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The Wildlife of the Proposed Toolonga Nature Reserve, Shark Bay Shire, Western Australia

BY

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PERTH
WESTERN AUSTRALIA

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R E P O R T

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TOOLONGA NATURE RESERVE,
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WILDLIFE OF THE PROPOSED TOOLONGA NATURE RESERVE, SHARK BAY SHIRE, WESTERN AUSTRALIA.

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ABSTRACT

Following a Cabinet endorsed recommendation by the Environmental Protection Authority in 1975, an area of vacant Crown land (the Toolonga Area) was examined during April and September, 1978.

The geology, soils and vegetation of the area are described and annotated lists of mammals, birds, amphibians and reptiles are presented. A small part of the area lies in the South West Botanical Province (Irwin District) but most is in the Eremaean Botanical Province (Carnarvon District). The vertebrate fauna is a mixture of south-western, Shark Bay and arid zone species, but the last predominate.

The Toolonga Area provides an opportunity to protect a representative portion of the southern part of the Carnarvon Botanical District and its flora and fauna, an area which has no Conservation Reserves at present. A recommendation is made for a Class A Nature Reserve of approximately 235 500 ha.

I INTRODUCTION

In its report to the Environmental Protection Authority the Conservation Through Reserves Committee (1974) under the heading "Nerren Nerren East Area", recommended: "that a biological survey of this region be carried out, coordinated by the Department of Fisheries and Fauna, with a view to selecting an area for reservation..."

In 1975 the Environmental Protection Authority made the following recommendations to Cabinet:

"The EPA recommends that:

1. the Department of Fisheries and Wildlife make a biological survey of the region with a view to selecting an area for reservation to be vested in the W.A. Wildlife Authority;

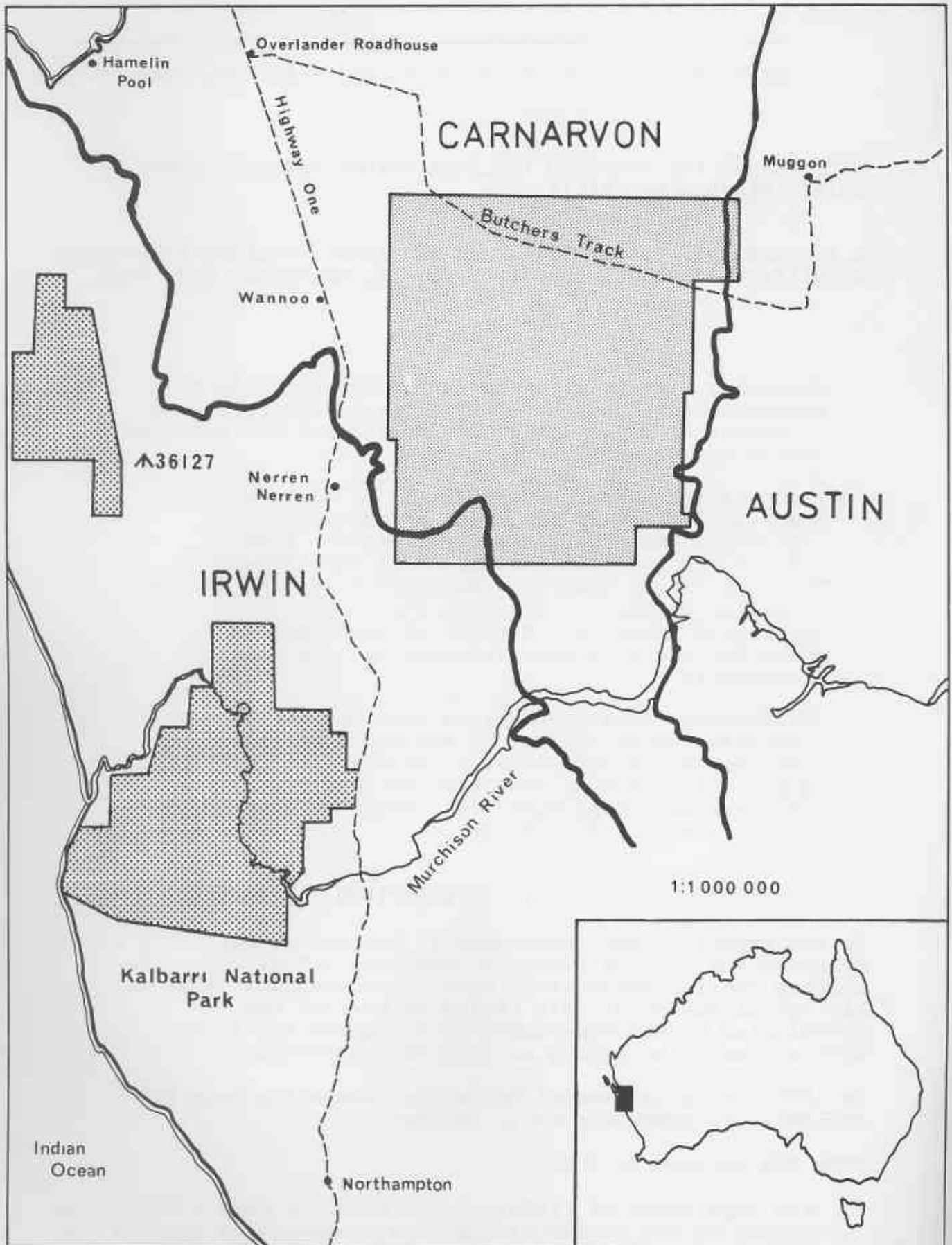


Figure 1. Location of Toolonga Area. Botanical District boundaries after Beard (1976b).

2. the Department of Lands and Surveys be advised that the large area of vacant Crown land east of Nerren Nerren is not available for leasing or alienation until completion of the survey."

The recommendation was endorsed by Cabinet on 9 February 1976.

The piece of land referred to has an area of 410 000 ha and lies within 26°39'-27°17'S and 114°44'-115°24'E in the Shire of Shark Bay. In this report it is called the "Toolonga Area" (Fig. 1).

Two biological surveys of the area were conducted between 3 and 12 April and 21 and 29 September 1978 by A.A. Burbidge, K. Cashin and P.J. Fuller, all from the Western Australian Wildlife Research Centre. K.D. Morris from the Zoology Department, University of Western Australia, assisted during the second trip.

II METHODS

The vegetation was examined in detail at 25 sites and was described according to the method of Muir (1977). Specimens of conspicuous plant species were collected and lodged in the Western Australian Herbarium. A vegetation map was prepared using 1964 black-and-white air photographs, and ground and aerial traverses. Recent fires were mapped from satellite photography.

Mammals were observed and collected during vehicle traverses by day and night. Traplines of metal Elliott and break-back traps were placed in all major vegetation formations and fire ages within working ranges of the two campsites. Trapping effort was: Elliott live traps (32 x 10 x 10 cm) - 1916 trap-nights, break-back - 1520 trap-nights, pit trap (approx. 30 x 30 x 70 cm deep) - 22 trap-nights, pit (12.5 cm diameter plastic tube, 40 cm deep) - 27 trap-nights. Bats were collected using the technique of Youngson and McKenzie (1977) and by shooting bats located with the aid of a spotlight.

Birds were observed at the campsites and during vehicle traverses, walks and spotlighting traverses at night. Reptiles and frogs were collected or observed while doing other work, by digging out burrows and heaps of bulldozer spoil and by turning over logs, litter and rubbish heaps. Nocturnal species were collected with the aid of a spotlight or head torch.

III PHYSICAL DESCRIPTION

A. CLIMATE

Meteorological data from Hamelin Pool are given in Table 1, and rainfall data from Woodliegh (26°11'S, 114°33'E), Wannoo, Muggon and Mt Narryer (26°35'S, 115°55'E) in Table 2. Data for 1977 and 1978 is given for Mt Narryer to show recent rainfall.

The Toolonga Area receives most of its rainfall during the winter although occasional late summer cyclonic rain also occurs. Hamelin Pool is on a large marine embayment and temperatures would be somewhat less extreme and humidity higher than at Toolonga.

The Mt Narryer rainfall shows that 1977 was a dry year but in 1978, the year of the survey, rainfall was slightly above average.

B. GEOLOGY AND SOILS

The geology of the area has not been mapped in detail, but Logan *et al.* (1970) described the geology of the Shark Bay region and subdivided it into 4 major geomorphological provinces. The Toolonga Area lies within the Yaringa Province, a terrain of dissected Cretaceous and Tertiary limestone units. Most of the Province is a limestone plateau, the Toolonga Plateau which, in the area covered by this report, is overlain by late Tertiary and Quaternary sands.

IV VEGETATION

The vegetation of the southern half of the Toolonga Area has been mapped at 1:250 000 by Beard (1976a) while the remainder has been mapped at 1:1 000 000 (Beard 1976b).

Descriptions of the 25 localities examined in detail are given in Appendix I and a list of all plants identified is provided in Appendix II. Plates 1 to 12 show the vegetation of the area.

