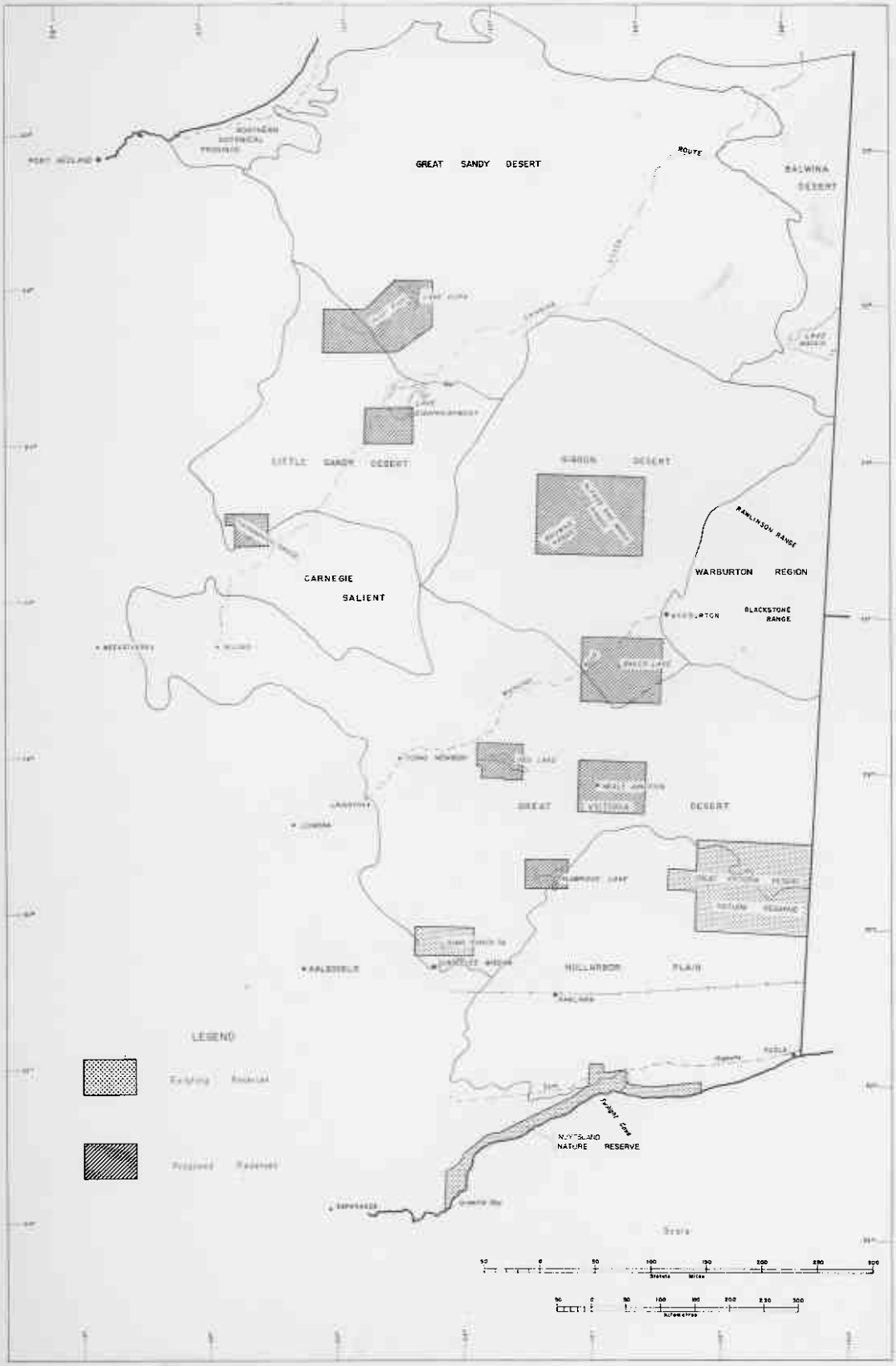

Figure 1. Existing and proposed nature reserves in Western Australian deserts. Adapted from the Report by the Conservation Through Reserves Committee (Anon. 1974) Nomenclature of deserts after Beard (1969)

The Wildlife of some Existing and Proposed Reserves in The Great Victoria and Gibson Deserts, Western Australia

BY

ANDREW A. BURBIDGE

N. L. McKENZIE

Western Australian Wildlife Research Centre, P.O. Box 51, Wanneroo. W.A. 6065.

A. CHAPMAN

W.A. Museum, Francis Street, Perth, W.A. 6000.

and

P. M. LAMBERT

Department of Fisheries and Wildlife, Kalgoorlie, W.A. 6430.

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THE WILDLIFE OF SOME EXISTING AND PROPOSED RESERVES IN THE GREAT VICTORIA AND GIBSON DESERTS, WESTERN AUSTRALIA

Andrew A. Burbidge, N. L. McKenzie (W.A. Wildlife Research Centre, P.O. Box 51, Wanneroo, W.A. 6065), A. Chapman (W.A. Museum, Francis St, Perth, W.A. 6000) and P. M. Lambert (Department of Fisheries and Wildlife, Kalgoorlie, W.A. 6430).

ABSTRACT

An existing and three proposed nature reserves in the Great Victoria and Gibson Deserts were examined during March 1975. Work was concentrated on mammals but some information on birds, reptiles and amphibians is presented. Relevant plant formations are described.

Twenty-two species of native and five species of introduced mammals were recorded. Small mammals were plentiful, probably due to recent excellent seasons in the region. A number of little known species were collected, including: *Ningaui ridei*, *Sminthopsis murina ooldea*, *S. longicaudata*, *S. hirtipes* and *Pseudomys desertor*. Previous mammal collections in the region are discussed.

Available information indicates that the system of nature reserves proposed in the recent Report of the Conservation Through Reserves Committee to the Environmental Protection Authority does include habitat for most of the mammals known from the Great Victoria and Gibson Deserts.

I—INTRODUCTION

Until recently the large arid areas of Western Australia have received little attention from biologists and few conservation reserves have been created there. The biological work done has been mainly by botanists, ornithologists or herpetologists and recent data on mammals are particularly scarce.

Two factors prompted the Western Australian Wildlife Research Centre to take an interest in the deserts of Western Australia at this time. The first was the release by the Environmental Protection Authority of the Report of the Conservation Through Reserves Committee (Anon. 1974). This report recommended a system of desert reserves but was not able to provide much data on the mammals of the areas. The second was the series of excellent seasons which the deserts, particularly the Gibson and Great Victoria Deserts, have had recently. Mouse plagues, reported from towns in the Goldfields and settlements in the interior, indicated an increase in small mammal numbers and suggested that this was an ideal time for survey work.

Thus the aims of this work are:

1. to investigate the status of mammals in parts of the Great Victoria and Gibson Deserts, and
2. to document the fauna (especially mammals) of an existing and some proposed conservation reserves.

The field trip reported here lasted from 4 March to 21 March 1975 and involved six people and two four-wheel drive vehicles. Personnel were: A. A. Burbidge, N. L. McKenzie, P. M. Lambert and E. Ride from the Department of Fisheries and Wildlife, A. Chapman from the Western Australian Museum, and J. A. W. Kirsch from the Peabody Museum of Natural History, Yale University, U.S.A.

Work was concentrated on four areas (Fig. 1. Inside front cover):

1. The Queen Victoria Spring Nature Reserve—5 March to 8 March 1975.
2. Plumridge Lakes Area—9 March to 11 March 1975.
3. Neale Junction Area—11 March to 14 March 1975.
4. Baker Lake Area—14 March to 19 March 1975.

The last three areas are proposed conservation reserves recommended by the Conservation Through Reserves Committee.

The deserts of Western Australia have been described and delineated by Beard (1969) and their vegetation has been mapped (Beard 1974a, 1974b, 1975). Descriptions also appear in the Report of the Conservation Through Reserves Committee. Detailed descriptions in this report will be limited to the sites at which we worked, so as to provide habitat information for the mammals which were collected. Descriptions of vegetation structural formations follow the system of Specht (1970), and Specht *et al.* (1974).

II—CLIMATE

The climate of Western Australian deserts has been discussed by Beard (1969, 1974a, 1974b, 1975). Table 1 shows the mean and median rainfall figures for Cundeelee, Rawlinna and Warburton. To show the unusually high rainfall during the period prior to this work it also includes monthly figures from January 1973 to February 1975.

III—METHODS

Work was concentrated on mammals. Campsites were selected so that traplines could be set in the major habitat types of each area. Traps used were as follows:

1. Large Elliott 50 cm x 17 cm x 17 cm.
2. Medium Elliott 32 cm x 10 cm x 8 cm.
3. Small Elliott 23 cm x 8 cm x 7 cm.
4. Sherman 23 cm x 9 cm x 8 cm.
5. Break-back. Standard commercial rat trap.
6. P.V.C. pit. A polyvinyl chloride tube, 10 cm in diameter, capped at the lower end and sunk vertically in the ground.
7. Dug pit. Pits were dug where soils were suitable. Approximate dimensions were 30 cm x 30 cm and 60-70 cm deep.

