# WILDLIFE OF THE GREAT SANDY DESERT, Western Australia


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## CONTENTS

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## TABLES

---

## FIGURES

---

## PLATES

## COLOUR PLATES - BETWEEN PAGES 32 and 33

Wildl. Res. Bull. West. Aust. No. 12, 1-127

# WILDLIFE OF THE GREAT SANDY DESERT, WESTERN AUSTRALIA

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## ABSTRACT

The Great Sandy Desert of 250 000 km$^2$ lies in the tropics of Western Australia. Expeditions between 1977 and 1982 examined the vegetation, flora and vertebrate fauna with the aim of advising the Environmental Protection Authority on the need for conservation reserves.

The Great Sandy Desert is a distinct natural area with marked changes in the flora and fauna from north to south and from east to west. As well as the typical and extensive sand plains, sand dunes and swales there are also gravelly rises and ferricrete breakaways, ranges and hills, alluvial and colluvial areas, lake deposits and calcrete outcrops. The wildlife is mainly arid zone (Eremaean = Eyrean) but has a Northern (Torresian) component: the 541 plant, 37 mammal, 156 bird, 8 frog and 75 reptile species comprise a rich assemblage for such an apparently unproductive region.

The various surfaces and species of the Great Sandy Desert are not well represented in the two existing conservation reserves. Recommendations are made to create a new National Park and four new Nature Reserves so that all major ecosystems and areas of special interest are protected.

## PART I

## ENVIRONMENT

by N.L. McKenzie[1], A.A. Burbidge[1], A.S. George[2], and A.S. Mitchell[3]

### INTRODUCTION

The Great Sandy Desert of Western Australia occupies an area of about 250 000 km$^2$ in the tropics, south of the Kimberley and north of the Gibson Desert (Fig. 1; for desert boundaries see Beard 1969, 1980). It is largely unoccupied, the only semi-permanent town being the mining settlement at Telfer. It forms a distinctive phytogeographic region of the State (Beard 1980) worthy of representation in the State's conservation reserve system.

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In its 1974 report the Conservation Through Reserves Committee (CTRC 1974 pp. 12-14) drew attention to the lack of conservation reserves in the Great Sandy Desert (GSD): "It should be noted that no recommendation is made at this stage for a large representative reserve in the Great Sandy Desert, since knowledge is still inadequate". The Committee recommended to the Environmental Protection Authority that four areas be investigated - the "Mt Phire - Munro Block", Radi Hills and Samphire Marsh, the Percival Lakes Area, and Gregory Lake. The first two are on the extreme western edge of the GSD, but are atypical of GSD environments because they include a variety of Northern Botanical Province formations and species. Also they are not readily available for reservation because they include areas under pastoral lease. Gregory Lake (officially named Lake Gregory) is within the Tanami Desert according to Beard's boundaries while the Percival Lakes are in the central GSD.

The Environmental Protection Authority's 1975 recommendations, resulting from the CTRC report, stated: "The EPA has noted that there are no conservation reserves in the Great Sandy Desert. The EPA considers it undesirable not to have such

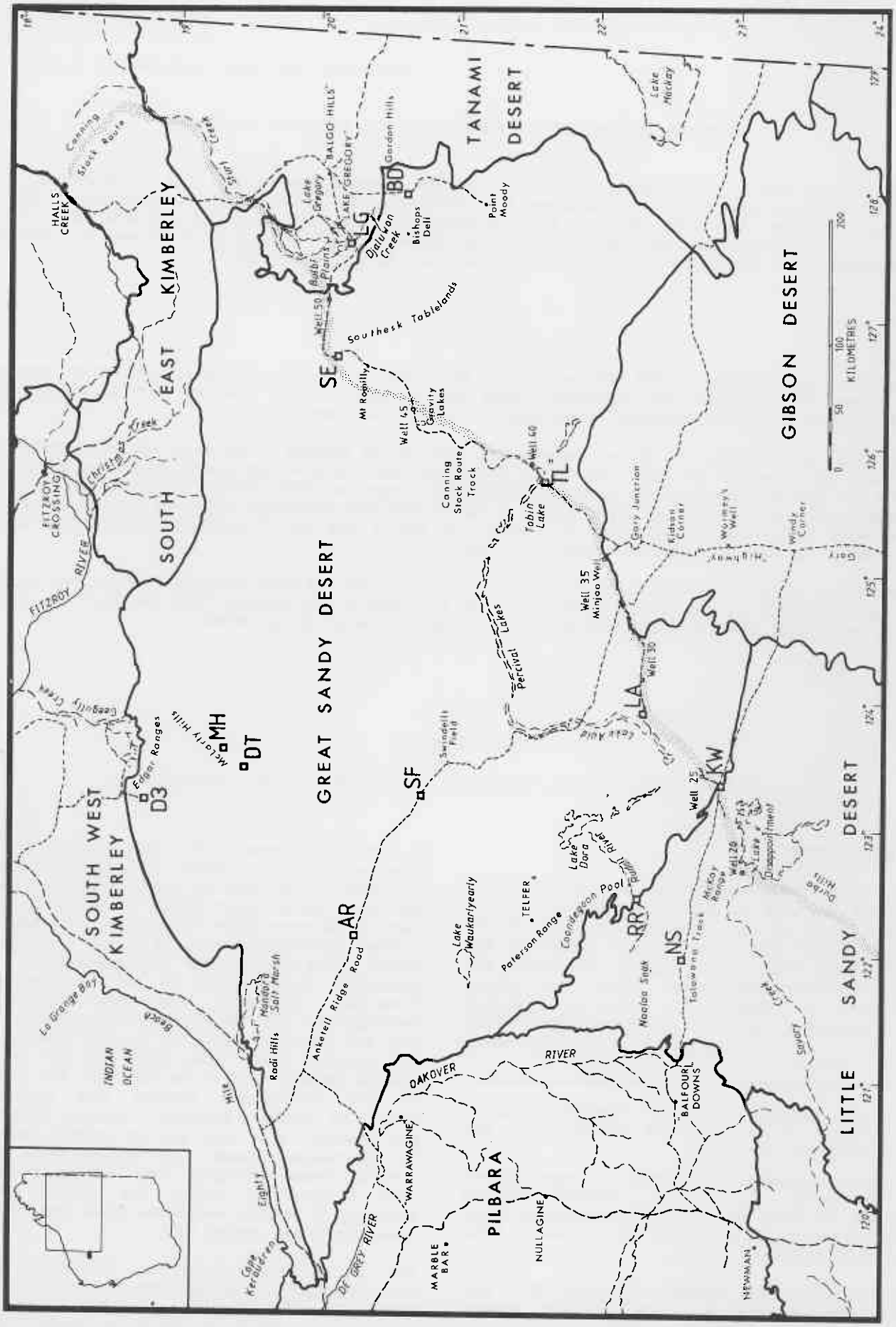


**Figure 1.** Great Sandy Desert and surrounds, showing campsites and tracks. Desert boundaries after Beard (1980).

Table 1. Campsites

| Site Name | Code | Campsite Coordinates | | Dates of Vegetation Description |
|---|---|---|---|---|
| McLarty Hills | MH | 19°31'S | 123°30'E | 5-9 August 1977 |
| Dragon Tree Soak | DT | 19°40'S | 123°22'E | 9-13 August 1977 |
| Southesk Tablelands | SE | 20°15'S | 126°34'E | 28 April - 2 May 1979 |
| Lake Gregory | LG | 20°20'S | 127°26'E | 23-28 April 1979 |
| Anketell Ridge | AR | 20°25'S | 122°08'E | 13-16 May 1979 |
| Bishops Dell | BD | 20°42'S | 127°48'E | 4-9 June 1980 |
| Swindells Field | SF | 20°56'S | 123°15'E | 9-13 May 1979 |
| Tobin Lake | TL | 21°45'S | 125°40'E | 4-7 May 1978 |
| Rudall River | RR | 22°32'S | 122°24'E | 26 April - 1 May 1979 |
| Lake Auld | LA | 22°28'S | 123°54'E | 8-11 May 1979 |
| Nooloo Soak | NS | 22°52'S | 121°57'E | 22-26 April 1979 |
| Karara Well | KW | 23°07'S | 123°21'E | 2-5 May 1979 |

a habitat represented in a scheme of reserves but is not presently in a position to do other than recommend further investigations to be made generally". This recommendation was endorsed by State Cabinet in February 1976.

Between 1977 and 1980 the Western Australian Wildlife Research Centre organised a series of expeditions to the GSD to fulfil the EPA recommendations. Biologists from the Western Australian Museum and the Western Australian Herbarium took part in some of this work and a botanist from the Northern Territory Herbarium took part in the major, 1979, expedition.

During the 1979 expedition through the Great Sandy Desert and adjacent parts of the Little Sandy Desert, Gibson Desert and Tanami Desert (as defined by Beard 1980) we visited nine campsites (Fig. 1). Previously, in 1977, two of us (ASG and NLMcK) had visited the McLarty Hills and Dragon Tree Soak and in 1980 one of us (AAB) visited an area south of Balgo Hills, near Bishops Dell.

Sites examined are listed in Table 1.

In 1979, Team 1 (including ASM and NLMcK) entered the area from the west along the Talawana Track and visited the "Nooloo Soak" campsite before turning north to Rudall River National Park. They then returned to the Track, and stopped at Karara Well (Canning Stock Route Well No. 24) before continuing east to the Gary "Highway", and north to Windy Corner and Kidson Corner. From here they proceeded north-west along the Anketell Ridge Road to the Canning Stock Route (CSR), then south-west to Well 30 and westward to Lake Auld. After returning to the Anketell Ridge Road they headed north-west to their final camp, on the Ridge, and then left the GSD via the old telegraph line track to Callawa Station.

At the same time, Team 2 (including ASG and AAB) proceeded to Lake Gregory via Derby and Halls Creek. They then headed west to the Canning Stock Route and along it to the Southesk Tablelands, Lake Tobin and Minjoo Well (CSR Well No. 35). Here they joined the Gary "Highway" and proceeded south to Kidson Corner to join the Anketell Ridge Road. The Swindells Field Camp was on this road and was the final survey site. The party left the area via the Anketell Ridge Road and the old telegraph line track to Callawa Station.

Bishops Dell was visited by AAB from Balgo in June 1980 and additional data on Anketell Ridge were provided from visits by NLMcK in August 1977 and March 1980.

Vegetation descriptions follow the structural terminology of Muir (1977).

## CLIMATE

The Great Sandy Desert has a tropical arid climate; mean annual, mostly summer, rainfall ranges from 400 mm on the northern edge to less than 200 mm near Percival Lakes (Fig. 2). Telfer, the only meteorological station in the GSD, is in its south-western corner and has kept records for only a few years so climatic data are extrapolated from peripheral locations.

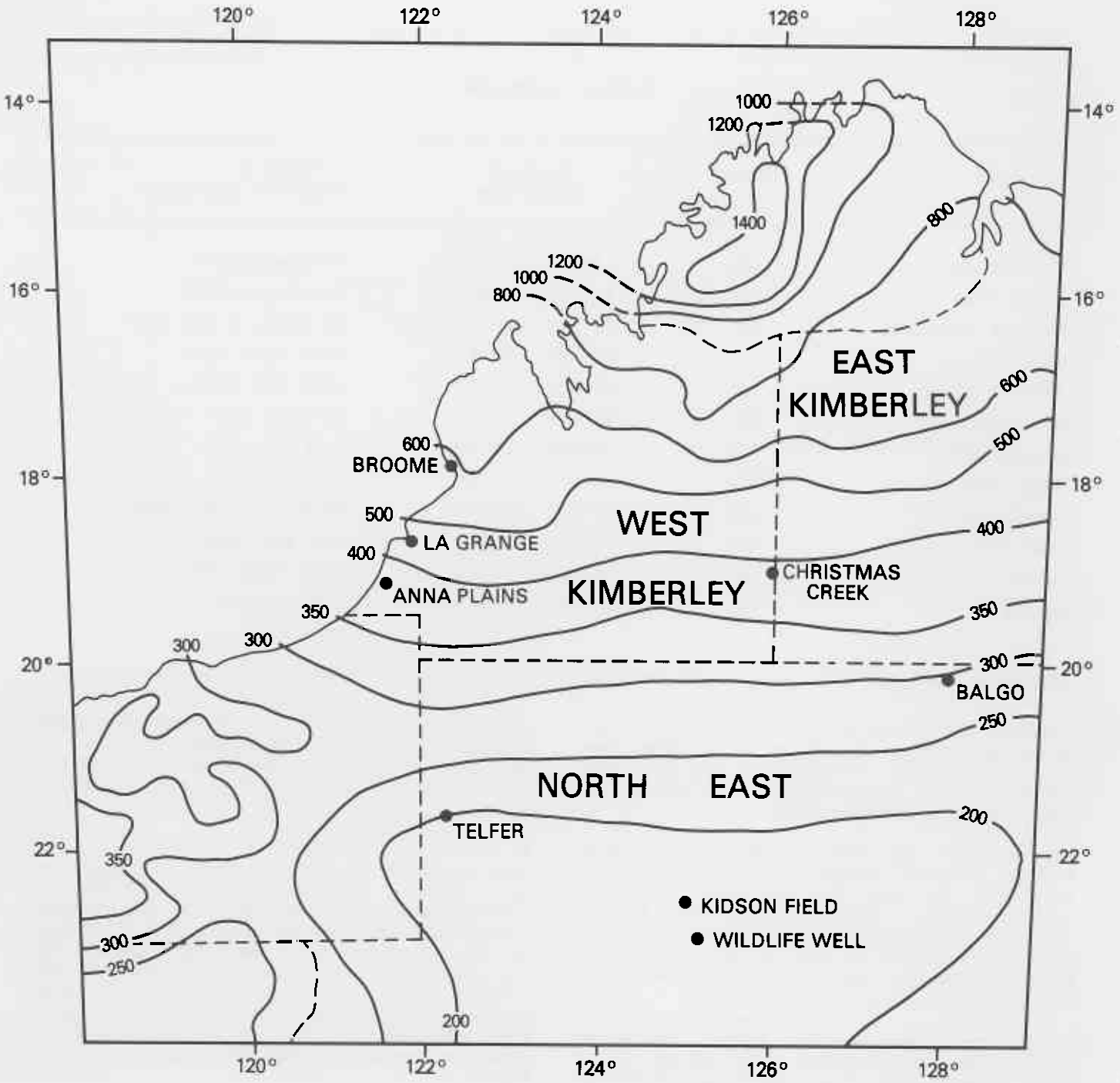


**Figure 2.** Rainfall isohyets (mm) and Meteorological Districts in northern Western Australia

The Little Sandy Desert and southern and eastern parts of the GSD have unreliable rainfall and low humidities inducing wide daily temperature fluctuations and high evaporation rates (Tables 2 and 3, see also Southern 1979, pp. 204-208). North-western areas of the GSD are substantially more humid and have a more regular, strongly seasonal rainfall associated with the monsoonal climate of the adjacent Kimberley District.

In some years no rain falls at sites in the northern Gibson Desert (Table 4) and presumably this pattern is repeated in the southern GSD. From evidence of flowering Acacia (Davies 1969), known cyclone movements, and Bureau of Meteorology monthly weather summaries, good rains had fallen in most of the GSD in the periods January to June 1978 and January to March 1979. Heavy rains also fell immediately before our visits to NS, RR, KW,

AR and LG. Mostly light rains fell along the CSR while Team 2 were in the region. The SF site was extremely dry although light rain fell during our visit. BD was also dry although Bureau of Meteorology records and the presence of flowering Acacia indicated reasonable rains during early 1980.

## GEOLOGY AND GEOMORPHOLOGY

The Great Sandy Desert occupies most of the Canning Basin, an area of Phanerozoic sedimentary rocks extensively mantled by reddish aeolian sands. The geology of the Canning Basin has been discussed by Towner et al. (1976), Towner and Gibson (1980) and Yeates et al. (1975).

**Table 2. Climatic data from selected stations**
(Data supplied by Bureau of Meteorology, Canberra)
(see Fig. 2 for relevant Meteorological Districts)

| Station | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Yearly Total mean (range) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MEAN MONTHLY RAINFALLS (mm) | | | | | | | | | | | | | | |
| Telfer (8)* | | 39 | 108 | 41 | 21 | 23 | 7 | 15 | 8 | 1 | 4 | 8 | 24 | 306(148-461) |
| Anna Plains (70+) | | 107 | 88 | 67 | 23 | 24 | 18 | 7 | 2 | 0.5 | 1 | 6 | 36 | 372 |
| La Grange (21+) | | 162 | 123 | 79 | 18 | 39 | 22 | 7 | 1 | 3 | 3 | 1 | 50 | 499(81-904) |
| Balgo Mission (32+) | | 68 | 68 | 23 | 17 | 20 | 12 | 11 | 4 | 4 | 10 | 19 | 45 | 343(142-907) |
| Christmas Creek (16) | | 113 | 129 | 69 | 27 | 13 | 2 | 3 | 1 | 5 | 9 | 12 | 39 | 422(145-638) |
| MEAN NO. OF DAYS WITH FOG | | | | | | | | | | | | | | |
| Telfer (6) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .25(0-2) |
| La Grange (23) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 4.5(0-15) |
| MEAN RELATIVE HUMIDITY (%) | | | | | | | | | | | | | | |
| Telfer (5) | 0900† | 38 | 45 | 36 | 28 | 38 | 38 | 37 | 31 | 20 | 16 | 18 | 22 | |
| | 1500 | 20 | 25 | 20 | 18 | 25 | 23 | 22 | 18 | 11 | 11 | 11 | 12 | |
| La Grange (18) | 0900 | 67 | 69 | 61 | 46 | 44 | 44 | 43 | 38 | 37 | 45 | 57 | 57 | |
| | 1500 | 65 | 67 | 57 | 46 | 42 | 40 | 38 | 37 | 42 | 52 | 57 | 60 | |
| Balgo (6) | 0900 | 39 | 41 | 39 | 36 | 35 | 41 | 38 | 26 | 20 | 25 | 29 | 30 | |
| " (2) | 1500 | 21 | 23 | 15 | 19 | 21 | 24 | 23 | 13 | 14 | 17 | 18 | 23 | |
| MEAN DAILY PAN EVAPORATION (mm) | | | | | | | | | | | | | | |
| Telfer (5) | | 13.5 | 12.8 | 11.6 | 10.9 | 7.4 | 6.2 | 6.7 | 8.2 | 10.7 | 12.3 | 14.1 | 14.5 | 3916 |
| Broome (13) | | 10.0 | 8.3 | 7.7 | 8.0 | 7.0 | 6.5 | 6.9 | 7.9 | 9.4 | 10.1 | 10.5 | 10.1 | 3117 |
| MEAN MAXIMUM AND MINIMUM TEMPERATURES (°C) | | | | | | | | | | | | | | |
| Telfer (6) | | 41 | 37 | 38 | 34 | 28 | 25 | 25 | 28 | 32 | 36 | 39 | 40 | |
| | | 26 | 25 | 24 | 20 | 15 | 12 | 11 | 12 | 15 | 20 | 22 | 25 | |
| Anna Plains (25) 35 | | 35 | 36 | 36 | 32 | 28 | 28 | 30 | 33 | 34 | 36 | 36 | | |
| | | 26 | 25 | 24 | 20 | 17 | 13 | 12 | 13 | 16 | 19 | 22 | 25 | |
| La Grange (22+) | | 34 | 34 | 35 | 35 | 32 | 30 | 29 | 31 | 33 | 34 | 35 | 35 | |
| | | 26 | 26 | 25 | 22 | 18 | 15 | 14 | 15 | 17 | 21 | 24 | 26 | |
| Balgo Mission (6+) | | 39 | 38 | 38 | 34 | 29 | 26 | 26 | 28 | 33 | 37 | 39 | 40 | |
| | | 26 | 25 | 24 | 22 | 16 | 13 | 12 | 13 | 17 | 22 | 24 | 26 | |

*No. of years of record
†time of reading

**Table 3. District rainfall data between 1913 and 1979**
(Bureau of Meteorology, Australia)
(see Fig. 2 for District Boundaries)

| District | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | TOTALS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NORTH EASTERN DISTRICT | | | | | | | | | | | | | |
| Mean Rainfall (mm) | 32 | 33 | 35 | 19 | 22 | 21 | 11 | 11 | 4 | 9 | 11 | 19 | 227 |
| Median Rainfall (mm) | 19 | 15 | 15 | 12 | 13 | 10 | 8 | 5 | 2 | 4 | 5 | 12 | 199 |
| WEST KIMBERLEY DISTRICT | | | | | | | | | | | | | |
| Mean Rainfall | 156 | 131 | 92 | 26 | 28 | 15 | 7 | 2 | 1 | 3 | 12 | 61 | 534 |
| Median Rainfall | 126 | 112 | 63 | 10 | 4 | 3 | 1 | 0 | 0 | 1 | 9 | 44 | 549 |

Sand surfaces dominate the landscape of the desert and are expressed mainly as longitudinal seif dunes (Crowe 1975), trending west to west-northwest, separated by inter-dune sandplains ranging from 0.5 km to several kilometres wide. Extensive sandplains without dunes are also present in some places. The parallel nature of the dunes is thought to have resulted from "uni-directional wind systems heaping dunes into elongated ridges" (see Towner and Gibson 1980) parallel to the wind direction.

The dunes vary from three to 20 metres in height and are not mobile; minor sand movement occurs where fire has removed the vegetation. Dune sand is quartzose, fine to medium grained, red-brown to yellow and contains minor silt. In inter-dune plains it is firmer, sometimes with minor clay, and darker in colour due to higher levels of organic material.

The aeolian sand is thought (Towner and Gibson 1980) to have originated in situ from "erosion and retreat of the ferruginous sandstone breakaways and re-distribution of soil originally present on top of the lateritic profile". The lateritic duricrust of the Great Sandy Desert is believed to have formed at the same time (mid-Miocene) as the relict palaeodrainages (van de Graaf et al. 1977). "The formation of an extensive sand blanket would have coincided with a change to a more arid climate, from the more humid condition prevailing during the formation of the relict drainage system and the duricrust" (Towner and Gibson 1980 p. 42).

Subsequent climatic fluctuations, even during the last 20 000 years, are likely to have included periods when the sands were redistributed by prevailing wind conditions. Wyrwoll (1979 p. 134) reviews evidence suggesting that the present array of Canning Basin dunes were formed approximately 20 000 years BP, a date corresponding to the peak of the last glacial maximum (17 000 years BP). On the basis of evidence from numerous sources (reviewed in McKenzie and Kenneally 1983) some subsequent events in the Canning Basin can be hypothesised. The onset of the Holocene (10 000 years BP), with its higher humidities and increasing rainfall, saw vegetative stabilization of the Canning Basin dunes and some dune erosion in northern areas such as the Dampier Peninsula. Partial rejuvenation of the more northern palaeorivers might also have occurred during the Holocene rainfall maximum (6 000 to 7 000 years BP) when rainfall in northern Australia is thought to have been 1.5 times present (Nix and Kalma 1972). Under such a climatic regime tropical sub-humid species would have formed a substantial component of the biota in the catchment of the Mandora Palaeoriver, possibly similar to that found in the Sandplain Province of the South-west Kimberley today (McKenzie 1981, McKenzie 1983). The Mandora Palaeoriver was mapped by van de Graaf et al. (1977) and drained the northern half of the area encompassed today by the Great Sandy Desert. Its headwaters were in Sturt Creek;

**Table 4. Rainfall records (mm) from Kidson Area, Northern Gibson Desert (Dr. S.J.J.F. Davies, pers. comm.)**
(see Fig. 2 for localities)

| Date | Wildlife Well | Kidson Field |
|---|---|---|
| .09.75 | 0.0 | - |
| 17.11.75 | 119.2+ | - |
| 24.04.76 | 8.8 | 3.8 |
| 15.09.77 | - | 0.0 |
| 15.09.78 | 57.0 | 126.0 |
| 16.10.78 | 2.6 | - |
| 1.12.78 | 16.2 | - |
| 6.05.79 | 51.4 | 35.5 |
| 3.07.80 | 5.2 | - |
| 2.08.80 | 203.0 | - |
| 19.05.81 | 0.0 | 21.0 |
| 17.06.82 | 0.0 | - |
| 23.07.82 | 0.5 | - |

Dash signifies no reading taken

thence its route can be traced westwards to the coast via Lake Gregory, Dragon Tree Soak and Mandora Salt Marsh (Fig. 1, see also Beard 1976).

The trend towards drier conditions during the late Holocene (using the smoothed sea-level curve of Chappell and Thom 1977) would be expected to have resulted in a general decrease in the height and density of the vegetative cover, an elimination of most of the tropical sub-humid biota, a corresponding intrusion of many arid zone species and a return to a fully occluded drainage system.

Today the Great Sandy Desert, like other deserts in Western Australia, has a disintegrated internal drainage characterised by ephemeral creeks and rivers that only flow following cyclonic events and discharge into saline playas (salt lakes). Most of these playas are arrayed in partly interconnected chains, or are elongate, and mark the courses of the ancient river valleys. One of the Palaeodrainage Provinces outlined by van de Graaf et al. (1977) includes the area surveyed during this study. It occupied the Little Sandy Desert and almost all of the Great Sandy Desert and was dominated by the catchments of the Percival and Mandora Palaeorivers, both of which drained to the coast.

Gradients are gentle along the axis of the major palaeodrainage valleys. Two distinct surface types are recognised: valley calcrete and saline alluvium/colluvium. Non-saline alluvia and colluvia occur in the upper reaches of the drainage lines discussed later.

The playas (lake deposits) comprise clay, silt, fine sand, some superficial gypsum and occasional colluvial patches of gravel or rock fragments. They are salt encrusted where the water table is close to the surface (allowing evaporation) and usually show desiccation cracks.

Laterally, the playas grade into alluvial valley-fill sediments or, more commonly, deposits that are a mixture of aeolian sand and alluvial clay/silt. The latter is often associated with calcrete and is gypsum-bearing along the margins of playas where it is sometimes referred to as a "caliche surface".

Calcrete crops out extensively as mounds and rubble within the valleys. According to Towner and Gibson (1980), the calcrete was derived by precipitation of calcium carbonate from carbonate saturated ground water in palaeodrainage depressions at a time when the climate was considerably wetter than it is today. The calcium carbonate cemented, partly or wholly replaced, and/or pushed apart the colluvial/alluvial valley fill sediments in which it precipitated. It is younger than the lateritic duricrust. The topography of both sandy and alluvial surfaces overlying calcrete deposits is uneven as a result of sub-terranean caves and other karst features such as sink holes. Sink holes were noted in the vicinity of Well 30 and in the surface of Lake Auld.

Exposures of the Permian to Cretaceous sedimentary strata underlying the Great Sandy Desert are expressed as low sandstone, siltstone or mudstone ranges and mesas, often capped with Tertiary laterite. In general, these outcrops are small and isolated, scarcely interrupting the pattern of sand dunes. The McLarty Hills, a series of Jurassic sandstone outcrops in the north-western part of the Great Sandy Desert, provide a typical illustration. More extensive buttes and ranges occur in the north-eastern sector of the Desert; comprising Permian sandstones, these outcrops are mostly 15 to 30 metres higher than the surrounding plains. The Southesk Tablelands near Godfreys Tank are 90 metres high in places.

Laterite (as ferricrete) is expressed as caps on many of the mesas and as intermittent gravelly rises and breakaways throughout the Great Sandy Desert. It represents the eroded remnants of the Tertiary duricrust discussed earlier. Ferruginous gravelly sandplains often overlie the laterite; the most extensive are found along the Anketell Ridge (Fig. 1).

Relatively small areas of clayey and silty soils with only minor sand and gravel are found in valleys and as outwash plains where small creeks drain the Desert uplands (ranges, breakaway systems and gravel ridges). These non-saline alluvial surfaces are best developed along the Rudall River, in the Southesk Tablelands, near Lake Gregory and on the Anketell Ridge. More typically, non-saline valley fill and outwash surfaces comprise a mixture of alluvial silt/clay and greater percentages of aeolian sand; although these are still only a minor element compared with the aeolian sand surfaces, substantial areas occur in landscape depressions along the salt lake systems and adjacent to ranges and the less steep-sided uplands.

A relatively small area, known as the Paterson Province, lies across the south-western edge of the Great Sandy Desert and the northern edge of the Little Sandy Desert as outlined by Beard (1980). It includes extensive outcrops of Proterozoic metamorphic and sedimentary rocks that are expressed as uplands - flat topped hills and low outcrops - and form the headwaters of the Rudall River. The remainder of the Little Sandy Desert lies to the south of the Paterson Province and is underlain by the Proterozoic sedimentary rocks of the Bangemall Basin. These outcrop as gently undulating flat-topped hills with cliffs and steep-sided gullies. Unlike the Phanerozoic outcrops of arid parts of the Canning Basin, the Proterozoic outcrops of the Bangemall Basin and Paterson Province include numerous temporary to semi-permanent pools.

The other exposed surfaces of the Paterson Province and Little Sandy Desert part of the Bangemall Basin are almost indistinguishable from those of the Great Sandy Desert; the same array of Cainozoic surfaces is present and believed to have a similar derivation and geomorphic history. Even so, differences in their relative importance are apparent - non-saline alluvial, colluvial and

eluvial surfaces, and mixed aeolian and alluvial deposits, are most extensive adjacent to the Proterozoic ranges.

## VEGETATION - SITE DESCRIPTIONS

Letter and number combinations (e.g. MH41) refer to sites where mammals were collected - see McKenzie and Youngson, this publication.

Plate 1.
Aerial view of McLarty Hills; hills, sand dunes and swales in perspective.

### 1977 Expedition

McLarty Hills (MH) (Colour Plate 1, Plate 1)

The hills near the campsite were widely spaced mesas, while to the east and northeast they became less dissected and more plateau-like. The area was very dry and many plants were long past flowering. Only with prolonged searching could individuals or small groups with flowers or fruit be found. Several areas had been burnt 1-2 years previously, and here some herbs were still flowering. On the other hand much of the flora of the dunes was in flower.

The screes of the hills (MH41) consisted of shaly pebbles and small boulders, often cemented together by a fragile crust of clay-like soil. The vegetation was mostly open hummock grass with a few herbs and occasional shrubs of Grevillea. Some areas were almost bare. The spinifexes were Triodia intermedia and T. pungens. Herbs included Abutilon lepidum, Dampiera candicans, Gomphrena cunninghamii, Ptilotus calostachyus, P. exaltatus, P. incanus, Trichodesma zeylanicum and Triumfetta micracantha. Two other grasses collected here were Eriachne ciliata and E. mucronata.

Among large boulders around the breakaway edges Grevillea pyramidalis in full bloom made a fine display and Ficus platypoda occurred as isolated plants. Herbaceous species here were Cyperus cunninghamii, Mukia maderaspatana, Nicotiana benthamiana, Solanum petrophilum, Stemodia lythrifolia and, by a sheltered overhang, Tinospora smilacina. A few lichens were found on the boulders.

The smaller mesas were very rocky at their summits with little vegetation. The plateau-like areas, however, carried open hummock grass with scattered shrubs. Triodia pungens was the common spinifex. Shrubs included Calytrix longiflora, Grevillea pyramidalis and G. wickhamii. In small gullies there were thickets of Acacia acradenia, A. monticola and Grevillea refracta.

In the larger valleys where sandy loam had accumulated, open scrub occurred along creek lines. This was dominated by Acacia, especially A. holosericea and A. monticola. There were a few Clerodendrum floribundum, Gardenia sp. (ASG 14658), Grevillea refracta and Hibiscus leptocladus. A ground layer included grasses such as Aristida browniana, Eragrostis eriopoda and Sorghum plumosum, together with the sedge Fimbristylis dichotoma. There were herbs such as Buchnera (ASG 14735), Crotolaria crispata, Drosera petiolaris, Pluchea tetranthera and Zornia sp. Away from the drainage lines Triodia pungens and T. intermedia predominated, often with Leptosema anomala. There was much bare ground.

Plate 2.
Eucalyptus papuana on floor of drainage valley in McLarty Hills. Hummock grass in foreground; small mesas behind.

Along a creek-line (MH43) there were a few Eucalyptus papuana (Plate 2), while occasional trees of this species were noted elsewhere on

sandy flats. Some had sprouted vigorously by epicormic shoots, following fire. Thickets of Acacia occurred along the creek, though many had been killed by fire. Species included A. holosericea, A. monticola and A. stipuligera. A few other shrubs were present, including Clerodendrum floribundum. There was a bunch grass to cane grass understorey, often dense and mostly dry. The species that could be determined were Aristida browniana, A. inaequiglumis, Sorghum plumosum and the hummock grass Triodia pungens. Species of Eragrostis and Eriachne were noted but could not be determined.

The plains and swales (MH42) were sandy or sandy loam, with vegetation varying from open hummock grass to scrub (Plate 3). The spinifex was Triodia pungens which in some areas was stoloniferous. Other grasses present were long past flowering, the ephemeral species mostly being dead. The only species that could be determined was Panicum australiense. Shrubs were generally scattered, the species being Acacia coriacea, A. translucens, Grevillea pyramidalis, G. wickhamii, Hakea sp. aff. suberea (ASG 14706), Persoonia falcata, Pimelea ammocharis and Stylobasium. In some areas there were thickets, usually of Acacia (e.g. A. monticola, A. orthocarpa, A. stipuligera) but sometimes of Grevillea refracta. Among the herbs were Bonamia sp. (ASG 14727), Cassia notabilis, Corchorus sidoides, Goodenia azurea, Heliotropium tenuifolium, Keraudrenia ? integrifolia, Phyllanthus maderaspatensis, Psoralea pustulata and Ptilotus fusiformis.

Plate 3.
Interdune vegetation west of the McLarty Hills. Hummock grass (Triodia pungens) in foreground with thicket of Acacia translucens beyond. The tree is Eucalyptus ? aspera.

The sand dunes (Plate 4) which were up to 5 m high, carried the richest flora, with a varied association of shrubs, herbs and grasses, as well as an occasional tree. The only spinifex on the dunes was Plectrachne schinzii. Shrubs were Acacia tumida, Burtonia simplicifolia, Calytrix longiflora, Comesperma pallidum, Crotalaria cunninghamii, Cyanostegia cyanocalyx, Gyrostemon tepperi, Dodonaea peduncularis, Dubosia hopwoodii, Grevillea aff. eriostachya (ASG 14703), G. stenobotrya, Jacksonia aculeata, Newcastelia cladotricha,

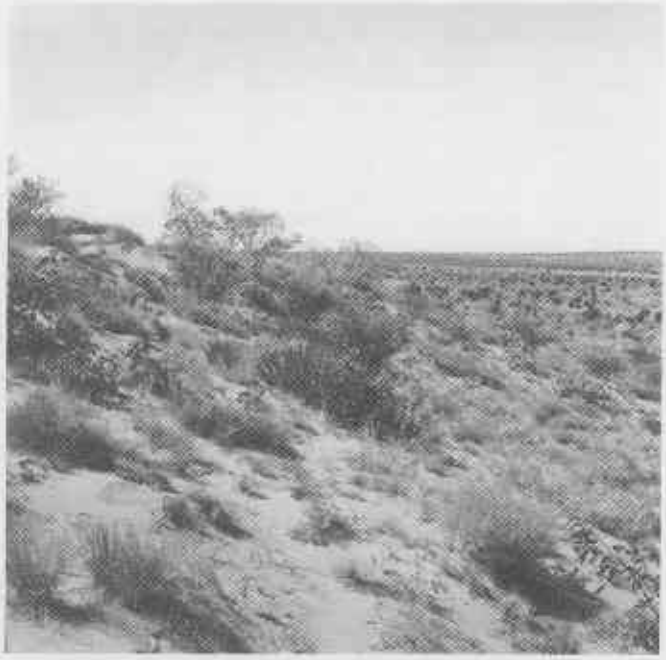

Plate 4.
Shrubs, herbs and spinifex on the side of a dune near the McLarty Hills.

Psoralea sp. (ASG 14645), Solanum diversiflorum and Templetonia incana. The perennial herbs included Aenictophyton reconditum, Cassia pumila, Dampiera cinerea, Goodenia armitiana, Halgania solanacea, Ptilotus arthrolasius, Scaevola parvifolia, Sida spp. (ASG 14691, 14701), Trichodesma zeylanicum, Velleia panduriformis and Zornia sp. (ASG 14646). Ephemeral herbs were few due to the lateness of the season; those recorded were Borreria auriculata, Setaria apiculata and Trianthema pilosa. The trees were Gardenia sp. (ASG 14658) and Owenia reticulata. Erythrophleum chlorostachys, which is usually arborescent, occurred as a shrub.

The flora of the Hills was not rich and in general was typical of the Great Sandy Desert. Of special interest were the collections of several undescribed species - Bonamia sp., Hakea sp. and Psoralea sp. - though all are recorded from several localities.

Beard and Webb (1974) classified the vegetation of the McLarty Hills as Triodia pungens grass steppe, surrounded by steppe of Owenia reticulata and Triodia pungens. Although Owenia was rare at the Hills, the vegetation and flora otherwise recorded support Beard's classification.

Dragon Tree Soak (DT) (Plate 5)

The centre of the Soak (DT44) was dominated by an almost pure stand of Baumea articulata (Plate 6) growing on wet black mud. At the southern and northern ends were small areas of Sesbania formosa as a low forest A (Colour Plates 2 and 3), the northern group being taller (up to 13 m). Scattered Sesbania also grew among the Baumea. Bullrush, Typha domingensis, occurred under the Sesbania, with occasional clumps among the Baumea. Around the edge of the soak in damp mud was a sward of Paspalum sp. (ASG 14737, Plate 6). Scattered plants of Fimbristylis ferruginea occurred in this sward. On the slightly higher (and dry) grey loam flat surrounding the Paspalum sward was a zone in which Sporobolus virginicus formed a ground cover and Acacia ampliceps occurred as scattered or grouped tall shrubs (Colour Plate 2). Some of the latter had been killed by fire, while others were regenerating by epicormic shoots or had not been burnt.

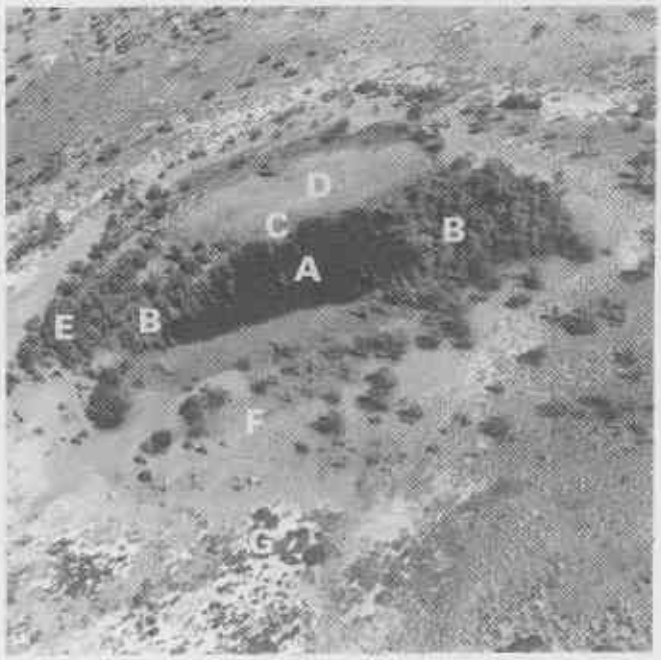


Plate 5.
Aerial view of Dragon Tree Soak. Long axis of the soak runs approximately north-south. Dark area in centre is Baumea articulata (A); "B" is Sesbania; Typha (C); Paspalum (D); Acacia ampliceps (E); Sporobolus (F); samphire in clayey areas (G).

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Further away from the Soak loam flats (Plate 7) and claypans carried dense low heath C to dwarf scrub C respectively; hummock grass covered occasional sandy rises (DT45). More clayey areas were dominated by samphires, especially Halosarcia indica subsp. leiostachya and H. halocnemoides. More widespread was Trianthema turgidifolia, its succulent leaves mostly dark red at the time of our visit. A number of grasses and herbs occurred among the Trianthema, e.g. Cyperus bulbosus, Eragrostis pergracilis, Flaveria australasica, Lawrencia sp., Lawrencia glomerata, Neobassia astrocarpa, Pluchea tetranthera, Pterocaulon sphacelatum, Salsola kali, Sesbania cannabina, Sporobolus australasicus, Trianthema triquetra and Xerochloa barbata.

Plate 6.
Eastern edge of Dragon Tree Soak. Dark sedge is Baumea with a sward of Paspalum to the right.

Plate 7.
Aerial view of alluvial flats just north of Dragon Tree Soak. Scattered termitaria.

Thickets also occurred on the flats, mostly dominated by Acacia ampliceps, some by Melaleuca glomerata and M. lasiandra, a few by Myoporum acuminatum. In one area, about 0.5 km south of the Soak, the perennial sedge Schoenus falcatus formed a tussock layer beneath Acacia and Melaleuca. Just west of the Soak was a solitary tree of Eucalyptus microtheca. Several Hakea suberea also occurred on the flats.

Plate 8.
Low dune near Dragon Tree Soak. Scattered low shrubs are Melaleuca lasiandra. The hummock grass is Plectrachne schinzii; the trees are Owenia reticulata.

Plate 9.
Low open woodland of Owenia reticulata over hummock grassland on a sandy flat near Dragon Tree Soak.

Hummock grass growing on the scattered sandy rises on the flats was dominated by Plectrachne pungens, a stoloniferous soft spinifex. Less common was Triodia pungens.

The flats were surrounded by dune country. Dunes and swales nearest the flats carried a low scrub B of Melaleuca lasiandra (Plate 8) mixed with Plectrachne schinzii. The Desert Walnut, Owenia reticulata, occurred either as open stands or scattered trees (Plate 9). In burnt areas, some were regenerating by epicormic shoots while others were dead.

Farther from the flats the dunes and swales still supported Owenia and Plectrachne schinzii but the Melaleuca was replaced by other shrubs such as Acacia anaticeps, A. translucens, Duboisia hopwoodii, Grevillea stenobotrya and G. wickhamii. Occasional shrubs were Crotalaria cunninghamii, Cyanostegia cyanocalyx, Dodonaea peduncularis and Dolichandrone heterophylla. A number of perennial herbs were found on the dunes, e.g. Aenictophyton reconditum, Cassia pumila, Corchorus sidoides, Corynotheca micrantha, Dampiera cinerea, Heliotropium sp. (ASG 14806), Newcastelia cladotricha, Solanum diversiflorum and Tephrosia sp. (ASG 14796). In spite of the lateness of the season a few ephemerals were found, viz. Aristida browniana, Borreria auriculata, Chamaesyce sp., Dactyloctenium radulans, and Trianthema pilosa. Two species of mistletoe were collected, Amyema gibberula on Grevillea wickhamii and A. ?preissii on Acacia ampliceps.

The outstanding feature of this site is the Soak, which appears to be unique. No similar association of plants is known in any of the Western Australian deserts. The occurrence of Baumea articulata is remarkable, for its nearest recorded locality is Gingin Brook, 80 km north of Perth, in south-western Australia. Neither Sesbania formosa nor Typha domingensis is known from any other desert locality in Western Australia.

The flora of the surrounding loam flats is quite varied, probably because of small changes in soil level and type. In general the species both there and on the dunes are typical of the Great Sandy Desert.

**1979 Expedition** - Team 1

The first night in the desert was spent in a recently burnt dune-interdune complex on the Talawana Track 70 km east of Balfour Downs Station. The vegetation on the adjacent dunes was a mixture of small trees and shrubs, including Eucalyptus gamophylla, Lamarchea sulcata, Grevillea stenobotrya and Thryptomene maisonneuvei, over grasses such as Eragrostris eriopoda, Eriachne

aristida and Triodia lanigera. The swales were dominated by Desert Oak (Casuarina decaisneana) with an understorey of regenerating Codonocarpus continifolius and an assortment of herbs including Heliotropium tenuifolium and Ptilotus clementii.

Nooloo Soak (NS)

The first campsite (22°52'S 121°57'E) was in a mulga (Acacia aneura) open low woodland B over scrub and open tall grass (Sample site NS1, Plate 10) further east along the Talawana Track. It was on an alluvial outwash plain of grey soil associated with a range of hills 0.5 km to the north. Nooloo Soak was 30 km to the north.

The mulga (to 5 m) was in excellent condition, with a thick groundcover of mixed grasses and some herbs. The shrub layer comprised Acacia tetragonophylla, A. cibaria, A. ancistrocarpa, Cassia oligophylla and Eucalyptus microtheca. Ground plants included the grasses Eulalia fulva, Eragrostis falcata, E. pergracilis, Aristida contorta and the sedge Bulbostylis turbinata. Herbs such as Portulaca oleracea and Ptilotus macrocephalus were also present. The high moisture regime was reflected in the presence of the fern Marsilea exarata and the grass Eragrostis pergracilis. The outwash plain graded into sand dunes to the south, sandplain to the east and west, and hill country to the north.

The crests of the dunes nearby (NS2, Plate 11) supported an open low woodland B of Eucalyptus sp. (bloodwood) over an open scrub A of Acacia dictyophleba and Grevillea stenobotyra, a dwarf scrub C of Thryptomene maisonneuvei, and a mid-dense hummock grass of Plectrachne schinzii. Shrubs on the slopes of the dunes were Acacia steedmanii and Grevillea aff. eriostachya.

A saddle in the dune complex three kilometres to the east (NS3) supported an open low woodland B of Eucalyptus kingsmillii (rather than the E. sp. of the adjacent crests) over Thryptomene maisonneuvei low scrub B over mid-dense hummock grass. Plectrachne schinzii occurred on the dune crest and slopes; Triodia lanigera was the hummock grass in the saddle. Acacia maitlandii was emergent in the saddle, together with scattered shrubs of Hakea rhombales. Understorey and ground species were few.

In swales adjacent to NS2 and NS3, Triodia lanigera replaced the Plectrachne of the dunes and Eucalyptus kingsmillii was common. Other swale communities had Melaleuca glomerata low scrub B, with emergent Eucalyptus microtheca and Acacia tenuissima, over a hummock grassland comprising both Plectrachne schinzii and Triodia lanigera.

Sandplains (NS4) adjacent to the dunes were covered with open low woodland A of Eucalyptus intertexta over an open dwarf scrub C comprising Melaleuca glomerata, Thryptomene maisonneuvei and (a few) Acacia tetragonophylla. The hummock grass Triodia lanigera was mid-dense.

One kilometre west of camp was a sandplain with a "buckshot" surface (NS5) dominated by mid-dense hummock grass (Triodia basedowii) with occasional emergent shrubs to 2 m ( Hakea suberea, Cassia desolata, Acacia tetragonophylla). Small, scattered sand rises were dominated by Eucalyptus kingsmillii and Triodia lanigera.

A red sandplain 2 km further west had been recently burnt (NS6, Plate 12) and was dominated by Eucalyptus terminalis open low woodland B. The regenerating community (30% dense) comprised a very mixed assemblage of herbs 30 to 60 cm high. Species present included Halgania solanacea, Newcastelia cladotricha, and Dicrastylis cordifolia. An open hummock grass of Triodia basedowii was showing only a few green tips from burnt butts.

An extensive spinifex sandplain 5 km to the west of camp was dominated by Plectrachne schinzii and Triodia basedowii, although the grasses Chrysopogon fallax and Themeda australis occurred along a sandy creek line under Eucalyptus brevifolia and Eremophila longifolia. Eucalyptus odontocarpa and Triodia lanigera were found on sandy rises.

The rocky hills to the north and north-east of the NS Camp supported a mosaic of sub-communities. On the more rocky outcrops Acacia sibirica and A. aff. gonoclada were co-dominant in some areas, with A. aff. ptychophylla and Triodia pungens on the tops of the hills. On the scree slopes were Cassia artemisioides, C. oligophylla var. sericea, C. glutinosa, Eremophila spathulata, E. ? exilifolia, E. latrobei, Acacia hilliana, A. retivenia, Burtonia polyzyga, and Eucalyptus brevifolia. Acacia cibaria and A. aff. gonoclada dominated the lower scree slopes.

In the rocky gullies were Eucalyptus brevifolia, Dodonaea petiolaris, Eremophila latrobei and Dicrastylis cordifolia, with Melaleuca lasiandra in the wetter parts. A wide sandy creek bed in the hills contained Eucalyptus odontocarpa, E. brevifolia, Grevillea aff. eriostachya, Hakea suberea, Acacia aff. tanumbirensis, A. ligulata and Santalum lanceolatum, with Stylobasium spathulatum and Cassia oligophylla var. sericea. A scree site nine km north-east of camp (NS7) supported an open low woodland B of Eucalyptus brevifolia, over a low scrub A of Acacia aff. gonoclada and A. cibaria, dwarf scrub D of Eremophila ? exilifolia and Acacia hilliana, and hummock grass (Triodia pungens).

Rudall River (RR) (Colour Plate 4)

On 26 April the party continued eastward along the Talawana Track before turning northward to the Rudall River National Park. Nine kilometres after turning north the group visited a small, and probably permanent, plunge pool (RR15, 22°53'S 122°33'E) in a rocky outcrop. Ficus platypoda grew near the water's edge with the sedge Bulbostylis barbata and the grasses Eragrostis aff. cumingii and Cymbopogon ambiguus. On the rocky slopes above (RR15A) were scattered Santalum

Plate 10.
Mulga open low woodland B on alluvial soil near the "Nooloo Soak" campsite (NS1).

Plate 11.
Typical dune vegetation near the NS campsite (NS2).

Plate 12.
Interdune sandplain re-generating after fire; a mixed assemblage of herbs (NS6). The trees are Eucalyptus terminalis (4 m high).

lanceolatum, Acacia inaequilatera, Eucalyptus setosa and Canthium latifolium over Triodia pungens hummock grass.

Camp was made at Talbot Soak (22°33'S 122°24'E) in the Rudall River National Park. The Rudall River near camp consisted of a number of wide, sandy, braided channels. The levees (RR8) supported a fringing woodland of Eucalyptus camaldulensis and E. microtheca over an open low woodland A of Erythrina vespertilio and an open low woodland B of Acacia eriopoda and Psoralea pustulata. The understorey was an open scrub, variably comprising Melaleuca glomerata, Acacia dictyophleba, A. holosericea and A. ampliceps, over dense low grass (Diplachne parviflora, Cenchrus ciliaris and Eragrostis eriopoda, although Eragrostis speciosa was the dominant grass in places). Thickets of Melaleuca ? cajuputi, a tall often multi-stemmed paperbark tree to 8 m, were also dominant in places (Plate 13). Adjacent to this campsite was a sandy rise, with scattered pebbles, dominated by large, rounded shrubs of Trianthema oxycalyptra.

A firm, red sandplain 3.5 km south-west of the RR camp (RR9) supported an open low scrub of Hakea suberea and Acacia inaequilatera over Atriplex vesicaria and Acacia dictyophleba and a mid-dense hummock grass (Triodia lanigera) with some very open low grass (Cenchrus ciliaris - an introduced species).

The undulating stony country (Plate 14) further south-west was dissected by shallow gullies feeding into the Rudall River. In these gullies the soil depth was greater and consisted of reddish sand mixed with pebbles. One such gully (RR10, 4.5 km south-west of camp) supported an open low scrub A of Acacia ancistrocarpa,over open low scrub B of Acacia cibaria and Cassia oligophylla var. sericea, open dwarf scrub D of Acacia hilliana and a hummock grass (Triodia pungens). The adjacent stony and gravelly rises were dominated by Plectrachne schinzii although there were sparse emergents including Eucalytpus odontocarpa and the shrub species described above for the gullies.

Plate 13.
Paperbarks in the bed of the Rudall River.

Plate 14.
Stony rises in Rudall River National Park. Note shallow gully in background (RR10).

Plate 15.
Sandstone ridge 1 km east of Talbot Soak in the Rudall River National Park (RR13).

Plate 16.
Sandy alluvial surface of an island between the braided channels of the Rudall River near Talbot Soak (RR14).