Our vegetation map (Fig. 2) differs in some respects from Beard's maps. We recognise the following communities (Botanical Provinces, Districts, Regions and Systems after Beard, 1976b):

A. Eremaean Botanical Province

1. Carnarvon Botanical District, Toolonga Plateau, Talisker System.

TABLE 1. METEOROLOGICAL DATA - HAMELIN POOL (1885 - 1978)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total or Mean
<u>Rainfall (mm)</u>													
Average	9	13	14	12	34	49	41	20	8	6	4	2	212
Highest monthly	115	149	129	101	144	159	160	85	53	50	86	53	160
Lowest monthly	0	0	0	0	0	2	1	0	0	0	0	0	0
Av. no. of rain days	1	2	2	2	5	8	7	5	3	2	1	1	39
<u>Temperature</u>													
Mean maximum	37.2	37.1	35.0	30.0	25.5	21.8	20.9	22.3	25.5	29.0	32.2	34.9	29.3
Mean minimum	21.0	21.8	20.1	16.9	13.4	11.4	9.5	9.5	11.2	13.6	16.0	18.8	15.3
<u>Relative Humidity (%)</u>													
9. a.m.	43	44	46	54	58	74	70	63	54	45	41	41	53
3. p.m.	33	34	34	39	45	58	52	45	38	34	32	33	40

TABLE 2. RAINFALL FROM ADJACENT STATIONS

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Woodliegh Average (1904-1976)	11	22	24	11	33	41	36	23	5	6	4	6	222
Wannoo Average (1969-1977)	19	15	24	11	33	51	65	23	9	21	5	2	278
Muggon Average (1932-1976)	25	25	23	19	31	38	40	19	4	6	6	7	243
Mt Narryer Average (1900-1978)	15	23	23	15	27	32	29	16	5	5	4	6	200
1977	0	3	0	8	28	24	0	6	1	3	-	-	73*
1978	12	120	10	9	0	0	65	23	12	0	-	-	251*

- No Data

* Incomplete Total

(i) *Acacia ramulosa* (Bowgada) Scrub over mixed species Low Scrub A on sandplain with patches of *Callitris columellaris* Open Low Woodland A over the same formations on sandplain.

(ii) *Eucalyptus oldfieldii*/*E. dongarraensis* Very Open Tree Mallee over *A. ramulosa* Scrub over mixed species Low Scrub A on sandplain with patches of *E. oldfieldii* and *E. dongarraensis* Low Woodland A over the same Scrub community on sandy loam.

(iii) *Eucalyptus* spp. Very Open Tree Mallee over *A. ramulosa* Scrub on low sandhills.

2. Austin Botanical Province, Byro Sub-region, Yallalong System.

(i) A Breakaway Complex.

B. South West Botanical Province

1. Irwin Botanical District, Eurardy System.

(i) *Eucalyptus* spp. Open Shrub Mallee over mixed species Scrub on sandplain.

In A1(i) *Callitris columellaris* occurs in belts where the soil is deeper (e.g. Loc. 1.1, Plate 1). *Callitris* is also found scattered throughout the Scrub (e.g. Loc. 3.4) and Tree Mallee areas (e.g. Loc. 2.2, Plate 4).

In some areas of A1(i) the upper stratum is mid-dense (30 to 70% canopy cover) and is structurally a Thicket (e.g. Loc. 3.5, Plate 8). A band of Thicket occurs in the north-eastern section of the Toolonga Area, running north and south from Loc. 3.5 along a slight depression.

In B1(i) there are patches of *Banksia sceptrum* Scrub, mainly on the crest of sandy rises.

Figure 3 shows the fire pattern over the past 25 years. The *A. ramulosa* Scrub is not prone to fire and most shows no evidence of past fires. One area (Loc. 3.3, Plate 9) was burnt about 1968. Here *Acacia murrayana* was dominant. The only other place this species was noted was in a small area on Butchers Track where the soil had been disturbed by bulldozing.

The Tree Mallee and Shrub Mallee communities have been extensively burnt in recent years. However, 1964 air photography shows little evidence of fires prior to that date. Satellite photography shows that the recent fires have originated well to the south of the area.

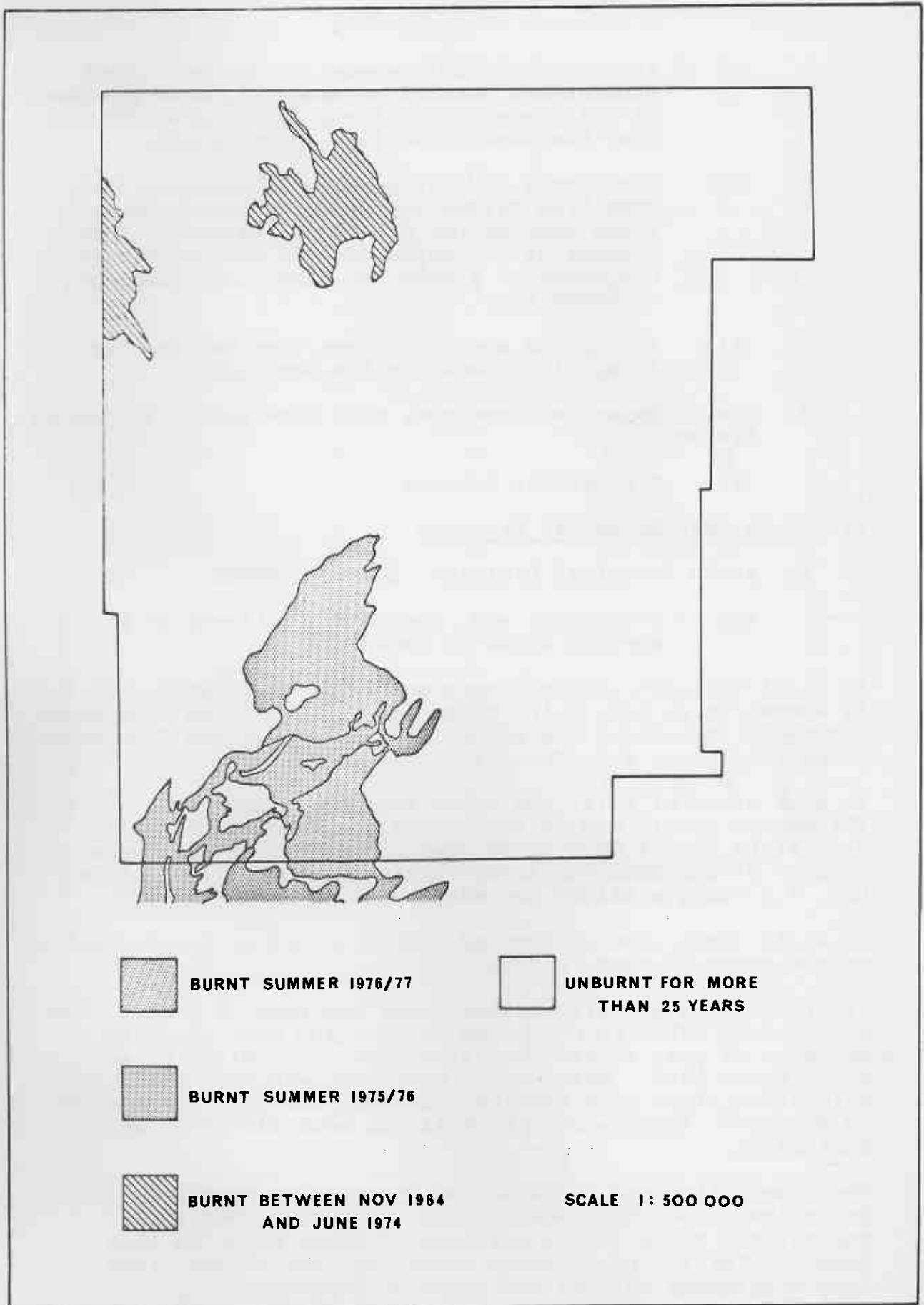


Figure 3. Fire History of Toolonga Area.

V VERTEBRATE FAUNA

A. MAMMALS

In the annotated species list data are presented in the following order: name, month of observation, number of observations and/or number of specimens from each habitat, method of observation or collection, weights and notes on breeding. Mammals collected were deposited in the Western Australian Museum with accession numbers M18021 to M18038 inclusive, and M18230 to M18240 inclusive.

ANNOTATED SPECIES LIST

MONOTREMATA

Tachyglossidae

Tachyglossus aculeatus (Shaw) Echidna

Characteristic droppings of Echidnas were found in the Breakaway Complex during both visits.

MARSUPALIA

Macropodidae

Macropus robustus Gould Euro

April and September, moderately common.

Breakaway Complex (4 sightings), Tree Mallee (1 sighting).

Sight records, daylight and spotlight.

Megaleia rufa (Desmarest) Red Kangaroo

April and September, moderately common.

Breakaway Complex (outwash zone) (2 sightings), Scrub (3), Tree Mallee (3), Shrub Mallee (1).

Sight records, daylight and spotlight.

RODENTIA

Muridae

Notomys alexis (Thomas) Spinifex Hopping-mouse

April (5♂, 7♀, 1 damaged), September (8♂, 3♀).

Shrub Mallee (recently burnt country only) and Scrub.

Locs 3.1(1), 3.2(2), 3.5(1), 3.7(4), 3.8(7), 3.10(3),
3.11(6).

Break-back traps (23); Shot, 2115 hrs (1).

Wt: April, ♀ : 28, 28.5, 29.5, 31, 35.5, 37, 46.5g (nipples
enlarged).

♂ : 24.5, 25.5, 26.5, 28, 30g.

September, ♀ : 35.5 (nipples slightly enlarged), 41
(nipples enlarged), 44g (pregnant, 4 fetuses).

Pseudomys hermannsburgensis (Waite) Sandy Mouse

September (1♀).

Shrub Mallee, burnt 1975/76, Loc. 3.11.

Elliott trap.

Wt: 12g.

CHIROPTERA

Vespertilionidae

Chalinolobus gouldii (Gray) Gould's Wattled Bat

April (2♀), September (1♀).

Scrub (same as Loc. 3.1).