The main bait used was a "universal" bait based on peanut paste, sultanas, nuts and rolled oats. Walnuts were also used, especially on break-back traps where

TABLE 1
RAINFALL (mm) FROM THREE LOCALITIES ADJACENT TO SURVEY AREAS

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
WARBURTON													
Mean	26	28	23	20	19	21	12	11	4	10	17	23	214
Median	10	9	3	6	13	12	4	3	1	4	9	15	168
(1940–1973)													
1973	136	0	60	10	22	54	51	36	24	5	7	—	405*
1974	—	—	—	—	—	—	—	—	12	45	—	—	—
1975	0	65											
RAWLINNA													
Mean	15	16	19	17	19	19	14	16	11	13	12	15	186
Median	7	3	12	9	13	15	10	10	6	10	8	7	159
(1915–1973)													
1973	21	0	17	26	36	25	18	49	14	13	28	11	258
1974	1	33	11	81	28	28	58	8	62	5	69	11	343
1975	2	46											
CUNDEELEE													
Mean	25	26	17	23	17	20	18	13	13	10	10	14	207
Median	7	9	8	17	11	12	17	11	9	8	6	10	159
(1940–1974)													
1973	30	1	17	28	24	28	40	40	20	—	9	5	242*
1974	4	16	104	61	18	21	43	16	43	14	71	11	422
1975	0	81											

* incomplete total — no data

ants were a nuisance. The P.V.C. pits were baited but the dug pits usually were not.

At dusk and after dark spotlighting traverses were made by vehicle and searches were made on foot using head-torches. General observational work was carried out during daylight.

Although reptiles and frogs were collected opportunistically, and bird lists were compiled from observations at each of the study areas, no special attempt was made to collect or observe animals other than mammals. As a result, little habitat information is included with the lists of birds, reptiles, and frogs. Relevant annotated bird lists have been published by Slater and Lindgren (1955), Serventy (1956), Ford and Sedgwick (1967), Pianka and Pianka (1970) and Ford (1971).

The breeding status of female mammal specimens was investigated by dissection and macroscopic examination.

IV—COLLECTIONS

All animals collected have been lodged with the Western Australian Museum. The relevant accession numbers are:

Mammals: M13200 to 13387.
Reptiles and Amphibians: R48641 to 48794 and R48797 to 48990.

A collection of plants was deposited in the Western Australian Herbarium.

V—QUEEN VICTORIA SPRING NATURE RESERVE

DESCRIPTION

The Queen Victoria Spring Nature Reserve was gazetted a Class "A" Reserve (No. 30491) on 21 August 1970. It is of approximately 272 600 ha and is vested in the Western Australian Wildlife Authority.

The Atlas of Australian Soils shows Queen Victoria Spring lying near the boundary between two main soil types. North-east of the Spring is an area of sandhills (Soil AB 47). This is described in the Explanatory Notes (Northcote *et al.* 1968) as "Plains and dunes—longitudinal and ring dunes with interdune corridors and plains; occasional salt-pans: chief soils are the red earthy sands of the interdune plains and corridors. Associated are the red soils of the dunes which may also cover some interdune areas, where they may overlie laterite, or silcrete or calcrete (kunkar)". In the area examined, extending to 3 km north of the spring, the hills are of yellow-brown rather than red sand with a red-brown loamy valley between two dunes. To the south and west of the Spring, the soils are more complex and are mapped in the Atlas of Australian Soils as Mx 43. This is described by Northcote *et al.* (1968) as "Gently undulating valley plains and pediments; some outcrop of basic rock: chief soils are alkaline red earth with limestone or limestone nodules at shallow depth".

Beard (1975) has mapped the vegetation of the reserve into four categories. The area of sandhills to the north-east of the Spring is shown as tree and shrub steppe between sandhills. The upper storey is of *Eucalyptus gongylocarpa* Blakely (Bara Gum or Marble Gum) less

than 10 m tall with shrubs of *Eucalyptus youngiana* F. Muell. greater than 1 m tall. Both species have a projective foliage cover of less than 10%. The ground cover is of *Triodia basedowii* E. Pritzel with a cover of 10 to 30%. In the eastern part of the reserve is a similar vegetation but without sandhills. The area to the south and west of the Spring is mapped as a shrub steppe of *E. youngiana* F. Muell. (greater than 1 m tall, projective foliage cover less than 10%) over *T. basedowii* E. Pritzel (hummock grassland, projective foliage cover 10 to 30%). An area in the north-west of the reserve is mapped as a mixed low woodland of Mulga (*Acacia aneura* F. Muell.), sheoak (*Casuarina cristata* Miq.) and eucalypts. A small area on the southern boundary is shown as sclerophyll woodland (*Eucalyptus salmonophloia* F. Muell. and *E. lesouefii* Maiden). A summary of the vegetation as mapped by Beard is given in Table 2.

We worked in the region of Queen Victoria Spring which is a small soak on the western slope of a depression containing a claypan (Plate 5). The claypan held *ca* 0·5 m of water at the time of our visit. It was surrounded by an area of reddish sand with a tall open-shrubland of *Acacia burkittii* Benth., *A. aneura* F. Muell. and *A. tetragonophylla* F. Muell. with occasional emergent stands of Blackboy (*Xanthorrhoea* sp.) and *Banksia elderiana* F. Muell. occur on the gentler slopes. The loamy valley supports a tall shrubland of *Eucalyptus gracilis* F. Muell. and *E. comitae-vallis* Maiden.

For the first 1·8 km south of the claypan the vegetation and soils are similar to the sandhills to the north, although the country is much flatter. *Xanthorrhoea* sp. is common in this area.

Further south is an area of red-brown soil with an open-woodland of *Eucalyptus transcontinentalis* Maiden to 12 m, and a shrub layer of *Melaleuca uncinata* R.Br. Occasional *E. foecunda* Schau. and Quondong (*Santalum acuminatum* (R.Br.) DC. emerge from the shrub layer. Scattered clumps of spinifex (*Triodia* sp.) provided partial ground cover.

Some 3·5 km south of Queen Victoria Spring is a low lying area which was flooded during our visit. Surrounding this is a tall shrubland of *Eucalyptus cylindrocarpa* Blakely with some *E. oleosa* F. Muell. The shrub layer includes thickets of *Acacia tetragonophylla* F. Muell., *Exocarpos* sp. and *Melaleuca uncinata* R.Br. Scattered clumps of *Triodia* sp. occur around the flooded area.

TABLE 2
QUEEN VICTORIA SPRING NATURE RESERVE, VEGETATION
Calculated from Beard (1975)

Beard—Webb Formula (Beard and Webb 1974)	Equivalent Specht Formation (Specht 1970)	Area (ha)	Per Cent
e_{20}Sr. t_2Hi	tall shrubland (*Eucalyptus youngiana*)	106 000	38·9
e_{19}Lr.e_{20}Sr.t_2Hi	low open-woodland between sandhills (*Eucalyptus gongylocarpa*)	83 000	30·4
a_1c_2eLi	low woodland (*Acacia aneura, Casuarina cristata*, and *Eucalyptus* spp.)	48 000	17·6
e_{19}Lr.e_{20}Sr.t_2Hi	low open-woodland (*Eucalyptus gongylocarpa*)	34 000	12·5
e_{13}Mi	woodland (*Eucalyptus salmonophloia, E. lesouefii*)	1 500	0·6
	Totals	272 500	100·0

Pittosporum phillyraeoides DC., *Callitris preissii* Miq. and *Santalum acuminatum* (R.Br.) DC. On areas of deeper sand clumps of *Lomandra leucocephala* (R.Br.) Ewart (0·5 m) are interspersed between extensive swards of *Helichrysum apiculatum* (Labill.) DC. ("Everlasting") with occasional patches of *Triodia* sp. Patches of bare sand are present.

The vegetation of the dunes to the north of the Spring is an open-woodland in which the upper storey consists of Bara Gums (*Eucalyptus gongylocarpa* Blakely) to 12 m. There is a scattered understorey to 5 m of *E. youngiana* F. Muell., *E. platycorys* Maiden et Blakely, *E. foecunda* Schau., *Callitris preissii* Miq., *Casuarina corniculata* F. Muell. and *Santalum acuminatum* (R.Br.) DC. Scattered shrubs to 2 m of *Acacia* spp., *Grevillea didymobotrya* (Endl.) Meisn. and *Leptospermum* sp. occur and the ground cover is chiefly spinifex (*Triodia* sp.) although the sedge *Mesomelaena* sp. is common in places. Along the tops of the higher dunes shrubs of *Calothamnus quadrifidus* R. Br. are found and occasional

We did not examine the country south of this in any detail but noted that it was somewhat more varied than Beard's (1975) map indicates. Some areas contained a tall open-shrubland of Mulga (*Acacia aneura* F. Muell.) while elsewhere there were extensive sand plains with mallee shrublands, *Eucalyptus youngiana* F. Muell. being prominent. Another area was vegetated with *Eucalyptus* woodland.