On the eastern side of the Rudall River in this area, rocky quartzitic outcrops interrupted a system of low red sand dunes. RR11 was situated on the side of such a dune, 2 km south-east of camp. Vegetation was dominated by hummock grasses (Plectrachne schinzii and Triodia lanigera) with open low scrub B comprising Grevillea stenobotrya, Hakea sp. and Acacia dictyophleba, as well as a variety of sub-shrubs and other grasses. RR12 was a chenopod flat on sandy alluvial soil over clay between the Rudall River and a quartzite ridge. Situated 3.2 km south-south-east of camp, it supported a dwarf scrub D of Frankenia sp., Sclerolaena spp. including S. diacantha, Atriplex vesicaria, Maireana spp. and Trianthema oxycalyptra as well as the very open low grass Sporobolus virginicus.

Prominent sandstone ridges were noted on the western side of the River, the closest (RR13, Plate 15) being 1 km east of camp. They supported an open low woodland of Eucalyptus aspera and E. terminalis over an open dwarf scrub C (Acacia hilliana, A. pyrifolia and Calytrix ? longiflora) and hummock grass(Triodia pungens). Bunch grasses such as Panicum australiense, Eriachne mucronata and Eriachne sp. were also noted. Lower slopes carried Acacia bivenosa ssp. wayii shrubs over bunch grasses such as Sporobolus actinocladus, Xerochloa laniflora, Paraneurachne muelleri and Eragrostis falcata.

There was an extensive alluvial island (RR14, Plate 16) in the bed of the Rudall River one kilometre south-east of camp. Its deep brown, sandy loam soil supported a low scrub A of Hakea suberea, Acacia bivenosa and A. dictyophleba over a dwarf scrub C of Cassia artemisioides, an open hummock grass of Plectrachne schinzii and an open low grass comprising Eragrostis eriopoda and Aristida browniana.

Plate 17.
Sandy alluvial surface fringing hills near Karara Well. Bunch grasses and low herbs (KW17).

Karara Well (KW)

On 1 May the party moved even further eastward, camping that night near Well 24 (Karara Well) on the Canning Stock Route. Well 24 (23°07'S 123°21'E) is in an open alluvial flat that supported a mixture of grasses and succulent herbs.

The low, red sand dune overlooking the well (KW16) supported an open scrub of Melaleuca glomerata and M. lasiandra over a dwarf scrub D comprising Rhagodia spinescens and Indigofera georgei, open herbs (Salsola kali and Boerhavia diffusa), open hummock grass (Plectrachne schinzii) and open low grass (Aristida browniana and Eriachne aristidea).

An alluvial red-brown sandy loam plain (KW17, Plate 17) fringing the ranges 0.5 km north-east of Well 24 supported an open scrub of Melaleuca lasiandra and Acacia monticola over the open herbs Salsola kali and Sclerolaena convexula and the low grass Eriachne obtusa. Occasional hummocks of Plectrachne schinzii were also present.

A sandplain (KW18, Plate 18) between sandstone ridges 2 km north-north-east of Karara Well, supported an open scrub of Melaleuca lasiandra over a low scrub A of Melaleuca glomerata and Acacia ligulata, a low scrub B of Acacia translucens and Stylobasium spathulatum, and a hummock grass (Plectrachne schinzii). Very open low grass (Eragrostis eriopoda) was also present in places.

The dune vegetation 3 km north of Karara Well (KW19) was severely damaged by a hail storm a few days prior to our visit. The spinifex hummocks were flattened; the eucalypts and the shrubs (such as Thryptomene) were virtually defoliated and the bark was chipped off the upper surfaces of their branches. Vegetation was an open low woodland A of Eucalyptus sp. (bloodwood), confined mainly to the dune crests, over a dwarf scrub C of Thryptomene maisonneuvei and a hummock grass of Plectrachne schinzii. At the base of the dune the shrubs Melaleuca glomerata and Acacia lanigera replaced the Thryptomene, and Triodia lanigera became the dominant hummock grass species.

An extensive system of claypans was encountered further north. KW20 (Plate 19) was situated on the flats around a claypan 3.5 km north-east of Karara Well. The soil was deep sandy loam and supported a low heath D of Halosarcia calyptrata, H. sp., Trianthema oxycalyptra, Salsola kali, Frankenia sp., Neobassia astrocarpa and Hemichroa diandra. These flats were interrupted by sandy rises, ephemeral pools of water, and some low crumbling breakaways of mudstone. The sandy rises supported a mixture of shrubs (such as Acacia jennerae, A. ligulata, Scaevola spinescens and Stylobasium spathulatum) and grasses (Plectrachne schinzii and Eragrostis eriopoda) with a wide variety of herbs. The mudstone rubble supported a mixture of small shrubs and sub-shrubs including Lepidium strongylophyllum, Chenopodium auricomum, Ptilotus obovatus and Gomphrena cunninghamii.

The KW campsite was adjacent to a riverine community between sandstone ridges 1 km south-west of the Well. The deep sandy soils at the site (KW21) supported a low woodland A of Eucalyptus microtheca over an open low scrub B of Eremophila latrobei, Stylobasium spathulatum, Melaleuca lasiandra and Acacia dictyophleba. Panicum cymbiforme dominated the creek frontage with, away from the frontage, the very open herbs Salsola kali and Tribulus terrestris, the hummock grass Plectrachne schinzii, and the very open low grass Aristida browniana.

A prominent sandstone hill 4 km west-south-west of Karara Well (KW22) supported an open hummock grass of Triodia lanigera. In contrast, the sandstone ridges adjacent to the Well (KW23, Plate 20) supported a low woodland B of Acacia aneura over a low scrub B including Cassia helmsii and Eremophila latrobei and an open hummock grass of Triodia lanigera.

Plate 18.
Shrub species and spinifex on a sandplain (KW18) near Karara Well. Note the low hills in the background.

Plate 19.
Samphire fringing shallow claypans (KW20) in a sandplain north of Karara Well.

Plate 20.
Vegetation on the sandstone hills near Karara Well. Mulga trees over Cassia and Eremophila shrubs and scattered Triodia (KW23).

On 5 and 6 May, the party continued eastwards along the Talawana Track towards Windy Corner (23°34'S 125°12'E), then northwards along the Gary 'Highway' towards Kidson Corner. Extensive tracts of mulga parkland on lateritic plains were traversed, a vegetation typical of the Gibson Desert. After refuelling from a supply dump at Kidson Corner (22°45'S 125°08'E) on 6 May, the party turned to the north-west, eventually intersecting the Canning Stock Route approximately 4 km south-west of Well 33. Well 30 (LA32, Colour Plate 5) was reached in the early afternoon on 7 May. Sited in a limestone depression, this well was surrounded by alluvial soils that supported a woodland of flowering Eucalyptus terminalis over a mozaic of the shrub Lawrencia sp. and the hummock grass Plectrachne rigidissima. Around the perimeter of the depression, the shrub Petalostylis labicheoides var. cassioides formed dense thickets under the woodland; Acacia bivenosa subsp. wayi and Santalum acuminatum were common further away from the well.

Lake Auld (LA)

The party continued westward from Well 30, finally reaching a new campsite (22°27'S 123°53'30"E) on the dry bed of Lake Auld on 8 May.

The saline pan of Lake Auld (LA25) supported a dwarf scrub D of Hemichroa diandra, Sclerolaena sp. and Trianthema triquetra var. clavata with a very open low grass of Eragrostis falcata. At a site closer to the edge of the pan (LA26, Plate 21, 1.8 km east of LA25) the dwarf scrub D was dominated by Atriplex sp. (ASM 1049) although Hemichroa diandra, Sclerolaena sp., Neobassia astrocarpa and ? Angianthus tomentosus were also common. The very open low grass Eragrostis falcata was ubiquitous on the lake bed. LA26 was less than 100 metres from the caliche sandplain community.

Plate 21.
Edge of Lake Auld; a dwarf scrub D of saltbush (LA26). The termitarium in the background is on the edge of the caliche sandplain.

Plate 22.
Mid-dense hummock grass (Triodia ? longiceps) on a caliche sandplain near Lake Auld (LA27).

Plate 23.
Heath A of Melaleuca glomerata over mid-dense Triodia lanigera in an interdune swale adjacent to Lake Auld (LA31).

Plate 24.
Hummock grass on a sandplain north of the Anketell Ridge (AR34). Note the ferricrete outcrop.

The caliche sandplain east of camp had numerous anthills. Its vegetation (LA27, Plate 22, 1.9 km east-south-east of camp) comprised a dwarf scrub C of Acacia sp. (ASM 1070) and huge tussocks of Triodia ? longiceps as a mid-dense hummock grass. Another site (LA28, 4 km east-south-east of camp) in the same caliche sandplain, supported an open scrub of Hakea eyreana, a low scrub B of Acacia ligulata, A. bivenosa and Grevillea stenobotrya, and a similar mid-dense hummock grass composed of huge tussocks of Triodia ? longiceps. In both cases a thick layer of leaf litter was noted on the surface, especially under the hummock grass. There were some occasional Trianthema triquetra var. clavata and ephemeral herbs at LA27 but not LA28.

A red sand dune 1.8 km south-east of the LA camp (LA29) supported a low scrub A of Acacia trachycarpa and A. prolifera, a low scrub B of Acacia translucens, and a hummock grass of Plectrachne schinzii. One kilometre further east on the same dune (LA30, Colour Plate 6) were scattered trees (Eucalyptus sp. - a bloodwood) over an open scrub of Grevillea stenobotrya, a low scrub A of Acacia trachycarpa and A. prolifera, a low heath of Thryptomene maisonneuvei and a Plectrachne schinzii hummock grass. Several herb species were also present, but were not common. The interdune swale community (LA31, Plate 23) adjacent to LA30 comprised a heath A of Melaleuca glomerata over a mid-dense hummock grass of Triodia lanigera with some succulent ground species such as Salsola kali, Trianthema triquetra var. clavata and the grass Eragrostis falcata.

After returning northwards along the Canning Stock Route to the Anketell Ridge Road on 11 May, the party continued north-westward, crossing Lake Auld at latitude 22°05'S. Species such as Acacia umbellata, A. tumida, A. monticola and Eucalyptus setosa were noted on the lateritic plains north-west of Lake Auld. A rocky outcrop (20°37'S 122°42'E) with several small caves was visited on 13 May. Around the caves was an assortment of herbs such as Nicotiana benthamiana, Bulbostylis barbata and Eriachne ciliata; Triodia brizoides dominated the lower scree slopes.

Anketell Ridge (AR)

On 13 May, the party camped in 20°25'S 122°08'E on the Anketell Ridge.

The red sand dune 5.1 km north-north-west of camp (AR33) supported a low scrub A of Acacia anaticeps, Grevillea wickhamii and A. tumida over a low scrub B of Grevillea stenobotrya, a dwarf scrub D of Crotalaria cunninghamii, Sida sp. nov. and Duboisia hopwoodii, very open herbs (including Cassia pumila), hummock grass (Plectrachne schinzii and, lower on its slopes, Triodia pungens), and open low grass (Aristida browniana, Eragrostis eriopoda and Eriachne aristidea).

Although the extensive sandplains between these dunes included a number of rocky outcrops, the seed culms standing above the hummocks of spinifex - mainly Plectrachne schinzii - gave the plains the appearance of wheatfields. The sandplain site AR34 (Plate 24, 0.8 km south-west of AR33) supported an open dwarf scrub C of Acacia orthocarpa over an open dwarf scrub D of Acacia transluscens and Indigofera georgei with a mid-dense hummock grass comprising Plectrachne schinzii and Triodia pungens. Elsewhere on this sandplain other shrubs and herbs were noted including Halgania solanacea, Grevillea aff. eriostachya and Scaevola parviflora. The rocky outcrop adjacent to AR34 had a mixture of shrubby species (including Acacia monticola, Cassia glutinosa and Rulingia loxophylla), grasses (such as Eriachne sp., Enneapogon polyphyllus and Triodia pungens), and herbs. Some of these rocky outcrops had magnificent specimens of Ficus platypoda var. minor atop them.

The dune crest at AR35 (Colour Plate 7, 1.6 km west of AR33) had been more recently burnt. Unburnt areas supported an open scrub of Acacia anaticeps, A. tumida and Grevillea stenobotrya, over a low scrub B of Crotalaria cunninghamii and Sida sp. nov. over a dwarf scrub D of Cyanostegia cyanocalyx. The grass layer was dominated by Plectrachne schinzii with other species similar to those at AR33. Santalum lanceolatum and Acacia coriacea were also noted on this dune.

A red-brown sandplain at AR36 (5.0 km north-west of camp) supported an open low woodland A of Owenia reticulata and open low scrub A of Grevillea aff. eriostachya over very open herbs (Jacksonia aculeata), mid-dense hummock grass (Plectrachne schinzii) and open low grass (Eragrostis eriopoda). Occasional other shrubs were present including Acacia tumida and A. transluscens.

The undulating gravelly country of the Anketell Ridge was dominated by a hummock grass of Triodia ? pungens with a few scattered herbs and occasional emergent Eucalyptus setosa. Along a disused track, 1.2 km east of camp, there was a much denser band of vegetation due to a higher water regime. This site (AR37, Plate 25) supported a scrub of Acacia monticola over an open low scrub A of Grevillea wickhamii, a low scrub B of Mirbelia viminalis, a dwarf scrub C of Acacia hilliana, and a mid-dense hummock grass of Triodia ? pungens. Acacia adsurgens and A. adoxa and a variety of other herbs and grasses were also noted nearby; Eucalyptus setosa was emergent in places. Soil was sandy-gravel on clay.

There was a valley, including an ephemeral watercourse, between the Anketell Ridge and the dune fields and sandplains to the north. The soil in the valley was alluvial sandy-loam on clay and, 2.1 km east of camp, its typical thicket-type vegetation was sampled (AR38, Plate 26). The eucalypts present at this site (Eucalyptus setosa and E. aspera) formed a low woodland A. Underneath were dense thickets of Acacia monticola and A. ancistrocarpa, an open low scrub B of Acacia tenuissima, Tephrosia arenicola and Indigofera monophylla, an open dwarf scrub C of Cassia oligophylla and Gossypium australe,and a variety of smaller herbs. In places Triodia pungens formed a mid-dense hummock grass although the bunch grasses Eragrostis eriopoda and Themeda australis were also present as were the shrubs Acacia adoxa and Eremophila latrobei.

The campsite was further west in the valley described under AR38; Eucalyptus aspera was emergent with some Acacia holosericea and occasional Owenia reticulata. In the lower- lying areas Themeda australis was the dominant grass, with Triodia brizoides dominant on the gradual lateritic slopes rising out of camp towards the road running along the top of the Anketell Ridge, 0.4 km to the south. The gravelly breakaways 0.3 km south of AR38 supported an open low scrub of Acacia spp. over Triodia ? pungens hummock grass (AR39).

On the 16 May, the party continued westwards towards Wallal Downs Station, and then south-west to Callawa Station.

Three sites had previously (5 to 13 August 1977) been sampled on the Anketell Ridge near the AR campsite. Site AR47 was a gravelly sandstone ridge 3.2 km east of the 1979 camp. It supported scattered low Ficus platypoda trees to 2.5 m with occasional patches of Acacia adsurgens as an open scrub in an open dwarf scrub C of Eremophila latrobei and Cassia helmsii over the very open herbs Sida ? cardiophylla and Nicotiana benthamiana.

Plate 25.
Gravelly surface on the Anketell Ridge (AR37). Acacia hilliana and Mirbelia viminalis are in the foreground; scattered Acacia monticola and Grevillea wickhamii in the background.

Plate 26.
Eucalyptus aspera over Acacia monticola and A. ancistrocarpa thicket and scattered hummocks of Triodia pungens on alluvial sandy loam in a drainage valley associated with the Anketell Ridge (AR38).

Seven kilometres ESE of the AR camp was an isolated, but well-vegetated, red sand dune (AR48) supporting an open low woodland A of Eucalyptus zygophylla over an open scrub of Acacia stipuligera over an open low scrub A of Acacia drepanocarpa and A. tumida, a low scrub B of Crotalaria cunninghamii and Acacia anticeps, a dwarf scrub C of Swainsona microphylla, Calytrix longiflora, Gyrostemon tepperi and Psoralea martinii and a dwarf scrub D of Jacksonia aculeata, Burtonia simplicifolia and Scaevola parvifolia. Herbaceous elements included a Plectrachne schinzii hummock grass mixed with an Eragrostis eriopoda open low grass.

The vegetation 3 km further east along the drainage line described in AR38 was also sampled in August 1977, and comprised an open low woodland A of Eucalyptus aspera over a low scrub A of Acacia holosericea, A. ancistrocarpa and Ehretia saligna, a low scub B of Cassia lanceolata, Acacia adoxa and Cassia oligophylla , a dwarf scrub C of Acacia ligulata and Gossypium australe, and a dwarf scrub D of Cassia notabilis, Cleome viscosa and Tephrosia uniovulata. The lowest stratum comprised the very open herb Mollugo molluginis.

**1979 Expedition** - Team 2.

Lake Gregory (LG)

The floor of the lake (formerly known as Gregory Salt Lake) was even, with a scarcely perceptible slope towards the centre where there was no vegetation. The soil was pale creamy grey clay-loam which, when dry, had an easily broken thin crust. Samphires dominated the vegetation (LG8), forming low heath D, dwarf scrub D and

Plate 27.
Open dwarf scrub D of samphire on the bed of Lake Gregory. Birds in shallow water in the background are Australian Pelicans.

open dwarf scrub D (Plate 27). Halosarcia halocnemoides subsp. tenuis was dominant. Interspersed among it was some H. indica subsp. leiostachya. Towards the inner edge of the vegetation were open stands of a bright green variant of H. halocnemoides subsp. tenuis, with admixture of the small perennial herb Cressa cretica. Throughout the samphire belt were small open areas carrying very open low grass (chiefly Eragrostis dielsii) together with the herbs Cressa cretica, Morgania floribunda, Sida rohlenae and Swainsona sp. (ASG 15408).

Where sampled in the south-eastern corner of Lake Gregory, the samphire belt was about 1 km wide and of very uniform aspect.

Towards the lake margin the samphires merged into thicket and scrub (LG4) consisting of pure stands of Acacia aff. tephrina (ASG 15415). The soil here was fine grey loam. The Acacia were mostly 4 to 6 m tall (Plate 28), but elsewhere there were trees to 10 m. Out in the samphires were tall dead trees. The main belt appeared to be a regenerating stand, and when mature would form low woodland or forest. Mature stands were noted around Bulbi Plain (LG10B,C). Beneath the Acacia was a sparse ground flora which included Eragrostis dielsii, Halosarcia halocnemoides subsp. tenuis, Salsola kali and Trianthema triquetra.

Beyond the Acacia belt there was a transition to hummock grass, sometimes with open low woodland A and B, as the soil became sandy. The most common spinifex was Triodia pungens, sometimes forming extensive, almost pure stands. The trees of the woodland were Acacia aff. tephrina, Eucalyptus microtheca and Hakea ? suberea.

Farther from the lake there were well-spaced low dunes with wide, shallow swales. The dunes (LG3, LG7) carried open hummock grass, very open low grass and open low scrub A, the formations being mingled. The spinifexes were Plectrachne schinzii and Triodia pungens. Other grasses were Aristida sp., Eragrostis eriopoda and Eriachne aristidea while herbs included Cassia pumila, Crotalaria cunninghamii and Dicrastylis exsuccosa. The shrubs were scattered and included Acacia stipuligera, Eucalyptus odontocarpa, E. pachyphylla, Grevillea stenobotrya and Stylobasium spathulatum.

In the swales, which were often so wide as to become small plains (LG6, LG9, LG10A), hummock grass was dominant, with extensive pure stands of Plectrachne schinzii. In places it was mixed with Triodia pungens. The scattered shrubs included Acacia ligulata, A. translucens, Cassia glutinosa, C. oligophylla, Eucalyptus microtheca, E. odontocarpa, E. pachyphylla and Hakea sp.

Plate 28.
Thicket and scrub of Acacia aff. tephrina, with scattered Eragrostis dielsii below. Edge of Lake Gregory.

Near Djaluwon Creek the soil was sandy with some exposed calcrete, again supporting hummock grass with some open low scrub A. Here, however, the spinifexes were Triodia longiceps and T. pungens with a little T. basedowii. Eucalyptus microtheca occurred as scattered small trees and shrubs. The other shrubs were mostly Acacia cuthbertsonii, A. ligulata, A. translucens and Melaleuca glomerata. In a few recently burnt areas a suite of herbs had appeared. They included Aristida contorta, Cassia notabilis, Chamaesyce australis, Enneapogon polyphyllus, Kallstroemia hirsuta, Ptilotus clementii, Scaevola ovalifolia and Sclerolaena cornishiana.

Djaluwon Creek is a small channel flowing into Lake Gregory from the south-east, becoming deeper and wider towards the Lake. It flows briefly after heavy rain and is fresh. The day before our arrival a thunderstorm which dumped 58 mm of rain on nearby Lake Gregory homestead passed over the upper catchment of the creek. On 24 April the water was about 50 cm deep and flowing strongly. By noon on 27 April the flow had dwindled to a trickle (Plate 29), which stopped during the afternoon. Pools in the bed were then small and would have dried within another week.

On the creek banks (LG10) was a fringe of low woodland B and open low woodland B, though a few trees reached 8 m (Plate 29). The trees were mostly Eucalyptus camaldulensis and E. microtheca. Smaller trees were Acacia holosericea and occasional Grevillea striata. The shrub Melaleuca glomerata was common, sometimes forming thickets, and in places mixed with M. lasiandra. Grasses were also common, especially Eulalia fulva and the introduced Buffel Grass, Cenchrus ciliaris. There was some Cyperus dactylotes along the banks. As the lake was approached and the banks became higher, the trees were taller and the understorey less dense.

During the 1979 visit Lake Gregory was almost dry with only a few pools near the mouths of Sturt and Djaluwon Creek and some areas of shallow, muddy water in the main lake.

In May-June 1980 one of us (AAB) revisited the area. At this time the lake was half to three-quarters full with the water's edge about 500 m from the belt of Acacia aff. tephrina adjacent to Lens Bore. In 1982 the Lake filled following heavy rains in the catchment.

## Lake Gregory to Southesk Tablelands

Around the southern side of the lake a wide, almost flat plain carried mostly Triodia hummock grass with scattered emergents such as Dolichandrone heterophylla, Hakea suberea, and Stylobasium spathulatum. There were scattered patches of Eucalyptus aspera and E. microtheca. The band of Acacia aff. tephrina appeared to be continuous around the southern margin of the lake.

Travelling west towards Well 51 the first dunes were reached; they were low and widely spaced.

Plate 29.
Djaluwon Creek on 27 April 1979. Low woodland B of Eucalyptus microtheca and E. camaldulensis on banks with dense grass understorey (LG10).

More shrubs occurred on these, e.g. Acacia ligulata, A. stipuligera, A. translucens, Eucalyptus odontocarpa and E. pachyphylla. There were patches of Cassia oligophylla var. sericea. Triodia pungens was here the predominant spinifex. This vegetation continued westwards to Well 50, with other shrubs sometimes appearing, e.g. Acacia coriacea, Dicrastylis exsuccosa, Gyrostemon tepperi, Grevillea wickhamii, Hakea ? suberea, Jacksonia aculeata and Petalostylis millefolium.

West of Well 50 the unnamed bloodwood became more common on the dunes. Seven km east of Well 49 there was a fine stand of Casuarina decaisneana, a tree previously noted as occasional.

While the floristic composition remained similar through here, the formations changed continuously as one species or another became common. Most areas had been burnt, though at different times, and there was little climax vegetation.

Well 49 lay on a flat covered with Melaleuca glomerata and M. lasiandra together with Triodia ? pungens.

About 12 km west of Well 49 a gravel ridge was crossed. Here there was a depauperate flora of spinifex and scattered Acacia cuthbertsonii.

As the Tablelands were approached, from the north, the dunes disappeared and an undulating plain was crossed, descending to run along the western foot of the hills. Mixed with Triodia here were shrubs such as Acacia stipuligera, A. ligulata, Capparis umbonata, Cassia oligophylla, C. pruinosa,

Gossypium australe, Hakea ? macrocarpa, Ipomoea costata and Stylobasium spathulatum. Along the creeks grew Clerodendrum. A few Owenia reticulata were emergent.

Southesk Tablelands (SE)

The Tablelands were topographically the most rugged area visited by Team Two (Colour Plates 8 and 9). From the campsite near the head of Breaden Valley excursions were made to sample as many as possible of the habitats. The three valleys with rock holes were all visited since the additional soil moisture along the valley bottoms supported a much more dense vegetation than that of the hills. In general the screes and hilltops carried a very sparse plant cover, leaving them with a barren, red-brown aspect.

The vegetation of the screes (SE14C and SE14E) was open hummock grass, sometimes hummock grass, with much bare ground, the spinifex being Triodia pungens. On some upper screes this changed to open or very open low grass dominated by Pseudochaetochloa australiensis and a closely related unnamed species of the same genus (ASG 15528). There were occasional shrubs of Acacia victoriae and Cassia pruinosa. Scattered among the spinifex were a few herbs such as Enneapogon polyphyllus, Gomphrena cunninghamii, Heliotropium ovalifolium, Ptilotus calostachyus, P. exaltatus, P. marduguru and Salsola kali.

Most of the mesas were edged by cliffs up to 10 m high, often undercut. Gullies on the screes varied in depth and vegetation. In the shallow ones the vegetation was similar to that of the screes, with the addition of Abutilon lepidum, Acacia monticola and Eriachne mucronata. In deeper gullies, especially on more gentle slopes, the scrub was augmented by more Acacia monticola as well as Cassia pruinosa, Grevillea wickhamii and Melaleuca lasiandra. Triodia pungens was frequent.

Plate 30.
Summit of a mesa along the north side of Breaden Valley in the Southesk Tablelands. Open hummock grass (Triodia pungens) and shrubs such as Acacia monticola.

Plate 31.
Rockhole at the head of Breaden Valley, Southesk Tablelands. Large shrubs on the upper slopes are Ficus platypoda.

The summits of the mesas were flat to undulating and very rocky (Plate 30). Here, too, open hummock grass with scattered shrubs was the main vegetation, Triodia pungens being the dominant spinifex. Shrubs, forming open scrub up to 4 m tall, were Acacia monticola, A. victoriae, Cassia pruinosa, Eremophila latrobei and Grevillea wickhamii. Along the breakaway edge was an occasional Ficus platypoda.

Each rockhole lay at the head of a narrow gully which eventually widened into a valley (Plate 31). The sandstone walls were undercut, and from the fissures grew a few Ficus platypoda and a viscid form of Eragrostis eriopoda. Under the overhang sheltered a few plants of Cheilanthes tenuifolia and Nicotiana benthamiana (SE14). In the damp soil by the pools were herbs such as Elytrophorus spicatus, Glossostigma diandra, Lipocarpha microcephala, Marsilea sp. and Oldenlandia galioides.

The deep gullies below the rockholes carried the thickest vegetation of the Tablelands, clearly due to the additional moisture (SE14A, B; Plate 32). At the time of our visit they were regenerating from fires several years previously, and the shrubs were well below their mature height. When

Plate 32.
Southesk Tablelands: gully below Kuningarra Rockhole with thicket regenerating after fire (SE14A, SE14B).

mature the formation would be thicket, scrub or open scrub with an occasional emergent tree of Erythrina vespertilio and Eucalyptus aspera. The dominant shrubs were Acacia holosericea, A. monticola, Grevillea wickhamii and Santalum lanceolatum. Beneath the shrubs was a dense growth of grass and herbs forming a mixture of dense low grass, herbs and very open tall grass, the last being a species of Sorghum (ASG 15510) whose flowering culms reached 3 m. The common species of this understorey included Abutilon andrewsianum, A. leucopetalum, Alternanthera nana, Cassia venusta, Cenchrus ciliaris (introduced), Gossypium australe, Heteropogon contortus, Hibiscus leptocladus, Ipomoea davenportii, Mukia madaraspatana, Tephrosia rosea and Zornia sp.

Where the gully from Godfreys Tank (Kuningarra Rockhole) joined Breaden Valley (SE12) there was a broad band of low open woodland A dominated by Erythrina vespertilio. Tall shrubs associated with it were Acacia holosericea, Grevillea pyramidalis and Santalum lanceolatum. There was a dense understorey of grass and herbs such as Achyranthes aspera, Cenchrus ciliaris, Hibiscus leptocladus, Mukia maderaspatana, Sorghum sp. (ASG 15510), Tephrosia rosea and Trichodesma zeylanicum.

The wide drier areas of Breaden Valley (SE13; Plate 33), and the valleys north and south of it, had scattered trees of Erythrina and Eucalyptus sp. Tall shrubs were Acacia ligulata, A. monticola, Atalaya hemiglauca and Stylobasium spathulatum. Spinifex, other grasses and herbs formed a groundstorey of varying density. Characteristic species were Abutilon leucopetalum, Aristida browniana, Atylosia marmorata, Enneapogon polyphyllus, Hybanthus aurantiacus, Scaevola aff. aemula, Sida platycalyx, Themeda australis, Trianthema pilosa, Trichodesma zeylanicum and Waltheria indica.

Above the valleys the Tablelands eastwards were overlain by sand and widely spaced dunes. Here open hummock grass with scattered shrubs was the predominant vegetation. The spinifexes were Plectrachne schinzii, Triodia basedowii and T. pungens. The mallees Eucalyptus odontocarpa and E. pachyphylla were present. Shrubs included Acacia hilliana, Grevillea stenobotrya and Pterigeron macrocephalus.

The barren general aspect of the Breaden Valley area belied a quite fascinating flora. The gullies where more moisture was available contained a dense flora in which were many species generally more characteristic of the Kimberley. Most species, however, were typical of the northern desert. Of special interest are two previously uncollected species - Ptilotus marduguru and Pseudochaetochloa sp., both found on the dry rocky slopes of mesas.

Southesk Tablelands to Tobin Lake

For about 20 km south-west from Breaden Valley the track passed mostly across the gently undulating plain with a slight fall westwards. The soil was sand or loam, with some areas of gravel, and the vegetation mostly shrubland, sometimes scrub or low open woodland, usually with hummock grassland. Composition varied, sometimes mixed, sometimes with one or another species more

Plate 33.
Breaden Valley, Southesk Tablelands. Low grass and low scrub A. At left centre is an open low woodland of Erythrina vespertilio (SE13).

common or dominant. Shrubs included Acacia spp. including A. cuthbertsonii, A. ligulata, A. stipuligera and A. victoriae, Carissa lanceolata, Cassia spp., Eucalyptus odontocarpa, E. pachyphylla, Grevillea aff. eriostachya, G. stenobotrya, G. striata and G. wickhamii, Hakea macrocarpa, H. ? suberea, Ipomoea costata and Jacksonia aculeata. Trees were Eucalyptus - occasionally E. ? aspera, areas of E. microtheca and of an undetermined bloodwood. The spinifexes appeared to be Triodia basedowii and T. pungens. Other grasses were Aristida, Enneapogon, and perennial herbs included Dampiera candicans, Dicrastylis sp., Newcastelia cladotricha, Ptilotus calostachyus and Salsola kali. Much of the country had been burned several years previously but was regenerating well. Just south of Mt Romilly there had been a recent fire.

Areas of low dunes were encountered south of Mt Romilly, but the plain predominated to beyond Mt Ford. In low lying areas the shrubland consisted of either Melaleuca lasiandra with Acacia stipuligera or Acacia cuthbertsonii and A. victoriae. There were a few small gravelly claypans quite bare of vegetation.

Near a small hill with trig point NMF207 there were open gravelly loam plains with low vegetation similar to that of the Gibson Desert, though with little spinifex. The herbaceous flora included Cassia notabilis, Dicrastylis exsuccosa, Eragrostis sp., Goodenia azurea, Halgania sp. aff. solanacea, Mollugo molluginea, Ptilotus calostachyus, P. polystachyus and Scaevola parvifolia. In some parts flowering was good, in others almost nil. There were some good stands of an undetermined bloodwood Eucalyptus.

Mt Ford and adjacent hills were not visited. They were small mesas with a few Ficus ? platypoda on the cliffs and almost bare screes.

One stand of Eucalyptus aspera was regenerating from epicormic shoots, having apparently been stripped by strong winds or hail. During a violent thunderstorm that we encountered north of Well 45, small branches and leaves were blown from Eucalyptus trees but without fully defoliating them.

For about 15 km north-east of Well 45 the track passed through confused small dunes with the undetermined bloodwood Eucalyptus (ASG 15554) and E. pachyphylla. Both Melaleuca glomerata and M. lasiandra were common; both species, being lignotuberous, were regenerating from the stock in burnt areas. Wattles included Acacia ligulata and A. stipuligera, and spinifex Triodia ? basedowii and T. pungens. A small depression contained a stand of Eucalyptus microtheca; this species, with Melaleuca glomerata and Triodia pungens, formed the chief vegetation about Well 45.

South of Well 45 the track passed across regular dunes, lying east-west and up to 8 m high, separated by wide swales. An undescribed bloodwood Eucalyptus (ASG 15559) occurred along the dunes. Shrubs included Acacia jensenii, Cyanostegia cyanocalyx, Grevillea stenobotrya, Newcastelia spodiotricha and Templetonia incana. The common spinifex was Plectrachne schinzii.

In the swales was an open scrub with hummock grass, mostly of Acacia spp. and Triodia pungens respectively.

The northern Gravity Lake was a bare pan with a hard, gravel floor; shallow water from a recent storm was quite fresh. The surrounding country was sandy, with a low rise next to the lake. The rise supported scattered low trees of Eucalyptus microtheca over Cassia oligophylla, Eremophila latrobei, Triodia ? pungens and Salsola kali as well as a few Melaleuca glomerata and Sclerolaena cornishiana. Further from the lake Acacia coriacea, A. translucens and Carissa lanceolata occurred with Eucalyptus microtheca among Triodia pungens.

The dunes continued to Tobin Lake except where the track crossed Lake Guli. Other species noted

Plate 34.
Samphire (Halosarcia species) on the floor of Tobin Lake.

Plate 1. McLarty Hills—open hummock grass and herbs cover the screes; open scrub over bunch grasses grow on the wider valley floors.
Photo: N. L. McKenzie.

Plate 2. Dragon Flower Trees on the north side of Dragon Tree Soak. Sward of *Sporobolus virginicus* in foreground. Shrubs in centre are *Acacia ampliceps*.
Photo: N. L. McKenzie.

Plate 3. Small pools of water are visible among the bullrushes and dense *Paspalum* sward under the *Sesbania* trees.
Photo: N. L. McKenzie.

Plate 4. A temporary pool in the Rudall River.
Photo: A. S. George.

Plate 5. Well 30, Canning Stock Route. Woodland of *Eucalyptus terminalis* over a hummock grassland of *Triodia rigedissima* in a limestone depression (LA32).
Photo: N. L. McKenzie.

Plate 6. Typical sand dune vegetation near Lake Auld (LA30).
Photo: N. L. McKenzie.

Plate 7. Sand dune vegetation north of the Anketell Ridge (AR35).
Photo: A. S. Mitchell.

Plate 8. Uplands in the Southesk Tablelands showing hummock grass on the screes and plains with shrubs on the alluvial soils.
Photo: A. A. Burbidge.

Plate 9. Southesk Tablelands. South of Breadon Valley.
Photo: A. A. Burbidge.

Plate 10. Desert Oak (*Casuarina decaisneana*) on dunes and swales near Tobin Lake (TL15).
Photo: A. A. Burbidge.

Plate 35.
Tobin Lake near southern margin showing herbs and samphire on the lake floor; scattered low dunes support open scrub and hummock grass (TL20).

on the dunes were Acacia anaticeps, A. coriacea, Comesperma pallidum, Dicrastylis doranii, Gyrostemon tepperi and Synostemon sp. (ASG 15562, 15563); Grevillea stenobotrya was often common. Towards Tobin Lake, Thryptomene maisonneuvei began to appear on the southern sides of the dunes. Additional species in swales included Acacia platycarpa, A. translucens, Burtonia simplicifolia, Dampiera cinerea, Petalostylis millefolium and Pityrodia loricata.

Again, Melaleuca lasiandra and M. glomerata were common in some low lying areas, especially near the lakes. Acacia ligulata and Stylobasium spathulatum also occurred in these habitats, while the spinifex was Triodia ? pungens. Where calcrete was on or close to the surface Ptilotus clementii appeared.

Lake Guli was similar in vegetation to Tobin Lake (described below). Well 42, in the south- west corner of Lake Guli, was surrounded by thickets of Melaleuca glomerata.

The dunes between Lake Guli and Tobin Lake were up to 16 m high.

Tobin Lake (TL)

The floor of the lake (TL21, Plate 34) was very slightly undulating and had, in the lowest parts, a low heath D and dwarf scrub D dominated by an undetermined species of Halosarcia (ASG 15616). Only a few small areas were bare. With a slight rise in level the samphires became more sparse, though with another species, H. calyptrata, and were mixed with herbs such as Atriplex cf. elachophylla, Eragrostis falcata, Hemichroa diandra, Maireana leuhmannii, Salsola kali and Trianthema turgidifolia. On slightly higher areas again, the samphires disappeared and there was dwarf scrub D or open herbs (Plate 35). In addition to the above species there were Lawrencia sp., Scaevola collaris, Tribulus occidentalis and Zygophyllum sp. In places Hemichroa and Trianthema were dominant.

Low sandy, but still saline, rises in the lake carried open hummock grass in which two species of Triodia were common. One was the soft T. pungens, the other (ASG 15614) a harsh species forming clumps to 4 m across with flowering culms to 1 m tall. It is possibly a new species and is related to T. inaequiloba. Associated plants included Eragrostis falcata, Goodenia sp. (ASG 15600), Haloragis gossei, Maireana luehmannii and Trianthema triquetra. In some areas Triodia ? plurinervata (ASG 15646) was also common - another species forming large, harsh clumps. Near the northern end of Tobin Lake, large termitaria occurred in this formation.

Low sand dunes occurred around the lake margins and, unusually, on the lake floor (TL20; Plate 35). On these there was open scrub and open low scrub A and B together with open hummock grass. Where the dunes were only 1-2 m high the species were few, principally Acacia ligulata, Melaleuca glomerata, Salsola kali and Triodia pungens. Dunes up to 5 m high had a more diverse flora including, as well as the above, Crotalaria cunninghamii, Eremophila exotrachys, Grevillea stenobotrya, Gyrostemon ramulosus, Melaleuca lasiandra, Solanum gilesii, Stylobasium spathulatum and Trichodesma zeylanicum. Both Plectrachne schinzii and Triodia basedowii were common. Herbs included Cleome uncifera, Corynotheca sp., Ptilotus arthrolasius, Scaevola parvifolia and Swainsona microphylla.

Parts of the lake margins were dominated by thickets of Melaleuca glomerata and M. lasiandra.

Dunes farther back from the lake supported low woodland A and open scrub. There was a marked difference in the woodland between the north and south sides of the lake, the former being dominated by the unnamed bloodwood Eucalyptus and the latter by Casuarina decaisneana (TL15; Colour Plate 10). Less than 2 km south of the lake, however, the Casuarina gave way to Eucalyptus (TL22; Plate 36).

The understorey below the Casuarina was sparse, containing scattered Acacia ligulata, Codonocarpus cotinifolius, Grevillea wickhamii, Gyrostemon tepperi, Heliotropium sp. (ASG 15604), Ptilotus clementii, Sida sp. (ASG 15635), Stylobasium spathulatum and Triodia pungens.

Mixed with the Eucalyptus, and often without the trees, was open scrub and open low scrub A. Typical species here were Acacia ligulata, Bonamia rosea, Calytrix longiflora, Dicrastylis exsuccosa, D. doranii, Grevillea stenobotrya, Newcastelia cladotricha, Petalostylis millefolium, Pityrodia loricata, Stylobasium spathulatum and Thryptomene

maisonneuvei. Spinifexes associated with these formations were Triodia basedowii and T. pungens, with Plectrachne schinzii on the dune crests.

In the swales (TL17), where open scrub and hummock grass predominated, there were a few trees of Eucalyptus ? aspera. Recently burned areas (TL19) contained abundant herbs, especially Ptilotus clementii.

Well 39, about 4 km south of the lake margin, lay in a swale on a loam flat (TL18). Here there were clumps of Acacia ligulata, Melaleuca glomerata and M. lasiandra. Salsola kali was thick about the well, and Cenchrus ciliaris was established both on the flat and on the dune to the south. Other common herbaceous species were Eragrostis sp. and Trianthema turgidifolia.

Plate 36.
South of Tobin Lake. Dunes and swale. The trees are Eucalyptus ? aspera (TL22).

## Tobin Lake to Swindells Field

For about 100 km south of Tobin Lake the track mostly passed over dunes typical of the Great Sandy Desert, as described above (Plates 37 and 38). The dunes were mostly regular but in some areas were confused. With progress southwards, Thryptomene maisonneuvei became more common. Several areas of Casuarina decaisneana were seen, with an understorey like that on the southern edge of Tobin Lake.

A few small sandstone hills and gravel rises were seen. The hills had only sparse Triodia, Acacia pruinocarpa, A. maitlandii, Ptilotus calostachyus and Eremophila latrobei.

Plate 37.
Swale south of Tobin Lake with hummock grass, Grevillea stenobotrya and Eucalyptus ? aspera.

The gravel rises were typical of the Gibson Desert, with sparse Triodia and shrubs such as Calytrix longiflora, Eremophila latrobei and Grevillea wickhamii. Eucalyptus aspera was sometimes present.

Northeast of Well 35 the main transition to the Gibson Desert occurred, where the gravel rises

Plate 38.
High dune (12 m) south of Tobin Lake with Eucalyptus sp. nov. (bloodwood). Hummock grass in the foreground is regenerating after fire.

became predominant instead of dunes. Their vegetation was open hummock grassland of Triodia, with perennial herbs such as Cassia notabilis, Dicrastylis exsuccosa, Goodenia azurea, Hybanthus aurantiacus, Ptilotus calostachyus and Sida spp. Shrubs were sparse, and included Acacia maitlandii, Anthobolus leptomerioides, Eremophila latrobei, Hakea sp. and Petalostylis millefolium. In small gullies were thickets of Acacia monticola and Grevillea wickhamii.

Minjoo Well (CSR Well 35), lying in a wide, shallow valley, was surrounded by thickets of Melaleuca glomerata and M. lasiandra with some Casuarina decaisneana and Santalum lanceolatum (MW23).

On sandy flats towards the valley margins, Grevillea stenobotrya, Thryptomene maisonneuvei and ? Triodia were common. Some dunes carried dense stands of the unnamed bloodwood Eucalyptus.

Between Well 35 and Gary Junction, south-east of the gravel plains at the Billiluna turnoff, there was an extensive area of dunes typical of the Great Sandy Desert. Beyond these was a wide flat of Melaleuca glomerata. Five km west of Gary Junction the first small population of mulga (Acacia aneura) was recorded, on a gravelly-loam rise, together with Eremophila latrobei. Gravel plains continued south to the Kidson turnoff and then for 30 km west. Other shrubs recorded along here were Acacia ancistrocarpa, A. cuthbertsonii, A. pruinocarpa, Canthium latifolium, Grevillea juncifolia and G. nematophylla.

From the old Kidson drilling site to Well 33 the country varied between gravelly plains and small areas of dunes, with a few small sandstone outcrops. West of Well 33 the road passed through dune country for almost 100 km; it mainly followed swales aligned east-west. Much of this area had not been burnt recently. The vegetation was typical of that on dunes elsewhere in southern and central parts of the Great Sandy Desert.

Lake Auld lay in a wide, shallow depression. Species of Halosarcia, Sclerolaena and Trianthema dominated the lowest-lying parts. Slight sandy rises carried thickets of Melaleuca glomerata and M. lasiandra, usually mixed with Triodia spp. (including an undescribed species - ASG 9136, recorded during an expedition in 1967 - also recorded at Tobin Lake - ASG 15614). Other species on the rises were Acacia ligulata, A. translucens and Stylobasium spathulatum.

West of Lake Auld the road followed a ridge so gently sloping, to north and south, that it was scarcely discernible. Much of this area was either sandy or gravelly with Plectrachne or Triodia and scattered shrubs and trees as the vegetation. Plectrachne schinzii often formed dense stands. Shrubs included Acacia drepanocarpa, A. translucens and other A. spp., Eucalyptus odontocarpa, Grevillea wickhamii, Hakea ? suberea and, in lower areas, Melaleuca glomerata. It was noteworthy that Thryptomene maisonneuvei was absent. A few small groups of trees occurred - Eucalyptus aspera and E. microtheca. The general aspect of this area seemed comparable with that of the northern desert, such as around Lake Gregory, rather than that of the dune country seen in its central and southern parts.

West of Swindells Field (SF)

This locality was the poorest studied in both vegetation formations and floristics. Although rain fell during our stay, it appeared to have been the first for a long time and there was little fresh growth or flowering.

A series of parallel dunes, lying east-west here, overlay duricrusted sandstone which, in two swales nearby, was exposed as low rocky outcrops. To the south-east was a wide, almost flat, sandy plain, with limestone outcrops. Northwards, the dunes gave way to undulating sandy and gravelly plains.

The dunes, up to 15 m high, carried (SF24, SF29; Plate 39) open scrub to open low scrub B on their crests. Common species were Acacia aff. pachyacra, A. tumida, Crotalaria cunninghamii, Grevillea stenobotrya, Newcastelia cladotricha, and Templetonia incana. The bloodwood Eucalyptus sp. nov. (ASG 15694) was sporadic as a component or emergent above the scrub. Mixed with the shrubs was open hummock grass of Plectrachne schinzii, with sometimes Triodia ? pungens. Herbs included Aristida browniana, Dampiera cinerea, Dicrastylis doranii, Eragrostis eriopoda, Eriachne aristidea, Plagiosetum refractum and Solanum gilesii.

On the dune slopes (SF25) the vegetation was similar to that of the crests, but included also the species Burtonia simplicifolia, Calytrix longiflora, Comesperma pallidum, Cyanostegia cyanocalyx, Grevillea aff. eriostachya, Jacksonia aculeata, Scaevola parvifolia and Velleia panduriformis.

Many areas in the swales had been burnt, probably 4-5 years before our visit. Regeneration generally was good but it will still be some years before the vegetation matures again. At the latter stage, as seen in unburnt areas, it was open scrub and scrub with the principal species being Acacia ancistrocarpa, A. orthocarpa, Grevillea stenobotrya and G. wickhamii. There were a few Grevillea aff. eriostachya and Hakea sp. Associated hummock grass consisted of Plectrachne schinzii and Triodia pungens. In burnt areas the firebushes Codonocarpus cotinifolius and Gyrostemon tepperi were common. Small shrubs and herbs growing quickly after the fire were Burtonia simplicifolia, Dampiera cinerea, Dicrastylis doranii, Goodenia azurea, Halgania aff. solanacea (ASG 15700), Heliotropium sp. nov. (ASG 15681), Jacksonia aculeata, Keraudrenia integrifolia, Ptilotus calostachyus and Scaevola parvifolia.

About 3 km south-west of the campsite, in a wide swale, was an area of open low woodland of Eucalyptus microtheca.

In two swales there were small ferricrete/sandstone outcrops, up to 5 m high (SF30). Their vegetation was sparse, consisting of a few shrubs of Acacia monticola, Calytrix longiflora and Grevillea wickhamii. Triodia pungens occurred as scattered clumps. The only herbs noted were Dampiera candicans, Ptilotus calostachyus and Sida sp.

On the plain south-east of the campsite the vegetation on the superficial limestone and associated loam was scrub and open scrub dominated by Melaleuca glomerata with some admixture of M. lasiandra, Acacia ? bivenosa, A. translucens, Grevillea wickhamii, Hakea aff. suberea (ASG 15674) and Santalum lanceolatum (SF26, SF27). With this formation there was also hummock grass of Triodia pungens.

Where the loam over limestone gave way to sand, the spinifex Plectrachne schinzii formed hummock grass and mid-dense hummock grass, often as an almost pure stand (SF28; Plate 40). Emergent shrubs were very scattered and included Acacia sp., Gyrostemon tepperi, Hakea aff. suberea and Jacksonia aculeata. The few herbs noted were Dampiera cinerea and Dicrastylis doranii.

Northwest of the campsite the undulating plains carried vegetation similar to that of the swales described above, but Grevillea stenobotrya was absent. In some places Grevillea wickhamii formed scrub, in others Acacia tumida. There were several areas of open low woodland of Eucalyptus aff. aspera, E. microtheca and E. setosa. On gravel rises there was open hummock grass with Hakea suberea emergent.

Plate 39.
Low double-crested dune west of Swindells Field with open hummock grass (Plectrachne schinzii) and open low scrub (SF29). Tree at left is Eucalyptus sp. nov. (bloodwood).

To the south was an area of close jumbled dunes with a similar vegetation to those at the campsite. Further south again were open plains dominated by hummock grass. At a point 31 km south of Gordon Hills in 20°50'S 127°59'E, was a breakaway system with a large cave (GH10G).

**1980 Expedition**

Bishops Dell (BD)

The campsite was in dunes 28 km east of Bishops Dell in 20°42'S 127°48'E. Here the dunes were well-spaced. The vegetation of the dunes was an open low woodland A of bloodwood (Eucalyptus sp.) over scrub of Acacia stipuligera and A. eriopoda over open dwarf scrub C of Newcastelia spodiotricha and Burtonia simplicifolia over Plectrachne schinzii hummock grass (BD10D). Some areas had been burnt, perhaps 3 to 5 years before our visit (BD10E).

In the swales bloodwoods occurred in occasional groves as open-low woodland A. Acacia stipuligera was the dominant shrub, in places as thickets but usually as open scrub. Plectrachne schinzii hummock grass was widespread.

An area (BD10F) which had been burnt recently (1 to 2 years) was regenerating as mixed very open herbs (Dicrastylis exsuccosa, Sida spp., Halgania sp.), very open low grass (Aristida browniana) and open hummock grass (Plectrachne schinzii).

Plate 40.
Plain, west of Swindells Field, dominated by Plectrachne schinzii with occasional Hakea ? suberea.

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## PART II

## FLORA

by A.S. George[1] and A.S. Mitchell[2]

### INTRODUCTION

On the 1979 Expedition we visited all campsites, spending 4 to 5 days at each site. During 1977 one of us (ASG) visited McLarty Hills and Dragon Tree Soak (each for 4 days). The breakdown of sites was as follows (for site localities and codes see McKenzie et al., this publication); ASG : MH, DT, SE, LG, SF, TL; ASM : AR, RR, LA, NS, KW.

### NOTES ON THE COLLECTION

The first set of the collections by ASG are lodged at the Western Australian Herbarium (PERTH) and those by ASM at the Northern Territory Herbarium (NT).

The list contains all the taxa identified; some only to family or genus. It totals 541 taxa in which there are 8 fungi, 8 lichens, 4 bryophytes, 2 ferns and 519 flowering plants (99 monocots, 420 dicots). There are only 4 monocot families compared to 58 dicot families.

In terms of species numbers the Poaceae is the largest family in the Great Sandy Desert. Table 1 lists the number of taxa in the larger families.

The surveys sampled a wide range of habitats in the Great Sandy Desert and adjacent areas. Because of seasonal conditions, collections in some places were limited to the perennial flora, and the accompanying species list must be considered preliminary.

Several species at present considered rare were collected, viz. Thryptomene naviculata, Sclerolaena crenata, Ptilotus marduguru, Indigofera ammobia, Tephrosia arenicola, Synostemon sp., Templetonia incana and Comesperma pallidum. The Templetonia is probably widespread on dunes of the Great Sandy Desert. Comesperma pallidum is remarkable for its robust habit, being much larger than all species of the genus in southern Australia, its centre of distribution. Several undetermined collections may prove to represent undescribed species.

**Table 1. Number of taxa in the larger families in the Great Sandy Desert**

| | |
|---|---|
| Poaceae | 74 |
| Mimosaceae | 44 (Acacia 44) |
| Papilionaceae | 39 |
| Chenopodiaceae | 31 |
| Malvaceae | 30 |
| Amaranthaceae | 26 |
| Cyperaceae | 22 |
| Myrtaceae | 22 |
| Goodeniaceae | 16 |

### ARRANGEMENT OF THE LIST OF SPECIES

The lichens and bryophytes are listed alphabetically; other groups are arranged alphabetically within families which are themselves arranged alphabetically.