Shot, 2045 hrs and 2052 hrs (April), 2010 hrs (September).

Wt: April, ♀ : 11, 15.5g.

September, ♀ : 14g.

Molossidae

Tadarida australis (Gray) White-striped Bat

September (1♂), commonly observed.

Breakaway Complex, Locs 6.1, 6.2.

Shot, 2010 hrs.

Wt: 37g.

LAGOMORPHA

Leporidae

Oryctolagus cuniculus (Linnaeus) European Rabbit

April and September, moderately common.
Breakaway Complex (scree and outwash zones).
Fresh warrens and droppings observed.

CARNIVORA

Canidae

Vulpes vulpes (Linnaeus) Red Fox
April and September, common.
Scrub, Breakaway Complex, Tree Mallee, Shrub Mallee.
Sighted in spotlight, tracks observed.

Felidae

Felis catus Linnaeus Cat
April and September, moderately common.
Scrub, Breakaway Complex.
Tracks observed.

ARTIODACTYLA

Bovidae

Bos taurus (Linnaeus) Cattle
Old tracks in Breakaway Complex (April) and Tree
Mallee near the southern edge of the area (September).

Capra hircus Linnaeus Goat
April and September, moderately common.
Breakaway Complex (all zones), numerous tracks,
sightings of parties of 2, 2 and 6. Shrub Mallee,
fresh tracks (September only).

A total of seven indigenous and five feral species were recorded.

Western Australian Museum records suggest that a further two native species might be present in the Toolonga Area:

Sminthopsis murina (Common Dunnart) - recorded at Overlander Roadhouse (WAM M10217, 1968).

Nyctophilus geoffroyi (Lesser Long-eared Bat) - Overlander Roadhouse (M4365, no date (approx. 1960)), Woodliegh Station (M10722, M10723, 1972; M13425, M13426, 1975).

Biological survey work in the region has not been intensive and other species, e.g. *Eptesicus pumilis*, *Sminthopsis crassicaudata* and *Antechinomys laniger* may also be present. Some south-western species could occur in the Shrub Mallee formations in the south-west corner of the Toolong Area, e.g. *Sminthopsis granulipes*, *Tarsipes spencerae* and *Pseudomys albocinereus*.

The Toolong Area is not rich in mammals. All the species recorded have widespread distributions.

B. BIRDS

In the annotated species list, data are presented on the species observed, the month observed, the habitat(s) they were observed in, followed by breeding data. Status is listed as common, moderately common or uncommon. When only one or two observations were made the actual numbers are given. When describing status we are making a judgement based on our experience with each species here and elsewhere in Western Australia. Common names follow the Royal Australian Ornithologists' Union list of recommended English names for Australian birds (1978).

ANNOTATED SPECIES LIST

Dromaiidae

Dromaius novaehollandiae

Emu

April, moderately common, Scrub, Shrub Mallee, including burnt areas.

September, moderately common, Scrub, Shrub Mallee, including burnt areas.

Old nest with scattered egg shells, Scrub, April.

Accipitridae

Hamirostra melanosternon

Black-breasted Kite

April, uncommon, Shrub Mallee.

September, moderately common, Scrub, Shrub Mallee, *Callitris* Open Low Woodland A.

Haliastur sphenurus Whistling Kite
April, uncommon, Breakaway Complex.
September, common, Breakaway Complex, Scrub, Shrub
Mallee and Tree Mallee.

Accipiter fasciatus Brown Goshawk
April, single bird in burnt Scrub.

Aquila audax Wedge-tailed Eagle
Several nests, Breakaway Complex (Plate 12).

Hieraaetus morphnoides Little Eagle
September, uncommon, Tree Mallee, Scrub and Shrub
Mallee.

Falconidae

Falco cenchroides Australian Kestrel
April, uncommon, Breakaway Complex and Scrub.
September, uncommon, Shrub Mallee (burnt) and Tree
Mallee.

Megapodiidae

Leipoa ocellata Mallee Fowl
April, common, Scrub, Tree Mallee, Shrub Mallee.
September, common, Scrub, Tree Mallee, Shrub Mallee.
Two birds sighted, fresh tracks abundant during both
visits. Several nesting mounds were located, none
of which were active. The majority of these mounds
were in burnt Shrub and Tree Mallee near the southern
boundary of the area and had not been used since
fires swept the area between 1975 and 1977.

Charadriidae

Vanellus tricolor Banded Lapwing
April, uncommon, Breakaway Complex and Scrub.

Turnicidae

Turnix velox Little Button-quail
September, two single birds observed, one in and one near
the Breakaway Complex.

Columbidae

- Phaps chalcoptera* Common Bronzewing
April, common, Scrub and Tree Mallee.
September, common, Breakaway Complex and Tree Mallee.
Nest with 2 eggs, Tree Mallee, on a fork on a horizontal limb of *Acacia roycei*, 22 September.
- Ocyphaps lophotes* Crested Pigeon
September, uncommon, Breakaway Complex.

Cacatuidae

- Cacatua roseicapilla* Galah
April, flock of 4, Tree Mallee.
September, common, all vegetation types.
Three or four fledglings in a hollow limb, *Eucalyptus* Low Woodland A, 26 September.

Polytelitidae

- Nymphicus hollandicus* Cockatiel
April, flock of 6, Tree Mallee.
September, common, Scrub, Breakaway Complex and Shrub Mallee (including burnt areas).

Platycercidae

- Melopsittacus undulatus* Budgerigar
September, common, generally in scattered pairs, Scrub, Tree Mallee (including burnt areas), Breakaway Complex.
Several birds were flushed from nesting hollows. One hollow examined on 26 September contained eggs.
- Barnardius zonarius* Port Lincoln Ringneck
April, uncommon, two birds in area of burnt Shrub Mallee.
September, uncommon, Scrub and Tree Mallee.
- Psephotus varius* Mulga Parrot
April, uncommon, Scrub and Tree Mallee.
September, moderately common, Scrub, *Eucalyptus* Woodland and Shrub Mallee.

Neophema bourkii

Bourke's Parrot

September, moderately common, Breakaway Complex,
Tree Mallee, Scrub.

Cuculidae

Cuculus pallidus

Pallid Cuckoo

September, common, Scrub, Tree Mallee and Shrub Mallee.

Chrysocolaptes osculans

Black-eared Cuckoo

April, uncommon, Scrub and Tree Mallee.

September, one bird, Tree Mallee.

Aegothelidae

Aegotheles cristatus

Australian Owlet-nightjar

April, moderately common, Scrub, Tree Mallee, Shrub
Mallee.

September, common, Tree Mallee, Shrub Mallee.

Nest with two fledglings in hollow *Eucalyptus oldfieldii*
branch, 24 September.

Caprimulgidae

Caprimulgus guttatus

Spotted Nightjar

April, uncommon, burnt Tree and Shrub Mallee.

September, uncommon, single bird, Breakaway Complex.

Hirundinidae

Cecropis nigricans

Tree Martin

April, common, Scrub, Breakaway Complex and Tree Mallee.

September, common, Tree Mallee.

During September several birds were observed flying
around suitable hollows. One such hollow, in a
Eucalyptus oldfieldii, examined on 23 September
contained 3 eggs.

Motacillidae

Anthus novaeseelandiae

Richard's Pipit

April, moderately common, Breakaway Complex (outwash
zone).

September, moderately common, Breakaway Complex
(outwash zone).

Campephagidae

Coracina novaehollandiae Black-faced Cuckoo-shrike
September, uncommon, Tree Mallee, Scrub and Shrub Mallee.
Nest under construction, horizontal *Eucalyptus* fork,
Shrub Mallee, 27 September.

Lalage sueurii White-winged Triller
September, common, Breakaway Complex, Scrub, burnt Tree
and Shrub Mallee.
Nest containing 2 eggs in *Acacia grasbyi*, Breakaway
Complex (visor Zone), 23 September.

Muscicapidae

Petroica goodenovii Red-capped Robin
April, common, all vegetation types.
September, common, all vegetation types.
During September several nests in *A. ramulosa*, all
stages from new nests to large juveniles.

Melanodryas cucullata Hooded Robin
April, two single birds, Scrub and *Callitris* Open
Low Woodland A.

Eopsaltria griseogularis Western Yellow Robin
September, moderately common, *Eucalyptus* Low Woodland A,
near Loc. 1.2, Tree Mallee near Loc. 2.2.

Pachycephala rufiventris Rufous Whistler
April, common, all vegetation types.
September, common, all vegetation types.
Nest in *Acacia ramulosa*, 3 eggs, Tree Mallee, 23
September.

Colluricincla harmonica Grey Shrike-thrush
April, common, Scrub and Shrub Mallee.
September, common, Scrub, *Callitris* Open Low Woodland A,
Tree Mallee and Shrub Mallee.
Nest with 3 eggs in hollow spout, *Eucalyptus* Low
Woodland A, 26 September.

Oreoica gutturalis Crested Bellbird

April, common, all vegetation types.

September, common, all vegetation types.

New nest in *Acacia ramulosa* ready for eggs, Scrub,
20 September.

Rhipidura leucophrys Willie Wagtail

April, one bird, Tree Mallee.

September, common, Breakaway Complex, Shrub Mallee.

Nest containing 1 egg, Breakaway Complex, 22 September.

Orthonychidae

Psophodes occidentalis Chiming Wedgebill

April, common, Scrub and Tree Mallee along Butchers Track

September, common, Scrub and Tree Mallee along Butchers
Track.

This species was abundant in the red soil areas along
Butchers Track but was not recorded in the southern
section of the area.