MAMMALS

Macropus fuliginosus (Desmarest). **Western Grey Kangaroo.**

Two were seen in the open-woodland of *Eucalyptus transcontinentalis.*

Ningaui ridei Archer. **Ride's Ningaui** (Plate 10).

One male was captured in a dug pit (see Methods) at the base of a dune in an open-woodland of *Eucalyptus gongylocarpa* with *Callitris preissii, Grevillea didymobotrya* and *Triodia* sp. This specimen is only the third (and the first adult) of this species collected.

Sminthopsis hirtipes Thomas. **Hairy-footed Dunnart.**

Four (2 males, 2 females) were collected. Two were in the open-woodland of *Eucalyptus gongylocarpa*. One was in a patch of *Helichrysum apiculatum* near the Spring. One freshly dead male was found on the track 10 km south of the Spring. It was in an area of sparse regenerating mallee and *Casuarina* sp., 0·5 m high, growing on gravelly sand.

Sminthopsis murina ooldea Troughton. **Troughton's Dunnart.**

Two specimens (1 female and 1 male) of an animal similar to *S. m. ooldea* (M. Archer, pers. comm.) were collected. The first was in *Eucalyptus gongylocarpa* open-woodland. The second, a mummified specimen, was found in the tall open-shrubland of *Acacia* spp. near the Spring. Archer proposes to raise this taxon to the specific level.

Notomys mitchellii (Ogilby). **Mitchell's Hopping-Mouse.**

Three females were trapped from different habitats in the reserve. Two were from open-woodland of *Eucalyptus gongylocarpa* (one from dune country and the other from flat country south of the Spring). The third specimen was collected in the tall shrubland of *Eucalyptus cylindrocarpa*.

Notomys alexis Thomas. **Spinifex Hopping Mouse** (Plate 4).

Three (2 males, 1 female). One was from an open-woodland of *Eucalyptus gongylocarpa*. Two were collected in an area of emergent *Callitris preissii* and large hummocks of *Triodia* sp. *ca* 0·25 km north of the Spring.

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

Nineteen (7 males, 12 females) were collected and many others were released. Dorsal fur colour ranged from greyish to yellowish-brown. The species was relatively common in most habitats although the limited data indicate that they were less common in the tall shrubland of *Eucalyptus cylindrocarpa*.

Mus musculus Linnaeus. **House Mouse.**

Thirty-eight were collected and many others were released. *Mus* was trapped in every habitat and, on some traplines, more than one animal was found in individual Elliott traps. This was the most abundant mammal recorded.

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

One female was shot while flying over the open-woodland of *Eucalyptus transcontinentalis* after dark. Others were seen over the claypan near the Spring.

Tadarida planiceps (Peters). **Little Flat Bat**

Two females were shot while they were flying over the claypan near the Spring after dark.

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

One was shot at the claypan near the Spring after dark.

Eptesicus pumilis (Gray). **Little Bat.**

One female was shot as it flew over a stretch of open water in the *Eucalyptus cylindrocarpa* tall shrubland, after dark.

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

Three (2 females, 1 male) were shot after dark. Two were collected over the flooded claypan at Queen Victoria Spring. One was collected over a stretch of open water in the *Eucalyptus cylindrocarpa* tall shrubland.

Nycticeius greyii (Gould). **Little Broad-nosed Bat.**

One female was shot at the claypan after dark.

Oryctolagus cuniculus (Linnaeus). **Rabbit.**

One was shot near the Spring. Piles of faeces were recorded nearby.

Camelus dromedarius Linnaeus. **Camel.**

Tracks were observed along the track in the *Eucalyptus cylindrocarpa* tall shrubland.

? Vulpes vulpes (Linnaeus). **Fox.**

Tracks, thought to be those of the European Fox, were recorded in the sandy edges of the track.

Thirteen species of native mammal were observed or collected in the Queen Victoria Spring Nature Reserve during a three day visit. These include one macropod, three dasyurid, three native rodent and six bat species. *Ningaui ridei*, *Sminthopsis murina ooldea*, *S. hirtipes* and *Tadarida planiceps* are all poorly represented in collections and the first two have not previously been recorded on a conservation reserve in Western Australia. *N. ridei* was previously known only from two specimens from *ca* 40 km east-north-east of Laverton (Archer 1975). *S. m. ooldea* occurs in central Western Australia, north-western South Australia (Archer, pers. comm.) and southern Northern Territory (Parker 1973).

Provisional indentifications by Dr D. J. Kitchener of the Western Australian Museum separate the *Notomys* recorded at Queen Victoria Spring Nature Reserve into two species, *Notomys mitchellii* and *N. alexis*. In Western Australia the former was previously known from the drier parts of the south-west and the latter from arid zone formations, mainly the spinifex-sand country of the deserts, although Parker (1973) lists it from a wider range of arid zone habitats in the Northern Territory. The presence of both species near Queen Victoria Spring probably reflects its location on the interface of the *Eucalyptus* formations of the Goldfields and the spinifex-sand country of the Great Victoria Desert. It is interesting that both species of *Notomys* were recorded in the spinifex-sand country usually considered the habitat of *N. alexis*. However only *N. mitchellii* was found in the *E. transcontinentalis* open-woodland to the south of the Spring.

Two rodents, *Mus musculus* and *Pseudomys hermannsburgensis*, were the most common mammals recorded on the reserve. Both species were present in large

numbers although limited data indicate that fewer *P. hermannsburgensis* were recorded in the mallee formations on soils south of the Spring.

BIRDS

The following birds were recorded:

Grey Teal (*Anas gibberifrons*)
Nankeen Kestrel (*Falco cenchroides*)
Brown Falcon (*Falco berigora*)
Little Quail (*Turnix velox*)
Australian Bustard (*Ardeotis australis*)
Australian Dotterel (*Peltohyas australis*)
Port Lincoln Parrot (*Barnardius zonarius*)
Mulga Parrot (*Psephotus varius*)
Boobook Owl (*Ninox novaeseelandiae*)
Tawny Frogmouth (*Podargus strigoides*)
Black-faced Cuckoo-Shrike (*Coracina novaehollandiae*)
Weebill (*Smicrornis brevirostris*)
Chestnut-rumped Thornbill (*Acanthiza uropygialis*)
Yellow-rumped Thornbill (*Acanthiza chrysorrhoa*)
Rufous Whistler (*Pachycephala rufiventris*)
Gilbert Whistler (*Pachycephala inornata*)
Crested Bellbird (*Oreoica gutturalis*)
Singing Honeyeater (*Meliphaga virescens*)
White-fronted Honeyeater (*Phylidonyris albifrons*)
Yellow-throated Miner (*Manorina flavigula*)
Spiny-cheeked Honeyeater (*Acanthogenys rufogularis*)
Grey Currawong (*Strepera versicolor*)
Pied Butcher-bird (*Cracticus nigrogularis*)
Grey Butcher-bird (*Cracticus torquatus*)

The Scarlet-chested Parrot (*Neophema splendida*) was recorded 10 km south of the reserve. Other species have been recorded on the reserve by Slater and Lindgren (1955) and Serventy (1956).

AMPHIBIANS AND REPTILES

The following species were collected:

LEPTODACTYLIDAE

Neobatrachus centralis (Parker)

GEKKONIDAE.

Gehyra variegata (Duméril & Bibron)
Nephrurus laevissimus Mertens
Diplodactylus strophurus (Duméril & Bibron)
Diplodactylus damaeus (Lucas & Frost)
Diplodactylus vittatus Gray

AGAMIDAE

Moloch horridus Gray
Diporiphora reginae Glauert
Amphibolurus minor Sternfeld
Amphibolurus cristatus (Gray)
Amphibolurus isolepis gularis Sternfeld
Amphibolurus fordi Storr
Amphibolurus clayi Storr

SCINCIDAE

Ctenotus atlas Storr
Ctenotus schomburgkii (Peters)
Ctenotus quattuordecimlineatus (Sternfeld)
Ctenotus pantherinus ocellifer (Boulenger)

Slater and Lindgren (1955) recorded the skink *Egernia inornata* and the Bandy-bandy, *Vermicella bertholdi*, in addition to some of the above species. They also recorded an additional species of frog—"*Heleioporus* sp."—which is probably *Neobatrachus sutor*, (Anon. 1965; Main 1965).

Most of the reptiles recorded by us have fairly wide distributions. Exceptions are *Diporiphora reginae*, which has a restricted distribution from Queen Victoria Spring south to Fraser Range, and *Amphibolurus clayi* which is known from North West Cape and a few scattered desert localities. The latter had been previously collected at Queen Victoria Spring (Storr 1966). *Ctenotus quattuordecimlineatus* is rare in collections but has a fairly wide geographical range (Storr 1968a).