Author citations comply with Royal Botanic Gardens, Kew (1980).

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[1] Western Australian Herbarium, George Street, South Perth, W.A. 6151. Present address: Bureau of Flora and Fauna, Department of Home Affairs and Environment, P.O. Box 1252, Canberra City, A.C.T. 2601.

[2] Herbarium of the Northern Territory, P.O. Box 2134, Alice Springs, N.T. 5750. Present address: CSIRO Division of Fisheries Research, P.O. Box 21, Cronulla, N.S.W. 2230.

# LIST OF PLANT SPECIES

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| FUNGI | | | | | | | | | | | |
| LYCOPERDACEAE | | | | | | | | | | | |
| ASM887 | | | | | | | | | X | | |
| Drainage line. | | | | | | | | | | | |
| ASM1039B | | | | | | | | | | | |
| Base of sand dune, Well 30. | | | | | | | | | | | |
| ASM 1235 | | | | | | | | | | | X |
| Inside termite mound. | | | | | | | | | | | |
| POLYPORACEAE | | | | | | | | | | | |
| Pycnoporus coccineus (Fr.) Bond. et Singer | | | | | | | | | X | | |
| On Melaleuca. | | | | | | | | | | | |
| TULOSTOMATACEAE | | | | | | | | | | | |
| ?Phellorina ASM 1039A | | | | | | | | | | | |
| Base of sand dune, Well 30. | | | | | | | | | | | |
| Podaxis pistilleris (L. ex Pers.) Fr. | | | | | | | | | X | | |
| Sandy loam. | | | | | | | | | | | |
| Tulostoma ASM 889, 896 | | | | | | | | | X | | |
| Sandy loam. | | | | | | | | | | | |
| UNKNOWN | | | | | | | | | | | |
| ASM 768B, 886, 1089 | | | | | | | | X | | | X |
| Sandy river bank, sandy loam (RR); | | | | | | | | | | | |
| laterite by roadside (AR). | | | | | | | | | | | |
| LICHENS | | | | | | | | | | | |
| Acarospora schleicheri (Ach.) Mass. | | | | | | | | | | | X |
| Rocky outcrop in sandy alluvium. | | | | | | | | | | | |
| Peltula australiensis (J. Muell.) R.B.Filson | | | | | | | | | X | | |
| Rocky hillside. | | | | | | | | | | | |
| Peltula euploca (Ach.) Wetmore | | | | | | | | | | | |
| Rocky caves on Anketell Ridge | | | | | | | | | | | |
| Peltula placodizans (Zahlbr.) Wetmore | | | | | | | | | | | |
| Rocky caves on Anketell Ridge. | | | | | | | | | | | |
| BRYOPHYTA | | | | | | | | | | | |
| Funaria ?helmsii | | | | | | | | X | | | |
| Rudall River bed. | | | | | | | | | | | |
| Riccia ?crozalsii | | | | | | | | | X | | |
| Soil pockets on rocky hillside. | | | | | | | | | | | |
| Riccia ?limbata | | | | | | | | | X | | |
| Soil pockets on rocky hillside. | | | | | | | | | | | |
| Riccia sp. | | | | | | | | | | | X |
| PTERIDOPHYTA | | | | | | | | | | | |
| ADIANTACEAE | | | | | | | | | | | |
| Cheilanthes sieberi Kuntze | | | | | | | | | | | X |
| Rocky sandstone outcrop. | | | | | | | | | | | |
| Cheilanthes tenuifolia (Burman) Sw. | | X | | | | | | | | | |
| Sandstone gorge near pool. | | | | | | | | | | | |
| MONOCOTYLEDONAE | | | | | | | | | | | |
| CYPERACEAE | | | | | | | | | | | |
| Baumea articulata (R.Br.) S.T. Blake | | | | | | X | | | | | |
| Black mud of freshwater swamp. | | | | | | | | | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Bulbostylis barbata (Rotth.) C.B. Clarke<br>Damp sand or rock crevices; rockhole S of RR; Rudall River bed; also caves near Anketell Ridge. | | | | | | | X | X | X | | X |
| Bulbostylis turbinata S.T. Blake<br>Alluvial plain at base of hills. | | | | | | | X | | | | |
| Cyperus bulbosus Vahl.<br>Open loam flat. | | | | | | X | | | X | | |
| Cyperus conicus (R.Br.) Bock.<br>Swale (NS); loam plain fringing scree (KW) | | | | | | | X | | X | | |
| Cyperus cunninghamii (C.B. Clarke) C. Gardner<br>Sandstone scree; rockhole S of RR. | | | | | X | | | | | | |
| Cyperus dactylotes Benth.<br>Loamy sand of creek bank; Rudall River bed. | X | | | | | | | X | X | | |
| Cyperus difformis L.<br>Rudall River bed. | | | | | | | | X | | | |
| Cyperus aff. holoschoenus ASG 14757<br>Sandy loam flat. | | | | | | X | | | | | |
| Cyperus iria L.<br>Rudall River bed. | | | | | | | | X | | | |
| Cyperus ixiocarpus F. Muell.<br>Rudall River bed. | | | | | | | | X | | | |
| Cyperus squarrosus L.<br>Rudall River bed. | | | | | | | | X | | | |
| Fimbristylis caespitosa R.Br.<br>Sandplain. | | | | | | X | | | | | |
| Fimbristylis dichotoma (L.) Vahl<br>Sandy wash area, among Triodia. | | | | | X | | | | X | | X |
| Fimbristylis eremophila Latz<br>Sandplains. | | | | | | | X | | | | |
| Fimbristylis ferruginea Vahl<br>Paspalum sward at edge of swamp. | | | | | | X | | | | | |
| Fimbristylis littoralis Gaudich.<br>Sandstone gorge by pool; Rudall River bed. | | X | | | | | | X | | | |
| Fimbristylis microcarya F. Muell.<br>Rudall River bed. | | | | | | | | X | | | |
| Fimbristylis oxystachya F. Muell. | | | | | | | X | | | | |
| Furiena microcephala (R.Br.) Kunth<br>Sandy loam plain at base of scree. | | | | | | | | | X | | |
| Schoenus falcatus R.Br.<br>Loam among scrub. | | | | | | X | | | | | |
| Scirpus dissachanthus S.T. Blake<br>Clay, at Well 33; Rudall River bed. | | | | | | | | X | | | |
| LILIACEAE | | | | | | | | | | | |
| Corynotheca micrantha (Lindley) Macbr.<br>Dune. | | | | | | X | | | | | |
| Corynotheca sp. ASM 1065<br>Dune. | | | | | | | | | | X | |
| POACEAE | | | | | | | | | | | |
| Amphipogon caricinus F. Muell<br>Sandplain. | | | | | | | X | | | | |
| Aristida browniana Henrard<br>Common in sand; also in Rudall River. | | X | | X | X | X | X | X | X | | X |
| Aristida contorta F. Muell.<br>Sandplain; alluvial plain. | X | | | | | | X | | | | X |
| Aristida inaequiglumis Domin<br>Sand in Breaden Valley (SE); on sand plain (MH); alluvial plain at base of ranges (NS). | | X | | | X | | X | | | | X |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Brachiaria holosericea (R.Br.) Hughes<br>Creek bed. | X | | | | | | | | | | |
| Brachyaria miliiformis (Presl) Chase<br>Sandstone gorge, near pool. | | X | | | | | | | | | |
| Cenchrus ciliaris L.<br>Creek banks (LG); in valley (SE); on flat by Well 39 (TL); Rudall River bed; alluvial flats (RR). | X | X | X | | | | | X<br>X | | | |
| Cenchrus setigerus Vahl.<br>Clay flat by Well 33; Well 30. | | | | | | | | | | | |
| Chrysopogon fallax S.T. Blake<br>Sandplain. | | | | | | | X | | | | |
| Cymbopogon ambiguus A. Camus<br>Sandstone gorge; Rockhole S of RR. | | X | | | | | | | | | |
| Cymbopogon bombycinus (R.Br.) Domin<br>Sandstone gully. | | X | | | | | | | | | |
| Dactyloctenium radulans (R.Br.) Beauv.<br>Loam/clay flat below quartzite ridge. | | | | | | | | X | | | |
| Diplachne parviflora (R.Br.) Benth.<br>Rudall River bed. | | | | | | | | X | | | |
| Echinochloa colonum (L.) Link<br>Creek bed. | X | | | | | | | | | | |
| Elytrophorus spicatus (Willd.) A. Camus<br>Sandstone gorge; Rudall River bed. | | X | | | | | | X | | | |
| Enneapogon caerulescens (Gaudich.) N. Burb.<br>Hill country NW of NS. | | | | | | | | | | | |
| Enneapogon pallidus (R.Br.) Beauv.<br>Rudall River bed; sandy alluvium. | | | | | | | | X | | | X |
| Enneapogon polyphyllus (Domin) N. Burb.<br>Common on hills and flats (SE). | X | X | | | | | X | | | | X |
| Enteropogon acicularis (Lindley) Lazarides<br>Alluvial plain fringing scree. | | | | | | | | | X | | |
| Eragrostis cumingii Steudel<br>Sandstone gorge; rockhole S of RR; Rudall River bed (RR): alluvial plain fringing scree (KW). | | X | | | | | | X | X | | |
| Eragrostis dielsii Pilger<br>Saline flat. | X | | | | | | | | | | |
| Eragrostis eriopoda Benth.<br>Widespread in sandy soils; also 70km E of Balfour Downs. | | X | X | | X | | X | X | X | X | X |
| Eragrostis falcata Gaudich.<br>Saline flat (TL); alluvial plain at base of range (NS); Sandstone scree (RR); alluvial plains (KW); saline flats, swale (LA). | | | X | | | | X | X | X | X | |
| Eragrostis japonica (Thunb.) Trin.<br>Sandstone gorge. | | X | | | | | | | | | |
| Eragrostis leptocarpa Benth.<br>Rudall River bed. | | | | | | | | X | | | |
| Eragrostis pergracilis S.T. Blake<br>Loam flat. | | | | | | X | X | | | | |
| Eragrostis setifolia Nees<br>Loam flat | | | | | | | X | | | | |
| Eragrostis speciosa (Roemer & Schultes) Steudel<br>Rudall River bed; alluvial plain fringing scree. | | | | | | | | X | X | | |
| Eragrostis tenellula (Kunth) Steudel<br>Rudall River bed. | | | | | | | | X | | | |
| Eriachne aristidea F. Meull.<br>Sandplains and dunes; also 70km E of Balfour Downs. | X | | X | X | | X | X | | X | | X |
| Eriachne ciliata R.Br.<br>Sandstone mesas; caves on Anketell Ridge. | | X | | | X | | | | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Eriachne helmsii (Domin) Hartley<br>Sandplain. | | | | | | | X | | | | |
| Eriachne mucronata R.Br.<br>Sandstone screes; also hill country NW of NS. | | X | | | X | | | X | | | |
| Eriachne obtusa R.Br.<br>Sandplains, alluvials; also clay near Well 33. | | | | | | | X | | X | | X |
| Eriachne pulchella Domin<br>Sandstone ridge and scree. | | | | | | | | X | | | |
| Eriachne sp. ASM 595, 744, 745, 1145<br>Sandstone ridge and scree (RR); sandplain near rock outcrop (AR); also hill country NW of NS. | | | | | | | | X | | | X |
| Eulalia fulva (R.Br.) Kuntze<br>Sandy creek banks (LG); in sandstone gorge (SE); alluvial plain at base of range (NS); Rudall River bed (RR); alluvial plain fringing scree (KW). | X | X | | | | | X | X | X | | |
| Heteropogon contortus (L.) Beauv. ex Roemer & Schultes<br>Common, in sandstone gorge. | | X | | | | | | | | | |
| Panicum australiense Domin<br>Sandy flats; sandstone ridge on scree (RR). | X | | | | X | | | X | X | | |
| Panicum cymbiforme Hughes<br>Dune (DT); sandy-loam watercourse between sandstone ridges (KW). | | | | | | X | | | X | | |
| Panicum decompositum R.Br.<br>Sandy and loamy flats. | | X | | | | X | | | | | X |
| Paractaenum novaehollandiae Beauv.<br>Well 30. | | | | | | | | | | | |
| Paraneurachne muelleri (Hackel) S.T. Blake<br>Sandplains (NS); sandstone ridge and scree (RR). | | | | | | | X | X | | | |
| Paspalidium clementii (Domin) C.E. Hubb.<br>Alluvial flat. | | | | | | | | | X | | |
| Paspalidium rarum (R.Br.) Hughes<br>Sandstone gully (SE); alluvial plain fringing range (NS). | | X | | | | | X | | | | |
| Paspalum sp. ASG 14737<br>Damp loam. | | | | | | X | | | | | |
| Perotis rara R.Br.<br>Alluvial sandy-loam plain fringing scree. | | | | | | | | | X | | |
| Plagoisetum refractum (F. Muell.) Benth.<br>Dunes; sandplain; Rudall river bed. | | | X | X | | | X | X | | | |
| Plectrachne pungens (R.Br.) C.E. Hubb.<br>Clay-loam flat. | | | | | | X | | | | | |
| Plectrachne rigidissima (Pilger) C.E. Hubb.<br>Well 30. | | | | | | | | | | | |
| Plectrachne schinzii Henrard<br>Very common on dunes and sandplains. | | | X | X | X | X | X | X | X | X | X |
| Pseudochaetochloa australiensis A. Hitch.<br>Sandstone screes. | | X | | | | | | | | | |
| Pseudochaetochloa sp. ASG 15528 | | X | | | | | | | | | |
| Setaria apiculata (Scribner & Merrill) K. Schum.<br>Sandstone gorge, by pool (SE); on dune (MH). | | X | | | X | | | | | | |
| Setaria surgens Stapf<br>Sandplain near rock outcrop. | | | | | | | | | | | X |
| Sorghum australiense Garber & Snyder<br>Rudall River bed. | | | | | | | | X | | | |
| Sorghum plumosum (R.Br.) Beauv.<br>Loam on creek-line. | | | | | X | | | | | | |
| Sorghum sp. ASG 15510<br>Sandstone gully. | | X | | | | | | | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Sporobolus actinocladus (F. Muell.) F. Muell. | | | | | | X | | X | X | | |
| Loam flat; rockhole S of RR; sandstone scree (RR); | | | | | | | | | | | |
| alluvial flat (KW). | | | | | | | | | | | |
| Sporobolus australasicus Domin | X | | | | | X | | | | | |
| Loam flat. | | | | | | | | | | | |
| Sporobolus virginicus (L.) Kunth | | | | | | X | | X | | | |
| Loamy alluvial flats. | | | | | | | | | | | |
| Themeda australis (R.Br.) Stapf | | X | | | | | X | | | | X |
| Sand, in gully (SE); sandplain (NS); alluvial valley | | | | | | | | | | | |
| between lateritic hills and sandplain (AR). | | | | | | | | | | | |
| Triodia basedowii E. Pritzel | X | X | X | | | | X | | | | |
| Sandplains. | | | | | | | | | | | |
| Triodia brizoides N. Burb. | | | | | | | | | | | X |
| Lateritic slopes; also caves on Anketell Ridge. | | | | | | | | | | | |
| Triodia aff. inaequiloba N. Burb. ASG 15614 | | | X | | | | | | | | |
| Edge of saline flat. | | | | | | | | | | | |
| Triodia intermedia Cheel | | | | | X | | | | | | |
| Common on sandstone screes. | | | | | | | | | | | |
| Triodia lanigera Domin | | | | | | | X | X | X | X | |
| Sanddunes and plains; sandstone hills (KW); also | | | | | | | | | | | |
| 70 km E of Balfour Downs. | | | | | | | | | | | |
| Triodia longiceps J. Black | X | | | | | | | | | X | |
| Sandplains. | | | | | | | | | | | |
| Triodia aff. longiceps J. Black ASG 15571 | | | | | | | • | | | | |
| Rise on saline flat at Lake Guli. | | | | | | | | | | | |
| Triodia aff. plurinervata N. Burb. ASG 15646 | | | X | | | | | | | | |
| Saline flat. | | | | | | | | | | | |
| Triodia pungens R.Br. var. pungens | X | X | X | X | X | X | X | | X | X | X |
| Common on sand flats and swales; hill country NW | | | | | | | • | | | | X |
| of NS; rockhole S of RR. | | | | | | | | | | | |
| Triraphis mollis R.Br. | | | | | | | | | | | |
| Alluvial flat. | | | | | | | | | X | | |
| Xerochloa barbata R.Br. | | | | | | X | | | | | |
| Loam flat. | | | | | | | | | | | |
| Xerochloa laniflora Benth. | | | | | | | | X | | | |
| Alluvial flat below quartzite ridge, sandstone scree. | | | | | | | | | | | |
| | | | | | | | | | | | |
| TYPHACEAE | | | | | | | | | | | |
| Typha domingensis Pers. | | | | | | X | | | | | |
| Black mud of freshwater swamp. | | | | | | | | | | | |
| | | | | | | | | | | | |
| DICOTYLEDONAE | | | | | | | | | | | |
| AIZOACEAE | | | | | | | | | | | |
| Mollugo cerviana (L.) Ser. | | | | | | | | X | | | |
| Rudall River bed. | | | | | | | | | | | |
| Mollugo molluginea (F. Muell.) Druce | | X | | | | | | X | | | |
| Sand flat in valley; Rudall River bed. | | | | | | | | | | | |
| Trianthema glossostigma F. Muell. | | | | X | | | | | | | |
| Trianthema oxycalyptra F. Muell. | | | | | | | | X | X | | |
| Rudall River bed; deep sandy-loam flats around | | | | | | • | | | | | |
| salt pans. | | | | | | | | | | | |
| Trianthema pilosa F. Muell. | | | | | | X | X | | | | X |
| Dune (DT,AR); Sandplain (NS). | | | | | | | | | | | |
| Trianthema triquetra Willd. | X | | X | | | X | | | X | X | |
| Loam by saline flats (LG,TL); loam flat (DT); | | | | | | | | | | X | |
| Rudall River bed (EE). alluvial flats (KW); salt lake, | | | | | | | | | | | |
| swale, caliche sandplain (LA). | | | | | | | | | | | |
| Trianthema turgidifolia F. Muell. | | | X | | | X | | | | | |
| Rise in saline flat (TL); on loam flat (DT). | | | | | | | | | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Trianthema sp. ASG 14762<br>Common on loam flat. | | | | | | X | | | | | |
| Zaleya galericulata (Melville) Eichler<br>Sandy alluvium. | | | | | | | | | | | X |
| AMARANTHACEAE | | | | | | | | | | | |
| Achyranthes aspera L.<br>Common in sandstone gorge (SE); valley between gravelly hills and sandplain (AR). | | X | | | | | | | | | X |
| Alternanthera angustifolia R.Br.<br>Alluvial plain fringing ranges (NS); Rudall River bed (RR); also in clay at Well 33. | | | | | | | X | | | | |
| Alternanthera nana R.Br.<br>Sand in valley. | | X | | | | | | | | | |
| Amaranthus mitchellii Benth.<br>Rudall River bed. | | | | | | | | X | | | |
| Amaranthus pallidiflorus F. Muell.<br>Sand in valley (SE); Sandplain (AR); also caves on Anketell Ridge. | | X | | | | | | | | | X |
| Gomphrena brachystylis F. Muell.<br>Sandstone gorge. | | X | | | | | | | | | |
| Gomphrena cunninghamii (Moq.) Druce<br>Sandstone screes (SE, MH, KW); flats around saltpans (FW). | | X | | | X | | | | X | | |
| Gomphrena flaccida R.Br.<br>Rudall River banks (RR); sandstone ridge and scree (KW). | | | | | | | | X | X | | |
| Gomphrena lanata R.Br.<br>Caves on Anketell Ridge. | | | | | | | | | | | |
| Gomphrena sp. ASM 930, 1226.<br>Alluvial plain fringing scree (KW); sandy alluvium (AR). | | | | | | | | | X | | X |
| Hemichroa diandra R.Br.<br>Loamy rise on saline flat (TL); alluvial flat around saltpans (KW); saltlake bed (LA). | | | X | | | | | | X | X | |
| Ptilotus arthrolasius F. Muell.<br>Widespread on dunes; alluvial valley (AR). | | | X | X | X | X | X | | | | X |
| Ptilotus astrolasius F. Muell.<br>Swale. | | | | X | | | | | | | X |
| Ptilotus axillaris (F. Muell. ex Benth.) F. Muell.<br>Well 30. | | | | | | | | | | | |
| Ptilotus calostachyus (F. Muell.) F. Muell.<br>Sandstone mesa, rockhole (MH); sandy gravel, alluvial valley (AR). | | | | | X | | | | | | X |
| Ptilotus clementii (Farmar) Benl<br>Sand over calcrete (LG,TL); buckshot sandplain (NS); Well 30; also 70 km E of Balfour Downs. | X | | X | | | | X | | | | |
| Ptilotus exaltatus (Nees) Benth.<br>Sandstone hills (SE,MH); loam flat (DT); sandy alluvium (AR); also hill country NW of NS. | | X | | | X | X | | | | | X |
| Ptilotus fusiformis (R.Br.) Poir.<br>Sandy loam with Triodia (MH); dune (AR); also hill country NW of NS. | | | | | X | | | | | | X |
| Ptilotus incanus (R.Br.) Poiret<br>Sandstone scree. | | | | | X | | | | | | |
| Ptilotus latifolius R.Br. var. latifolius<br>Dune; Rudall River bed. | | | X | | | | | X | | | |
| Ptilotus macrocephalus (R.Br.) Poiret<br>Alluvial plain fringing ranges. | | | | | | | X | | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Ptilotus marduguru Benl<br>Sandstone cliffs. | | X | | | | | | | | | |
| Ptilotus obovatus (Gaudich.) F. Muell.<br>Deep sandy loam flats around saltpans (KW); sandy alluvium also hill country NW of NS. | | | | | | | | | X | | X |
| Ptilotus polystachyus (Gaudich.) F. Muell.<br>Sand in valley (SE); alluvial plain fringing scree (KW); dune (AR). | | X | | | | | | | X | | X |
| Ptilotus schwarzii (F. Muell.) Tate ex J. Black<br>Gravel rises (SF); buckshot sandplain (NS); sandstone ridge and scree (KW); sandplain (AR). | | | X | X | | | X | | X | | X |
| Ptilotus sp. ASM 453<br>70 km E of Balfour Downs. | | | | | | | | | | | |
| APIACEAE | | | | | | | | | | | |
| Hydrocotyle sp. ASM 940<br>Alluvial plain fringing scree. | | | | | | | | | X | | |
| APOCYNACEAE | | | | | | | | | | | |
| Carissa lanceolata R.Br.<br>Sandy alluvium. | | | | | | | | | | | X |
| ASCLEPIADACEAE | | | | | | | | | | | |
| Cynanchum floribundum R.Br.<br>Rudall River bed. | | | | | | | | X | | | |
| Sarcostemma australe R.Br.<br>Sandstone gully. | | X | | | | | | | | | |
| ASTERACEAE | | | | | | | | | | | |
| Angianthus tomentosus Wendl.<br>Saline flats of lake bed. | | | | | | | | | | X | |
| Brachycome ciliaris (Labill.) Lesson<br>Rudall River banks. | | | | | | | | X | | | |
| Centipeda minima (L.) A.Br. & Aschers<br>Rudall River bed. | | | | | | | | X | | | |
| Flaveria australasica Hook.<br>Loam flat. | | | | | | X | | | | | |
| Helichrysum ambiguum Turcz.<br>Dune (LS); Rudall River banks (RR); deep sandy loam around saltpans (KW). | | | | | | | X | X | X | | |
| Helichrysum apiculatum (Labill.) D.Don<br>Rudall River bed. | | | | | | | | X | | | |
| Pluchea tetranthera F. Muell.<br>Sandy loam. | | | | | X | X | | | X | | |
| Pterocaulon glandulosum (F. Muell. ex Benth.) Benth. & Hook. f. | | | | X | | | | | | | |
| Pterocaulon sphacelatum (Labill.) Benth. & Hook.<br>Pebbly loam with Triodia (MH); loam flat (DT); Rudall River banks. | | | | | X | X | | X | | | |
| Rutidosis helichrysoides DC.<br>Alluvial plain fringing ranges (NS); Rudall River bed. | | | | | | | X | X | | | |
| Streptoglossa macrocephala (F. Muell.) C.R. Dunlop<br>Rocky sand. | | | | | X | | | | | | |
| Streptoglossa odora (F. Muell.) Dunlop<br>Sandstone gully (SE); loam depression (DT). | | X | | | | X | | | | | |
| Streptoglossa sp. ASG 14627<br>Pebbly loam with Triodia. | | | | | X | | | | | | |
| Vittadinia sp. ASM 700<br>Sandplain. | | | | | | | X | | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| BIGNONIACEAE | | | | | | | | | | | |
| Dolichandrone heterophylla (R.Br.) F. Muell. Dune. | | | | | | X | | | | | |
| BORAGINACEAE | | | | | | | | | | | |
| Halgania aff. solanacea F. Muell. Gravelly sand on plain (SF); on dune (MH). | | | | X | X | | | | | | |
| Halgania solanacea F. Muell. Sandplains (NS); sandplain sandy gravel on clay, alluvial valley (AR); also 70 km E of Balfour Downs. | | | | | | | X | | | | X |
| Heliotropium bacciferum Forsskal Rudall River bed (RR); sandy loam flats around salt pans (KW). | | | | | | | | X | X | | |
| Heliotropium conocarpum F. Muell. ex Benth. Alluvial plain at base of ranges (NS); sandy alluvium. | | | | | | | X | | | | X |
| Heliotropium epacrideum F. Muell. ex Benth. Dunes. | | | | | | | | | | X | X |
| Heliotropium filaginoides W.V. Fitzg. Sandy alluvium. | | | | | | | | | | | X |
| Heliotropium ovalifolium Forsskal Sandstone gully (SE); Rudall River bed. | | X | | | | | | X | | | |
| Heliotropium strigosum Willd. Rudall Riverbanks; also Well 30. | | | | | | | | X | | | |
| Heliotropium sp. ASG 14806, 15579, 15653, etc. Swales. | | | X | X | | X | | | | | |
| Heliotropium sp. ASG 15604 Dune. | | | X | | | | | | | | |
| Heliotropium sp. ASG 15542 Sandstone scree. | | X | | | | | | | | | |
| Heliotropium sp. ASG 15710 Gravelly sandplain. | | | | X | | | | | | | |
| Heliotropium tenuifolium R.Br. Rocky sand on creek bank (SE); in gravelly sand with spinifex (MH); Rudall River banks low dune (RR); Flats around saltpans (KW); also 70 km E of Balfour Downs. | | X | | | X | | | X | X | | |
| Trichodesma zeylanicum (L.) R.Br. Sandstone mesa (MH); Rudall River bed; dune (LA). | | | | | X | | | X | | X | |
| BRASSICACEAE | | | | | | | | | | | |
| Lepidium strongylophyllum F.Muell. ex Benth. Deep sandy loam flats around salt pans. | | | | | | | | | X | | |
| Stenopetalum lineare R. Br. ex DC. Sandstone ridge and scree. | | | | | | | | X | | | |
| BRUNONIACEAE | | | | | | | | | | | |
| Brunonia australis Smith Dune. | | | | | | | X | | | | |
| CAESALPINIACEAE | | | | | | | | | | | |
| Cassia artemisioides Gaudich. ex DC. Alluvial island in River; also hill country NW of NS. | | | | | | | | X | | | |
| Cassia desolata F. Muell. Buckshot sandplain. | | | | | | | X | | | | |
| Cassia glutinosa DC. Sandplain near rock outcrop; also hill country NW of NS. | | | | | | | | | | | X |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Cassia helmsii Symon<br>Sandplain (NS); alluvial plain fringing scree; sandstone and claystone ranges (KW). | | | | | | | X | | X | | |
| Cassia notabilis F. Muell.<br>Sandy flats. | | | | | X | X | X | | | | |
| Cassia oligoclada F. Muell.<br>Sandplains; also on Anketell Ridge. | | | | | | | X | | | | X |
| Cassia oligophylla F. Muell. var. sericea Symon<br>Alluvial soils; also hill country NW of NS. | | X | | | | | | X | | | |
| Cassia oligophylla F. Muell. var. oligophylla<br>Alluvial plains and valleys. | | | | | | | X | | | | X |
| Cassia pruinosa F. Muell.<br>Sand in valley. | | X | | | | | | | | | |
| Cassia pumila Lam.<br>Dunes. | | | | | X | X | | | | | X |
| Cassia venusta F. Muell.<br>Sand in valley. | | X | | | | | | | | | |
| Erythrophleum chlorostachys (F. Muell.) Baill.<br>Dune slope. | | | | | X | | | | | | |
| Petalostylis labicheoides R.Br. var. cassioides Benth.<br>Sandplains alluvials, dunes; also Well 30. | | | | | | | X | X | X | X | |
| Petalostylis spinescens E. Pritzel<br>70 km E of Balfour Downs. | | | | | | | | | | | |
| CAMPANULACEAE | | | | | | | | | | | |
| Wahlenbergia sp. ASM 859<br>Rudall River bed. | | | | | | | | X | | | |
| CAPPARACEAE | | | | | | | | | | | |
| Capparis umbonata Lindley<br>Sandstone hill. | | X | | | | | | | | | X |
| CARYOPHYLLACEAE | | | | | | | | | | | |
| Polycarpaea diversifolia Domin<br>Sandplain (NS); sandy alluvium (AR). | | | | | | | X | | | | X |
| CASUARINACEAE | | | | | | | | | | | |
| Casuarina decaisneana F. Muell.<br>Dune slopes (TL); also 70 km E of Balfour Downs; 7km E of Well 50; S of TL; etc. | | | X | | | | | | | | |
| CHENOPODIACEAE | | | | | | | | | | | |
| Atriplex elachophylla F. Muell.<br>Sandy loam. | X | | X | | | | | | | | |
| Atriplex limbata Benth.<br>Deep sandy loam flats around salt pans. | | | | | | | | | X | | |
| Atriplex sp. ASM 1007, 10106, 1049, 1057.<br>Flats around saltpans (KW); saline flat of lake (LA). | | | | | | | | | X | X | |
| Atriplex vesicaria Heward ex Benth.<br>Sandplain, alluvial flat. | | | | | | | | X | | | |
| Chenopodium auricomum Lindl.<br>Deep sandy loam flats around saltpans. | | | | | | | | | X | | |
| Dysphania inflata (Domin) A.J. Scott<br>Alluvial flats fringing ranges. | | | | | | | X | | | | |
| Dysphania plantaginella F. Muell.<br>Rudall River bed; alluvial flat, alluvial plain fringing scree (KW). | | | | | | | | X | X | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Enchylaena tomentosa R.Br.<br>Alluvial plain, sandplain (NS); alluvials (KW); also hill country NW of NS. | | | | | | | X | | X | | |
| Halosarcia calyptrata P.G. Wilson<br>Saline flat (TL); deepy sandy loam flat around saltpans (KW). | | | X | | | | | | X | | |
| Halosarcia halocnemoides (Nees) P.G. Wilson subsp. halocnemoides<br>Saline flat. | | | | | | X | | | | | |
| Halosarcia halocnemoides (Nees) P.G. Wilson subsp. tenuis P.G. Wilson<br>Saline flat. | X | | | | | | | | | | |
| Halosarcia indica (Willd.) P.G. Wilson subsp. leiostachyum (Benth.) P.G. Wilson<br>Saline flats; also at Lake Guli. | X | | | | X | X | | | | X | |
| Halosarcia sp. ASM 974<br>Alluvial flat around saltpans. | | | | | | | | | X | | |
| Maireana luehmannii (F. Muell.) P.G. Wilson<br>Rise in saline flat; also at Lake Auld. | | | X | | | | | | | | |
| Maireana planifolia (F. Muell.) P.G. Wilson<br>Alluvial plain fringing ranges (NS); sandstone scree (KW). | | | | | | | X | | X | | |
| Maireana scleroptera (J. Black) P.G. Wilson<br>Flats around salt pans. | | | | | | | | | X | | |
| Maireana sp. ASM 798, 1001, 1004.<br>Alluvial flat below quartzite ridge (RR); flats around saltpans (KW). | | | | | | | | X | X | | |
| Neobassia astrocarpa (F. Muell.) A.J. Scott<br>Saline flats and rises (TL, DT); flats around saltpans (KW); saltbed of lake (LA); also at Lake Guli and Lake Auld. | | | X | | | X | | | X | X | |
| Rhagodia sp. ASM 660<br>Alluvial flat fringing ranges. | | | | | | | X | | | | |
| Rhagodia spinescens R.Br.<br>Rudall River bed; drainage lines between sandstone hills (KW); dune (LA). | | | | | | | X | X | X | X | |
| Salsola kali L.<br>Saline flat (LG); sandstone hills (SE); loam flat (DT); sandplain, alluvial plain (NS); Rudall River bed and island (RR); dune and alluvials (KW); swale (LA); also at Well 30. | X | X | X | | | X | X | X | X | X | |
| Sclerolaena convexula (R. Anderson) A.J. Scott<br>Alluvial plain fronting ranges (NS); and fringing scree (KW). | | | | | | | X | | X | | |
| Sclerolaena cornishiana (F. Muell.) A.J. Scott<br>Sandstone scree (SE); also sand near Gravity Lakes. | | X | | | | | | | | | |
| Sclerolaena crenata (Ising) A.J. Scott<br>Sand, in wash area. | X | | | | | | | | | | |
| Sclerolaena diacantha (Nees) Benth.<br>Alluvial flat below quartzite ridge (RR); flats around saltpans (KW). | | | | | | | | X | X | | |
| Sclerolaena divaricata (R.Br.) Domin<br>Alluvials. | | | | | | | | X | X | | |
| Sclerolaena fimbriolata (F. Muell.) A.J. Scott<br>Salt lake bed. | | | | | | | | | | X | |
| Sclerolaena muelleri (Benth.) A.J. Scott<br>Loam over calcrete. | X | | | | | | | | | | |
| Sclerolaena sp. ASM 1054<br>Salt lake bed, swale. | | | | | | | | | | X | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Sclerolaena spinosa (Ewart & Davies) A.J. Scott<br>Rudall River banks, alluvial flat, sandstone scree (RR); flat around saltpans (KW). | | | | | | | | X | X | | |
| Tecticornia verrucosa P.G. Wilson<br>Sandy loam flats around salt pans. | | | | | | | | | X | | |
| CHLOANTHACEAE | | | | | | | | | | | |
| Dicrastylis cordifolia Munir<br>Sandplain; also gravelly loam near Swindell Field; hill country NW of NS. | | | | | | | X | | | | |
| Dicrastylis doranii F. Muell.<br>Dune (NS); flats around saltpans (KW); dune (LA); dune and sandplain (AR); also Well 30. | | | | | | | X | | X | X | X |
| Dicrastylis exsuccosa (F. Muell.) Druce<br>Sandplain (AR); also sand near Well 42 and near Swindell Field; Well 30. | | | | | | | | | | | X |
| Dicrastylis sp. ASM 546<br>Buckshot sandplain. | | | | | | | X | | | | |
| Newcastelia cladotricha F. Muell.<br>Dunes and swales; also 70 km E of Balfour Downs. | | | X | X | X | X | X | | | | X |
| Newcastelia spodiotricha F. Muell.<br>Dune; also W of Swindell Field. | | | | | | | | | | X | |
| Pityrodia loricata (F. Muell.) E. Pritzel<br>Dunes. | | | X | | | | | | | | |
| Pityrodia loxocarpa (F. Muell.) Druce<br>Sandplain. | | | | | | | X | | | | |
| CLEOMACEAE | | | | | | | | | | | |
| Cleome ? uncifera Kers<br>Dunes. | | | X | | | | | | | | |
| Cleome viscosa L.<br>Rudall River bed (RR); alluvial plains, sandstone scree (KW); sandplain (AR). | | X | | | | | | X | X | | X |
| CONVOLVULACEAE | | | | | | | | | | | |
| Bonamia media (R.Br.) Trin. ex Steudel<br>Sandy loam (LG, SE); Rudall River banks, alluvial plain fringing scree (KW). | X | X | | | | | | X | X | | |
| Bonamia pannosa (R.Br.) A. Haller<br>Sand in valley (SE); sandstone scree (RR). | | X | | | | | | X | | | |
| Bonamia rosea (F. Muell.) A. Haller<br>Dune, buckshot sandplain (NS); sandplain (RR). | | | | | | X | X | | | | |
| Bonamia sp. ASG 14727<br>Sand plain with Triodia. | | | | | X | | | | | | |
| Cressa cretica L.<br>Saline flat. | X | | | | | | | | | | |
| Evolvulus alsinoides L.<br>Sand in valley (SE); alluvial plain, sandplain (NS); Rudall River banks; sandplain. | | X | | | | | X | X | X | | X |
| Ipomoea davenportii F. Muell.<br>Sandstone gully. | | X | | | | | | | | | |
| Ipomoea muelleri Benth.<br>Rudall River bed. | | | | | | | | X | | | |
| Ipomoea polymorpha Roemer & Schultes<br>Sand in valley. | | X | | | | | | | | | |
| CUCURBITACEAE | | | | | | | | | | | |
| Citrullus lanatus (Thunb.) Mansf.<br>Rudall River bed. | | | | | | | | X | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Mukia maderaspatana (L.) M. Roemer<br>Sand in valley (SE); Rudall River bed; dune (LA); also in caves on Anketell Ridge. | | X | | | X | | | X | | X | X |
| DROSERACEAE | | | | | | | | | | | |
| Drosera indica L.<br>Rudall River bed; alluvial plain fringing scree (KW). | | | | | | | | X | X | | |
| Drosera petiolaris R.Br. ex DC.<br>Sand in gully. | | | | | X | | | | | | |
| ELATINACEAE | | | | | | | | | | | |
| Bergia perennis (F. Muell.) F. Muell. ex. Benth.<br>Buckshot sandplain. | | | | | | | X | | | | |
| Bergia trimera Fischer & Meyer<br>Rudall River bed; clay at Well 33. | | | | | | | | X | | | |
| EUPHORBIACEAE | | | | | | | | | | | |
| Adriana hookeri F. Muell.<br>Rudall River bed. | | | | | | | | X | | | |
| Euphorbia australis Boiss.<br>Sand over calcrete near creek (LG); sand in valley (SE); Rudall River banks; sandplain (AR). | X | X | | | | | | X | | | X |
| Euphorbia boophthona C. Gardner<br>Alluvial plain fringing ranges (NS); sandy alluvium (AR). | | | | | | | X | | | | X |
| Euphorbia coghlanii Bailey<br>Sandy loam near creek. | X | | | | | | | | | | |
| Euphorbia drummondii Boiss.<br>Rudall River bed; low dune between ranges (KW). | | | | | | | | X | X | | |
| Euphorbia eremophila Cunn. ex Hook.<br>Buckshot sandplain. | | | | | | | X | | | | |
| Euphorbia schultzii Benth.<br>Alluvial plain fringing ranges, sandplain. | | | | | | | X | | | | |
| Euphorbia tannensis Sprengel subsp. eremophila (Cunn.) D. Hassall<br>Sandstone gully (SE); sand with Casuarina (TL). | | X | X | | | | | | | | |
| Euphorbia wheeleri Bailey<br>Sandy loam flats around saltpans (KW); dune (AR). | | | | | | | | | X | | X |
| Monotaxis luteiflora F. Muell.<br>Sandy gravel near Well 35. | | | | | | | | | | | |
| Phyllanthus lacunarius F. Muell.<br>Alluvial plain fringing ranges. | | | | | | | X | | | | |
| Phyllanthus maderaspatensis L.<br>Sand near dune. | | | | | X | | | | | | |
| Synostemon sp. ASG 15562, 15563, etc.<br>Dunes. | | | X | | | | | | | | |
| FRANKENIACEAE | | | | | | | | | | | |
| Frankenia cordata J. Black<br>Saline flat, L. Auld. | | | | | | | | | | | |
| Frankenia sp. ASM 1053<br>Alluvial plains; bed of salt lake (LA). | | | | | | | | X | X | X | |
| GOODENIACEAE | | | | | | | | | | | |
| Dampiera candicans F. Muell.<br>Sandplain (SF, AR); pebbly loam (MH); buckshot sandplain (NS). | | | | X | X | | X | | | | X |
| Dampiera cinerea Ewart & Davies<br>Dunes and swales; also near Well 42. | | | | X | X | X | X | | | X | X |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Goodenia armitiana F. Muell. | | | | | X | | | | | | |
| Dune; also W of Well 33. | | | | | | | | | | | |
| Goodenia azurea F. Muell | | | | X | X | | X | | | | |
| Gravelly sand (SF); dune (MH); buckshot sandplain (NS). | | | | | | | | | | | |
| Goodenia heterochila F. Muell. | | | | | | | | | X | | |
| Deep sandy loam flats around saltpans. | | | | | | | | | | | |
| Goodenia hirsuta F. Muell. | | | | | | | | | X | | |
| Alluvial plain fringing scree. | | | | | | | | | | | |
| Goodenia mueckeana F. Muell. | | | | | | | X | | | | |
| Sandplains. | | | | | | | | | | | |
| Goodenia purpurascens R.Br. | | | | | | | | X | | | |
| Rudall River bed. | | | | | | | | | | | |
| Goodenia scaevolina F. Muell. | | | | | | | | X | | | |
| Gully, redsand with pebbles; also hill country NW of NS. | | | | | | | | | | | |
| Goodenia triodiophila Carolin | | | | | | | X | | | | X |
| Sandplains. | | | | | | | | | | | |
| Scaevola collaris F. Muell. | | | X | | | | | | | X | |
| Rises in saline flat; also at Lake Guli and Lake Auld. | | | | | | | | | | | |
| Scaevola ovalifolia R. Br. | X | X | | | | | | | | | |
| Sandy loam. | | | | | | | | | | | |
| Scaevola parvifolia F. Muell. | | | X | | X | | X | X | X | X | X |
| Dunes and sandplains. | | | | | | | | | | | |
| Scaevola spinescens R. Br. | | X | | | | | | | X | | |
| Sandstone gully (SE); flats around saltpans (KW). | | | | | | | | | | | |
| Velleia connata F. Muell. | | | | | | | X | | | | X |
| Sandplains, often with gravel. | | | | | | | | | | | |
| Velleia panduriformis Cunn. ex Benth. | | | | | X | | | | | | |
| Dunes. | | | | | | | | | | | |
| GYROSTEMONACEAE | | | | | | | | | | | |
| Codonocarpus cotinifolius (Desf.) F. Muell. | | | X | X | | | | | | | X |
| Swales, also 70 km E of Balfour Downs. | | | | | | | | | | | |
| Gyrostemon ramulosus Desf. | | | | | | | | | | | |
| Well 30. | | | | | | | | | | | |
| Gyrostemon tepperi (F. Muell. ex H. Walter) A.S. George | | | X | | X | | | | | | |
| Dunes, also 70 km E of Balfour Downs. | | | | | | | | | | | |
| HALORAGACEAE | | | | | | | | | | | |
| Gonocarpus eremophilus Orchard | | | X | | | | | | | | |
| Gravel plain. | | | | | | | | | | | |
| Haloragis gossei F. Muell. | | | X | | | | X | | | | |
| Rise in saline flat (TL); alluvial plain fringing ranges (NS); also near Kidson Field. | | | | | | | | | | | |
| Haloragis uncatipila Orchard | | X | | | | | | | | | |
| Sand by sandstone rocks in valley. | | | | | | | | | | | |
| LAURACEAE | | | | | | | | | | | |
| Cassytha filiformis L. | | | | | | | | | | | X |
| Dune, sandy gravel on clay; also Well 30. | | | | | | | | | | | |
| LORANTHACEAE | | | | | | | | | | | |
| Amyema benthamii (Blakely) Danser | | | | | X | | | | | | |
| On Gardenia sp. | | | | | | | | | | | |
| Amyema gibberulus (Tate) Danser | | | | | | X | | | | | |
| On Grevillea wickhamii; also Well 30, on G. wickhamii. | | | | | | | | | | | |
| Amyema hillianum (Blakely) Danser | | | | | | | | | | | |
| Hill country NW of NS, on Acacia. | | | | | | | | | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Amyema miraculosum (Miq.) Tiegh. | | | | | | | | | | | |
| Well 30, on Santalum. | | | | | | | | | | | |
| Amyema preissii (Miq.) Tieghem | X | | | | | X | | X | X | | |
| On Acacia cuthbertsonii (LG); on Acacia ampliceps (DT); | | | | | | | | | | | |
| on Acacia sp. (RR); on Acacia dictyophleba (KW). | | | | | | | | | | | |
| Amyema sanguineum (F. Muell.) Danser | X | | | | | | | X | | | X |
| On Eucalyptus. | | | | | | | | | | | |
| Lysiana spathulata (Blakely) Barlow | | X | | | | | | | | | |
| On Acacia monticola. | | | | | | | | | | | |
| Unknown sp. ASM 749 | | | | | | | | X | | | |
| On Eucalyptus sp. | | | | | | | | | | | |
| LYTHRACEAE | | | | | | | | | | | |
| Ammannia auriculata Willd. | | | | | | | | X | | | |
| Rudall River bed. | | | | | | | | | | | |
| Lythrum ?hyssopifolium L. ASM 830 | | | | | | | | X | | | |
| Rudall River bed. | | | | | | | | | | | |
| MALVACEAE | | | | | | | | | | | |
| Abutilon andrewsianum W. Fitzg. | | X | | | | | | | | | |
| Valley. | | | | | | | | | | | |
| Abutilon lepidum (F. Muell.) A.S. Mitchell | | X | | | X | | | | | | X |
| Sandstone gully (SE); on scree (MH); sandy alluvium (AR). | | | | | | | | | | | |
| Abutilon leucopetalum (F. Muell.) Benth. | | X | | | | | X | | | | |
| Sand in valley (SE); sandplain (NS). | | | | | | | | | | | |
| Abutilon macrum F. Muell. | | | | | | | X | | | | X |
| Alluvial plain fringing scree (NS); sandy alluvium (AR). | | | | | | | | | | | |
| Abutilon otocarpum F. Muell. | | | | | | | X | X | X | | X |
| Alluvial plain fringing scree (NS); Rudall River bed, | | | | | | | | | | | |
| alluvial island (RR); alluvials (KW,AR). | | | | | | | | | | | |
| Alyogyne pinoniana (Gaudich.) Fryxell | | | | | | | | | | | |
| Well 30. | | | | | | | | | | | |
| Gossypium australe F. Muell. | | | | | | | | X | | | X |
| Rudall River bed; valley between gravelly hills. | | | | | | | | | | | |
| Hibiscus brachychlaenus F. Muell. | | | | | | | X | | | | |
| Sandplains. | | | | | | | | | | | |
| Hibiscus burtonii Bailey | | | | | | | X | | | | |
| Alluvial plain fringing ranges. | | | | | | | | | | | |
| Hibiscus leptocladus Benth. | | X | | | X | | | | | | X |
| Sand in gullies. | | | | | | | | | | | |
| Hibiscus panduriformis Burm. f. | | | | | | | | X | | | |
| Rudall River bed. | | | | | | | | | | | |
| Hibiscus sturtii Hook. var. campylochlamys Benth. | | | | | | | | | | | X |
| Sandy alluvium. | | | | | | | | | | | |
| Hibiscus sturtii Hook. var. grandiflorus Benth. | | | | | | | X | | | | X |
| Alluvial valleys and plains. | | | | | | | | | | | |
| Hibiscus sturtii Hook. var. platychlamys Benth. | | | | | | | | X | | | |
| Sandstone ridge and scree. | | | | | | | | | | | |
| Hibiscus sturtii Hook. var. truncatus Fryxell | | | | | | | X | | | | |
| Alluvial plain fringing ranges. | | | | | | | | | | | |
| Lawrencia glomerata Hook. | | | | | | X | | | X | | |
| Loam flats. | | | | | | | | | | | |
| Lawrencia incana (J. Black) Melville | | | | | | | | | | X | |
| Bed of salt lake. | | | | | | | | | | | |
| Lawrencia sp. ASG 14783 | | | | | | X | | | | | |
| Clay-loam flat. | | | | | | | | | | | |
| Lawrencia sp. ASM 1023 | | | | | | | | | | | |
| Well 30. | | | | | | | | | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Malvastrum americanum (L.) Torrey<br>Sandy alluvium | | | | | | | | | | | X |
| Sida ammophila F. Muell. ex J.H. Willis<br>70 km E of Balfour Downs. | | | | | | | | | | | |
| Sida cardiophylla F. Muell.<br>Sandplains (NS); low dune (KW). | | | | | | | X | | X | | X |
| Sida fibulifera Lindley<br>Clay-loam flat (DT); Rudall River bank; sandy alluvium (AR). | | | | | | X | | X | | | X |
| Sida filiformis Cunn. ASG 15474, 15499<br>Sand in valley (SE); alluvial plain fringing ranges (NS); sandy alluvium (AR). | | X | | | | | X | | | | X |
| Sida platycalyx F. Muell. ex Benth.<br>Sand in gully; also W of AR. | | X | | | | | | | | | |
| Sida rohlenae Domin<br>Saline flat (LG); sand in valley (SE). | X | X | | | | | | | | | |
| Sida trichopoda F. Muell.<br>Alluvial flats. | | | | | | | | | X | | |
| Sida aff. virgata Hook. ASM 586, 984, 1109, 1189<br>Sandplain (NS,AR); alluvial flats around saltpans (KW). | | | | | | | X | | X | | X |
| Sida sp. ASM 548, 984<br>Buckshot sandplain (NS); flats around saltpans (KW) | | | | | | X | | X | | | |
| Sida sp. ASM 508, 1167, 1191<br>Dunes. | | | | | | | X | | | | X |
| MARSILEACEAE | | | | | | | | | | | |
| Marsilea exarata A.Br.<br>Alluvial plain fringing ranges (NS); Rudall River bed. | | | | | | | X | X | | | |
| MELIACEAE | | | | | | | | | | | |
| Owenia reticulata F. Muell.<br>Sandstone hill (SE); dunes (MH); dunes and swales (DT); sandplain (AR). | | X | | | X | X | | | | | X |
| MENISPERMACEAE | | | | | | | | | | | |
| Tinospora smilacina Benth.<br>Dune (TL); under breakaway (MH); sandplain (AR). | | | X | | X | | | | | | X |
| MIMOSACEAE | | | | | | | | | | | |
| Acacia acradenia F. Muell.<br>Gravel depression. | | | | | X | | | | | | |
| Acacia adoxa Pedley<br>Gravelly loam and sand on plains. | | | | X | | | X | | | | X |
| Acacia adsurgens Maiden & Blakely.<br>Sandplain (NS); sandy gravel on clay (AR). | | | | | | | X | | | | X |
| Acacia ampliceps Maslin<br>Loam near swamp (DT); Rudall River banks. | | | | | | X | | X | | | |
| Acacia anaticeps Tindale<br>Creek-line (MH); dune (DT, AR); also near Gravity Lakes. | | | | | X | X | | | | | X |
| Acacia ancistrocarpa Maiden & Blakely<br>Sandy swales, sandplains. | X | X | X | X | | | X | X | | | X |
| Acacia aneura F. Muell.<br>Gravelly loam, sandstone. | | | | | | | X | | X | | |
| Acacia bivenosa DC. subsp. wayi (Maiden) Pedley<br>Sandplain (NS); alluvial island in River, sandstone scree (RR); caliche sandplain, dune (LA); also Well 30. | | | | | | | X | X | | X | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Acacia cibaria F. Muell.<br>Alluvial plain fringing ranges (NS,KW); sand with pebbles in gully (RR); also hill country NW of NS. | | | | | | | X | X | X | | |
| Acacia coriacea DC.<br>Sandplains (MH,NS); dune (AR). | | | | | X | | X | | | | X |
| Acacia dictyophleba F. Muell.<br>Dunes, sandplains, alluvials; also near Lake Auld; 70 km E of Balfour Downs; Rudall River bed. | | | X | | | | X | X | X | | |
| Acacia drepanocarpa F. Muell. subsp. latifolia Pedley<br>Gravelly sand plain. | | | | X | | | | | | | |
| Acacia eriopoda Maiden & Blakely<br>Rudall River bed. | | | | | | | | X | | | |
| Acacia aff. gonoclada ASM 891<br>Hill country NW of NS. | | | | | | | | | | | |
| Acacia hilliana Maiden<br>Sand plains; sandstone scree (KW); also hill country NW of NS. | | X | | X | | | | X | | | X |
| Acacia holosericea Cunn. ex Don<br>Loamy creek banks (LG); sand in valley (SE); pebbly loam on creek line (MH); Rudall River banks; alluvial valley between gravelly hills and sandplain (AR). | X | X | | | X | | | X | | | X |
| Acacia inaequilatera Domin<br>Rockhole S of RR. | | | | | | | | X | | | |
| Acacia jennerae Maiden<br>Flats around saltpans. | | | | | | | | X | | | |
| Acacia jensenii Maiden<br>Dune (TL); sandplain (NS). | | | X | | | | X | | | | |
| Acacia ligulata Cunn. ex. Benth.<br>Sand over calcrete (LG,TL); sandstone hill (SE); also 70 km E of Balfour Downs; hill country NW of NS. | X | X | X | | | | | | | | |
| Acacia maitlandii F. Muell.<br>Dune. | | | | | | | X | | | | |
| Acacia monticola J. Black<br>Sandstone gully (SE); sand among sandstone rocks in swale (SF); gravel depression (MH); alluvial plain fringing scree (KW); sandplain, alluvials (AR); also Anketell Ridge Road. | | X | | X | X | | | | X | | X |
| Acacia orthocarpa F. Muell.<br>Sandplains. | | | | X | X | | | | | | X |
| Acacia platycarpa F. Muell.<br>Swale SW of Gravity Lakes. | | | | | | | | | | | |
| Acacia prolifera J. Black<br>Dunes. | | | | | | | | | | X | |
| Acacia pruinocarpa Tindale<br>Alluvial island in River. | | | | | | | | X | | | |
| Acacia aff. ptychophylla ASM 675<br>Hill country NW of NS. | | | | | | | | | | | |
| Acacia pyrifolia DC.<br>Sandstone ridge and scree. | | | | | | | | X | | | |
| Acacia retivenia F. Muell.<br>Hill country NW of NS. | | | | | | | | | | | |
| Acacia sibirica S. Moore<br>Hill country NW of NS. | | | | | | | | | | | |
| Acacia steedmanii Maiden & Blakely<br>Dune. | | | | | | | X | | | | |
| Acacia stipuligera F. Muell.<br>Sandy plains. | | | | | X | X | | | | X | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Acacia strongylophylla F. Muell. | | | | | | | X | | | | |
| Buckshot sand plain. | | | | | | | | | | | |
| Acacia aff. tanumbirensis | | | | | | | X | | | | |
| Sandplain; also hill country NW of NS. | | | | | | | | | | | |
| Acacia tenuissima F. Muell. | | | | | | | X | | | | X |
| Sandplain (NS); sandy gravel and loam on clay (AR). | | | | | | | | | | | |
| Acacia aff. tephrina Pedley ASG 15415 | X | | | | | | | | | | |
| Loam fringing lake. | | | | | | | | | | | |
| Acacia tetragonophylla F. Muell | | | | | | | X | | X | | |
| Alluvials, sandplain. | | | | | | | | | | | |
| Acacia trachycarpa E. Pritzel | | | | | | | | | | X | |
| Dunes. | | | | | | | | | | | |
| Acacia translucens Cunn. ex Benth. | X | | | X | X | X | | X | X | X | X |
| Sandplains; one record from dune (LA). | | | | | | | | | | | |
| Acacia tumida F. Muell. ex Benth. | | | X | X | X | | | | | | X |
| Dunes and sandplains; also along Anketell Ridge Road. | | | | | | | | | | | |
| Acacia umbellata Cunn. ex Benth. | | | | | | | | | | | |
| Anketell Ridge road. | | | | | | | | | | | |
| Acacia aff. victoriae ASM 724. | | | | | | | | | | | |
| Rockhole S of RR. | | | | | | | | | | | |
| Acacia wiseana C. Gardner | | | | | | | | | | | |
| Sandplain with spinifex near Lake Auld. | | | | | | | | | | | |
| Acacia sp. ASM 1070 | | | | | | | | | | X | |
| Caliche sandplain. | | | | | | | | | | | |
| MORACEAE | | | | | | | | | | | |
| Ficus platypoda (Miq.) Cunn. ex Miq. var. minor Benth. | | X | | | X | | | | | | X |
| Edge of sandstone gorge (SE); on mesa (MH). rockhole S of RR; rocky outcrop in sandplain (AR). | | | | | | | | | | | |
| MYOPORACEAE | | | | | | | | | | | |
| Eremophila ?exilifolia F. Muell. ASM 587 | | | | | | | | | | | |
| Hill country NW of NS. | | | | | | | | | | | |
| Eremophila exotrachys Kraenzlin | | | X | | | | | | X | | |
| Dune by lake (TL); alluvial flats around saltpans (KW). | | | | | | | | | | | |
| Eremophila latrobei F. Muell. | X | | | | | | | X | X | | |
| Sandplains alluvials and screes; also hill country NW of NS. | | | | | | | | X | X | | X |
| Eremophila longifolia F. Muell. | | | | | | | X | X | | | |
| Alluvial plain fringing scree, sandplain (NS); Rudall River bed. | | | | | | | | | | | |
| Eremophila rotundifolia F. Muell | | | | | | | | X | | | |
| Rudall River banks. | | | | | | | | | | | |
| Eremophila spathulata W. Fitzg. | | | | | | | | | | | |
| Hill country NW of NS. | | | | | | | | | | | |
| Eremophila sp. ASM 682, 685 | | | | | | | X | | | | |
| Alluvial plains fringing scree; also hill country NW of NS. | | | | | | | | | | | |
| Myoporum acuminatum R.Br. | | | | | | X | | | | | |
| Loam flat. | | | | | | | | | | | |
| MYRTACEAE | | | | | | | | | | | |
| Calytrix longiflora F. Muell. | | | | | X | | | X | | | X |
| Sandstone plateau (MH); sandstone ridge and scree (RR); also hill country NW of NS. | | | | | | | | | | | |
| Eucalyptus aspera F. Muell. | | X | | | | | | X | | | X |
| Sandstone gully (SE); sandstone ridge and scree (RR); valley between gravelly hills (AR). | | | | | | | | | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Eucalyptus brevifolia F. Muell.<br>Hill country NW of NS. | | | | | | | | | | | |
| Eucalyptus camaldulensis Dehnh.<br>Sandy creek banks (LG); Rudall River banks. | X | | | | | | | X | | | |
| Eucalyptus gamophylla F. Muell.<br>70 km E of Balfour Downs. | | | | | | | | | | | |
| Eucalyptus intertexta R. Baker<br>Sandplain. | | | | | | | X | | | | |
| Eucalyptus kingsmillii Maiden & Blakely<br>Dunes and sandplain. | | | | | | | X | | | | |
| Eucalyptus microtheca F. Muell.<br>Sandy creek banks (LG); sandplain (LG,SF,NS); Loam flat (DT); Rudall River banks (RR); sandy loam watercourse between sandstone ridges (KW). | X | | | X | | X | X | X | X | | |
| Eucalyptus odontocarpa F. Muell.<br>Sand with spinifex; also at Swindell Field; hill country NW of NS. Well 30. | X | X | | | | | X | X | | | |
| Eucalyptus pachyphylla F. Muell.<br>Sandplains. | X | X | X | | | | | | | | |
| Eucalyptus papuana F. Muell.<br>Sandplains and by creek-line. | | | | | X | | | | | | |
| Eucalyptus setosa Schau.<br>Loam with spinifex; also near Swindell Field; rockhole S of RR; gravel slopes (AR). | | | | | | | | | | | X |
| Eucalyptus terminalis F. Muell.<br>Sandplains (NS); sandstone ridge on scree (RR) also Well 30. | | | | | | | X | X | | | |
| Eucalyptus sp. ASG 15554, 15559, 15694; ASM 511, 1041<br>Common on dunes, also at Balfour Downs. | | | X | X | | | X | | | X | |
| Eucalyptus sp. ASM 779B<br>Undulating gravelly rises. | | | | | | | | X | | | |
| Lamarchea sulcata A.S. George<br>70 km E of Balfour Downs. | | | | | | | | | | | |
| Melaleuca cajuputi Powell<br>Rudall River bed. | | | | | | | | X | | | |
| Melaleuca glomerata F. Muell.<br>Sandy creek banks (LG); sandy flats (SF,DT); sandplain (NS); Rudall River bed; dunes and swales (KW,LA). | X | | | X | | X | X | X | X | X | |
| Melaleuca lasiandra F. Muell.<br>Sandy flats (LG,SF,DT), sandstone gully (SE); sandplain (NS); alluvials (KW); also hill country NW of NS. | X | X | | X | | X | X | | X | | |
| Micromyrtus flaviflora (F. Muell.) F. Muell. ex J. Black<br>Sandplain near Lake Auld. | | | | | | | | | | | |
| Thryptomene maisonneuvei F. Muell.<br>Dunes; also 70 km E of Balfour Downs. | | | X | | | | X | | X | X | |
| Thryptomene naviculata J.W. Green<br>Sandy, rocky rise. | | | | | | | | | | X | |
| PAPILIONACEAE | | | | | | | | | | | |
| Aenictophyton reconditum A. Lee<br>Dunes. | | | | | X | X | | | | | |
| Aeschynomene indica L.<br>Rudall River bed. | | | | | | | | X | | | |
| Atylosia marmorata Benth.<br>Sand in valley. | | X | | | | | | | | | |
| Burtonia polyzyga (F. Muell.) Benth.<br>Buckshot sandplain; also hill country NW of NS. | | | | | | | X | | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Burtonia simplicifolia F. Muell. & Tate<br>Dunes, sandplain; also near Lake Auld. | | | | | X | | X | | | | X |
| Crotalaria crispata F. Muell.<br>Sand, in wash area (MH); Rudall River bed; alluvial plain fringing scree (KW). | | | | | X | | | X | X | | |
| Crotalaria cunninghamii R.Br.<br>Dunes; Rudall River bed. | | | | | X | | X | X | | X | X |
| Erythrina vespertilio Benth.<br>Sand in valley, sandstone gorge (SE); banks of Rudall River. | | X | | | | | | X | | | |
| Indigofera ammobia Maconochie<br>On dunes. | | | | X | | X | | | | | |
| Indigofera colutea (Burm. f.) Merr.<br>Alluvials, Rudall River banks. | X | | | | | | | X | X | | |
| Indigofera georgei E. Pritzel<br>Sandy loam watercourse between sandstone ridges (KW); sandplain near rock outcrop (AR). | | | | | | | | | X | | X |
| Indigofera linifolia (L.f.) Retz<br>Dune. | | | | | | | | | | | X |
| Indigofera linnaei Ali<br>Rudall River banks. | | | | | | | | X | | | |
| Indigofera monophylla DC.<br>Sand over limestone (LG); snadplain (NS); Rudall River bed; sandy gravel on clay (AR). | X | | | | | | X | | | | X |
| Indigofera sp. ASM 1163<br>Dune. | | | | | | | | | | | X |
| Isotropis atropurpurea F. Muell.<br>Sandplain (NS); alluvial plain fringing scree (KW). | | | | | | | X | | X | | |
| Jacksonia aculeata W. Fitzg.<br>Sand plains and dunes. | | | | X | X | | X | | | | |
| Leptosema anomalum (Ewart & Morrison) Crisp<br>Sand, in wash area. | | | | | X | | | | | | |
| Leptosema chambersii F. Muell.<br>Loam with spinifex; also near Swindell Field. | | | | | | | X | | | | |
| Mirbelia viminalis (Cunn.) C. Gardner<br>Sandy gravel on clay. | | | | | | | | | | X | |
| Muelleranthus trifoliata (F. Muell.) Hutch. ex Lee<br>Sandplain. | | | | | | | X | | | | |
| Paratephrosia lanata (Benth.) Domin<br>Sandplain, adjacent Anketell Ridge. | | | | | | | | | | | |
| Psoralea martinii F. Muell. | X | | | | | | | | | | |
| Psoralea pustulata F. Muell.<br>Pebbly loam with Triodia; Rudall River bed. | | | | | X | | | X | | | X |
| Psoralea sp. ASG 14645<br>Dunes. | | | | | X | | | | | | |
| Rhynchosia minima (L.) DC.<br>Rudall River banks. | | | | | | | X | | | | |
| Sesbania cannabina (Retz.) Poiret<br>Loam flat. | | | | | | X | | | | | |
| Sesbania formosa F. Muell.<br>Freshwater swamp. | | | | | | X | | | | | |
| Swainsona kingii F. Muell.<br>Loam flat, Lake Auld. | | | | | | | | | | | |
| Swainsona microphylla A. Gray<br>Dune. | | | | | | | X | | | | |
| Templetonia incana J. Ross<br>Dunes; also near Lake Auld. | | | X | | X | | | | | | |
| Templetonia sp. ASM 1043.<br>Dune. | | | | | | | | | | X | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Tephrosia arenicola Maconochie<br>On sandy gravel plain (SF); sandstone and claystone ranges (NS); sandy gravel on clay (AR). | | | | X | | | X | | | | X |
| Tephrosia brachyodon Domin var. longifolia (Benth.) Domin<br>Sandplain. | | | | | | | X | | | | |
| Tephrosia rosea F. Muell. ex Benth.<br>Sand in valleys; Rudall River banks. | | X | | | X | | | X | | | |
| Tephrosia sphaerospora F. Muell.<br>Flats around salt pans; also dune near Lake Auld. | | | | | | | | | X | | |
| Tephrosia supina Domin<br>Sandy alluvium. | | | | | | | | | | | X |
| Tephrosia uniovulata F. Muell.<br>Sandplain. | | | | | | | | | | | X |
| Vigna lanceolata Benth. var. latifolia C. White<br>Sandplain. | | | | | | | X | | | | |
| NAIADACEAE | | | | | | | | | | | |
| Naius tenuifola R.Br.<br>Aquatic, in pool of Rudall River. | | | | | | | | X | | | |
| NYCTAGINACEAE | | | | | | | | | | | |
| Boerhavia diffusa L.<br>Dune, alluvial plains (KW); sandplain (AR). | | | | | | | | | X | | X |
| POLYGALACEAE | | | | | | | | | | | |
| Comesperma pallidum Pedley<br>Dunes; also SW of Gravity Lakes. | | | | X | X | | | | | | |
| Polygala linariifolia Willd.<br>Alluvial plain fringing ranges. | | | | | | | X | | | | |
| Polygala sp. ASM 568<br>Sandplain. | | | | | | | X | | | | |
| PORTULACACEAE | | | | | | | | | | | |
| Calandrinia balonensis Lindley<br>Sandplain. | | | | | | | X | | | | |
| Calandrinia eremaea Ewart<br>Rudall River bed. | | | | | | | | X | | | |
| Calandrinia pumila (F. Muell. ex Benth.) F. Muell.<br>Alluvial plain fringing ranges. | | | | | | | X | | | | |
| Calandrinia stagnensis J. Black<br>Alluvial flats. | | | | | | | | | X | | |
| Portulaca filifolia F. Muell<br>Rudall River bed. | | | | | | | | X | | | |
| Portulaca intraterranea J. Black<br>Sand in gully (SE). | X | X | | | | | | | | | |
| Portulaca oleracea L.<br>Alluvial plain fringing scree. | | | | | | | X | | X | | |
| Portulaca pilosa L. subsp. pilosa<br>Sand in gully. | | X | | | | | | | | | |
| PROTEACEAE | | | | | | | | | | | |
| Grevillea aff. eriostachya Lindley<br>Dune and sandplains; also SW of Gravity Lakes; hill country NW of NS. | | | | | X | | X | | X | | X |
| Grevillea pterosperma F. Muell.<br>Sandplain. | | | | | | | X | | | | |
| Grevillea pyramidalis Cunn.<br>Sandstone mesas. | | | | | X | | | | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| Grevillea refracta R.Br.<br>Dune and sandplain. | | | | | X | | | | | | |
| Grevillea stenobotrya F. Muell.<br>Common on duens; also caliche sandplain (LA); also 70 km E of Balfour Downs. | | | X | X | X | X | X | X | | X | X |
| Grevillea striata R.Br.<br>Sandy loam near creek. | X | | | | | | | | | | |
| Grevillea wickhamii Meissner<br>Sandstone gully (SE); base of dunes (TL,SF,DT); gravelly loam by creek (MH). sandplain, buckshot sandplain (NS); sandstone ridge and scree (RR); dune, sandplain, sandy gravel on clay (NR); also hill country NW of NS. Well 30. | | X | X | X | X | X | X | X | | | X |
| Hakea eyreana (S. Moore) McGillivray<br>Caliche sandplain (LA); dune (AR); also Well 30. | | | | | | | | | | X | X |
| Hakea macrocarpa Cunn. ex R.Br.<br>Sandplain. | X | X | | | | | | | | | |
| Hakea rhombales F. Muell.<br>Dune, sandplain. | | | | | | | X | | | | |
| Hakea suberea S. Moore<br>Sandplains; also hill country NW of NS. | | | | | X | X | X | X | | | X |
| Persoonia falcata R.Br.<br>In sandy loam with spinifex; also near Swindell Field. | | | | | X | | | | | | |
| RUBIACEAE | | | | | | | | | | | |
| Borreria auriculata F. Muell.<br>Dunes. | | | | | X | X | | | | | |
| Canthium latifolium F. Muell. ex Benth.<br>Sandplain; rockhole S of RR. | | | | | | | X | | | | |
| Gardenia pyriformis Cunn. ex Benth.<br>W of AR. | | | | | | | | | | | |
| Gardenia sp. ASG 14658<br>Dune and sandplain. | | | | | X | | | | | | |
| Oldenlandia galioides (F. Muell.) F. Muell.<br>Sandstone gorge. | | X | | | | | | | | | |
| Oldenlandia sp. ASM 752<br>Dunes (NS,AR); Rudall River bed. | | | | | | | X | X | | | X |
| SANTALACEAE | | | | | | | | | | | |
| Anthobolus leptomerioides F. Muell.<br>Alluvial plain fringing ranges. | | | | | | | X | | | | |
| Exocarpos sparteus R.Br.<br>Dune; also E of Well 45. | | | | | | | X | | | | |
| Santalum acuminatum (R.Br.) DC.<br>Sandplains; Rudall River bed; also Well 30. | | | | | | | X | X | X | X | |
| Santalum lanceolatum R.Br.<br>Sand flats (SF,DT); dune (AR); also hill country NW of NS; rockhole S of RR; Well 30. | | | | X | | X | | | | | X |
| SAPINDACEAE | | | | | | | | | | | |
| Diplopeltis stuartii F. Muell. var. glandulosa A.S. George<br>Sandplain; Loam on plain, E of Swindell Field. | | | | | | | X | | | | |
| Dodonaea coriacea (Ewart & Davies) McGillivray<br>Hill country NW of NS. | | | | | | | | | | | |
| Dodonaea peduncularis Lindley<br>Dunes. | | | | | X | X | | | | | |
| Dodonaea petiolaris F. Muell<br>Hill country NW of NS. | | | | | | | | | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| SCROPHULARIACEAE | | | | | | | | | | | |
| Buchnera linearis R.Br. | | | | | | | | | | | |
| Rudall River bed. | | | | | | | | X | | | |
| Glossostigma diandrum (L.) O. Kuntze | | | | | | | | | | | |
| Sand by pool. | | X | | | | | | | | | |
| Mimulus linearis (R.Br.) Wettst. | | | | | | | | | | | |
| Clay at Well 33. | | | | | | | | | | | |
| Morgania floribunda Benth. | | | | | | | | | | | |
| Saline flat and on sandplain; Rudall River bed. | X | | | | | | | X | | | |
| Stemodia lythrifolia F. Muell. ex Benth. | | | | | | | | | | | |
| Sandstone scree. | | | | | X | | | | | | |
| SOLANACEAE | | | | | | | | | | | |
| Duboisia hopwoodii F. Muell. | | | | | | | | | | | |
| Dunes. | | | | | X | X | | | | | X |
| Nicotiana benthamiana Domin | | | | | | | | | | | |
| Under sandstone overhang; also caves on Anketell Ridge. | | X | | | X | | | | | | |
| Nicotiana simulans N. Burb. | | | | | | | | | | | |
| Hill country NW of NS. | | | | | | | | | | | |
| Solanum chippendalei Symon | | | | | | | | | | | |
| Sandplain; also Anketell Ridge. | | | | | | | X | | | | |
| Solanum cleistogamum Symon | | | | | | | | | | | |
| Sandy alluvium; also Well 30. | | | | | | | | | | | X |
| Solanum diversiflorum F. Muell. | | | | | | | | | | | |
| Sandplains and dunes. | X | | | | X | X | | | | | X |
| Solanum gilesii Symon | | | | | | | | | | | |
| Dunes; also Well 30. | | | X | X | | | | | | | |
| Solanum lasiophyllum Dunal | | | | | | | | | | | |
| Alluvial plains fringing ranges (NS,KW); Rudall River banks. | | | | | | | X | X | X | | |
| Solanum petrophilum F. Muell. | | | | | | | | | | | |
| Sandstone scree. | | | | | X | | | | | | |
| Solanum sp. ASM 655 | | | | | | | | | | | |
| Alluvial plain fringing ranges. | | | | | | | X | | | | |
| STACKHOUSIACEAE | | | | | | | | | | | |
| Macgregoria racemigera F. Muell. | | | | | | | | | | | |
| Alluvial plain fringing ranges. | | | | | | | X | | | | |
| Stackhousia viminea Smith | | | | | | | | | | | |
| Gravelly sand in swale (SF); sandplain (NS). | | | | X | | | X | | | | |
| STERCULIACEAE | | | | | | | | | | | |
| Keraudrenia sp. ASM 609, 782, 1176 | | | | | | | | | | | |
| Gully (RR); dune (AR); also hill country NW of NS. | | | | | | | | X | | | X |
| Melhania oblongifolia F. Muell. | | | | | | | | | | | |
| Sandplains; also Well 30. | | | | | | | X | | | | |
| Rulingia loxophylla F. Muell. | | | | | | | | | | | |
| Sandplain. | | | | | | | | | | | X |
| Rulingia rotundifolia Turcz. | | | | | | | | | | | |
| Sandstone ridge and scree. | | | | | | | | X | | | |
| Rulingia sp. ASM 747 | | | | | | | | | | | |
| Sandstone ridge and scree. | | | | | | | | X | | | |
| Waltheria indica L. | | | | | | | | | | | |
| Sandy creek banks. | X | X | | | | | | | | | X |
| Waltheria virgata Ewart & Cookson | | | | | | | | | | | |
| Sandy creek banks (SE); sandstone ridge and scree (RR). | | X | | | | | | X | | | |

