 1:100 000 photo mosaics were available)] The colour aerial photography, at scales of 1:40 000, 1:86 950 and 1:87 400, was referred to simultaneously. Stereoscopic viewing was used when it became difficult to delineate the boundaries of different plant communities.

All of the basic plant communities, such as open grassland, open shrubland and open scrub, as well as a network of previously unmapped tracks, were readily identifiable using this method. However, areas of transition between two plant communities, or ecotones, proved problematic. In these cases, deciding exactly where one plant community ended and another began was, in part, a subjective judgement. Consequently, as Forward (in prep.) suggests, vegetation mapping from aerial photography is a valuable guide rather than an exact science.

Once mapping was complete, the information was transferred onto transparent overlays or 'mylars' which were produced at scales of 1:50 000 and 1:100 000 to match the black and white photo-mosaics. Topographic features such as roads, tracks and fences, had been digitised from the 1:100 000 map sheets by the Australian Surveying and Land Information Group (AUSLIG), using the Environmental Systems Research Institute's (ESRI) ARC/INFO Geographical Information System software. This information was plotted on to the mylars and helped to correct some of the distortion inherent in aerial photography.

The mylar base maps were then digitised by the Geographical Analysis and Research Group (GAR) of the Department of Housing and Urban Development (DHUD) using ESRI's ARC/INFO GIS software. The final vegetation map is contained in the pocket inside the back cover of this report.

Data Analysis

Vegetation *quadrat* data from Yumbarra Conservation Park and the surrounding area was analysed using the PATN software package to analyse patterns and trends in the data (Belbin, 1987a, b, c) and ESRI's ARC/INFO Geographical Information System software to display species and group distributions and analyse geographic trends in the data. The analysis pathway using PATN is detailed in Forward (in prep.).

Results

VEGETATION

There are a number of sources of plant species lists for Yumbarra Conservation Park and these are detailed in Appendix II. A vegetation floristic classification and 1:50 000 and 1:100 000 vegetation mapping of selected areas was carried out for the Yellabinna Survey (Copley and Kemper, 1992). These floristic group definitions and maps formed the basis for the present 1:50 000 and 1:100 000 mapping project. Where appropriate, vegetation types defined for the Yellabinna vegetation mapping survey were used but some of these types were further sub-divided for this much more extensive mapping of Yumbarra Conservation Park and surrounds.

The final vegetation map covered eight 1:50 000 and six 1:100 000 scale topographic map sheets, but the southern boundary of the vegetation mapping was the Eyre Highway. The vegetation map for the total study area is in the pocket inside the back cover of this report.

Floristic Vegetation Analysis

Only those plants that would have been sampled consistently in the very dry conditions prevailing during the present survey were included in all the data sets that went to make up the total floristic analysis. This reduced the number of species from 391 to 281. The final analysis was therefore conducted on 281 species occurring at 82 *patches* (30 from the Yellabinna Biological Survey in 1987, including the YU 1-5, MI 1-5 and MF 1-5 *quadrats*, 8 from the camel trip survey in 1989, including the MF 6-11 *quadrats* and 44 from the present survey, including the YU 04 and YU 6-38 *quadrats*). These *patches* were grouped into 14 community types as shown on the dendrogram (Fig.11).

These 14 floristic groups are discussed in detail below and information on each is presented in a standard format. The 'typical *quadrats*' reference guides the reader to a photograph typical of the particular floristic community, either in this chapter or in Appendix I.

The listing shows:

The floristic Group number.

A structural name following Specht, Roe and Boughton (1974) as modified by Forward (in prep).

An indication of the corresponding floristic vegetation group shown on the vegetation map. Note that in some cases several classified floristic groups are *mapped* as the same floristic vegetation group.

The dominant overstorey species, defined as having a proportion of occurrence of greater than or equal to 0.50, a large lifeform size and a high value of chi square for average abundance. The chi square values indicate whether the species is likely to occur in the group by chance alone. The higher the value the more likely the species is representative of a group or a number of groups. A species that occurs with the same frequency across all groups has a chi square value close to 0. A species that occurs more frequently in one or two groups and is absent in all others will have a large chi square value and hence is likely to be a good indicator species for a particular floristic group.

The indicator species for each floristic group is defined as having a proportion of occurrence greater than or equal to 0.50 and with a chi square of not less than 1.00 for average abundance.

A floristic group species list, with statistics on the average abundance and proportion of occurrence (including chi square values for both). Frequency data is also provided for the Braun-Blanquet cover/abundance scores. Only species that occurred at greater than or equal to 50% of the patches are listed.

A general description of the floristic group

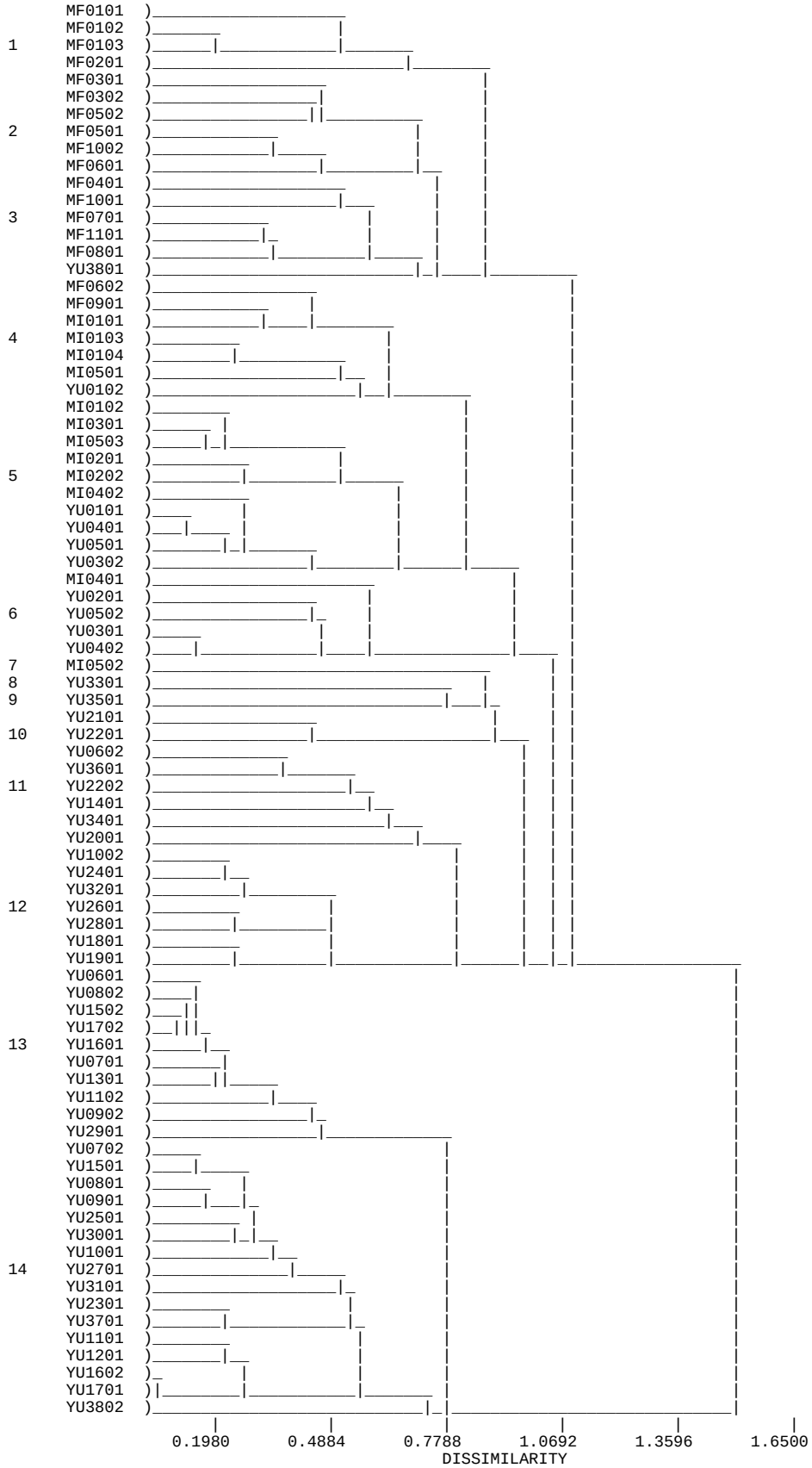


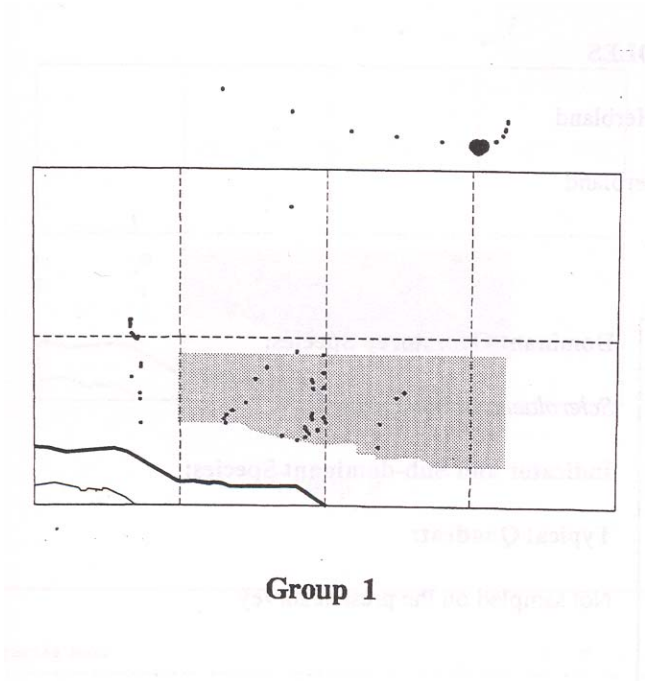
Figure 11 Dendrogram of the *patch* groups from the vegetation analysis of Yumbarra Conservation Park

PLANT COMMUNITIES ON THE QUARTZITE OUTCROP OF MT FINKE

Floristic Group: 1 *Eucalyptus trivalvis / Acacia aneura* Open Shrub Mallee

Map Group: *Eucalyptus trivalvis / Acacia aneura* Open Shrub Mallee and *Eucalyptus youngiana / Triodia irritans* Open Shrubland (cf: *Eucalyptus trivalvis / Acacia aneura* Open Scrub and *Eucalyptus pyriformis / Triodia irritans* Open Heath of Copley & Kemper (1992))

4 members



Dominant Overstorey Species:

Eucalyptus trivalvis
Eucalyptus youngiana
Acacia aneura

Indicator and Sub-dominant Species:

Triodia irritans
Grevillea trueriana
Euphorbia tannensis ssp. *eremophila*

Typical Quadrat:

Not sampled on the present survey, see Copley & Kemper (1992) Appendix I Quadrat MF 1 I

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Euphorbia tannensis ssp. *eremophila*	0	4	0	0	0	0	0	0.10	1.03	1.00	10.33
Lycium australe	0	4	0	0	0	0	0	0.10	0.45	1.00	4.53
Acacia tetragonophylla	0	4	0	0	0	0	0	0.10	1.01	1.00	10.08
Triodia irritans	0	1	3	0	0	0	0	0.78	9.13	1.00	10.08
Zygophyllum eremaeum	0	4	0	0	0	0	0	0.10	0.47	1.00	4.69
Chenopodium desertorum ssp. *desertorum*	0	4	0	0	0	0	0	0.10	0.34	1.00	3.40
Eriochiton sclerolaenoides	0	3	0	0	0	0	0	0.07	0.62	0.75	6.18
Eucalyptus trivalvis	0	3	0	0	0	0	0	0.07	0.91	0.75	9.05
Eucalyptus youngiana	0	3	0	0	0	0	0	0.07	0.17	0.75	5.85
Acacia kempeana	0	3	0	0	0	0	0	0.07	0.19	0.75	7.16
Maireana sedifolia	0	3	0	0	0	0	0	0.07	0.14	0.75	3.35
Maireana villosa	0	3	0	0	0	0	0	0.07	0.91	0.75	9.05
Pittosporum phylliraeoides var. *microcarpa*	0	3	0	0	0	0	0	0.07	0.02	0.75	1.32
Ptilotus gaudichaudii var. *gaudichaudii*	0	3	0	0	0	0	0	0.07	0.72	0.75	7.16
Ptilotus obovatus var. *obovatus*	0	3	0	0	0	0	0	0.07	0.15	0.75	1.55
Ptilotus polystachyus var. *polystachyus*	0	3	0	0	0	0	0	0.07	0.22	0.75	2.20
Salsola kali	0	3	0	0	0	0	0	0.07	0.09	0.75	0.95
Sarcozona praecox	0	3	0	0	0	0	0	0.07	0.45	0.75	4.47
Sclerolaena diacantha/uniflora	0	3	0	0	0	0	0	0.07	0.08	0.75	0.81
Senna artemisioides nothossp. *coriacea*	0	3	0	0	0	0	0	0.07	0.04	0.75	2.22
Atriplex vesicaria ssp.	0	3	0	0	0	0	0	0.07	0.10	0.75	0.26
Acacia aneura	0	2	1	0	0	0	0	0.30	1.73	0.75	3.12
Enchylaena tomentosa var. *tomentosa*	0	3	0	0	0	0	0	0.07	0.00	0.75	0.13
Eremophila latrobei ssp. *glabra*	0	3	0	0	0	0	0	0.07	0.91	0.75	9.05
Eriostemon linearis	0	2	0	0	0	0	0	0.05	0.60	0.50	6.04
Acacia continua	0	2	0	0	0	0	0	0.05	0.60	0.50	6.04
Goodenia glabra	0	2	0	0	0	0	0	0.05	0.43	0.50	4.30
Grevillea nematophylla	0	2	0	0	0	0	0	0.05	0.43	0.50	4.30
Grevillea treueriana	0	1	1	0	0	0	0	0.28	3.32	0.50	6.04
Indigofera australis var. *australis*	0	2	0	0	0	0	0	0.05	0.60	0.50	6.04
Leucochrysum stipitatum	0	2	0	0	0	0	0	0.05	0.60	0.50	6.04
Maireana trichoptera	0	2	0	0	0	0	0	0.05	0.14	0.50	1.35
Abutilon leucopetalum	0	2	0	0	0	0	0	0.05	0.60	0.50	6.04
Pomax umbellata	0	2	0	0	0	0	0	0.05	0.43	0.50	4.30
Rostraria pumila	0	2	0	0	0	0	0	0.05	0.45	0.50	4.49
Scaevola collina	0	2	0	0	0	0	0	0.05	0.60	0.50	6.04
Scaevola spinescens	0	2	0	0	0	0	0	0.05	0.00	0.50	0.29
Sclerolaena eriacantha	0	2	0	0	0	0	0	0.05	0.60	0.50	6.04
Senna artemisioides nothossp *sturtii*	0	2	0	0	0	0	0	0.05	0.60	0.50	6.04
Senna artemisioides nothossp. *artemisioides*	0	2	0	0	0	0	0	0.05	0.60	0.50	6.04
Senna artemisioides ssp. *helmsii*	0	2	0	0	0	0	0	0.05	0.60	0.50	6.04
Sida petrophila	0	2	0	0	0	0	0	0.05	0.43	0.50	4.30
Solanum ellipticum	0	2	0	0	0	0	0	0.05	0.33	0.50	3.26
Alectryon oleifolius ssp. *canescens*	0	2	0	0	0	0	0	0.05	0.12	0.50	1.25
Velleia connata	0	2	0	0	0	0	0	0.05	0.60	0.50	6.04
Zygophyllum apiculatum	0	2	0	0	0	0	0	0.05	0.00	0.50	0.69
Abutilon malvaefolium	0	2	0	0	0	0	0	0.05	0.43	0.50	4.30
Brachycome ciliaris var. *ciliaris*	0	2	0	0	0	0	0	0.05	0.60	0.50	6.04

Casuarina pauper	0	2	0	0	0	0	0	0.05	0.00	0.50	1.30
Chenopodium melanocarpum forma *melanocarpum*	0	2	0	0	0	0	0	0.05	0.33	0.50	3.26
Einadia nutans ssp. *nutans*	0	2	0	0	0	0	0	0.05	0.43	0.50	4.30
Eremophila serrulata	0	2	0	0	0	0	0	0.05	0.60	0.50	6.04

Description

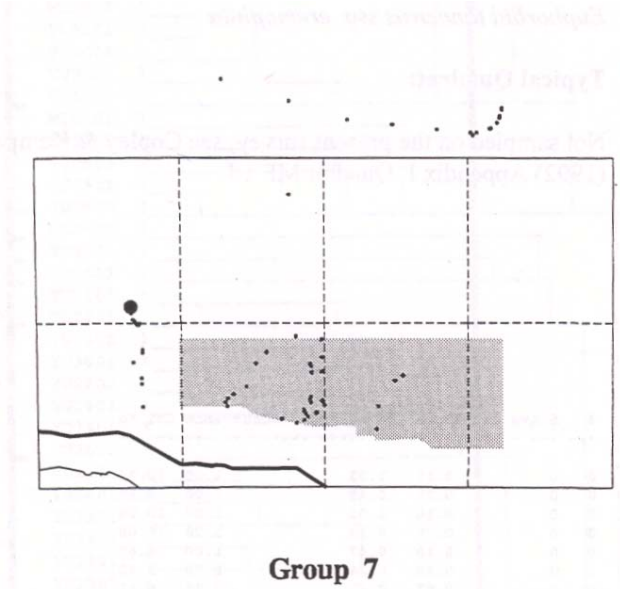
A strong group confined to the skeletal soils on the quartzite of Mt Finke.

PLANT COMMUNITIES OF THE GRANITE ROCKHOLES

Floristic Group: 7 *Sclerolaena obliquicuspis* Open Herbland

Map Group: Sclerolaena obliquicuspis Open Herbland

1 member



Dominant Overstorey Species:

Sclerolaena obliquicuspis

Indicator and Sub-dominant Species:

Typical Quadrat:

Not sampled on the present survey

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Sclerolaena obliquicuspis	0	1	0	0	0	0	0	0.10	0.40	1.00	3.95

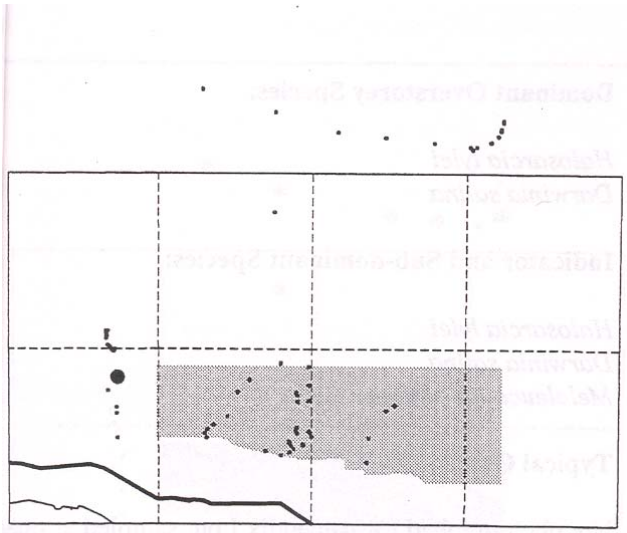
Description

More sampling around granite outcrops and rockholes is clearly needed to refine this group which is represented by a single *quadrat* at Mitcherie Rockhole. Following rain these areas support a variety of ephemeral plants which were not included in the present analysis including *Marsilea* sp., *Calandrinia eremaea, Polycarpon tetraphyllum, Crassula sieberana* ssp. *tetramera, Crassula helmsii, Glossostigma* sp. A and *Juncus buffonius.*

Floristic Group: 9 *Atriplex stipitata* Very Open Shrubland

Map Group: Not mapped

1 member



Group 9

Dominant Overstorey Species:

Atriplex stipitata

Indicator and Sub-dominant Species:

Nitraria billardierei

Typical Quadrat:

Not photographed for Appendix I but sampled as quadrat YU 35 01 on the present survey

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Myoporum platycarpum ssp. *platycarpum*	0	1	0	0	0	0	0	0.10	0.02	1.00	1.05
Nitraria billardierei	0	1	0	0	0	0	0	0.10	1.21	1.00	12.07
Salsola kali	0	1	0	0	0	0	0	0.10	0.21	1.00	2.15
Sclerolaena brevifolia	0	1	0	0	0	0	0	0.10	0.46	1.00	4.62
Solanum hystrix	0	1	0	0	0	0	0	0.10	1.03	1.00	10.33
Atriplex stipitata	0	0	0	1	0	0	0	2.00	24.14	1.00	12.07
Chenopodium curvispicatum	0	1	0	0	0	0	0	0.10	0.09	1.00	4.07
Enchylaena tomentosa var. *tomentosa*	0	1	0	0	0	0	0	0.10	0.01	1.00	0.51

Description

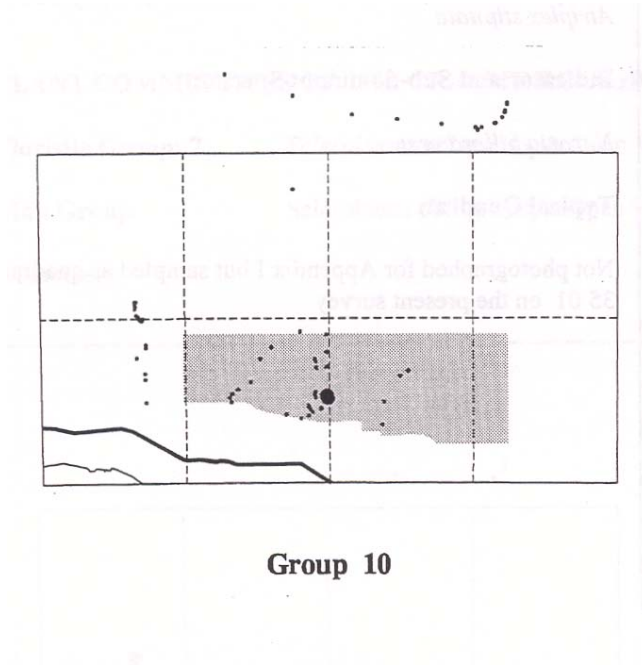
More sampling in areas of shallow loams over limestone are clearly needed to refine this group which is represented by the area around Euria Well.