Other species have been collected in the reserve in the past, e.g. *Ctenotus calurus*, *C. brooksi* and the rare *Ctenotus leae* (Storr 1968a), *Nephrurus levis* (Storr 1963), *Egernia inornata* (Storr 1968b), *Sphenomorphus richardsonii* (Storr 1967) and *Diplodactylus maini* (Kluge 1962).

VI—PLUMRIDGE LAKES AREA

DESCRIPTION

This proposed flora and fauna reserve of about 3 050 km² lies on the north-western boundary of the Nullarbor Plain and contains country typical of both the Nullarbor fringes and the Great Victoria Desert. Its boundaries are 29° 20′-29° 43′ S and 124° 40′-125° 25′ E.

We entered the area via a track running westward from the Rawlinna-Warburton road. It passed to the south of the Plumridge Lakes and joined a bulldozed line, constructed by a mining company, which ran west-north-west, passing some 12 km south of the salt creek to the west of the lakes at the point where it turns northward. A number of other tracks ran from this cut line, apparently the result of activity by sandalwood cutters.

Beard's (1975) vegetation map of this area appears to be partially incorrect. He maps the area south-east of Plumridge Lakes as sheoak and mulga over bluebush although, in part at least, it is myall and bluebush. The area south-west of the Lakes, mapped as mallee and spinifex is, again in part at least, sheoak and mulga over bluebush. Beard did not traverse this particular area and his map here is based on a Department of Lands and Surveys pastoral classification plan.

Our description of the Plumridge Lake area is therefore based on the Atlas of Australian Soils with our own vegetation notes.

There are four main soil types on the proposed reserve and each supports a different vegetation formation. The soils, as shown in the Atlas of Australian Soils, and their vegetations are as follows:

1. Soil DD 34. The south-eastern section (*ca* 560 km²) of the proposed reserve consists of this soil type. It is described by Northcote *et al.* (1968) as "Very gently to gently undulating plains with broad flats and low broad rises, the former being the prominent feature: chief soils are brown calcareous earths with calcareous loams on the low rises". Where we traversed it the vegetation is a low open-woodland of Myall (*Acacia sowdenii* Maiden) with a shrub layer of bluebush, mainly *Kochia sedifolia* F. Muell., although *K. triptera* Benth. and *K. pyramidata* Benth. are also present. The ground cover is of scattered grasses (Plate 1). A depression in this country supports a low open-woodland of *Casuarina cristata* Miq. and Mulga (*Acacia aneura* F. Muell.) with a ground cover of *Muehlenbeckia cunninghamii* (Meisn.) F. Muell. and the grass *Eragrostis setifolia* Nees.

2. Soil BB 38. "Undulating terrain on limestone. Chief soils are probably shallow calcareous loams". (Northcote *et al. loc. cit.*). This soil type covers about 800 km² of the proposed reserve, mostly west of the Plumridge Lakes. Where we traversed it the vegetation is a low open-woodland with sheoak (*Casuarina cristata* Miq.) the dominant upper storey element but with Mulga (*Acacia aneura* F. Muell.) mixed with it and becoming dominant in places. The shrub layer is varied, species include *Eremophila latrobei* F. Muell., *Cassia artemisioides* DC., Sandalwood (*Santalum spicatum* (R.Br.) DC.) and *Acacia* spp. There is a ground cover of small shrubs e.g. *Ptilotus obovatus* (Gaud.) F. Muell. and *Sida calyxhymenia* J. Gay., and grasses, especially *Eragrostis eriopoda* Benth. and *Danthonia bipartita* F. Muell. with spinifex (*Triodia* sp.) in some places (Plates 2 and 3).

3. Soils AB 82 and AB 83. These cover the western part of the proposed reserve and are also found to the north and north-west of the Plumridge Lakes (*ca* 1 290 km²). AB 82 is a dune field of mainly red earthy sands while AB 83 is a plain, with only occasional dunes, of the same soil (Northcote *et al.* 1968). The vegetation is an open-woodland or low open-woodland of *Eucalyptus gongylocarpa* Blakely and *E. transcontinentalis* Maiden with scattered mallees e.g. *E. youngiana* F. Muell. and an open ground cover of spinifex (*Triodia* sp.). Occasional patches of country support stands of *Acacia leptopetala* Benth. with the shrub *Cassia artemisioides* DC. and a tussock grassland of *Danthonia bipartita* Nees.

4. Soil SV 13. This soil occurs in and around the Plumridge Lakes and consists of saline plains with salt pans and lakes and some fringing dunes (Northcote *et al. loc. cit.*). It covers an area of *ca* 360 km². The only area of this soil examined was on the salt creek to the west of the Lakes. A typical halophytic plant formation of *Arthrocnemum* spp. was found here. Extensive sheets of shallow, saline water were present in this creek at the time of our visit.

A small area (*ca* 40 km²) of soil AY 2—ironstone gravels with a sandy matrix—occurs in the north-east corner of the proposed reserve. We did not examine this area.

MAMMALS

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

One was recorded in the open-woodland formation of *Eucalyptus transcontinentalis* over spinifex.

Notomys alexis Thomas. **Spinifex Hopping-Mouse.**

Fifteen (8 males, 6 females, 1 unsexed) were collected. Several others were seen but not collected. Seven came from the low open-woodland of *Acacia sowdenii* and three from low open-woodland of *Casuarina cristata*. The others came from soil AB 83, in an open-woodland to low open-woodland of *Eucalyptus gongylocarpa*, *E. transcontinentalis* and *E. youngiana* over spinifex and *Danthonia*, and from a tussock grassland of *Danthonia* with emergent *Acacia leptopetala*.

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

Four (3 males, 1 female). Two in low open-woodland of *Acacia sowdenii* and one in low open-woodland of *Casuarina cristata*.

Mus musculus Linneaus. **House Mouse.**

Six were collected and many others were released. They came from both the low open-woodland of *Acacia sowdenii* and the low open-woodland of *Casuarina cristata*.

Oryctolagus cuniculus (Linnaeus). **Rabbit.**

Rabbit warrens and scat heaps were present in both the *Casuarina cristata* and the *Acacia sowdenii* low open-woodlands.

Camelus dromedarius Linnaeus. **Camel.**

Tracks were seen in soils of the AB 83 unit.

Felis catus (Linnaeus). **Feral Cat.**

A feral cat was seen in a spotlight. It was in the mulga-sheoak low open-woodland.

? Canis familiaris dingo Meyer. **Dingo.**

Tracks thought to be those of a dingo were seen in the mulga-sheoak country.

The three species of native mammal observed or collected included one macropod and two rodents.

Mus musculus appeared to be the most common mammal although in the sheoak and myall formations, where systematic collection was concentrated, *Notomys* and *Pseudomys hermannsburgensis* were also present. Perhaps the most interesting point is that *N. alexis* was plentiful in myall and sheoak formations more than 10 km from sand-spinifex country (see p. 6).

No trapping was carried out in the area typical of the Great Victoria Desert (AB 82 and AB 83 soils) although spotlight runs were made. An idea of mammals which might occur in this area can be gained from examination of the data from Queen Victoria Spring and Neale Junction.

Plate 1.—
Plumridge Lakes Area.
Myall (*Acacia sowdenii*) with a shrub layer of Bluebush (*Kochia sedifolia*).

Plate 2.—
Plumridge Lakes Area.
Sheoak (*Casuarina cristata*) and Mulga (*Acacia aneura*) over Bluebush (*Kochia* spp.).

Plate 3.—
Plumridge Lakes Area.
Mulga (*Acacia aneura*) with tussock grasses.

Plate 4.—Spinifix Hopping Mouse (*Notomys alexis*). Photo by A. G. WELLS

Plate 5.—
Claypan at Queen Victoria Spring. Shrubs are mainly *Acacia burkittii*.

Plate 6.—
Neale Junction Area. Open-woodland of Bara Gum (*Eucalyptus gongylocarpa*) and hummock grass (*Triodia* sp.).

Plate 7.—Red-eared Antechinus (*Antechinus macdonnellensis*).

Plate 8.—
Miss Gibson Hill area.

Plate 9.—
Brown Desert Mouse
(*Pseudonys desertor*).

Plate 10.—
Ride's Ningaui (*Ningaui ridei*).

Plate 11.—
Stick nest in cave near
Miss Gibson Hill.

Plate 12.—
Campsite in sandhills 29 km
north of Neale Junction.
Note sandhills in distance.