Cinlosoma castanotum Chestnut Quail-thrush

April, moderately common, Scrub and Tree Mallee.

September, moderately common, Scrub, *Callitris* Open
Low Woodland A, Tree Mallee.

Timaliidae

Pomatostomus superciliosus White-browed Babbler

April, common, all vegetation types.

September, common, all vegetation types.

Nest containing 3 eggs, Scrub, 22 September. Many old
nests were found in most areas visited.

Sylviidae

Cinclorhamphus mathewsi Rufous Songlark

September, uncommon, burnt Tree Mallee, Scrub.

Maluridae

- Malurus splendens* Splendid Fairy-wren
April, moderately common, Scrub and Tree Mallee,
including burnt areas.
September, common, Scrub, Tree Mallee, *Callitris* Open
Low Woodland A, including burnt areas.
- Malurus lamberti* Variegated Fairy-wren
September, moderately common, Scrub and Tree Mallee.
- Malurus leucopterus* White-winged Fairy-wren
April, one party, Breakaway Complex (outwash zone).
September, two parties, Breakaway Complex (outwash zone).

Acanthizidae

- Sericornis brunneus* Redthroat
April, one bird (collected), Scrub.
September, one party, Shrub Mallee.
- Smicrorornis brevirostris* Weebill
September, moderately common, Shrub Mallee.
- Gerygone fusca* Western Gerygone
September, single bird in Scrub.
- Acanthiza apicalis* Inland Thornbill
April, common, all vegetation types.
September, common, all vegetation types.
- Acanthiza uropygialis* Chestnut-rumped Thornbill
April, one party, burnt Shrub Mallee.
September, common, Scrub, burnt Shrub Mallee and Breakaway
Complex.
During September several nests were located containing
eggs or young, Breakaway Complex (visor and outwash
zones), in *Acacia aneura*.
- Aphelocephala leucopsis* Southern Whiteface
April, moderately common, Scrub.
September, one party in Scrub.
Nest in Scrub with 2 large young, 24 September.

Meliphagidae

- Acanthagenys rufogularis* Spiny-cheeked Honeyeater
April, common, all vegetation types.
September, common, all vegetation types.
- Lichenostomus virescens* Singing Honeyeater
April, common, Tree Mallee, Scrub and Shrub Mallee.
September, common, Tree Mallee, Breakaway Complex.
Several nests were found during September all of which contained eggs, Breakaway Complex (outwash zone).
- Lichenostomus plumulus* Grey-fronted Honeyeater
September, moderately common, Shrub Mallee.
- Melithreptus brevirostris* Brown-headed Honeyeater
April, uncommon. *Eucalyptus* Low Woodland A and Tree Mallee near Loc. 1.2.
- Phylidonyris albifrons* White-fronted Honeyeater
April, uncommon, Scrub.
September, uncommon, Breakaway Complex and Tree Mallee.
- Certhionyx variegatus* Pied Honeyeater
September, common, Breakaway Complex, Tree Mallee.
New nest and nest with one egg, 22 September, nest with 2 eggs, 23 September, Breakaway Complex (outwash zone).

Ephthianuridae

- Ephthianura tricolor* Crimson Chat
April, uncommon, burnt Shrub Mallee.
September, common, burnt Tree Mallee, Scrub, Breakaway Complex, Shrub Mallee, Tree Mallee.
One nest with large fledglings, in *Atriplex*, 21 September, Breakaway Complex (outwash zone).

Dicaeidae

- Dicaeum hirundinaceum* Mistletoebird
September, one bird in Tree Mallee.

Pardalotidae

Pardalotus striatus

Striated Pardalote

April, uncommon, *Eucalyptus* Woodland.

September, common, Shrub Mallee, *Eucalyptus* Woodland, Scrub, Tree Mallee.

Ploceidae

Poephila guttata

Zebra Finch

April, moderately common, burnt Shrub Mallee, Breakaway Complex.

September, common, Scrub (including burnt areas), Breakaway Complex, Tree Mallee.

Several nests were located during September, Breakaway Complex (visor zone), in old Wedge-tailed Eagle nest.

Artamidae

Artamus personatus

Masked Woodswallow

April, uncommon, Breakaway Complex, Scrub (including burnt areas).

September, common, Breakaway Complex, Scrub (including burnt areas).

Nest containing two large young, 23 September, Breakaway Complex (visor zone).

Artamus cinereus

Black-faced Woodswallow

April, uncommon, Breakaway Complex.

September, common, Breakaway Complex, Scrub (including burnt), Tree Mallee, Shrub Mallee.

Nest with 3 eggs, 23 September, Shrub Mallee.

Cracticidae

Cracticus torquatus

Grey Butcherbird

April, moderately common, Scrub, *Callitris* Low Open Woodland A, Shrub Mallee.

September, common, Tree Mallee, Shrub Mallee and burnt Scrub.

Cracticus nigrogularis

Pied Butcherbird

September, one bird, Breakaway Complex.

Corvidae

Corvus bennettii

Little Crow

April, uncommon, Scrub.

September, uncommon, Scrub and Shrub Mallee.

Two specimens were collected, one from Scrub along Butchers Track and one in Shrub Mallee. Not retained.

A bird was flushed from a nest in a tall *Eucalyptus oldfieldii* Tree Mallee emergent from *A. ramulosa* Scrub.

Sixty-one bird species were recorded in the Toolonga Area. The number of species recorded for each habitat were: Scrub (including *Callitris* Woodland) - 44, Tree Mallee (including *Eucalyptus* Woodland) - 41, Breakaway Complex - 31, Shrub Mallee - 33.

Almost all the species recorded have widespread or mainly arid zone distributions and could be expected to occur in this area. Two south-western species, however, were recorded at the limit of their known distribution - the Western Yellow Robin (*Eopsaltria griseogularis*) and the Brown-headed Honeyeater (*Melithreptus brevirostris*).

Further work would add some species to our list, e.g. Brown Falcon, Collared Sparrowhawk, Spotted Harrier, Australian Hobby, Australian Bustard, Red-tailed Black Cockatoo, Horsefield's Bronze Cuckoo, Boobook Owl, Barn Owl, Tawny Frogmouth, Red-backed Kingfisher, Rainbow Bee-eater, Ground Cuckoo-shrike, Brown Songlark, Yellow-throated Miner, Brown Honeyeater, Black Honeyeater, White-fronted Chat, Little Woodswallow and Torresian Crow. This suggests a total avifauna of about 80 species.

Brooker and Estbergs (1976) list the birds of Callagiddy and Brickhouse Stations, about 250 km NNW of the Toolonga Area and within the Carnarvon Botanical District. The habitats where they worked are different and more varied than at Toolonga but their habitat type 2 "Dense acacia scrub" has a bird fauna very similar to that of the *Acacia* Scrub in the Toolonga Area.

Twenty-two species were breeding in the Toolonga Area during our September visit and we found evidence of a further three species having bred in the past. This is a high number of breeding records considering the relatively small amount of searching and reflects both the good season at the time of our visit and the undisturbed nature of the country.

C. AMPHIBIANS AND REPTILES

In the annotated species list data are presented in the following order: name, month collected and number of specimens, habitat, method of collection. Specimens collected were lodged in the Western Australian Museum with accession numbers R59571 - 59636 and R60612 - 60665 inclusive.

ANNOTATED SPECIES LIST

AMPHIBIANS

Leptodactylidae

Ground Frogs

Neobatrachus wilsmorei (Parker)

April (2), commonly observed.

Scrub.

Spotlighting, headtorching.

REPTILES

Gekkonidae

Geckos

Diplodactylus alboguttatus Werner

Spotted-striped Gecko

April (3), September (1), commonly observed.

Shrub Mallee.

Spotlighting.

Diplodactylus pulcher (Steindachner)

Beautiful Gecko

April (5), September (2).

Scrub, Shrub Mallee, Tree Mallee, Breakaway Complex (outwash zone), commonly observed in Scrub.

Spotlighting, headtorching.

Diplodactylus strophurus (Duméril & Bibron)

April (1), September (1).

Scrub, Breakaway Complex (outwash zone).

Spotlighting, headtorching.

Gehyra variegata (Duméril & Bibron) Dtella
April (4), September (2).
All vegetations.
Spotlighting, in leaf litter, under bark of dead trees.

Heteronotia binoei (Gray) Bynoe's Gecko
April (3), September (2).
All vegetations.
Spotlighting, in leaf litter, under boulders, dug from
bulldozer spoil.

Rhynchoedura ornata Günther Beaked Gecko
April (1), September (1).
Scrub.
Spotlighting.

Pygopodidae

Legless Lizards

Aprasia smithi Storr
September (1).
Banksia sceptrum Scrub, burnt 1975/76.
Dug from sand in vehicle track.

Pygopus nigriceps (Fischer)
April (1).
Breakaway Complex (outwash zone).
Shot during daytime.

Agamidae

Dragon Lizards

Amphibolurus inermis (De Vis)
April (1), September (2).
Breakaway Complex (outwash zone), *Banksia sceptrum* Scrub.
Shot during daytime.

Amphibolurus minor Sternfeld Western Jew Lizard
April (2), September (4).
Scrub, Tree Mallee, Shrub Mallee.
Shot during daytime.

Amphibolurus reticulatus (Gray) Western Netted Dragon
April (3).
Breakaway Complex (visor zone).
Shot during daytime, dug from burrow.

Amphibolurus scutulatus Stirling & Zietz Lozenge-marked Dragon
April (7), September (4).
Scrub, Tree Mallee, Shrub Mallee.
Shot during daytime, Elliott trap.