PLANT COMMUNITIES OF THE SALINE SOILS

Floristic Group: 10 *Halosarcia lylei /Darwinia salina* Low Open Shrubland

Map Group: *Halosarcia lylei / Darwinia salina* Low Open Shrubland

2 members



Dominant Overstorey Species:

Halosarcia lylei
Darwinia salina

Indicator and Sub-dominant Species:

Halosarcia lylei
Darwinia salina
Melaleuca lanceolata

Typical Quadrat:

Not photographed for Appendix I but sampled as quadrat YU 21 01 and YU 22 01 on the present survey

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Halosarcia lylei	0	0	0	2	0	0	0	2.00	24.14	1.00	12.07
Eucalyptus oleosa	0	1	0	0	0	0	0	0.05	0.25	0.50	0.19
Exocarpos sparteus	0	1	0	0	0	0	0	0.05	0.13	0.50	1.29
Grevillea huegelii	0	1	0	0	0	0	0	0.05	0.00	0.50	0.37
Maireana pentatropis	0	1	0	0	0	0	0	0.05	0.08	0.50	0.02
Melaleuca lanceolata	0	0	1	0	0	0	0	0.50	3.46	0.50	0.77
Melaleuca pauperiflora	0	0	1	0	0	0	0	0.50	0.79	0.50	0.49
Acacia sclerophylla	0	1	0	0	0	0	0	0.05	0.60	0.50	6.04
Atriplex vesicaria ssp.	0	0	1	0	0	0	0	0.50	0.33	0.50	0.02
Darwinia salina	0	0	0	1	0	0	0	1.00	12.07	0.50	6.04
Enchylaena tomentosa var. *tomentosa*	0	1	0	0	0	0	0	0.05	0.01	0.50	0.00

Description

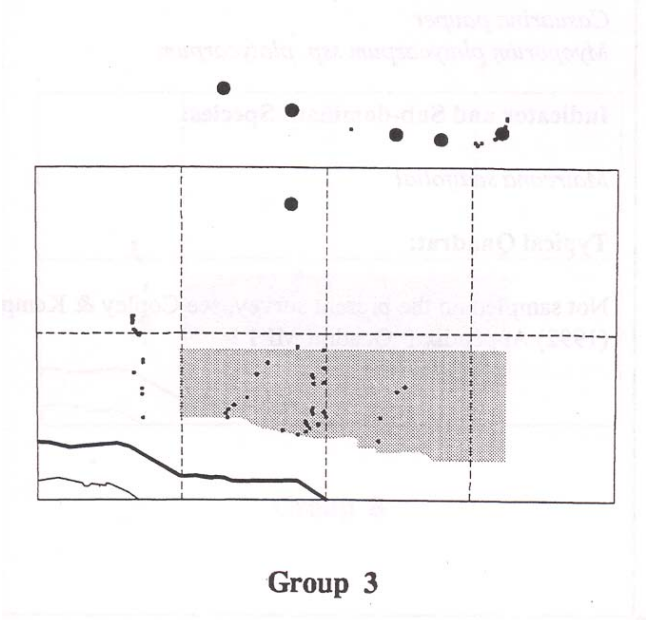
A well-defined group even though only represented by two quadrats from the lakes E of Yumbarra Rockhole. Further sampling of the lakes E of Googs Track and SE of Mt Finke is needed to refine the floristic composition of this group.

PLANT COMMUNITIES OF THE LOAMS OVER LIMESTONE

Floristic Group: 3 *Dodonaea viscosa ssp angustissima / Acacia colletioides* Tall Shrubland

Map Group: Not mapped

6 members



Dominant Overstorey Species:

Dodonaea viscosa ssp. *angustissima*
Acacia colletioides
Eucalyptus concinna

Indicator and Sub-dominant Species:

Dodonaea viscosa ssp. angustissima
Acacia colletioides
Eucalyptus conciinna
Acacia prainii

Typical Quadrat:

Not sampled on the present survey, see Copley & Kemper (1992) Appendix I Quadrat MF 4 I

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Senna artemisioides ssp. *petiolaris*	0	3	3	0	0	0	0	0.55	1.70	1.00	2.46
Dodonaea viscosa ssp. *angustissima*	0	0	6	0	0	0	0	1.00	7.50	1.00	2.76
Sclerolaena parviflora	0	5	0	0	0	0	0	0.08	0.59	0.83	5.85
Enchylaena tomentosa var. *tomentosa*	0	4	1	0	0	0	0	0.23	0.37	0.83	0.23
Acacia colletioides	0	3	1	0	0	0	0	0.22	2.43	0.67	6.41
Eucalyptus concinna	0	1	3	0	0	0	0	0.52	4.12	0.67	3.43
Acacia oswaldii	0	4	0	0	0	0	0	0.07	0.03	0.67	0.34
Santalum acuminatum	0	4	0	0	0	0	0	0.07	0.00	0.67	0.19
Eucalyptus eremicola	0	3	0	0	0	0	0	0.05	0.60	0.50	6.04
Eucalyptus socialis	0	2	1	0	0	0	0	0.20	1.69	0.50	2.00
Acacia ligulata	0	2	1	0	0	0	0	0.20	0.22	0.50	0.38
Maireana pentatropis	0	3	0	0	0	0	0	0.05	0.08	0.50	0.02
Myoporum platycarpum ssp. *platycarpum*	0	3	0	0	0	0	0	0.05	0.00	0.50	0.04
Acacia prainii	0	2	1	0	0	0	0	0.20	2.21	0.50	4.33
Ptilotus obovatus var. *obovatus*	0	3	0	0	0	0	0	0.05	0.05	0.50	0.46
Ptilotus polystachyus var. *polystachyus*	0	3	0	0	0	0	0	0.05	0.07	0.50	0.73
Sclerolaena diacantha/uniflora	0	3	0	0	0	0	0	0.05	0.02	0.50	0.18
Sida ammophila	0	3	0	0	0	0	0	0.05	0.20	0.50	1.96
Triodia lanata	0	0	3	0	0	0	0	0.50	3.10	0.50	2.57
Westringia rigida	0	3	0	0	0	0	0	0.05	0.16	0.50	0.04
Amphipogon caricinus var. *caricinus*	0	3	0	0	0	0	0	0.05	0.23	0.50	2.31
Chenopodium desertorum ssp. *desertorum*	0	3	0	0	0	0	0	0.05	0.05	0.50	0.50
Dicrastylis beveridgei var. *lanata*	0	3	0	0	0	0	0	0.05	0.21	0.50	2.08

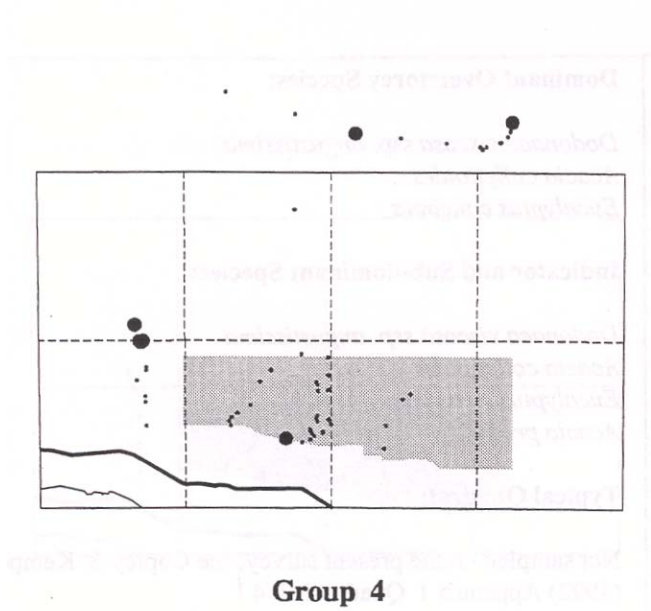
Description

A vegetation community found on shallow sandy loams over limestone in interdunes in the extreme northern part of the present study area.

Floristic Group: 4 *Casuarina pauper / Myoporum platycarpum* Low Open Woodland

Map Group: *Stipa drummondii / Danthonia caespitosa* Open (Tussock) Grassland

7 members



Group 4

Dominant Overstorey Species:

Casuarina pauper
Myoporum platycarpum ssp. platycarpum

Indicator and Sub-dominant Species:

Maireana sedifoliai

Typical Quadrat:

Not sampled on the present survey, see Copley & Kemper (1992) Appendix I Quadrat MI 1 I

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Acacia oswaldii	0	7	0	0	0	0	0	0.10	0.13	1.00	1.35
Sclerolaena diacantha/uniflora	0	6	0	0	0	0	0	0.09	0.12	0.86	1.22
Atriplex vesicaria ssp.	0	5	1	0	0	0	0	0.21	0.00	0.86	0.46
Enchylaena tomentosa var. *tomentosa*	0	6	0	0	0	0	0	0.09	0.00	0.86	0.26
Eremophila glabra ssp. *glabra*	0	6	0	0	0	0	0	0.09	0.05	0.86	2.20
Maireana pentatropis	0	5	0	0	0	0	0	0.07	0.06	0.71	0.23
Myoporum platycarpum ssp. *platycarpum*	0	5	0	0	0	0	0	0.07	0.00	0.71	0.31
Pittosporum phylliraeoides var. *microcarpa*	0	5	0	0	0	0	0	0.07	0.02	0.71	1.15
Ptilotus obovatus var. *obovatus*	0	5	0	0	0	0	0	0.07	0.14	0.71	1.35
Rhagodia spinescens	0	5	0	0	0	0	0	0.07	0.18	0.71	3.67
Salsola kali	0	5	0	0	0	0	0	0.07	0.08	0.71	0.81
Maireana sedifolia	0	3	1	0	0	0	0	0.19	1.29	0.57	1.72
Acacia nyssophylla	0	4	0	0	0	0	0	0.06	0.08	0.57	0.56
Olearia muelleri	0	4	0	0	0	0	0	0.06	0.05	0.57	0.23
Sclerolaena obliquicuspis	0	4	0	0	0	0	0	0.06	0.09	0.57	0.92
Casuarina pauper	0	1	3	0	0	0	0	0.44	4.18	0.57	1.82
Dodonaea viscosa ssp. *angustissima*	0	4	0	0	0	0	0	0.06	0.02	0.57	0.56

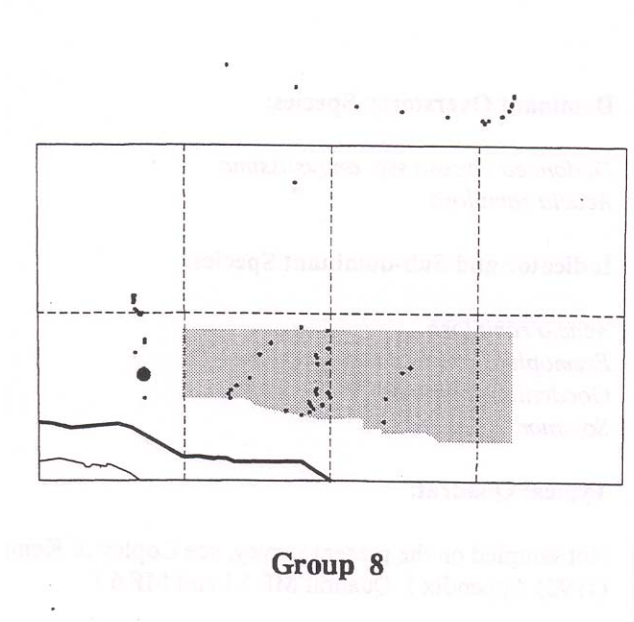
Description

A community of the shallow loams over limestone scattered through the southern part of the study area. Significant growth of grass on these areas following rains means that they have been appropriately mapped as grassland rather than open woodland.

Floristic Group: 8 *Acacia nyssophylla* Very Open Shrubland

Map Group: *Stipa drummondii / Danthonia caespiitosa* Open (Tussock) Grassland

1 member



Dominant Overstorey Species:

Acacia nyssophylla

Indicator and Sub-dominant Species:

Westringia rigida
Maireana pentatropis

Typical Quadrat:

Not photographed for Appendix I but sampled as quadrat YU 33 01 on the present survey

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Geijera linearifolia	0	1	0	0	0	0	0	0.10	0.00	1.00	2.09
Lawrencia squamata	0	1	0	0	0	0	0	0.10	1.01	1.00	10.08
Maireana pentatropis	0	0	1	0	0	0	0	1.00	4.14	1.00	0.86
Maireana radiata	0	1	0	0	0	0	0	0.10	0.36	1.00	3.56
Acacia nyssophylla	0	0	0	1	0	0	0	2.00	18.69	1.00	2.76
Myoporum platycarpum ssp. *platycarpum*	0	1	0	0	0	0	0	0.10	0.02	1.00	1.05
Acacia oswaldii	0	1	0	0	0	0	0	0.10	0.13	1.00	1.35
Sclerolaena brevifolia	0	1	0	0	0	0	0	0.10	0.46	1.00	4.62
Threlkeldia diffusa	0	1	0	0	0	0	0	0.10	0.23	1.00	4.69
Westringia rigida	0	0	0	1	0	0	0	2.00	12.12	1.00	1.02
Atriplex vesicaria ssp.	0	1	0	0	0	0	0	0.10	0.07	1.00	0.81
Chenopodium curvispicatum	0	1	0	0	0	0	0	0.10	0.09	1.00	4.07
Dianella revoluta var.	0	1	0	0	0	0	0	0.10	0.07	1.00	1.60
Enchylaena tomentosa var. *tomentosa*	0	1	0	0	0	0	0	0.10	0.01	1.00	0.51

Description

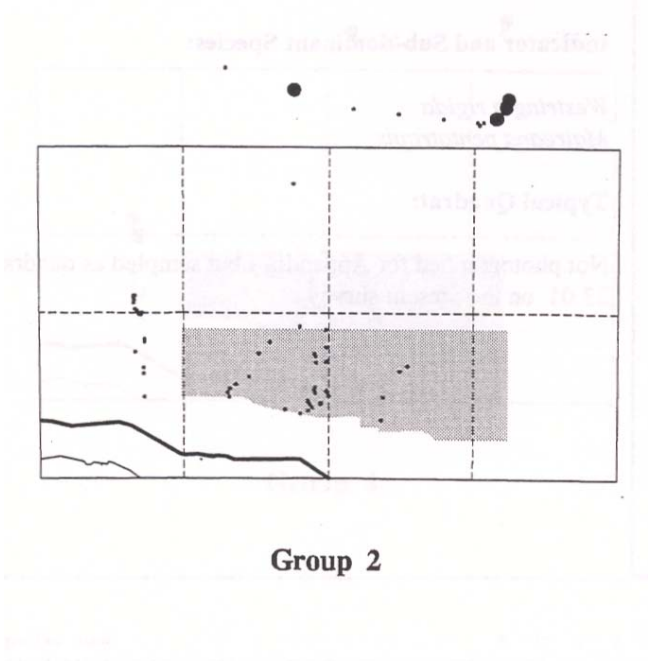
A single quadrat where shallow soils supported *Acacia nyssophylla* with other shrubs in clumps. Following rain significant grass growth would occur on this area and it has been mapped as a grassland.

PLANT COMMUNITIES OF THE SILICEOUS SANDS

Floristic Group: 2 *Dodonaea viscosa* ssp. *angustissima / Acacia ramulosa* Tall Open Shrubland

Map Group: / *Dodonaea viscosa ssp. angustissima / Acacia ramulosa* Tall Open Shrubland (cf: *Acacia ramulosa Dicrastylis beveridgei* var. *lanata* Tall Open Shrubland of Copley & Kemper (1992))

6 members



Group 2

Dominant Overstorey Species:

Dodonaea viscosa ssp. *angustissima*
Acacia ramulosa

Indicator and Sub-dominant Species:

Acacia ramulosa
Eremophila maculata var. maculata
Goodenia cycloptera
Solanum coactiliferum

Typical Quadrat:

Not sampled on the present survey, see Copley & Kemper (1992) Appendix I Quadrat MF 5 I and MF 6 I

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Enchylaena tomentosa var. *tomentosa*	0	6	0	0	0	0	0	0.10	0.01	1.00	0.51
Ptilotus polystachyus var. *polystachyus*	0	5	0	0	0	0	0	0.08	0.29	0.83	2.86
Santalum acuminatum	0	5	0	0	0	0	0	0.08	0.00	0.83	0.49
Senna artemisioides ssp. *petiolaris*	0	5	0	0	0	0	0	0.08	0.01	0.83	1.50
Bossiaea walkeri	0	5	0	0	0	0	0	0.08	0.09	0.83	5.72
Acacia aneura	0	4	1	0	0	0	0	0.23	0.96	0.83	4.01
Acacia burkittii	0	5	0	0	0	0	0	0.08	0.47	0.83	4.68
Dodonaea viscosa ssp. *angustissima*	0	5	0	0	0	0	0	0.08	0.01	0.83	1.71
Eucalyptus concinna	0	3	1	0	0	0	0	0.22	0.52	0.67	3.43
Myoporum platycarpum ssp. *platycarpum*	0	4	0	0	0	0	0	0.07	0.00	0.67	0.23
Acacia ramulosa	0	2	2	0	0	0	0	0.37	1.50	0.67	4.96
Sclerolaena diacantha/uniflora	0	4	0	0	0	0	0	0.07	0.05	0.67	0.55
Alectryon oleifolius ssp. *canescens*	0	4	0	0	0	0	0	0.07	0.26	0.67	2.57
Zygophyllum eremaeum	0	4	0	0	0	0	0	0.07	0.17	0.67	1.72
Atriplex vesicaria ssp.	0	4	0	0	0	0	0	0.07	0.11	0.67	0.15
Dicrastylis beveridgei var. *lanata*	0	4	0	0	0	0	0	0.07	0.41	0.67	4.08
Duboisia hopwoodii	0	4	0	0	0	0	0	0.07	0.62	0.67	6.19
Eremophila maculata var. *maculata*	0	4	0	0	0	0	0	0.07	0.45	0.67	4.49
Eucalyptus foecunda	0	0	3	0	0	0	0	0.50	5.56	0.50	3.10
Eucalyptus socialis	0	3	0	0	0	0	0	0.05	0.05	0.50	2.00
Goodenia cycloptera	0	2	1	0	0	0	0	0.20	2.20	0.50	4.30

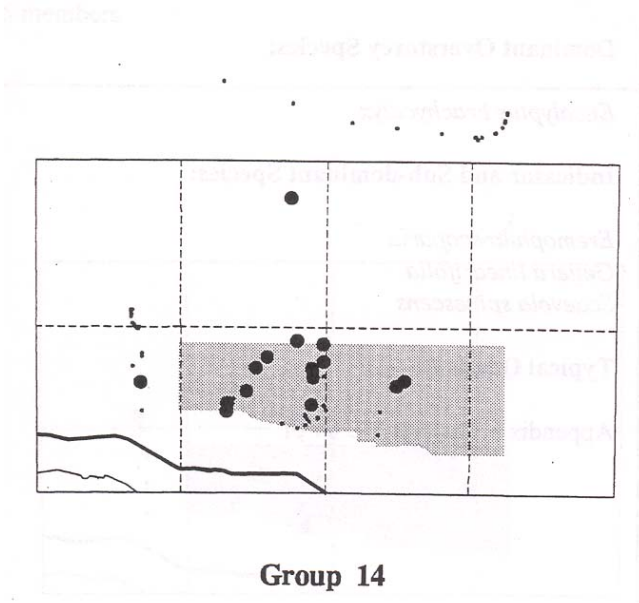
Description

Found on irregular dunefields where the distinctions between dune crests and swales are generally subtle and confined to the N of the present study area.

Floristic Group: 14 *Eucalyptus oleosa* Open Tree Mallee

Map Group:

16 members



Dominant Overstorey Species:

Eucalyptus oleosa

Indicator and Sub-dominant Species:

Triodia scariosa
Dodonaea bursariifolia
Melaleuca eleutherostachya

Typical Quadrat:

Appendix I quadrats, YU 08 01 and YU 09 01 on the present survey

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Triodia scariosa ssp. *scariosa*	0	0	1	15	0	0	0	1.94	8.27	1.00	1.88
Melaleuca eleutherostachya	0	0	3	12	0	0	0	1.69	8.29	0.94	1.85
Eucalyptus yumbarrana ssp. *yumbarrana*	0	2	3	6	0	0	0	0.95	1.77	0.69	0.95
Dodonaea bursariifolia	0	7	2	1	0	0	0	0.29	1.50	0.63	1.27
Eucalyptus oleosa	0	0	2	7	0	0	0	1.00	1.26	0.56	0.31
Dianella revoluta var.	0	9	0	0	0	0	0	0.06	0.00	0.56	0.22
Westringia rigida	0	5	3	0	0	0	0	0.22	0.00	0.50	0.04

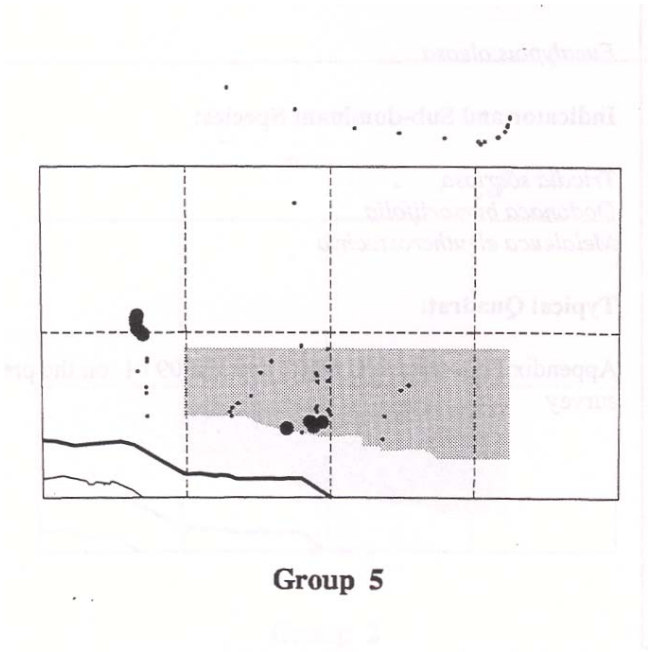
Description

A complex group with floristic variation between the dune crests and interdunes, it is confined to the red sands of the central and northern part of the present study area.