BIRDS

The following species of birds were recorded:

Emu (*Dromaius novaehollandiae*)
White-faced Heron (*Ardea novaehollandiae*)
Grey Teal (*Anas gibberifrons*)
Wedge-tailed Eagle (*Aquila audax*)
Little Quail (*Turnix velox*)
Australian Bustard (*Ardeotis australis*)
Galah (*Cacatua roseicapilla*)
Cockatiel (*Nymphicus hollandicus*)
Port Lincoln Parrot (*Barnardius zonarius*)
Mulga Parrot (*Psephotus varius*)
Pallid Cuckoo (*Cuculus pallidus*)
Barn Owl (*Tyto alba*)
Tawny Frogmouth (*Podargus strigoides*)
Owlet-Nightjar (*Aegotheles cristatus*)
Red-backed Kingfisher (*Halcyon pyrrhopygia*)
Australian Pipit (*Anthus novaeseelandiae*)
Black-faced Cuckoo-Shrike (*Coracina novaehollandiae*)
White-winged Triller (*Lalage sueurii*)
? Chestnut Quail-Thrush (*Cinclosoma castanotum*)
White-browed Babbler (*Pomatostomus superciliosus*)
Brown Songlark (*Cinclorhamphus cruralis*)
Chestnut-rumped Thornbill (*Acanthiza uropygialis*)
Southern Whiteface (*Aphelocephala leucopsis*)
Red-capped Robin (*Petroica goodenovii*)
Hooded Robin (*Petroica cucullata*)
Willie Wagtail (*Rhipidura leucophrys*)
Rufous Whistler (*Pachycephala rufiventris*)
Gilbert Whistler (*Pachycephala inornata*)
Western Shrike-Thrush (*Colluricincla rufiventris*)
Crested Bellbird (*Oreoica gutturalis*)
White-browed Tree-Creeper (*Climacteris affinis*)
Pied Honeyeater (*Certhionyx variegatus*)
White-fronted Honeyeater (*Phylidonyris albifrons*)
Yellow-throated Miner (*Manorina flavigula*)
Spiny-cheeked Honeyeater (*Acanthagenys rufogularis*)
Black-faced Wood-Swallow (*Artamus cinereus*)
Pied Butcher-bird (*Cracticus nigrogularis*)
Grey Butcher-bird (*Cracticus torquatus*)
Little Crow (*Corvus bennetti*)

Two Naretha Blue-bonnet Parrots (*Psephotus haematogaster narethae*) were recorded 20 km south-east of the proposed Plumridge Lakes Reserve.

The White-faced Heron and Grey Teal were recorded on the salt creek to the west of the Plumridge Lakes. The Quail-Thrush record was from red sands with an open-woodland of Bara Gums and spinifex and was probably the Chestnut Quail-Thrush rather than the Nullarbor Quail-Thrush (*Cinclosoma alisteri*).

AMPHIBIANS AND REPTILES

The following species were collected:

LEPTODACTYLIDAE

Neobatrachus centralis (Parker)

GEKKONIDAE

Nephrurus levis levis De Vis
Nephrurus vertebralis Storr
Diplodactylus damaeus (Lucas & Frost)

AGAMIDAE

Amphibolurus isolepis gularis Sternfeld
Amphibolurus minor Sternfeld
Amphibolurus reticulatus (Gray)
Amphibolurus cristatus (Gray)

SCINCIDAE

Egernia inornata Rosen
Menetia greyii Gray
Tiliqua occipitalis (Peters)
Tiliqua multifasciata Sternfeld

This is the first time that collections have been made in this area. Of interest is the occurrence of both *Tiliqua occipitalis* and *T. multifasciata* which have been treated by some authors as sub-species of the same species. All species collected have fairly wide distributions.

VII—NEALE JUNCTION AREA

DESCRIPTION

The Neale Junction area is representative of the Great Victoria Desert and the soils are largely red sands with many sandhills, especially in the northern half. The proposed reserve lies within 28° 00′-28° 40′ S and 125° 30′-126° 30′ E. Its area is *ca* 7 414 km². The Atlas of Australian Soils maps most of the area as AB 48 and AB 83 with a few small areas around breakaways as AY 4. AB 48 is a gently undulating plain traversed by long dunes; the chief soils are the red earthy sands of the interdune areas and the red siliceous sands of the dunes. AB 83 has been described above (Plumridge Lakes). AY 2 is a dissected lateritic upland of flat to hilly topography with shallow detrital valleys and pediment slopes: the chief soils are shallow stony and/or gravelly sands and sandy loams (Northcote *et al.* 1968).

Beard (1974b) has mapped the vegetation in four categories. The chief one, corresponding largely with the AB soils, is a tree steppe. This consists of low trees of *Eucalyptus gongylocarpa* Blakely with a projective foliage cover of less than 10%, scattered shrubs of *E. youngiana* F. Muell., and a hummock grassland of *Triodia basedowii* E. Pritzel with a cover of 10 to 30%. In the northern half and parts of the southern half this vegetation occurs between sandhills. An area north of Neale Junction is mapped as mallee scrub while areas associated with breakaways are shown as Mulga (*Acacia aneura* F. Muell.) low woodland. A portion of the eastern part of the area is shown as Mulga low woodland between sandhills. A summary of the vegetation of the proposed reserve is given in Table 3.

We worked at two different places within the proposed reserve. The first was some 34 km south of Neale Junction. The country here is a gently undulating sandplain supporting an open-woodland of Bara Gum (*Eucalyptus gongylocarpa* Blakely), with scattered mallees (*E. youngiana* F. Muell.), shrubs of *Acacia* spp. and a hummock grassland of *Triodia* sp. (Plate 6).

The other location was 29 km north of Neale Junction (Plate 12). Here there are many red sandhills vegetated with an open-woodland of *E. gongylocarpa* Blakely but

TABLE 3

NEALE JUNCTION AREA VEGETATION

Calculated from Beard (1974b)

Beard-Webb Formula (Beard and Webb 1974)	Equivalent Specht Formation (Specht 1970)	Area (ha)	Per Cent
$e_{19}Lr.e_{20}Sr.t_2Hi$ between sandhills	low open-woodland between sandhills (*Eucalyptus gongylocarpa*)	343 260	46·3
$e_{19}Lr.e_{20}Sr.t_2Hi$ on sand plain	low open-woodland (*Eucalyptus gongylocarpa*)	227 100	30·6
a_1Li between sandhills	low woodland between sandhills (*Acacia aneura*)	74 840	10·1
a_1Li on sandplain	low woodland (*Acacia aneura*)	48 400	6·5
eSi	tall shrubland (mallee)	42 600	5·8
xCi	low open-shrubland (saltbush and samphire)	5 200	0·7
	Totals	741 400	100·0

with a more diverse shrub layer including *E. youngiana* F. Muell., *Acacia ligulata* A. Cunn., *Thryptomene* sp., *Grevillea stenobotrya* F. Muell., *Anthothroche blackii* F. Muell. and *Gyrostemon ramulosus* Desf. The spinifex is more scattered leaving many areas of bare red sand. *Plectrachne* sp. is mixed with the *Triodia*. Between the sandhills the vegetation is again an open-woodland of Bara Gum and spinifex but on areas of gravelly soils and in some valleys a tall shrubland of *Acacia aneura* F. Muell., with *Eremophila* spp. and immature *A. aneura* as a lower storey, is found. The ground cover is sparse, consisting of occasional tussocks of *Danthonia bipartita* F. Muell.

MAMMALS

Ningaui ridei Archer. **Ride's Ningaui.**

One female was caught in a dug pit 34 km south of Neale Junction. It was in gently undulating sandplain country supporting an open-woodland of *Eucalyptus gongylocarpa* over spinifex. This is only the fourth specimen of this species.

Sminthopsis hirtipes Thomas. **Hairy-footed Dunnart.**

Three (2 males, 1 sex unknown) were collected 29 km north of Neale Junction, one from the crest and the other two from the slope of a sandhill. In both cases the formation was an open-woodland of *Eucalyptus gongylocarpa* although the specimen from the top of the sandhill was trapped on a patch of bare red sand.

Sminthopsis murina ooldea Troughton. **Troughton's Dunnart.**

One female was caught in a dug pit trap 29 km north of Neale Junction. It was in an open-woodland of *Eucalyptus gongylocarpa* over spinifex.

Notomys alexis Thomas. **Spinifex Hopping-Mouse.**

Two males came from the open-woodland of *Eucalyptus gongylocarpa* over spinifex, one from the site 34 km south and the other from 29 km north of Neale Junction.

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

Thirty-one (17 males, 9 females, 5 sex unknown) were collected and many others were released. They were collected in all formations. Dorsal fur colour was variable.

Mus musculus Linnaeus. **House Mouse.**

Seven (3 females, 4 males) were collected and many others were released. Recorded in open-woodland (*Eucalyptus gongylocarpa*) and tall shrubland (*Acacia aneura*).

Oryctolagus cuniculus (Linnaeus). **Rabbit.**

Warrens and scat piles were recorded in the *Acacia aneura* tall shrubland.