Moloch horridus Gray Thorny Devil
April (1), September (1).
Shrub Mallee.
Picked up during daytime.

Scincidae

Skins

Cryptoblepharus carnabyi Storr
April (1).
Tree Mallee.
Shot, in bulldozer spoil.

Cryptoblepharus plagiocephalus (Cocteau)
September (1).
Shrub Mallee.
Shot, on trunk of Mallee.

Ctenotus alleni Storr
April (1), September (2).
Shrub Mallee, Tree Mallee.
Shot during daytime, dug from bulldozer spoil.

Ctenotus leonhardii Sternfeld
April (1), September (1).
Breakaway Complex (outwash zone).
Shot during daytime.

Ctenotus pantherinus pantherinus (Peters)
April (2), September (3).
Breakaway Complex Scree (4) (outwash zone (1)).
Shot during daytime.



Plate 1. Loc. 1.1. *Callitris collumelaris* Open Low Woodland A.



Plate 2. Loc. 1.2. *Eucalyptus dongarraensis* Open Low Woodland A. Pole is 2 m high with 10 cm divisions.



Plate 3. Loc. 2.1. *Eucalyptus oldfieldii* Very Open
Tree Mallee.



Plate 4. Loc. 2.2. *Eucalyptus oldfieldii* Very Open
Tree Mallee.



Plate 5. Loc. 2.4. *Eucalyptus foecunda*, *E. brachycorys* and *E. jucunda* Open Shrub Mallee.



Plate 6. Loc. 3.7. *Hibiscus pinonianus*
Stylobasium spathulatum Heath B.
Burnt 1976/77, formerly Open Shrub
Mallee.



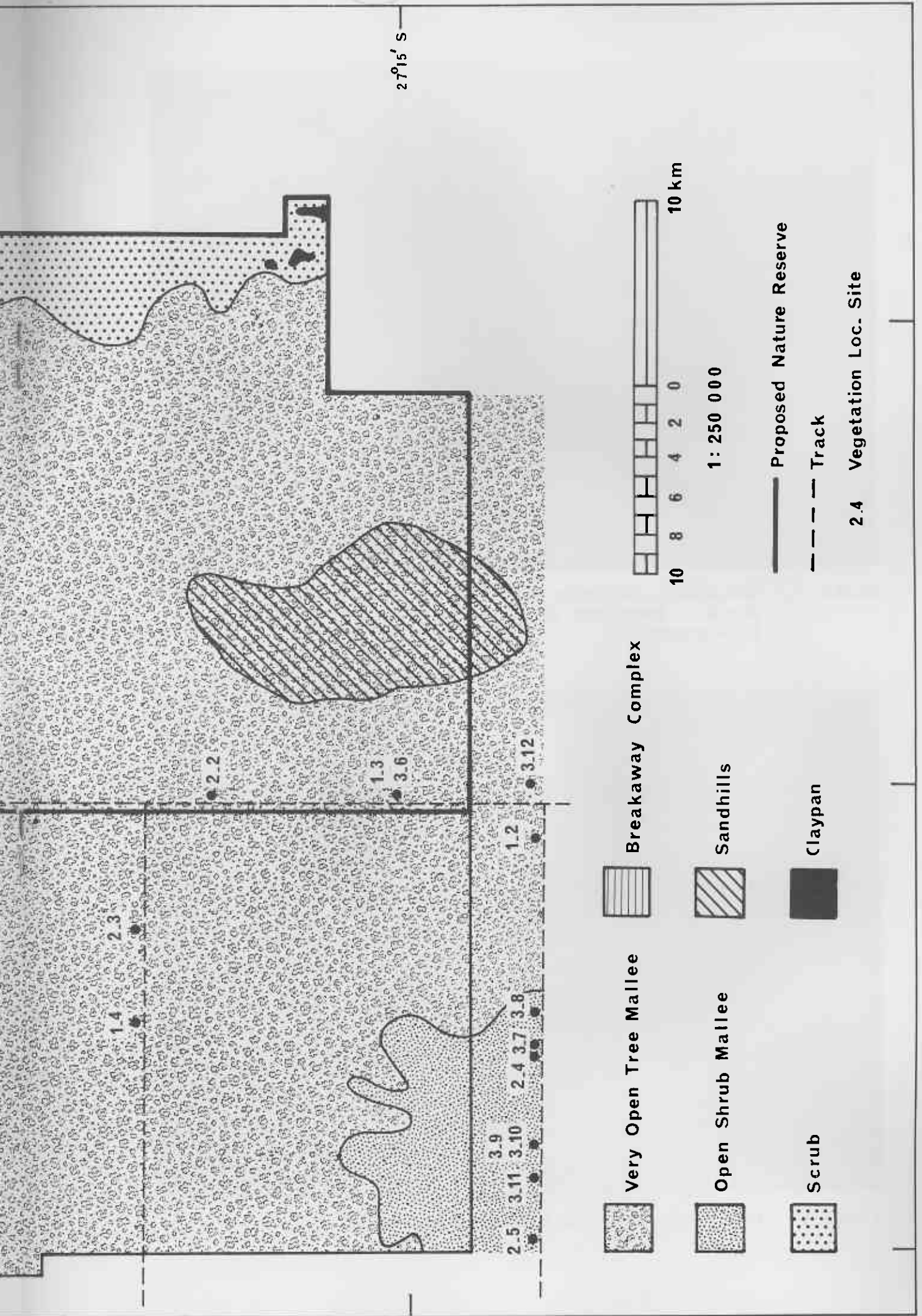


Figure 2. Map of Toolonga Area showing vegetation and proposed Nature Reserve.



Plate 7. Loc. 3.1. *Acacia ramulosa* and *A. roycei* Scrub. Emergent *Eucalyptus foecunda* in background.

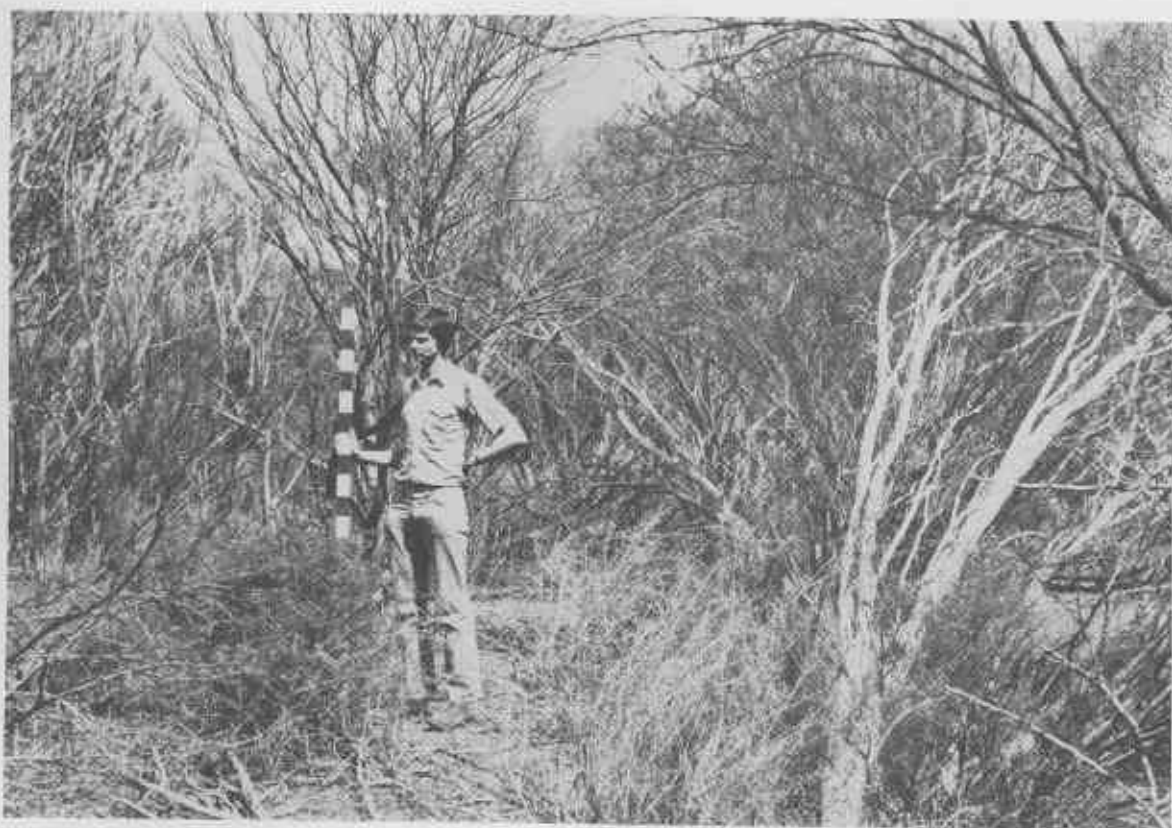


Plate 8. Loc. 3.5. *Acacia ramulosa* Thicket.