Floristic Group: 5 *Eucalyptus brachycalyx* Open Tree Mallee

Map Group: Eucalyptus brachycalyx Open Tree Mallee (cf: Eucalyptus brachycalyx / Geijera linearifolia Mallee Open Scrub of Copley & Kemper (1992))

10 members



Dominant Overstorey Species:

Eucalyptus brachycalyx

Indicator and Sub-dominant Species:

Eremophila scoparia
Geijera linearifolia
Scaevola spinescens

Typical Quadrat:

Appendix I Quadrat YU 04 0I

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Eucalyptus brachycalyx	0	3	6	0	0	0	0	0.63	2.96	0.90	4.00
Exocarpos aphyllus	0	9	0	0	0	0	0	0.09	0.13	0.90	2.73
Geijera linearifolia	0	7	2	0	0	0	0	0.27	0.28	0.90	1.56
Maireana pentatropis	0	9	0	0	0	0	0	0.09	0.04	0.90	0.60
Olearia muelleri	0	9	0	0	0	0	0	0.09	0.02	0.90	1.16
Eremophila scoparia	0	5	4	0	0	0	0	0.45	0.28	0.90	1.94
Acacia oswaldii	0	8	0	0	0	0	0	0.08	0.07	0.80	0.66
Pittosporum phylliraeoides var. *microcarpa*	0	8	0	0	0	0	0	0.08	0.03	0.80	1.58
Rhagodia crassifolia	0	8	0	0	0	0	0	0.08	0.01	0.80	1.48
Scaevola spinescens	0	7	1	0	0	0	0	0.17	0.27	0.80	1.33
Atriplex vesicaria ssp.	0	8	0	0	0	0	0	0.08	0.09	0.80	0.35
Cratystylis conocephala	0	8	0	0	0	0	0	0.08	0.00	0.80	2.66
Maireana radiata	0	7	0	0	0	0	0	0.07	0.14	0.70	1.42
Santalum acuminatum	0	6	1	0	0	0	0	0.16	0.10	0.70	0.24
Senna artemisioides nothossp. *coriacea*	0	7	0	0	0	0	0	0.07	0.03	0.70	1.86
Westringia rigida	0	7	0	0	0	0	0	0.07	0.13	0.70	0.27
Myoporum platycarpum ssp. *platycarpum*	0	6	0	0	0	0	0	0.06	0.00	0.60	0.14
Olearia magniflora	0	6	0	0	0	0	0	0.06	0.31	0.60	3.10
Acacia papyrocarpa	0	2	4	0	0	0	0	0.42	2.16	0.60	2.00
Sclerolaena obliquicuspis	0	6	0	0	0	0	0	0.06	0.11	0.60	1.05
Zygophyllum aurantiacum	0	6	0	0	0	0	0	0.06	0.26	0.60	2.60
Eucalyptus oleosa	0	0	4	1	0	0	0	0.60	0.19	0.50	0.19
Grevillea huegelii	0	5	0	0	0	0	0	0.05	0.00	0.50	0.37
Sclerolaena diacantha/uniflora	0	5	0	0	0	0	0	0.05	0.02	0.50	0.18
Amyema maidenii ssp. *maidenii*	0	5	0	0	0	0	0	0.05	0.27	0.50	2.74
Cassytha melantha	0	4	1	0	0	0	0	0.14	0.47	0.50	0.67
Dianella revoluta var.	0	5	0	0	0	0	0	0.05	0.00	0.50	0.13
Dodonaea stenozyga	0	5	0	0	0	0	0	0.05	0.00	0.50	1.14

Description

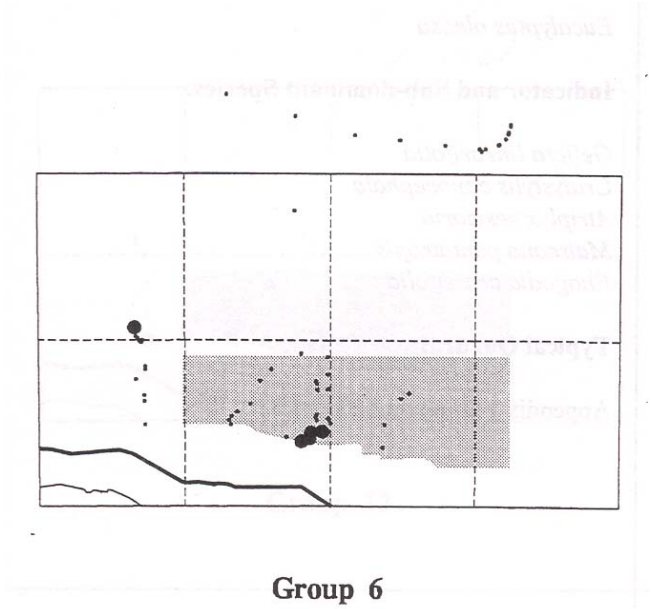
A community of the loams over limestone in the southern part of the study area.

PLANT COMMUNITIES OF THE SOUTHERN SAND PLAINS

Floristic Group: 6 *Eucalyptus yumbarrana* Open Shrub Mallee

Map Group: *Eucalyptus yumbarrana* Open Shrub Mallee (cf: *Eucalyptus incrassata* [now *E. ceratocorys*] / *Eucalyptus yumbarrana* Mallee Open Scrub of Copley & Kemper (1992))

5 members



Group 6

Dominant Overstorey Species:

Eucalyptus yumbarrana

Indicator and Sub-dominant Species:

Eucalyptus ceratocorys
Dianella revoluta

Typical Quadrat:

Not sampled on the present survey, see Copley & Kemper (1992) Appendix I Quadrat MI 4 I

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Eucalyptus yumbarrana ssp. *yumbarrana*	0	1	4	0	0	0	0	0.82	1.16	1.00	2.66
Melaleuca lanceolata	0	5	0	0	0	0	0	0.10	0.03	1.00	4.61
Rhagodia preissii ssp. *preissii*	0	5	0	0	0	0	0	0.10	0.04	1.00	1.81
Triodia scariosa ssp. *scariosa*	0	4	1	0	0	0	0	0.28	0.00	1.00	1.88
Dianella revoluta var.	0	4	1	0	0	0	0	0.28	1.30	1.00	1.60
Melaleuca eleutherostachya	0	3	1	0	0	0	0	0.26	0.00	0.80	1.18
Microcybe multiflora var. *multiflora*	0	4	0	0	0	0	0	0.08	0.07	0.80	3.82
Olearia muelleri	0	4	0	0	0	0	0	0.08	0.02	0.80	0.80
Westringia rigida	0	4	0	0	0	0	0	0.08	0.12	0.80	0.47
Dodonaea bursariifolia	0	4	0	0	0	0	0	0.08	0.03	0.80	2.43
Eucalyptus brachycalyx	0	2	1	0	0	0	0	0.24	0.21	0.60	1.46
Eucalyptus ceratocorys	0	1	2	0	0	0	0	0.42	2.65	0.60	4.31
Exocarpos aphyllus	0	3	0	0	0	0	0	0.06	0.03	0.60	0.92
Gahnia lanigera	0	3	0	0	0	0	0	0.06	0.26	0.60	2.63
Grevillea huegelii	0	3	0	0	0	0	0	0.06	0.01	0.60	0.67
Acacia ligulata	0	3	0	0	0	0	0	0.06	0.00	0.60	0.69
Acacia merrallii	0	3	0	0	0	0	0	0.06	0.00	0.60	1.09
Lomandra leucocephala ssp. *robusta*	0	3	0	0	0	0	0	0.06	0.01	0.60	0.86
Pultenaea elachista	0	3	0	0	0	0	0	0.06	0.15	0.60	5.26
Rhagodia crassifolia	0	3	0	0	0	0	0	0.06	0.00	0.60	0.63
Santalum acuminatum	0	3	0	0	0	0	0	0.06	0.00	0.60	0.11
Sclerolaena diacantha/uniflora	0	3	0	0	0	0	0	0.06	0.04	0.60	0.38
Coopernookia strophiolata	0	3	0	0	0	0	0	0.06	0.28	0.60	5.80
Cryptandra propinqua	0	3	0	0	0	0	0	0.06	0.30	0.60	3.04
Dodonaea stenozyga	0	3	0	0	0	0	0	0.06	0.01	0.60	1.82
Eremophila weldii	0	3	0	0	0	0	0	0.06	0.00	0.60	1.40

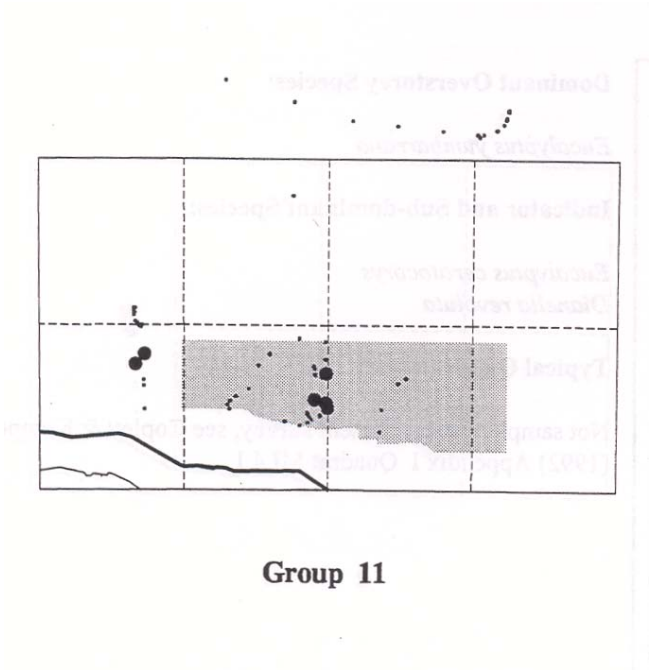
Description

This community of the south western extent of the Yellabinna dune system is a varient of Floristic Group 13 and is confined to dune crests and slopes.

Floristic Group: 11 *Eucalyptus oleosa* Open Tree Mallee

Map Group: *Eucalyptus oleosa* Open Tree Mallee (cf: *Eucalyptus socialis / Acacia gilesiana* Mallee Open Scrub of Copley & Kemper (1992))

6 members



Dominant Overstorey Species:

Eucalyptus oleosa

Indicator and Sub-dominant Species:

Geijera linearifolia
Cratystylis conocephala
Atriplex vesicaria
Maireana pentatropis
Rhagodia crassifolia

Typical Quadrat:

Appendix I as quadrat YU 14 01

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Atriplex vesicaria ssp.	0	0	1	5	0	0	0	1.83	11.40	1.00	0.81
Maireana pentatropis	0	2	2	1	0	0	0	0.70	1.69	0.83	0.45
Eucalyptus oleosa	0	0	2	2	0	0	0	1.00	1.26	0.67	0.58
Rhagodia crassifolia	0	2	2	0	0	0	0	0.37	1.86	0.67	0.88
Eremophila scoparia	0	3	1	0	0	0	0	0.22	0.00	0.67	0.82
Exocarpos sparteus	0	3	0	0	0	0	0	0.05	0.13	0.50	1.29
Geijera linearifolia	0	0	2	1	0	0	0	0.67	3.15	0.50	0.22
Acacia nyssophylla	0	2	1	0	0	0	0	0.20	0.00	0.50	0.35
Pittosporum phylliraeoides var. *microcarpa*	0	1	2	0	0	0	0	0.35	2.19	0.50	0.37
Scaevola spinescens	0	1	2	0	0	0	0	0.35	1.72	0.50	0.29
Senna artemisioides ssp. *petiolaris*	0	1	2	0	0	0	0	0.35	0.50	0.50	0.29
Threlkeldia diffusa	0	3	0	0	0	0	0	0.05	0.03	0.50	0.79
Cratystylis conocephala	0	1	1	1	0	0	0	0.52	3.14	0.50	0.76
Eremophila glabra ssp. *glabra*	*0*	*2*	*1*	*0*	*0*	*0*	*0*	*0.20*	*0.65*	*0.50*	*0.46*

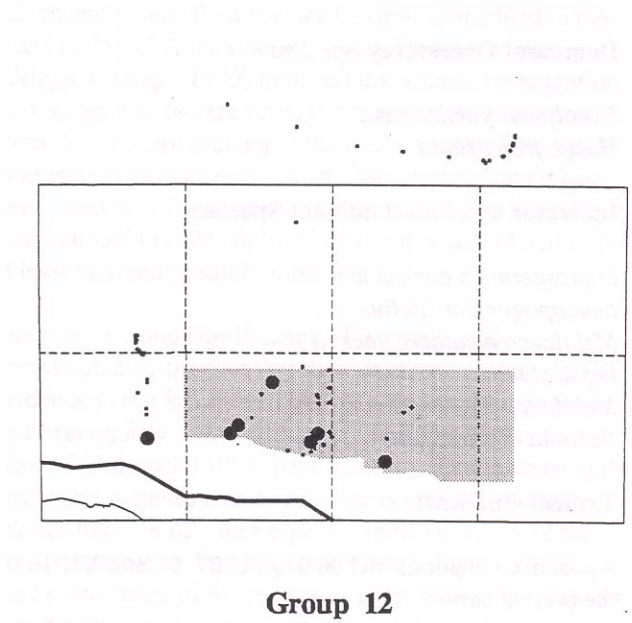
Description

A community of the more loamy sands of the interdunes in the southern parts of the study area.

Floristic Group: 12 *Eucalyptus oleosa* Open Tree Mallee

Map Group: *Eucalyptus oleosa* Open Tree Mallee

7 members



Dominant Overstorey Species:

Eucalyptus oleosa

Indicator and Sub-dominant Species:

Eremophila scoparia
Olearia muelleri
Westringia rigida

Typical Quadrat:

Not photographed for Appendix I but sampled as quadrat YU 18 01, YU 19 01, YU 26 01 and YU 28 01 on the present survey

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Eucalyptus oleosa	0	0	1	6	0	0	0	1.86	6.68	1.00	1.96
Acacia merrallii	0	4	2	1	0	0	0	0.63	5.10	1.00	4.05
Olearia muelleri	0	2	3	2	0	0	0	1.03	5.72	1.00	1.58
Westringia rigida	0	2	3	2	0	0	0	1.03	2.39	1.00	1.02
Eremophila scoparia	0	0	0	7	0	0	0	2.00	15.46	1.00	2.56
Grevillea huegelii	0	5	1	0	0	0	0	0.21	0.72	0.86	1.89
Melaleuca pauperiflora	0	2	2	2	0	0	0	0.89	3.51	0.86	2.29
Santalum acuminatum	0	4	2	0	0	0	0	0.34	0.97	0.86	0.55
Eremophila weldii	0	4	0	1	0	0	0	0.34	1.91	0.71	2.20
Maireana pentatropis	0	2	2	0	0	0	0	0.31	0.13	0.57	0.07
Melaleuca eleutherostachya	0	2	2	0	0	0	0	0.31	0.02	0.57	0.40
Rhagodia crassifolia	0	3	1	0	0	0	0	0.19	0.33	0.57	0.54

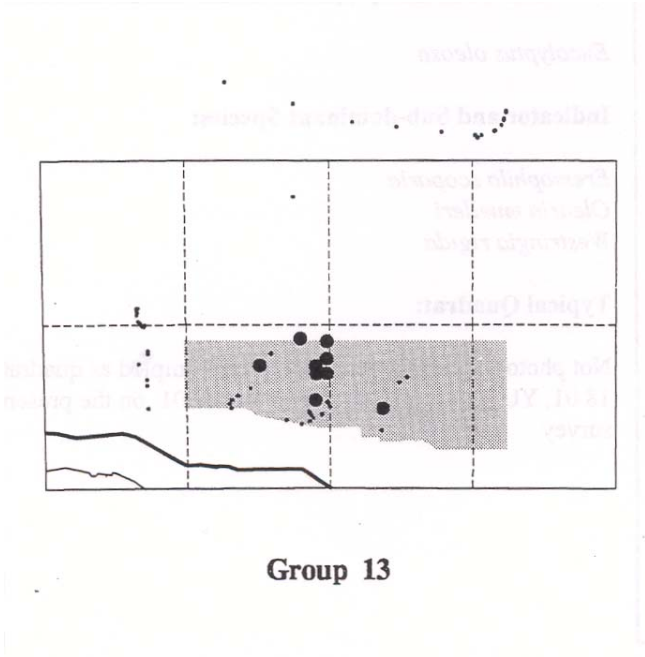
Description

A varient of Floristic Group 11 more characteristic of the dune slopes and crests than the interdunes.

Floristic Group: 13 *Eucalyptus yumbarrana / Hakea francisiana* Open Shrub Mallee

Map Group: *Eucalyptus yumbarrana* Open Shrub Mallee (cf: *Eucalyptus incrassata* [now *E. ceratocorys*] / *Eucalyptus yumbarrana* Mallee Open Scrub of Copley & Kemper (1992))

10 members



Dominant Overstorey Species:

Eucalyptus yumbarrana
Hakea francisiana

Indicator and Sub-dominant Species:

Leptospermum coriaceum
Leucopogon cordifolius
Melaleuca eleutherostachya
Lepidosperma viscidum
Melaleuca leiocarpa
Boronia coerulescens

Typical Quadrat:

Appendix I quadrats YU 06 01, YU 07 01 and YU 16 01 on the present survey

Species Name	R	T	1	2	3	4	5	Avg abundance	Chi Sq	Propn occurrence	Chi Sq
Eucalyptus yumbarrana ssp. *yumbarrana*	0	0	1	9	0	0	0	1.90	10.06	1.00	2.66
Hakea francisiana	0	3	6	1	0	0	0	0.83	8.69	1.00	7.36
Lomandra leucocephala ssp. *robusta*	0	7	3	0	0	0	0	0.37	2.85	1.00	3.37
Triodia scariosa ssp. *scariosa*	0	1	1	8	0	0	0	1.71	6.11	1.00	1.88
Acacia ligulata	0	4	5	0	0	0	0	0.54	2.99	0.90	2.17
Lepidosperma viscidum	0	5	4	0	0	0	0	0.45	4.71	0.90	5.93
Leptospermum coriaceum	0	0	1	8	0	0	0	1.70	17.26	0.90	5.59
Melaleuca eleutherostachya	0	0	6	3	0	0	0	1.20	3.62	0.90	1.65
Boronia coerulescens ssp. *coerulescens*	0	4	5	0	0	0	0	0.54	6.17	0.90	8.04
Grammosolen truncatus	0	7	1	0	0	0	0	0.17	1.63	0.80	6.16
Leucopogon cordifolius	0	2	5	1	0	0	0	0.72	8.44	0.80	7.54
Comesperma scoparium	0	7	1	0	0	0	0	0.17	1.97	0.80	8.85
Melaleuca leiocarpa	0	1	3	3	0	0	0	0.91	9.46	0.70	6.97
Santalum acuminatum	0	6	1	0	0	0	0	0.16	0.10	0.70	0.24
Cassytha melantha	0	7	0	0	0	0	0	0.07	0.07	0.70	1.72
Daviesia ulicifolia	0	7	0	0	0	0	0	0.07	0.35	0.70	3.50
Dillwynia uncinata	0	6	1	0	0	0	0	0.16	1.93	0.70	8.45
Eremophila crassifolia	0	7	0	0	0	0	0	0.07	0.39	0.70	7.65
Grevillea sarissa ssp. *umbellifera*	0	4	2	0	0	0	0	0.24	2.19	0.60	2.92
Gahnia lanigera	0	5	0	0	0	0	0	0.05	0.17	0.50	1.69
Logania nuda	0	4	1	0	0	0	0	0.14	1.48	0.50	4.30
Lomandra collina	0	5	0	0	0	0	0	0.05	0.23	0.50	2.30
Rhagodia preissii ssp. *preissii*	0	5	0	0	0	0	0	0.05	0.00	0.50	0.17
Schoenus subaphyllus	0	5	0	0	0	0	0	0.05	0.27	0.50	2.71

Description

Confined to the pale coloured longitudinal dunes on the southern edge of the study area and almost completely confined to the dune crests.

Species of Particular Interest

Species of national significance

Eremophila praecox
An erect woody shrub with purplish flowers. Although this recently described species has not been added to the latest listing of Australian Rare and Threatened plants (Briggs & Leigh, 1995, in press) it warrants investigation as it appears to be rare throughout its range. It is known from Western Australia and the western end of the Eyre Peninsula region in South Australia. In this State it has been rated as K (uncertain conservation status) by Lang & Kraehenbuehl (1994) indicating that it is considered to be at least rare and possibly threatened.

The conservation significance of *E. praecox* is complicated by the fact that there is strong circumstantial evidence that it is a hybrid between *Eremophila scoparia* and *Eremophila weldii* (Fig.12*)*. (This is contrary to the view of Chinnock (1995, pers. comm.) who is revising the genus and believes that *E. praecox* is probably a true species because of a hair type not found in either of the putative parents.) In addition to morphological evidence, the hybrid status of *E. praecox* is supported by the fact that populations usually appear to comprise of only one to a few individuals, or are extremely localised, and one or two of the putative parents are frequently recorded nearby.

Eremophila praecox was recorded at eight sites in Yumbarra Conservation Park by Kingsley Turner in April 1990.(details are provided in Appendix II). Turner recorded it in *Eucalyptus brachycalyx* +/- *Eucalyptus oleosa* mallee and considers that it typically occurs where substrates are transitional between sands and areas of heavier soils.

Yellow Swainson-pea (*Swainsona pyrophila)*
A spreading, erect, perennial herb with green, glabrous, pinnate leaves and racemes of yellow pea-flowers. Its Australian status has recently been amended from Vulnerable to Rare (Briggs & Leigh, in prep.). The species has a wide distribution in New South Wales, Victoria and South Australia, where it has been collected from the Murray, Yorke Peninsula, Eyre Peninsula and Gairdner-Torrens regions. It is considered highly likely to be present in Yumbarra Conservation Park having been collected on land adjoining the southern boundary of the park (see footnote in Appendix II). *Swainsona pyrophila* is a classic post-fire pioneer and was only detected at this site because of burning associated with land clearance. Adult plants only persist for a few years after fire or other disturbance and population sizes have been greatly underestimated in the past. Consequently the species has been regarded as threatened. Recently, large populations of plants have been recorded in a range of conservation reserves and it is now recognised that large populations would be present as a store of long-lived seeds in many others including Yumbarra Conservation Park. Appropriate fire regimes are necessary to ensure the long-term conservation of this species.

Species Rare in South Australia

Pungent Honey-myrtle *(Melaleuca leiocarpa)*
Yellow-flowered, pungent-leaved shrub to 2.5m high. A Western Australian *Melaleuca* with a more limited, disjunct occurrence in South Australia where it is best known from the Gawler Ranges. It is rated as Rare for the State (Lang & Kraehenbuehl, 1994). The Yumbarra record appears to be the first from a conservation reserve in this State.

Yellow-flower Sour-bush *(Choretrum glomeratum* var. *chrysanthum)*
This variety was previously treated as a different species to the more common white-flowered sour bush (var. *glomeratum)* and there seems to be good evidence, at least in this State, for reinstating it to specific rank. It differs from the typical variety in a range of attributes including flower colour, more open habit, less angular and more greenish branchlets, less densely clustered inflorescences, and a preference for heavier more fertile soils.

Yellow-flower Sour-bush is regarded as rare throughout its wide range in the southern districts of South Australia where it has declined due to preferential clearance of its habitat for agriculture. It reaches its northern limit in this State in the Yumbarra district. It also occurs in Western Australia, Victoria and New South Wales.

Goodenia gibbosa
A prostrate, spreading yellow-flowered herb similar to G. *pinnatifida* but differing in its often stoloniferous habit, less divided leaves and more prominent corolla pouch. A specimen collected from Yumbarra Conservation Park on the Yellabinna Survey appears to be the first record from South Australia. This is a significant southerly disjunction from its previously known range in southern Northern Territory and an adjoining portion of Western Australia. The species is rated as Rare for the State pending further information.

Goodenia glandulosa
An erect herb with several leafy stems to 40cm and yellow flowers in terminal racemes. This species was first collected for South Australia during the Yellabinna Survey from Yumbarra Conservation Park, at *quadrat* YU 02 , 3km SW of Inila Rock Waters. It was found on a sandy plain with whipstick mallee and a *Triodia* understorey. Formerly it was only known from Western Australia (Gibson and Great Victoria Deserts and Warburton region) and the Northern Territory (Central South region).