| SPECIES | SITE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LG | SE | TL | SF | MH | DT | NS | RR | KW | LA | AR |
| STYLOBASIACEAE | | | | | X | | | | | | |
| Stylobasium spathulatum Desf. Sandplain (NS); dune, sandplain, alluvials (KW); also hill country NW of NS. | | | | | | | X | | X | | |
| THYMELAEACEAE | | | | | | | | | | | |
| Pimelea ammocharis F. Muell. Swale. | | | | | X | | | | | | |
| TILIACEAE | | | | | | | | | | | |
| Corchorus sidoides F. Muell. Edge of sandstone gorge (SE); sand in valley (SE); sandplain with spinifex (MH); on dune (DT); alluvial plain fringing scree (KW); sandplain (AR). | | X | | | X | X | | | X | | X |
| Corchorus tridens L. Rudall River bed. | | | | | | | | X | | | |
| Corchorus walcottii F. Muell. Hill country NW of NS. | | | | | | | | | | | |
| Triumfetta micracantha F. Muell. Sandstone scree. | | | | | X | | | | | | |
| Triumfetta sp. ASM 1116 Sandplain. | | | | | | | | | | | X |
| Triumfetta sp. ASM 688 Hill country NW of NS. | | | | | | | | | | | X |
| VERBENACEAE | | | | | | | | | | | |
| Clerodendrum floribundum R. Br. Dune (LG); edge of sandstone gorge (SE); sand on creek-line (MH). | X | X | | | X | | | | | | |
| Cyanostegia cyanocalyx (F. Muell.) C. Gardner Dunes; also at Lake Auld. | | | | | X | | | | | | |
| VIOLACEAE | | | | | | | | | | | |
| Hybanthus aurantiacus (F. Muell. ex Benth.) F. Muell. Sand in valley (SE); sandplain (NS); alluvial plain fringing scree (KW). | | X | | | | | X | | X | | |
| ZYGOPHYLLACEAE | | | | | | | | | | | |
| Kallstroemia hirsuta (Benth.) Enge. Sand over calcrete near creek. | X | | | | | | | | | | |
| Kallstroemia platyptera (Benth.) Engl. Hill country NW of NS. | | | | | | | | | | | |
| Tribulus macrocarpus F. Muell. ex Benth. Alluvial plain fringing ranges (NS); sandy alluvium (AR). | | | | | | | X | | | | X |
| Tribulus occidentalis R.Br. Saline flat. | | | X | | | | | | | | |
| Tribulus terrestris L. Rudall River banks; sandy loam watercourse between sandstone ridges. | | | | | | | | X | X | | |
| Zygophyllum compressum J. Black Saline flat, Lake Auld. | | | | | | | | | | X | |
| Zygophyllum sp. ASM 1025. Swale; also Well 30. | | | | | | | | | | | X |

## PART III

## MAMMALS

by N.L. McKenzie[1] and W.K. Youngson[2]

### INTRODUCTION

This account is a synthesis of available mammal records from the Great Sandy Desert and certain adjacent areas of Western Australia. It incorporates mammal records collected during five visits to the Great Sandy Desert since 1976 - four are described in McKenzie et al., (this publication), the fifth (September 1980) is detailed in McKenzie and Kenneally (1981). All mammals collected have been lodged in the Western Australian Museum with the accession numbers quoted in text (prefix "M"); specimens submitted to the W.A. Museum but not yet accessed are listed according to their field numbers (prefix "FW" or "MH").

Prior to 1977, available mammal records from the Great Sandy Desert comprised incidental captures by the occasional travellers (usually explorers, geologists or ornithologists). The one large and reasonably comprehensive collection was made by Otto Lipfert and his colleagues during the Canning Stock Route Expedition of 1930 to 1931. The specimens collected during this 18 month trip are a matter of record, being held in the collections of the South Australian and Western Australian Museums. Lipfert's covering letter, detailing his general impressions of the expedition, is included as Appendix 3.

This paper details the known species composition of the Great Sandy Desert mammal fauna since European settlement, discusses the distributions of the component species within the desert and in relation to adjacent areas, and finally, speculates on changes that have occurred since European settlement.

Techniques of mammal survey during our 1977 - 1980 field work were different from those listed in McKenzie et al. (1979) because less emphasis was placed on metal traps (cage, medium sized Elliott, and break-back). Pit traps with drift fences were the principal collecting technique. In all, 5633 metal trap-nights and 190 pit-fence nights were effected. Each pit-fence consisted of a 50 metre long wall of flywire approximately 300 mm high; six pit traps (2 x 600 mm deep x 125 mm outside diameter and 4 x 450 mm deep x 125 mm diameter) were set in the ground at regular (10 metre) intervals along the fence.

Campsite locations for the 1979 expedition were pre-selected using available maps of superficial geology and vegetation; their proximity to a variety of important environmental mozaics and the need for representation of all accessable sectors of the desert were the primary considerations.

Trapping effort (see Table 1) was proportionally divided between the different habitat mozaics (depending on their local importance) convenient to each of the ten different campsites visited. Sample site locations, brief descriptions and complete trap effort figures are listed in Appendix 1. Detailed environmental descriptions for sample sites near nine of the campsites are provided in McKenzie et al. this publication. Sites near the tenth campsite (coded as D3) are described in McKenzie and Kenneally (1981) and detailed in Appendix 4. Sample site descriptions are all cross-referenced to the habitat codes provided in the annotated list of mammal species, and Appendix 1.

Bats were collected by spotlight-shooting techniques, mist-netting and foraging in caves as outlined in previous publications in this series.

In the annotated list of species the following data are presented:

(i) Species name.
(ii) Male and female specimens collected since 1977 are listed and coded to trapline location and habitat descriptions (which include dates) in either McKenzie et al. (this publication) or Appendix 4.
(iii) A synthesis of habitats from which the species was recorded (an overall summary is provided in Appendix 1).
(iv) Breeding data for the 1977, 1979, and 1980 specimens. Where of interest this is discussed in the context of populations elsewhere in the arid zone.
(v) Taxonomic comments and tabulated measurements for native species collected post-1977.
(vi) Previous records of species not recorded in the Great Sandy and north end of the Little Sandy Desert during the 1977 to 1980 work, along with specimen number, localities, dates, sources of information, reproductive and taxonomic notes and measurements as relevant.

External measurements quoted include N (number of specimens measured), W (weight in grams), HV (head to vent length, mm), TV (tail to vent length), F/A (radius length), E (ear tip to canal, stretched),

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Ti + P (tibia + pes length), St (maximum length of supertragus), HF (length of hind foot, no claw). Only body weight is taken as a fresh measurement; the others are from spirit specimens. The standard cranial measures quoted mainly follow Davis and Baker (1974). For rodents and Taphozous, the braincage depth measure follows Handley (1959); for other species it is the distance between the ventral surface of the condyles and the point of intersection of the saggital and lambdoid crests. Dasyurid cranial measurements follow Archer (1976). The measure "skull height at posterior edge of palate" follows Felten (1964).

**Table 1. Trap effort figures summarized from Appendix 1**

| Environmental Mozaic | Trapping Effort | |
|---|---|---|
| | Pit-fence Nights | Metal Trap Nights |
| Sandplains | 81 | 1496 |
| Sand Dunes | 73 | 1289 |
| Sedimentary Hills and Ranges | - | 614 |
| Alluvial Sandy Loam (on Clay) as Plains, Floodplains, River Levees, Valley Floors, Fringing Ranges, Lakes or Undulating Stony or Lateritic Country | 24 | 1939 |
| Samphire Flats | 12 | 295 |
| | 190 | 5633 |

## ANNOTATED SPECIES LIST

### MACROPODIDAE

Megaleia rufa (Desmarest). **Red Kangaroo**

NS1 (1 seen), NS5 (1 seen), AR38 (2 seen), AR49 (2 seen), DT44 (scat and hair), BD (5 seen).

Alluvial areas along drainage lines and fronting ranges; buckshot plain. Mostly grazing on bunch grasses.

Female at AR38 had a medium-sized pouch joey (15 May 1979).

Macropus robustus Gould **Euro**

MH41 (1 seen), SE14 (1 seen), AR39 (1 seen), RR15 (skeletal), NS7 (2 seen), KW22 (1 seen), KW23 (1 seen).

Sedimentary ranges and mesas throughout the deserts.

Onychogalea unguifera (Gould) **Northern Nail-tailed Wallaby, Karrabul**

LG (1 seen and hair from scats under spinifex hummock in May 1979). LG10B : FW5150 male; LG10C : FW5148 female, FW5149 male.

Recorded only on the sandy clay plains around Lake Gregory where Acacia, herbs and tussock grasses were the predominant cover. Diurnal shelter under Triodia hummocks.

FW5149 (12 June 1980) had one nipple enlarged and a pouch joey (FW5149) weighing 294 g.

Lagorchestes hirsutus (Gould) **Rufous Hare-Wallaby, Mala**

Last recorded in the Great Sandy Desert in 1931 when Otto Lipfert (Appendix 3) described this Hare Wallaby as the most common mammal; he collected six adults and three young on the Canning Stock Route and pointed out that "around the old camps of the natives the bones of this little wallaby were the proof of their being the principal food."

The South Australian Museum has five of these specimens: M1466, Canning Stock Route Well 28; M1467, Well 29; M1468, Well 44; M1469 and M1470, Well 45. The Western Australian Museum specimens are: M1471 and M1472 from the vicinity of Lake Disappointment in the Little Sandy Desert; M1464 and M1465, Well 26, Great Sandy Desert.

Measurements are presented in Table 2.

### PHALANGERIDAE

Trichosurus arnhemensis Collett **Northern Brush-tail Possum**

Although recorded as hair material in dingo scats collected in an interdune swale south of the Edgar Ranges in 1976 (Youngson, Henry and McKenzie 1981), this species has not been recorded in inland parts of the Great Sandy Desert since 1931 when Otto Lipfert caught two specimens. Not known from the Little Sandy Desert.

One was caught "on a spinifex flat near a gum tree nine miles from any water" near Canning Stock Route Well 43 and is lodged in the South Australian Museum (M1473). The other (M1474), lodged in the Western Australian Museum, was speared near Billiluna in the Sturt Creek area (Table 2).

Table 2. External and cranial measurements of Lagorchestes hirsutus and Trichosurus arnhemensis

| | L. hirsutus | | | T. arnhemensis | |
|---|---|---|---|---|---|
| Specimen Number | M1471 | M1465 | M1464 | M1473* | M1474 |
| Sex | M | F | F | - | F |
| HV | 335 | 380 | 316 | 335 | 348 |
| TV | 274 | 264 | 278 | 238 | 245 |
| HF | 102 | 113 | 105 | 50 | 41 |
| E | 55 | 55 | 55 | 47 | 49 |
| Condylo-basal Length | 62.1 | 65.4 | 65.6 | - | - |
| Inter-orbital Width | 12.3 | 12.1 | 11.4 | - | - |
| Zygomatic Width | 39.8 | 41.8 | 40.7 | - | - |
| Maximum Bullae Length | 12.9 | 12.5 | 12.9 | - | - |
| $PM^1$ to $M^4$ | 22.5 | 25.0 | 23.9 | - | - |
| $C^1$ to $M^4$ | - | - | - | - | - |
| Upper Molar Row | 19.5 | 19.8 | 19.7 | - | - |
| $RM^3$ to $LM^3$ | 20.4 | 21.4 | 22.6 | - | - |
| Skull Depth | 26.2 | 27.9 | 27.0 | - | - |

*Measurements from label - may not correspond to standard measurements.

THYLACOMYIDAE

Macrotis lagotis (Reid) **Dalgyte, Bilby**

AR38: tracks, scats, diggings and hair material were collected at this site during the 1979 and 1980 visits. The identification is based on the distinctive cross-sectional morphology of the guard hairs found in the scats. Burrows, tracks and scats were also recorded in 1976 by Youngson et al. (1981) in dune country south of the Edgar Ranges at their D1 and D2 campsites. More recently Dr W.J. Peasley (pers. comm.) recorded burrows and tracks just east of the south-eastern corner of Lake Guli (21°19'S 125°53'E, 14 July 1982) and 8 kilometres west of Helena Spring (21°21'S 126°34'E, 15 July 1982).

Recent records from the far north-western fringes of the desert near Mount Phire, and in the Edgar Ranges area, suggest an association with alluvial surfaces, rather than sandplains and dunes. The AR38 material was in an alluvial area along a drainage line.

Older collecting localities are known from this desert - recorded by Lipfert. A South Australian Museum specimen (M1492) was obtained near Sturt Creek in 1931. The Western Australian Museum lists a specimen (M1491) from the central sector of the desert, near King Hill, in the vicinity of Well 33, collected in September 1930. In the original list of mammals collected during the "Canning Expedition" (W.A. Museum file A174/72), M1491 is listed as coming from the Sturt Creek area.

PERAMELIDAE

Perameles eremeana Spencer **Orange-backed Bandicoot, Walilya**

Not recorded in the Great Sandy Desert since 1943. Available specimens were collected in 1931 at Well 46 (M1489) and in September 1943 at Well 35 (M2629 to M2631). These specimens are lodged in the Western Australian Museum. There are no records from the Little Sandy Desert.

Measurements are presented in Table 3.

Isoodon auratus (Ramsay) **Golden Bandicoot, Wintaru**

Not recorded in these deserts since 1931.

The only records of this species from the Great Sandy Desert were collected at wells along the Canning Stock Route in 1930 and

1931 by Otto Lipfert. These specimens are held in the collections of both the Western Australian Museum and the South Australian Museum but all have Western Australian Museum accession numbers:

M1475 male, M1476 female, Sept. 1930 (Well 31); M1477 female, Oct. 1930 (Well 32); M1478 male, 1931 (Well 33); M1479 male, M1480 male, 1931 (Well 41); M1481 male, 1931 (Well 43); M1482 female, M1483 female, M1484 female, M1485 male, 1931 (Well 44); M1487 male, M1488 female, June 1931 (near Well 44); M1486 male, April 1931 (Well 45); M1489, M1490 (Well 46).

M1477 was caught on a sandhill near Well 32.

External and cranial measures of adult specimens are included in Table 3, but most of the skulls are broken or sub-adult.

**Table 3. Measurements of Perameles eremeana and Isoodon auratus**

| | P. eremeana | I. auratus | | |
|---|---|---|---|---|
| Specimen Number | M2629 | M1487 | M1475 | M1476 |
| Sex | F | M | M | F |
| HV | 204 | 210 | 210 | 220 |
| TV | 121 | 110 | 102 | 88 |
| HF | 51 | 42 | 42 | 42 |
| E | 39 | 28 | 25 | 22 |
| Condylo-basal L. | 59.8 | 49.6 | - | - |
| Inter-orbital W. | 12.0 | 11.4 | - | - |
| Post-zygomatic W. | 29.4 | - | - | - |
| Maximum Bulla L. | 7.5 | 11.6 | - | - |
| $C^1$ - $M^4$ | 25.7 | 20.0 | - | - |
| Upper Molar Row $RM^3$ - $LM^3$ | 11.1 | 10.0 | - | - |
| | 14.8 | 14.7 | - | - |
| Skull Depth | 15.0 | 15.0 | - | - |

DASYURIDAE

Dasyurus geoffroii Gould. **Western Native Cat**

Not recorded in these deserts since 1931 when Lipfert collected a single specimen near Well 46 on the Canning Stock Route. The specimen is held in the Western Australian Museum (M1494).

Measurements are presented in Table 4.

Dasycercus cristicauda (Kreft) **Mulgara**

Not encountered during the post-1977 work. Following heavy rains in late summer of 1931 Otto Lipfert recorded this species at "nearly every camp" along the Canning Stock Route; he collected a total of fifty-two specimens in early 1931. M2641 was subsequently collected in September 1943 near Well 45 on the Canning Stock Route.

**Table 4. Measurements of Dasyurus geoffroii, Dasycercus cristicauda and Antechinomys laniger**

| | D. geoffroii | Dasycercus cristicauda | | | A. laniger |
|---|---|---|---|---|---|
| Specimen Number | M1494 | M1513 | M1496 | M1498 | M1546 |
| Sex | F | M | M | F | F |
| HV | 266 | 157 | 142 | 135 | 68 |
| TV | 242 | 105 | 78 | 76 | 108 |
| HF | 50 | 30 | 29 | 27 | 25 |
| E | 47 | 26 | 25 | 23 | 15 |
| Condylo-basal Length | 63.5 | 39.7 | 35.7 | - | 25.5 |
| Inter-orbital Width | 10.2 | 12.4 | 12.1 | - | 5.0 |
| Post-zygomatic Width | 25.0 | 22.4 | 19.7 | - | 10.2 |
| Maximum Bulla Length | 11.8 | 14.2 | 13.4 | - | 7.5 |
| $C^1$ - $M^4$ | 27.3 | 15.3 | 13.6 | - | 10.0 |
| Upper Molar Row $RM^3$ - $LM^3$ | 17.0 | 10.0 | 8.5 | - | 5.4 |
| | 22.6 | 13.4 | 12.3 | - | 8.4 |
| Skull Depth | 26.5 | 9.8 | 8.8 | - | 7.4 |

The Western Australian Museum has accession numbers for Lipfert's entire collection (M1495-M1544) although half the collection is held in the South Australian Museum. Specimens were collected at Canning Stock Route Wells 26 to 29, 31, 33 to 36, 41 to 47, and 49.

Females with three to six pouch young were recorded in the months of July, August and October 1930.

Measures of adults are presented in Table 4.

Phascogale calura Gould **Red-tailed Wambenger**

A specimen was caught near Well 44 in May 1931 by Otto Lipfert. The specimen (M1545) is lodged in the South Australian Museum. No subsequent records are available from these deserts.

Antechinomys laniger (Gould) **Kultarr, Wuhl-Wuhl**

At the northern end of the Canning Stock Route (near Sturt Creek), Lipfert caught an adult female in a trap on a wet stormy night in March 1931. The specimen, M1546, is held in the Western Australian Museum.

Measurements are presented in Table 4.

Antechinus macdonnellensis (Spencer) **Red-eared Antechinus**

LA27: FW1042 male from a pit fence.

During our earlier surveys in deserts further south, this species was collected only in ranges; despite a number of trapping attempts in apparently similar habitat (appropriate ranges and breakaways) in various parts of the Great Sandy Desert, the only specimen collected was in a caliche sandplain with numbers of large termitaria. The species has previously been recorded in termitaria (P. Woolley, pers. comm.).

This arid zone species has not previously been recorded in the Great Sandy Desert but was predictable considering its presence in arid areas such as the Pilbara, Gibson Desert and adjacent areas in the Northern Territory.

Measurements are included in Table 5.

**Table 5. External and cranial measurements of Antechinus macdonnellensis and A. rosamondae from the Great and Little Sandy Deserts**

| | A. macdonnellensis* | A. rosamondae | | | |
|---|---|---|---|---|---|
| Specimen No. | FW1042 | FW1038 | FW0977 | FW0964 | FW1041 |
| Sex | M | F | F | ? | F |
| Weight | 33.0 | 20.0 | 25.0 | - | 26.0 |
| HV | 83.0 | 84.6 | 80.6 | - | 91.3 |
| TV | 80.1 | 63.2 | 59.6 | - | 57.2 |
| E | 20.2 | 12.6 | 13.8 | - | 13.2 |
| HF | 14.4 | 17.0 | 16.6 | - | 16.7 |
| Basicranial Length | 25.00 | 24.05 | 23.68 | 25.50 | - |
| Zygomatic Width | 15.77 | 15.60 | 15.51 | 17.79 | - |
| Outside Bulla Width | 11.00 | 11.21 | 11.71 | 11.61 | - |
| Inside Bulla Width | 2.47 | 2.75 | 3.00 | 2.70 | - |
| $C^1$ - $M^4$ | 9.90 | 9.77 | 9.64 | 9.54 | - |
| $M^1$ - $M^4$ | 6.24 | 6.44 | 6.37 | 6.24 | - |
| $M^1$ - $M^3$ | 5.72 | 5.72 | 5.70 | 5.51 | - |
| $RM^3$ - $LM^3$ | 8.96 | 8.91 | 9.17 | 8.97 | - |
| Inter-orbital Width | 5.14 | 5.65 | 5.51 | 5.88 | - |
| Skull Depth | 6.37 | 6.90 | 7.51 | 7.64 | - |

*Young animal.

Antechinus rosamondae Ride **Little Red Antechinus**

NS: FW0964 as skeleton from tree spout in habitat resembling site NS4; RR9: FW0977 female from pit fence; LA31: FW1038 female from pit fence; LA28: FW1041 female from breakback.
All specimens came from sandplain situations (Appendix 1). Although spinifex was present in all cases, the overstorey elements were not consistent ranging from shrubs to scattered eucalypts.

The skeleton from the eucalypt tree spout was complete, undamaged, and lying on top of a leaf nest made of dry eucalyptus leaves. Other, more fragmentary, bone material was found in the nest under the skeleton; small lizard, bird and mammal (Notomys alexis : FW0965) cranials were recognisable. As the ant-cleaned Antechinus skeleton was complete, partially articulated, showed no sign of damage, and belonged to a very old animal (tooth wear, cranial crest development), we suggest that the animal died in its own nest and the other bones are prey species of this small active carnivore.

None of the three females collected in late April or early May were pregnant. The pouch area was recognisable as a faint shallow depression with tiny but visible teats in all specimens; all had uteri 1.1 to 1.4 mm in diameter.

Measurements are included in Table 5 and are comparable to those listed for Pilbara specimens by Ride (1964).

Previously known only from the Pilbara and near Nooloo Soak in the Little Sandy Desert; our records from central and southern parts of the Great Sandy Desert suggest a much wider range.

Sminthopsis macroura (Gould) **Larapinta**

LA25 : FW1027 female, FW1028 female from pit-fence; LA26: FW1044 male from pit-fence; LG8: FW5022 female from Elliott trap.

All specimens came from samphire formations on duplex saline loam over clay surfaces associated with salt lakes (Table 19).

The two Lake Auld females were not pregnant. They had 1.0 to 1.2 mm (diameter) uteri and circular, lipped pouches with distinct but small teats; no milk could be expressed. In contrast, the female from Lake Gregory had sub-adult uteri 0.3 mm in diameter; 8 teats were visible but no pouch development was present. The Lake Auld male had scrotal testes 5 mm long.

Measurements are included in Table 6.

Sminthopsis youngsoni McKenzie & Archer **Lesser Hairy-footed Dunnart**

NS3: M22613 male; NS4: M22612 female; NS5: M22624 female, M22620 male; KW17: FW1005 male, and one released; KW18: M22623 male; KW20: M22626 male, M22625 female; LA26: M22614 male; LA28: M22621 male; LA31: M22622 male; AR36: M24551 male; D3/3: M24552 male, M22609 female; D3/5: M22608 male, M22610 female; LG7: M22618 male; BD10D: M22619 female; LT22: M22617 female; SF24: M22616 male; SF25: M22615 male. All the foregoing were caught in pit-fences. Two additional specimens were collected in pit traps at Wormys Well (23°04'S 125°16'E) in the Gibson Desert - M22627 and FW1070.

Recorded throughout the Great Sandy Desert and northern edge of the Little Sandy and Gibson Deserts. Most specimens came from dunes and sandplains although specimens were also recorded on buckshot plain, sandy alluvial flats between ranges and sand dune country, and from samphire flats where these were immediately adjacent to sandy surfaces. Recorded in a wide variety of those plant formations associated with the sandplain and dune surfaces including shrubs, herbs and hummock grasses (see appropriate habitat codes in McKenzie et al., this publication).

All 12 males collected during April/May 1979 had scrotal testes 3 to 4 mm long. The four females recorded during the same period all had bilaterally symmetrical uteri 1.0 to 1.2 mm in diameter; two of these had a tiny pouch area with six minute teats but none were lactating. The female collected in June 1980 (M22619) showed no uterine development and had a pouch area with tiny teats. In M22619 the anterior lip of the pouch was well formed. The reproductive condition of the September 1980 specimens, which included pregnant females, is described in Youngson et al. (1981).

Measurements of young adults are presented in Table 6 and can be compared with measurements in McKenzie and Archer (1982).

Sminthopsis hirtipes Thomas **Hairy-footed Dunnart**

Only four specimens have been recorded in the Great Sandy Desert - all by Lipfert ca. 1930 at Well 29 on the Canning Stock Route. Their Western Australian Museum numbers are M1547 to M1550.

Adult measures are presented in Table 6.

Ningaui cf. ridei Archer **Inland Ningaui**

NS3: M22678 male; KW21: M22673 female; LA27: M22674 male, FW1033 female; LA28: M22675 female, FW1024 male, M22676 female; LA29: FW1025 male; LT22: M22677 male. All from pit-fences.

**Table 6. Measurements of adult Sminthopsis macroura, S. youngsoni and S. hirtipes from the Great Sandy Desert**

| Sex | N | HV | TV | E | HF | W |
|---|---|---|---|---|---|---|
| S. macroura | | | | | | |
| F | 3 | 62.4(60.4-64.8) | 74.3(65.0-80.5) | 18.6(17.2-20.3) | 14.8(14.5-15.0) | 12.2(10.5-13.0) |
| M | 1 | 59.5 | 89.3 | 19.3 | 15.8 | 13.5 |
| S. youngsoni | | | | | | |
| M | 3 | 65.9(63.5-69.8) | 63.9(61.2-67.4) | 17.9(16.8-19.1) | 13.4(13.2-13.5) | 9.2(8.5-10.0) |
| S. hirtipes | | | | | | |
| F | 1 | 68 | 80 | - | 17.0 | - |
| M | 1 | 76 | 92 | - | 18.5 | - |

| | Sminthopsis macroura | | Sminthopsis youngsoni | | |
|---|---|---|---|---|---|
| Specimen Number | FW5022 | FW1027 | FW1005 | FW1054 | M22621 |
| Sex | F | F | M | M | M |
| Basicranial Length | 19.94 | 20.31 | 20.45 | 20.31 | 20.80 |
| Outside Bullae Distance | 8.74 | 9.08 | 8.40 | 8.50 | 8.85 |
| Inside Bullae Distance | 2.93 | 3.00 | 2.70 | 2.52 | 2.74 |
| $C^1$ - $M^5$ | 8.65 | 8.87 | 8.38 | 8.45 | 8.61 |
| $M^2$ - $M^5$ | 5.15 | 5.29 | 4.76 | 4.85 | 4.79 |
| $LM^4$ - $RM^4$ | 8.02 | 7.45 | 6.80 | 6.80 | 6.95 |
| Inter-orbital Width | 3.77 | 3.99 | 4.51 | 4.43 | 4.06 |
| Post-zygomatic Width | 9.68 | 9.91 | 9.68 | 9.65 | 9.90 |
| Skull Depth | 5.85 | 5.64 | 6.28 | 6.46 | 6.29 |

From southern and central parts of the Great Sandy Desert and the northern end of Little Sandy Desert. Best trap results were on caliche sandplains near Lake Auld in association with huge tussocks of Triodia longiceps. Also recorded on well vegetated dunes at Nooloo Soak, Lake Auld and Lake Tobin and in a floodway in deep red sand near Karara Well; deep red sand and tussocks of Plectrachne schinzii were common to these localities.

All specimens were collected during the April/May 1979 trip. None of the four females were lactating; all had seven tiny but distinct teats but no pouch development. Bilaterally symmetrical uteri were observed in all cases; diameters varied from individual to individual: M22673 (0.7 mm), M22675 (1.7 mm), FW1033 (1.0 mm) and M22676 (1.3 mm). All five males had scrotal testes 3.5 to 5 mm long.

A selection of measurements are presented in Table 7 for comparison with appropriate measures from Archer (1975). In external and cranial characters our specimens are a mixture of Archer's Ningaui ridei and N. timealeyi diagnostic features; in some cases intermediate features can be recognised. Overall the skulls are much closer to N. ridei if allowance is made for age differences - Archer described this species from two sub-adult specimens. The specimens in our collection are generally larger than dimensions listed by Archer for either species. All our specimens had tail-vent greater than head-vent - a N. timealeyi character. However, hind foot pad characters followed Archer's N. ridei as did ratios of hind foot to head-vent lengths (Table 8). In contrast, supertragus to ear length ratios correspond to N. ridei in some instances (M22675, FW1033, M22676), to N. timealeyi in others (M22678, M22673, M22677) and were intermediate in the remainder (M22674, FW1024).