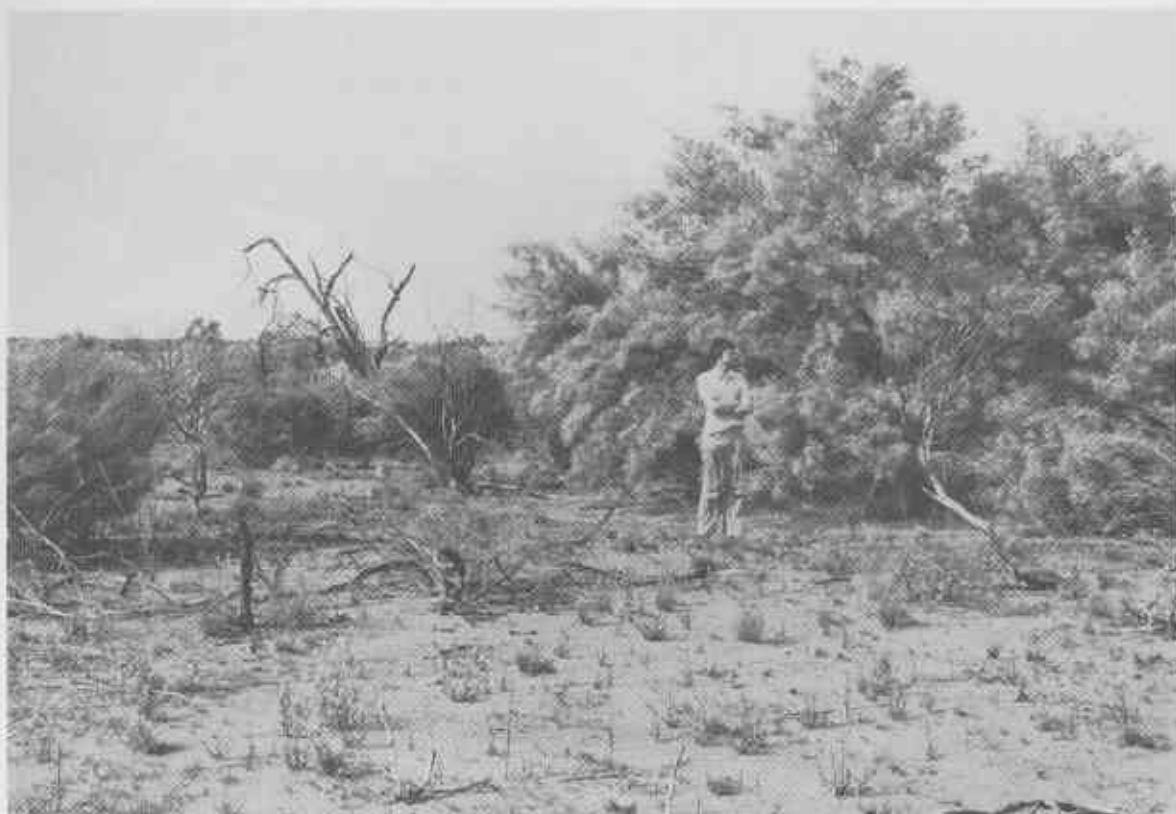


Plate 9. Loc. 3.3. *Acacia murrayana* Open Scrub.



Plate 10. Loc. 3.9. *Casuarina acutivalvis* and *Calothamnus* sp. Thicket.



Plate 11. Loc. 6.2. *Eremophila* sp. Open Low Scrub on scree of breakaway. Outwash zone in background.



Plate 12. Loc. 6.4. *Acacia ramulosa* Scrub with emergent *Acacia aneura*, visor zone of Breakaway Complex. Wedge-tailed Eagle nest in Mulga.

Ctenotus schomburgkii (Peters)

April (3), September (2).

Tree Mallee, *Eucalyptus* Woodland, Scrub, Shrub Mallee.

Shot during daytime.

Ctenotus severus Storr

April (1), September (2).

Breakaway Complex (scree slope).

Shot during daytime.

Lerista connivens Storr

September (4).

Scrub, Breakaway Complex (outwash zone), Shrub Mallee.

Shot and picked up during daytime.

Lerista macropisthopus (Werner)

April (1), September (2).

Shrub Mallee, Tree Mallee.

Dug from bulldozer spoil.

Lerista muelleri (Fischer)

April (2), September (3).

Scrub, Tree Mallee.

Dug from bulldozer spoil, in leaf litter, under log.

Lerista praepedita (Boulenger)

April (3), September (2).

Shrub Mallee, Tree Mallee.

Dug from bulldozer spoil.

Menetia greyii (Gray)

September (1).

Shrub Mallee.

Shot during daytime.

Menetia surda Storr

September (1).

Shrub Mallee.

Shot during daytime.

Morethia obscura Storr
September (2).
Scrub, Tree Mallee.
Shot, in leaf litter.

Varanidae

Goannas

Varanus caudolineatus Boulenger
April (2), September (1).
Scrub, Tree Mallee.
Shot during daytime, arboreal.

Varanus eremius Lucas & Frost
April (1).
Scrub.
Shot during daytime.

Elapidae

Venomous Snakes

Pseudonaja modesta (Günther)
September (1).
Breakaway Complex (outwash zone).
Shot during daytime.

Ringed Snake

Pseudonaja nuchalis Günther
April (1), September (1).
Tree Mallee.
Dug from bulldozer spoil.

Gwardar

Vermicella bimaiculata (Duméril, Bibron & Duméril)
September (1).
Tree Mallee.
Dug from bulldozer spoil.

Our collection includes 1 species of frog and 31 of reptiles. To our knowledge no other collections have been made within the Toolonga Area although there are specimens in the W.A. Museum from adjacent areas along Highway One. Because of different habitats along the highway and the lack of habitat data accompanying most specimens these have been ignored.

The list includes a number of species typical of arid central Western Australia, e.g. *Neobatrachus wilsmorei*, *Diplodactylus strophurus*, *Rhychoedura ornata*, *Pygopus nigriceps*, *Amphibolurus scutulatus*, *Moloch horridus*, *Ctenotus leonhardii*, *C. severus*, *Lerista macropisthopus*, *Menetia surda*, *Varanus caudolineatus* and *V. eremius*. One species of skink, *Ctenotus leonhardii*, has not been recorded further to the south-west.

Other species have a mainly south-western distribution and occur here near their northern limit, e.g. *Diplodactylus albovittatus*, *Ctenotus p. pantherinus*, *Lerista praepedita*, *Morethia obscura* and *Vermicella bimaculata*. The skink *Ctenotus alleni* has a restricted distribution in the Ajana - Yuna area and our specimens provide a significant range extension. However, this is not unexpected considering geomorphology and habitat.

Two species are restricted to the Shark Bay region (Storr and Harold 1978), viz. *Aprasia smithi* and *Lerista connivens*. Our records of these species extend their known range.

Storr and Harold (1978) have recently listed and discussed the herpetofauna of the Shark Bay region. Of the 92 species known, 55 have been recorded in their "eastern zone" which they define as "the coastal plains south and east of Hamelin Pool gulf, north to the Gascoyne River and east to about the North-west Coastal Highway" (p. 452). They suggest that the total number of species in this zone probably exceeds 60.

While our total of 31 species for the Toolonga Area will no doubt be increased with further work there seems little doubt that the area is relatively depauperate in species when compared with the Shark Bay region. This is probably due to the uniformity of the country and the lack of habitat diversity. The widespread Bowgada Scrub formation, typical of the Carnarvon Botanical District, yielded only 14 species while a further six species were added from areas of Tree Mallee - basically the same vegetation with the addition of an upper storey. Some of these additions are south-western species collected from the southern edge of the area which would not occur further north, e.g. *Ctenotus alleni* and *Lerista praepedita*. On the other hand the relatively small Breakaway Complex, an area of greater habitat diversity, yielded 12 species, six of which were not found elsewhere in the Toolonga Area, and which are mostly typical of the arid interior of the State.

From inspection of the annotations in Storr and Harold (1978) and from our knowledge of reptile distributions and habitats the total herpetofauna of the Toolonga Area is probably in the order of 40 to 45 species. Species which might be expected but which we did not collect include:

Neobatrachus centralis, *Diplodactylus squarrosus*, *Delma tincta*, *Ctenotus mimetes*, *Egernia depressa*, *Morethia butleri*, *Lerista nichollsi*, *Tiliqua occipitalis*, *Denisonia fasciata*, *Pseudechis australis* and *Typhlina bituberculata*.

Brooker and Estbergs (1976) list 3 amphibians and 31 reptiles from Callagiddy and Brickhouse Stations 250 km NNW of the Toolong Area and within the Carnarvon Botanical District. Their list differs significantly from ours, reflecting the different habitats of that area.

VI DISCUSSION

The Toolong Area lies across the boundary of the South Western and Eremaean Botanical Provinces (Irwin and Carnarvon Botanical Districts) (Fig. 1). However, only a small part in the south-west corner can be included in the former - most of it contains vegetation typical of the southern part of the Carnarvon Botanical District (as defined by Beard 1976b). Similarly the vertebrate fauna is comprised largely of species typical of the arid zone - south-western species are few and at the limit of their known range.

The Irwin Botanical District contains two significant conservation reserves and one proposed reserve:

1. Kalbarri National Park, 185 571 ha (Fig. 1),
2. Nature Reserve No. 36127, 50 350 ha (Fig. 1), and
3. the proposed Wandana Nature Reserve, ca 26 600 ha (130 km SSE of the Toolong Area).

However, there are no conservation reserves in the Carnarvon Botanical District, most of it being under pastoral lease.

Current proposals to extend Kalbarri National Park north-eastwards to Highway One mean that the vegetation and plants present in the south-western corner of the Toolong Area will be adequately protected by reservation. Reserve No. 36127 was examined by W.A. Wildlife Research Centre staff in September 1979. It includes a complex mosaic of Thicket, Scrub, Low Woodland, Low Forest, Tree Mallee, Tree Heath and Heath on red and yellow sands. There are several endemic plants in the area and few plant species in common with the Toolong Area (S.D. Hopper pers. comm.). The fauna includes many south-western species not recorded at Toolong, e.g. *Macropus fuliginosus* (Western Grey Kangaroo), *Strepera versicolor* (Grey Currawong), *Cuculus pyrrhophanus* (Fan-tailed Cuckoo), *Anthochaera carunculata* (Red Wattlebird), *Diplodactylus michaelsoni* and *Lerista planiventralis*. The

Wandana Area includes extensive Shrub Mallee on yellow sandplain soils and a small area of *Eucalyptus loxophleba* Woodland on red soils (Burbidge *et al.* 1978).