Rusty Spyridium *(Spyridium tricolor)*
An erect dense rounded shrub to 1.5m high with rounded green leaves that are initially folded and rusty-coloured below. This recently described species (Barker & Rye, 1993) has its major occurrence in Western Australia with a disjunct outlier on the South Australian side of the Nullarbor plain in the Koonibba district.

The occurrence of this species within Yumbarra Conservation Park is inconclusive (see footnotes in appendix II) but the two known South Australian populations occur only 6.5 and 10.5km south of the park. At these sites *S. tricolor* is reported from a variety of plant communities on shallow sand to sandy loam over limestone rubble or sheets (calcrete) and it even extends into the Yellabinna Environmental Association in *E .incrassata* [*E. ceratocorys*] open scrub on red siliceous sand dunes. As all the habitats are represented in Yumbarra Conservation Park, the occurrence of *S. tricolor* there seems quite probable. The species has a South Australian rating of 'K' (uncertain status) indicating that it is rare and possibly threatened in this State.

Spiny Templetonia *(Templetonia battii)*
A small, intricate, leafless shrub with rigid, cylindrical, spiny branches and yellowish pea-flowers. In its vegetative state it is similar in appearance to *Acacia spinescens*. The species occurs in Western Australia and South Australia where it is rare and confined to the north-western part of the Eyre Peninsula region.

Species rare in Eyre Peninsula Region

Harrow Wattle *(Acacia acanthoclada)*
A spiny divaricate shrub to 2m high with downy stems and characteristic small, curved phyllodes. *A. acanthoclada* has a wide distribution from Western Australia to Victoria and New South Wales. It is regarded as Uncommon in South Australia and Rare on Eyre Peninsula where it occurs sparsely in a relatively narrow band across the northern part of the region (Whibley & Symon, 1992). It is found on calcareous and sandy soils and often increases after disturbance.

Prain's Wattle *(Acacia prainii)*
An erect bushy shrub to 2.5m tall with long, flattened, viscid phyllodes marked by four obvious veins. This is a good example of a species at the southern limit of its distribution in Yumbarra Conservation Park. The record from the park is the first for the Eyre Peninsula region. *A. prainii* occurs in Western Australia and Northern Territory and extends southeastwards into South Australia through desert sand systems in the North-Western, Gairdner-Torrens and Nullarbor regions (Whibley & Symon, 1992). The occurrence in the Eyre Peninsula region represents a southerly extension of the Nullarbor populations. Its rarity at region level only results from the fact that it is at the southern limit of its distribution.

Coopernookia strophiolata
A spreading shrub to 1m tall with viscid leaves that appear glabrous and white goodenia-like flowers. This is a predominantly Western Australian species with some disjunct occurrences on the eastern side of the Nullarbor in South Australia (Carolin, 1992). As with the preceding species, this is a new record for the Eyre Peninsula region representing a southerly extension of populations in the Nullarbor region.

Paisley's Emubush *(Eremophila paisleyi)*
A broom-like shrub to 3m tall with warty stems, myoporum-like foliage and spotted pale purple flowers. A widespread arid zone species on loamy or rocky soils in Western Australia, Northern Territory and South Australia. The Yumbarra record is the first for the Eyre peninsula region and is at the southern limit of its distribution.

Eremophila platythamnos ssp. "exotrachys"
A low shrub to 1m with rounded, hairy leaves and purple flowers. In South Australia this species occurs in the North-Western and Nullarbor regions as well as Eyre Peninsula where it is rarely encountered and reaches the southern limit of its distribution.

Silver Sea-berry Saltbush *(Rhagodia candolleana* ssp. *argentea)*
A spreading, semi-succulent shrub distinguished from the typical ssp. *candolleana* by its hastate leaves with a silvery metallic sheen resulting from a layer of flattened and fused vesicular hairs. It is associated with inland salt lakes (Jessop & Toelken, 1986). It has been recorded for the North-Western and Nullarbor regions in South Australia. The Yumbarra collection represents the first record for the Eyre Peninsula region, but again its significance here is as an extension of the Nullarbor occurrences.

Species Uncommon in South Australia

Grevillea sarissa ssp. *umbellifera*
A low spreading shrub to 2m high with linear leaves and showy combs of pink to red flowers which betray its close relationship with *Grevillea huegelii*. The species occurs in Western Australia and in a relatively narrow zone stretching from Kyancutta to Koonibba in the northern part of the Eyre Peninsula region and southern Gairdner-Torrens region. Although it grows on the ubiquitous red desert dunes it has a restricted distribution and reaches its northern limits in the vicinity of Yumbarra Conservation Park.

Splendid Daisy-bush *(Olearia magniflora)*
A sparse shrub to 1m high with somewhat viscid, dark green, toothed leaves and conspicuous purple daisy flowers. This species is widely distributed in Queensland, New South Wales, Victoria and in the southern districts of South Australia, extending as far north as the Nullarbor region. It has been greatly depleted in the agricultural districts of South Australia because of its association with fertile calcareous loams and its susceptibility to grazing.

Feather Daisy-bush *(Olearia passerinoides* ssp. *passerinoides)*
An erect shrub to 2.5m tall with small linear leaves and terminal white daisy flowers borne singly on the ends of the branchlets. This is a species of sandy soils in the semi-arid mallee areas from Western Australia through to Victoria. In South Australia it occurs in the Murray and Eyre Peninsula regions and reaches its northern limit in the Yumbarra area (Cooke, 1985). It occurs infrequently, often in scattered populations of one to several plants, but can become prolific after bushfires or other disturbances.

Silky Riceflower *(Pimelea subvillifera)*
A shrub to 0.5m high with alternate short, hairy leaves and terminal clusters of hairy cream flowers. This species has widely disjunct occurrences in Western Australia and on Eyre Peninsula in South Australia where it reaches its northern limit in the Yumbarra area (Rye & Heads, 1990).

Limestone Bush-pea *(Pultenaea elachista)*
A small rigid shrub to 0.5m high with crowded decussate leaves and yellow and brown pea flowers. The species occurs in Western Australia and the Eyre Peninsula region of South Australia, typically on soils with sheet limestone. It is presumed extinct on Kangaroo Island.

Trident Spyridium *(Spyridium tridentatum)*
A small intricate shrub to 0.3m tall with folded, pale greyish leaves and inconspicuous terminal clusters of flowers. In many ways it is superficially similar to *Cryptandra leucophracta*. The species is widely distributed from the mallee regions of Western Australia through to Victoria, although in South Australia it has been much overlooked (Barker & Lang, 1988). It occurs on deep sands and is another example of a taxon that reaches its northern limit in the Yumbarra district.

Other species of interest

Salt Darwinia *(Darwinia salina)*
A low shrub to 0.5m tall with minute, decussate foliage and clusters of small white flowers. This species was recently segregated by Craven & Jones (1991) from its more common close relative *Darwinia micropetala.* It is confined to South Australia, occurring in the North-Western, Nullarbor, and Gairdner-Torrens Regions and extending into the northern part of Eyre Peninsula region where it is rated as Uncommon (Lang & Kraehenbuehl, 1994). It is typically associated with gypseous soils and is often found on the margins of salt lakes and clay pans or on lunettes. It often occurs together with *Halosarcia lylei* (qv).

Woolly Emubush *(Eremophila subfloccosa* ssp. "imbricata")
A distinctive spreading shrub to 1m high with white-woolly leaves and branches and yellowish-green flowers. This taxon is recorded in Western Australia and in the North-Western, Eyre Peninsula and Yorke Peninsula regions of South Australia. It is considered Uncommon on Eyre Peninsula although it may be locally abundant following disturbance.

Grammosolen truncatus (Fig. 13)
An erect shrub to 2m high with velvet-grey ovate leaves and white starry flowers. Endemic to South Australia and occurring on sandy soils in the North-Western, Gairdner-Torrens, Nullarbor and Eyre Peninsula regions. It is rated as Uncommon on Eyre Peninsula and is not known to be conserved in any other conservation reserve (Lang & Kraehenbuehl, 1994).

Halosarcia lylei Wiry Glasswort
A shrub to 1m high with slender, erect, cylindrical, casuarina-like stems. It is one of the most distinctive and easily recognisable of the samphires. Like *Darwinia salina*, it is typically associated with gypseous salt lakes but has a wider distribution. It has a major disjunct population in each of three states, occurring in Western Australia and Victoria as well as the Nullarbor, Gairdner-Torrens and Eyre Peninsula regions of South Australia (Wilson, 1980). It is rated as Uncommon for Eyre Peninsula.

Examples of plants found in Yumbarra Conservation Park are shown in Figs. 12-17.

Figure 12
The purple emubush *Eremophila weldii*
Photo: A. Robinson

Figure 13
A typical shrub of the dune crests *Grammosolen truncatus*
Photo: A. Robinson

Figure 14
The silvery phebalium *Phebalium bullatum*
Photo: P. Lang

Figure 15
The dark turpentine bush *Beyeria opaca*
Photo: A. Robinson

Figure 16
The lobed-leaf daisy-bush *Olearia exiguifolia*
Photo: P. Lang

Figure 17
The broom milkwort *Comesperma scoparium*
Photo: A. Robinson

MAMMALS

Background

The mammal fauna of the Yellabinna region, of which Yumbarra Conservation Park falls in the south-east corner, was investigated extensively by Kemper (1992). However, within Yumbarra Conservation Park little work has been carried out on the mammal fauna particularly in the dune systems occupying the northern three-quarters of the park. Five visits, including the current survey, have been made to the park, resulting in a list of 17 species (Appendix III). These visits have been the only source of specimens at the South Australian Museum.

The earliest recorded visit targeting the mammal fauna of the park was an overnight trip in spring 1969 by a member of the South Australian Field Naturalist Society, Mammal Group. This trip confirmed the presence of Mitchell's Hopping Mouse (*Notomys mitchellii*) and provided the only record for the park of the Hairy-nosed Wombat (*Lasiorhinus latifrons*).

A brief visit was made in spring 1974 by two members of the Department of Environment and Planning (now Department of Environment and Natural Resources, DENR). A few traps were set up overnight at the salt lakes in the north east corner of the park, east of Goog's Track (Fig. 3). The only records available from this visit were a Western Pygmy Possum (*Cercartetus concinnus)* (Fig. 18*)* and a Little Long-tailed Dunnart (*Sminthopsis dolichura)* (Fig. 19) which were registered with the South Australian Museum.

The Animal and Plant Control Commission visited the park during summer 1980. Trapping was conducted in several habitats, including sand dunes, although no sites were more than 1km North of Inila Rock Waters (Fig. 3). This survey recorded nine species within the park, including the first bat record, Gould's Wattled Bat (*Chalinolobus gouldii*).

During spring 1987 the Biological Research Section, Department of Environment and Planning (now DENR) carried out a survey of the whole Yellabinna Region. Traps were set at five *quadrats* within Yumbarra Conservation Park, none of these located more than 1km North of Inila Rock Waters (Fig. 3). This was the first visit that used mist nets to survey for bats. As a result three new bat species were added to the park list, the King River Eptesicus (*Eptesicus regulus*) (Fig. 20), the Lesser Long-eared Bat (*Nyctophilus geoffroyi*) and the Greater Long-eared Bat (*Nyctophilus timoriensis*) (Fig. 21). A total of 13 species were recorded including the first record of the Fat-tailed Dunnart (*Sminthopsis crassicaudata).*

The current survey held in Autumn 1995, also recorded 13 mammal species for the park. This survey concentrated on the dune systems north of Inila Rock Waters through to the northern boundary of the park. This additional effort within the dune systems produced the first records of Yvonne's Ningaui (*Ningaui yvonneae*) (Fig. 22) within the park. The first evidence of the Echidna (*Tachyglossus aculeatus*) was also recorded from characteristic droppings and diggings observed at two sites.

The total mammal fauna recorded for Yumbarra Conservation Park to-date consists of 17 species, including four species of bat and four introduced species (Appendix III).

Notable Species Recorded Within Yumbarra Conservation Park

Insufficient records exist to permit statistical analysis of the mammal data, however several patterns have emerged which have been used to help interpret the results.

Western Pygmy Possum (*C. concinnus)* (Fig. 18)
The Western Pygmy Possum (*C. concinnus*) shows no strong habitat preference within the park being captured on both the dunes and swales in the north of the park and the open mallee sandplains in the south. It appears to be relatively common and is likely to be found throughout the park.

Dunnarts (*Sminthopsis sp*.)
Records of the Fat-tailed Dunnart (*Sminthopsis crassicaudata)* from the South Australian Museum show that this species is widespread throughout most of South Australia, although there are no records in the far north west of the State. In contrast to this species records of the Ooldea Dunnart (*Sminthopsis ooldea*) are restricted to the north west region of the state and do not fall below the Transcontinental Railway Line, suggesting this species is unlikely to be found as far south as Yumbarra Conservation Park. The Fat-tailed Dunnart (*S. crassicaudata)* was not recorded on the recent survey but several specimens were trapped on the 1987 survey. This species has not been recorded in the north of the park or at any *quadrats* where the Little Long-tailed Dunnart (*S. dolichura*) (Fig. 19) has been found. It is not clear what factors influence the distribution of these two species within the park.

Ningauis (*Ningaui sp*.)
The nine records of Yvonne's Ningaui (*Ningaui yvonneae*) (Fig. 22) from the current survey are the first for the park. This species showed a distinct preference for interdunes in the northern half of the park, perhaps explaining why it has escaped detection on previous trips, as trapping was not conducted in this area. It is often associated with Spinifex (*Triodia sp*.) and although not recorded in the park prior to this survey, there is a museum record of it just north of the park along Goog's Track. All museum records of the closely related Wongai Ningaui (*Ningaui ridei*) are north of 30 degrees latitude, ie: above the Transcontinental Railway Line, suggesting Yvonne's Ningaui is the only species likely to occur throughout the northern dunefields of the park.

Mitchell's Hopping Mouse (*Notomys. mitchellii)*
Mitchell's Hopping Mouse appears to be widespread and abundant within the park. It has been recorded on each visit and 20 specimens were recorded from eight separate localities on the current survey. Within Yumbarra Conservation Park the species tends to occur on sandy soils with open Mallee and at least some Spinifex (*Triodia sp).* This association is dominant throughout the park. It has quite characteristic tracks and 'pop holes' in it's burrow systems and these can also help in detecting the species presence.

Hairy-nosed Wombat (*Lasiorhinus latifrons)*
The Hairy-nosed Wombat was recorded during the 1969 visit as occurring '10 miles from South boundary' leaving some ambiguity as to whether it was actually recorded inside the park. This sighting along with 'opportunistic' records of active burrows to the west of the park during the current survey, confirms the presence of the Hairy-nosed Wombat (*L. latifrons)* in the region

Echidna (*Tachyglossus aculeatus)*
Echidna's are an elusive species and sightings are uncommon even in areas where numbers are known to be high. There are very few museum records of this species for the pastoral region of the state and although their distribution is considered widespread throughout South Australia, often diggings and droppings are the only evidence of the species presence in an area. Signs of the Echidna were found inside Yumbarra Conservation Park on the present survey and the species probably occurs in low numbers throughout the park.

Greater Long-eared Bat (*Nyctophilus timoriensis*) (Fig. 21)
A limited amount of effort has been put into surveying the bat fauna of Yumbarra Conservation Park, with the majority of trapping being carried out near Inila Rock Waters. Although within its presently understood range, records of the Greater Long-eared Bat are limited. This species is considered 'uncommon' by Kemper and Queale (1990) and will benefit from the protection of any areas of suitable habitat.

Introduced Species

The House Mouse (*Mus domesticus*) is an expert generalist and well known for colonising disturbed areas. Records of this species within the park are restricted to the Inila Rock Waters area and further south. In most circumstances House Mice are easily detected when present in an area. This suggests that the drier, less disturbed area of the park, north of Inila Rock Waters, may have little infestation from this introduced pest. Any activities which involve further disturbance to the park will probably lead to an increase in numbers and further spread of this species. This in turn, will put additional pressure on populations of small native mammals and decrease their chance of survival during less-favourable seasons. Other feral pests such as the Cat (*Felis cattus*) and the Fox (*Vulpes vulpes*) will also benefit from increased access into the park. The feral cat is known to increase in number in response to human habitation of an area due to an increase in refuge spots such as rubbish dumps (D. Paton, Australian Research Fellow, Adelaide University, pers. comm.). Although artificial refuges may support high numbers, any change in conditions which puts pressure on the population is likely to result in an increased pressure on native wildlife. The ongoing monitoring program by the Environment section at Olympic Dam, on feral cat numbers and stomach contents indicates the devastating impact these animals can have on native fauna (Olympic Dam Operations, 1993).

Although the current survey concentrated on the proposed mining licence area in the north of the park, one *quadrat* near Inila Rock Waters, YU 04, established during the Yellabinna survey in spring 1987, was re-surveyed. This enabled a rough comparison of results between two separate trapping sessions. The most notable difference was the absence of the Dunnart (*S. dolichura*) and the House Mouse (*M. domesticus*) from the autumn 1995 trapping session. As the same trapping effort was used during both sessions it suggests that fluctuations in numbers over time or season can influence the chance of capture and result in some species not being detected although they are known to exist at a site.

Significant Species Possibly Occurring Within Yumbarra Conservation Park

Sandhill Dunnart (*Sminthopsis psammophila)*
The Sandhill Dunnart has a state conservation rating of vulnerable (Kemper and Queale, 1990) and is considered rare by Kemper, 1992. The information available on this species is limited with only nine specimens held in the South Australian Museum. The closest record to Yumbarra Conservation Park is 100km to the north, however four other specimens were collected approximately 200km south east of the park in 1967. This suggests the range could be continuous between these two localities and therefore include Yumbarra Conservation Park. The limited information available on the habitat preference of this species suggests that it prefers 'low parallel sand ridges capped by hummocks of porcupine grass with wide swales' (Strahan, 1991). During the Yellabinna survey in 1987, the species was found in *Casuarina cristata* or *Callitris verrucosa* and mallee woodland with a diverse shrub layer over *Triodia* (Kemper, 1992) and further details of its habitat preferences in both South Australia and Western Australia can be found in Pearson and Robinson (1990). Yumbarra Conservation Park has what is considered to be suitable habitat for this species. It is important that more intensive effort is put into confirming the presence or absence of this species within the park before any of the potential habitat is put at risk.

Sandy Inland Mouse (*Pseudomys hermansburgensis*)
The Sandy Inland Mouse was recorded at seven *quadrats* during the Yellabinna Survey, one of these only 50km to the north west of Yumbarra Conservation Park (Copley and Kemper, 1992). It was recorded in open woodlands and shrublands and although it was found throughout the

dune systems and sandplains, it was shown to favour the interdunes (Kemper, 1992). Yumbarra Conservation Park appears to provide extensive habitat suitable for this species, however the park is located along the southern limits of its range (Kemper and Queale, 1990). This arid adapted species may have been in low numbers during the current survey due to the dry conditions and, limited trapping effort in some areas of the park, may explain why no specimens have been recorded.

Inland Eptesicus (*Eptesicus baverstocki)*
Yumbarra Conservation Park lies in the overlap zone between the King River Bat (*E. regulus*) (Fig 20), found in the southern half of South Australia, and the Inland Eptesicus found in the north (Reardon and Flavel, 1991). Only the King River Bat has been recorded within the park but it is likely that the Inland Eptesicus also occurs in the region. The absence of any records of the Inland Eptesicus in the park may support the theory that the two species are mutually exclusive (L. Queale, Collection Manager of Mammals, South Australian Museum, pers. comm.).

Other Species Potentially Occurring Within Yumbarra Conservation Park

Camel (*Camelus dromedarius)*
Although there are no documented records of Camels in Yumbarra Conservation Park there were a few old tracks observed on the recent survey which were typical of those made by camels. This species is reported as common along the south western edge of the Nullarbor (Long, 1974) and was found at several *quadrats* during the Nullarbor survey in 1984, including Yalata Aboriginal Reserve approximately 100km west of Yumbarra Conservation Park (McKenzie and Robinson, 1987). It was not recorded south of the Trans Continental Railway during the Yellabinna survey (Copley and Kemper, 1992). No records have been found for camels south east of Yumbarra Conservation Park. Although the species may visit the park on occasions it would be considered uncommon in the area.

Red Kangaroo (*Macropus rufus*)
Red Kangaroo's are found in a variety of habitats throughout northern South Australia but prefer open plains (Strahan, 1991). There are only small areas in the southern part of Yumbarra Conservation Park that provide this habitat which may explain why the species has not been recorded to-date. Opportunistic sightings to the west of the park during the current survey confirm that the species is present in the area and probably occurs in low numbers within the park.

Although a number of visits have been made to the park over a range of seasons, every habitat was not surveyed on each visit. This means that additional mammal species may still be found particularly in the far north of the park which has only been surveyed in autumn, which is not the optimum trapping season. The species discussed above could all be recorded in the future with more extensive trapping in favourable seasons

Pictures of typical species from Yumbarra Conservation Park are shown in Figs. 18-23.

Figure 18
The Western Pygmy-possum *Cercartetus concinnus*
Photo: A. Robinson

Figure 19
A dunnart widespread in the western mallee areas of South Australia, *Sminthopsis dolichura*
Photo: A. Robinson

Figure 20
The King River Eptesicus *Eptesicus regulus*
Photo: A. Robinson

Figure 21
The Greater Long-eared Bat *Nyctophilus timoriensis*
Photo: A. Robinson

Figure 22
Yvonne's Ningaui *Ningaui yvonnae*
Photo: A. Robinson

Figure 23
A dingo pup *Canis familiaris dingo* near Inila Rock Waters
Photo: A. Robinson

BIRDS

A total of 101 species of birds have been recorded in Yumbarra Conservation Park (Appendix IV). This list was compiled from records made since 1968 and includes observations from all seasons.

On this survey, observations were made at 13 *quadrats* within Yumbarra Conservation Park, from 19 March - 1 April 1995. Each quadrat was searched for a total of one to four hours including a standard half hour transect count. Opportunistic records were gathered at a further 12 sites within the conservation park, at one site within Yellabinna Regional Reserve (Jellabinna Rocks), and at four sites immediately west of Yumbarra Conservation Park, (near Euria Well).

Fifty seven bird species were recorded within Yumbarra Conservation Park on the current survey. An additional five species were recorded at Jellabinna Rocks (*Dromaius novaehollandiae, Cacatua leadbeateri, Melopsittacus undulatus, Ardeotis australis, Acanthiza uropygialis*) and four species near Euria Well, (*Dicaeum hirundinaceum, Hirundo neoxena, Hirundo nigricans, Cheramoeca leucosternum).* All of these species apart from the Bustard *(Ardeotis australis)* have been recorded in the park on previous surveys. Two species, the Painted-Button Quail (*Turnix varia*) and the Silvereye (*Zosterops lateralis*) had not been observed within Yumbarra Conservation Park prior to the March 1995 survey.

Low rainfall in preceding years may account for some species being in lower numbers and less vocal than would be expected in better seasonal conditions, or during the breeding season. This may have resulted in some species being overlooked at some sites.