Camelus dromedarius Linnaeus. **Camel.**

Two were sighted. Tracks were frequently seen.

Vulpes vulpes (Linnaeus). **Fox.**

Two were seen and a third shot in open-woodland. Its stomach contained three *Pseudomys hermannsburgensis*, one *Mus musculus*, and one *Notomys alexis*. Fresh pad marks were common.

Felis catus (Linnaeus). **Feral Cat.**

One was shot in open-woodland. Its stomach contents included four *Pseudomys hermannsburgensis*.

The Neale Junction sites, selected to represent the important formations of the Great Victoria Desert, yielded five species of native mammal including three dasyurids and two rodents.

The most common mammal was *Pseudomys hermannsburgensis* although *Notomys alexis* and *Mus musculus* were also frequent. *Sminthopsis hirtipes* has previously been collected near Neale Junction (WAM M8943) but *S. murina ooldea* is a new record for the area. As noted above (Queen Victoria Spring), *Ningaui ridei* was previously only known from two specimens collected near Laverton (Archer 1975).

The White-striped Bat (*Tadarida australis*) has been collected on the southern boundary of the proposed reserve at 28° 40′ S, 125° 50′ E (WAM M8963). Thus a total of six native species are known from the area.

BIRDS

The following species of birds were recorded:

Nankeen Kestrel (*Falco cenchroides*)
Brown Falcon (*Falco berigora*)
Little Quail (*Turnix velox*)
Cockatiel (*Nymphicus hollandicus*)
Port Lincoln Parrot (*Barnardius zonarius*)
Mulga Parrot (*Psephotus varius*)
Scarlet-chested Parrot (*Neophema splendida*)
Budgerygah (*Melopsittacus undulatus*)
Boobook Owl (*Ninox novaeseelandiae*)
Tawny Frogmouth (*Podargus strigoides*)
Spotted Nightjar (*Eurostopodus guttatus*)
Fork-tailed Swift (*Apus pacificus*)
Red-backed Kingfisher (*Halcyon pyrrhopygia*)
Black-faced Cuckoo-Shrike (*Coracina novaehollandiae*)
White-winged Triller (*Lalage sueurii*)
White-browed Babbler (*Pomatostomus superciliosus*)
Striated Grass-Wren (*Amytornis striatus*)
Orange Chat (*Epthianura aurifrons*)
Red-capped Robin (*Petroica goodenovii*)
Hooded Robin (*Petroica cucullata*)
Gilbert Whistler (*Pachycephala inornata*)
Crested Bellbird (*Oreoica gutturalis*)
Yellow-fronted Honeyeater (*Meliphaga plumula*)
Yellow-throated Miner (*Manorina flavigula*)
Zebra Finch (*Poephila guttata*)
Black-faced Wood-Swallow (*Artamus cinereus*)
Pied Butcher-bird (*Cracticus nigrogularis*)
Grey Butcher-bird (*Cracticus torquatus*)
Little Crow (*Corvus bennetti*)

Probably our most interesting record was the Fork-tailed Swift. A flock of between 50 and 100 was sighted on 12 March 1975, 2·5 km south of Neale Junction. They were hawking over an area of hummock grassland with scattered emergent *Hakea lorea* R.Br. and mallees. Some birds flew to within five or ten metres of the ground and their white rumps and forked tails could be clearly seen. More were sighted around the Junction but these were flying at a considerable height. At the time it was cool with a low overcast and some light rain.

Additional species from within the proposed Neale Junction reserve have been listed by Ford (1971) and Pianka and Pianka (1970).

REPTILES

The following species were collected:

GEKKONIDAE

Gehyra variegata (Duméril & Bibron)
Heteronotia binoei (Gray)
Nephrurus levis levis De Vis
Nephrurus laevissimus Mertens
Diplodactylus conspicillatus Lucas & Frost

AGAMIDAE

Moloch horridus Gray
Amphibolurus isolepis gularis Sternfeld
Amphibolurus fordi Storr
Physignathus longirostris Boulenger

SCINCIDAE

Egernia striata Sternfeld
Egernia inornata Rosen
Ctenotus pantherinus ocellifera (Boulenger)
Ctenotus dux Storr
Ctenotus leae (Boulenger)
Ctenotus helenae Storr

ELAPIDAE

Pseudechis australis (Gray)

Pianka (1969) lists a number of additional lizards for his study areas—27 km south and 13 km west of Neale Junction—which are within the proposed reserve. We obtained species additional to his but this is explained by the fact that we sampled a wider range of habitats. Pianka did not work in sandhill country in this area and all the additional species we collected (*Nephrurus laevissimus*, *Physignathus longirostris*, *Ctenotus dux* and *C. leae*) were obtained elsewhere by Pianka and listed by him as occurring in sandridge country.

C. leae is poorly represented in collections and prior to our trip there was only one specimen of it in the Western Australian Museum.

With the above additions 31 species of lizards are known from the proposed reserve as well as 4 species of snakes.

VIII—BAKER LAKE AREA

DESCRIPTION

This proposed reserve lies on the boundary of the Gibson and Great Victoria Deserts, south-west of Warburton. Most of it lies in the Gibson Desert, a region typified by undulating lateritic plains with occasional hills and ranges and intervening areas of sand dunes. In its south-western and south-eastern corners the proposed reserve includes small areas of the Great Victoria Desert. The proposed reserve lies within 26° 25′—27° 15′ S and 125° 30′—126° 40′ E. Its area is *ca* 10 529 km².

The Atlas of Australian Soils shows three main soils in the area. Ironstone gravels with a sandy matrix (AY 2) are the most widespread. They are interspersed with red sands with many sandhills (AB 47, 48, described under Neale Junction Area). Baker Lake itself is mapped as SV 10—shallow valleys with lakes, claypans, saltpans, calcrete (kunkar) platforms, sand dunes, kopi dunes and calcareous dunes; chief soils are probably shallow loams (Northcote *et al.* 1968).

Beard's (1974b) vegetation map correlates closely with the Atlas in this region. The AY 2 soils are mapped as Mulga parkland—scattered shrubs of *Acacia aneura* F. Muell. over a hummock grassland of *Triodia basedowii* E. Pritzel with a projective foliage cover of 10 to 30%.

The AB 47 soil is mapped as mixed shrub steppe between sandhills—scattered shrubs of *Acacia* spp. over a hummock grassland of *T. basedowii* with a projective foliage cover of 10 to 30%. The AB 48 soil areas are shown as mallee and mulga between sandhills and mulga between sandhills. A summary of the vegetation in this area is given in Table 4.

Surveys were carried out at two different places. The first (26° 51′ S, 126° 23′ E) was in the Hann Breakaways, an interesting topographic feature to the east of Baker Lake, where a lateritic duricrust on sedimentary rocks has eroded into breakaways. The area worked was about 6 km east of Miss Gibson Hill (Plate 8). On top of the plateau is a low hummock grassland of *Triodia* sp. and *Plectrachne* sp. with occasional emergent *Hakea lorea* R.Br. and *Acacia* spp. including Mulga (*Acacia aneura* F. Muell.). The plateau slopes gradually to the east and, where the soils are deeper, a tall shrubland of Mulga and other Acacia spp. occurs. A shrub layer of *Eremophila* spp. is found and the ground cover is scattered *Plectrachne* sp. and other grasses.

Along the edge of the breakaway are occasional patches of *Eucalyptus* aff. *oldfieldii* F. Muell. and *Acacia* spp. to 3 to 4 m. Immediately below the breakaway, and in the upper end of eroding valleys, *Ficus* sp. often occurs. *Callitris huegelii* (Carr.) Franco is also found occasionally in crevices and sheltered areas under breakaways. The scree slope is covered with a tall shrubland of *Acacia aneura* and *A. kempeana* F. Muell. with little shrub layer or ground cover. The valleys contain a low shrubland of *Scaevola spinescens* R.Br. and *Acacia* spp.

Below the breakaway numerous small creeks join to form one main watercourse which flows westward towards Baker Lake. A few small pools of fresh water were present in the creek at the time of our visit. Occasional River Gums (*Eucalyptus camaldulensis* Dehn.) occur along it.

The second area investigated was in the vicinity of Winduldarra Rockhole (26° 31′ S, 126° 01′ E) on the Warburton-Laverton road. Around the rockhole are low gravelly hills and breakaways with a vegetation somewhat similar to that described above. On the hills and above the breakaways there is a low open-shrubland of *Acacia* sp., *A. sibirica* S. Moore and *Olearia stuartii* (F. Muell.) Benth. The slopes support a tall open-shrubland of *Acacia aneura* F. Muell. with scattered low shrubs of *Kochia triptera* Benth. over bare gravelly soil. Drainage lines between and below the hills have a much denser vegetation. Close to the hills it consists of a tall open-shrubland of *Acacia aneura* F. Muell. over a closed-tussock grassland of *Themeda australis* (R.Br.) Stapf. and some *Eragrostis eriopoda* Benth. Scattered shrubs of *Eremophila latrobei* F. Muell. and *Solanum lasiophyllum* Dun. are also present. A low open-woodland of Bloodwoods (*Eucalyptus ? dichromophloia* F. Muell.) is present in drainage lines to the east (above) the breakaways. Here there is an understorey of *Acacia aneura* F. Muell. to 6 m and a dense ground cover of *Triodia* sp. and other grasses.