**Table 7.** External and cranial measurements of adult Ningaui cf. ridei and Planigale ingrami from the Great Sandy Desert

| Sex | N | HV | TV | HF | E | St | W |
|---|---|---|---|---|---|---|---|
| Ningaui sp. | | | | | | | |
| M | 2 | 64.6,60.9 | 67.3,65.6 | 13.2,12.6 | 12.5,12.0 | 3.0,3.1 | 7.0,6.5 |
| F | 1 | 61.3 | 68.5 | 12.7 | 12.9 | 2.7 | 7.0 |
| Planigale ingrami | | | | | | | |
| M | 2 | 65.0,62.1 | - , 65.8 | 9.1,9.4 | 9.7,9.5 | 3.0,2.8 | 9.5,8.0 |
| F | 1 | 54.1 | 58.4 | 9.1 | 9.7 | 3.1 | 5.5 |

| | Ningaui cf. ridei | | P. ingrami | | |
|---|---|---|---|---|---|
| Specimen Number | M22674 | M22675 | FW5052 | FW1059 | FW1060 |
| Sex | M | F | M | M | M |
| Basicranial Length | 18.66 | 18.38 | 18.05 | 18.26 | 18.47 |
| Outside Bullae Distance | 8.49 | 8.00 | 8.35 | 8.26 | 7.65 |
| Inside Bullae Distance | 2.00 | 1.55 | 1.85 | 2.80 | 2.90 |
| $C^1 - M^4$ | 7.07 | 7.02 | 7.29 | 6.86 | 6.92 |
| $M^1 - M^4$ | 4.15 | 4.21 | 4.39 | 4.23 | 4.28 |
| $M^1 - M^3$ | 3.55 | 3.64 | 3.78 | 3.67 | 3.68 |
| $RM^3 - LM^3$ | 6.38 | 6.35 | 6.07 | 6.37 | 6.27 |
| Inter-orbital Width | 3.74 | 3.40 | 3.78 | 4.09 | 4.31 |
| Max. Nasal Length | 6.18 | 6.37 | 6.69 | 7.45 | 7.91 |
| Max. Nasal Width | 1.49 | 2.14 | 1.76 | 3.33 | 3.22 |
| Min. Nasal Width | 1.17 | 1.46 | 1.49 | 1.16 | 1.24 |
| Skull Depth | 5.34 | 5.18 | 5.56 | 3.99 | 4.22 |
| Zygomatic Width | 11.38 | 10.88 | 10.96 | 10.40 | 10.44 |
| Bulla Length | - | - | - | 4.75 | 4.80 |

A closer examination of the Alispheroid Tympanic Wing and of the Bullae of the six skulls cleaned - see Plate 29 in Archer (1975) - shows all (M22674-5, M22676 FW1035, M22677 and M22678) correspond to N. ridei. Only M22678 has parallel sided nasal bones as in N. ridei; the other five skulls examined have expanded nasals as in N. timealeyi. In all but M22676 the paracrista of $M^4$ is greater or equal to that of $M^3$ - a N. timealeyi character. In $I^2$ and $I^4$ size relationships M22678, M22673, M22674, FW1033 and M22676 correspond to N. ridei while M22677 appears intermediate though $I^2$ is somewhat recurved as in N. ridei.

Planigale ingrami (Thomas) **Ingram's Planigale**

AR37: FW1059 male; AR38: FW1060 male, FW1061 female. All from pit-fences.

Sandy gravel to sandy loam over clay on Anketell Ridge; both sites were mixed shrubland - spinifex (Triodia pungens) situations.

All specimens were collected in May 1979. Both males had scrotal testes 5 to 6 mm long. The female was not lactating; its teats were very tiny. A swelling (0.5 mm diameter) was present in each uterine horn.

A selection of the cranial and external measures listed by Archer (1976) are

presented in Table 7; all the ratios he used were calculated in determining our collection. The above specimens correspond to Planigale ingrami using Archer's external and cranial diagnostic characters and ratios; in fact they bridge the ratio differences Archer noted between the Kimberley subspecies (P. i. subtilissima) and P. ingrami from Northern Territory and Queensland. In absolute size dimensions the desert specimens are surprisingly large, being as big as P. maculata and P. gilesi.

NOTORYCTIDAE

Notoryctes typhlops (Stirling) **Marsupial-Mole**

DT (jaw bones in fresh dingo scats, 1977 - MH/60); the Western Australian Museum received a specimen (M18254) collected at 20°50'S 127°58'E in 1979.

Previous records from these deserts include a specimen (M1493) collected near Sturt Creek in 1931 by Lipfert, and lodged in the South Australian Museum; a Western Australian Museum specimen (M16061) collected between Wells 17 and 18 in the Little Sandy Desert by Trotman in 1906 (see McKenzie et al. 1979, p.20); another W.A. Museum specimen (M6157) was collected "14 miles" from Balgo (20°10'S 127°50'E). In Appendix 3, Lipfert pointed out that the "only" Marsupial Mole was captured between Goodwin Soak (Well 11) and Well 36; the Sturt Creek locality listed above is doubtful.

MURIDAE

Notomys alexis Thomas **Spinifex Hopping-Mouse**

NS2: FW0960 female; NS4: FW0952 male; NS5: FW0961 male, FW0963 female; NS6: FW0953 male, FW0954 female, FW0962 female; KW16: FW0994 female, FW0995 male, released male, released female; KW17: FW1017 male; KW18: FW0998 female, released male; KW19: FW1018 male; KW21: FW0997 male; AR36: FW1049 female; LT17: FW5044 male. The foregoing were all collected in pit-fences.

**Table 8. Diagnostic ratios of Ningaui (includes specimens from 4.5 to 7.0 g body weight, equivalent in size to N. ridei type specimens)**

| | HF/H-V | St/E |
|---|---|---|
| M22678 | 0.24 | 0.28 |
| M22673 | 0.25 | 0.28 |
| M22674 | 0.20 | 0.24 |
| M22675 | 0.21 | 0.21 |
| FW1024 | 0.23 | 0.23 |
| FW1033 | 0.20 | 0.21 |
| M22676 | 0.22 | 0.22 |
| M22677 | 0.21 | 0.26 |
| N. ridei* | 0.21-0.23 | 0.20-0.22 |
| N. timealeyi* | 0.17-0.20 | 0.25-0.29 |

*from Archer (1976)

**Table 9. Reproductive data of April/May 1979 Notomys alexis females (adults)**

| Specimen Number | Developed Mammae | Elongated Teats | Lactating | Foetuses* RS | LS | Crown-Rump | Uterine Horns† Diameter | Striated | Comment |
|---|---|---|---|---|---|---|---|---|---|
| FW0960 | X | X | X | 2 | 1 | 6.3 | - | - | Pregnant |
| FW0963 | X | X | X | 3 | 1 | 5.7 | - | - | Pregnant |
| FW0954 | X | X | - | - | - | - | - | - | Not Pregnant |
| FW0962 | X | X | - | 1 | 3 | 7.5 | - | X | ? Post-partum Oestrus |
| FW0931 | X | X | X | - | 2 | 7.6 | 2.0 | X | Post-partum RS |
| FW0994 | X | X | - | 3 | 2 | 5.5 | - | - | Pregnant |
| released | - | - | - | - | - | - | ? | ? | Not Pregnant |
| FW0998 | - | - | - | - | - | - | 1.5 | X | Faint Striations |
| FW1049 | X | X | - | - | - | - | 2.0 | X | Faint Striations |

*Number of foetuses in right hand side uterine horn (RS), left hand side horn (LS) and average crown to rump length of foetuses (mm).
?Not examined.
X : Yes.
†Diameter only measured if enlarged (> 1.5 mm), but no obvious foetuses present.

Five were collected or seen at night in spotlights near Nooloo Soak (NS) - one in country similar to NS4 (FW0932 male, 2130 hrs), the others in habitat equivalent to NS6 (FW0930 male, 2020 hrs; FW0931 female, 2030 hrs; FW0941 male and another seen, 1925 hrs). One was caught by hand at 1030 hrs at AR36. Three were collected at night in spotlights at BD10F (FW5151 male, FW5152 female, FW5166 male). Tracks of Notomys were noted at LA31.

Lipfert collected this species at Canning Stock Route Wells 24, 26 and 43 in 1930/1931 (M1449 to M1462).

From sand-spinifex country through the desert. Most specimens came from sandplains with vegetation ranging from post-burn herbfields to shrublands over spinifex, sometimes with scattered Eucalypts or Owenia trees. Also from buckshot sandplains and a sandy watercourse continuous with sandplains. Six were recorded on well vegetated (shrubs and spinifex) sand dunes typical of dunes in southern areas. One specimen was collected on a sandy-loam plain fringing ranges.

In all areas where captured, N. alexis was actively reproducing in April/May 1979. Data for females are summarised in Table 9. The six Nooloo Soak males included one juvenile with abdominal testes and five older animals with scrotal testes 3 to 4 mm long. Five of the six males from Karara Well had scrotal testes 5 to 6 mm long; the sixth was a juvenile. Juvenile males were also collected at the Lake Tobin and Anketell Ridge sites - using data in Happold (1976) these would be less than 3 months old.

The female (FW5152) collected near Bishops Dell in June 1980 had enlarged mammae and elongate teats although no uterine striations were apparent and no milk could be expressed. The males collected at this site in June 1980 were both sub-adult.

These reproductive data are consistent with observations of captive populations made by Smith, Watts and Crichton (1972) and Happold (1976). Litter size of the Great Sandy and Little Sandy Desert populations ranged from 3 to 5 (based on uterine foetus numbers in Table 9). The presence of specimens in this series with post-partum uteri containing foetuses suggests post-partum oestrus (Breed 1979). Finlayson (1940) pointed out that N. alexis in Central Australia breeds at any time of the year with peaks of activity following periods of heavy rain. All the sites at which we collected N. alexis had experienced heavy falls of rain in the preceeding months.

Cranial and external measures are presented in Table 10. Cranials are presented for four adults and one sub-adult.

**Table 10. External and cranial measurements of Notomys alexis from the Great and Little Sandy Deserts**

| SEX | N | HV | TV | E | HF | W |
|---|---|---|---|---|---|---|
| F | 6 | 95.2(87.6-97.7) | 135.0(131.3-140.4) | 23.0(22.0-23.6) | 31.6(30.9-32.3) | 33.4(30.0-37.0) |
| M | 3 | 86.6(83.5-89.2) | 134.8(131.7-139.8) | 22.8(21.9-23.3) | 32.6(32.2-33.2) | 26.0(25.0-27.0) |

| Specimen Number | FW0953* | FW1018 | FW0962 | FW0998 | FW1049 |
|---|---|---|---|---|---|
| Sex | M | M | F | F | F |
| Condylo-basal Length | 25.14 | 26.06 | 26.69 | 25.80 | 27.00 |
| Inter-orbital Width | 5.05 | 4.64 | 4.80 | 4.98 | 4.92 |
| Zygomatic Breadth | 14.19 | 14.60 | 14.61 | 14.26 | - |
| Post-palatal Length | 9.22 | 9.22 | 9.71 | 8.90 | 9.54 |
| Auditory Bulla Length | 6.68 | 6.55 | 6.51 | 7.06 | 6.90 |
| Braincase Depth | 9.46 | 9.86 | 9.69 | 9.60 | 9.64 |
| $M^1$ - $M^3$ | 4.85 | 4.75 | 4.98 | 5.10 | 5.04 |
| Nasal Length | 10.50 | 10.14 | 10.64 | 10.85 | 10.91 |
| $M^1$ - $M^1$ | 6.09 | 6.20 | 6.19 | 6.11 | 6.24 |
| Palatal Foramen Length | 4.72 | 4.62 | 4.72 | 4.00 | 5.45 |

*sub-adult.

Pseudomys desertor Troughton **Desert Mouse**

The only record from the Great Sandy Desert is a specimen collected in 1931 by Otto Lipfert and lodged at the Western Australian Museum. This specimen (M1448) is a female and came from Well 48 on the Canning Stock Route.

Measurements are listed in Table 11.

Pseudomys nanus (Gould) **Western Chestnut Mouse**

SE12: FW5035 male from a pit-fence.

From the alluvial floor of Breaden Valley in the South-Esk Tableland, close to Well 48. This habitat can be related to surfaces in adjacent parts of the Kimberley where P. nanus is common; the site might be regarded as an outlying pocket of Kimberley habitat.

Sub-adult with abdominal testes.

Measurements are listed in Table 11. The apparent correspondence of this locality to that of Lipfert's P. desertor is of interest. Finlayson (1941) reached the conclusion that desertor is a synonym of nanus. Tate (1951, pp. 247-8) distinguished the species on the basis of differences in the palatine vacuity length and the presence or absence of an anterior accessory lingual cusp on the first upper molar. Using these characters FW5035 and M1448 are clearly distinct; the Well 48 vicinity is an area of sympatry consistent with the currently held view that they are good species rather than geographical variates of a single species.

**Table 11. External and cranial measurements of Pseudomys desertor and Pseudomys nanus**

| | Pseudomys desertor | Pseudomys nanus* |
|---|---|---|
| Specimen Number | M1448 | FW5035 |
| Sex | F | M |
| HV | 77.4 | 70.4 |
| TV | 88.0 | 77.3 |
| HF | 21.8 | 20.5 |
| E | - | 13.8 |
| Weight | - | 17.0 |
| Condylo-basal Length | 25.0 | 21.33 |
| Inter-orbital Width | 3.61 | 3.52 |
| Zygomatic Breadth | - | 12.71 |
| Post-palatal Length | 8.30 | 7.11 |
| Auditory Bulla Length | 5.85 | 5.46 |
| Braincase Depth | 7.97 | 7.78 |
| $M^1$ to $M^3$ | 5.20 | 5.00 |
| Nasal Length | 7.81 | 8.17 |
| $M^1$ to $M^1$ | 5.13 | 5.12 |

* sub-adult

Leggadina forresti (Thomas) **Short-tailed Mouse**

AR34: FW1056 male, FW1065 male; SE12: M18365; SE13: FW5036 male; LG3: FW5012 male. The foregoing were collected in pit-fences. AR38: FW1062 female was collected in an Elliott trap.

All were collected in northern areas of the Great Sandy Desert. Specimens came from a variety of habitats: sandplain with spinifex and herbs, a sand dune with mixed tussock grassland and spinifex, a loamy floodplain with tussock grassland and herbs, and an alluvial drainage line with Eucalyptus, dense shrubs and spinifex (see Appendix 1).

All specimens were collected during the April/May 1979 trip. The four males all had large scrotal testes 6 to 8 mm long. The female was pregnant with elongated teats, 5 foetuses in its left side and 1 foetus in its right side uterine horn (crown - rump 7.6 mm). In contrast, Finlayson (1941) notes that central Australian populations of this species (as Leggadina waitei) have three young. Watts (1979) records a litter size of three to four.

Adult external and cranial measures are presented in Table 12.

The only previous record of this species from the desert areas of Western Australia is a specimen from the Blackstone Range in the Warburton District (Philpott and Smyth 1967). Other records come from Thevenard Island and Kimberley areas of W.A., as well as arid N.T., Qld. and S.A.

Pseudomys delicatulus (Gould) **Delicate Mouse**

MH43: MH/1 male, another escaped; D3/1: FW1494 male, FW1501 male; D3/2: FW1484-6 males, FW1495 female, one male released; D3/3: one male released; D3/4: FW1487 male; D3/5: one female released.

The MH records came from Elliott traps in a drainage line in a mixed bunch (cane grass) and hummock grassland with burnt Acacia and Grevillea shrubs. The D3 records were from sandy dunes and interdune plains supporting mixed shrubs, bunch grass and spinifex with scattered trees.

The MH specimen was a sub-adult, its testes were not descended. Reproductive status of the D3 specimens is described in Youngson et al. (1981).

External and cranial measures are listed in Table 12. A further specimen (M12980) was collected in April 1974 at 19°28'S 124°40'E, near the northern edge of the Great Sandy Desert.

Pseudomys hermannsburgensis (Waite) **Sandy Inland Mouse**

NS1: FW0939 male, FW0958 male; NS2: FW0936 female, FW0937 male, FW0943 male, FW0948 male; NS3: FW0946 male, released male; NS4: FW0938 male, FW0944 male; NS5: released male; NS6: FW0949 male, FW0950 male, FW0951 male; RR10: FW0988 male; RR14: FW0974 female; KW16: FW1000 female, FW0996 male, released female, released male; KW18: FW1013 male; KW19: FW0999 female, FW1001 female; KW20: FW1020 female; KW21: FW1002 male, FW1004 female; AR33: FW1057 male, FW1058 female; AR34: FW1055 male; AR35: released female; LG3: FW5010 female, FW5011 male, FW5018 male, FW5023 male; LG9: FW5025 male, FW5028 male, FW5029 male, FW5030 male, FW5031 male; BD10F: FW5153, FW5154 female; SE13: FW5037 male; LT15: FW5040 female, FW5041 male, FW5042 female, FW5048 female; LT17: FW5053 male; LT22: FW5043 male; SF25: FW5056 male. The foregoing all came from pit-fences.
The following came from metal traps. NS5: FW0947 female, released female; NS6: FW0945 female, released, released, released 3 females, released male; KW18: FW1014 female; AR36: FW1064 female; AR49: MH/54 female. One also collected from permanent pits set at Minjoo Well (MW23: FW5054 male).

Youngson et al. (1981) collected a specimen (M15063) from 18°54'15"S 123°39'50"E, in the Edgar Ranges area, in August 1976.

Thirty came from sandplains including a wide range of soil-vegetation varieties throughout the desert (Appendix 1): ranging from post-burn herbfields to shrublands over spinifex, sometimes with scattered Eucalyptus or Owenia trees. Also from buckshot sandplains (3) and drainage lines through sandplains (3). Collected on dune surfaces (22 specimens) in all parts of the desert and with nearly all observed kinds of vegetative

**Table 12.** External and cranial measuements of adult Leggadina forresti and a sub-adult Pseudomys delicatulus from the Great Sandy Desert

| SEX | N | HV | TV | E | HF | W |
|---|---|---|---|---|---|---|
| L. forresti | | | | | | |
| M | 4 | 65.7(58.1-77.1) | 51.8(46.7-59.5) | 13.0(12.2-14.0)) | 14.8(14.0-15.5) | 11.1(9.5-12.5) |
| F | 1 | 74.5 | 57.4 | 14.1 | 16.3 | 22.0 |
| P. delicatulus | | | | | | |
| M | 1 | 56.0 | 64.1 | - | 16.2 | 9.0 |

| | Leggadina forresti | | | | Pseudomys delicatulus |
|---|---|---|---|---|---|
| Specimen Number | FW1062 | FW1065 | FW5012 | FW5036 | MH/1 |
| Sex | F | M | M | M | M |
| Condylo-basal Length | 22.34 | 19.76 | 20.81 | 18.66 | 18.25 |
| Inter-orbital Width | 3.61 | 3.44 | 3.24 | 3.32 | 3.65 |
| Zygomatic Breadth | 13.01 | 11.18 | 12.20 | 10.72 | 10.51 |
| Post-palatal Length | 7.77 | 6.90 | 6.75 | 6.35 | 6.34 |
| Auditory Bulla Length | 4.98 | 4.62 | 4.97 | 4.68 | 4.50 |
| Braincase Depth | 7.44 | 6.90 | 6.84 | 6.99 | 7.13 |
| $M^1$ - $M^3$ | 4.47 | 3.92 | 4.35 | 3.99 | 3.36 |
| Nasals Length | 8.20 | 7.16 | 7.24 | 6.90 | 6.46 |
| $RM^1$ - $LM^1$ | 5.39 | 4.65 | 4.93 | 4.84 | 4.50 |

cover: from spinifex, herbs and grasses to shrubs over spinifex, sometimes with Casuarina decaisneana or Eucalyptus spp. trees. Four specimens were collected on alluvial sandy loam surfaces as plains or floodplains in or fringing ranges - soft grasses and Acacia shrub thickets - and one specimen was collected on a samphire flat. Two specimens were taken in gravelly undulating country with alluvial valleys; basically a formation of shrub thickets over spinifex and/or herbs.

In desert areas of Western Australia, it seems to be the most ubiquitous small mammal; throughout its range it is a habitat generalist, occurring in more kinds of habitats than any other species of native rodent. Not only is P. hermannsburgensis found in a wider range of habitats at any one locality (except the Lake Auld sites), it also has a larger geographic range than the other Pseudomys species (P. desertor, P. chapmani, P. fieldi, P. occidentalis etc.) of semi-arid and arid Australia.

Twenty-eight adult male P. hermannsburgensis collected during the April/May 1979 trip had scrotal testes between 6 and 10 mm long. The other four were sub-adults with abdominal testes (FW0988, FW5029, FW5037, FW5054). Five campsites yielded a total of 22 female specimens during the April/May 1979 expedition - in all cases the samples included reproductively active females. At the two campsites (NS, KW) where larger series were collected, non-pregnant, pregnant and post-partum individuals were included (Table 13).

The female (MH/54) collected in August 1977 was not pregnant; its mammae and teats were small.

The female collected during the June 1980 trip had enlarged mammae, elongated teats and striated uteri (right horn = left horn = 2.0 mm diameter) suggesting a post-partum condition. The male collected on the same night had scrotal testes 7 mm long.

**Table 13. Reproductive data of April/May 1979 Pseudomys hermannsburgensis females**

| Campsite Code | Specimen Number | Developed Mammae | Elongated Teats | Foetuses* RS | Foetuses* LS | Foetuses* Crown-Rump | Uterine Horns Diameter | Uterine Horns Striated | Conclusion |
|---|---|---|---|---|---|---|---|---|---|
| NS | FW0936 | - | - | 2 | 2 | 2.4 | - | - | Early pregnancy |
| NS | FW0945 | X | - | 4 | 2 | 20.2 | - | - | Late pregnancy |
| NS | FW0947 | X | - | - | - | - | 1.6 | X | Post-partum |
| NS | released | X | - | - | - | - | - | - | Palpably pregnant |
| NS | released | X | - | - | - | - | - | - | Palpably pregnant |
| NS | released | X | - | - | - | - | - | - | Palpably pregnant |
| NS | released | - | - | - | - | - | - | - | Not pregnant |
| RR | FW0974 | - | - | - | - | - | 1.5 | - | Recent implantation scars. |
| KW | FW0999 | X | - | 3 | 2 | 6.5 | - | - | Pregnant |
| KW | FW1000 | - | - | - | - | - | 1.0 | - | Not Pregnant |
| KW | FW1001 | - | - | - | - | - | 1.5 | - | Not Pregnant |
| KW | FW1004 | X | X | - | - | - | 3.0 | X | Post-partum |
| KW | FW1014 | X | X | - | - | - | 5.2 | X | Post-partum |
| KW | released | - | - | - | - | | - | - | Palpably pregnant |
| KW | FW1020 | - | - | - | - | - | 1.0 | - | Not Pregnant |
| AR | FW1047 | X | - | 3 | 1 | 19.0 | - | - | Late Pregnancy |
| AR | FW1058 | - | - | - | - | - | 1.4 | - | Not Pregnant |
| AR | FW1064 | X | - | 3 | 3 | 11.3 | - | - | Pregnant |
| LG | FW5010 | - | X | - | - | - | 2.8 | X | Post-partum |
| LT | FW5040 | - | - | - | - | - | <1.0 | - | Sub-Adult |
| LT | FW5042 | - | - | - | - | - | 2.7 | - | ?Pro-Oestrus |
| LT | FW5048 | - | - | - | - | - | 1.0 | - | ? Sub-Adult |

No specimens were lactating. X = Yes. † Diameter in mm.
*Number of foetuses in right hand side (RS) and left hand side (LS) uterine horn; average crown to rump length of foetuses (mm).

**Table 14.** External and cranial measurements (mean and range) of Pseudomys hermannsburgensis from the Little and Great Sandy Deserts

| SEX | N | HV | TV | E | HF | W |
|---|---|---|---|---|---|---|
| F | 7 | 68.2(59.2-75.0) | 84.1(73.4-92.6) | 15.8(14.0-17.3) | 17.3(17.0-17.7) | 17.3(17.0-17.7) |
| M | 13 | 67.0(59.8-73.0) | 83.3(78.6-89.5) | 16.1(14.3-17.3) | 17.8(16.6-18.5) | 17.8(16.6-18.5) |

| | | |
|---|---|---|
| Sample Size | 9 | 3 |
| Sex | M | F |
| Condylo-basal Length | 20.39(19.24-20.89) | 20.72(20.63-20.88) |
| Inter-orbital Width | 3.52(3.39-3.70) | 3.53(3.32-3.66) |
| Zygomatic Breadth | 11.42(11.13-11.78) | 11.24(10.71-11.78) |
| Post-palatal Length | 7.47(6.80-8.04) | 7.62(7.41-7.78) |
| Auditory Bulla Length | 5.49(5.16-5.90) | 5.47(5.17-5.96) |
| Braincase Depth | 7.29(6.89-7.60) | 7.12(7.05-7.21) |
| $M^1$ - $M^3$ | 3.71(3.42-3.91) | 3.61(3.42-3.91) |
| Nasals Length | 7.56(6.95-8.22) | 7.76(7.59-7.97) |
| $M^1$ - $M^1$ | 4.49(4.30-4.65) | 4.49(4.43-4.53) |
| Palatal Foramen Length | 4.10(3.75-4.42) | 4.15(4.00-4.36) |

Finlayson (1941) reported that Central Australian populations carry three to four embryos (which contrast to the four to six of Sandy Desert populations) and that the right uterine horn houses the greater number of implants. Reference to Table 13 suggests a similar conclusion. Watts (1979) recorded litter sizes of two to six for laboratory specimens from northern South Australia. Finlayson (1941) also considered that this species has seasonal independence of reproductive activity in Central Australia, with the intensity of breeding increasing following heavy rains. Data presented here (Table 13) show a very high level of breeding activity in the Great Sandy Desert in the months following heavy rains.

External and cranial measures of adult specimens are presented in Table 14. Some variability was noted in the tail length, the shape of the palatine foramina, the distance that these extend back between the upper first molars, the position of the frontal-parietal suture, and the degree of development of the anterior accessory lingual cusp on the upper first molar. FW5154 is an extreme case.

Mus musculus Linnaeus **House Mouse**

NS1: 1 released; SE13: FW5039 male. Both came from pit fences.
The following came from metal traps. NS1: FW0959 female; RR8: FW0987 female, FW0990 female, FW0991 male; RR9: FW0975 male; RR10: FW0992 male, FW0993 male; KW17: FW1003 female, FW1016 male; KW18: FW1019 male; KW20: FW1009 female, FW1015 female; LA28: FW1043 male, FW1046 male; LA31: FW1037 female; DT44: MH/6 male, MH/12 male, MH/14 female; DT45: MH/3 male, MH/7 female, MH/13 male; LG4: FW5027 male; LT18: FW5046 female; LT21: FW5051 female.
The following were collected by hand. LG4: FW5013 male; FW5015 female, FW5016 male, FW5017 female, FW5024 female; LG6: FW5020 male; LG10: FW5026 male; LT20: FW5049 male; LT21: FW5050 female.

Found in a wide variety of landscape elements (sandplain, dune, alluvial plain, river course, samphire flat, swamp, floodplain) supporting an even wider variety of vegetation formations (samphire, tussock grasslands, spinifex grasslands, Melaleuca shrublands, Mulga and Eucalyptus woodlands etc.). However, one consistent feature emerges: Mus was caught in, or immediately adjacent to, areas which would be subject to water run-off (drainage lines, floodplains) or catchment (swamp, claypans, salt lakes) after rain. Of the 35 specimens recorded, 24 came from heavy, poorly drained, alluvial surfaces of swamps, floodplains, drainage lines, plains fronting ranges and salt lake systems, 3 came from sandy soils adjacent to drainage lines, 5 from sandy surfaces adjacent to salt lakes and the remaining 3 from a sandy-loam surface adjacent to a fresh-water swamp.

Actively breeding throughout the desert in April/May 1979. Of twelve adult females collected, five were pregnant with between four and eight foetuses ranging from four 2.5 mm uterine swellings in FW1003 to five 15 mm (crown-rump) foetuses in FW5050. A further six had developed teats and mammae as well as at least one uterine horn striated and enlarged suggesting a recent post-partum condition. Another (FW1037) had a striated and regressing left side horn and a striated and distended right side horn including one 14 mm (crown-rump) foetus in its upper end. Eleven of the fifteen males were adults and had scrotal testes (4 to 9 mm long).

Of two females collected in August 1977, one (MH/14) was pregnant; it had two foetuses (5 mm crown-rump) in each uterine horn. Three of the males had scrotal testes (5 mm long); one was sub-adult.

LEPORIDAE

Oryctolagus cuniculus Lilljeborg **European Rabbit**

Active warrens were recorded in samphire at LA25 and elsewhere in the bed of Lake Auld, Lake Tobin (not far from LT21), and Lake Guli near Well 42. At Lake Tobin they were also seen on small spinifex-covered sandy rises in the lake bed.

CANIDAE

Canis familiaris dingo Meyer **Dingo**

Frequently seen in all parts of the desert and during all visits. Dingos, their scats and/or tracks were recorded at NS1, NS2, NS3, NS4, NS6, NS7, RR8, RR9, RR11, RR12, RR14, KW16, Canning Stock Route well 30, LA25, AR48, DT44, MH41, in Breaden Valley near SE12, Canning Stock Route Well 42, LT18 and LT17.
Lipfert collected this species near Well 43 in 1930/31 (M1463).

Wide ranging, apparently not confined to any habitat although more common near sites with fresh water.

Analysis of scats yielded material assignable to Emu, small bird, small goanna and other lizards, Euro, Red Kangaroo, Feral Cat, Dingo, Marsupial Mole (Dragon Tree Soak), European Rabbit, Antechinus ? rosamondiae (Wormy's Well in the Gibson Desert, 23°05'S 125°17'E), Sminthopsis (LG) and Pseudomys hermannsburgensis. Stomach contents of a male shot at SE included two Varanus acanthurus, one Ctenotus grandis and unidentifiable remnants of numerous skinks and grasshoppers.

FELIDAE

Felis catus Linnaeus **Feral Cat**

Cats were observed in a variety of habitats throughout these deserts; they were noted during all visits. They were seen at NS4, RR15 (skull only), KW24, AR33, LG3, LG7, SF26, 20°09'S 126°37'E, 22°10'S 125°14'E, 21°10'S 123°25'E, 21°02'S 123°10'E, 20°20'S 121°30'E, 20°10'S 121°15'E.

CAMELIDAE

Camelus dromedarius Linnaeus **Camel**

Seen or fresh tracks were recorded in all sectors of desert and all habitats except the ranges: NS2, RR8, RR9, RR11, RR12, RR14, LA25, LA32, Canning Stock Route Well 30, DT44, DT45, LT15, near LT21, Canning Stock Route Well 35, various points along the track between the north-western corner of Lake Auld and Swindell Field (21°10'S 123°30'E), 35 km north-west of Swindell Field, 60 km north-west of Swindell Field and BD.

VESPERTILIONIDAE

Nyctophilus geoffroyi Leach **Lesser Long-eared Bat**

DT44: MH/4 male, MH/8 female, released male.

Mistnetted from dusk onwards over a pool in a dense stand of Sesbania formosa over bullrushes, sedges and tussock grasses. The site was a freshwater swamp, totalling about 5 ha, situated on an interdune plain.

The female (August 1977) had an enlarged left side (LHS) uterine horn with thickened walls and a prominent vascular spot (LHS: 2 mm diam, RHS: 1 mm). It had enlarged mammae but its teats were not elongated.

External and cranial measures are presented in Table 15. They correspond to the N. g. pallescens form of this species.

Eptesicus pumilis (Grey) **Little Bat**

NS7: FW0955 female, FW0956 female, FW0957 male; RR15A: FW0970 male, FW0971 female; AR39: FW1050 male, FW1051 female, FW1052 male, FW1053 female, released 6 females, released 1 male; SE11: FW5032 male, FW5033 female.

In addition MH/52 male, MH/53 female, MH/55 female and MH/56 male were taken at AR39 in August 1977. FW5165 male was found dead on the floor of a breakaway cave near BD at 20°50'S 127°59'E (GH10G) in June 1980.

Found in parties of between two (1 male, 1 female) and seven (6 females, 1 male) in old Fairy Martin nests on the roofs of overhangs and shallow caves in ranges throughout the Great and Little Sandy Deserts. A group of at least four were disturbed from a crevice in a range at the RR15A site.

Of the twelve females examined during the April/May 1979 trip, only one had developed mammae (FW0971) and one (FW0956) was lactating. Six of these females were collected and dissected; none were obviously pregnant. Males all had scrotal testes 3.5 to 4.5 mm long.

One of the two August 1977 females was pregnant (MH/53; one foetus; crown-rump 12 mm) and had prominant mammae and teats. The male collected in June 1980 had scrotal testes 3 mm long.

External and cranial measures of adults are presented in Table 15.

Nycticeius balstoni caprenus Troughton **Broad-nosed Bat**

RR8: FW0979 male; D3/5: FW1497 female; SE14: FW5038 female.

Lipfert collected this species at Canning Stock Route Wells 43 and 46 (M1425 to M1446).

The RR and SE specimens were collected over pools, one in the course of the Rudall River at Coondegoon Pool and the other in a sandstone gorge in ranges. The former site was surrounded by tall trees, the latter was not vegetated. The specimen collected near D3/5 was flying over an interdune sandplain with scattered low trees over bunch and hummock grassland.

FW5038 was neither pregnant (LHS = RHS uterus = 0.7 mm diam.) nor lactating; it had a blood spot on its LHS uterus. The male had scrotal testes 3.5 mm long. FW1497 was not pregnant (see Youngson et al. 1981).

External and cranial measures of both adult specimens are presented in Table 16.

Chalinolobus gouldii (Gray) **Gould's Wattled Bat**

NS1: FW0942 female; RR8: FW980 female, FW0981 female, FW0982 female, FW0983 female, FW0984 female, FW0985 female, FW0986 male.

**Table 15. External and cranial measurements of Eptesicus and Nyctophilus**

| | Eptesicus pumilis | | | | | | Nyctophilus geoffroyi |
|---|---|---|---|---|---|---|---|
| Specimen Number | FW0955 | FW0957 | FW1050 | FW1053 | FW5032 | FW5033 | MH/4 |
| Sex | F | M | M | F | M | F | M |
| Condylo-basal L. | 11.10 | 11.21 | 11.55 | 11.20 | 11.10 | 11.22 | 15.10 |
| Inter-orbital W. | 3.20 | 3.25 | 3.31 | 3.18 | 2.93 | 3.04 | 3.29 |
| Post-zygomatic B. | 6.13 | 6.22 | 6.38 | 6.33 | 6.05 | 6.15 | 7.35 |
| Mastoid B | 6.75 | 6.80 | 7.38 | 7.05 | 6.59 | 6.58 | 8.23 |
| Post-palatal Length | 4.58 | 4.70 | 4.85 | 4.63 | 4.48 | 4.84 | 5.91 |
| Auditory Bulla | 2.70 | 2.75 | 2.49 | 2.52 | 2.34 | 2.59 | 3.81 |
| Braincase Depth | 4.62 | 4.55 | 5.03 | 4.67 | 4.55 | 4.65 | - |
| $C\text{-}M^3$ | 4.20 | 4.24 | 4.14 | 4.16 | 4.18 | 4.22 | 5.51 |
| $C^1 - C^1$ | 3.65 | 3.65 | 3.66 | 3.46 | 3.58 | 3.55 | 4.27 |
| $M^3 - M^3$ | 4.92 | 5.01 | 5.10 | 5.19 | 5.04 | 5.01 | 6.23 |
| HV | 39.7 | 37.6 | 37.5 | 40.3 | 38.6 | 38.6 | 45.1 |
| TV | 35.9 | 36.8 | 37.4 | 37.2 | 34.2 | 34.8 | 39.1 |
| F/A | 33.1 | 33.5 | 32.0 | 30.8 | 30.4 | 31.4 | 35.2 |
| Ti + P | 11.5 | 11.7 | 12.6 | 12.7 | 11.3 | 12.0 | 21.3 |
| E | 17.5 | 18.9 | 18.3 | 17.3 | 17.9 | 17.5 | 21.8 |
| W(g) | 4.0 | 3.5 | 4.0 | 4.5 | 4.0 | 4.5 | 6.7 |

**Table 16.** Adult measurements of Nycticeius and Chalinolobus

| | N. balstoni caprenus | | Chalinolobus gouldii | | |
|---|---|---|---|---|---|
| Specimen Number | FW0979 | FW5038 | FW942 | FW983 | -* |
| Sex | M | F | F | F | 6F |
| HV | 45.6 | 49.2 | 52.8 | 54.0 | 51.8 (48.5-52.7) |
| TV | 37.8 | 41.2 | 43.7 | 49.9 | 46.1 (42.8-49.9) |
| F/A | 31.0 | 34.0 | 38.5 | 40.4 | 39.5 (38.8-40.4) |
| E | 12.9 | 12.8 | 13.8 | 13.1 | 13.3 (11.8-14.0) |
| Ti + P | 19.7 | 21.9 | - | - | - |
| Wt (g) | 7.5 | 9.5 | 10.0 | 10.0 | 10.0 (9.0-10.5) |
| $C\text{-}M^3$ | 4.96 | 5.10 | 5.40 | 5.53 | - |
| Condylo-basal L. | 13.32 | 13.36 | 14.51 | 14.30 | - |
| Post-palatal L. | 5.05 | 5.35 | 6.44 | 6.00 | - |
| $M^3 - M^3$ | 6.21 | 6.31 | 6.72 | 7.04 | - |
| Auditory Bulla | 3.10 | 2.94 | 3.65 | 3.92 | - |
| Braincase Depth | 5.15 | 5.15 | 5.88 | 6.36 | - |
| Inter-orbital Width | 3.38 | 3.76 | 4.54 | 4.45 | - |
| Mastoid Breadth | 8.14 | 8.40 | 8.75 | 8.72 | - |
| Post-Zygomatic B. | 7.24 | 7.66 | 8.31 | 8.39 | - |
| $C^1 - C^1$ | 4.83 | 4.38 | 4.90 | 5.25 | - |

*mean and range of six females

Collected after dark (1900 - 2130 hrs) over a low woodland on an alluvial plain fronting ranges and in a fringing formation of tall trees at Coondagoon Pool.

None of the seven females (April 1979) collected were pregnant (LHS uterus = RHS = 1 mm diameter) or lactating. The male had scrotal testes 4 mm long.

Cranial and external measures of adults are presented in Table 16.

EMBALLONURIDAE

Taphozous hilli Kitchener **Hill's Sheath-tailed Bat**

GH10G: FW5156 female, FW5160 female, FW5163 female, FW5164 female, FW5157 male, FW5158 male, FW5159 male, FW5161 male, FW5162 male.

Taken from cave in breakaway.

None of the four adult females (6 June 1980) had developed mammae or uterine horns (right side horn = left side horn = 0.7-0.9 mm).

Cranial and external measures of adults are presented in Table 17.

Taphozous flaviventris Peters **Yellow-bellied Bat**

RR8: FW0972 male; D3/1: FW1506 female; D3/2: several seen; LG5: FW5019 female; DT45: FW1936 female. One cranium (FW1157) was taken from an owl pellet at SE.

Collected after dark. Flying at canopy height in the fringing formation of the Rudall River, and over a fresh water pool with no surrounding vegetation adjacent to Lake Gregory. The D3 and DT45 records were over dunes and interdune sandplains supporting scattered low trees and bunch and hummock grasses.

The April 1979 (LG) female was neither pregnant (RHS uterus = LHS = 1 mm) nor lactating. The D3 female (September 1980) was pregnant (see Youngson et al. 1981). The DT45 female (September 1982) was also pregnant with one foetus (13 mm crown-rump) in its right side uterine horn.

External and cranial measures of adults are presented in Table 17 and are consistent with measures of Kimberley specimens.

MOLOSSIDAE

Mormopterus cf. beccarii (Peters)

RR: FW0978 female.

Collected after dark over Coondegoon Pool in the course of the Rudall River. The pool is surrounded by a fringing formation of tall Eucalyptus trees and resembles RR8.

A sub-adult; not pregnant (right side uterine horn = left side = 1 mm diameter).

A revision of this sub-genus is currently being undertaken. In several respects the specimen resembles Mormopterus beccarii.

Tadarida australis (Gray) **White-striped Bat**

NS1: seen; NS2: seen; NS3: M19635 female; NS4: M19636 female; NS5: seen; NS6: M19634 female; RR8: M19637 female; KW16: M19639 female; KW20: M19638 female; LA25: FW1039 male, M19641 female; LA31: FW1021 male; LA32: FW1029 male, FW1030 male, FW1031 male, M19640 female; LT19: M19642 female.

In addition a mummified specimen was picked up near a breakaway at AR47: MH/51 in August 1977.

Recorded in both the Little Sandy Desert and throughout the western Great Sandy Desert. Collected after dark over a variety of habitats: sand dunes, sandplains, buckshot plains, river fringing formations, samphire surfaces of saltlakes and alluvials fronting ranges. Large numbers were recorded at Well 30 (LA32) in a woodland of flowering bloodwoods.

None of the nine females collected during the April/May 1979 trip had developed mammae or teats (none were lactating); seven showed no uterine development (RHS uterine horn = LHS = 1 to 1.2 mm), and two M19641 and M19638 had slightly enlarged RHS horns (1.6 and 1.8 mm diam. respectively) suggesting early pro-oestrus.

Cranial and external (mean and range) measures of adult individuals are presented in Table 18.

Chaerephon jobensis (Miller) **Northern Mastiff Bat**

D3/1: FW1500 female; D3/2: FW1505 female

**Table 17. Measurements of adult Taphozous from the Great Sandy Desert**

| | Taphozous hilli | | Taphozous flaviventris | | |
|---|---|---|---|---|---|
| | FW5162 | FW5164 | FW0972 | FW5019 | FW1157 |
| Sex | M | F | M | F | - |
| HV | 74.7 | 70.6 | 84.2 | 85.5 | - |
| TV | 30.0 | 33.2 | 29.4 | 33.7 | - |
| FA | 65.9 | 69.1 | - | 73.6 | - |
| E | 23.3 | 23.1 | 22.4 | 22.5 | - |
| Ti + P | 36.9 | 38.3 | 42.5 | 42.9 | - |
| W (g) | 31.2 | 27.5 | 55.5 | 44.0 | - |
| C - $M^3$ | 8.16 | 8.02 | 10.48 | - | 10.79 |
| Greatest Length | 21.25 | 21.15 | 26.7 | - | - |
| Post-palatal Length | 9.52 | 9.47 | 11.73 | - | 10.70 |
| Inter-orbital Width | 4.63 | 4.74 | 5.25 | - | 5.50 |
| Post-Zygomatic Width | 10.55 | 10.41 | 12.22 | - | 13.62 |
| $M^2$ - $M^2$ | 9.45 | 9.10 | 11.16 | - | 11.86 |
| $C^1$ - $C^1$ | 3.48 | 3.38 | 6.30 | - | 6.55 |
| Braincase Depth | 7.20 | 7.18 | - | - | 8.55 |
| Height of $I^1$ above alveolus | 2.38 | 2.45 | 4.12 | - | - |
| Auditory Bulla Length | 5.43 | 4.95 | 5.00 | - | - |

Table 18. Measurements of Tadarida australis

| SEX | N | HV | TV | F/A |
|---|---|---|---|---|
| F | 9 | 83.4(81.6-88.1) | 50.5(46.1-55.5) | 60.1(58.6-60.8) |
| M | 5 | 84.6(81.8-87.8) | 49.0(46.1-53.9) | 59.6(56.6-61.6) |
| | | E | Ti + P | W(g) |
| | | 30.1(27.5-32.1) | 30.7(29.5-31.5) | 34.7(31.5-38.5) |
| | | 30.8(29.4-33.0) | 30.8(29.6-32.1) | 34.2(33.0-35.0) |

| | M19638 | M19639 | FW1021 | M19640 |
|---|---|---|---|---|
| Sex | F | F | M | F |
| Condyo-basal Length | 23.26 | 23.07 | 24.00 | 23.75 |
| Post-zygomatic Breadth | 12.98 | 13.35 | 13.15 | 12.85 |
| Inter-orbital Breadth | 5.48 | 5.67 | 5.58 | 5.83 |
| Mastoid Breadth | 13.54 | 13.75 | 13.95 | 13.90 |
| Skull height at post. edge of palate | 6.42 | 6.48 | 6.60 | 6.39 |
| Post-palatal Length | 11.95 | 12.14 | - | 11.90 |
| Auditory Bulla | 5.21 | 5.75 | 5.42 | 5.87 |
| Braincase Depth | 8.92 | 8.78 | 9.00 | 9.05 |
| $C\text{-}M^3$ | 8.85 | 8.75 | 9.16 | 8.99 |
| $M^3 - M^3$ | 9.85 | 10.10 | 9.75 | 9.78 |
| $C^1 - C^1$ | 6.23 | 6.27 | 6.11 | 6.21 |

Sand dunes and sandplains with scattered low trees over hummock and bunch grassland.

One of the two females (September 1980) was lactating with post-partum uteri (Youngson et al. 1981).

PTEROPODIDAE

Pteropus scapulatus Peters **Red Flying Fox**

D3/2: FW1507 male.

Flying over a sand dune with scattered low trees over hummock and bunch grassland (Youngson et al. 1981).

## DISCUSSION

### 1. SPECIES COMPOSITION

Thirty-seven species of native mammal have been recorded in the Great Sandy Desert since European settlement. These have been discussed in the Annotated Species List and are also listed in Table 19. Two additional species were probably present ca 1900 A.D.; at that time both Bettongia lesueur and Lagorchestes conspicillatus are known to have been extant in adjacent arid regions to the east (Parker 1973) and south-west (L. conspicillatus, McKenzie et al. 1979, p.20), and in semi-arid areas to the north (McKenzie 1981).

Pseudomys chapmani (M18790; 21 Sept. 1980) was collected at 23°02'S 122°45'E in the McKay Range of the Little Sandy Desert, 50 km west of the Karara Well campsite. This species should occur in the Great Sandy Desert - similar habitats are found in the Paterson Range (21°50'S, 122°08'E) - although, like Antechinus rosamondae, it is regarded as primarily a Pilbara species.

Another species, reported from Deibel Spring (23°37'S 122°20'E) in the Little Sandy Desert in 1906 by Trotman (Smith 1966) may have occurred in the Great Sandy Desert. Smith (1966 p. 125) reports: "... creature with its flat burrowing snout." "This bandicoot was, I believe, the marsupial Chaeropus ecaudatus of the family Peramelidae." "It had cloven feet and bristly fur similar to a pig ..." "I was later to see other species of bandicoot with soft fur and longer ears, but this pig-like creature was the type mostly caught by the blacks in desert country." No specimens are available to confirm the identification but, taken together, Trotman's descriptions of the

head shape, feet and fur, and the elimination of possible confusion with the Dalgyte, are convincing (see Troughton 1967 pp 76-78).

The mammal inventory of the Great Sandy Desert was far from complete in 1977; fifteen of the twenty-seven species recorded during our 1977 to 1980 surveys were new records for the Desert (see Table 19). Prior to our work, only one reasonably comprehensive search for mammals had been documented - that undertaken by Otto Lipfert during a seventeen month expedition along the Canning Stock Route in 1930 and 1931. Lipfert recorded seventeen species of native mammal (Appendix 3) within the Great Sandy Desert; eight of these have not been recorded there since, and two others, Perameles eremeana and Dasycercus cristicauda, were last recorded in 1943 (Table 19). An earlier collection made by Keartland in 1895 was lost when the Calvert Scientific expedition met with disaster while still in the desert.

**Table 19. Native mammals of the Great Sandy Desert (from annotation)**

| Species | Distribution | Date of Most Recent Record (X=Post-1977) | Tree Steppe Sub-district | Shrub Steppe Sub-district |
|---|---|---|---|---|
| Megaleia rufa | A | X** | X | X |
| Macropus robustus | W | X | X | X |
| Onychogalea unguifera | T | X** | X | - |
| Lagorchestes hirsutus | A | 1931** | - | X |
| Trichosurus arnhemensis | T | 1931** (?1976) | X | X |
| Isoodon auratus | W | 1931** | X | X |
| Perameles eremeana | A | 1943** | - | X |
| Macrotis lagotis | A | X** | X | X |
| Dasyurus geoffroii | W | 1931** | - | X |
| Phascogale calura | A | 1931** | - | X |
| Dasycercus cristicauda | A | 1943** | X | X |
| Antechinus macdonnellensis | A* | X† | - | X |
| A. rosamondae | A* | X† | - | X |
| Sminthopsis youngsoni | A* | X† | X | X |
| S. hirtipes | A* | 1930** | - | X |
| S. macroura | A* | X† | X | X |
| Antechinomys laniger | A* | 1931** | X | - |
| Planigale ingrami | ?A* | X† | X | - |
| Ningaui cf. ridei | A* | X | - | X |
| Notoryctes typhlops | A* | X** | X | X |
| Pseudomys desertor | A* | 1931** | X | X†† |
| Leggadina forresti | ?W* | X† | X | - |
| Pseudomys nanus | W* | X† | X | - |
| P. delicatulus | T* | X | X | - |
| P. hermannsburgensis | A* | X | X | X |
| Notomys alexis | A* | X** | X | X |
| Canis familiaris | W | X** | X | X |
| Pteropus scapulatus | W* | X† | X | - |
| Nyctophilus geoffroyi | W* | X† | X | X |
| Eptesicus pumilis | W* | X | X | X |
| Chalinolobus gouldii | W* | X† | X | X |
| Nycticeius balstoni | W* | X** | X | X |
| Taphozous hilli | A* | X† | - | X |
| T. flaviventris | W* | X† | X | X |
| Tadarida australis | W* | X† | X | X |
| Mormopterus cf. beccarii | W* | X† | X | X |
| Chaerephon jobensis | T* | X† | X | - |

* Small ground mammal or bat **Recorded by Lipfert
† Not previously recorded in the Great Sandy Desert †† Parker (1973)

T Torresian )
A Eyrean ) Known distributions in Australia - follows McKenzie (1981).
W Wide )

Our failure to detect Lagorchestes hirsutus, Isoodon auratus and Perameles eremeana during the 1977 to 1980 surveys is consistent with the observed decline of bandicoot and small wallaby populations elsewhere throughout medium rainfall to arid areas of Australia - noted by Frith (1973, - p.105 et seq.) and discussed for Western Australia by Burbidge and Fuller (1979) and McKenzie (1981). The first of these species may still occur in the Great Sandy Desert; Bolton and Latz (1978) have found populations persisting in adjacent parts of the Tanami Desert (to the east); appropriate habitats are also widespread in the Great Sandy Desert. A similar decline in arid-zone populations of Trichosurus arnhemensis and Dasyurus geoffroii has been noted by Burbidge and Fuller (1979) and McKenzie (1981) respectively. Both species still occur in areas peripheral to Western Australia's deserts. The current status of Phascogale calura populations in arid Australia is not known.

Populations of Dasycercus cristicauda, Antechinomys laniger, Sminthopsis hirtipes and Pseudomys desertor are almost certainly still extant in the Great Sandy Desert. All have recently been recorded in similar habitats of adjacent deserts to the south and/or south-east (McKenzie et al. 1979, Burbidge et al. 1975, Burbidge and Fuller 1979, Parker 1973).

## 2. BIOGEOGRAPHY

No species of mammal is endemic to the Great Sandy Desert; all are known from at least one of the adjacent districts.

Three main biogeographical components are present in its fauna (Table 19). The most important component can be categorized as arid/semi-arid (Eyrean) - species that are restricted to arid and semi-arid areas of Australia. Nineteen Eyrean species are known from the Great Sandy Desert; two of these (Antechinus rosamondae and Sminthopsis youngsoni) are only known from arid areas north of the Tropic of Capricorn. Planigale ingrami is provisionally placed in this category because most Western Australian and Northern Territory records come from semi-arid to arid localities (see also Parker 1973 and Brown 1974, p.271) although the species extends into well watered areas of Queensland (Archer 1976).

Four Torresian species, usually associated with the higher rainfall areas of tropical Australia, occur in the Great Sandy Desert; all also occur in the adjacent sub-humid Kimberley. Only Trichosurus arnhemensis is known from central areas of the Desert; the other three appear restricted to northern and north-western sectors; despite extensive field work, two of them (Onychogalea unguifera and Chaerephon jobensis) are only known from the Desert's northern fringe and, on available habitat and distribution characteristics, are unlikely to intrude further into its interior.