The cumulative list of birds from Yumbarra Conservation Park includes one species listed as endangered, seven species listed as vulnerable and one as rare by Parker and Horton (1990). Carpenter and Reid (1988) recognise twenty four species of state or regional conservation significance. Brief comments on each of these species are given below.

Species of Significance Recorded Within the Park

Endangered Species

Malleefowl (*Leipoa ocellata*) (Fig. 24 & 25)
This ground dwelling species has declined throughout its range due to habitat clearance and introduced predators. Fifteen inactive nest mounds were located, however sightings of a bird or fresh tracks were only made at three areas in the conservation park, as far north as YU 10, during the survey. The low density population and lack of breeding activity may be due to low rainfall in recent years.

Vulnerable Species

Pink Cockatoo (*C. leadbeateri)*
This species has declined through habitat clearance and illegal trapping. It was not recorded in the conservation park during the present survey, however a feather was found at Jellabinna Rocks, within the Yellabinna Regional Reserve. The small flock previously resident near Inila Rock Waters may have moved elsewhere due to dry seasonal conditions or may have been removed by trappers.

Shy Hylacola (*Hylacola cauta)*
This species was recorded at 14 sites during the survey, in mallee/*Triodia* habitats. It has declined elsewhere in its range due to habitat clearance and degradation.

Painted Button-Quail (*Turnix. varia)*
Observations of birds and/or their distinctive feeding scrapes were recorded at three *quadrats* (YU 04, YU 13, YU 24) during the survey. This is a westerly range extension from the previously known limit at Corrobinnie Hill (S.A.M. B34459). The species has probably been overlooked by previous observers. A downy chick caught at YU 04 in 1987 and identified as a Little Button-Quail (*T. velox)* may actually have been a Painted Button-Quail (*T. varia).*

Rufous Treecreeper (*Climacteris rufa*)
This species occurs in areas of larger mallee containing hollows and has declined elsewhere in its range due to habitat clearance. This survey and previous observers found the species at YU 04 and along the southern boundary of the park.

Chestnut Quailthrush (*Cinclosoma castanotum*)
This ground living species is apparently widespread but occurs in low numbers in mallee/*Triodia* within the region. This survey only recorded tracks and calls at one *quadrat* (YU 08). Previous records show that the species occurs over a wide area of Yumbarra Conservation park.

Purple-gaped Honeyeater (*Meliphaga cratitia*)
This species was not found during this survey but was recorded in 1977 and 1980, apparently being a seasonal or irregular visitor to the area. Its range has been reduced elsewhere by clearance of Mallee habitats.

Yellow-plumed Honeyeater (*Meliphaga ornatus*) (Fig. 26)
This species was common at many sites during this survey. Its range has been reduced elsewhere by clearance of Mallee Habitats.

Rare Species

Scarlet-chested Parrot (*Neophema splendida*) (Fig. 27)
This little known species was not found during the present survey but has been reported breeding on at least two occasions in Yumbarra Conservation Park (T. Dennis and J. Needle, pers. comm.). It is apparently a seasonal or

irregular visitor from the Great Victoria Desert Region and has occasionally been reported from surrounding regions (Gawler Ranges and Pinkawillinie Conservation Park, L. Pedler, pers. obs.). Cleland (1929) reported the species at Koonibba just south of Yumbarra Conservation Park.

Species of Significance Potentially Occurring Within Yumbarra Conservation Park

In addition to the above the following two species listed as vulnerable (Parker and Horton, 1990) may also occur in Yumbarra Conservation Park.

Bustard *(Ardeotis australis)*
One bird was seen in cleared land adjacent to Yumbarra Conservation Park in 1987 (McKenzie and Robinson, 1987) and a sternum was found near an old campfire at Jellabinna Rocks on this survey. Open mallee and grassland areas within the park may be used by this species which is threatened by hunting pressure and introduced predators.

Red-lored Whistler (*Pachycephala rufogularis)*
Although suitable mallee/*Triodia* habitat appears to be widespread in and near Yumbarra Conservation Park this species was searched for unsuccessfully during this survey. Recent discovery of this species at Corrobinnie Hill (Matthew, Croft and Carpenter, 1995) suggests that a population exists somewhere on Eyre Peninsula. The species was previously known only from the Murray Mallee and adjacent areas in Victoria and New South Wales, where it has declined due to habitat clearance.

Other Notable Species Recorded Within Yumbarra Conservation Park

Brief comments are given below for "species of conservation significance" (Carpenter and Reid, 1988) not already discussed above, which are recorded for Yumbarra Conservation Park.

Emus (*Dromaius novaehollandiae*) were recorded drinking at Inila Rock Waters in 1970 (Ranger Reports) but no evidence of their presence was found in the park on this survey, however fresh tracks were found at Jellabinna Rocks.

Striated Grasswrens (*Amytornis striatus*) (Fig. 28), a cryptic species of 'insufficiently known status' (Garnett, 1992), were found at one *quadrat* (YU 11) on this survey and have only previously been recorded in Yumbarra Conservation Park at four sites along Goog's track in 1983 (L. Pedler, pers. obs.*)*. While probably more widespread than the few records suggest the species and its mallee/*Triodia* habitat requirements are poorly known and require further study.

Blue-breasted Fairy-wrens (*Malurus pulcherrimus*) were tentatively identified on Goog's Track in 1983 by Pedler, however specimens are needed to confirm this species presence north of its known range. All wrens seen on the present survey were the similar Variegated Fairy-wren (*M. lamberti).*

The Black-eared Cuckoo (*Chrysococcyx osculans*) and Red-backed Kingfisher (*Halcyon pyrrhopygia*) are irregular seasonal visitors to the region. The Crested Bellbird (*Oreoica gutturalis*), Jacky Winter (*Microeca leucophaea*), Western Yellow Robin (*Eopsaltria griseogularis*), Yellow-rumped Pardalote (*Pardalotus xanthopygus*) and Grey Currawong (*Strepera versicolor*) are moderately common and widespread in extensive mallee areas within Yumbarra Conservation Park and in the region while the Hooded Robin (*Melanodryus cucullata*), Chestnut-rumped Thornbill (*A. uropygialis*), Redthroat (*Pyrrholaemus brunneus*), Southern Scrub-Robin (*Drymodes brunneopygia*), Gilberts Whistler (*Pachycephala inornata*) and Spotted Nightjar (*Eurostopodus argus*) appear to be sparsely or patchily distributed within Yumbarra Conservation Park but are moderately
common in mallee areas of the region.

Pictures of typical species from Yumbarra Conservation Park are shown in Figs. 24-29.

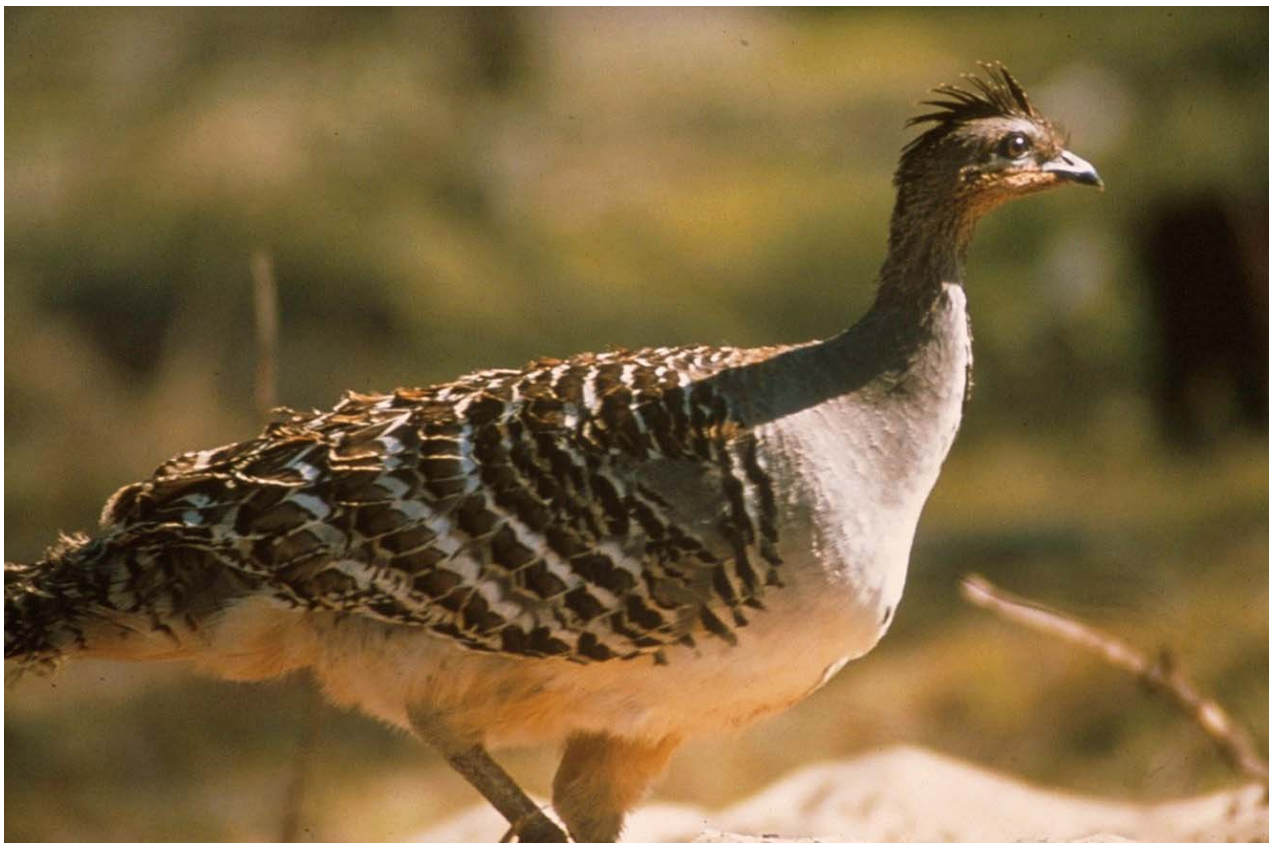


Figure 24
A Mallee Fowl *Leipoa ocellata*
Photo: L. Pedler

Figure 25
A Mallee Fowl mound N of quadrat YU 15
Photo: A. Robinson

Figure 26
The Yellow-plumed Honeyeater *Meliphaga plumula*
Photo: A. Robinson

Figure 27
Restless Flycatcher *Myiagra inquieta*
Photo: L. Pedler

Figure 28
A Striated Grasswren *Amytornis striatus*
S.A.O.A.

Figure 29
A Dusky Woodswallow *Artamus cyanopterus*
Biological Survey and Research Branch, Photographic Data Store

REPTILES AND AMPHIBIANS

Despite the recent survey being held outside the optimum time of year for reptile activity,(September to December in temperate climatic zones) the results were pleasing with over 250 observations of 37 species, of which 13 were previously not recorded within Yumbarra Conservation Park. Earlier records from a variety of sources show a further nine species to occur within the park, bringing the total to 46 reptile species, consisting of seven dragons, nine geckos, five legless lizards, 19 skinks, two goannas and four elapid snakes (Appendix V). As yet no amphibians have been recorded within Yumbarra Conservation Park.

Sampling for the 1995 survey concentrated on the mallee/*Triodia* vegetation association on the east-west sand dune system which dominates the park, rather than the larger mallee on the less undulating, harder calcareous soils, along the southern and south-western boundaries adjacent to agricultural and pastoral land, which had been more extensively investigated in 1987. Four of the nine species known from the park but not recorded during March 1995, the Red-tailed Worm-lizard (*Aprasia inaurita*), Common Scaly-foot (*Pygopus lepidopodus*), Desert Wall Skink (*Cryptoblepharus plagiocephalus*) and the Western Earless Skink (*Hemiergis initialis*) have been recorded only in this peripheral southerly habitat. Three are elapid snakes, the Western Brown Snake (*Pseudonaja nuchalis*), Desert Banded Snake (*Simoselaps bertholdi*) and Half-girdled Snake (*Simoselaps semifasciatus*), and are infrequently encountered, whilst the remaining two species, the Sandplain Gecko (*Diplodactylus stenodactylus*) and Woomera Slider (*Lerista elongata*), are probably scarce in the area as they are at the southern extreme of their range and known from within Yumbarra Conservation Park from only two specimens and one specimen respectively, collected in the 1970's. Other species preferring this area of larger mallee on calcareous soils are the Painted Dragon (*Ctenophorus pictus*), Barking Gecko (*Nephurus milii*), Western Tree Skink (*Egernia richardi*) (Fig.30) and Butler's Snake-eye (*Morethia butleri*) all of which were recorded during the present survey.

Significantly, some species recorded have the majority of their distribution in Western Australia and extend into South Australia along a relatively narrow tongue of mallee across the top of the Nullarbor to the Yumbarra area and in some cases through to parts of the Eyre Peninsula. This group contains the Thorn-tailed Gecko (*Strophurus assimilis*) (Fig. 31), Fraser's Snake-lizard (*Delma fraseri*), Western Tree Skink (*E. richardi),* Western Earless Skink (*H. initialis*), Dwarf Four-toed Slider *(Lerista distinguenda*) and Butler's Snake-eye (*M. butleri*). For Fraser's Snake-lizard (*D. fraseri*) and as currently understood the Thorn-tailed Gecko (*S. assimilis*), this is a discontinuous distribution with separate populations in Western and South Australia.

Of just over 250 records gathered of 37 species during the March 1995 survey over half (130) were of only four species, the Crested Dragon (*Ctenophorus cristatus*) (Fig. 32), Thorny Devil (*Moloch horridus*) (Fig. 33), Dwarf Bearded Dragon (*Pogona minor*) and Desert Skink (*Egernia inornata*). These species showed no particular habitat preference, being recorded at most of the *quadrats* sampled. The Thorny Devil (*M. horridus)* was particularly ubiquitous, two of 50 specimens observed even being caught in elliot traps, probably after following ant trails feeding on the bait. Discussions with many experienced field biologists indicate that such a high concentration of this species is certainly unique. The Desert Skink (*E. inornata*) was generally recorded as present or absent at a site by the occurrence of characteristic burrow systems, which were abundant throughout Yumbarra Conservation Park, although few were trapped as their activity at this time of year is low.

Three other species accounted for 40% of the remaining records. The Southern Spinifex Ctenotus (*Ctenotus atlas*) was collected at six of 13 vertebrate *quadrats*, and as a *Triodia* specialist was encountered wherever this plant species provided adequate cover. The Sandplain Ctenotus (*Ctenotus schomburgkii*) exhibited a strong preference for the harder soils of the southern areas of the park and the swales within the dune system. The Starred Knob-tailed Gecko (*Nephurus stellatus*) (Fig. 34) was most often trapped on dune crests and was collected at eight of the 13 *quadrats* sampled.

Therefore, the majority of records for March 1995 come from only seven of 37 species, leaving many species represented by a single or small number of observations. This bias is almost certainly linked to annual activity cycles, particularly with the small skinks and geckoes, and subsequently the small snakes which prey on them. This is in turn relates to temperature and food availability.

The goannas, large elapid snakes and the larger skinks, particularly the Western Blue-tongue (*Tiliqua occipitalis*) (Fig. 35), as predators, are of necessity in lower numbers and therefore infrequently encountered. The Sleepy Lizard (*Tiliqua rugosa*) does not venture far into the dune country preferring the more productive habitat to the south where it would be commonly observed during spring and early summer. Whilst the Sand Goanna (*Varanus gouldii*) is also highly seasonal in activity, the paucity of disused burrows and other diggings indicates that it too is scarce within the dune system.

Other Species Potentially Occurring Within Yumbarra Conservation Park

Two species not yet recorded for Yumbarra Conservation Park which could be expected are the Jewelled Gecko (*Strophurus elderi*) and Burton's Legless Lizard (*Lialis burtonis*). The Jewelled Gecko (*S. elderi)* is a *Triodia* specialist whilst Burton's Legless Lizard (*L. burtonis*) is known to favour *Triodia* for shelter when available. In the Western deserts of South Australia the Jewelled Gecko (*S. elderi)* is known from only a handful of specimens. One specimen was collected during the survey, but at

Jellabinna Rocks some 50km north of the park boundary and in a much larger form of *Triodia.* Their absence is possibly due to the low, very sparse nature of the individual Spinifex (*Triodia scariosa)* plants dominant throughout the dune system, which is therefore generally unsuitable for these species. To support this theory, species which often shelter in *Triodia,* the Spinifex Slender Blue-tongue *(Cyclodomorphus melanops*) (Fig. 36), the Broad-banded Sandswimmer *(Eremiascincus richardsonii)* (Fig. 37*)* and Bynoe's Gecko (*Heteronotia binoei*) were collected on dune crests under another dense low plant, Leafless Logania (*Logania nuda*), but were absent from the more abundant Spinifex (*T. scariosa*) nearby. In fact searching through *Triodia* provided very few specimens and only the occasional, large healthy plant contained any reptiles other than the Southern Spinifex Ctenotus (*C. atlas*).

In addition to the Jewelled Gecko (*S. elderi)* mentioned above, five other species were collected outside Yumbarra Conservation Park during the survey. Their occurrence within the park is possible particularly in comparable habitat surrounding rock holes. These were the Southern Three-toed Slider (*Lerista terdigitata)* also from Jellabinna Rocks and the Mallee Black-headed Snake (*Suta spectabilis*) (Fig. 38), Carpet Python (*Morelia spiolota*) (Fig. 39), Eastern Desert Ctenotus (*Ctenotus regius*) and Dwarf Three-toed Slider (*Lerista muelleri*) all from Euria Well about 50km west of the park.

Species Of Particular Interest Within Yumbarra Conservation Park

Linga Dragon (*Diporiphora linga)*
This species is confined to the mallee/*Triodia* sand ridge system of which Yumbarra Conservation Park is a sizeable portion.

Desert Pygmy Goanna (*Varanus eremius)* (Fig. 40)
Two specimens were collected during the March 1995 survey which brings to thirteen the total number collected in South Australia from similar sand dune and tussock grass habitat extending from the Great Sandy Deserts of Western Australia into western South Australia. Most of these have been collected in the last 10 years illustrating the lack of effort put into biological work until recently due to the logistics of travel in such isolated wilderness areas. As the first records of the Desert Pygmy Goanna (*V. eremius*) south of the Transcontinental Railway Line, extending the known range of this species almost 100km south, this almost certainly represents the southern limits of its range.

Thorn-tailed Gecko (*Strophurus assimilis)* (Fig 31)
The occurrence of this species in Yumbarra Conservation Park is interesting as up until three years ago it was only known from the *Eucalyptus* and *Acacia* woodlands of southern interior Western Australia. It is now known from two locations in South Australia, coastal mallee just north of Port Kenny on the central west coast of Eyre Peninsula and the mallee/*Triodia* sand ridges of Yumbarra Conservation Park, 250km to the north-west. Possibly, this indicates a continuous distribution into Eyre Peninsula from Western Australia. Certainly, this species and the several others recorded in Yumbarra Conservation Park for the first time during the March 1995 survey lead to the conclusion that other herpetological discoveries are yet to be made in the park and that only continued intensive survey at the optimum time of the year will add extra species to the parks reptile fauna.

Pictures of typical species from Yumbarra Conservation Park are shown in Figs. 30-43.

Figure 30
The Western Tree Skink *Egernia richardi*
Photo: A. Robinson

Figure 31
The Thorn-tailed Gecko *Strophurus assimilis*
Photo: A. Robinson

Figure 32
The Crested Dragon *Ctenophorus cristatus*
Photo: D. Armstrong

Figure 33
The Thorny Devil (Moloch) *Moloch horridus*
Photo: A. Robinson

Figure 34
The Starred Knob-tailed Gecko *Nephrurus stellatus*
Photo: A. Robinson

Figure 35
The Western Blue-tongue Lizard *Tiliqua occipitalis*
Photo: A. Robinson

Fig 36
The Spinifex Slender Blue-tongue *Cyclodomorphus melanops*
Photo: A. Robinson

Figure 37
The Broad-banded Sandswimmer *Eremiscincus richardsonii*
Photo: A. Robinson

Figure 38
The Mallee Black-headed Snake *Suta spectabilis*
Photo: A. Robinson

Figure 39
The Carpet Python *Morelia spilota*
Photo: A. Robinson

Figure 40
The Desert Pygmy Goanna *Varanus eremius*
Photo: A. Robinson

Figure 41
The Western Stone Gecko *Diplodactylus granariensis*
Photo: A. Robinson

Figure 42
Two very similar legless lizards the Barred Snake-lizard *Delma australis* and the Spinifex Snake-lizard *Delma butleri*
Photos: A. Robinson

Figure 43
The Mulga (King Brown) Snake *Pseudechis australis*
Photo: A. Robinson

Management Issues and Summary

The vast Yellabinna dunefield area is of great conservation significance and this was clearly demonstrated by the 1987 Biological Survey (Copley and Kemper, 1992). The present survey has provided more detailed information for Yumbarra Conservation Park and its immediate surrounds. In addition to the purely biological information collected during these two surveys, specific conservation management problems within these areas became apparent and these are discussed below.

Coupled with conservation management problems of a general nature, the discovery, during aeromagnetic survey, of a geologically interesting area of basement rock with potential for significant mineralisation beneath Yumbarra Conservation Park has presented the Government of South Australia with a series of complex management decisions. They relate to four areas:

The paucity of ecological data from this vast area makes decisions on the conservation value of specific areas difficult. The present survey has focussed on these decisions as they relate to the area of geological interest.

The wilderness value of the Yellabinna dunefield in general and the Yumbarra Conservation Park in particular.

The legal impediments to mineral exploration and possible subsequent mining in Yumbarra Conservation Park.

Methods of limiting the impact of mineral exploration and possible subsequent mining development on the conservation value of this area.

Conservation Value

The biological value of the unbroken and largely untouched area of mallee-covered dunefield which stretches from Pinkawillinie Conservation Park in the east through Pureba and Yumbarra Conservation Parks, the Yellabinna Regional Reserve and Yalata Aboriginal Lands then across the northern edge of the Nullarbor Plain through the Maralinga Tjarutja, the Unnamed Conservation Park and into Western Australia, cannot be over-emphasised. This presently continuous link between the mallee and *Acacia* woodland flora and fauna of eastern Western Australia and western South Australia was discussed in more detail and mapped in Copley and Kemper (1992). The present survey of Yumbarra Conservation Park provided further evidence of this important biogeographical link with plant species such as the Pungent Honey-myrtle (*Melaleuca leiocarpa*) and *Coopernookia strophiolata*, mammals such as Mitchell's Hopping Mouse *(Notomys mitchelli),* birds such as the Western Yellow Robin (*Eopsaltria griseogularis*) and Rufous Treecreeper (*Climacteris rufa*) and reptiles such as the Thorn-tailed Gecko (*Strophurus assimilis)* and Western Tree Skink (*Egernia richardi)* being examples of this important link. For some of these species, the Yumbarra Conservation Park area appears to be at their eastern limits. There are many other species which are near their western limits here and which do not extend around this corridor into the Western Australian mallee.