South-west of Winduldarra the soils change to red sands with many sandhills. The vegetation is a low open-shrubland of *Acacia* spp. and *Thryptomene* sp. over a hummock grassland of *Triodia* sp. Occasional Native Poplar (*Codonocarpus cotinifolius* (Desf.) F. Muell.), *Grevillea juncifolia* Hook. and Mulga are emergent from the shrubland.

MAMMALS

Macropus robustus Gould. **Euro.**

Although none were seen, droppings of euros were plentiful in caves below breakaways in the Miss Gibson Hill area.

Dasycercus cristicauda (Krefft). **Mulgara.**

Skeletal remains, identified by M. Archer as belonging to this species, were obtained from owl pellet material picked up near Gahnda Rockhole (23° 36′ S, 125° 51′ E). The material appeared to be fairly fresh and, because it was in an exposed position at the base of a vertical breakaway, we judge it to be considerably less than five years old. This species was collected previously at this site in 1931 (WAM M1576).

TABLE 4

BAKER LAKE AREA VEGETATION

Calculated from Beard (1974b)

Beard-Webb Formula (Beard and Webb 1974)	Equivalent Specht Formation (Specht 1970)	Area (ha)	Per Cent
$a_1Sp.t_2Hi$	tall open-shrubland (*Acacia aneura*)	387 070	36·8
$a_1Si/eSi.t_2Hi$ between sandhills	tall shrubland (*A. aneura* and mallees)	170 970	16·2
$a_nSr.t_2Hi$ between sandhills	tall open-shrubland (*Acacia* spp.)	161 290	15·3
a_1Li	low woodland (*Acacia aneura*)	156 130	14·8
a_1Li between sandhills	low woodland between sandhills (*Acacia aneura*)	85 160	8·1
$e_{19}Lr.e_{20}Sr.t_2Hi$ between sandhills	open-woodland (*Eucalyptus gongylocarpa*) between sandhills	77 420	7·4
Baker Lake		14 840	1·4
	Totals	1 052 880	100·0

Antechinus macdonnellensis (Spencer). **Red-eared Antechinus** (Plate 7).

One male was captured in an Elliott trap set beneath the edge of a laterite breakaway near Winduldarra Rockhole. Vegetation on the slope beneath the capture site was a tall open-shrubland of *Acacia aneura* over bare gravelly soil.

Ningaui ridei Archer. **Ride's Ningaui.**

This species was identified by M. Archer from the owl pellet material described above.

Sminthopsis murina ooldea Troughton. **Troughton's Dunnart.**

A mummified specimen was found in a dry creek bed *ca* 2 km east of Miss Gibson Hill. The surrounding formation was a tall open-shrubland of *Acacia* spp. with occasional emergent *Eucalyptus camaldulensis* fringing the creek. Skeletal remains, identified by M. Archer as belonging to this species, were obtained from the owl pellet material picked up in an exposed position near Gahnda Rockhole.

Sminthopsis longicaudata (Spencer). **Long-tailed Dunnart.**

One female was shot at late dusk *ca* 6 km east of Miss Gibson Hill. It was on top of the plateau, *ca* 10 m from the breakaway edge, in an area of low hummock grassland of *Triodia* sp. and *Plectrachne* sp. with occasional emergent *Hakea lorea* and *Acacia* sp.

Leporillus sp. **Stick-nest Rat.**

Stick nests were common in crevices and caves under the breakaway near the camp 6 km east of Miss Gibson Hill (Plate 11). Several were also found in similar situations near Winduldarra and Gahnda Rockholes. Only two, of more than 25 nests examined near the campsite east of Miss Gibson Hill, appeared to include fresh material. No direct evidence of extant *Leporillus* was collected during the visits.

The stick barrier of some nests was up to 1 m high and 2 m wide. Three nests were excavated and a small amount of bone material collected. A. M. Douglas (pers. comm.) of the Western Australian Museum has identified material from similar concretions in Western Australia as *Leporillus apicalis*.

Notomys alexis Thomas. **Spinifex Hopping-Mouse.**

Sixteen were collected (8 males, 7 females, 1 unknown). Three were taken on the gravelly soils, and two on reddish-brown sandy soils found on the plateau above the breakaways near Miss Gibson Hill. Thirteen were collected near Winduldarra Rockhole. Two came from tall open-shrubland of *Acacia aneura* on gravelly soil and the other eleven from the low open-shrubland of *Acacia* spp. and *Thryptomene* over spinifex found on the sandy country west of Winduldarra. One female was pregnant with two foetuses in each uterine horn.

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

Thirteen (5 males, 8 females) were collected and others were released. They were collected at both sites in all the formations examined.

Pseudomys desertor Troughton. **Brown Desert Mouse** (Plate 9).

Three (2 females, 1 male) were collected but only two were from the proposed Baker Lake nature reserve; these were from *ca* 6 km east of Miss Gibson Hill.

One was shot at night in low hummock grassland on the gravelly soil of the plateau above the breakaways, and the other was trapped in a tall shrubland of *Acacia aneura* on the scree slope just below the breakaway. The third specimen was shot in the daytime on the edge of the track *ca* 3 km north of Cooper Creek. It was in an area of tall open-shrubland of *Acacia* sp. over *Triodia* sp. on reddish gravelly sand.

Mus musculus (Linnaeus). **House Mouse.**

Only two males were trapped, one from the Miss Gibson Hill site and another near Winduldarra Rockhole. The first came from a tall shrubland of *Acacia aneura* on a scree slope and the other from tall open-shrubland of *Acacia aneura* over *Themeda australis* and *Eragrostis eriopoda*.

Taphozous georgianus Thomas. **Common Sheath-tailed Bat.**

One male was shot after dark at Winduldarra Rockhole.

Eptesicus pumilis (Gray). **Little Bat.**

Nine (5 males, 3 females, 1 not sexed) were collected. Eight were mist netted in laterite caves. Five (3 females and 2 males) came from three different caves near the Miss Gibson Hill site and three males came from two caves near Gahnda Rockhole. A mummified specimen was found under a laterite breakaway near Winduldarra Rockhole.

Tachyglossus aculeatus (Shaw). **Echidna.**

Echidna scats were collected in the breakaways near Miss Gibson Hill.

Oryctolagus cuniculus (Linnaeus). **Rabbit.**

A few were seen in the breakaways.

Camelus dromedarius Linnaeus. **Camel.**

Tracks were seen at the Miss Gibson Hill campsite.

Canis familiaris dingo Meyer. **Dingo.**

One was seen near the Miss Gibson Hill camp.

The proposed Baker Lake reserve yielded thirteen species of native mammals—one macropod, five dasyurids, three rodents, two bats, one monotreme and the dingo. The area has been collected by other workers, mainly along the Laverton-Warburton road, including W. D. L. Ride, A. M. Douglas and W. H. Butler (Bannister 1969). Extant species recorded by them, but not by us, are *Sminthopsis crassicaudata* (WAM M10043), *Macroderma gigas* (WAM M4637), *Chalinolobus gouldii* (Bannister 1969) and *Tadarida australis* (WAM M10063). *T. australis* is also known from Point Wood (WAM M8965; 27° 13′ S, 126° 29′ E) and at 26° 34′ S, 126° 25′ E (WAM M8966). A specimen of *Sminthopsis hirtipes* was collected at Winduldarra in 1931 (WAM M1577). This brings the total number of native mammals known to eighteen.

Three species collected during the survey are of special interest. Our specimen of *Sminthopsis longicaudata* (WAM M13348) is only the fifth and is the first with detailed habitat information. The other specimens came from near Marble Bar and "Central Australia". *Ningaui ridei* is poorly represented in collections and had not previously been collected outside the Great Victoria Desert. The skeletal remains obtained by us from owl pellet material near Gahnda Rockhole are therefore a range extension. *Pseudomys desertor* is also poorly represented in collections and our specimens extend its known range in Western Australia southward to the southern edge of the Gibson Desert.

Mus musculus was present in the laterite country of the Gibson Desert, but apparently at much lower densities than in the more sandy areas of the Great Victoria Desert and Nullarbor Plain.

A female *Notomys alexis* from the sand dunes west of Winduldarra was the only specimen from the entire survey found to be pregnant.