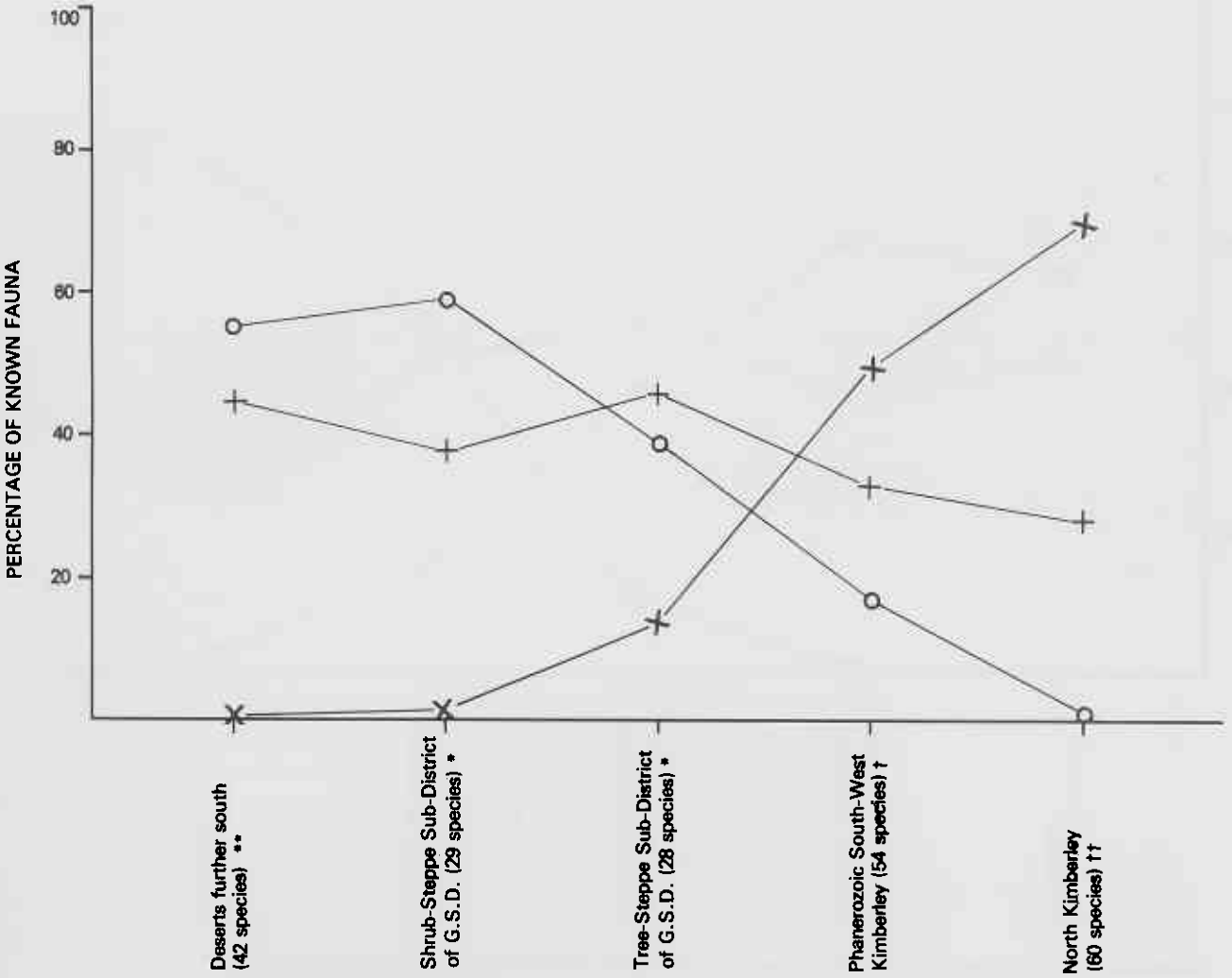
The remaining fourteen of the thirty-seven species recorded in the Great Sandy Desert have wider distributions involving arid as well as better watered tropical and/or temperate areas of Western Australia. Of particular note in this respect are Dasyurus geoffroii and Pteropus scapulatus. The former has been recorded throughout the inland deserts (south of 20° south latitude) and temperate sub-humid and semi-arid districts; the latter has a Torresian distribution, but coastally, extends southwards into temperate areas. P. scapulatus is also known from arid central areas of the Northern Territory (Parker 1973). The presence of Torresian species in the Great Sandy Desert suggests that the faunal interzone, noted by McKenzie (1981) in the south-western section of the Kimberley (the Phanerozoic South-west Kimberley), may include adjacent northern areas of the Great Sandy Desert. Further support for such an idea comes from the presence of Torresian plants of the genus Acacia in northern parts of the desert (Hnatiuk, Maslin and D'Antuono, in press; Maslin, pers. comm.), the catchment pattern of the two major palaeorivers in the Great Sandy Desert (the "Mandora to Sturt Creek" and the Percival Palaeorivers outlined by van de Graaf et al. 1977, p. 385) which would have been at least partially active in the mid-Holocene, and the vegetation map prepared by Beard and Webb (1974) who subdivided the dominant plant cover of the desert (the Canning Botanical District) into "Tree Steppe" and "Shrub Steppe". The former sub-district occupies northern and north-western areas subject to monsoonal influence from the adjacent sub-humid Kimberley and the latter occupies central and southern sections which, like the deserts further south, generally have low humidities and receive irregular rainfall, mainly from thunderstorms of cyclones.

Comparisons of the biogeographical components of the known mammal faunas of the two sub-districts within the Great Sandy Desert, as well as with the mammal faunas of adjacent districts to the south and north (see McKenzie et al., this publication), are presented in Figures 1 and 2.

It is important to bear in mind that Figure 1 was derived using known records. As pointed out at the beginning of the discussion, the list in Table 19 is incomplete. Records of species that have declined since the 1930s and 1940s are too scanty to provide any certain "absence" (as opposed to presence) data, especially in the Tree Steppe sub-district of the Great Sandy Desert; the Canning Stock Route, along which Lipfert collected, only penetrates the far eastern margin of this sub-district. However, if the analysis is repeated using only the small ground mammal and bat faunas, which are known to have persisted relatively intact in semi-arid pastoral districts and in desert areas of Western Australia (McKenzie 1981, pp. 276-278), and which was objectively sampled using traps and, for bats, netting and spotlight shooting techniques, a more believable analysis is possible. This is diagrammed in Figure 2.

Figures 1 and 2 clearly show that both sub-districts of the Great Sandy Desert have Eyrean dominated

FIGURE 1 **Relative proportions of the three biogeographical components in the mammal faunas known from various districts adjacent to, and the two sub-districts within, the Great Sandy Desert.**

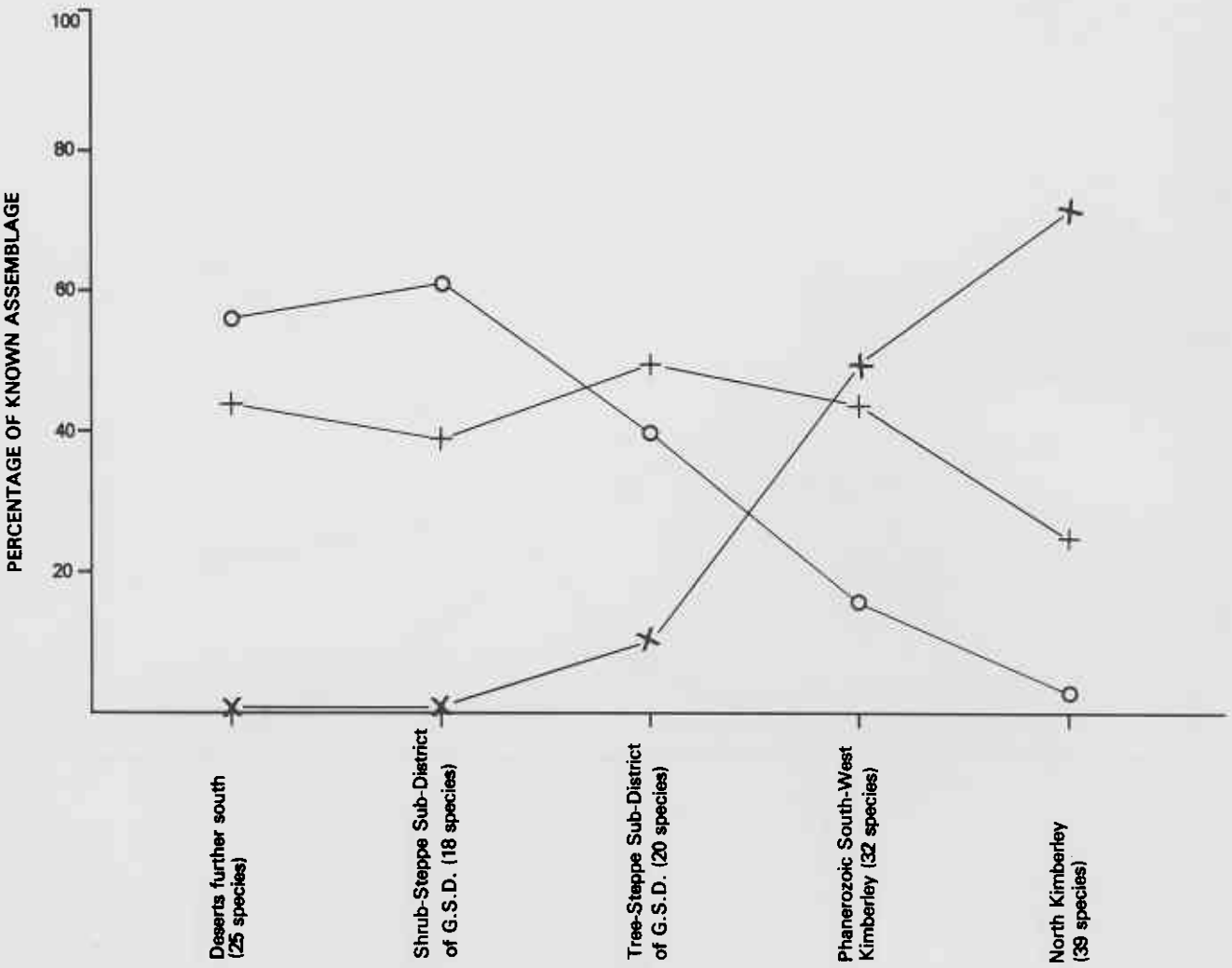



mammal faunas. The major change in the faunal balance between Torresian and Eyrean species occurs in the Tree Steppe sub-district and the Phanerozoic South-west Kimberley, but the Tree Steppe actually belongs to the Eyrean sub-region of Australia in the same way that the Phanerozoic South-west Kimberley belongs with the Torresian sub-region. This is confirmed by the species similarity figures for the mammal faunas of the various districts and sub-districts presented in Table 20. The percentage similarity figures are based on the formula in Dasmann (1973), and are equivalent to the Jaccard Index (J) widely used as a coefficient of faunal similarity (Fallow 1979): J = $C/(N_1+N_2 - C)$ where C is the number of taxa common to the two districts and N1 and N2 are the total number of taxa in district 1 and district 2 respectively.

## 3. HABITAT PREFERENCES AND PATTERN OF SPECIES IN THE DESERT

In terms of substrate, geomorphology and vegetative cover, five broad habitat types can be recognised in the Great Sandy Desert and tropical parts of the Little Sandy Desert. The total number of each species of mammal collected in the

FIGURE 2 **Relative proportions of the three biogeographical components in the small ground mammal and bat assemblages of various districts adjacent to, and the two sub-districts within, the Great Sandy Desert.**




**(Sources and Symbols as in Figure 1)**

Table 20. Paired comparisons of the mammal faunas known from various districts adjacent to, and the two sub-districts within, the Great Sandy Desert

| | SD | SS | TS | PWK | NK | |
|---|---|---|---|---|---|---|
| Deserts Further South** (SD) | - | 57.8 | 40.0 | 28.0 | 12.1 | Percent |
| Shrub Steppe Sub-district* (SS) | 26 | - | 54.1 | 22.7 | 11.3 | |
| Tree Steppe Sub-district* (TS) | 20 | 20 | - | 39.0 | 20.5 | |
| Phanerozoic South-west Kimberley† (PWK) | 21 | 15 | 23 | - | 59.2 | |
| North Kimberley†† (NK) | 11 | 9 | 15 | 42 | - | |
| | | Number of species in common | | | | |

*From Table 19 **From Appendix 2 †McKenzie 1983 ††McKenzie 1981

various broad habitat types during the post-1977 surveys is included in Appendix 1 and provides some concept of habitat preferences.

A cautious interpretation of Appendix 1 is necessary because:

(i) the data from which these totals were derived is a composite of tropical dry season trips made in the months of March, April/May, June, August and September;

(ii) certain species were only recorded once or twice;

(iii) there were differences in trapping effort from habitat to habitat; hill and range country was poorly sampled because of difficulties in sinking pit traps.

In general, habitats noted for the various species are consistent with those recognised for the same species elsewhere in Western Australian deserts (McKenzie et al. 1979, Burbidge and Fuller 1979). Where exceptions exist they have already been discussed in the annotated list.

Five small mammal species were trapped in sufficient numbers to attempt an analysis of habitat preferences using the trapping data. Two distinct techniques for trapping small mammals were used. These are described in the introduction to this paper. Table 21 shows that pit-fences caught both a greater number of individuals and a greater number of species than the metal traps. In addition, no native species was collected in metal traps that was not collected in greater numbers in the pit-fences. For this reason, the pit-fence results were used to generate Table 22 which relates mammal species to various habitat descriptors. Unfortunately, limitations of time and equipment precluded the use of pit-fences in rocky habitats of hill and ranges country so this surface could not be included in the analysis. Bearing in mind the patterning of small mammal species across these deserts, detected in Figure 2 and discussed earlier, the Tree Steppe and Shrub Steppe representatives of each broad habitat type were treated separately in Table 22.

The tropical dry season data in Table 22 shows that a number of mammal species were strongly influenced by environmental trends within the desert. Sufficient Notomys alexis (Chi square = 10.18, $0.005 > p > 0.001$) were captured to show that the species is significantly more common in the Shrub Steppe sub-district. On the other hand, Pseudomys delicatulus was significantly more common (Chi square = 13.16, $p < 0.0005$) in the Tree Steppe sub-district. Ningaui cf. ridei was not recorded in the Tree Steppe sub-district, and in the Shrub Steppe sub-district was only recorded on sandy surfaces; data were sufficient to show that within these sandy surfaces, it is unlikely to occur in the Tree Steppe sub-district (Chi square = 7.9, $0.005 > p > 0.001$).

**Table 21. Comparison of trapping success using metal traps and pit-fences in the tropical sandy deserts of Western Australia in April/May 1979**

**Trap return comparisons - by campsite**

| Campsite[1] Code | Trap[2] Type | Effort[2] | No.of Species | No.of Specimens |
|---|---|---|---|---|
| LG | PF | 20 | 3 | 11 |
| | M | 721 | 1 | 1 |
| SE | PF | 6 | 4 | 5 |
| | M | 420 | 0 | 0 |
| LT | PF | 18 | 4 | 9 |
| | M | 414 | 1 | 2 |
| SF | PF | 16 | 2 | 3 |
| | M | 419 | 0 | 0 |
| NS | PF | 22 | 4 | 25 |
| | M | 572 | 2 | 12 |
| RR | PF | 20 | 2 | 3 |
| | M | 468 | 1 | 6 |
| KW | PF | 18 | 4 | 24 |
| | M | 468 | 2 | 6 |
| LA | PF | 21 | 5 | 14 |
| | M | 208 | 2 | 4 |
| AR | PF | 16 | 5 | 15 |
| | M | 226 | 2 | 2 |
| TOTALS | PF | 157 | 11 | 109 |
| | M | 3916 | 6 | 33 |

**Trap return comparisons - by species**

| Species | Number of Specimens Metal Traps | Pit Fences |
|---|---|---|
| Antechinus macdonnellensis | 0 | 1 |
| A. rosamondae | 1 | 2 |
| Sminthopsis macroura | 1 | 3 |
| S. youngsoni | 0 | 16 |
| Ningaui cf. ridei | 0 | 9 |
| Planigale ingrami | 0 | 3 |
| Notomys alexis | 2 | 17 |
| Pseudomys nanus | 0 | 1 |
| Leggadina forresti | 1 | 5 |
| Pseudomys hermannsburgensis | 12 | 51 |
| Mus musculus* | 16 | 1 |

*Exotic mammal.

[1]Campsite data listed is for the April/May 1979 survey during which pit-fencing and metal trapping were undertaken simultaneously. As far as possible, metal lines were set in similar habitats not far from drift fences to provide a similar habitat average.

[2]Metal Trap (M) nights or Pit-fence (PF) nights.

Table 22. Trap success in the different habitat types (1977 to 1980).

| MAJOR HABITAT TYPES | TRAP EFFORT Pit Fence Nights* | MAMMAL SPECIMEN NUMBERS FROM FENCES Sminthopsis youngsoni | Ningaui cf. ridei | Notomys alexis | Pseudomys herman. | Pseudomys delicatulus |
|---|---|---|---|---|---|---|
| SANDPLAINS | 81 | 11 | 6 | 11 | 23 | 4 |
| Tree Steppe | 36(817) | 5 | 0 | 1 | 6 | 4 |
| Shrub Steppe | 45(679) | 6 | 6 | 10 | 17 | 0 |
| SAND DUNES | 73 | 6 | 3 | 6 | 21 | 6 |
| Tree Steppe | 36(772) | 3 | 0 | 0 | 8 | 6 |
| Shrub Steppe | 37(517) | 3 | 3 | 6 | 13 | 0 |
| ALLUVIAL LOAMS | 24 | 2 | 0 | 1 | 4 | 0 |
| Tree Steppe | 10(1489) | 0 | 0 | 0 | 1 | 0(2)* |
| Shrub Steppe | 14(450) | 2 | 0 | 1 | 3 | 0 |
| SALINE SURFACES | 12 | 3 | 0 | 0 | 1 | 0 |
| Tree Steppe | 0(45) | 0 | 0 | 0 | 0 | 0 |
| Shrub Steppe | 12(250) | 3 | 0 | 0 | 1 | 0 |

*Number of metal trap nights are in brackets; metal trap captures of particular significance are included in the table.

Notomys alexis (Chi square = 6.44, 0.025 > p > 0.01), and Pseudomys hermannsburgensis (Chi square = 5.86, 0.025 > p > 0.01) had a significant preference for sandy surface environments rather than habitats on heavier soils (saline and alluvial loam surfaces).

Both Sminthopsis youngsoni and Pseudomys hermannsburgensis were present in all four major habitats analysed. Data were sufficient to show the latter to favour sandy environments and to be equally common on dunes and sandplains (Chi square = 0.002, 0.975 > p > 0.95). The tabulated data of S. youngsoni showed no such preference - however, a re-examination of the saline (KW20 and LA26) and alluvial (KW17) sample sites at which the species was caught showed that all three sites were within 100 metres of sand dune or sandplain environments.

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# APPENDIX I

## NATIVE MAMMAL DATA FROM POST-1977 SAMPLE SITES IN THE GREAT SANDY DESERT

HABITATS

Codes are cross-referenced to McKenzie *et al.* this publication or to Appendix 4.

Under each habitat, sites are ordered north to south.

NUMBER OF SPECIMENS RECORDED
(S = scat or skeletal; X = present; T = tracks)

TRAPPING EFFORT

PF = Pit-fence Nights
M = Metal Trap Nights

| HABITATS | *Megaleia rufa* | *Macropus robustus* | *Onychogalea unguifera* | *Macrotis lagotis* | *Antechinus rosamondae* | *A. macdonnellensis* | *Sminthopsis macroura* | *S. youngsoni* | *Ningaui* cf. *ridei* | *Planigale ingrami* | *Notomys alexis* | *Leggadina forresti* | *Pseudomys nanus* | *P. hermannsburgensis* | *P. delicatulus* | *Canis familiaris* | *Nyctophilus geoffroyi* | *Eptesicus pumilus* | *Chalinolobus gouldii* | *Nyctinomus balstoni* | *Taphozous hilli* | *T. flaviventris* | *Tadarida australis* | *Mormopterus* cf. *beccarii* | *Chaerephon jobensis* | *Pteropus spaculatus* | *Mus musculus* | PF | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. SANDPLAINS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a. Sand, sometimes loamy or clayey | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D3/1 | | | | | | | | | | | | | | 2 | | | | | | | | 1 | | | 2 | | | 4 | |
| D3/3 | | | | | | | | 2 | | | | | | 1 | | | | | | | | | | | | | | 5 | |
| D3/5 | | | | | | | | 2 | | | | | | 1 | | | | | | 1 | | | | | | | | 5 | |
| MH42 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 80 |
| DT45 | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | 3 | | 45 |
| LG6 | | | X | | | | | | | | | | | | | | | | | | | | | | | | 1 | 4 | 160 |
| LG9 | | | X | | | | | | | | | | 5 | | | | | | | | | | | | | | | 3 | 60 |
| LG10A | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 60 |
| AR34 | | | | | | | | | | | | 2 | 1 | | | | | | | | | | | | | | | 3 | |
| AR36 | | | | | | | | 1 | | | 2 | | 1 | | | | | | | | | | | | | | | 3 | 52 |
| BD10F | | | | | | | | | | | 3 | | 2 | | | | | | | | | | | | | | | 4 | |
| SF26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | |
| SF27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 120 |
| SF28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 120 |
| LT15 | | | | | | | | | | | | | 4 | | | | | | | | | | | | | | | 3 | |
| LT17 | | | | | | | | | | | 1 | | 1 | | X | | | | | | | | | | | | | 3 | 60 |
| LT19 | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | 3 | 99 |
| LA27 | | | | | | 1 | | | 2 | | | | | | | | | | | | | | | | | | | 3 | |
| LA28 | | | | | 1 | | | 1 | 3 | | | | | | | | | | | | | | | | | | 2 | 3 | |
| LA31 | | | | | 1 | | | 1 | | | T | | | | | | | | | | | | 1 | | | | 1 | 3 | 78 |
| RR9 | | | | | 1 | | | | | | | | | | X | | | | | | | | | | | | 1 | 4 | 104 |
| NS4 | | | | | S | | | 1 | | | 2 | | 2 | | X | | | | | | | | 1 | | | | | 4 | 104 |
| NS6 | | | | | | | | | | | 3 | | 10 | | X | | | | | | | | 1 | | | | | 3 | 78 |
| KW18 | | | | | | | | 1 | | | 2 | | 2 | | | | | | | | | | | | | | 1 | 3 | 78 |
| b. Buckshot plains | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NS5 | 1 | | | | | | | 2 | | | 2 | | 3 | | | | | | | | | | 1 | | | | | 3 | 78 |
| KW24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| c. Drainage lines in sandplains | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LG10 | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | 120 |
| RR14 | | | | | | | | | | | | | 1 | | X | | | | | | | | | | | | | 3 | |
| KW21 | | | | | | | | | 1 | | 1 | | 2 | | | | | | | | | | | | | | | 3 | |
| TOTALS | 1 | | X | | 4 | 1 | | 11 | 6 | | 20 | 2 | 34 | 4 | X | | | | | 1 | | 2 | 5 | | 2 | | 10 | 81 | 1496 |

## APPENDIX I (Continued)

## NATIVE MAMMAL DATA FROM POST-1977 SAMPLE SITES IN THE GREAT SANDY DESERT

| HABITATS | NUMBER OF SPECIMENS RECORDED (S = scat or skeletal; X = present; T = tracks) | | | | | | | | | | | | | | | | | | | | | | | | | TRAPPING EFFORT PF = Pit-fence Nights M = Metal Trap Nights | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Megaleia rufa* | *Macropus robustus* | *Onychogalea unguifera* | *Macrotis lagotis* | *Antechinus rosamondae* | *A. macdonnellensis* | *Smithopsis macroura* | *S. youngsoni* | *Ningaui* cf. *ridei* | *Planigale ingrami* | *Notomys alexis* | *Leggadina forresti* | *Pseudomys nanus* | *P. hermannsburgensis* | *P. delicatulus* | *Canis familiaris* | *Nyctophilus geoffroyi* | *Epiesicus pumilis* | *Chalinolobus gouldii* | *Nyctiecius balstoni* | *Taphozous hilli* | *T. flaviventris* | *Tadarida australis* | *Mormopterus* cf. *beccarii* | *Chaerephon jobensis* | *Pteropus spaculatus* | *Mus musculus* | PF | M |
| 2. SAND DUNES | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D3/2 | | | | | | | | | | | | | | | 5 | | | | | | 1 | | | 1 | 1 | | 4 | |
| D3/4 | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | 5 | |
| LG3 | | | | | | | | | | | | 1 | | 4 | | | | | | | | | | | | | 4 | 60 |
| LG7 | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | 4 | 160 |
| AR33 | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | 3 | 52 |
| AR35 | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | 3 | |
| AR48 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 420 |
| BD10D | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | 4 | |
| BD10E | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 | |
| SF24 | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | 6 | |
| SF25 | | | | | | | | 1 | | | | | | 1 | | | | | | | | | | | | | 4 | 80 |
| SF29 | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | |
| LT20 | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | 75 |
| LT22 | | | | | | | | 1 | 1 | | | | | 1 | | | | | | | | | | | | | 6 | |
| MW23 | | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | |
| LA29 | | | | | | | | | 1 | | | | | | | | | | | | | | | | | | 3 | |
| LA30 | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 78 |
| RR11 | | | | | | | | | | | | | | | | X | | | | | | | | | | | 3 | 78 |
| NS2 | | | | | | | | | | | 1 | | | 4 | | X | | | | | | 1 | | | | | 4 | 104 |
| NS3 | | | | | | | | 1 | 1 | | | | | 2 | | X | | | | | | 1 | | | | | 4 | 104 |
| KW16 | | | | | | | | | | | 4 | | | 4 | | | | | | | | 1 | | | | | 3 | |
| KW19 | | | | | | | | | | | 1 | | | 2 | | | | | | | | | | | | | 3 | 78 |
| TOTALS | | | | | | | | 6 | 3 | | 6 | 1 | | 22 | 6 | X | | | | | | 1 | 3 | | 1 | 1 | 1 | 73 | 1289 |
| 3. HILLS AND RANGES | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MH41 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | 80 |
| GH10G | | | | | | | | | | | | | | | | | | 1 | | | 9 | | | | | | | |
| SE14 | | 1 | | | | | | | | | | | | | | | | | | 1 | | | | | | | | |
| SE14B/C | | | | | | | | | | | | | | | | | | | | | | | | | | | | 180 |
| SE14D | | | | | | | | | | | | | | | | | | | | | | | | | | | | 120 |
| SE11 | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | |
| AR39 | | 1 | | | | | | | | | | | | | | | | 15 | | | | | | | | | | |
| RR13 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 78 |
| RR15 | | S | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RR15A | | | | | | | | | | | | | | | | | | 2 | | | | | | | | | | |
| NS7 | | 2 | | | | | | | | | | | | | | X | | 3 | | | | | | | | | | |
| KW22 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | 78 |
| KW23 | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | 78 |
| TOTALS | | 7 | | | | | | | | | | | | | | X | | 23 | | 1 | 9 | | | | | | 0 | 614 |

## APPENDIX I (Continued)

## NATIVE MAMMAL DATA FROM POST-1977 SAMPLE SITES IN THE GREAT SANDY DESERT

| HABITATS | NUMBER OF SPECIMENS RECORDED (S = scat or skeletal; X = present; T = tracks) | | | | | | | | | | | | | | | | | | | | | | | | | TRAPPING EFFORT PF = Pit-fence Nights M = Metal Trap Nights | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Megaleia rufa* | *Macropus robustus* | *Onychogalea unguifera* | *Macrotis lagotis* | *Antechinus rosamondae* | *A. macdonnellensis* | *Sminthopsis macroura* | *S. youngsoni* | *Ningaui* cf. *ridei* | *Planigale ingrami* | *Notomys alexis* | *Leggadina forresti* | *Pseudomys nanus* | *P. hermannsburgensis* | *P. delicatulus* | *Canis familiaris* | *Nyctophilus geoffroyi* | *Eptesicus pumilus* | *Chalinolobus gouldii* | *Nyctiecius balstoni* | *Taphozous hilli* | *T. flaviventris* | *Tadarida australis* | *Mormopterus* cf. *beccarii* | *Chaerephon jobensis* | *Pteropus spaculatus* | *Mus musculus* | PF | M |
| 4. ALLUVIAL LOAMS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MH43 | | | | | | | | | | | | | | 2 | | | | | | | | | | | | | | 12 |
| DT44 | S | | | | | | | | | | | | | | | 3 | | | | | | | | | | 3 | | 80 |
| LG4 | | | | | | | | | | | | | | | | | | | | | | | | | | 6 | | 56 |
| LG5 | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | |
| LG10B | | | 1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| LG10C | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| AR37 | | | | | | | | | | 1 | | | | | | | | | | | | | | | | | 2 | 50 |
| AR38 | 2 | | | S | | | | | | 2 | | 1 | | | | | | | | | | | | | | | 2 | 72 |
| AR47 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 320 |
| AR49 | 2 | | | | | | | | | | | | | 1 | | | | | | | | | | | | | | 560 |
| SE12 | | | | | | | | | | | | 1 | 1 | | | X | | | | | | | | | | | 3 | |
| SE13 | | | | | | | | | | | | 1 | | 1 | | | | | | | | | | | | 1 | 3 | |
| SE14A | | | | | | | | | | | | | | | | | | | | | | | | | | | | 120 |
| SE14B | | | | | | | | | | | | | | | | | | | | | | | | | | | | 120 |
| SF30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | 99 |
| LA32 | | | | | | | | | | | | | | | | X | | | | | | 4 | | | | | | |
| LT18 | | | | | | | | | | | | | | | | X | | | | | | | | | | 1 | 3 | 60 |
| RR8 | | | | | | | | | | | | | | | | X | | | 7 | 1 | | 1 | 1 | 1 | | 3 | | 104 |
| RR10 | | | | | | | | | | | | | | 1 | | | | | | | | | | | | 2 | 4 | 104 |
| NS1 | 1 | | | | | | | | | | | | | 2 | | X | | | 1 | | | | 1 | | | 2 | 4 | 104 |
| KW17 | | | | | | | | 2 | | | 1 | | | | | | | | | | | | | | | 2 | 3 | 78 |
| TOTALS | 5 | | 3 | S | | | | 2 | | 3 | 1 | 3 | 1 | 5 | 2 | X | 3 | | 8 | 1 | | 2 | 6 | 1 | | 20 | 24 | 1939 |
| 5. SALINE LOAMS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LG8 | | | | | | | 1 | | | | | | | | | | | | | | | | | | | | | 45 |
| LT21 | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | | 120 |
| LA25 | | | | | | | 2 | | | | | | | | | X | | | | | | 2 | | | | | 3 | |
| LA26 | | | | | | | 1 | 1 | | | | | | | | | | | | | | | | | | | 3 | 52 |
| RR12 | | | | | | | | | | | | | | | | X | | | | | | | | | | | 3 | |
| KW20 | | | | | | | | 2 | | | | | | 1 | | | | | | | | | 1 | | | 2 | 3 | 78 |
| TOTALS | | | | | | | 4 | 3 | | | | | | 1 | | X | | | | | | | 3 | | | 3 | 12 | 295 |

## Appendix 2. Mammals known from the Gibson, Little Sandy and Great Victoria Deserts and the Warburton Region

| SPECIES NAME | DISTRI-BUTION* | DATE OF RECORD† |
|---|---|---|
| Macropus robustus | W | X |
| Megaleia rufa | A | X |
| Onychogalea lunata** | A | ?** |
| Lagorchestes hirsutus | A | 1931 |
| L. conspicillatus | A | 1959 |
| Petrogale penicillata | W | 1971 |
| Bettongia lesueur | A | 1889 (1929) |
| Trichosurus vulpecula | W | 1965 |
| Isoodon auratus | W | 1931 |
| Perameles eremeana | A | 1943 |
| Macrotis lagotis | A | X |
| Dasyurus geoffroii | W | ** |
| Dasycercus cristicauda | A | X |
| *Antechinus rosamondae | A | X |
| *A. macdonnellensis | A | X |
| *Sminthopsis ooldea | A | X |
| *S. longicaudata | A | X |
| *S. crassicaudata | W | 1967 |
| *S. macroura | A | X |
| *S. hirtipes | A | X |
| *S. youngsoni | A | X |
| *Antechinomys laniger | A | 1973 |
| Myrmecobius fasciatus | W | ?1948** |
| *Ningaui ridei | A | X |
| *Notoryctes typhlops | A | 1968 |
| Leporillis apicalis | A | nests only |
| *Notomys alexis | A | X |
| *Leggadina forresti | W | 1967 |
| *Pseudomys hermann. | A | X |
| *P. chapmani | A | X |
| *P. desertor | A | X |
| Canis familiaris | W | X |
| Tachyglossus aculeatus | W | X |
| *Macroderma gigas | W | 1961 |
| *Nyctophilus geoffroyi | W | X |
| *Eptesicus pumilis | W | X |
| *Chalinolobus gouldii | W | X |
| *Nycticeius balstoni | W | X |
| *Taphozous georgianus | W | X |
| *T. flaviventris | W | X |
| *Tadarida australis | W | X |
| *Mormopterus aff beccarii | W | X |
| *M. planiceps | W | X |

*Small ground mammals and bats.
*Distribution Code as in Table 19.
†Most recent record; X = post-1975
**Burbidge and Fuller (1979).

## Appendix 3. Further data on mammals collected by the Canning Expedition (Lipfert) in the Great Sandy Desert (W.A. Museum File A174/72)

The General Secretary
Public Library, Museum & Art Gallery
PERTH W.A.

Sir,

By courtesy of the Minister for Works I had the honour to be entrusted with the collection of natural history as well as ethnological specimens on the Canning Stock route expedition through the interior of Western Australia, no collection in this part having ever been made.

With respect to the former a fairly complete and representative collection of all or nearly all marsupials, birds and reptiles was obtained, all the members of our party assisting in the collection of them. Snakes were very rarely met with, lizards were, on the contrary, plentiful, but not of great variety, one or two species were met with on nearly the whole route. At some of the water holes, tadpoles and frogs were obtained as well as water beetles and some other aquatic animals. Birds were not very numerous, at some camps even very rare and seemed to be continually moving. If I did not collect a bird immediately it was seen, it would hardly ever be seen again. The greater number of birds seemed to be Honey-eaters and Woodswallows. One species of singing Honey-eater was observed at nearly every Well. The scarcity of animal life may perhaps be explained by the prolonged period of drought, three years or more, which had occurred up to the year before our expedition. Mammals were not observed for nearly one third of the distance. At Well 24. the first positive proof of them was found in the capture of eleven Jerboa Mice, though scratchings had been found near some of the earlier wells and one bat had been captured at Well 8 but a fairly large number of bats was captured later at Wells 46 and 45.

The larger marsupials were almost completely absent during our trip northwards. Only one kangaroo was seen by me. Mr Canning, however, reported having seen two. Near the flooded Sturt Creek several Nail-tailed kangaroos were observed by some of our party, but none obtained. Small rodents were very rare, only a few being caught. Really pure-bred Dingoes also may be considered as very scarce; the dogs caught during our trip can only be regarded as mixed breeds, being for the most part niggerdogs. Owing to our food supply getting rather short, the Wells were repaired only up to 37 from whence a continued march was made to Well 51. and from there to Billiluna Cattle Station, from the store of which some tinned food as well as fresh beef was obtained. A few days after our arrival in the vicinity of Billiluna Pool, Mr Canning and two members of our party left for Hall's Creek, about 140 miles off, to bring provisions for our return trip, the Wells 51 to 39

having to be repaired. Shortage of food may be explained by the work taking far longer than was estimated, the woodwork around many of the Wells had to be replaced, having been destroyed either by fire or by natives, and the troughing and other iron work having been carried off by them. On the return trip some very hot weather was experienced, as well as further south very cold nights, but on the whole very little complaint needed to be made on that account. It is to be regretted that neither a thermometer nor a barometer was carried as the temperature could not properly be registered by guess.

A flock of 105 or so of goats was bought in Hall's Creek by Mr Canning and delivered at Well 50, if I remember rightly, so we could have fresh meat for most of our return trip, also a good deal of milk.

A number of Wedgetail Eagles was seen, but mostly soaring at a great height. Only one came to my gun. Unfortunately, however, although severely wounded, it flew over several sandhills and was found only two or three days later, totally useless for preserving. Mr Canning reported having killed another, but was not able to find it in the spinifex.

Of Emu, only the track of one was seen on our up trip, but the tracks of two natives were just close behind it. Bustards also were observed but not killed. Natives were very rarely encountered, though often smokes were seen. On five or six different occasions small parties came near the camps but were each time sent away.

I personally never regarded the niggers as very dangerous, as with the exception of stealing one bag of flour and about three-quarters of a bag of sugar and spearing several camels, no trouble with them was experienced. But I do not wish to say that they are harmless, as there are up that route the graves of six or seven whites who have been speared by them. But as I never before have been in touch with niggers, I do not wish to give an opinion either way, although our camp could have been routed any night, as no watch was kept and our only dog got poisoned on the road up with bait laid for dingoes. As I could not obtain any specimens by sitting in camp, I tramped about in a radius of two or even three miles from camp by myself without even once coming in contact or even seeing any natives.

The few spears and native curios were picked up near old camps or brought up when cleaning out the Wells by the well-sinkers. Of the few natives encountered close to camp I secured photos, which I trust will prove interesting. A very good collection of curios was presented by Mr Rowan of Billiluna, who also gave me the translation of more than seventy native words.

A very peculiar find was made at Well 34. when that was cleaned out. The skull of, as I take it, a young half-caste woman was brought up, somewhat damaged by a shovel, being pushed into it. As no other human bones could be found, how did the head come into the Well? And what became of the body? One tribe, the "Goona Dunga Jarrah" are said to be feared by all other natives as cannibals; was the head the remains of a feast? We had used the water of this Well for the whole week for cooking, drinking and washing, without the least ill effect.

The most common animnal was a little Hare Wallaby, Lagorchestes sp. which, however, was exceedingly agile; one leap (after having been fired at) measured nine feet eight inches. Only six adult and three young were obtained with the help of different members of the party, although around the old camps of the natives the bones of this little wallaby were the proof of their being the principal food. The nest-building Rat, said to have been found twenty four or twenty six years ago, was, however, not seen this trip. At Well 24, I was lucky in obtaining eleven Jerboa Mice, the only place where I found them on our up trip. Several more were trapped further north on our return trip. At Well 31, the Bandicoots were first encountered, one Dalgyte as well as two of a Short-nosed sp. being trapped - the Dalgyte in a Dingo trap by D. Cronin. On account of heavy rains during the late summer, food being more plentiful, the Short-nosed Bandicoot was quite numerous on our return trip, tracks were seen every day and sixteen being obtained. Only one Marsupial Mole was captured, by members of the party, on their return from Goodwin (Well 11) (on our trip north, a lot of iron material had to be left behind to be picked up later when the work on the Wells really commenced, so from Well 24 a party of four were sent back to bring that material in, they met us again at Well 36.) A member of this party found the Mole and brought it to me. At this Well, also, a little Marsupial, Dasycercus, like a small Native Cat, but without spots, was trapped; this little animal I found later on at nearly every camp, fifty-two being obtained and preserved.

Snakes were not often seen and all belong to three or four species, one Pseudechis sp. was caught in a rat-trap. Lizards, however, were quite plentiful, particularly a small red kind, of which quite a number was collected, also a Woodlizard was obtained in numbers.

With the exception of millions of very troublesome flies and, in the region of the swollen Sturt Creek, mosquitoes, insects were not over plentiful. Of butterflies, the Checkered Swallowtail, a Woodwhite, Meadowargus, and one or two more, besides a number of very small Blues, were the only species seen and caught. Moths were more numerous and I had, on different nights, very good bags, especially in Mr Canning's tent.

I found also a number of Dragon-flies, both in larval and full grown stages, and a number of Lacewings, which might prove to be very interesting.

Wasps, I found in numbers around some flowering wattle bushes at Well 49 during a spell of exceedingly hot weather. Ants also were numerous at some camps, sometimes even troublesome.

I took about twenty reels of photos, but as the camera proved after a little use to be not quite light-tight, many of the films are spoiled. During the last few weeks I had the loan of Mr J. Stuart's camera, and those photos are good. As most of them are views of the so-called Desert Country they should be quite interesting.

The trip itself, estimated to take nine or ten months, lasted over seventeen months, and was, at times, somewhat severe. The distance from Perth to Meekatharra by rail is about 600 miles, from there to Windich Spring, by motor truck, two hundred, and from there to Billiluna Pool about eight hundred and thirty miles. The return journey was over Wiluna, eight hundred and fifty five miles or so and then by rail to Perth, about seven hundred miles.

Sandhills in vast numbers had to be crossed, which proved often very hard on the dray camels, less so on pack camels or on saddle horses.

The vegetation consisted for the greatest part of several kinds of spinifex, though large groves of so-called Desert oak, several kinds of Gum trees, Wattle, Mulga, and other bushes were often passed through. Over the whole of the route, if rain would fall as during last season, the droving of stock should not be a very difficult undertaking.

The health, during the whole of that prolonged trip,of all of our party, must be considered as having been remarkably good, only one accident occurred, luckily without any serious consequences.

In conclusion, I wish here to express my sincere thanks to all the members of our party for their cordial assistance and co-operation in helping me to make the Canning Expedition collection as complete as possible.

Trusting that the collection in all its parts has proved, numerically as well as in condition, satisfactory to the Trustees of this Institution.

I am,

Yours faithfully,

Sgd. Otto H. Lipfert.
Taxidermist.

**Appendix 4. Habitat descriptions, dates and trapping effort at the D3 campsite (drawn from McKenzie and Kenneally 1981)**

The D3 Campsite, 18°54'00"S 123°02'20"E, was visited between 24 and 29 September 1980. Five of the seven sample sites trapped were within the Great Sandy Desert as defined by Beard (1978). Vegetation codes follow Muir (1977).

D3/1: red-brown interdune sandplain, 1.5 km south of camp (4 pit-fence nights).
LBr Eucalyptus zygophylla, Gardenia sp., Grevillea pyramidalis; Sr Grevillea wickhamii; SCi Acacia tumida, Cyanostegia cyanocalyx; SDi Jacksonia aculeata, Calytrix longiflora, Newcastelia cladotricha, Dampiera cinerea; GLi; Hr Plectrachne schinzii.

D3/2: red-brown loamy sand dune, 0.6 km north of camp (4 pit-fence nights).
LBr Eucalyptus zygophylla, Grevillea pyramidalis; Sr Grevillea wickhamii; SAr Acacia tumida, Grevillea aff. eriostachya; SCr Erythrophleum chlorostachys; SDi Cyanostegia cyanocalyx, Burtonia simplicifolia, Calytrix longiflora; GLr; Hi Plectrachne schinzii.

D3/3 : red loamy sandplain, 8.5 km north of camp (5 pit-fence nights).
LBr Gardenia sp., Eucalyptus zygophylla, Grevillea pyramidalis, Codonocarpos continifolius; Si Acacia ptychophylla; SCi Jacksonia aculeata, Erythrophleum chlorostachys; SDr Ptilotus calostachyus, Brunonia australis; GTr; GLi; Hi.

D3/4 : red loamy sand of lower dune slope, 10.4 km north of camp (5 pit-fence nights).
LBr Eucalyptus zygophylla; Si Acacia stipuligera, SCr Keraudrinia integrifolia; SDi Newcastelia cladotricha; GLr; Hi. Large thickets of SAc Acacia platycarpa also present.

D3/5 : firm red-brown loamy sandplain, 18.9 km north of camp (5 pit-fence nights).
LBr Eucalyptus sp. nov. ("bloodwood"), Gardenia sp., Grevillea refracta; Sr Acacia stipuligera, A. ancistrocarpa; SCr Jacksonia aculeata; GTi; GLi; Hi.

## PART IV

## BIRDS

by A.N. Start[1] and P.J. Fuller[2]

### INTRODUCTION

This paper presents an account of observations made on birds of the Great Sandy Desert and adjoining areas of the Little Sandy and Tanami Deserts (nomenclature of Beard 1969) during five visits between August 1977 and June 1980.

In August 1977 N.L. McKenzie visited the McLarty Hills and Dragon Tree Soak by helicopter while W.K. Youngson and J.K. Rolfe worked on the Anketell Ridge. In April and May 1979 A.A. Burbidge, P.J. Fuller, A. Chapman, R.E. Johnstone and L.A. Smith visited Lake Gregory and travelled down the Canning Stock Route to Well 35, then via Gary Junction and the Anketell Ridge Road across Lake Auld and along the Anketell Ridge. At the same time N.L. McKenzie, W.K. Youngson, A.N. Start and A.A.E. Williams travelled east along the Talawana track to Windy Corner (on the edge of the Gibson Desert), north along the Gary Highway then west on the Anketell Ridge road to Well 33 and north west by the same route as A.A. Burbidge et al. They made diversions to the Rudall River from the Talawana Track and to Lake Auld from Well 33 via Well 30. In March 1980 N.L. McKenzie, C.J. Nicholson, P.J. Pennings and R.E.S. Sokolowski revisited the Anketell Ridge. In May and June 1980 A.A. Burbidge and P.J. Fuller revisited Lake Gregory and travelled south from Balgo Mission to near Bishops Dell and Point Moody. Campsites are shown in Table 1.

Geomorphology and vegetation of these sites are described in McKenzie et al. (this publication). Description of vegetation formations follows the terminology of Muir (1977). "Samphire" refers to Dwarf Scrub D of Halosarcia spp. on saline flats.

Data on birds were collected opportunistically while working traplines and exploring various habitats on foot as well as from vehicles in the vicinity of campsites (including spotlight surveys at night) and while in transit between campsites.

In the annotated list, data are presented in the following order:

1. Species name. Scientific and vernacular nomenclature and sequence follow Storr and Johnstone (1979). Sub-specific status is quoted only where identification is based on specimens.
2. Site(s) at which species was recorded. Where relevant the number of individual birds at each site is shown in brackets.
3. Status and habitat. Status is given as common, moderately common, uncommon or rare. When describing status we are making a judgement based on our experience with each species here and elsewhere in Western Australia.
4. Breeding data.
5. Specimens. Specimens are lodged in the Western Australian Museum. Accession numbers are given in the annotated list for all specimens.

### ANNOTATED SPECIES LIST

CASUARIIDAE

Dromaius novaehollandiae **Emu**

DT (tracks), LG (tracks, 1979), BD (2), NS (2), 37 km E of Balfour Downs Homestead (2).

Uncommon. Gravel plains, sand plains and dunes.

PODICIPEDIDAE

Podiceps novaehollandiae **Black-throated Grebe**

LG (2 on a claypan 30 km NW of Lake Gregory Homestead and 1 on Bulbi Plain, all 1980), RR (3 on Coondegoon Pool and 1 in a rockhole 3 km W of RR camp).

Uncommon. Flooded claypan, temporary lake, river pool and rockhole.

Podiceps poliocephalus **Hoary-headed Grebe**

LG (2, 1979), RR (1 on Coondegoon Pool).

Uncommon. Open water on Lake Gregory and river pools.

PELECANIDAE

Pelecanus conspicillatus **Australian Pelican**

LG (About 5 000 and 1 000 near S end of Lake Gregory and smaller flocks on Bulbi Plain, all 1980).

Sometimes common. On NE lakes in suitable seasons.

[1]National Parks Authority of Western Australia, P.O. Box 119, Karratha, W.A. 6714.

[2]Western Australian Wildlife Research Centre, Department of Fisheries and Wildlife, P.O. Box 51, Wanneroo, W.A. 6065.

**Table 1. Great Sandy Desert Campsites**

| Site Name | Code | Campsite Coordinates | Dates |
|---|---|---|---|
| McLarty Hills | MH | 19°31'S 123°30'E | 5 - 9 August 1977 |
| Dragon Tree Soak | DT | 19°40'S 123°22'E | 9 - 13 August 1977 |
| Southesk Tablelands | SE | 20°15'S 126°34'E | 28 April - 2 May 1980 |
| Lake Gregory | LG | 20°20'S 127°26'E | 23 - 28 April 1979 |
| | | | 30 May - 4 June 1980 |
| Anketell Ridge | AR | 20°25'S 122°08'E | 5 - 13 August 1977 |
| | | | 13 - 16 May 1979 |
| | | | 22 - 25 March 1980 |
| Bishops Dell | DB | 20°42'S 127°48'E | 4 - 9 June 1980 |
| Swindells Field | SF | 20°56'S 123°15'E | 9 - 13 May 1979 |
| Lake Tobin | LT | 21°45'S 125°40"E | 4 - 7 May 1979 |
| Rudall River | RR | 22°32'S 122°24'E | 26 April - 1 May 1979 |
| Lake Auld | LA | 22°28'S 123°54'E | 8 - 11 May 1979 |
| Nooloo Soak | NS | 22°52'S 121°57'E | 22 - 26 April 1979 |
| Karara Well (No. 24) | KW | 23°07'S 123°21'E | 2 - 5 May 1979 |

PHALACROCORACIDAE

Anhinga melanogaster **Darter**

LG (1 at S end, 1980).

Rare.

ARDEIDAE

Ardea pacifica **Pacific Heron**

LG (4 single birds 1979, 39 and 40 on Lake Gregory and Bulbi Plain respectively, 1980), RR (3 at Coondegoon Pool).

Sometimes common on NE lakes, uncommon elsewhere. Lake margins and river pools.

Ardea novaehollandiae **White-faced Heron**

LG (1 near mouth of Sturt Creek, 1979, 1 and 11 on Lake Gregory and Bulbi Plain respectively, 1980), RR (1 near campsite, 2 at Coondegoon Pool).

Sometimes moderately common on NE lakes, uncommon elsewhere. Lake margins and river pools.

Egretta alba **Great Egret**

LG (1 11 km from mouth of Sturt Creek, 1979, 16 at S end of Lake Gregory, 1980).

Sometimes moderately common on NE lakes. Lake margins.

Nycticorax caledonicus **Rufous Night Heron**

Well 30 (1).

Rare. A roosting adult was flushed from the canopy of a tree in Low Woodland A of Eucalyptus terminalis.

THRESKIORNITHIDAE

Threskiornis spinicollis **Straw-necked Ibis**

LG (3 W of Bulbi Plain, 1980), AR (9 at about 20°28'S 122°12'E, 1977).

Uncommon. Lake margins. The 9 birds at AR which were perched in a dead tree over hummock grass were probably passage migrants.

Platalea regia **Royal Spoonbill**

LG (1, 1980).

Rare. Lake margin.

Platalea flavipes **Yellow-billed Spoonbill**

LG (7, 1980).

Uncommon. Lake margin.

ANATIDAE

Cygnus atratus **Black Swan**

LG (14 at mouth of Djaluwon Creek and 10 near mouth of Sturt Creek, 1979, 18 at S end of Lake Gregory, 1980).

Moderately common on NE lakes. Open water.

Tadorna tadornoides **Mountain Duck**

LG (8 11 km from the mouth of Sturt Creek, 1979).

Uncommon. Open water.

Anas superciliosa **Black Duck**

LG (1 11 km from the mouth of Sturt Creek, 1979), RR (5 adults on Coondegoon Pool).

Uncommon. Open water and river pools.

Two broods of 8 and 3 ducklings on Coondegoon Pool.

One specimen, a duckling, A17348, from Coondegoon Pool.

Anas gibberifrons **Grey Teal**

LG (about 100 near the mouth of Djaluwon Creek, 100 and 1 000 respectively at the mouth of and 8 km further upstream on Sturt Creek, all 1979, 6 on a claypan 30 km NW of Lake Gregory Homestead, more than 25 000 at the S end of Lake Gregory and up to 500 on Bulbi Plain, all 1980), RR (3 on a rockhole 3 km W of camp and 11 at Coondegoon Pool).

Common on NE lakes, moderately common elsewhere. Water, including isolated rockholes, flooded claypans and lakes.

Malacorhynchus membranaceus **Pink-eared Duck**

LG (about 100 + 20 near the mouth of Sturt Creek, 1979, about 50 on Bulbi Plain, 1980), RR (2 on Coondegoon Pool).

Moderately common, especially on NE lakes. Lakes and river pools.

Aythya australis **Hardhead**

LG (6 at SW corner of Lake Gregory, 1980).

Uncommon. Open water.

Chenonetta jubata **Wood Duck**

LG (4 at SW corner of Lake Gregory, 1980).

Uncommon. Open water.

ACCIPITRIDAE

Elanus caeruleus **Black-shouldered Kite**

AR (1, 1979).

Rare. Flying above scattered shrubs over hummock grass.

Hamirostra melanosternon **Black-breasted Kite**

MH (1), BD (1 at 85 km and 1 at 168 km S of Balgo Mission).