In addition, Yumbarra sits across a major transition from the larger mallee woodlands on its southern edge, northwards into the more open mallee and *Triodia* dunefields of the Yellabinna Regional Reserve. Typical examples of more arid adapted species at the southern limits of their range in Yumbarra include: the plants Prain's Wattle (*Acacia prainii*), *Goodenia gibbosa* and Paisley's Emubush (*Eremophila paisleyi*); the mammals Wongai Ningaui (*Ningaui ridei)* (not collected on this survey but from the Muckera and Yarle Lakes sites on the Yellabinna Survey); birds such as the Scarlet-chested Parrot (*Neophema splendida*); and reptiles such as the Desert Pygmy Goanna (*Varanus eremius)* and Sandplain Gecko (*Diplodactylus stenodactylus*). Species at the northern limit of their range in the larger mallee woodlands of southern Yumbarra include: the plants Yellow-flower Sour-bush (*Choretrum glomeratum* var. *chrysanthum*), *Grevillea sarissa* var. *umbellifera*, Feather Daisy-bush (*Olearia passerinoides* ssp. *passerinoides*) and Trident Spyridium (*Spyridium tridentatum*); mammals such as the Little Long-tailed Dunnart *(Sminthopsis dolichura)* and Western Pygmy Possum (*Cercartetus concinnus*); birds such as the Painted Button-quail (*Turnix varia varia*); and reptiles such as the Common Scalyfoot (*Pygopus lepidopodus*) and Starred Knob-tailed Gecko (*Nephurus stellatus*). Certainly, Yumbarra Conservation Park is a significant place along both the east-west and the north-south gradients across the greater Yellabinna area.

The areas covered by the proposed mineral exploration licences to Dominion and Western Mining (Fig. 3) also sit squarely on this transition although they are significantly to the north of the larger mallee and therefore do not support the characteristic more southern species of plants and animals. This transition zone however extends some 25km to the west and then 80km to the east and there is unlikely to be anything that is ecologically confined to the proposed licence areas. Similarly, although the proposed licence areas are right on the southern limit of the more arid-adapted northern species of the Yellabinna dunefields,

there are unlikely to be any of these species which will not be found to the west, and particularly east of the mining licence areas.

The vegetation map in the back pocket of this report clearly shows the diffuse nature of these east-west, and particularly the north-south transition zones.

Wilderness

While it is not possible to develop an ecological argument that the proposed mineral exploration licence areas are biologically significant in the context of the overall greater Yellabinna area, this larger area has an extremely high wilderness and nature conservation value as a whole. It provides an opportunity for South Australia to proclaim and properly manage a significant mallee wilderness area which will have ecological integrity and where natural ecological processes can continue with minimal human input.

The major current threat to the long-term integrity of this wilderness is the proliferation of tracks in the area over the last 10 years or so as shown in Fig. 3. At present, DENR staff are not in a position to deal effectively with track management in this area. These tracks have three original uses:

1) Short tracks from the dog fence on the southern boundary of Yumbarra northwards into open grassy areas in the southern woodlands of the park. All these tracks were established 20-30 or more years ago for dingo baiting and shooting in the northern buffer area along the fence, for fox, cat and rabbit shooting and as access to camping areas for visitors.

2) Tracks established in more recent years by four wheel drive enthusiasts using modern equipment to find rockholes and accurately navigate through the dune systems. The track north from Inila Rock Waters via Jellabinna Rocks to the Trans-Continental railway is an example of such a track.

An earlier and now much more permanent track put in for similar reasons (ie: as a new and different access route to the railway line via the spectacular Mt Finke) is Denton's or Goog's Track established in the late 1970's.

3) Other recent tracks in the Yellabinna Regional Reserve and the western portion of the Yumbarra Conservation Park have been established for mineral exploration.

Whatever the reason for the establishment of tracks, each new one degrades the wilderness value of the greater Yellabinna area. Prior to the establishment of Googs Track there were no north-south access tracks through the sand dunes and the Yalata-Lake Ifould-Ooldea track to the west and outside the dunefield was the only access north to the railway. There are now two north-south tracks within the dunefield and a proliferation of east-west tracks coming from the edges of the dunes and taking advantage of the relatively, easier travelling along the interdune corridors into the heart of the dunefield. Every new track increases the potential for introduced weeds to spread into this presently almost weed-free dune system, particularly around rockholes and outcrops with their more favourable water regimes and better soils. In addition, these new tracks give easier access to the dunes for introduced predators such as cats and foxes. They also provide access to sites of Aboriginal significance for people who are not necessarily sensitive to their rights and responsibilities when visiting such places. Tracks also generally degrade the overall wilderness value of this significant area.

DENR field staff based in Ceduna need to control and limit access to this area to prevent its degradation. The issue of wilderness protection should be referred to the Wilderness Advisory Committee for consideration and advice.

Cultural Values

Local Aboriginal communities have a significant and developing interest in the identification and future management of areas of cultural signigficance both within Yumbarra Conservation Park and the greater Yellabinna dunefield area. This issue was not addressed during the present survey but must be adequately researched and specific recommendations incorporated into the Draft Management Plan prepared for the park.

Reproclamation Proceedures

In 1968, Yumbarra National Park, with a total area of 1062km^2 was proclaimed under the National Parks Act 1966. The *National Parks and Wildlife Act 1972* established a revised system of conservation reserve nomenclature. Under this Act, Yumbarra National Park was re-named Yumbarra Conservation Park.

After 1972 there was a general expectation that once an area was proclaimed for conservation management alone, it became unavailable for mineral exploration and development. This principal is widely accepted in National Parks legislation throughout the world and was consistent with the IUCN Protected Area Management Categories first developed in 1978. These initial categories were reviewed over the next ten years and the present definitions were endorsed by the IUCN General Assembly in Buenos Aires (Phillips, 1994). Under the latest classification Yumbarra Conservation Park would be a Category Ia Strict Nature Reserve: protected area managed mainly for science. Further details of this category can be found in IUCN Commission on National Parks and Protected Areas (1994).

In 1985 a change in policy by the South Australian Labor Government required virtually all new parks to be dedicated under what is known as a 'joint proclamation'. This allowed new conservation reserves to be proclaimed but still be available for mineral exploration and potential development subject to agreement between the Environment and Mining Ministers, and subject to appropriate Environmental Impact Assessment. This

change in policy allowed areas of significant conservation value to be proclaimed where there was either existing or potential mineral exploration interest.

A further category of multiple-use reserve was subsequently established under *the National Parks and Wildlife Act 1972*. A Regional Reserve can be proclaimed over areas with either existing or potential for resource utilisation landuses such as mineral or petroleum exploration and extractipon or rangeland pastoralism. Such an area can be proclaimed as a multiple use management area or Regional Reserve where management emphasised nature conservation but allowed other properly managed and ecologically sustainable land-uses.

This diversity of conservation land tenure provides South Australia with the widest range of conservation management options of any State in Australia. Most importantly however, as in all other States, it retains a core of conservation reserves where mining exploration and development is specifically excluded and the sole function of the land is conservation management. Since the 1985 change in policy the majority of new reserves have been dedicated with a simultaneous proclamation to allow mining. Only a few new areas have been added to the core of reserves where mining has not been provided for.

At present therefore we have in this State, as everywhere else in Australia, a significant core of exclusively nature conservation reserves. To date none of these areas have had this designation changed.

Within this legislative framework, significant additions of 2214km^2 were made to the east and west boundaries of Yumbarra Conservation Park in 1990. These additions were dedicated by 'joint proclamation' and there has already been some exploratory drilling in the western addition. In the same year the 1444km^2 Pureba Conservation Park was proclaimed to the east of the expanded Yumbarra Conservation Park, while to the north, the vast 25,227km^2 Yellabinna Regional Reserve was dedicated. Pureba Conservation Park was a 'joint proclamation' and the Regional Reserve category by definition, allows properly managed exploration and mining as part of multiple-use management.

We now therefore have the situation of the original core area of Yumbarra Conservation Park being unavailable for mining with all the surrounding areas accessible under controlled conditions.

Section 43(2) of the *National Parks and Wildlife Act 1972* provides for the Governor to proclaim conditions whereby rights of entering, prospecting, exploration and mining may be acquired or exercised. Subsection (4) enables the Governor by proclam,ation to vary or revoke a proclamation under subsection (2). Subsection (5) makes provision for a re-proclamation to be made in pursuance of a resolution passed by both Houses of Parliamaent. If this proceedure is followed the whole of the Yellabinna dunefield will be available for mining exploration and development..

Impact of Mineral Exploration

At present Dominion Mining Ltd who wish to explore the area of geological interest under the core area of Yumbarra Conservation Park have suggested a three-stage exploration of their proposed mineral exploration licence area:

Stage 1 Remote Airborne/Satellite Exploration

The biological and geographical outcomes anticipated to come from Stage 1 have largely been covered by the present biological survey. We now have a good vegetation classification and digitised map and all the existing tracks within the survey area have been accurately located and digitised. There is however no information on areas of Aboriginal significance and the Stage 1 survey should now be re-designed to cover this important area in association with the preparation of a Plan of Management for the park in accordance with the National Parks and Wildlife Act 1972. In addition Stage 1 will also involve:

1) An airborne INPUT (electromagnetic) survey at a line spacing of 200m over targets of interest.

2) Flying new colour aerial photography at a scale of 1:20 000

3) A one day helicopter visit to ground-truth information.

Stage 2 Low-impact Ground Investigation

This stage would aim to collect sufficient information to decide if drill testing was necessary and if so where and how.

The access track for this stage must extend north-east into the core area of Yumbarra Conservation Park from the end of the existing Geo Peko track which presently ends just inside the western boundary of the core area (Fig. 3). Dominion have proposed to use a "non-graded bush track put in by four wheel drive vehicles with low tyre pressure over a route specially selected along interdune corridors to avoid mature vegetation". They propose to rehabilitate the track if it is to be used over "an extended project life". This rehabilitation should also include the whole of the existing Geo Peko track back to the southern park boundary on the dog fence.

Stage 3 Drilling

Initially, it is proposed that drill targets selected in Stages 1 and 2 would be drilled. Dominion have stated that "it is thought difficult and too expensive to use helicopter transport of percussion drill rigs". Holes would therefore be drilled from vehicle mounted units using "low impact techniques and would essentially provide bedrock geochemical information". If this drilling produced interesting results "follow up drilling would be by reverse circulation or diamond drilling techniques, with appropriate site clean up methods utilised. If a significant

amount of diamond drilling was necessary a water bore would have to be sunk and a transportable swimming pool used for temporary storage. Digging sumps for drilling could be avoided by using transportable tanks, water could be piped between sites rather than transported on trucks".

If encouraging results were still being obtained at this stage and the economic significance of any mineral discovery was becoming apparent, further much more detailed environmental studies would need to be undertaken leading to a full Environmental Impact Assessment.

Summary

As a result of the 1987 and 1995 biological surveys within the Yellabinna dunefield it is clear that there needs to be an increase in Government-directed conservation management within this significant wilderness area. The impetus to this process has been provided by the desire to explore the geological anomaly discovered beneath the core area of Yumbarra Conservation Park. Future conservation management of the area should therefore now proceed in the following sequence with each step being dependent on resolution of any problems raised by the preceding step:

1) The Yumbarra Conservation Park biological survey has revealed that the core area of the park covers a very significant north-south and east-west biogeographical transition but that the area of geological interest is unlikely to contain any species or ecological communities not also found to the east or west of the proposed mineral exploration licence areas.

2) The greater Yellabinna dunefield area is the most significant mallee wilderness remaining in South Australia and the Wilderness Advisory Committee should be directed to examine this area as a matter of priority with a view to making recommendations to Government on its future management.

3) To allow the three stage exploration programme proposed by Dominion for the core area of Yumbarra Conservation Park, the Government should prepare a resolution for both Houses of Parliament authorising the Governor to revoke the original 1968 proclamation of the core area and re-proclaim the area under Section 43(2) of the National Parks and Wildlife Act 1972.

4) If this re-proclamation is successfully passed then the three-stage exploration programme proposed by Dominion could be approved subject to strict environmental controls jointly enforced by appropriate officers of MESA and DENR.

5) A Plan of Management under the National Parks and Wildlife Act 1972 should be prepared for the whole of Yumbarra Conservation Park and set within the total management framework for the greater Yellabinna Wilderness Area.

6) Should a mining operation within the area of geological interest proceed, the Government should support the hypothecation of a proportion of mineral royalties from mining developments in the park for its ongoing management and maintenance.

Resource Material and Bibliography

MAPS

1:250 000 Topographic

Fowler	SH 53-13	1987
Childara	SH 53-14	1981

1:100 000 Topographic

Midgerie	SH 5435	1981
Poondinga	SH 5535	1981
Jellabinna	SH 5635	1981
Tolmer	SH 5735	1981
Bookabie	SH 5434	1981
Penong	SH 5534	1981
Kalanbi	SH 5634	1981
Pureba	SH 5734	1981

1:100 000 Photo maps

Midgerie	5435	1978
Poondinga	5535	1978
Jellabinna	5635	1977
Tolmer	5735	1977
Kalanbi	5634	1977
Pureba	5734	1977

1:50 000 Topographic

Euria	5434-I	1986
Cundilippy	5434-II	1985
Bookabie	5434-III	1985
Kroonilla	5434-IV	1985
Inila	5534-I	1985
Koonibba	5534-II	1985
Penong	5534-III	1985
Kintore	5534-IV	1985

1:50 000 Photo maps

Euria	5434	1980
Cundilippy	5434	1980
Bookabie	5434	1980
Kroonilla	5434	1980
Inila	5534	1968
Koonibba	5534	1980
Penong	5534	1968
Kintore	5534	1968

AERIAL PHOTOGRAPHS

Stereo coverage of the core of Yumbarra Conservation Park and single photo coverage of most of the total study area. The 1:250 000 map sheet reference, photograph scale, survey number, date of photography and photo numbers are given.

Fowler SH 53-13

1:87 400
Svy: 3859
Date: 17/3/88
Photo numbers: 6, 8, 10, 12, 14, 16, 34, 36, 38, 40, 42, 44, 48, 50, 52, 54, 56, 58, 74, 76, 78, 80, 82, 84

1:40 000
Svy: 3339
Date: 19/11/85
Photo numbers: 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124

1:40 000
Svy: 3345
Date: 11, 13/12/85
Photo numbers: 202, 203, 204, 205, 206, 207, 208, 209, 210

1:40 000
Svy: 4517
Date: 11/3/92
Photo numbers: 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 180, 181, 182, 183, 184, 185, 186, 187, 188

Childara SH 53-14

1:86 950
Svy: 3334
Date: 6, 7/11/85
Photo numbers: 12, 14, 16, 18, 20, 22, 26, 28, 30, 32, 34, 36, 52, 54, 56, 58, 60, 62, 80, 83, 84, 85, 86, 87, 88, 90, 92, 114,
116, 118, 120, 122, 124

1:86 950
Svy: 3327
Date: 31/10/85
Photo numbers: 22, 23,24

1:40 000
Svy: 4517
Date: 11/3/92
Photo numbers: 130,189

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Appendices

Appendix I

QUADRAT AND TRAPSITE LOCATIONS AND PHOTOGRAPHIC MONITORING POINT PHOTOS: YUMBARRA CONSERVATION PARK SURVEY

Quadrat locations are shown on the map (Fig. 3). The photographs are of the permanent photopoint at each *quadrat*. The latitude and longitude shown is the position of the sighting post for the photograph determined using a Global Positioning System (G.P.S.). It has been converted from an A.M.G. reference obtained in the field to the nearest second of latitude and longitude. Data on the physical environment of each *quadrat* is from the survey database.

The scaling pole is 2m high with the top of the photopoint marker set at 1.5m.

Quadrat: YU 04 01 Date:22-Mar-1995 Latitude: 31 46’ 46” Longitude: 133 25’ 53” Altitude(m): 110
Location(km): 1 E INILA ROCK WATERS, SA Landform: Dune Footslope Geology: Moornaba Sand
Soil: clay sand Surface Strew: none apparent Disturbance: none visable Land Use: conservation

Quadrat: YU 06 01 Date:29-Mar-1995 Latitude: 31 38’ 54” Longitude: 133 29’ 27” Altitude(m): 110
Location(km): 16 NNE INILA ROCK WATERS, SA Landform: dune crest Geology: Moornaba Sand
Soil: sand Surface Strew: none apparent Disturbance: none visible Land Use: conservation

Quadrat: YU 07 01 Date:28-Mar-1995 Latitude: 31 36’ 13” Longitude: 133 29’ 24” Altitude(m): 110
Location(km): 20 NNE INILA ROCK WATERS, SA Landform: dune crest Geology: Moornaba Sand
Soil: sand Surface Strew: none apparent Disturbance: none visible Land Use: conservation

Quadrat: YU 08 01 Date:29-Mar-1995 Latitude: 31 33’ 01” Longitude: 133 29’ 27” Altitude(m): 100
Location(km): 26 NNE INILA ROCK WATERS, SA Landform: interdune corridor Geology: Moornaba Sand
Soil: clayey sand Surface Strew: none apparent Disturbance: burned Land Use: conservation

Quadrat: YU 09 01 Date:28-Mar-1995 Latitude: 31 32’ 25” Longitude: 133 24’ 01” Altitude(m): 100
Location(km): 26 NNW INILA ROCK WATERS, SA Landform: interdune corridor Geology: Moornaba Sand
Soil: clayey sand Surface Strew: none apparent Disturbance: none visible Land Use: conservation

Quadrat: YU 10 01 Date:30-Mar-1995 Latitude: 31 35’ 20” Longitude: 133 17’ 48” Altitude(m): 120
Location(km): 24 NW INILA ROCK WATERS, SA Landform: dune crest Geology: Moornaba Sand
Soil: sand Surface Strew: none apparent Disturbance: none visible Land Use: conservation

Quadrat: YU 11 01 Date:30-Mar-1995 Latitude: 31 37’ 20” Longitude: 133 15’ 29” Altitude(m): 100
Location(km): 23 NW INILA ROCK WATERS, SA Landform: interdune corridor Geology: Moornaba Sand
Soil: clayey sand Surface Strew: none apparent Disturbance: none visible Land Use: conservation

Quadrat: YU 12 01 Date:22-Mar-1995 Latitude: 31 44’ 01” Longitude: 133 26’ 59” Altitude(m): 100
Location(km): 5 NNE INILA ROCK WATERS, SA Landform: interdune corridor Geology: Moornaba Sand
Soil: sand Surface Strew: none apparent Disturbance: none visible Land Use: conservation

Quadrat: YU 13 01 Date:22-Mar-1995 Latitude: 31 43’ 47” Longitude: 133 27’ 02” Altitude(m): 100
Location(km): 6 NNE INILA ROCK WATERS, SA Landform: dune crest Geology: Moornaba Sand
Soil: sand Surface Strew: none apparent Disturbance: none visible Land Use: conservation

Quadrat: YU 14 01 Date:22-Mar-1995 Latitude: 31 43’ 29” Longitude: 133 27’ 11” Altitude(m): 100
Location(km): 6 NNE INILA ROCK WATERS, SA Landform: interdune corridor Geology: Moornaba Sand
Soil: clayey sand Surface Strew: pebble (5-50mm) Disturbance: none visible Land Use: conservation

PHOTO UNAVAILABLE

Quadrat: YU 15 01 Date:21-Mar-1995 Latitude: 31 39’ 03” Longitude: 133 27’ 18” Altitude(m): 110
Location(km): 14 NNE INILA ROCK WATERS, SA Landform: interdune corridor Geology: Moornaba Sand
Soil: sand Surface Strew: none apparent Disturbance: none visible Land Use: conservation

Quadrat: YU 16 01 Date:21-Mar-1995 Latitude: 31 37’ 55” Longitude: 133 27’ 15” Altitude(m): 110
Location(km): 16 NNE INILA ROCK WATERS, SA Landform: dune crest Geology: Moornaba Sand
Soil: sand Surface Strew: none apparent Disturbance: burned Land Use: conservation

Quadrat: YU 17 01 Date:21-Mar-1995 Latitude: 31 37’ 25” Longitude: 133 27’ 05” Altitude(m): 120
Location(km): 17 NNE INILA ROCK WATERS, SA Landform: interdune corridor Geology: Moornaba Sand
Soil: sand Surface Strew: none apparent Disturbance: none visible Land Use: conservation

Appendices

Appendix II

PLANT SPECIES RECORDED FROM YUMBARRA CONSERVATION PARK

Plant taxonomy and nomenclature is in accordance with Jessop (1993) but includes some more recent taxonomic changes incorporated in the SA FLORA Database. Old names recorded on previous surveys have been updated to current nomenclature and taxonomy, where there is no ambiguity about the identity of the taxon. In cases where the identity of particular species is not completely certain or obvious, comments are provided as footnotes. Common names are from Jessop and Toelken (1986) and/or the SA FLORA Database.

Unique taxa considered to occur in the reserve are shown in ***italic*** typeface.

Taxa that are either not accepted as occurring in the reserve or constitute a redundant record for the reserve due to other more complete identifications, are listed with the scientific names in **normal** typeface.

Introduced species are indicated with an asterisk (*****).

Conservation status codes are in bold following the scientific name and are listed in the sequence:
Australian (Species) **/ South Australian / Eyre Peninsula** Region.

The status categories are as follows:

E **Endangered**: rare and in danger of becoming extinct in the wild.

V **Vulnerable**: rare and at risk from potential threats or long term threats which could cause the species to become endangered in the future.

R **Rare**: having a low overall frequency of occurrence: confined to a restricted range or scattered sparsely over a wider area. Not currently exposed to significant threats, but warranting monitoring and protective measures to prevent reduction of population sizes.

K **Uncertain**: likely to be either Threatened or Rare but insufficient data for a more precise assessment.

U **Uncommon**: less common species of interest but not rare enough to warrant special protective measures.

N Not of particular significance / common.

Not yet assessed but flagged as being of possible significance.

The final seven columns indicate the **source** of plant species records from Yumbarra Conservation Park.
Records that are **presumed** from a different identification are indicated by the letter '**p**' under a particular source.
Records that are **not accepted** as correct are indicated by the letter '**n**' under a particular source.
Records that are **redundant** for a given source due to a more complete (presumed) identification are indicated by the letter '**r**' under that source.

KEY: Source of Records

1 D.N. Kraehenbuehl, November 1993, inspection of Sn 95 Out of Hundreds, 1300 ha adjoining southern boundary of Yumbarra Conservation Park.

2 A.K. Turner, June 1984, list for Yumbarra Conservation Park.

3 G.C. Carpenter, 2 July 1987, list for Yumbarra Conservation Park.

4 Yellabinna Survey, October 1987, *quadrats* for Yumbarra Conservation Park, identifications by State Herbarium.

5 Yellabinna Survey, October 1987, opportune plant records from Yumbarra Conservation Park, identifications by State Herbarium.