BIRDS

The following species were recorded:

Emu (*Dromaius novaehollandiae*)
Whistling Kite (*Haliastur sphenurus*)
Wedge-tailed Eagle (*Aquila audax*)
Nankeen Kestrel (*Falco cenchroides*)
Brown Falcon (*Falco berigora*)
Little Quail (*Turnix velox*)
Australian Bustard (*Ardeotis australis*)
Common Bronzewing (*Phaps chalcoptera*)
Cockatiel (*Nymphicus hollandicus*)
Port Lincoln Parrot (*Barnardius zonarius*)
Mulga Parrot (*Psephotus varius*)
Bourke Parrot (*Neophema bourkii*)
Scarlet-chested Parrot (*Neophema splendida*)
Owl (*Tyto* sp.)
Owlet-Nightjar (*Aegotheles cristatus*)
Spotted Nightjar (*Eurostopodus guttatus*)
Fairy Martin (*Petrochelidon ariel*)
Australian Pipit (*Anthus novaeseelandiae*)
Cinnamon Quail-Thrush (*Cinclosoma cinnamomeum*)
Rufous Songlark (*Cinclorhamphus mathewsi*)
Variegated Wren (*Malurus lamberti*)
Red-capped Robin (*Petroica goodenovii*)
Hooded Robin (*Petroica cucullata*)
Willie Wagtail (*Rhipidura leucophrys*)
Rufous Whistler (*Pachycephala rufiventris*)
Western Shrike-Thrush (*Colluricincla rufiventris*)
Crested Bellbird (*Oreoica gutturalis*)
Singing Honeyeater (*Meliphaga virescens*)
White-fronted Honeyeater (*Phylidonyris albifrons*)
Yellow-throated Miner (*Manorina flavigula*)
Spiny-cheeked Honeyeater (*Acanthagenys rufogularis*)
Zebra Finch (*Poephila guttata*)
Black-faced Wood-Swallow (*Artamus cinereus*)

The *Tyto* was recorded at the Hann Breakaways, where it was seen flying over the camp after dark. It was most likely *Tyto alba* although *T. novaehollandiae* cannot be ruled out.

At a series of small pools along Cooper Creek, 8 km south of the Baker Lake Area, the following species were recorded: Grey Teal (*Anas gibberifrons*), White-faced Heron (*Ardea novaehollandiae*), Little Pied Cormorant (*Phalacrocorax melanoleucos*), and Zebra Finch (*Poephila guttata*).

Information collected by Ford (1971) is relevant to the proposed reserve.

AMPHIBIANS AND REPTILES

The following species were collected:

LEPTODACTYLIDAE
Neobatrachus centralis (Parker)

GEKKONIDAE
Gehyra variegata (Duméril & Bibron)
Rhynchoedura ornata Guenther
Nephrurus levis levis (De Vis)
Nephrurus laevissimus Mertens
Heteronotia binoei (Gray)
Diplodactylus ciliaris Boulenger
Diplodactylus conspicillatus Lucas & Frost
Diplodactylus strophurus (Duméril & Bibron)

AGAMIDAE
Tympanocryptis cephala gigas Mitchell
Amphibolurus reticulatus (Gray)

SCINCIDAE
Egernia striata Sternfeld
Sphenomorphus richardsonii (Gray)
Ctenotus leonhardii (Sternfeld)
Ctenotus helenae Storr

VARANIDAE
Varanus gouldii flavirufus Mertens
Varanus giganteus (Gray)

BOIDAE
Liasis childreni Gray

ELAPIDAE
Denisonia fasciata Rosen

An elapid snake, thought to be *Furina christieana*, was captured but later escaped. Additional species have been collected by other workers, especially along the Laverton-Warburton road, e.g. *Amphibolurus isolepis gularis* (Storr 1965) and *Lerista bipes* (Storr 1972).

Tympanocryptis cephala gigas was found well to the east of its known range (Storr 1964). The specimen of Perentie (*Varanus giganteus*) helps fill in a gap in its known range since it appears to be absent from most of the deserts between the North-West Division and the Central Australian Highlands. The species favours rocky situations and this probably explains its occurrence at the Hann Breakaways.

IX—DISCUSSION

Twenty-two species of native mammals were recorded during the survey. Two additional species have been collected by other workers at one site, making a total of twenty-four native species for the four existing and proposed reserves. A further five species of introduced mammals were recorded.

Eight of the twenty-four native species were bats, all with wide distributions. Of the terrestrial mammals two species, *Macropus fuliginosus* and *Notomys mitchellii*, are associated with the higher and more regular rainfall areas of southern Australia, although *M. fuliginosus* occurs on parts of the Nullarbor Plain. Both were recorded on the Queen Victoria Spring Nature Reserve, near the inland limits of their distributions. *Sminthopsis crassicaudata* has a wide distribution including both medium and low rainfall areas.

The others, with the exception of the Dingo, are species largely restricted to the arid zone of the continent, although *Sminthopsis hirtipes* (WAM M10208, Kalbarri National Park, 1972), *Notomys alexis* (WAM M4379, Kalbarri) and *Pseudomys hermannsburgensis* (WAM M10597, 50 km north of Beacon, 1973) are also known from the fringe of the agricultural areas of the south-west. *Antechinus macdonnellensis* has an arid zone distribution if treated as distinct from Kimberley (McKenzie *et al.* 1975) and Arnhem Land (Parker 1973) populations which are probably referable to *A. bilarni* Johnson (M. Archer, pers. comm.).

Considering the short duration of the survey a remarkable diversity of small mammals was obtained. Because few data are available on mammals in Western Australian deserts it is difficult to judge how much of our success was due to the recent good seasons experienced in the region. Our work does show that a wide range of species, including some thought to be rare, are obtainable during some years.

Some of the mammals we collected are common and widespread, e.g. *Notomys alexis* and *Pseudomys hermannsburgensis*. Others are poorly known and our records add considerably to the knowledge of them. Thus *Ningaui ridei* was previously known from only two specimens (we collected a further two and some skeletal material), *Sminthopsis longicaudata* was known from four specimens (we collected a fifth) and *S. hirtipes* was known from nine (we obtained a further seven). Other little known species include *S. murina ooldea* and *Pseudomys desertor*. An examination of what little information is available on the distribution of desert mammals suggests that only a few additional species can be expected in the areas we examined. Three small mammals which, on current knowledge, appear probable are *Sminthopsis froggattii* (WAM M5888, Warburton; WAM M8862, Yamarna Homestead), *Antechinomys spenceri* (known from the Warburton area, WAM M7738 and others) and *Notoryctes typhlops*—known from the Great Victoria Desert at Eltoon (Anon., 1965) and at Warburton (WAM M7711, collected 1968).

Among larger mammals two further species have been taken in recent times from the Warburton area—*Macrotis lagotis* in 1968 (WAM M9980, see also Smyth and Philpott 1968) and *Onychogalea lunata* in 1964 (Ride 1970, p 198). The Brush-tailed Rock Wallaby (*Petrogale penicillata*) occurs in central Australia (e.g. WAM M4988, 19 km south-east of Warburton Mission) but no suitable habitat was found in the areas we examined. It should be noted that Warburton, and the country to the east of it, occupy a different geological and vegetational region to the country we examined (Beard 1969).

Species which have been collected (as whole specimens) in or near the proposed Baker Lake reserve in the more distant past include *Perameles eremiana*, *Isoodon auratus*, *Macrotis lagotis* and *Lagorchestes hirsutus*, all taken in 1931 (WAM M1572—1575). A flat skin of *Myrmecobius fasciatus rufus* from Warburton Range was accessed by the Western Australian Museum in 1950 (WAM M2848) but the date of collection is not known.

One major conservation reserve—the Great Victoria Desert Nature Reserve of 2 495 777 ha—was not examined. This reserve is situated on the South Australian border and contains country typical of the Great Victoria Desert, the Nullarbor fringes and the Nullarbor Plain. The little information available on this reserve is reported in Anon. (1965) and Beard (1975). As stated above the Marsupial Mole (*Notoryctes typhlops*) is known from this reserve. Although it includes somewhat similar country to three of the areas which we examined, it lies further eastward and would, to some extent, complement rather than duplicate them, by providing protected habitat for animals using the northern side of the Nullarbor as a corridor connecting the faunas of eastern and western Australia (Anon. 1965; Ford 1971). In addition it includes country typical of the true Nullarbor Plain, country not included in the areas we examined. It would also be distant enough from the places we examined to be subject to a different cycle of seasons in this region of unreliable rainfall.

Two major Conservation Through Reserves Committee proposals (Anon. 1974) in the region were not examined. These are the "Gibson Desert Area", including the Browne, and Alfred and Marie Ranges to the north-west of Warburton, and the Yeo Lake Area east of Cosmo Newbery (Fig. 1). Any complete analysis of the adequacy of the proposed reserve system in the Great Victoria and Gibson Deserts must await surveys of these two areas as well as an improved knowledge of desert mammal distributions. However, available information indicates that the system of nature reserves proposed by the Conservation Through Reserves Committee does include habitat for most of the mammals known from the Great Victoria and Gibson Deserts.

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