Appendix III compares the mammal and reptile faunas of Kalbarri, Wandana and Toolonga and the birds of Wandana and Toolonga. While many species are known from more than one area Toolonga includes species which have not been recorded at Kalbarri or Wandana, e.g. the gecko *Diplodactylus strophurus*, the skinks *Ctenotus leonhardii*, *C. severus* and the goanna *Varanus caudolineatus*. *Ctenotus alleni*, a skink of restricted distribution which occurs in the southern part of the Toolonga Area is common at Wandana and will be well protected when that area is reserved.

Except for the extreme south-western corner the Toolonga Area has a vegetation very different from either Kalbarri National Park or the proposed Wandana Nature Reserve.

The importance of the Toolonga Area, therefore, is as a representative portion of the southern part of the Carnarvon Botanical District and its flora and fauna, and the boundaries of the proposed Nature Reserve have been chosen with that in mind. It should be noted, however, that the proposed Toolonga Nature Reserve is not representative of the whole of the Carnarvon Botanical District - an examination of Beard's (1976b) vegetation map and Brooker and Estberg's Callagiddy fauna list shows that further reserves are needed in order to preserve a significant proportion of the plants and animals of the District.

VII RECOMMENDATIONS

We recommend that:

1. the vacant Crown land delineated in Fig. 2, of approximately 235 500 ha, be declared a Class A Reserve for the Conservation of flora and fauna and be vested in the Western Australian Wildlife Authority, and
2. the reserve be named "Toolonga Nature Reserve".

VIII ACKNOWLEDGEMENTS

We are most grateful for the field assistance of Mr Keith Morris during our second trip. We thank Drs D.J. Kitchener and G.M. Storr of the W.A. Museum for the identification of animal specimens and the W.A. Herbarium for the identification of our plant collection. The Department of Lands and Surveys supplied satellite photographs of the area.

We also thank Dr G.M. Storr, Dr I.G. Crook and Mr N.L. McKenzie for their constructive criticism of this report.

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APPENDIX I.

VEGETATION DESCRIPTIONS, TOOLONGA AREA

WOODLAND FORMATIONS

Loc. 1.1 23 September 1978 (Plate 1)

Description: Open Low Woodland A *over* Scrub *over* Open Low Scrub A.

Code: gLAr.aSi.xSAr

Details:

Stratum 1: *Callitris columellaris* trees 5-7m, 2-10%, mature.

Stratum 2: *Acacia ramulosa* shrubs, 2-4m, 10-30%, mature.

Stratum 3: Mixed shrubs, 1.5-2m, 2-10%, mature and immature.

Soil: Sand, yellowish red (5YR 4/8).*

Species Recorded:

Stratum 1:	<i>Callitris columellaris</i> <i>Santalum acuminatum</i>	<i>Bursaria spinosa</i> <i>Casuarina acutivalvis</i>
Stratum 2:	<i>Acacia ramulosa</i> <i>Thryptomene</i> sp. AAB 11 <i>Acacia roycei</i>	<i>Callitris columellaris</i> <i>Hakea kippistiana</i> <i>Acacia wiseana</i>
Stratum 3:	<i>Eremophila clarkei</i> <i>Solanum nummularium</i>	<i>Grevillea stenostachya</i> <i>Solanum lasiophyllum</i>
Stratum 4:	(<2%) <i>Ptilotus schwarzii</i>	<i>Monochather paradoxa</i>

Comments: No evidence of fire.

Loc. 1.2 26 September 1978 (Plate 2)

Description: Low Woodland A *over* Scrub *over* Open Low Scrub A *over* Very Open Tall Sedges.

Code: eLAi.aSi.xSAr.nVTr

Details:

Stratum 1: *Eucalyptus dongarraensis* trees 6-8m, 10-30%, mature.

Stratum 2: *Acacia ramulosa* shrubs 3-4m, 10-30%, mature.

Stratum 3: Mixed shrubs 1.5-2m, 2-10%, mature and immature.

Stratum 4: *Ecdeiocola monostachya* sedges 1m, 2-10%, mature and immature.

* Colours after Munsell Color Company (1954).

Species Recorded:

Stratum 1: *Eucalyptus dongarraensis* *Callitris columellaris*
E. brachycorys *Bursaria spinosa*
E. oldfieldii *Eucalyptus gracilis*

Stratum 2: *Acacia ramulosa* *Cassia nemophila*
Eremophila clarkei *Acacia roycei*
Acacia colletioides

Stratum 3: *Eremophila duttonii* *Acacia roycei*
Acacia ramulosa *Acacia colletioides*

Stratum 4: *Ecdeiocolea monostachya*

Comments: No evidence of fire.

Loc. 1.3 26 September 1978

Same as Loc. 1.2 but no *E. oldfieldii*.

Loc. 1.4 26 September 1978

Description: Open Low Woodland A over Scrub over Low Scrub A.

Code: eLAr.aSi.xSAi

Details:

Stratum 1: *Eucalyptus dongarraensis* trees 6-9m, 2-10%, mature.
Stratum 2: *Acacia ramulosa* shrubs 2-4m, 10-30%, mature.
Stratum 3: Mixed shrubs 1.5-2m, 30-70%, mature and immature.

Species Recorded:

Stratum 1: *Eucalyptus dongarraensis* *E. ? redunca* AAB 51
Callitris columellaris

Stratum 2: *Acacia ramulosa* *Casuarina acutivalvis*

Stratum 3: *Thryptomene urceolaris* *Leschenaultia linearioides*

Comments: No evidence of fire.

TREE MALLEE FORMATIONS

Loc. 2.1 24 September 1978 Trapline 3 (Plate 3)

Description: Very Open Tree Mallee over Scrub over Open Low Scrub A.

Code: eKTr.aSi.xSAr

Details:

- Stratum 1: *Eucalyptus oldfieldii* tree mallee 8-10m,
2-10%, mature.
- Stratum 2: *Acacia ramulosa* shrubs, 3-4m, 10-30%, mature.
- Stratum 3: Mixed shrubs 1.5-2m, 2-10%, mature and immature.
- Soil: Sand, yellowish red (5YR 4/8).

Species Recorded:

- Stratum 1: *Eucalyptus oldfieldii* *Bursaria spinosa*
E. foecunda
- Stratum 2: *Acacia ramulosa* *Acacia roycei*
Eremophila latrobei *Thryptomene* sp. AAB 11
Acacia wiseana *Hakea kippisteana*
Cassia chatelaineana *Heterodendron oleifolium*
- Stratum 3: *Eremophila clarkei* *Eremophila* sp. AAB 28

Comments: No evidence of fire. Vegetation very similar to
Loc. 3.1 except for presence of *Eucalyptus*
upper stratum.

Loc. 2.2 26 September 1978 (Plate 4)

Description: Very Open Tree Mallee over Scrub.

Code: eKTr.aSi

Details:

- Stratum 1: *Eucalyptus oldfieldii* tree mallee 6-8m, 2-10%,
mature.
- Stratum 2: *Acacia ramulosa* shrubs 3-5m, 10-30%, mature.

Species Recorded:

- Stratum 1: *Eucalyptus oldfieldii* *Eucalyptus dongarraensis*
Callitris columellaris *Bursaria spinosa*
- Stratum 2: *Acacia ramulosa*

Loc. 2.3 26 September 1978

Description: Very Open Tree Mallee over Scrub over Very Open
Low Grass.

Code: eKTr.aSi.nGLr

Details:

- Stratum 1: *Eucalyptus dongarraensis* tree mallee (sometimes as trees) 6-8m, 2-10%, mature.
Stratum 2: *Acacia ramulosa* shrubs, 3-5m, 10-30%, mature.
Stratum 3: *Amphipogon caricinus* bunch grass 30-50cm, 2-10%, mature.

Species Recorded:

- Stratum 1: *Eucalyptus dongarraensis* *Callitris columellaris*
Stratum 2: *Acacia ramulosa* *Hakea kippistiana*
Stratum 3: *Amphipogon caricinus*

Comments: No evidence of fire.

SHRUB MALLEE FORMATIONS

Loc. 2.4 27 September 1978 Trapline 6 (Plate 5)

Description: Open Shrub Mallee over Scrub over Open Tall Sedges.

Code: eKSi.xSi.nVTi

Details:

- Stratum 1: Mixed mallee 3-5m, 10-30%, mature.
Stratum 2: Mixed shrubs, 1.5-3m, 10-30%, mature.
Stratum 3: *Ecdiocola monostachya* sedges 0.5-1m, 10-30%, mature.
Soil: Sand, reddish yellow (7.5YR 6/6) surface, yellowish red (5YR 5/6) at 10cm.

Species Recorded:

- Emergents: *Eucalyptus dongarraensis* *Callitris columellaris*
 Banksia ashbyi *Grevillea eriostachya*
Stratum 1: *Eucalyptus foecunda* *Eucalyptus jucunda*
 Eucalyptus brachycorys
Stratum 2: *Calothamnus* sp. AAB 55 *Eremophila* sp. AAB 62
 Acacia ramulosa *Eremophila clarkei*
 Acacia roycei *Micromyrtus rosea*
 Hakea bucculenta *Cassia nemophila*
 Acacia ligulata *Eremophila duttonii*
 Acacia sp. AAB 61
Stratum 3: *Ecdiocola monostachya* *Patersonia limbata*
 Ptilotus schwartzii

Comments: No evidence of fire.