6 A.K. Turner, April 1990, survey of Yumbarra Conservation Park.

7 Yumbarra Survey (this survey), March 1995, sites within Yumbarra Conservation Park, identifications by P.J. Lang.

			Source						
	Scientific Name	Common Name	1	2	3	4	5	6	7
	AIZOACEAE								
	Carpobrotus rossii	karkalla						+	
	Disphyma crassifolium ssp. clavellatum	round-leaf pigface						+	
*	*Mesembryanthemum crystallinum*	iceplant					+		
	Sarcozona praecox	sarcozona				+			+
	Tetragonia eremaea	native spinach					+		
	AMARANTHACEAE								
	Ptilotus obovatus var. *obovatus*	silver mulla mulla		+		+		+	
	Ptilotus seminudus	rabbit-tails				+			
	APOCYNACEAE								
	Alyxia buxifolia	sea box		+		+		+	+
	BORAGINACEAE								
	Halgania andromedifolia	scented blue-flower	+	+		+		+	+
	Halgania cyanea	rough blue-flower	+		+			+	
	CARYOPHYLLACEAE								
*	*Polycarpon tetraphyllum*	four-leaved allseed					+		
	CASUARINACEAE								
	Allocasuarina muelleriana ssp. *muelleriana*	common oak-bush			+		+	+	+
	Casuarina pauper	black oak		+		+		+	
	CENTROLEPIDACEAE								
[1]	Centrolepis aristata	pointed centrolepis					n		
	CHENOPODIACEAE			+					
	Atriplex stipitata	bitter saltbush						+	
	Atriplex vesicaria ssp.	bladder saltbush		+		+		+	+
	Atriplex sp.	saltbush		+					
[2]	*Chenopodium curvispicatum*	cottony goosefoot		+p					
	Chenopodium desertorum ssp.	desert goosefoot			+				
	Enchylaena tomentosa var. *tomentosa*	ruby saltbush		+		+		+	+
	Halosarcia halocnemoides ssp.	grey samphire							+
	Halosarcia lylei **N N U**	wiry glasswort							+
	Maireana erioclada	rosy bluebush			+			+	
	Maireana oppositifolia	salt bluebush						+	+
	Maireana pentatropis	erect bluebush		+p	+	+			+
	Maireana radiata	grey bluebush		+	+	+			+
	Maireana sp.	bluebush						+	
	Maireana trichoptera	mallee bluebush		+		+			
[3]	Maireana triptera	three-wing bluebush		n					
[4]	*Rhagodia candolleana* ssp. *argentea* **N N R**	silver sea-berry saltbush							+
	Rhagodia crassifolia	fleshy saltbush		+	+	+		+	+
	Rhagodia parabolica	mealy saltbush							+
	Rhagodia preissii ssp. *preissii*	mallee saltbush		+	+	+		+	+
	Rhagodia spinescens	spiny saltbush					+		
	Rhagodia ulicina	intricate saltbush						+	
	Salsola kali	prickly saltwort		+		+			
	Sclerolaena brevifolia	small-leaf bindyi							+
	Sclerolaena diacantha	grey bindyi		+	+	+		+	

[1] Well outside the known range and habitat of this species (Cooke, 1992). Possibly a mis-identification of *C. polygyna* which does occur in this district.
[2] Presumed identity based on record of *Rhagodia spinescens* var. *deltaphylla*.
[3] This name is known to have been misapplied in the past by the surveyor (source 2) and most likely refers to *M. pentatropis* which was not otherwise recorded.
[4] First record for Eyre Peninsula region as defined by State Herbarium.

			Source						
	Scientific Name	Common Name	1	2	3	4	5	6	7
	Sclerolaena obliquicuspis	oblique-spined bindyi				+			
	Sclerolaena parviflora	small-flower bindyi					+	+	
	Sclerolaena patenticuspis	spear-fruit bindyi		+				+	
	Threlkeldia diffusa	coast bonefruit		+	+	+		+	+
	CHLOANTHACEAE								
	Dicrastylis verticillata	whorled sand-sage			+		+		
	COMPOSITAE								
	Actinobole uliginosum	flannel cudweed				+			
	Angianthus sp.	angianthus						r	
	Angianthus tomentosus	hairy angianthus			+	+		+p	
	Asteridea athrixioides forma *athrixioides*	wirewort				+			
*	*Centaurea melitensis*	Maltese cockspur				+	+		
	Cratystylis conocephala	bluebush daisy		+		+		+	+
*	*Dittrichia graveolens*	stinkwort					+		
*	*Hedypnois rhagadioloides*	Cretan weed					+		
	Helichrysum leucopsideum	satin everlasting				+	+		
*	*Hypochaeris glabra*	smooth catsear					+		
	Minuria leptophylla	minnie daisy					+		
	Olearia ciliata var. *ciliata*	fringed daisy-bush					+		
	Olearia exiguifolia **N N U**	lobed-leaf daisy-bush				+		+	+
	Olearia floribunda var. *floribunda*	heath daisy-bush				+			
	Olearia lepidophylla	club-moss daisy-bush					+		+
	Olearia magniflora **N U U**	splendid daisy-bush			+	+		+	+
	Olearia minor	heath daisy-bush		+					+
	Olearia muelleri	Mueller's daisy-bush	+	+	+	+			+
	Olearia passerinoides ssp. *passerinoides* **N U U**	feather daisy-bush					+		
	Olearia pimeleoides ssp. *pimeleoides*	pimelea daisy-bush		+		+		+	
	Ozothamnus decurrens	ridged bush-everlasting						+	+
	Ozothamnus retusus	notched bush-everlasting				+			
	Podolepis capillaris	wiry podolepis					+	+	
	Podolepis rugata var. *rugata*	pleated podolepis				+			
	Rhodanthe haigii **N N #**	Haig's everlasting				+			
	Senecio lautus	variable groundsel					+		
*	*Sonchus tenerrimus*	clammy sow-thistle				+			
	Vittadinia australasica var. *australasica*	New Holland daisy				+			
	Vittadinia gracilis	woolly New Holland daisy				+			
	CRASSULACEAE								
	Crassula colorata var. *colorata*	dense stonecrop				+			
[5]	Crassula helmsii	swamp crassula					n		
*	*Crassula natans* var. *minus*						+p		
	Crassula sieberiana ssp. *tetramera*	Australian crassula					+		
	CRUCIFERAE								
	Brassica tournefortii	wild turnip				+			
*	*Carrichtera annua*	Ward's weed				+			
	CUPRESSACEAE								
	Callitris verrucosa	mallee cypress pine						+	+
	CYPERACEAE								
	Gahnia lanigera	black grass saw-sedge				+		+	+
	Lepidosperma carphoides	black rapier-sedge		+					+
	Lepidosperma congestum	clustered sword-sedge				+p			+

[5] *C. helmsi* is not recorded for Eyre Peninsula and appears to be confined to swampy habitats of higher rainfall or areas with permanent water (Toelken, 1981). Presumed to be a mis-identification of the related alien species *C. natans* var. *minus.*

			Source						
	Scientific Name	Common Name	1	2	3	4	5	6	7
[6]	Lepidosperma laterale	sharp sword-sedge				n			
	Lepidosperma viscidum	sticky sword-sedge				+		+	+
	Schoenus racemosus	sandhill bog-rush							+
	Schoenus subaphyllus	desert bog-rush				+			+
	EPACRIDACEAE								
	Leucopogon cordifolius	heart-leaved beard-heath	+	+			+	+	+
	EUPHORBIACEAE								
	Beyeria lechenaultii	pale turpentine bush							+
	Beyeria opaca	dark turpentine bush		+	+	+		+	+
	Euphorbia drummondii	caustic weed				+			
	GOODENIACEAE								
[7]	*Coopernookia strophiolata* **N N R**					+			+
	Dampiera rosmarinifolia	wild rosemary					+		+
[8]	*Goodenia gibbosa* **N R R**					+			
	Goodenia glabra **N N R**	smooth goodenia					+		
[9]	*Goodenia glandulosa* **N R R**					+			
	Goodenia robusta	woolly goodenia			+				
	Goodenia varia	sticky goodenia		+		+		+	
	Scaevola bursariifolia	bursaria fanflower						+	+
	Scaevola myrtifolia	myrtle fanflower							+
	Scaevola spinescens	spiny fanflower		+		+		+	+
	GRAMINEAE								
*	*Bromus rubens*	red brome				+			
	Danthonia setacea var. *setacea*	small-flower wallaby-grass				+			
	Danthonia sp.	wallaby-grass		+					
*	*Parapholis incurva*	curly rye grass					+		
*	*Schismus barbatus*	Arabian grass					+		
	Stipa drummondii	cottony spear-grass				+			
	Stipa elegantissima	elegant spear-grass						+	
	Stipa nitida	Balcarra spear-grass				+			
	Stipa platychaeta	flat-awn spear-grass				+			
	Stipa sp.	spear-grass		+					
[10]	Triodia irritans	spinifex	n	n					
	Triodia scariosa var. *scariosa*	spinifex	+p	+p	+	+		+p	+
	Triodia sp.	spinifex						r	
	Tripogon loliiformis	five-minute grass				+			
*	*Vulpia muralis*	wall fescue					+		
	GYROSTEMONACEAE								
	Gyrostemon ramulosus	bushy wheelfruit							+
	HALORAGACEAE								
	Glischrocaryon sp.						r		
[11]	*Glischrocaryon aureum* var. *angustifolium* **N N U**	golden pennants					+p	p+	
	Glischrocaryon behrii	golden pennants						n	
	JUNCACEAE								

[6] *L. laterale* in the strict sense does not occur in South Australia. The record from source 4 probably refers the same entity as the source 7 record of *L. congestum*, an elongated form that was initially identified as *L. laterale* s.lat.

[7] First record for the Eyre Peninsula region. *C. strophiolata* was previously attributed to Eyre Peninsula by Jessop (1993), but the only collections from this region seen at the State Herbarium were mis-identifications of *Scaevola bursarifolia*. This occurrence is at the southern limit of the species distribution.

[8] Apparently the first record for South Australia (see species notes at end of Vegetation chapter).

[9] First record for South Australia (see species notes at end of Vegetation chapter).

[10] *T. irritans* **s.lat.**, is the only taxon of *Triodia* recorded by sources 1 & 2 and most likely refers to *T. scariosa* var. *scariosa*.

[11] *G. aureum* is more likely than *G. behrii* in this district.

			Source						
	Scientific Name	Common Name	1	2	3	4	5	6	7
*	*Juncus bufonius*	toad rush					+		
	LABIATAE								
	Prostanthera ammophila	sand mint-bush							+
	Prostanthera serpyllifolia ssp. *microphylla*	small-leaf mintbush	+			+			
	Prostanthera sp.	mintbush						+	
	Teucrium sessiliflorum	mallee germander				+			
	Westringia rigida	stiff rosemary	+	+		+		+	+
	LAURACEAE								
	Cassytha melantha	large dodder-laurel				+			+
	Cassytha peninsularis var. *peninsularis*	peninsula dodder-laurel						+	
	Cassytha sp.	dodder-laurel		+					
	LEGUMINOSAE								
	Acacia acanthoclada **N U R**	harrow wattle					+	+	+
	Acacia anceps	angled wattle		+					
	Acacia ancistrophylla var. *lissophylla*	hook-leaf wattle			+				+
	Acacia colletioides	veined wait-a-while		+					
	Acacia farinosa	mealy wattle				+			
	Acacia hakeoides	hakea wattle	+	+		+			+
	Acacia ligulata	umbrella bush	+	+	+			+	+
	Acacia merrallii	Merrall's wattle		+		+		+	+
	Acacia nyssophylla	wait-a-while		+	+	+		+	+
	Acacia oswaldii	umbrella wattle		+		+		+	+
	Acacia papyrocarpa	western myall		+					
[12]	*Acacia prainii* **N N R**	Prain's wattle							+
	Acacia rigens	nealie							+
	Acacia sclerophylla	hard-leaf wattle						+	+
	Aotus subspinescens	sandhill pea							+
	Bossiaea walkeri **N N U**	cactus pea						+	+
	Daviesia benthamii ssp. *benthamii* **N U U**	dryland bitter-pea				+			+
	Daviesia sp.	bitter-pea		+				+	
	Daviesia ulicifolia	gorse bitter-pea		+					+
[13]	Dillwynia hispida	red parrot-pea				n			
	Dillwynia sp.	parrot-pea						r	
	Dillwynia uncinata	silky parrot-pea			+	+p		+p	+
	Eutaxia microphylla var. *microphylla*	common eutaxia		+				+	+
[14]	Pultenaea densifolia	dense-leaved bush-pea	n						
	Pultenaea elachista **N U U**	limestone bush-pea	+p		+	+		+	+
	Senna artemisioides nothossp. *coriacea*	desert senna		+	+	+			+
	Senna artemisioides nothossp. *sturtii*	grey desert senna				+			
[15]	*Senna artemisioides* ssp. *filifolia*	fine-leaf desert senna		+p	+			+p	
	Senna artemisioides ssp. *petiolaris*	flat-stalk senna						+	+
[16]	*Swainsona pyrophila* **R R R**	yellow swainson-pea							
	Templetonia battii **N R R**	spiny templetonia				+p		+	
	Templetonia egena	broombush templetonia	+				+		

[12] First record for the Eyre Peninsula region.
[13] Probably a mis-identification of *D. uncinata* which was not otherwise recorded by source 4.
[14] Probably a mis-identification of *P. elachista* which was not otherwise recorded by source 1.
[15] Records of *Cassia nemophila* var. *nemophila* by sources 2 & 6 most likely refer to this taxon.
[16] Recorded by P.B. Copley on 10 June 1987 from 17.5km N of Koonibba, Pt Section 95 Out of Hundreds, on land undergoing vegetation clearance (population # 289 in DENR Threatened Plant Population Database). This site is only about 0.5km S of the park's southern boundary and is the same section as sampled by source 1. Davies (1992) considers that the species probably occurs within the park. See species notes at end of Vegetation chapter.

			Source						
	Scientific Name	Common Name	1	2	3	4	5	6	7
	LILIACEAE								
[17]	Dianella longifolia		n						
	Dianella revoluta var.	black-anther flax-lily		+				+	
	Dianella revoluta var. *divaricata*	broad-leaf flax-lily	+p						
	Dianella revoluta var. *revoluta*	black-anther flax-lily				+			+
[18]	*Lomandra collina*	sandhill mat-rush	+p	+p		+		+p	+
	Lomandra leucocephala ssp. *robusta*	woolly mat-rush			+	+			+
	LOGANIACEAE								
	Logania nuda	leafless logania							+
	LORANTHACEAE								
	Amyema melaleucae	tea-tree mistletoe					+		+
	MALVACEAE								
	Lawrencia squamata	thorny lawrencia							+
	Sida corrugata var.	corrugated sida						+	
	MARSILEACEAE								
	Marsilea sp.	nardoo					+		
	MYOPORACEAE								
	Eremophila alternifolia	narrow-leaf fuchsia-bush					+	+	+
	Eremophila crassifolia	thick-leaved emubush		+				+	+
	Eremophila glabra ssp. *glabra*	tar bush		+	+	+		+	+
[19]	*Eremophila paisleyi* **N N R**	Paisley's emubush							+
	Eremophila platythamnos ssp. "exotrachys" **# # R**								+
[20]	*Eremophila praecox* **# K K**							+	
	Eremophila scoparia	broom emubush		+	+	+		+	+
	Eremophila subfloccosa ssp. "imbricata" **N N U**	woolly emubush			+			+	
	Eremophila weldii	purple emubush		+		+		+	+
	Myoporum platycarpum ssp.	false sandalwood		+	+	+		+	
	Myoporum platycarpum ssp. *platycarpum*	false sandalwood							+
	Myoporum sp.			+					
	MYRTACEAE								
	Baeckea crassifolia	desert baeckea		+					
[21]	Calytrix involucrata	cup fringe-myrtle		n					
	Calytrix tetragona	common fringe-myrtle	+	+p					+
	Darwinia salina **N N U**	salt darwinia			+				+
	Eucalyptus brachycalyx	gilja	+	+		+		+	+
	Eucalyptus ceratocorys	desert ridge-fruit mallee		+p	+p	+p		+p	+
	Eucalyptus dumosa	white mallee				+		+	+
	Eucalyptus gracilis	yorrell		+	+	+		+	+
[22]	Eucalyptus incrassata	ridge-fruit mallee		n	n	n		n	

[17] Out of range for *D. longifolia* (recorded as *D. laevis* by source 1). Most likely this refers to *D. revoluta* var. *divaricata* which is superficially similar in its broad, glaucous leaves.

[18] Presumed from records of *L. glauca* in sources 1, 2 & 6.

[19] First record for the Eyre Peninsula region.

[20] This taxon is possibly a hybrid between *E. scoparia* and *E. weldii* (see species notes at end of Vegetation chapter). Recorded by A.K. Turner in April 1990 from the following eight locations in the southern part of the park, some of which are along the dog-fence on the southern boundary.

5534 II	354900E 6483750N	361550E 6479450N	357900E 6479350N
	354750E 6483700N	357150E 6479300N (4 plants)	361550E 6479420N
	25 mile sign on Dog Fence (no AMG)	357700E 6479300N	

[21] West of the known range of this species (Craven, 1987). Presumed to be *C. tetragona* which is within range and was not otherwise recorded by source 2.

[22] *E. incrassata* **s.lat.**, presumed to be *E. ceratocorys*, following Brooker & Kleinig (1990).

			Source						
	Scientific Name	Common Name	1	2	3	4	5	6	7
	Eucalyptus leptophylla	narrow-leaf mallee	+		+			+	+
	Eucalyptus oleosa	red mallee		+	+	+	+	+	+
[23]	*Eucalyptus socialis*	summer red mallee						+	
	Eucalyptus striaticalyx	kopi mallee						+	+
	Eucalyptus yalatensis	Yalata mallee	+						
	Eucalyptus yumbarrana ssp. *yumbarrana*	Yumbarra mallee		+	+	+	+	+	+
	Homoranthus wilhelmii	Wilhelm's homoranthus							+
	Leptospermum coriaceum	sandhill tea-tree		+		+			+
	Melaleuca acuminata	mallee honey-myrtle				+			
	Melaleuca eleutherostachya	hummock honey-myrtle	+	+	+	+		+	+
	Melaleuca lanceolata	dryland tea-tree		+		+		+	+
	Melaleuca leiocarpa **N R R**	pungent honey-myrtle							+
[24]	Melaleuca nanophylla	dwarf-leaf honey-myrtle		n					
	Melaleuca pauperiflora	boree		+	+	+		+	+
	PITTOSPORACEAE								
	Billardiera cymosa	sweet apple-berry		+		+			+
[25]	*Billardiera sericophora*	silky apple-berry		+p				+	
	Billardiera sp.	apple-berry		r					
	Pittosporum phylliraeoides var. *microcarpa*	native apricot		+		+		+	+
	POLYGALACEAE								
	Comesperma scoparium	broom milkwort			+			+	+
	PORTULACACEAE								
	Calandrinia eremaea	small purslane					+		
	PRIMULACEAE								
*	*Anagallis arvensis*	pimpernel				+	+		
	PROTEACEAE								
	Grevillea huegelii	comb grevillea		+	+	+		+	+
	Grevillea pterosperma	sandhill grevillea							+
	Grevillea sarissa ssp. *umbellifera* **N U U**	desert spider-flower	+			+		+	+
	Grevillea sp.			+					
	Hakea francisiana	bottle-brush hakea		+	+	+		+	+
	RHAMNACEAE								
	Cryptandra amara var. *amara*	spiny cryptandra		+		+		+	
	Cryptandra propinqua	silky cryptandra							+
[26]	*Spyridium tricolor* **N K K**	rusty spyridium		?					
	Spyridium tridentatum **N U U**	trident spyridium							+
	RUBIACEAE								
	Opercularia turpis	twiggy stinkweed				+			
	RUTACEAE								
	Boronia coerulescens ssp. *coerulescens*	blue boronia		+		+			+
	Geijera linearifolia	sheep bush		+		+		+	+

[23] Recorded in dune swale and identified on the basis of fruit shape (A.K. Turner, pers. comm. 1995). Some specimens identified as *E. yumbarrana* ssp. *yumbarrana* in source 7 showed intergradation towards *E. socialis*.

[24] Well outside the known range of this species which has a very localised distribution in the Emu district of North-Western region (Carrick & Chorney, 1979). The identification is presumed to be in error.

[25] The identification of *B. sericophora* was recorded by source 6 as being doubtful ("?") but is supported by the record (by the same surveyor) of a second *Billardiera* species in source 2.

[26] The occurrence of *S. tricolor* in Yumbarra Conservation Park is inconclusive. It is tentatively recorded for source 2 on the basis of a record given as "*Spyridium* affin. *spathulata*" well before *S. tricolor* was recognised as a new species by Barker & Rye (1993). The two populations known in South Australia are located in the Hundred of Cattat sites 6.5 and 10.5km south of the southern park boundary. The possible occurrence of *S. tricolor* in Yumbarra Conservation Park is supported by the fact that the habitats at these sites are well represented in the park (see species notes at end of Vegetation chapter).

			Source						
	Scientific Name	Common Name	1	2	3	4	5	6	7
[27]	Microcybe multiflora var. baccharoides	scale-leaf microcybe						n	
	Microcybe multiflora var *multiflora*	small-leaf microcybe				+		+p	+
	Phebalium bullatum	silvery phebalium	+			+		+	+
	SANTALACEAE								
	Choretrum glomeratum var. *chrysanthum* **N R R**	yellow-flower sour-bush		+					+
[28]	Leptomeria aphylla	leafless currant-bush				n			
	Exocarpos aphyllus	leafless ballart		+	+	+		+	+
	Exocarpos sparteus	broom ballart		+			+	+	+
	Santalum acuminatum	quandong		+	+	+		+	+
	SAPINDACEAE								
	Dodonaea bursariifolia	small hop-bush		+		+		+	+
	Dodonaea stenozyga	desert hop-bush		+	+	+		+	+
	Dodonaea viscosa ssp. *angustissima*	narrow-leaf hop-bush		+	+	+		+	+
	SCROPHULARIACEAE								
	Limosella sp.	mudwort					+		
	SOLANACEAE								
	Grammosolen truncatus **N N U**					+		+	+
	Lycium australe	Australian boxthorn					+	+	
*	*Lycium ferocissimum*	African boxthorn					+		
	Nicotiana goodspeedii	small-flower tobacco				+			
	Solanum coactiliferum	tomato-bush				+	+		+
	Solanum hystrix	Afghan thistle				+			
*	*Solanum nigrum*	black nightshade					+		
	STACKHOUSIACEAE								
	Stackhousia muricata	yellow candles				+			
	STERCULIACEAE			+					
	Lasiopetalum baueri	slender velvet-bush		+				+	
	Lasiopetalum behrii	pink velvet-bush				+		+	+
	THYMELAEACEAE								
	Pimelea microcephala ssp. *microcephala*	mallee riceflower				+	+	+	
	Pimelea subvillifera **N U U**	silky riceflower	+						
	UMBELLIFERAE								
*	*Bupleurum semicompositum*	hare's ear				+			
	Daucus glochidiatus	native carrot					+		
	VIOLACEAE								
	Hybanthus floribundus ssp. *floribundus*	shrub violet			+				
	ZYGOPHYLLACEAE								
	Zygophyllum apiculatum	common twinleaf		+	+	+		+	+
	Zygophyllum aurantiacum	shrubby twinleaf		+	+	+		+	+
	Zygophyllum glaucum	pale twinleaf				+			+
	Zygophyllum ovatum	dwarf twinleaf				+			
	Total Number of Species Recorded for Each Source		**21**	**84**	**47**	**117**	**45**	**101**	**119**
	Total Number of Species Recorded in the Park	**226**							

[27] The two subspecies of *M. multiflora* intergrade. This record is more likely to be ssp. *multiflora* on the basis of other collections from the district and the fact that ssp. *multiflora* was not otherwise recorded by source 6.