Uncommon. Flying over sand plains and sand dunes.

Haliastur sphenurus **Whistling Kite**

LG (7 sightings, various locations around Lake Gregory, 6 in 1979 and 1 in 1980, 1 11 km NW of Lake Gregory Homestead, 1980), 70 km SW of Radi Hills (1, 1979).

Moderately common around LG, rare elsewhere. Frequently near the lake margins.

Milvus migrans **Black Kite**

SE (2), LG (1, 1979, 1, 1980), BD (2 sightings, possibly only one bird), AR (about 100 flying south, 22 March 1980).

Uncommon. Variety of habitats. About one week after the AR sightings, a large influx of this species was noted in the Pilbara (ANS pers. obs.).

Accipiter fasciatus **Brown Goshawk**

DT(1), RR(1), NS(2).

Uncommon. Variety of habitats, usually in or near trees along watercourses.

Accipiter cirrocephalus **Collared Sparrowhawk**

LG (2 sightings, possibly of one bird, 1979), 20°06'S 121°09'E (1, 1979).

Uncommon. One in trees along a watercourse and one in sparse shrubs over hummock grass.

Aquila morphnoides **Little Eagle**

LG (2, 1980), BD (2 between 75 and 80 km S of Balgo Mission), RR (1 at Coondegoon Pool), 5 km S of Radi Hills (1, 1979), 5 km N of Kidson Corner and near Wells 30, 39, 49 and 50 (single birds).

Moderately common. Variety of habitats; usually seen flying.

One nest with young on Bulbi Plain, May 1980.

Aquila audax **Wedge-tailed Eagle**

LG (2 sightings possibly of one bird, 1979, 1, 1980), AR (2, 1980).

Uncommon.

A large nest at AR contained twigs with fresh green leaves in 1979.

Circus assimilis **Spotted Harrier**

LG (3, 1980), 35 km W of Well 51 (1), BD (1), AR (1, 1979), MH (1), DT (1), SF (2), LT (1), RR (1), KW (1).

Moderately common. Single birds quartering, usually over hummock grass among dunes and over sand plains, less commonly over scrub (e.g. Acacia aneura on rocky ridges at KW) and along tree-lined watercourses.

Circus aeruginosus **Marsh Harrier**

LG (1 on Bulbi Plain, 1980).

Rare. Near water's edge.

FALCONIDAE

Falco subniger **Black Falcon**

55 km NW of SF (1, 1979).

Rare. It stooped on a vehicle. Dwarf scrub over open hummock grass on sand plain.

Falco peregrinus **Peregrine Falcon**

LG (1, 11 km from mouth of Sturt Creek, 1979).

Rare. Mobbed by Magpie-larks.

Falco longipennis **Australian Hobby**

LT (2 sightings, possibly of one bird).

Rare. Over samphire, once in pursuit of a Budgerigah.

Falco berigora **Brown Falcon**

All campsites.

Common. In a variety of habitats particularly dunes and plains with scattered trees and shrubs over hummock grass.

One pair attending a new nest at LG on 2 June 1980.

Falco cenchroides **Australian Kestrel**

All campsites.

Common. The most abundant raptore throughout the area.

PHASIANIDAE

Coturnix ypsilophora **Brown Quail**

LG (3 on Bulbi Plain 1980).

Rare. At lake's edge in low grass.

TURNICIDAE

Turnix velox **Little Button-quail**

Most areas.

Common, particularly in bunch grass on Bulbi Plain and at NS, but regularly observed in hummock grass at some sites. Frequently flushed while spotlighting at night.

Chicks were captured in pit traps at NS, AR (1979) and were seen 51 km E of SF.

Two specimens, A16084 and A17149, from NS.

GRUIDAE

Grus rubicundus **Brolga**

LG (5 flocks of 2 to 15, 1979, 11 flocks of 2 to 25, 1980).

Locally common. Near water's edge on Lake Gregory and Bulbi Plain.

RALLIDAE

Gallinula ventralis **Black-tailed Native Hen**

RR (1 at Coondegoon Pool).

Rare. Bank of a permanent river pool.

Fulica atra **Coot**

LG (1 and 6 at the mouths of Djaluwon and Sturt Creeks respectively, 2 on a pool in the Lake, 1979).

Uncommon. Open water. None were recorded in 1980 when water was much more abundant in the area.

OTIDIDAE

Otis australis **Australian Bustard**

Most areas.

Moderately common. Wide range of open habitats.

CHARADRIIDAE

Charadrius ruficapillus **Red-capped Plover**

LG (flocks of about 50 and 200, 1980).

Moderately common. Lake margins.

Charadrius melanops **Black-fronted Plover**

LG (several on a claypan 30 km NW of Lake Gregory Homestead, odd groups on Lake Gregory, 6 at Len's Bore, 1980), RR (4 at RR, 2 3 km W of RR and 5 at Coondegoon Pool), Gravity Lakes (1).

Moderately common. Claypan, lake margins, rockhole and permanent river pool.

2 of the 4 at RR were fledged young.

One specimen, A17146, from Coondegoon Pool.

Charadrius cinctus **Red-kneed Plover**

LG (5, 1980).

Uncommon. Lake margin.

Peltohyas australis **Australian Dotterel**

KW (3 on N slopes of McKay Range, 3 and 5 4 km E of Well 24).

Uncommon. Sparsely vegetated rocky and gravelly slopes.

SCOLOPACIDAE

Tringa nebularia **Greenshank**

LG (1, 1979).

Rare. Water's edge.

Tringa hypoleucos **Common Sandpiper**

LG (3, 1979).

Rare. Water's edge.

Calidris ruficollis **Red-necked Stint**

LG (3, 1979, 1, 1980).

Uncommon. Water's edge.

RECURVIROSTRIDAE

Himantopus himantopus **Black-winged Stilt**

LG (1, 1979, 1, 1980).

Uncommon. Lake margin.

Recurvirostra novaehollandiae **Red-necked Avocet**

LG (3, 1979, 25, 1980).

Uncommon. Lake margins and lagoons.

GLAREOLIDAE

Stiltia isabella **Australian Pratincole**

LG (3 20 km W Balgo Mission, 1979, 16 on Lake Gregory, 1980).

Uncommon. Gravelly plain after a storm and near lake's edge.

LARIDAE

Larus novaehollandiae **Silver Gull**

LG (20 at mouth of Sturt Creek, 1979, 9 and about 60 at SW and S sides of Lake Gregory, 1980).

Moderately common. Lake margins and open water.

Two specimens, A16063-4 (1970). One contained small fish.

Sterna nilotica **Gull-billed Tern**

LG (21 at mouth of Sturt Creek, 1979, 9 at SW corner of Lake Gregory, 1980).

Moderately common. Lake margins and open water.

One specimen, A16065 (1979).

Sterna caspia **Caspian Tern**

LG (7 at mouth of Sturt Creek, 1979, 62 at SW corner of Lake Gregory, 1980).

Moderately common. Lake margins and open water.

Sterna hybrida **Whiskered Tern**

LG (30 at mouth of Sturt Creek, 1979, 6 at SW corner of Lake Gregory and about 2 000 on Bulbi Plain, 1980).

Sometimes locally common. Lake margins and open water.

COLUMBIDAE

Geopelia striata **Peaceful Dove**

RR.

Locally common. Drank regularly from a soak. Seen and heard frequently in riverine vegetation.

Geopelia cuneata **Diamond Dove**

DT, LG, AR, LT, RR, NS, KW and intervening locations.

Common. Frequently near water. Timbered drainage lines, thickets of Acacia aneura and

open scrub to scattered shrubs over hummock grass.

One specimen, A17140, from a rockhole at 22°53'S 122°33'E.

Phaps chalcoptera **Common Bronzewing**

DT (2), RR (2 including 1 at Coondegoon Pool), NS (1).

Uncommon. Sandstone range, gravelly river bed and at a waterhole; usually on the ground under moderately dense scrub.

Geophaps plumifera **Spinifex Pigeon**

RR (5), Rockhole at 22°53'S 122°33'E, (6).

Uncommon. Rocky hills and ridges near water.

Two specimens, A16082 and A17145, from 22°53'S 122°33'E.

Ocyphaps lophotes **Crested Pigeon**

DT, LG (1979 and 1980), RR, LA, NS, 25 km S of Radi Hills (1979) and intervening locations.

Common. Frequently near water, in a wide range of habitats including scrub and open-scrub over hummock grass, samphire, thickets of Acacia aneura and riverine vegetation.

PSITTACIDAE

Polytelis alexandrae **Princess Parrot**

LT (5 just N of Well 39).

Rare. Hummock grass on sand. When flushed they perched in a clump of Casuarina decaisniana before returning to the ground.

Platycercus zonarius **Ring-necked Parrot**

RR (one pair and two single birds).

Uncommon. Open woodland of Eucalyptus camaldulensis bordering river channels.

Melopsittacus undulatus **Budgerigah**

All campsites (except MH and DT) and many intervening locations.

Common. Wide range of habitats. Usually in small groups but flocks of about 50 and 400 were noted.

Nymphicus hollandicus **Cockatiel**

LG (10, 1980), DT (up to 30 daily), BD (1), SF (12), RR (4 at campsite, 28 at Coondegoon Pool).

Moderately common in a variety of habitats, usually near water.

Cacatua roseicapilla **Galah**

LG (1979 and 1980), SE, LT, RR (including Coondegoon Pool), NS, KW, Well 30.

Common, particularly along timbered watercourses. Usually in groups up to 30 but about 100 drank at Coondegoon Pool.

Ten specimens, 5, A16093-97 at 27 km ENE of Gravity Lakes, 3, A16098-100 at LT, 2, A17141-2 at KW.

Cacatua tenuirostris **Corella**

Balgo Mission (about 100), LG (30 at Len's Bore and a party at campsite, 1979, about 1500 at SW end of Lake Gregory, 1980), BD (2).

Moderately common. The large flocks at LG in 1980 were on the ground near the lake's edge.

Cacatua leadbeateri **Major Mitchell's Cockatoo**

MH (2), SE (2), BD (15).

Uncommon. Usually in trees. Observed feeding on galls on Eucalyptus sp. (Bloodwood) at SE and in fruiting Ficus platypoda at MH.

Three specimens, 2, A16018-9 at SE, 1, A15107 at MH.

CUCULIDAE

Cuculus pallidus **Pallid Cuckoo**

LG (1, 1979), SE (1), NS (1), AR (1 at campsite and 1 at 20°28'S 121°22'E, 1979).

Uncommon. Variety of habitats from low scrub A over hummock grass to thicket of Acacia aneura.

One specimen, A16110 from AR.

Chrysococcyx basalis **Horsefield's Bronze-cuckoo**

LG (1, 1979), AR (2, 1979, 1, 1980), RR (1), KW (1).

Uncommon. Variety of habitats from very open shrub mallee and open scrub over hummock grass to thicket of Acacia spp. along drainage lines.

Three specimens, A16112, A17349 and A17150 from LG, KW and AR respectively.

STRIGIDAE

Ninox novaeseelandiae **Boobook Owl**

LG (1 at campsite, 1979, 2 on Bulbi Plain, 1980), SE (1), BD (2), RR (1), KW (2), Well 30 (1).

Moderately common. Generally associated with trees. Most observations made while spotlighting.

One specimen, A16113, from LG (1979).

AEGOTHELIDAE

Aegotheles cristatus **Australian Owlet-nightjar**

RR (2), NS (2), KW (1).

Moderately common in the SW. Most sightings were of birds disturbed from trees by day.

Two specimens, A16114-5, from NS and RR respectively.

CAPRIMULGIDAE

Eurostopodus guttatus **Spotted Nightjar**

LG (3, 1980), BD (2), KW (1), AR (2 at camp and 7 elsewhere between Lake Auld crossing and Radi Hills).

Common along Kidson track, moderately common elsewhere. Variety of open habitats. Most observations made while spotlighting.

One specimen, A16116, from KW.

ALCEDINIDAE

Dacelo leachii **Blue-winged Kookaburra**

30 km NW of Lake Gregory Homestead (1, 1980).

In a eucalypt near a flooded claypan. (Although N of the area covered here the record is noteworthy.)

Halcyon pyrrhopygia **Red-backed Kingfisher**

All campsites except KW.

Common in a variety of habitats, particularly along tree lined watercourses.

Halcyon sancta **Sacred Kingfisher**

RR (1 at campsite, 1 at Coondegoon Pool).

Uncommon. One in woodland of Melaleuca leucadendron and Eucalyptus camaldulensis in a dry river channel and one flying over a permanent river pool.

MEROPIDAE

Merops ornatus **Rainbow Bee-eater**

DT (4), LG (numerous on 24 April 1979 only), RR (frequent at campsite and Coondegoon Pool).

Sometimes common. Woodland along watercourses and, at DT, open low woodland of Sesbania formosa.

ALAUDIDAE

Mirafra javanica **Horsefield's Bushlark**

LG (numerous between Balgo Mission and campsite, 1979 and 1980), BD (1), 41 km S of LT (1), numerous along Kidson Track west of AR (1979 and 1980).

Locally common, particularly on gravelly soils with open low woodland and open scrub over hummock grass, also observed on samphire.

HIRUNDINIDAE

Cheramoeca leucosterna **White-backed Swallow**

AR (1980), SF, LT, RR, LA, NS, KW and 9 km N of Well 36.

Moderately common in S and W, hawking in ones, twos and occasionally groups up to 6 over dunes, sandplains, samphire and woodland fringing river channels.

One bird excavating a burrow in a dune at SF.

Two specimens, A17346-7, from 22°52'S 122° 08'E near NS.

Hirundo nigricans **Tree Martin**

LG (4 at Len's Bore and several along lake's edge, 1980), RR (frequent).

Locally moderately common in open woodland along river channels and at lake's edge.

Hirundo ariel **Fairy Martin**

LT (4).

- Rare or absent at times of our visits, however disused nests suggest it is a moderately common summer breeding visitor.

Disused nests at MH, SE, AR, BD, SF, NS.

MOTACILLIDAE

Anthus novaeseelandiae **Richard's Pipit**

AR (1979), BD, SF, LT, Guli Lake, Gary Junction, NS, KW.

Common in samphire and moderately common in hummock grass.

CAMPEPHAGIDAE

Coracina maxima **Ground Cuckoo-shrike**

LG (2, 1980), BD (4, 1980).

Uncommon. Open woodland along a riverbed and open low woodland.

Coracina novaehollandiae **Black-faced Cuckoo-shrike**

All campsites except LT, LA and KW.

Moderately common in a variety of habitats, particularly thickets and woodlands.

Three specimens, A16124-5 from RR and A16126 from SE.

The two specimens from RR are referable to C. n. subpallida while that from SE is typical C. n. novaehollandiae (Storr, pers. comm.).

Lalage sueurii **White-winged Triller**

DT (2), Kidson Track west from SF (13), KW (1).

Moderately common along the Anketell Ridge, uncommon elsewhere. Scrub and thicket of Acacia spp., Grevillea spp. and Melaleuca spp. Also low woodland of Sesbania formosa at DT.

PACHYCEPHALIDAE

Petroica goodenovii **Red-capped Robin**

SE (1), RR (1), NS (common), KW (3).

Uncommon except at NS. Thicket and scrub usually of Acacia spp. (especially A. aneura at NS and KW). No birds at NS were in adult male plumage.

One specimen, A16127, from SE.

Pachycephala rufiventris **Rufous Whistler**

DT (1), LG (2, 1979), LT (1), RR (1 at campsite, 1 at Coondegoon Pool), LA (1), NS (common), KW (2).

Moderately common in a variety of habitats, usually thicket and scrub of Acacia spp. (especially A. aneura at NS). No birds at NS were in adult male plumage.

One specimen, A16128, from NS. (Male with skull not fully ossified and small testes. Plumage similar to female.)

Colluricincla harmonica **Grey Shrike-thrush**

RR (6 at campsite, 1 at Coondegoon Pool), NS (3).

Locally moderately common in the SW. Open woodland of Eucalyptus camaldulensis along river channels and thicket of Acacia aneura at NS.

Oreoica gutturalis **Crested Bellbird**

LG (calling 30 km NW of Lake Gregory Homestead, 1980), RR (calling), Well 30 (calling), NS (several seen and heard), KW (calling).

Moderately common in SW, uncommon elsewhere.

Psophodes occidentalis **Western Wedgebill**

42 km S of SE (2, calling).

Rare. Dense scrub surrounding a claypan.

MONARCHIDAE

Rhipidura leucophrys **Willie Wagtail**

All areas.

Common. One of the most abundant species throughout the area. Found in all vegetation associations.

ORTHONYCHIDAE

Pomatostomus temporalis **Grey-crowned Babbler**

LG (3 at Bulbi Plain, 1980).

Rare. One party in thicket of Acacia spp. near the water's edge.

Pomatostomus superciliosus **White-browed Babbler**

Well 35 (2).

Rare. Open low scrub of Melaleuca glomerata.

ACANTHIZIDAE

Aphelocephala nigricincta **Banded Whiteface**

SE, AR (1979), BD, SF, LT, 99 km E of KW, Gary Junction. Usually in pairs.

Locally common but not observed in SW. Open scrub to open dwarf scrub over hummock grass, including burnt areas.

New nests at LG and LT. 4 nests: 1 old, 1 new, 1 with 1 egg and 1 with 2 chicks at Gary Junction.

Gerygone fusca **Western Flyeater**

NS, KW (1), 22°28'S 124°25'E (1).

Moderately common near NS. Uncommon or absent elsewhere. Scrub and thicket of Acacia spp. (especially A. aneura at NS) and Grevillea wickhamii.

Smicrornis brevirostris **Weebill**

LG (2, 1979).

Rare. In Acacia spp. adjacent to water at Len's Bore.

Acanthiza apicalis **Broad-tailed Thornbill**

NS (1, probably this species with a Western Flyeater), LA (2).

Uncommon. Scrub and thicket of Melaleuca glomerata and Acacia aneura.

One specimen, A17351, from LA.

Sericornis fuliginosus **Calamanthus**

NS (2), LA (several).

Uncommon. Dwarf scrub D (early post-fire association) at NS and mid dense samphire on lake's edge at LA.

Three specimens, A16137 from NS and A16138-9 from LA. All are referable to S. f. campestris (Storr pers. comm.).

MALURIDAE

Amytornis striatus **Striated Grasswren**

Two km W Lake Gregory Homestead (1, 1980), 68 km W of Well 51 (1), Gravity Lakes (1).

Uncommon. Hummock grass.

Malurus lamberti **Variegated Fairy-wren**

LG (party, 1979), 15 km W Well 51 (party), SE (party), RR (2 parties), LA (2 parties), KW (party).

Moderately common in a variety of habitats but generally preferring denser vegetation than White-winged Fairy-wren. All parties contained a partially or fully coloured male.

Malurus leucopterus **White-winged Fairy-wren**

All areas except DT, MH and the Anketell Ridge W of a point 73 km W of SF.

Common in a wide range of vegetation types including open dwarf scrub, open scrub and scrub over hummock grass, thickets on dunes, sand plains and rocky ridges as well as samphire.

One specimen, A17350, from LA.

Stipiturus ruficeps **Rufous-crowned Emu-wren**

LA (one party probably this species).

Thicket of Melaleuca spp. between dunes.

SYLVIIDAE

Acrocephalus stenotoreus **Clamorous Reed Warbler**

DT.

Observed and heard in Typha domingensis (bullrush) beds throughout the swamp.

One specimen, A15106.

Eremiornis carteri **Spinifex-bird**

AR (2, 1979), LA (1).

Uncommon. Scrub or open scrub of Acacia spp., Hakea spp. and Grevillea spp. over mid dense hummock grass.

One specimen, A16144, from LA. Stomach contents were insects, including an ant.

Cincloramphus cruralis **Brown Songlark**

LG (common 1979, 1980), 20 km NW of Lake Gregory Homestead (1, 1980), AR (common along the Anketell Ridge 1979), between Wells 32 and 49 (several).

Locally common. Lake margins, hummock grass and dwarf scrub.

One specimen, A16145 from 22°52'S 122°56'E.

DICAEIDAE

Dicaeum hirundinaceum **Mistletoebird**

DT (several), SE (4), LG (4, 1979), RR (3 including 2 at Coondegoon Pool).

Moderately common, usually in larger shrubs or trees, particularly along drainage lines.

PARDALOTIDAE

Pardalotus rubricatus **Red-browed Pardalote**

SE (1), LT (1).

Uncommon. Shrubs and trees in a rocky valley and on lake's edge.

Pardalotus striatus **Striated Pardalote**

RR (1).

Rare. Canopy of Eucalyptus camaldulensis near woodland fringing a river channel.

MELIPHAGIDAE

Lichmera indistincta **Brown Honeyeater**

DT (3), SE (numerous), 78 km S of SE (1), AR (numerous 1979), NS (2/3), 22 km S of Radi Hills (several 1979).

Locally common, usually associated with flowering shrubs, e.g. Melaleuca lasiandra, Grevillea wickhamii and Eremophila spp.

Certhionyx niger **Black Honeyeater**

AR (common 1979), from 56 to 106 km W of SF (3), LA (2), Well 30 (2).

Locally common near AR where territories were being defended in breakaway country. Elsewhere moderately common, usually associated with flowering shrubs including Grevillea refracta and G. wickhamii.

One specimen, A17151, from 22°38'S 124°25'E near Well 30.

Certhionyx variegatus **Pied Honeyeater**

LA (1), NS (numerous), Well 30 (several), AR (common along Anketell Ridge, 1979).

Locally common, usually in flowering shrubs, e.g. Grevillea wickhamii, G. refracta, Acacia spp. Also occasional in flowering Eucalyptus sp. (Bloodwood).

One specimen, A16154, from NS.

Meliphaga virescens **Singing Honeyeater**

All areas.

Common in a wide range of vegetation types, frequently more numerous in flowering shrubs and trees, e.g. Grevillea spp., Melaleuca spp., Acacia spp. and Eucalyptus spp. (Bloodwoods).

Three specimens, A16155 and A17147 from NS and A16156 from SE.

Meliphaga keartlandi **Grey-headed Honeyeater**

Widespread but not recorded from AR (1980), DT, KW, LA or RR.

Locally common. Frequently associated with Eucalyptus kingsmillii and flowering Grevillea wickhamii.

Three specimens, A16157-8 and A17148 from NS.

Meliphaga penicillata **White-plumed Honeyeater**

DT (several pairs), SE (7), LG (several, 1979), RR (including Coondegoon Pool, common), Wormey's Well (4).

Locally common. Restricted to woodlands fringing rivers and creeks and around the swamp at DT.

Three specimens, A16162-3 from LG and A16164 from SE.

Melithreptus gularis **Black-chinned Honeyeater**

62 km W of Well 51 (2), LG (2, 1979), SE (calling), Well 30 (8).

Uncommon. Woodland, particularly bordering rivers.

Phylidonyris albifrons **White-fronted Honeyeater**

AR (2, 1979), SF (several), Gary Junction (several), Well 30 (common), LA (2), NS (5), KW (2).

Locally common in central and southern areas. More abundant in flowering shrubs, e.g. Melaleuca lasiandra and Grevillea wickhamii.

Two specimens, A16168-9, from NS.

Manorina flavigula **Yellow-throated Miner**

AR (several, 1979, 1980), BD (3), SF (8), 60 km SE of Radi Hills (2, 1979), Well 45 (several), RR (several), NS (several).

Moderately common in SW, uncommon in N. Wide range of vegetation types usually including woodlands or extensive scrub or thicket.

New nest at AR (22-23 March 1980).

Three specimens, A16174-6, from 20°00'S 120°51'E.

Acanthagenys rufogularis **Spiny-cheeked Honeyeater**

DT (2), SE (1), Mt Ford (2), AR (2, 1979), 144 km W of SF (1), 60 km S of LT (1), RR (2), LA (1), NS (1), KW (numerous), 40 and 22 km SE of Radi Hills (1 + 1).

Common in a wide range of denser vegetation types particularly in flowering shrubs.

Epthianura aurifrons **Orange Chat**

LG (common, 1979, 1980), LA (4), KW (6).

Locally moderately common to common, confined to samphire.

One juvenile with three adults on Bulbi Plain (1980) indicates breeding there.

Four specimens, A16180-2 from LG (1979) and A17143, from KW.

Epthianura tricolor **Crimson Chat**

All areas except DT in flocks up to 60.

Common, on dunes, sand and gravel plains, generally in more open vegetation, particularly scattered shrubs and trees over hummock grass and dwarf scrub.

One specimen, A17351, from 22°51'S 124° 25'E.

PLOCEIDAE

Emblema pictum **Painted Finch**

41 km W of Balgo Mission (party), SE (numerous, AR (2, 1979), RR (several), Rockhole at 22°53'S 122°33'E (2).

Locally moderately common, particularly in rocky terrain. Often observed drinking.

New nest at SE.

Poephila guttata **Zebra Finch**

All areas.

Common in a wide range of habitats usually in flocks up to 20, but as many as 250 were observed drinking.

LG two nests C/2 and C/7 (1979), Well 30, 1 nest C/1, NS 7 new nests, RR several new nests and one with 4 near fledged young, KW, 4 nests, C/2, C/3, 5 newly hatched and 5 nearly fledged young, also new nests and flocks of newly fledged young.

GRALLINIDAE

Grallina cyanoleuca **Magpie-lark**

LG (common along rivers and at Len's Bore 1979, 1980), BD (1), RR (including Coondegoon Pool, common), 30 km E of Balfour Downs Homestead (2).

Locally common, generally confined to larger rivers.

Disused nest at RR.

ARTAMIDAE

Artamus personatus **Masked Woodswallow**

All areas except DT.

Common, usually in flocks of 2-20 but it was not uncommon to see groups of several hundred. At Well 30 where an extensive open woodland of Eucalyptus terminalis was in flower, many thousands fed and roosted in the trees.

Three specimens, A17152-4 from Well 30. A sticky sweet fluid (nectar) oozed from these birds when first shot. Later examination of one stomach contents revealed Eucalypt pollen and numerous small insects, mostly Hemipterans.

Artamus cinereus **Black-faced Woodswallow**

All areas except DT.

Common. The most frequently recorded bird species, it was observed in a wide range of habitats, often associating with Crimson Chats.

Artamus minor **Little Woodswallow**

SF (5).

Rare. In flight over breakaway country.

CRACTICIDAE

Cracticus nigrogularis **Pied Butcherbird**

All areas except MH, DT, LT and LA.

Moderately common in a variety of habitats, frequently near wooded watercourses or rocky ridges.

One specimen, A16184, from SE.

CORVIDAE

Crows were uncommon and generally found only near water. Species were seldom identified. Records of unknown corvids were: 43 km W Balgo Mission (1, 1979), LG (occasional flocks up to 10, 1979), NS (4), Rockhole at 22°53'S 122°33'E.

Corvus orru **Australian Crow**

LG (4, calling, 1979), RR (2).

One specimen, A17144, from RR.

## DISCUSSION

### 1. INTRODUCTION

Storr (1981) reviewed the available information on birds of this district. His paper, which covers an area somewhat different to the GSD as defined by Beard (1969), incorporated all published data and many previously unpublished records including many of those reported in more detail here. He also listed expeditions by ornithologists and some explorers who have made ornithological notes in the region. In view of this we have made no

attempt to review earlier accounts except where they are of direct relevance to our observations.

However, we discuss some biogeographical relationships with adjacent natural districts and some aspects of the significance of habitat diversity as both topics are of direct relevance to an understanding of the composition of the avifauna and to conservation.

## 2. NUMERICAL ANALYSIS

Storr (1981) included 151 species in the annotated list for his area. We recorded 126 species, including four species not noted by Storr: i.e. Black Falcon, Brown Quail, Peaceful Dove and Blue-winged Kookaburra (the last species was recorded outside the area under discussion here but within the boundaries discussed by Storr). Thus the total number of species recorded for the "north-eastern interior" (Storr 1981) is 155.

Seventeen of the 29 species recorded by Storr but not seen by us are non-passerines. These include eight waterbirds or waders (six known only as visitors to Lake Gregory), four nomadic species, two species recorded only on the fringes of the area (which probably do not penetrate the deserts significantly) and three nocturnal species.

As we spent a considerable time spotlighting, the nocturnal species we failed to record, Bush Stone-curlew (Burhinus grallarius), Barn Owl (Tyto alba), and Tawny Frogmouth (Podargus strigoides), may be rare. This view is supported by the paucity of records for these species available to Storr.

Five of the twelve passerines not seen by us are essentially birds of Mulga (Acacia aneura) low woodland of the Gibson Desert, the Pilbara and extra-limital parts of the Little Sandy Desert. They are recorded by Storr only from the extreme south of the district. One other, Little Crow (Corvus bennetti), may have been overlooked as most corvids were not identified to species level by us; nevertheless corvids are generally scarce. Storr regarded five of the six remaining species as uncommon or rare and one, the Hooded Robin Petroica cucullata, as widespread and moderately common in some areas.

With the exception of the Hooded Robin (and possibly the Little Crow and the three nocturnal species), the birds which are known from the district but which we did not record are either scarce, rare, vagrant, nomadic (and present only when suitable conditions prevail) or at the margin of their distribution in adjacent districts.

## 3. BIOGEOGRAPHY

There are no bird species endemic to the Great or Little Sandy Deserts and only one which occurs in the district is confined, in Western Australia, to deserts. That species is the Princess Parrot (Serventy and Whittell 1976, Storr and Johnstone 1979) which has an extensive extra-limital distribution in the deserts of central Australia (e.g. Pizzey 1980).

The Banded Whiteface is essentially an inhabitant of deserts but extends into the upper Murchison, Gascoyne and eastern Pilbara regions (Serventy and Whittell 1976).

With the exception of five rare visitors (see "Kimberley" below) the avifauna of the district is composed of species with Eyrean distributions or species which are widespread in Australia.

However, the distribution of species is not uniform. Two factors which affect distribution patterns of birds within the district are the influence of adjacent districts (particularly the Kimberley, the Pilbara and deserts to the south) and the habitat requirements of individual species which may restrict their spatial as well as their temporal distributions. In some instances the effects of these two factors are combined.

In his discussion of the birds of the district, Storr (1981 p. 96) considered that "the far north east and the far south west are essentially extensions of the Kimberley and Pilbara regions." He indicated that 44 non-passerine and 10 passerine species were regionally confined to these areas with a further 4 passerines and 9 non-passerines "...restricted to the far south, especially the mulga thickets of the Gibson Desert," and excluded these 67 species from the avifauna of the "Great Sandy Desert."

Three of the four species noted here but omitted by Storr (Brown Quail, Blue-winged Kookaburra and Peaceful Dove) are known only from the north-east and south-west respectively. Thus, 70 (45%) of the species known from the district are restricted to the north-east, south or south-west and are frequently (particularly in the south and south-west) restricted to habitats more commonly found in adjacent districts.

### Pilbara

There are marked similarities between the avifaunas of these sandy deserts and the Pilbara although the Pilbara contains a greater number of species. This no doubt reflects the arid climate and prevalence of hummock grass in both districts. However the more varied geomorphological features and a higher, more reliable rainfall result in greater diversity of habitats in the Pilbara.

With the exception of the Princess Parrot, Brown Quail and Varied Lorikeet Trichoglossus versicolor all species recorded from the district occur in the Pilbara and all species which are common over the greater part of the district are also common birds of the Pilbara (e.g. Brown Falcon, Australian Kestrel, Crested Pigeon, Budgerigah, Galah, Willie Wagtail, White-winged Fairy-wren, Singing Honeyeater, Crimson Chat, Zebra Finch and Black-faced Woodswallow).

Populations of a number of species that are confined within the district to the relatively well watered south-west are probably either continuous with Pilbara populations or relict populations derived from the Pilbara. They include Spinifex Pigeon, Peaceful Dove, Sacred Kingfisher and Ring-necked Parrot (although Storr notes isolated records of the latter from as far into the deserts as Well 35 and Separation Well). Red-tailed Black Cockatoos (Calyptorhynchus magnificus) noted by Ford near Old Talawana (Storr 1981) were probably only vagrants to the edge of the deserts.

**Kimberley**

One hundred and forty one (91%) of the species recorded from the district are also known from the Kimberley Division (Storr 1980). However most of these species have extensive Eyrean or pan Australian distributions and some (e.g. Princess Parrot, Banded Whiteface) are no more than vagrant or infrequent visitors to the arid south Kimberley.

The Torresian element in the desert avifauna is negligible, comprising only five species which are confined or vagrant to the far north of the district. These are Black-necked Stork, Royal Spoonbill, Brown Quail, Brolga and Varied Lorikeet.

The paucity of Torresian species occupying the boundary zone between the Great Sandy Desert and the Kimberley has been demonstrated by Johnstone, Smith and Fuller 1981). They list 121 species of birds from the Edgar Ranges area. Although the Edgar Ranges are part of the south west Kimberley (McKenzie and Kenneally 1981), their list includes only eight Torresian species, seven of which have not been recorded in the Great Sandy Desert. The eighth, Varied Lorikeet, was included by Storr in his list of birds of the Great Sandy Desert on the basis of a sighting by L.A. Smith and R.E. Johnstone "2 km S of the Kimberley Boundary".

Nevertheless the Kimberley is significant as a source of birds that are able to penetrate the deserts particularly following heavy rains. This is most evident amongst waterbirds. In good years, the numbers of some species on Lake Gregory can be very high (e.g. about 25 000 Grey Teal and about 6 000 Australian Pelicans in May 1980).

Thirty-nine of the species listed for the district by Storr are waterbirds (including waders). Thirty seven (95%) of these have been recorded on the north eastern lakes, particularly Lake Gregory and twenty-three (59%) are known only from that area. Many records of waterbirds from other parts of the district are based on isolated sightings. For example, Oriental Plovers are possibly regular summer visitors to Lake Gregory but the only record from elsewhere in the district is a single bird collected in 1930 by O.H. Lipfert at Well 31 (Storr 1981); the inclusion of Rufous Night Heron in the avifauna of the district is based on one bird flushed by us from a Bloodwood at Well 30.

Although the origin of waterbirds visiting Lake Gregory is unknown, some (e.g. Black-necked Stork and Royal Spoonbill), have most probably come through the Kimberley and it is likely that this has been either the source, or the access route, of the majority.

**Deserts south of the Tropic of Capricorn**

There are several passerine species usually associated with shrublands, thickets or low woodlands (particularly of Mulga) which have been recorded only in the southern parts of the district. These include five species recorded by Storr but not seen by us: Chestnut-breasted Quail-thrush, (Cinclosoma castaneothorax), Redthroat (Pyrrholaemus brunneus), Slaty-backed Thornbill (Acanthiza robustirostris), Chestnut-rumped Thornbill (A. uropygialis), and Grey Butcherbird (Cracticus torquatus).

We encountered mulga at NS and KW in which Red-capped Robins, Rufous Whistlers, Grey Shrike-thrushes, Crested Bellbirds and Western Flyeaters were moderately common or common. Elsewhere we found these species scarce (except the Grey Shrike-thrush which was moderately common on the well timbered Rudall River).

Beard (1974) states that mulga is "...the typical vegetation of the southern half of the Australian Eramaea," but that it "thins out north of the Tropic of Capricorn". The patchy occurrence of mulga in the southern part of the district under discussion provides suitable habitat for these species.

## 4. · HABITAT DIVERSITY

Plant communities comprising scattered trees or shrubs over hummock grass (Plectrachne and Triodia spp.) cover much of the district. (Beard 1974, McKenzie et al. this publication.) Birds that inhabit the hummock grass communities are mostly widespread and frequently common. However there are a number of other habitats which, although relatively small in area, are of considerable importance to the avifauna. The significance of mulga in the south has already been mentioned. The most important minority habitats are related to paleodrainage systems and their extant remnants. (For a description of the paleodrainage system see van de Graaf et al. 1977.)

These drainage systems provide a number of distinct habitats including lakes, samphire flats, water courses and, rarely, swamps.

**Lakes**

Lake Gregory (previously known as Gregory Salt Lake) is the only lake which retains some surface water permanently. Despite its former name the lake is fresh when full. One of us (PJF) recorded the concentration of total soluble salts as less than 0.5 parts per thousand in May 1980. The significance of Lake Gregory has been discussed

above. Most other lakes are salt playas which seldom contain surface water. So far as we are aware none of the salt lakes has been visited by ornithologists when full of water and the extent to which they may be used by waterbirds is unknown. However, the discovery of pigmented fragments of Banded Stilt (Cladorhynchus leucocephala) egg shells at Percival Lakes (Storr 1981) is of interest.

**Samphire**

Samphire, which grows on and around most lakes, is used by a number of birds but it is important to two species: Orange Chat and Calamanthus. Orange Chats were found to be widespread (LG, LA, KW) and locally common but almost wholely restricted to samphire.

One pair of Calamanthus was seen in dwarf scrub D (an early transitional association in postfire regeneration of hummock grassland) at NS and several were seen in rank samphire at LA. This species is rare in the deserts and samphire appears to be an important habitat for it. Johnstone et al. (1979) recorded only one bird "...calling on extensive samphire-saltbush flat" in the Yeo Lake Area, Great Victoria Desert. The samphire fringed chains of salt lakes that mark the paleodrainage lines may provide corridors for dispersal as well as safe refuges for the species in the deserts.

**Water Courses**

There are no permanently flowing rivers in the district and, because there are few areas of high relief, active drainage channels are scarce. Nevertheless there are some drainage lines which carry water after rain. They vary in size from small creek lines supporting scrub and small rivers lines by trees (characteristically Eucalyptus microtheca), to relatively large rivers (e.g. Sturt and Djaluwon Creeks) supporting riverine woodland of E. microtheca and E. camaldulensis. On the Rudall River which has a number of permanent pools and soaks there are stands of Melaleuca cajuputi in addition to E. camaldulensis and E. microtheca.

Vegetation along water courses, particularly when trees are present, is usually relatively rich in birds. The richness of bird species found along watercourses tends to increase with the species richness and extent of the riverine vegetation. Thus, we found that Red-backed Kingfishers, Mistletoebirds and White-plumed Honeyeaters were generally confined to tree lined watercourses but were widespread.

Rainbow Bee-waters, Tree Martins and Magpie-larks were found only on the larger rivers (Sturt and Djaluwon Creeks and the Rudall River), although Rainbow Bee-eaters were also recorded at Dragon Tree Soak (see below). The extensive riverine woodland along the Rudall River was particularly rich. Besides the above, Grey Shrike-thrush (also seen at NS) was moderately common. We did not record Peaceful Doves, Ring-necked Parrots or Striated Pardalotes anywhere else.

Pools on the Rudall River also provided habitat for some water birds. We recorded White-faced and Pacific Herons, Black Duck (breeding), Grey Teal, Pink-eared Duck, Black-tailed Native-hen and Black-fronted Plover (including fledged young) there.

**Swamps**

Swamps are rare in the desert. The only one visited was Dragon Tree Soak. It differed from other water holes and soaks that were visited in that it supported beds of Typha domingensis and was surrounded by low woodland of Sesbania formosa. Most of the birds observed in the swamp were those of surrounding hummock grasslands which visited it opportunistically or to drink. However, a number of species were present which are associated with scrub or tree-lined water courses elsewhere. These include Common Bronzewing, Red-backed Kingfisher, Rainbow Bee-eater, Rufous Whistler, Variegated Fairy-wren, Mistletoebird, and White-plumed Honeyeater. The most notable species, however, was the Clamorous Reed Warbler, which was present in the Typha beds and which has not been recorded anywhere else in the region.

## 5. CONSERVATION

Recommendations for the creation of conservation reserves are made elsewhere in this publication but some general comments on the requirements for effective conservation of the avifauna of the district are pertinent here.

There is no evidence of a decline in the numbers or diversity of birds in the district except that Wedge-tailed Eagles have become uncommon, presumably as a result of a decline in medium sized mammals (Storr 1981). Nevertheless desert regions are being increasingly exploited for grazing, prospecting and tourism (e.g. Buckley 1982) and the provision of conservation reserves now may be important if the avifauna is to be adequately safeguarded.

We have shown that the distribution of birds in this district is not uniform. It is influenced by the proximity of adjacent natural regions as well as by habitat diversity, particularly habitats associated with extant and paleodrainage systems. The design of an effective reserve system in this district should take these factors into account.

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PART V

# AMPHIBIANS AND REPTILES

By Andrew A. Burbidge[1]

## INTRODUCTION

This paper is based on recent collections of amphibians and reptiles made in the Great Sandy Desert (GSD) (boundaries follow Beard 1979), in adjacent areas of the Little Sandy Desert, and in the area around Lake Gregory (mapped by Beard in the Tanami Desert). All specimens are lodged in the Western Australian Museum, except where indicated, with accession numbers as follows:

1. W.A. Wildlife Research Centre 1977
   R57262-57315

2. W.A. Wildlife Research Centre 1979
   R63703-64019
   R64055-64295

3. W.A. Museum 1979
   R63165-63211
   R63214-63218
   R63254-63268
   R63295-63339
   R63342-63596

4. W.A. Wildlife Research Centre 1980
   R69889-69891
   R69901-69923

5. W.A. Wildlife Research Centre 1982
   R81647-81659
   R80727

In addition the literature and the W.A. Museum accession register were searched for earlier records. With the exception of 5. (above), data herein were correct at December 1980.

Sites surveyed in 1977, 1979, 1980 and 1982 are listed in Table 1.

Geomorphology and vegetation of these sites are described in McKenzie et al. (this publication).

Collecting was usually limited to an area within 5 to 10 km of the campsite although on occasions (e.g. BD) collecting was undertaken further afield. Specimens were also collected opportunistically while travelling between sites. Near campsites specimens were collected using pit traps with drift fences (located to sample the major habitats of the area) and by opportunistic methods including burning spinifex, rolling logs and stones, raking litter, digging out burrows, head torching and spotlighting from vehicles. Some specimens were obtained from metal traps set to catch small mammals. Large termitaria, when available, were examined by cutting with a steel cable attached to an electric vehicle winch or by breaking up with explosives.

In the annotated list data are presented in the following order:

1. Species Name.
2. Site(s) where species was recorded and number of specimens from each site. Localities shown in square brackets are those of other collections. ER refers to specimens from the GSD portion of the proposed Edgar Range Nature Reserve at the northern edge of the GSD (Storr and Smith 1981).
3. Habitat and microhabitat. Where detailed vegetation descriptions are given they follow Muir (1977). Samphire refers to Dwarf Scrub D of Halosarcia spp. on saline flats.
4. Distribution beyond the Great Sandy Desert.

Abbreviations used are as follows:

N,S,E,W - North, South, East, West.
W.A. - Western Australia
N.T. - Northern Territory
S.A. - South Australia
Qld - Queensland
N.S.W. - New South Wales
Well numbers refer to wells on the Canning Stock Route.

## ANNOTATED SPECIES LIST

### AMPHIBIA

HYLIDAE **Tree Frogs**

Cylorana australis (Gray)

SE(1), LG(2), 19°39'S 126°13'E(2).

In or near water.

Northern Australia.

Cyclorana maini Tyler & Martin

AR(1), RR(5), KW(11), [ Well 46(1)].

Near water; near claypan; in open scrub over grass or hummock grass on sandplain and dunes.

Northern half of arid W.A., southern N.T.

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**Table 1. Great Sandy Desert Campsites**

| Name | Code | Campsite Coordinates | Dates |
|---|---|---|---|
| McLarty Hills | MH | 19°31'S 123°30'E | 5 - 9 August 1977 |
| Dragon Tree Soak | DT | 19°40'S 123°22'E | 9 - 13 August 1977 |
| | | | 10 - 13 September 1982 |
| Southesk Tablelands | SE | 20°15'S 126°34'E | 28 April - 2 May 1979 |
| Lake Gregory | LG | 20°20'S 127°26'E | 23 - 28 April 1979 |
| | | | 30 May - 4 June 1980 |
| Anketell Ridge | AR | 20°25'S 122°08'E | 5 - 13 Aug 1977 |
| | | | 13 - 16 May 1979 |
| | | | 22 - 25 March 1980 |
| Bishops Dell | BD | 20°42'S 127°48'E | 4 - 9 June 1980 |
| Swindell Field | SF | 20°56'S 123°15'E | 9 - 13 May 1979 |
| Lake Tobin | LT | 21°45'S 125°40'E | 4 - 7 May 1979 |
| Rudall River | RR | 22°32'S 122°24'E | 26 April - 1 May 1979 |
| Lake Auld | LA | 22°28'S 123°54'E | 8 - 11 May 1979 |
| Nooloo Soak | NS | 22°52'S 121°57'E | 22 - 26 April 1979 |
| Karara Well (No. 24) | KW | 23°07'S 123°21'E | 2 - 5 May 1979 |

Cyclorana platycephala (Gunther)

RR(2).

In pool in river.

Arid central latitudes from central west coast to Qld.

Litoria rubella (Gray)

RR(2).

Fringing formation along river.

Widespread in arid zone and northern Australia.

LEPTODACTYLIDAE **Ground Frogs**

Limnodynastes spenceri Parker

RR(12).

Fringing woodland along river.

Arid W.A., N.T. and S.A.

Neobatrachus centralis (Parker)

KW(3), [Well 46(1), 8 km N Well 45(3)].

Scrub over grass or hummock grass on sandplains and dunes.

W.A., except S.W. corner, S.A., southern N.T., western Qld and N.S.W.

Notaden nichollsi Parker

LG(9), LT(1), RR(1), KW(6), Gravity Lakes (1), 22°07'S 123°52'E(1), [Well 50(4), Mt Romilly (1), 16 km S Well 42(2), Well 40(1)].

Widespread on sandplains and dunes.

Northern sandy deserts.

Uperoleia sp.

RR(2)

Fringing woodland along river; in riverbed.

**REPTILIA**

GEKKONIDAE **Geckos**

Diplodactylus ciliaris Boulenger

MH(1), DT(2), SE(1), LG(3), AR(1), BD(2), SF(1), LT(7), NS(3), Gravity Lakes (1), Well 35(1), 19°31'S 126°13'E(2), 19°59'S 121°16'E(18), 20°06'S 121°13'E(1), 20°27'S 120°41'E(1), [ER(22), 16 km S Well 38(1)].

Widespread in wide variety of habitats, usually arboreal but also active on ground at night. Active on cool nights, body temperatures at BD on 8 June 1980 were as low as 16°C.

Distributed widely in northern, north-western and central Australia.

Diplodactylus conspicillatus Lucas & Frost

MH(1), SE(1), LG(2), KW(1), 20°07'S 121°14'E(1), [ER(2)].

Scrub over grass on sandplain; hummock grass on gravel, sandstone and sandplains. Active at night on ground.

Distributed widely in arid central Australia and arid coastal regions.

Diplodactylus elderi Stirling & Zietz

SE(4), AR(2), SF(3), LT(7), LA(3), 21°41'S 122°50'E(4), [ER(2), 16 km SW Mt Romilly(1)].

Hummock grass on sandplains, dunes, sandstone, lateritic plains, gravelly sand. Found inside Triodia and Plectrachne hummocks, occasionally ventures out far enough to be caught in pit traps.

Arid central Australia.

Diplodactylus stenodactylus Boulenger

SE(4), LG(4), AR(1), BD(1), SF(2), LT(2), RR(1), NS(1), KW(2), [ER(7), 8 km N Well 45(1), Well 45(1), Well 30(1)].

Variety of habitats: sandplains, sandstone, alluvial valley, dune, outwash zone of breakaway. Active on ground at night (one on fallen limb).

North, north-western and central Australia.

Diplodactylus taeniatus (Lonnberg & Andersson)

MH(2), SE(2), LG(8), AR(1), BD(4), SF(2), [ER(3)].

Usually found in spinifex hummocks; one on bough shed and one swimming in creek. Sandplains, dune, swales, sandstone, fringing woodland along creek.

Pilbara, southern N.T. and western Qld.

Gehyra pilbara Mitchell

MH(6), DT(2), SE(19), AR(12), BD(2), SF(6), LT(42), RR(3), LA(13), 19°59'S 121°16'E(1), 20°37'S 122°43'E(10), 22°07'S 123°52'E(6), [ER(7)].

In and on termitaria; under litter; in open woodland; in Fairy Martin (Hirundo ariel) nests; under bark of tree; on trees and shrubs; on sandstone. Active at night on trees and shrubs and on sandstone.
Pilbara, Ashburton, south Kimberley and western N.T.

Gehyra purpurascens Storr

RR(1), KW(4), [92 km S of Balgo (1), SF(1), Well 35(1)].

In hollow eucalypt branches, on eucalypt trunks in rocky country and along watercourses.

Widespread in arid zone of W.A., S.A. and N.T.

Gehyra variegata (Duméril & Bibron)

MH(2), DT(3), SE(1), LG(12), AR(3), BD(2), SF(1), LT(8), LA(3), NS(3), KW(3), 19°31'S 126°13'E(1), 19°59'S 126°13'E(1), 22°07'S 123°52E(1), 22°28'S 124°30'E(1), [Well 30(1)].

Wide variety of habitats, often arboreal; four specimens from termitaria at Lake Tobin. Active at night on trees, especially dead trunks, and on ground.

Australia-wide except extreme south-west, south-east and north.

Heteronotia binoei (Gray)

SE(3), LG(3), AR(5), BD(1), SF(4), LT(12), RR(5), LA(2), 20°03'S 121°12'E(1), 20°17'S 120°53'E(1), 20°41'S 122°53'E(3), 22°53'S 125°08'E(1), Well 30(1), [ER(13), Well 40(2)].

All major surfaces including termitaria and Fairy Martin (Hirundo ariel) nests. Active on ground at night.

Widespread, Australia-wide except extreme south-west and south-east.

Nephrurus laevissimus Mertens

LG(3), AR(2), BD(3), SF(5), LT(6), LA(1), NS(6), KW(2), Gravity Lakes(2), 21°39'S 125°45'E(3), Well 30(1), [ER(9), Well 45(5), 16 km S Well 42(3), Well 40(2) 8 km NE Well 29(2)].

Most from dunes and adjacent areas; two specimens from loamy sand adjacent to claypans. Active on ground at night.

Sandy deserts.

Nephrurus levis De Vis

LG(2), RR(1), LA(1), 20°07'S 121°16'E(1), [ER(2)].

Most on dunes; one on sandy island in river, one on sandplain. Active on ground at night.

Widespread in arid zone.

Oedura marmorata Gray

20°23'S 120°46'E(2), 20°27'S 120°41'E(8).

In Fairy Martin (Hirundo ariel) nest in sandstone cave, on sandstone.

Northern two-thirds of Australia except east coast.

Rhynchoedura ornata Gunther

LG(2), AR(1), SF(2), LT(1), NS(1), 20°07'S 121°16'E(1), [ER(4), Well 30(1)].

Sandplains and dunes with hummock grass.

Widespread in arid zone and adjacent areas.

PYGOPODIDAE **Legless Lizards**

Delma borea Kluge

SE(2), LG(2), AR(1), LT(1).

Hummock grass on dune, alluvial valley, gravelly sand; creek fringing woodland.

North, north-western and central Australia.

Delma nasuta Kluge

SE(1), AR(1), BD(1), LT(3).

Hummock grass on alluvial sand and on stony range, in bed of salt lake. In spinifex hummocks.

Widespread in arid zone.

Lialis burtonis Gray

MH(1), LG(3), AR(1), BD(1), LT(3), 19°31'S 126°13'E(2), 20°41'S 122°53'E(1), [Well 46(1), Well 45(1)].

Hummock grass on sandplains and dunes; lake margin; loamy plain; gravelly sand. In spinifex hummocks.

Almost Australia-wide.

Pygopus nigriceps (Fischer)

AR(2).

Alluvial drainage line in lateritic hills; gravelly sandplain. In spinifex hummocks.

Australia-wide except extreme south-west, south and south-east.

AGAMIDAE **Dragon Lizards**

Amphibolurus caudicinctus (Gunther)

RR(2), NS(3), KW(7).

Scree slopes; bare rocks; river bed; sandplains; dunes.

Northern and north-western Australia.

Amphibolurus clayi Storr

SF(1), [Well 48(1), Well 45(1), Well 37(1), Well 30(1)].

Hummock grass on dune.

Arid zone of W.A. and adjacent parts of N.T. and S.A. Uncommon.