[28] *L. aphylla* is unlikely to occur in this district and the record is presumed to be a mis-identification of *Templetonia battii*, a superficially similar spinescent shrub of family Leguminosae.

Appendices

Appendix III

MAMMAL SPECIES RECORDED FROM YUMBARRA CONSERVATION PARK

Mammal taxonomy follows Kemper and Queale (1990). Species records from the collections of the South Australian Museum are up to 1993 and do not include specimens collected during the present survey.

Introduced species are indicated with an asterisk (*).

Comments on particular species are indicated in the annotations to the list.

The State conservation ratings are shown in bold following the scientific name. These have been taken from Kemper and Queale (1990).

The definition for the status codes are as follows:
U Uncommon: taxa occurring in relatively low numbers in South Australia, but not rare.
C Common: the category of greatest abundance; relatively numerous generally, locally and/or seasonally.(Local abundance applies to species with restricted distribution).

The final eight columns indicate the source of mammal species records for Yumbarra Conservation Park.

KEY: Source of Records

1 South Australian Museum Records 1960-1969.
2 Field Naturalist Society of SA Mammal Club Survey 20/9/1969.
3 Opportunistic trapping by R. Henderson and S. Barker, Dept. of Environment, 11 November 1974.
4 South Australian Museum Records 1970-1979.
5 South Australian Museum Records 1980-1989.
6 Survey of Yumbarra Conservation Park by P. Bird and R. Sinclair, Dept. of Agriculture, 30/11 - 6/12/1980.
7 Biological Survey of Yellabinna Region, Biological Research Section, DENR, 4-22/10/1987. *Quadrat* based data and opportunistic observations within Yumbarra Conservation Park.
8 Survey of Yumbarra Conservation Park by Biological Research Section, DENR, 19-31/3/1995 (current survey). *Quadrat* based data and opportunistic observations within Yumbarra Conservation Park.

			Source							
	Scientific Name	Common Name	1	2	3	4	5	6	7	8
	BURRAMYIDAE									
	Cercartetus concinnus **C**	Western Pygmy-possum			+	+	+	+	+	+
	CANIDAE									
	Canis familiaris dingo	Dingo							+	+
*	*Vulpes vulpes*	Fox		+			+	+	+	+
	DASYURIDAE									
	Ningaui yvonneae **C**	Yvonne's Ningaui								+
	Sminthopsis crassicaudata **C**	Fat-tailed Dunnart					+		+	
	Sminthopsis dolichura **C**				+	+	+	+	+	+
	FELIDAE									
*	*Felis catus*	Cat		+			+	+	+	+
	LEPORIDAE									
*	*Oryctolagus cuniculus*	Rabbit						+	+	+
	MACROPODIDAE									
	Macropus fuliginosus **C**	Western Grey Kangaroo		+			+	+	+	+
	MURIDAE									
*	*Mus domesticus*	House Mouse		+			+	+	+	
	Notomys mitchellii **C**	Mitchell's Hopping Mouse	+	+			+	+	+	+
	TACHYGLOSSIDAE									
	Tachyglossus aculeatus **C**	Short-beaked Echidna								+
	VESPERTILIONIDAE									
	Chalinolobus gouldii **C**	Gould's Wattled Bat						+		
	Eptesicus regulus **C**	King River Eptesicus					+		+	+
	Nyctophilus geoffroyi **C**	Lesser Long-eared Bat					+		+	+
	Nyctophilus timoriensis **U**	Greater Long-eared Bat					+		+	+
	VOMBATIDAE									
1	*Lasiorhinus latifrons* **U**	Hairy-nosed Wombat		+						
	Total Number of Species Recorded For Each Source		**1**	**6**	**2**	**2**	**11**	**9**	**13**	**13**
	Total Number of Species Recorded in the Park	**17**								

1 Hairy -nosed wombat recorded by Ray Williams (Mammal Club) 'in dog trap 10 miles from South boundary', direction not given. This record may not fall, within park boundary.

Appendices

Appendix IV

BIRD SPECIES RECORDED FROM YUMBARRA CONSERVATION PARK

Species are arranged in alphabetical order of Family using the taxonomy and nomenclature of Parker and Horton (1990). Where common names differ from those recommended by the Royal Australian Ornithological Union the latter is given in parentheses.

Introduced species are preceded with an asterisk (*).

Comments on particular species are indicated in the annotations to the list.

The State conservation ratings are shown in parentheses following the scientific name. These have been taken from Parker and Horton (1990).

The definition for the status codes are as follows:
(E) Endangered: taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating.
(V) Vulnerable: taxa believed likely to move into endangered category in the near future if the causal factors continue operating.
(R) Rare: taxa with small populations in South Australia that are not at present endangered or vulnerable, but are at risk.

These are followed by statewide and Eyre Peninsula Region ratings in bold from Carpenter and Reid (1988).

The definition for the status codes are as follows:
R Rare: considered to be at risk due to low numbers of individuals even though no or little decline has been detected.
U Uncommon: although not an IUCN category, the term uncommon has been introduced to include bird populations which are inadequately conserved or declining but are not yet threatened.
C Common: considered widespread throughout most of its known distribution and under no immediate threat.

The final twelve columns indicate the source of bird species records for Yumbarra Conservation Park, arranged chronologically.

KEY: Source of Records

1 National Parks Commission Ranger Inspection Reports, October 1968 - May 1971.
2 Additional Records recorded by D.H. Close, 7-12 June 1977.
3 Survey of Yumbarra Conservation Park by P. Bird and R. Sinclair, Dept. of Agriculture, 30/11 - 6/12/1980.
4 L. Pedler, *et al.,* Bird List along Goog's Track, August 1983.
5 J. Reid, Bird List for Yumbarra Conservation Park, 19-20 June 1984.
6 Records from Denton's (Goog's) Track, within Yumbarra Conservation Park by J. Needle and G. White, 26-27 August 1984.
7 Records from Denton's (Goog's) Track, within Yumbarra Conservation Park by J. Needle, 1-2 September 1985.
8 Visit to Yumbarra Conservation Park by J. Needle, 13-14 October 1985.
9 Biological Survey of Yellabinna Region, Biological Research Section, DENR, 4-22 October 1987.
10 Bird List for Yumbarra Conservation Park, 22km NE Penong by G. Carpenter and J. Matthew, 12 August 1994.
11 Survey of Yumbarra Conservation Park by Biological Research Section, DENR, 19-31/3/1995 (current survey).
12 Bird List for Yumbarra Conservation Park (Yumbarra Rock Hole and Goog's Track) by J. Day and K. Martin *et al.,*14-15 May 1995.

		Source											
Scientific Name	**Common Name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
ACCIPITRIDAE													
Accipiter cirrhocephalus	Collared Sparrowhawk				+							+	+
Accipiter fasciatus	Brown Goshawk				+								
Aquila audax	Wedge-tailed Eagle	+		+	+	+	+		+	+		+	+
Circus assimilis	Spotted Harrier	+			+								
Elanus caeruleus	Black-shouldered Kite			+									
Haliastur sphenurus	Whistling Kite	+											
Hieraaetus morphnoides	Little Eagle			+			+						
AEGOTHELIDAE													
Aegotheles cristatus	Australian Owlet-nightjar			+	+		+	+	+			+	+
CASUARIIDAE													
Dromaius novaehollandiae **C U**	Emu	+		+									
CHARADRIIDAE													
Holopterus tricolor	Banded Plover (Banded Lapwing)			+	+	+				+		+	+
CLIMACTERIDAE													
Climacteris rufa (V) **V V**	Rufous Treecreeper			+		+				+	+	+	
COLUMBIDAE													
Geopelia cuneata	Diamond Dove	+											
Ocyphaps lophotes	Crested Pigeon	+		+								+	
Phaps chalcoptera	Common Bronzewing	+		+	+				+	+		+	+
CORVIDAE													
Artamus cinereus	Black-faced Woodswallow			+	+								
Artamus cyanopterus	Dusky Woodswallow	+		+	+	+			+	+		+	+
Artamus personatus	Masked Woodswallow				+				+				

		Source											
Scientific Name	**Common Name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Artamus superciliosus	White-browed Woodswallow			+					+				
Cinclosoma castanotum (V) **V V**	Chestnut Quailthrush		+		+	+				+		+	
Colluricincla harmonica rufiventris	Western Shrikethrush	+		+	+	+	+		+	+	+	+	+
Coracina novaehollandiae	Black-faced Cuckooshrike	+		+	+			+	+	+		+	+
Corvus bennetti	Little Crow	+			+	+		+	+			+	
Corvus coronoides	Australian Raven	+			+			+				+	+
Corvus mellori	Little Raven			+		+						+	
Cracticus torquatus	Grey Butcherbird	+		+	+	+	+	+	+		+	+	+
Gymnorhina tibicen	Black-backed Magpie			+						+		+	+
Lalage sueurii	White-winged Triller				+				+				
Myiagra inquieta	Restless Flycatcher (Scissor-grinder)	+		+	+	+			+		+	+	
Oreoica gutturalis **C U**	Crested Bellbird			+	+	+	+	+		+	+	+	
Pachycephala inornata **R R**	Gilbert's Whistler			+		+		+			+	+	+
Pachycephala pectoralis	Golden Whistler		+		+	+					+		+
Pachycephala rufiventris	Rufous Whistler			+	+	+	+	+	+				
Rhipidura fuliginosa	Grey Fantail					+							
Rhipidura leucophrys	Willie Wagtail	+		+	+		+					+	+
Strepera versicolor **U U**	Grey Currawong	+		+	+	+	+		+	+	+	+	+
CUCULIDAE													
Chrysococcyx basalis	Horsfield's Bronze Cuckoo				+		+		+		+		
Chrysococcyx osculans **U U**	Black-eared Cuckoo				+		+				+		
Cuculus pallidus	Pallid Cuckoo				+		+	+					
DACELONIDAE													
Halcyon pyrrhopygia **U U**	Red-backed Kingfisher	+											
EOPSALTRIIDAE													
Daphoenositta chrysoptera	(Varied) Sittella	+			+	+			+			+	+

		Source											
Scientific Name	**Common Name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Drymodes brunneopygia **U U**	Southern Scrub-robin		+	+					+	+		+	
Eopsaltria griseogularis **U U**	Western Yellow Robin				+	+				+	+	+	
Melanodryas cucullata **C U**	Hooded Robin				+				+				
Microeca leucophaea **C U**	Jacky Winter			+	+	+	+				+	+	+
Petroica goodenovii	Red-capped Robin	+		+	+	+	+	+	+			+	+
EUROSTOPODIDAE													
Eurostopodus argus (guttatus) **C V**	Spotted Nightjar				+								
FALCONIDAE													
Falco berigora	Brown Hawk (Brown Falcon)	+		+	+	+	+		+	+		+	+
Falco cenchroides	Nankeen Kestrel	+		+	+				+	+		+	
Falco longipennis	Little Falcon	+											
HIRUNDINIDAE													
Cheramoeca leucosternum	White-backed Swallow			+									
Hirundo neoxena	Welcome Swallow	+		+				+					+
Hirundo nigricans nigricans	Tree Martin			+		+		+		+	+		+
MALURIDAE													
Amytornis striatus **V V**	Striated Grasswren				+							+	
Malurus lamberti	Variegated Wren	+	+	+	+		+	+	+	+	+	+	+
Malurus pulcherrimus ?	Blue-brested Wren				+								
MEGAPODIIDAE													
Leipoa ocellata (E) **V V**	Malleefowl				+					+		+	
MELIPHAGIDAE													
Acanthagenys rufogularis	Spiny-cheeked Honeyeater	+		+	+		+	+	+	+		+	+
Anthochaera carunculata	Red Wattlebird	+		+	+	+			+	+	+	+	+

		Source											
Scientific Name	**Common Name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Certhionyx variegatus	Pied Honeyeater								+				
Epthianura albifrons	White-fronted Chat	+		+					+				+
Epthianura aurifrons	Orange Chat	+											
Epthianura tricolor	Crimson Chat				+				+				
Manorina flavigula	Yellow-throated Miner	+		+	+	+	+	+	+	+		+	+
Meliphaga cratitia (V) **U U**	Purple-gaped Honeyeater		+	+									
Meliphaga leucotis	White-eared Honeyeater			+	+	+	+	+	+	+	+	+	+
Meliphaga ornata (V)	Yellow-plumed Honeyeater	+		+	+	+	+		+	+	+	+	+
Meliphaga plumula	Grey-fronted Honeyeater				+								
Meliphaga virescens	Singing Honeyeater	+		+		+			+			+	+
Melithreptus brevirostris	Brown-headed Honeyeater			+	+	+	+	+	+	+		+	+
Phylidonyris albifrons	White-fronted Honeyeater				+	+	+	+	+	+	+	+	+
Sugomel niger	Black Honeyeater								+				
MEROPIDAE													
Merops ornatus	Rainbow Bird (Rainbow Bee-eater)	+		+					+	+		+	
NECTARINIIDAE													
Dicaeum hirundinaceum	Mistletoe Bird						+						
PARDALOTIDAE													
Acanthiza apicalis	Inland (Brown) Thornbill			+	+	+	+	+	+	+	+	+	+
Acanthiza chrysorrhoa	Yellow-rumped Thornbill			+	+	+					+	+	+
Acanthiza uropygialis **C U**	Chestnut-rumped Thornbill				+		+	+					+
Aphelocephala leucopsis **C U**	Southern (Common) Whiteface					+		+					
Hylacola cauta (V) **U U**	Shy Heathwren (Shy Hylacola)		+	+	+					+	+	+	
Pardalotus sp.										+			
Pardalotus striatus	Striated Pardalote				+	+	+	+	+		+	+	+
Pardalotus xanthopygus **U U**	Yellow-tailed Pardalote	+		+	+	+	+	+	+	+	+	+	
Pyrrholaemus brunneus **R R**	Redthroat				+		+	+					+

		Source											
Scientific Name	**Common Name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Smicrornis brevirostris	Weebill			+	+	+	+	+	+	+	+	+	+
PASSERIDAE													
Anthus novaeseelandiae	Richard's Pipit	+		+	+	+			+			+	+
Poephila guttata	Zebra Finch			+									
PHASIANIDAE													
Coturnix novaezelandiae	Stubble Quail									+			
PODARGIDAE													
Podargus strigoides	Tawny Frogmouth	+			+	+				+		+	
POMATOSTOMIDAE													
Pomatostomus superciliosus	White-browed Babbler	+		+	+	+	+	+	+	+	+	+	+
PSITTACIDAE													
Barnardius zonarius zonarius	Port Lincoln Ringneck	+		+	+	+	+	+		+	+	+	+
Cacatua leadbeateri (V) **V V**	Major Mitchell (Pink Cockatoo)	+		+				+					
Eolophus roseicapillus	Galah	+		+	+	+	+	+	+	+		+	+
Glossopsitta porphyrocephala	Purple-crowned Lorikeet			+		+			+	+	+	+	
Melopsittacus undulatus	Budgerigah	+							+				
Neophema splendida (R) **R R**	Scarlet-chested Parrot								+				
Psephotus varius	Mulga Parrot (Many-coloured Parrot)			+	+	+	+	+	+		+	+	
STRIGIDAE													
Ninox novaeseelandiae	Boobook Owl (Southern Boobook)				+	+					+	+	
STURNIDAE													
**Sturnus vulgaris*	(Common, European) Starling	+		+					+	+		+	

		Source											
Scientific Name	**Common Name**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
SYLVIIDAE													
Cinclorhamphus cruralis	Brown Songlark			+	+								
TURNICIDAE													
Turnix varia varia (V) **U U**	Painted Button-quail											+	
Turnix velox	Little Button-quail	+								+			
ZOSTEROPIDAE													
Zosterops lateralis lateralis	Silvereye											+	+
Total Number of Species Recorded For Each Source		**42**	**6**	**57**	**63**	**43**	**33**	**30**	**47**	**39**	**29**	**57**	**42**
Total Number of Species Recorded in the Park	**101**												

Appendices

Appendix V

REPTILE AND AMPHIBIAN SPECIES RECORDED FROM YUMBARRA CONSERVATION PARK

Reptile taxonomy follows Edwards and Tyler (1990), but includes some recent taxonomic changes and additional common names from Hutchinson (in prep.). Species records from the collections of the South Australian Museum are up to 1993 and do not include specimens collected during the present survey.

Comments on particular species are indicated in the annotations to the list.

The final five columns indicate the source of reptile species records for Yumbarra Conservation Park.

KEY: Source of Records

1 South Australian Museum Records 1970-1979.
2 South Australian Museum Records 1980-1989.
3 Survey of Yumbarra Conservation Park by P. Bird and R. Sinclair, Dept. of Agriculture, 30/11 - 6/12/1980.
4 Biological Survey of Yellabinna Region, Biological Research Section, DENR, 4-22/10/1987. *Quadrat* based data and opportunistic observations within Yumbarra Conservation Park.
5 Survey of Yumbarra Conservation Park by Biological Research Section, DENR, 19-31/3/1995 (current survey). *Quadrat* based data and opportunistic observations within Yumbarra Conservation Park.

			Source				
	Scientific Name	Common Name	1	2	3	4	5
	AGAMIDAE						
	Ctenophorus cristatus	Crested Dragon		+	+	+	+
	Ctenophorus fordi	Mallee Dragon	+	+	+	+	+
	Ctenophorus isolepis	Military Dragon			+		+
	Ctenophorus pictus	Painted Dragon		+		+	+
	Diporiphora linga	Linga Dragon	+		+		+
	Moloch horridus	Thorny Devil (Moloch)	+		+		+
	Pogona minor	Dwarf Bearded Dragon	+	+		+	+
	ELAPIDAE						
	Pseudechis australis	Mulga (King Brown) Snake					+
	Pseudonaja nuchalis	Western Brown Snake		+		+	
	Simoselaps bertholdi	Desert Banded Snake	+				
	Simoselaps semifasciatus	Half-girdled Snake	+				
	GEKKONIDAE						
	Diplodactylus damaeus	Beaded Gecko					+
1	*Diplodactylus granariensis*	Western Stone Gecko	+	+	+	+	+
	Diplodactylus stenodactylus	Sandplain Gecko	+				
2	*Gehyra variegata*	Tree Dtella	+	+		+	+
	Gehyra '2n=44'	Southern Rock Dtella					+
	Heteronotia binoei	Bynoe's Gecko					+
	Nephrurus milii	Thick-tailed Gecko					+
	Nephrurus stellatus	Starred Knob-tailed Gecko	+	+		+	+
	Strophurus assimilis	Thorn-tailed Gecko					+
	PYGOPODIDAE						
	Aprasia inaurita	Red-tailed Worm Lizard		+		+	
	Delma australis	Barred Snake-lizard	+		+		+
	Delma butleri	Spinifex Snake-lizard		+		+	+

			Source				
	Scientific Name	Common Name	1	2	3	4	5
	Delma fraseri	Fraser's Snake-lizard					+
	Pygopus lepidopodus	Common Scaly-foot	+	+		+	
	SCINCIDAE						
	Cryptoblepharus	Desert Wall Skink		+		+	
	Ctenotus atlas	Southern Spinifex Ctenotus	+	+	+	+	+
	Ctenotus pantherinus	Leopard Skink	+	+	+		+
	Ctenotus schomburgkii	Sandplain Ctenotus	+	+	+	+	+
	Cyclodomorphus melanops	Spinifex Slender Blue-tongue		+		+	+
	Egernia inornata	Desert Skink	+	+	+	+	+
3	*Egernia richardi*	Western Tree Skink		+	+	+	+
	Eremiascincus richardsonii	Broad-banded Sand Swimmer					+
	Hemiergis initialis	Western Earless Skink		+		+	
	Lerista desertorum	Great Desert Slider					+
	Lerista dorsalis	Southern Four-toed Slider		+		+	+
	Lerista distinguenda	Dwarf Four-toed Slider					+
4	*Lerista edwardsae*	Yellow-bellied Slider	+	+		+	+
	Lerista elongata	Woomera Slider	+				
	Menetia greyii	Dwarf Skink				+	+
	Morethia butleri	Butler's Snake-eye	+	+		+	+
	Morethia obscura	Mallee Snake-eye					+
	Tiliqua occipitalis	Western Blue-tongue Lizard					+
	Tiliqua rugosa	Shingle-back		+	+	+	+
	VARANIDAE						
	Varanus eremius	Desert Pygmy Goanna					+
	Varanus gouldii	Gould's Goanna (Sand Goanna)		+	+	+	+
	Total Number of Species Recorded For Each Source		**19**	**24**	**14**	**24**	**37**
	Total Number of Species Recorded in the Park	**46**					

1 Sighting by source 3 was recorded as *Diplodactylus vittatus.*
2 *Gehyra variegata* specimens may include *G.'2n=44'* yet to be described.
3 Specimen collected by source 3 was recorded as *Egernia striolata.*
4 Specimens collected during Yellabinna Survey (1987), source 4, were recorded as *Lerista picturata*.

Appendices

Appendix VI

WEATHER OBSERVATIONS RECORDED DURING THE BIOLOGICAL SURVEY OF YUMBARRA CONSERVATION PARK, MARCH 1995.

DATE (reading taken)	SUN Min(oC)	SUN Max(oC)	SHADE Min(oC)	SHADE Max(oC)	COMMENTS
20/03/95	11	46	11	27	Fine, clear, still.
21/03/95	9	50	12	32	Fine, clear, still.
22/03/95	9	50	11	37	Fine, clear, still.
23/03/95	10	48.5	11	36	Early morning fog. Fine, clear, still.
24/03/95	9	46	11	38	Fine, clear, still.
25/03/95	10.5	45.5	12	33.5	Fine, warm, still.
26/03/95	9	46	12	22	Overcast early in day. Warm, fine, some cloud.
27/03/95	5.5	43	9	28	Fine, clear, still.
28/03/95	6	46	19	26	Fine, clear.
29/03/95	6	26	10	19	Overcast early in day.
30/03/95	5.5	44	9	25	Fine, warm.