Amphiloburus isolepis isolepis (Fischer)

MH(3), DT(2), SE(7), LG(16), AR(10), BD(4), SF(13), LT(10), RR(16), LA(4), NS(11), KW(7), Well 35(2), 29 km W of Well 30(1), 19°30'S 126°27'E(1), 20°01'S 121°14'E(1), 20°07'S 121°15'E(1), 20°17'S 120°58'E(4), 20°25'S 122°08'E(1), 20°25'S 122°09'E(1), 20°27'S 120°41'E(1), 20°28'S 122°12'E(1), 20°41'S 122°53'E(1), [ER(11), Well 49(2), Mt Romilly(6), Well 46(1), Well 45(6), Well 42(1), Well 38(1), between Wells 37 and 38(1), Well 35(3), Well 32(3), Well 31(7), Well 30(1), Well 29(3)].

Abundant in most habitats. Active during daytime on ground.

Northern W.A. and arid N.T.

Amphibolurus minor Sternfeld

[Well 30(1)].

Arid W.A., N.T., S.A., and western Qld.

Amphibolurus mitchelli Badham

[ER(1), between Wells 31 and 36(1)].

West Kimberley, southern N.T.

Amphibolurus inermis (de Vis)

SE(1), LG(7), AR(1), LT(1), RR(1), NS(4), KW(1), [ER(1), Well 42(1), Well 41(1), Well 39(1)].

Many habitats including stony plains, dunes, swales and along watercourses; one on termitarium. Active during daytime on ground; also climbs.

Arid zone and Kimberley.

Diporiphora lalliae Storr

LG(1), [between Wells 39 and 51(1)].

Scrub over hummock grass on gravelly clay.

Southern half of N.T. and adjacent parts of W.A.

Diporiphora pindan Storr

19°59'S 121°16'E(1), [ER(5), Joanna Spring (see Houston 1977, Storr 1979)].

Sandplain with Acacia.

South-west Kimberley.

Diporiphora winneckei Lucas & Frost

DT(1), SE(1), LG(1), AR(1), SF(1), LT(5), RR(1), NS(1), Well 30(4), 20°27'S 120°41'E(1), 21°39'S 125°45'E(3), [ER(3), Joanna Spring(1), 3 km S Mt Romilly(1), Well 41(2), Well 30(1)].

Most from dunes with spinifex, also on gravelly sand, claypan area. Inactive in shrubs at night.

Arid W.A., southern N.T. and northern S.A.

Lophognathus longirostris (Boulenger)

LG(6), RR(4), NS(1), 20°17'S 120°58'E(1), 21°39'S 125°45'E(2), [Well 49(1), Well 46(2), Well 41(1), Well 37(1), KW(1)].

River and creek fringing woodlands; dune; sandplains.

Arid northern Australia.

Moloch horridus Gray

LG(2), SF(1), LT(3), RR(1), NS(1), KW(1), 21°59'S 125°26'E(1), 22°04'S 125°25'E(1), [16 km SW Mt Romilly(1)].

Sandplains; dunes; one in termitarium.

Arid western two-thirds of Australia and adjacent better watered areas.

Tympanocryptis cephala gigas Mitchell

SE(1), 20°33'S 126°28'E(1), [between Wells 39 and 43(1)].

Gravelly sand, gravelly claypan.

Western arid zone (except the Pilbara).

Tympanocryptis lineata centralis Sternfeld

SE(2), LG(2), LT(2), LA(1), [SE(1)].

Scrub over spinifex on loamy plains and gravelly sand.

Central Australia from Gulf of Carpentaria to Great Australian Bight, extending into south-eastern Australia. Our specimens at north-western edge of known range.

SCINCIDAE **Skinks**

Carlia triacantha (Mitchell)

AR(3), 20°27'S 120°41'E(1).

Shrubs over spinifex on gravelly sand over clay; sandplain near sandstone.

N.T. and northern half of W.A.

Cryptoblepharus plagiocephalus (Cocteau)

DT(1), [Well 37(1)].

Under bark of tree (Sesbania) on edge of swamp.

Australia-wide except east, south and south-east near coast. Sparsely distributed in interior.

Ctenotus ariadnae Storr

[Well 30(1)].

Central arid zone of W.A.

Ctenotus brooksi brooksi (Loveridge)

DT(2), SF(2), BD(1), LT(7), LA(2), NS(4).

Only on dunes; trees and shrubs over spinifex.

Gibson and Great Victoria Deserts; our specimens extended the known range.

Ctenotus calurus Storr

SF(1), RR(1), NS(4).

Dunes and sandplains; trees and shrubs over spinifex.

Sandy deserts of W.A. and adjacent N.T. and S.A., isolated population south-east of Exmouth Gulf.

Ctenotus colletti nasutus Storr

SF(2), LT(1), LA(1), NS(2).

Dunes, swales, sandplain; trees and shrubs over spinifex.

Deserts of W.A. and adjacent N.T.

Ctenotus dux Storr

BD(1), LA(1), NS(6).

Dunes, sandplains; trees and/or shrubs over spinifex.

Sandy deserts of W.A. and adjacent N.T.

Ctenotus grandis grandis Storr

LG(2), SF(2), LA(2), RR(1), NS(4), [ER(2), 16 km SW Mt Romilly(1), Well 26(1)].

Dunes, swales, sandplains; trees and/or shrubs over spinifex or only spinifex; one on stony hill with spinifex; one from dingo stomach (SE).

W.A. sandy deserts, adjacent N.T.

Ctenotus hanloni Storr

SE(1), LT(1), NS(1), [16 km S Mt Romilly].

Sandplains.

Pilbara, Barrow Island, Gibson Desert, Great Victoria Desert, Tanami Desert.

Ctenotus helenae Storr

SE(1), LG(8), SF(2), LT(7), RR(1), NS(3), KW(2), 20°17'S 120°58'E(1), 21°58'S 125°29'E(1) [26 km NE of MH(1), Mt Romilly(2)].

Variety of habitats: fringing formations, samphire, dunes, sandplains, scree slopes.

Southern edge of Kimberley, Pilbara, W.A. deserts, southern half of N.T., northern S.A.

Ctenotus leonhardii (Sternfeld)

LG(3).

Samphire on lake edge; low open woodland of Acacia sp. over open low grass near lake edge.

Central W.A., southern N.T., northern S.A., southern Qld, western N.S.W. Our specimens at northern edge of range in W.A.

Ctenotus pantherinus ocellifer (Boulenger)

MH(1), SE(2), LG(8), AR(2), BD(1), SF(3), LT(3), RR(3), NS(5), KW(10), Gravity Lakes(1), 19°30'S 126°27'E(2), 20°07'S 121°14'E(1), [ER(8), Well 43(1), Well 35(1)].

Sandplains, dunes, gravelly sand, samphire, scree slopes, stony hill, fringing formation. Active during hot nights as well as during daytime.

Widespread in arid zone.

Ctenotus piankai Storr

20°02'S 120°51E(1), [ER(1), MH(1)].

Grevillea refracta and Acacia sp. over hummock grass on gravelly sand. Among spinifex.

Sandy deserts of W.A. and southern N.T.

Ctenotus quattuordecimlineatus (Sternfeld)

AR(1), LT(4), RR(2), NS(2), KW(1), Well 35(1), [ER(1), 106 km W of MH(1), Well 35(1)].

Dunes, sandplains, low stony hill; trees and/or shrubs over spinifex.

W.A. sandy deserts and adjacent N.T. and S.A.

Ctenotus saxatilis Storr

SE(7), RR(11), 20°17'S 120°58'E(4), 20°27'S 120°41'E(2), 22°54'S 120°33'E(1), [Well 35(1), KW(1)].
Alluvial soils in rocky country; riverine vegetation; in cave; sandplain near sandstone.

Pilbara, southern Kimberley, southern N.T., north-western S.A.

Ctenotus tanamiensis Storr

LG(1).

Sandplain with hummock grassland and emergent Eucalyptus microtheca.

Tanami Desert of N.T. and W.A.

Egernia depressa (Gunther)

Well 46(1) .

Arid W.A. and south-west N.T.

Egernia kintorei Stirling & Zietz

[SE(1)].

Sandy deserts of W.A. and Tanami Desert (N.T.).

Egernia striata Sternfeld

[SE(1)].

Deserts of W.A., south-west N.T. and north-west S.A.

Eremiascincus fasciolatus (Gunther)

DR(2), AR(1), SF(1), LT(2), LA(2), NS(1), KW(1), [KW(1)].

Dunes with hummock grass or with trees and/or shrubs over hummock grass.

Widespread in arid zone except southern half of W.A.

Eremiascincus richardsonii (Gray)

[ER(2)].

Widespread in arid and semi-arid Australia.

Lerista bipes (Fischer)

LG(3), SF(2), LT(4), RR(2), KW(4), Well 35(1), 22°53'S 125°08'E(1), [ER(1), Well 39(1), Well 37(1), KW(1)].

Dunes, swales, sandplains, samphire (under animal carcass), loam over clay, island in river.

Sandy parts of northern half of W.A., arid N.T., northern S.A. and western Qld.

Lerista ips Storr

DT(4), 22°07'S 123°52'E(1).

Emergent Grevillea stenobotrya over open low scrub B of Thryptomene maisonneuvii over hummock grass on dune crest.

Known only from GSD and from 23°42'S 129°02'E in the Northern Territory.

Lerista vermicularis Storr

[DT(1), MH(2), Joanna Spring (1), 63 km SE of Wallal (1)].

Known only from dune crests in the GSD.

Menetia greyii Gray

LG(1), LT(2), RR(1), KW(1), [Well 46(1), Well 35(1), Well 30(1)].

Fringing formation, scrub over hummock grass and grass on sandplain, dune slope and crest.

Australia-wide excluding high rainfall areas.

Morethia ruficauda ruficauda (Lucas & Frost)

LG(1).

Scrub over grass in fringing formation, under animal carcass.

Kimberley, northern Pilbara, N.T.

Notoscincus ornatus ornatus (Broom)

DT(1), LG(7), RR(1).

Sandplains, dunes; hummock grass or scrub over hummock grass.

Pilbara, central N.T. and western Qld.

Omolepida branchialis (Gunther)

LT(2), RR(1), LA(1), [50 km E of Warrawagine (1)].

Sandplain and low dune with spinifex; riverine vegetation with woodland and grass.

Western two-thirds of Australia.

Proablepharus reginae (Glauert)

19°31'S 126°13'E(1).

Hummock grass with Eucalyptus and Acacia emergents on gravel; in spinifex.

Deserts of W.A., south-western N.T. and north-western S.A.

Sphenomorphus isolepis (Boulenger)

[ER(6)].

Pilbara, Kimberley, northern N.T.

Tiliqua multifasciata Sternfeld

MH(1), SE(1), LG(3), AR(1), BD(1), LT(1), RR(1).

Gravelly sand, sandplains, dunes, rocky range; trees and/or shrubs over spinifex.

Arid W.A., N.T., northern S.A., western Qld.

VARANIDAE **Goannas**

Varanus acanthurus Boulenger

SE(1), AR(2), LT(2), LA(3), KW(1), 20°41'S 122°50'E(3).

In termitaria; under sandstone slab; from stomach of dingo (at base of scree, SE); spinifex on gravel; sand dune.

Northern half of W.A., N.T., northern S.A., western Qld.

Varanus brevicauda Boulenger

SF(1), KW(1).

Dune, samphire around claypan.

Pilbara, southern N.T., western Qld.

Varanus caudolineatus Boulenger

[Well 29(1)].

Pilbara, Gascoyne and Murchison of W.A.

Varanus eremius Lucas & Frost

LG(1), SF(1), LA(1), [ER(2), Well 38(1)].

Sandplain, swale, lateritic plain with hummock grass or shrubs over hummock grass. One dropped by Kestrel (Falco cenchroides).

Arid zone of W.A., N.T. and S.A.

Varanus gilleni Lucas & Frost

DT(3), SE(1), AR(1), LT(1), Well 30(2), [ER(1), Mt Romilly(1), Well 37(1)].

Under bark and in hollow tree limbs, in termitarium, under fuel drums on sandplain.

Sandy deserts of W.A., N.T. and S.A.

Varanus gouldii (Gray)

SE(3), LG(2), AR(1), SF(2), LT(1), LA(1), NS(2), 19°59'S 121°16'E(1), 21°14'S 125°55'E(1), Well 35(4).

Sandplains; dunes; alluvial valley in ranges; creek bed in ranges.

Australia-wide except cool wet south-west and south-east.

Varanus tristis tristis (Schlegel)

AR(1), BD(1), RR(1).

In tree in fringing formation; in Fairy Martin (Hirundo ariel) nests in cave; in sandstone cave.

Widespread in W.A., N.T., S.A., Qld and N.S.W.

TYPHLOPIDAE **Blind Snakes**

Ramphotyphlops endoterus (Waite)

[Between Wells 39 and 51(1)].

Western deserts of Australia.

Ramphotyphlops grypus (Waite)

AR(1), LT(1), 19°39'S 126°13'E(1), [Well 39(1), Well 40(1), Paterson Range(1)].

Hummock grass on sandy gravel, in termitarium, hummock grass at base of dune.

Arid northern Australia.

BOIDAE **Pythons**

Aspidites ramsayi (Macleay)

AR(1).

Acacia over hummock grass on laterite.

Widespread in arid zone and adjacent areas.

Liasis affin. childreni Gray

SE(1), AR(1), LA(2), [ER(2)].

Stony plateau in ranges with spinifex, shrubs and grass on gravel, on rocky hill, in termitarium.

Liasis perthensis Stull

KW(1), 20°27'S 120°41'E(2).

Hummock grass in rocky range, on sandstone.

W.A., between latitudes 20°S and 32°S. Our specimens at northern end of known range.

ELAPIDAE **Front-fanged Snakes**

Denisonia fasciata Rosén

22°54'S 120°33'E(1).

Rocky area around pool.

Arid W.A.

Furina ornata (Gray)

LT(1), LA(3).

In termitaria.

Northern two-thirds of Australia including fringes of south-western W.A.

Pseudechis australis (Gray)

LG(2), AR(2), [RR(1)].

Dune; gravelly sand plain. Active at night.

Australia-wide except south-west and south-east.

Pseudonaja modesta (Gunther)

[Pt Moody(1)].

Widespread in arid zone.

Vermicella anomala (Sternfeld)

[Well 37(1), KW(1)].

South-west Kimberley, west Pilbara, arid central Australia.

**DISCUSSION**

A total of 8 frog and 75 reptile species are known from the Great Sandy Desert (GSD) as defined by Beard (1979). A further three species of skinks, Ctenotus leonhardii, C. tanamiensis, and Morethia ruficauda, were collected at Lake Gregory which Beard maps in the Tanami Desert. No additional species were found at Nooloo Soak, mapped by Beard in the Little Sandy Desert.

The reptile list includes 13 species of gecko, 4 legless lizards, 13 dragon lizards, 31 skinks, 7 goannas, 2 blind snakes, 3 pythons and 5 elapid snakes. Numbers of species from each site are:

| | | |
|---|---|---|
| McLarty Hills | : | 11 reptiles |
| Dragon Tree Soak | : | 12 reptiles |
| Southesk Tablelands | : | 1 frog, 27 reptiles |
| Lake Gregory | : | 2 frogs, 30 reptiles |
| Anketell Ridge | : | 1 frog, 29 reptiles |
| Bishops Dell | : | 14 reptiles |
| Swindell Field | : | 24 reptiles |
| Lake Tobin | : | 1 frog, 32 reptiles |
| Rudall River | : | 6 frogs, 24 reptiles |
| Lake Auld | : | 19 reptiles |
| Nooloo Soak | : | 22 reptiles |
| Karara Well | : | 3 frogs, 21 reptiles |
| Edgar Range | : | 25 reptiles (GSD portion only, see Storr and Smith 1981). |

It should be noted that effort differed markedly between some sites. Effort was, of necessity, low at MH and DT, and BD was visited during June when there was little reptile activity due to low temperatures. However, the number of reptile species collected from the other sites does not vary greatly, suggesting even collecting effort and efficiency.

Collections from desert localities adjacent to the GSD throw additional light on distributions.

Thompson and Hosmer (1963), collected in the Tanami Desert of W.A. and N.T. Taxonomic changes and possible mis-identifications make it difficult to compare their list with this one; an examination of it suggests that they did not collect species not known from the GSD.

Smith and Johnstone (1979) list 21 species of reptiles and one species of frog from the proposed Lake Disappointment Nature Reserve in the Little Sandy Desert. They recorded only one species not known from the GSD - the Perentie, Varanus giganteus. It is an inhabitant of rocky areas or well-vegetated watercourses and, in the desert, has not been recorded north of the Durba Hills. It is unlikely to occur in the GSD.

Of the additional three species of skinks from Lake Gregory (see above), two, Ctenotus leonhardii and Morethia ruficauda, came from habitats on the fringe of the lake. C. leonhardii is a widespread arid zone species which utilises a variety of habitats. Pianka (1969) stated that it is restricted to mulga in the Great Victoria Desert; however it occurs in other habitats elsewhere, eg, rocky areas (Burbidge et al. 1980), and it probably will be found in the GSD. M. ruficauda is a mainly tropical species inhabiting mostly rocky areas. It seems unlikely that it occurs in the GSD dunes or sandplains although it may be found in rocky country. The third additional LG species, Ctenotus tanamiensis, was collected on a sandy-loam plain near the lake, covered in hummock grass with emergent Eucalyptus microtheca. This habitat is not repeated to any extent in the GSD and the species may not extend far into the area under discussion.

Thus it seems likely that most species of frogs and reptiles occurring in the GSD have been identified. Doubtless a few species known from surrounding regions, e.g. Pilbara and south Kimberley, will be located inside the GSD and doubtless a few, especially cryptic, species will be found with more intensive surveys conducted in different seasons.

The frog fauna of the GSD is poorly known; the collection reported here was the first significant one from the GSD. Eight species are known to be

present; all are arid-zone specialists, although Litoria rubella extends into well-watered areas in northern Australia. Cyclorana australis is a Torresian species which, in W.A., is not known further south than the GSD.

The GSD has a rich reptile fauna of at least 74 species. In common with other Australian deserts it is particularly rich in skinks, geckos and dragon lizards; snakes are not well represented. The only sandy desert for which comparative information is available is the Great Victoria. Pianka (1969) lists 60 species of lizards from eight study sites; a further four species have been recorded in the Queen Victoria Spring Nature Reserve, viz. Diplodactylus granariensis (="vittatus"), D. maini, Proablepharus reginae and Amphibolurus cristatus (Burbidge et al. 1976), one more, viz. Varanus giganteus, at Yeo Lake Nature Reserve (Smith and Johnstone 1979), and two others, Gehyra purpurascens and Ctenotus hanloni, have been added following nomenclatural changes (Storr 1980, 1982). Table 2 lists the number of lizard species by family known from the two deserts and the number of species in common. It can be seen that the total number of species and the number in each family are comparable although only 44 are common to both deserts.

On present knowledge Lerista vermicularis is the only species restricted to the GSD.

The predominantly Eyrean fauna includes species typical of, and widespread in, Australian deserts as well as those with a more cosmopolitan distribution extending beyond the arid zone into comparatively well watered regions (Table 3). Some Eyrean species present have fairly restricted ranges (e.g. Gehyra pilbara) or are poorly known at present (e.g. Lerista ips and L. vermicularis. A few species recorded near the edge of the GSD are largely restricted to adjacent regions, e.g. Varanus caudolineatus (Pilbara, Gascoyne, Eastern Goldfields) and Liasis perthensis (Pilbara, Gascoyne and further south).

Some GSD reptiles have Torresian affinities and occur here at the southern periphery of their distribution. Species in this category include Carlia triacantha, Sphenomorphus isolepis and Diporiphora pindan. On the other hand, many species typical of the sandy deserts reach their northern limit in Western Australia in the GSD., e.g. most Ctenotus spp.

**Table 2. Number of lizard species from the Great Victoria (GVD) and Great Sandy (GSD) Deserts**

| Family | GVD | GSD | Common to both |
|---|---|---|---|
| Gekkonidae | 16 | 13 | 10 |
| Pygopodidae | 3 | 4 | 2 |
| Agamidae | 11 | 13 | 7 |
| Scincidae | 30 | 28 | 20 |
| Varanidae | 6 | 7 | 5 |
| TOTAL | 66 | 65 | 44 |

**Table 3. Eyrean species of reptiles**

| SPECIES WIDESPREAD IN DESERTS | | SPECIES EXTENDING INTO ADJACENT REGIONS |
|---|---|---|
| Diplodactylus ciliaris | Ctenotus dux | Gehyra variegata |
| D. elderi | C. grandis | Heteronotia binoei |
| D. stenodactylus | C. hanloni | Delma borea |
| D. taeniatus | C. helenae | Lialis burtonis |
| Gehyra purpurascens | C. pantherinus | Pygopus nigriceps |
| Nephrurus laevissimus | C. piankai | Amphibolurus caudicinctus |
| N. levis | C. quattuordecimlineatus | A. inermis |
| Oedura marmorata | C. saxatilis | Moloch horridus |
| Rhynchoedura ornata | Egernia depressa | Lerista bipes |
| Delma nasuta | E. kintorei | Menetia greyii |
| Amphibolurus clayi | E. striata | Omolepida branchialis |
| A. isolepis | Eremiascinus fasciolatus | Varanus acanthurus |
| Diporiphora lalliae | E. richardsonii | V. gouldii |
| D. winneckei | Notoscincus ornatus | Liasis aff. childreni |
| Lophognathus longirostris | Proablepharus reginae | Rhamphotyphlops grypus |
| Tympanocryptis cephala | Tiliqua multifasciata | Furina ornata |
| Ctenotus ariadnae | Varanus brevicauda | Pseudechis australis |
| C. brooksi | V. eremius | |
| C. calurus | V. gilleni | |
| C. colletti | Denisonia fasciata | |

**Table 4. Ubiquitous reptiles and species restricted to various habitats**

| UBIQUITOUS | DUNES AND SANDPLAINS | DUNES ONLY |
|---|---|---|
| Diplodactylus ciliaris* | Nephrurus levis | Nephrurus laevissimus |
| Diplodactylus conspicillatus | Rhynchoeurda ornata | Amphibolurus clayi |
| Gehyra variegata* | Moluch horridus | Diporiphora winneckei* |
| Amphibolurus caudicinctus | Ctenotus calurus | Ctenotus brooksi |
| A. inermis* | C. collettii | Lerista ips |
| A. isolepis | C. dux | L. vermicularis |
| Ctenotus helenae | C. grandis | |
| C. pantherinus | C. hanloni | |
| Tiliqua multifasciata | Notoscincus ornatus | |
| Varanus acanthurus | Omolepida branchialis | |
| V. gouldii | | |

| RANGES/ROCKY AREAS | SPINIFEX HUMMOCKS |
|---|---|
| Oedura reticulata* | Diplpodactylus elderi |
| Varanus tristis* | D. taeniatus |
| Liasis affin. childreni | Delma borea |
| Liasis perthensis | D. nasuta |
| Denisonia fasciata | Lialis burtonis |
| | Proablepharus reginae |

* Arboreal.

Many GSD reptiles utilise a variety of habitats while others are restricted to particular situations. Table 4 shows ubiquitous species and species largely associated with specific habitats. Species listed under "Spinifex Hummocks" are those which live inside the hummocks and seldom leave them - many other species are associated with spinifex, which is widespread in the GSD, and it was not possible to distinguish other species which are dependent on it, but spend a lot of time outside its shelter. Particular attention was paid to termitaria during this survey (Table 5) and it can be seen that although a variety of species shelter in termitaria none is restricted to them. Mitchell (1965) suggests that Gehyra pilbara is restricted to termitaria; data herein show that it also occurs in other habitats.

Pianka (1969) listed habitats for reptiles in the Western Australian portion of the Great Victoria Desert between 26° and 28°30'S. A comparison of species occurring in both deserts shows that they occupy similar habitats. However, in the GSD, some species occupy a greater variety of habitats, e.g. Pianka lists Lerista bipes under "Spinifex"; in the GSD it was also found under an animal carcass in samphire and in alluvial soils. In the GSD Ctenotus colletti and C. dux occurred on dunes and sandplains; Pianka found them only on dunes.

A. Chapman (pers. comm.) examined the breeding condition of all reptiles in the 1979 GSD collection. Only two species, Nephrurus laevissimus and N. levis, showed any evidence of breeding.

**Table 5. Reptiles found in termitaria**

| |
|---|
| Gehyra pilbara |
| G. variegata |
| Heteronotia binoei |
| Moloch horridus |
| Varanus acanthurus |
| V. gilleni |
| Ramphotyphlops grypus |
| Liasis aff. childreni |
| Furina ornata |

Two specimens of female N. laevissimus each had two oviducal eggs, one in each oviduct. One came from LG and was collected on 26 April and the other came from Well 29 on 10 May. The single N. levis female, also with one egg in each oviduct, was collected at LG on 26 April.

It appears, therefore, that most GSD reptiles do not breed in April or May which is after the wet season. However, some species, at least, may be able to react to suitable weather conditions - it had rained just before our arrival at Lake Gregory and at the time of our visit the vegetation around Well 29 was lush with many plants in flower.

## ACKNOWLEDGEMENTS

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# PART VI

## CONCLUSIONS AND RECOMMENDATIONS

by A.A. Burbidge[1], N.L. McKenzie[1] and A.N. Start[2]

### INTRODUCTION

Prior to this study few data were available on the flora or vertebrate fauna of the Great Sandy Desert (GSD). Indeed it was this scarcity which caused the Conservation Through Reserves Committee (1974) to defer any systematic recommendations for conservation reserves in the GSD until the area had been examined by biologists in the context of conservation requirements (see McKenzie et al., this publication). Now that this work has been done recommendations can be made for a system of conservation reserves similar to those in other Western Australian deserts.

Interpretation of the data presented in this report has been made easier by our previous biological surveys in other deserts (Burbidge et al. 1976, McKenzie and Burbidge 1979, Burbidge and Fuller 1979), in the adjacent south-western Kimberley (McKenzie 1981a, 1981b, 1982) and by reference to collections of, and observations on, vertebrates made by Western Australian Museum staff and others from the Pilbara and south-eastern Kimberley.

### WILDLIFE RESOURCES

Beard (1980) recognised the GSD as a distinct natural area - the Canning Botanical District. It is the only substantial area of tropical sandy desert in Western Australia; the Tanami Desert barely intrudes into the State and has a different geology.

While a superficial examination of the GSD might suggest that it is dominated by relatively homogeneous vegetation communities on a monotonous series of sandplains and dunes, a closer examination has shown that this is not the case. There are distinct changes in the vegetation and vertebrate fauna from north to south and from east to west. These are partly a reflection of the changes in rainfall (Fig. 2 in McKenzie et al., this publication) but are also associated with the proximity of adjacent biogeographical districts.

For instance the influence of the sub-humid Kimberley to the north is reflected in the strong north-south change in the species composition of both the flora and the fauna within the desert. In northern sections of the GSD a variety of Northern (Torresian) species occur, and there is a corresponding absence of many Eremaean (= Eyrean) species that are widespread in the central and southern GSD. These Northern elements include the plants Ehretia saligna, Dolicandrone heterophylla, Mirbelia viminalis, Acacia depranocarpa and Pimelea ammochoris and the animals Pseudomys delicatulus, Planigale ingrami, Platalea regia, Coturnix ypsilophora, Diporiphora pindan, Sphenomorphus isolepis and Cyclorana australis. Eremaean (Eyrean) species which occur in central and southern parts of the GSD but which are rare or absent from northern parts include Eucalyptus gammophylla, Acacia maitlandii, Thryptomene maisonneuvei, Sminthopsis hirtipes, Ningaui ridei, Pseudomys hermannsburgensis, Notomys alexis, Calamanthus fuliginosus, Stipiturus ruficeps, Liasis perthensis and Cyclorana platycephala.

Acacia scelerosperma, A. trachycarpa, Antechinus rosamondae, Geopelia striata, Halcyon sacra and Varanus candolineatus were recorded only in the south-western part of the GSD and reflect the proximity of Pilbara populations. In contrast Eucalyptus pachyphylla occurs in eastern parts of the GSD and its distribution is centred in tropical arid areas of the Northern Territory.

As well as the internal changes in plant and animal distributions evidenced above, the GSD includes areas of special significance because of their different geology or physiography. These include Lake Gregory, the Southesk Tablelands, Rudall River and Dragon Tree Soak.

Five hundred and forty one species of plant were identified during this study; a variety of 'sterile' specimens remained unidentified (George and Mitchell, this publication). The flora is dominated by Eremaean species but also includes a variety of Northern species. The GSD is either the northern or southern limit of distribution for many species in Western Australia. Of particular biogeographical significance is the bullrush/Sesbania swamp, known as Dragon Tree Soak. It is believed to be a relict of the riverine vegetation found along the Mandora Palaeoriver during its partial rejuvenation by the wetter climates of the early to mid Holocene. A number of species that are considered rare were collected in the GSD including Thryptomene naviculata, Sclerolaena crenata, Indigofera ammobia and Ptilotus marduguru.

The fauna of the GSD is also mainly Eyrean (= Eremaean) with a smaller proportion of Torresian (sub-humid Kimberley) species occurring in the northern sub-districts. Thirty-seven species of native mammals have been recorded in the GSD since European settlement but a number of these appear to now be extinct or very rare (McKenzie

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and Youngson, this publication). There is an urgent need to conserve sites (actual habitat) known to have supported species such as the Desert Bandicoot, Golden Bandicoot, and Western Hare-wallaby if provision is to be made for further research aimed at understanding the causes of their decline and thence reversing the trend through appropriate introduction and management. The small mammal fauna and the bat fauna appears to be intact. Available data on habitats suggest that suitable habitat for all native species known to have been extant in the GSD at European settlement is represented in the proposed and existing system of nature reserves and national parks.

One hundred and fifty-six species of bird are known from the GSD. Much of this species richness is due to the array of alluvial surfaces and other relatively restricted habitats such as ranges and playa lakes (Start and Fuller, this publication). The additions to the system of conservation reserves proposed herein were selected to include suitable habitat for all known bird species and to allow for the vagrant or nomadic habit of many desert birds - a requirement of their survival in desert areas of unpredictable climate, localised rainfall and often prolonged droughts. Only one species of bird is known to have become uncommon in the GSD since settlement; the decline of Wedge-tailed Eagles is thought to be related to the disappearance of many of the medium-sized mammals on which they preyed.

Seventy-five species of reptile and 8 species of frog have been recorded in the Great Sandy Desert (Burbidge, this publication). One species is thought to be endemic - the skink Lerista vermicularis. The GSD, in common with some other Australian deserts, is very rich in reptiles compared with deserts in other continents (Pianka 1969, 1975). There are 65 species of lizards in the GSD compared to 66 for the Great Victoria Desert, the best known of the Australian deserts in relation to reptiles. The Great Victoria has been the subject of much more study than the GSD and the latter may, with more study, turn out to have the richest reptile fauna of any desert in the world. The number of species restricted to particular surface types provides some idea of the importance of including representatives of all surface types in the proposed reserve system (see Table 4 in Burbidge, this publication).

The various communities sampled during this study are grouped into categories according to surface type in McKenzie and Youngson (this publication) and are further summarised below to provide some indication of the variety of country within the GSD.

**1. Sandplains, sand dunes and swales** are the most widespread surfaces in the GSD and support hummock grass sometimes with scrub to open low scrub, or even open low woodland overstories. Herbfields occur where sandplains are regenerating after fire. Beard and Webb (1974) recognised three sandy surface sub-districts of the GSD: two northern ones supporting "tree steppe" - the dominant trees being Owenia reticulata and Eucalyptus species respectively - and a southern and central one supporting "shrub steppe". In the last, trees are restricted to scattered patches while some typically Eremaean shrubs such as Thryptomene maisonneuvei do not extend further north. Vertebrates recorded only on sandy surfaces include the mammals Notoryctes typhlops, Sminthopsis youngsoni, Ningaui cf. ridei, Notomys alexis, Pseudomys delicatulus and P. hermannsburgensis, the reptiles Nephrurus laevissimus, Amphibolurus clayi, Ctenotus grandis, Lerista ips and Notoscincus ornatus and the frog Notaden nichollsi.

**2. Gravelly rises and ferricrete breakaways** are best represented along the Anketell Ridge where they support scrub to open low scrub over hummock grass. Shrub species such as Acacia umbellata, A. monticola, A. adsurgens, A. adoxa, A. hilliana, Grevillea wickhamii and Mirbelia viminalis, and the low tree Eucalyptus setosa, are important. Also present are drainage lines and associated alluvial outwash areas supporting thickets of Eucalyptus aspera, Acacia monticola and A. ancistrocarpa over hummock grass (Triodia pungens and T. brizoides) and tussock grass. Some vertebrates of the Anketell Ridge, which are uncommon or absent elsewhere in the GSD, include Planigale ingrami, Pygopus nigriceps, Carlia triacantha and Aspidites ramsayi.

**3. Ranges and hills.** A variety of sedimentary rocks outcrop in the GSD. The Proterozoic strata of the Paterson Province outcrop on the south western margin of the GSD and support low open woodlands of Acacia aneura over open shrublands of species such as Cassia helmsii and Eremophila latrobei, and of Eucalyptus terminalis over Acacia pyrifolia and Calytrix ? longiflora, with the grasses Triodia pungens, Panicum australiense, Eriachne species and Sporobolus actinocladus.

Permian strata outcrop in the Southesk Tablelands, a prominent feature in the landscape of the north eastern corner of the GSD. The screes of the Tablelands are sparsely vegetated with hummock grasses (Triodia pungens), shrubs such as Acacia victoriae and Cassia pruinosa, herbs including Ptilotus marduguru and P. exaltatus, and the grasses Pseudochaetochloa australiensis and P. sp. nov. Laterite capping is widespread and supports communities similar to those on the Anketell Ridge.

Jurassic to Cretaceous strata outcrop as ranges and low hills elsewhere in the desert. The McLarty Hills in the north-western part of the desert are typical. The isolated plateaux and mesas comprising the McLarty Hills scarcely disrupt the pattern of the sand dunes. Several communities were recognised although hummock grass was almost ubiquitous. Species noted on the Hills included the shrubs Grevillea pyramidalis, G. wickhami, Acacia acradenia and A. monticola and

the herbs Cyperus cunninghamii, Nicotiana benthamiana, Tinospora smilacina and Abutilon lepidum.

**4. Alluvial and colluvial areas** occur throughout the desert, usually in association with ranges or breakaways. A variety of such soils were noted. Larger valleys in the Southesk Tablelands, such as Breaden Valley, support open low woodlands of Erythrina vespertilio over shrubs and herbs, (e.g. Mukia maderaspatana and Hybanthus aurantiacus) and bunch and tussock grasses. In contract, alluvial levees along the Rudall River support fringing woodlands comprising Eucalyptus camaldulensis, E. microtheca, Melaleuca cajaputi and Acacia eriopoda over rich understories of shrubs, including Psoralea pustulata, and tussock grasses. An outwash valley sampled in the McLarty Hills supported scattered Eucalyptus papuana over scrub thickets comprising Acacia holosericea, A. monticola, Clerodendrum floribundum and Hibiscus leptocladus with patches of tussock grass including Aristida browniana and Sorghum plumosum. Alluvial soils in valleys on the Anketell Ridge support patches of dense thickets involving Acacia monticola, A. ancistrocarpa, and/or A. tenuissima, scattered shrubs such as Tephrosia arenicola and Indigophora monophylla, and areas of mixed hummock and tussock grass. Eucalyptus aspera is emergent.

Alluvial deposits on interdune plains near Dragon Tree Soak support thickets of Melaleuca glomerata, M. lasiandra, Acacia ampliceps and Myoporum acuminatum over grasses such as Sporobolus virginicus, S. australasica and Paspalum sp. (ASG 14737) and the sedge Schoenus falcatus.

**5. Lake deposits** comprising clay, silt and fine sand, with some superficial gypsum, occur along the major palaeodrainage valleys (the Mandora system in the north and the Percival system in the south). These deposits are saline and support dwarf scrub communities of samphires. Near Dragon Tree Soak on the Mandora Palaeoriver these comprise Halosarcia indica subsp. leistachya and H. halocnemoides but are dominated by the herb Trianthema turgidifolia. Among the samphires a number of grasses and herbs occurred including Eragrostis pergracilis and Xerochloa barbata. At Lake Gregory, further east along the same palaeodrainage line, the samphire Halosarcia halocnemoides subsp. tenuis is dominant although H. indica subsp. leiostachya is also present along with perennial herbs (Cassia cretica, Morgania floribunda, etc.) and very open low grass (Eragrostis dielsii).

Lake deposits in the other main palaeodrainage system occurring in the GSD - the Percival Palaeoriver - were sampled at a number of locations. At Tobin Lake the dominant samphire is Halosarcia sp. (ASG 15616) along with H. calyptrata, Hemichroa diandra, Maireana luehmannii, Neobassia astrocarpa and Atriplex cf. elachophylla. The dwarf scrub on Lake Auld includes Hemichroa diandra, Sclerolaena sp., Trianthema triquetra var. clavata and ? Angianthus tomentosus along with the very open low grass Eragrostis flacata. An extensive system of claypans near Karara Well, elsewhere in the same palaeodrainage system, supports a low heath of Halosarcia calyptrata, Trianthema oxycalyptra, Neobassia astrocarpa and Hemichroa diandra with scattered tussocks of the low grass Eragrostis eriopoda.

Along the edge of the major playas, the saline soils grade into colluvial soils comprising aeolian sand, alluvial clay and silt. Where these colluvials are gypsum bearing they are referred to as a "caliche surface". A caliche surface, sampled near Lake Auld, supports scrub species such as Hakea eyreana, Acacia ligulata, and A. bivenosa over huge hummocks of Triodia ? longiceps. Numerous termitaria are present.

**6. Calcrete** outcrops extensively as mounds and rubble within the palaeodrainage valleys. Where sandy and alluvial surfaces overlie calcrete deposits the topography is uneven as a result of karst features. At Well 30, on the Canning Stock Route, alluvial soils in a limestone depression support a woodland of Eucalyptus terminalis over shrubs such as Lawrencia sp. and Petalostylis labicheoides var. cassioides and the hummock grass Plectrachne rigidissima. Low scrubs of Melaleuca glomerata are common in interdune swales and on sandplains where limestone is close to the surface.

## RESERVE DESIGN CONSIDERATIONS

Most of the GSD is vacant Crown land and, as such, an opportunity exists to conserve representative areas of all of the surface-types and biotic communities occurring within it. Oil exploration permits have been granted over much of the desert but no long-term conflict in land-use is expected from this source.

The effective design of a reserve system representing a natural district of Western Australia comprises a number of large reserves spaced across the district and numerous small reserves often duplicating the communities on the larger reserves but also preserving specialized habitats of relatively limited extent which fall outside the boundaries of the larger reserves. The large reserves should include a wide range of community-types thereby ensuring habitat heterogeneity and hence species richness. Ideally they should be positioned so as to include substantial areas of the more widespread communities typical of the region and, together, represent any biogeographical trends within these communities.

In the context of a district with relatively low productivity, such as the GSD, an area of about 200 000 to 400 000 ha (about the size of viable pastoral holdings in more productive sections of the interior) is considered to be the minimum size for 'large' reserves. The level of data available on the wildlife of the GSD is not considered sufficiently detailed to delineate most of the smaller reserves needed to complete the system at this time.

In selecting the areas proposed as 'large' reserves, the above design criteria were followed. The actual positioning and size of the proposals was influenced by:

1. The array of different surface-types, each with their distinctive community of plants and animals.
2. The north-south and east-west changes that were clearly apparent in our data as well as those of Beard and Webb (1974).
3. The need to represent the array of surfaces in both of the major palaeodrainage systems recognised by de van de Graaf et al. (1977) in the GSD - the Mandora and Percival Palaeodrainage Systems.
4. Known populations illustrating the trends in the distribution of plants and vertebrates, within the desert, discussed in the relevant papers of this publication.

It should be emphasised that we do not regard the recommendations as complete. At least one additional area needs to be investigated. A reconnaissance survey in the vicinity of the Radi Hills and Mandora Salt Marsh, was undertaken by Wildlife Research Centre and Western Australian Herbarium staff in June 1981 in response to the EPA (1975) recommendations. The area includes a number of communities of special interest: such as 'pindan' communities representing an area of rapid transition from GSD to south-west Kimberley environments that occurs on the seaward margin of the Canning Basin in the vicinity of the Eighty Mile Beach (McKenzie 1981b, p. 69), and remnant estuarine and riverine communities associated with the occluded mouth of the Mandora Palaeoriver (Beard 1967). Since the Radi Hills and Mandora Salt Marsh are within a pastoral lease, and the field investigations are incomplete, no specific recommendation is possible at this stage.

No recommendation has been made with regard to Lake Gregory. In its 1975 recommendations the EPA asked that, following a biological survey, it be advised as to whether a conservation reserve should be created in the region.

The Lake is undoubtedly one of the State's natural history wonders. After heavy rains in the south-east Kimberley it becomes an inland sea which teams with bird life. Not only does it harbour tens of thousands of ducks, pelicans and other birds commonly found on inland fresh water, but it also supports sea birds like Silver Gulls and Caspian Terns.

Lake Gregory is within a pastoral lease owned by the Aboriginal Lands Trust on behalf of the Mulan Aboriginal Community, who run it as a cattle station. Cattle graze the fringes of the lake. In our view it is unrealistic to recommend that a conservation reserve be declared under the present circumstances. Should the Station be abandoned in the future the possibility of reservation should be reviewed.

## THE PROPOSED RESERVE SYSTEM

Only two conservation reserves exist in the GSD. Dragon Tree Soak Nature Reserve (A35918), in the north-western part, is relatively small (14 182 ha) and protects a site of special scientific importance rather than the widespread surfaces and communities of the northern sub-districts. It conserves a fresh-water soak and surrounding alluvial flats associated with the Mandora Palaeoriver. Small areas of dunes and swales are included.

The Rudall River National Park (A34607) is a large reserve (1 569 459 ha) that lies across the interface between the Little Sandy Desert and the Great Sandy Desert. It adequately represents communities on dune systems typical of the south-western part of the GSD, outcrop surfaces of the Paterson Geological Province and the northern edge of the Bangemall Basin, the extensive alluvial outwash plains associated with the headwaters and course of the Rudall River, and the salt lake surfaces and playas associated with Lake Dora. In terms of conservation, this National Park could be one of Australia's Biosphere Reserves (Anon 1978) - it includes an entire landscape sequence.

Another large reserve has previously been proposed on the far north-western edge of the GSD (McKenzie 1981b). The proposed Edgar Ranges Nature Reserve (807 000 ha) represents the biogeographical transition between the south-west Kimberley and the GSD. It includes the Edgar Ranges, the headwaters of Geegully Creek (a tributary of the Fitzroy River), as well as extensive areas of sand dunes and swales grading into 'pindan' sandplains.

The following additional conservation reserves are proposed (Fig. 1):-

### 1. Southesk Tablelands National Park

The proposed National Park includes some of the most prominent of the Permian hills which occur in the north-east GSD as well as extensive areas of alluvial surfaces both as valley floors and outwash plains. The Tablelands flora includes some endemic plants. A number of semi-permanent fresh-water rock pools are present. Surrounding the Tablelands are dunes and sandplains typical of the north-eastern extremity of the GSD included by Beard and Webb (1974) in the north-eastern sub-district of "Tree Steppe".

There are no National Parks at present in the south-east Kimberley except the very small Wolf Creek Crater National Park (1460 ha). If created, the Southesk Tablelands National Park would provide a National Park in a region which, although it has little tourist traffic at present, could become a major attraction in the future. The Southesk Tablelands are very scenic and are of historical interest; they are worthy of National Park status.

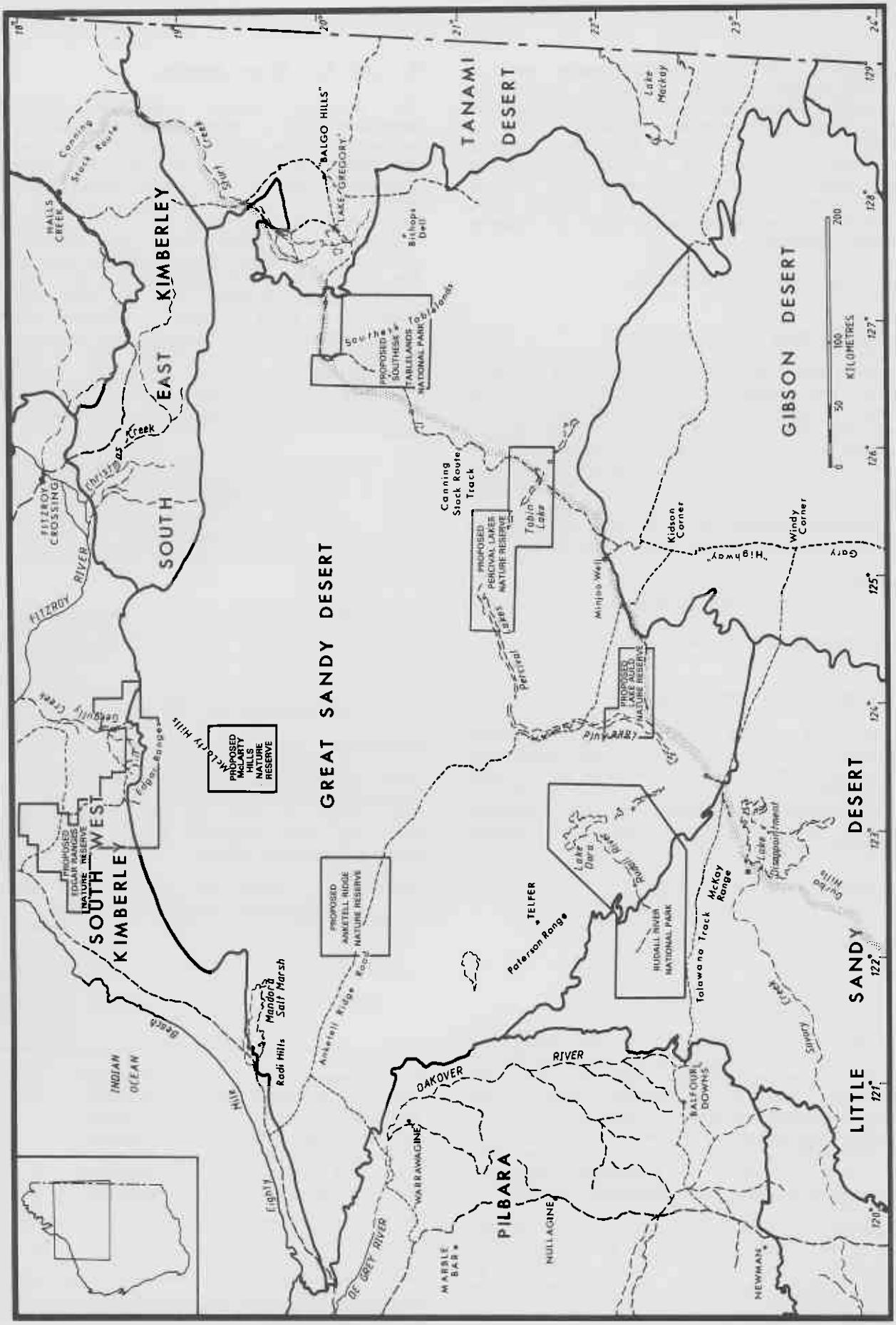


**Figure 1.** Proposed and existing conservation reserves in the Great Sandy Desert

**Boundaries:** 20°05'S 126°20'E thence east to 126°33'E, south to the north-west corner of Reserve No. 22956 (Use and Benefit of Aborigines), south along the western boundary to the south-west corner of Reserve No. 22956, east to the western boundary of the Billiluna Pastoral Lease (approx. 127°03'30"E), south to latitude 20°55'S, west to 126°20'E, north to starting point. The proposed reserve includes much of Reserve 5280 for "Camping".

**Area:** Approximately 570 000 ha.

## 2. McLarty Hills Nature Reserve

This proposed reserve includes an area of dune country, with strong Northern affinities, typical of the north-western part of the GSD included by Beard and Webb (1974) in the "Tree Steppe" sub-district. It includes extensive stands of Desert Walnut (Owenia reticulata), Jurassic outcrops typical of central and northern areas of the GSD, and playas and alluvial surfaces associated with the Mandora Palaeoriver. It also includes the existing Nature Reserve at Dragon Tree Soak.

**Boundaries:** 19°20'S - 19°50'S
123°15'E - 123°45'E.

**Area:** Approximately 290 000 ha.

## 3. Anketell Ridge Nature Reserve

The proposed reserve includes plant and animal communities on gravel, pavement and breakaway surfaces associated with the remnants of duricrust in the GSD. It also contains areas of derived alluvial surfaces and represents the transition between the tree-steppe and shrub-steppe sub-districts of Beard and Webb (1974).

**Boundaries:** 20°10'S - 20°40'S
122°00'E - 122°45'E.

**Area:** Approximately 430 000 ha.

## 4. Percival Lakes Nature Reserve

Including areas representative of the dunes and sandplains of the central GSD, the proposed Nature Reserve is centred on the Percival Lakes and Tobin Lake, playas of the Percival Palaeodrainage system. It contains extensive stands of Desert Oak (Casuarina decaisneana) as well as sites where some mammals, now rare or extinct in the GSD, were last recorded: Perameles eremiana, Trichosurus arnhemensis and Phascogale calura.

**Boundaries:** 21°15'S 124°30'E, thence to 21°15'S 125°25'E, to 21°30'S 125°25'E, to 21°30'S 125°55'E, to 21°50'S 125°55'E, to 21°50'S 125°10'E, to 21°35'S 125°10'E, to 21°35'S 124°30'E, and to the starting point.

**Area:** Approximately 580 000 ha.

## 5. Lake Auld Nature Reserve

The proposed reserve represents communities associated with a major playa lake; part of the remnants of the Percival Palaeoriver. Important are extensive areas underlain by superficial calcrete as well as the largest areas of "caliche" surface in the GSD. Of particular note is the karst formation at Well 30. The north-south orientation of Lake Auld has allowed the persistence of large, dense spinifex hummocks in the fire shadow on its eastern side; leaf litter has created organic horizons over the sand under the hummocks. It is in such a situation that the Rufous Hare-wallaby (Lagorchestes hirsutus) has persisted in the Tanami Desert and it was last recorded on the Western Australian mainland in this area. The last GSD record of another rare mammal, Dasycercus cristicauda, was also from this area.

The proposed reserve also includes an extensive area of Melaleuca glomerata and M. lasiandra low scrub in swales, a feature of the GSD not found in other proposed reserves. It contains the easternmost known populations of Antechinus rosamondae, previously thought to be restricted to the Pilbara.

**Boundaries:** 22°15'S 123°42'E, thence to 22°15'S 123°55'E, to 22°20'S 123°55'E, to 22°20'S 124°23'E, to 22°35'S 124°23'E, to 22°35'S 123°42'E, to the starting point.

**Area:** Approximately 210 000 ha.

## OVERVIEW

Table 1 and Fig. 1 show the areas of the conservation reserves proposed here as well as the GSD portion of both the Rudall River National Park and the proposed Edgar Range Nature Reserve (McKenzie 1981b).

**Table 1. Areas of existing and proposed conservation reserves in the GSD**
(N.P. - National Park, N.R. - Nature Reserve)

| Reserve | Status | Area (km ) |
|---|---|---|
| Edgar Range N.R. | Proposed | 1 300† |
| Southesk Tablelands N.P. | Proposed | 5 700 |
| McLarty Hills N.R.* | Proposed | 2 900 |
| Anketell Ridge N.R. | Proposed | 4 300 |
| Percival Lakes N.R. | Proposed | 5 800 |
| Lake Auld N.R. | Proposed | 2 100 |
| Rudall River N.P. | Existing | 9 500† |
| TOTAL | | 31 600 |

*Includes the existing Dragon Tree Soak N.R.
†GSD portion only.

The area of the GSD reserved for nature conservation at present is about 3.8%. The total area of existing and proposed conservation reserves in Table 1 is about 12.5% of the total area of the desert: approximately 250 000 $km^2$.

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