Loc. 2.5 28 September 1978

Description: Open Shrub Mallee over Scrub over Very Open Low Sedges.

Code: eKSi.xSi.nVLr

Details:

Stratum 1: Mixed Open Shrub Mallee 3-6m, 10-30%, mature.

Stratum 2: Mixed shrubs 1.5-2.5m, 10-30%, mature.

Stratum 3: Unidentified sedge, 20-40cm, 2-10%, mature.

Soil: Sand, reddish yellow (7.5YR 6/6) surface, strong brown (7.5YR 5/8) at 10cm.

Species Recorded:

Stratum 1: *Eucalyptus dongarraensis*
Eucalyptus oldfieldii

Eucalyptus foecunda
Banksia ashbyi

Stratum 2: *Calothamnus* sp. AAB 71
Casuarina acutivalvis
Hakea bucculenta
Acacia roycei
Calothamnus sp. AAB 55
Acacia rostellifera

Calothamnus sp. AAB 78
Acacia longispinea
Acacia colletioides
Melaleuca cordata
Calytrix sp. AAB 74
Micromyrtys rosea

Stratum 3: AAB 79 (Restionaceae).

Comments: No evidence of fire.

SHRUBLAND FORMATIONS

Loc. 3.1 22 September 1978 Trapline 4 (Plate 7)

Description: Thicket/Scrub over Low Scrub A over Very Open Herbs/Very Open Low Grass.

Code: aSc/aSi.xSAi.nJr/nGLr

Details:

Stratum 1: *Acacia ramulosa* and *A. roycei* shrubs 2-4m, 10-30% and 30-70%, mature and senescent.

Stratum 2: Mixed shrubs 1.5-2m, 10-30%, immature and mature.

Stratum 3: *Ptilotus schwartzii* herbs with patches of *Aristida contorta* grass 30-40cm, 2-10%

Soil: Sand, yellowish-red (5YR 4/8).

Species Recorded:

Emergents: *Eucalyptus foecunda* *Santalum acuminatum*
Brachychiton gregorii *Bursaria spinosa*

Stratum 1: *Acacia ramulosa* *Grevillea eriostachya*
Acacia roycei *Heterodendron oleifolium*
Thryptomene sp. AAB 11 *Hakea kippisteana*

Stratum 2: *Acacia ramulosa* *Solanum nummularium*
Acacia roycei *Cassia chatelaineana*
Grevillea stenostachya *Acacia wiseana*
Eremophila clarkei *Eremophila* sp. AAB 28
Eremophila latrobei *Acacia tetragonophylla*

Stratum 3: *Ptilotus schwartzii* *Aristida contorta*

Comments: No evidence of fire.

Loc. 3.2 23 September 1978 Trapline 5

Same as Loc. 3.1

Loc. 3.3 23 September 1978 (Plate 9)

Description: Open Scrub over Open Low Scrub A over Open Low
Grass.

Code: aSr.aSAr.nGLi

Details:

Stratum 1: *Acacia murrayana* shrubs, 2-5m, 2-10%, mature
and immature.

Stratum 2: *Acacia ramulosa* and *A. roycei* shrubs 1.5-2m,
2-10%, immature.

Stratum 3: *Monochather paradoxa* bunch grass, 20-30cm,
10-30%, mature.

Soil: Sand, yellowish-red (5YR 4/8).

Species Recorded:

Stratum 1: *Acacia murrayana* *Gyrostemon ramulosus*
Codonocarpus continifolius *Eucalyptus foecunda*
Eucalyptus oldfieldii *Grevillea eriostachya*

Stratum 2: *Acacia ramulosa* *Grevillea stenostachya*
Acacia roycei *Cassia chatelaineana*
Solanum nummularium *Acacia wiseana*
Psammoya ephedroides *Eremophila* sp.
Bursaria spinosa

Stratum 3: *Monochather paradoxa* *Ptilotus polystachus*

Comments: Burnt approx. 1968.

Loc. 3.4 23 September 1978

Same as Loc. 3.1 except as below.

Additional species recorded:

Emergents: *Callitris columellaris*

Stratum 2: *Pseudanthus intricatus*

Stratum 3: *Ptilotus polystachus*

Loc. 3.5 24 September 1978 Trapline 2 (Plate 8)

Description: Thicket over Open Low Scrub B

Code: aSc.xSBr

Details:

Stratum 1: *Acacia ramulosa* shrubs, 3-5m, 30-70% (70-100% in places), mature and senescent.

Stratum 2: Mixed shrubs, 1-1.5m, 2-10%, mature and senescent.

Soil: Sandy loam, yellowish-red (5YR 4/8).

Species Recorded:

Emergents: *Bursaria spinosa*

Callitris columellaris

Stratum 1: *Acacia ramulosa*
A. grasbyi

A. roycei

Heterodendron oleifolium

Stratum 2: *Pseudanthus intricatus*

Grevillea stenostachya

Comments: No evidence of fire.

Loc. 3.6 26 September 1978

Description: Open Low Scrub A over Open Tall Grass

Code: nSAr.nGTi

Details:

Stratum 1: *Codonocarpus continifolius* shrubs, 1.5-2m, 2-10%, immature.

Stratum 2: *Monochather paradoxa* grass 1m, 10-30%, mature.

Species Recorded:

Stratum 1: *Codonocarpus continifolius* *E. brachycorys*
Eucalyptus dongarraensis

Stratum 2: *Monochather paradoxa*

Comments: Burnt 1976/77. Vegetation before fire similar to Loc. 1.2.

Loc. 3.7 27 September 1978 Trapline 9 (Plate 6)

Description: Heath B.

Code: xSBc

Details:

Stratum 1: Mixed shrubs 1-1.5m, 30-70%, immature.

Species Recorded:

Stratum 1: *Hibiscus pinonianus* *Eucalyptus dongarraensis*
Stylobasium spathulatum *E. spp.*
Acacia sp.

Comments: Burnt 1976/77. Vegetation before fire similar to Loc. 2.4.

Loc. 3.8 27 September 1978 Trapline 10

Description: Open Low Scrub B over Low Heath D.

Code: xSBr.xSDi

Details:

Stratum 1: Mixed shrubs 1-1.5m, 2-10%, immature.

Soil: Sand, strong brown (7.5YR 5/6) surface, yellowish red (5YR 5/8) at 10cm).

Species Recorded:

Stratum 1: *Eremophila sp.* *Sterculiaceae* AAB 70
Dampiera incana Numerous seedlings.
Eucalyptus spp.

Comments: Burnt 1976/77.

Loc. 3.9 28 September 1978 Trapline 7 (Plate 10)

Description: Thicket over Open Low Scrub A.

Code: xSC.xSAr

Details:

Stratum 1: Mixed shrubs 3-4m, 30-70%, mature.
Stratum 2: Mixed shrubs 1.5-2m, 2-10%, mature.
Soil: Sand, reddish-yellow (7.5YR 6/6) surface,
strong brown (7.5YR 5/8) at 10cm.

Species Recorded:

Emergents: *Eucalyptus dongarraensis*
Stratum 1: *Casuarina acutivalvis* *Acacia rostellifera*
Calothamnus sp. AAB 55 *Eremophila* sp. AAB 62
Calothamnus sp. AAB 71 *Banksia ashbyi*
Grevillea eriostachya *Banksia sceptrum*
Acacia longispinea *Banksia lindleyana*
Acacia roycei
Stratum 2: *Calytrix* sp. AAB 74 *Labichea teretifolia*
Baeckia sp. AAB 75

Comments: No evidence of fire.

Loc. 3.10 28 September 1978 Trapline 7

Description: Heath B.

Code: xSBc

Details:

Stratum 1: Mixed shrubs 1-1.5m, 30-70%, immature.
Soil: Sand, reddish-yellow (7.5YR 6/6) surface,
strong brown (7.5YR 5/8) at 10cm.

Species Recorded:

Stratum 1: *Eremophila* sp. AAB 62 *Calothamnus* sp. AAB 55
Hibiscus pinonianus Numerous seedlings.

Comments: Burnt 1975/76. Vegetation before fire similar to
Loc. 3.9.

Loc. 3.11 28 September 1978 Trapline 8

Description: Low Scrub B over Dwarf Scrub D.

Code: xSBi.xSDi

Details

Stratum 1: Mixed shrubs 1-1.5m, 10-30%, immature.
Stratum 2: Mixed shrubs to 0.5m, 10-30%, immature.
Soil: Sand, reddish-yellow (7.5YR 6/6) surface,
strong brown (7.5YR 5/8) at 10cm.

Species Recorded:

Stratum 1: *Eremophila* sp. AAB 62 *Melaleuca cordata*
Stratum 2: *Eremophila* sp. AAB 62 AAB 70 (Sterculiaceae)
Hibiscus pinonianus *Dampiera incana*
Glyschrocaryon sp. *Pityrodia verbascina*

Comments: Burnt 1975/76. Vegetation before fire similar to
Loc. 3.9.

Loc. 3.12 26 September 1978

Description: Open Low Scrub A over Open Dwarf Scrub C over
Very Open Low Grass.

Code: nSAr.xSCr.nGLr

Details:

Stratum 1: *Codonocarpus continifolius* shrubs 1.5-2m,
2-10%, immature.
Stratum 2: Mixed shrubs 0.5-1m, 2-10%, immature.
Stratum 3: *Aristida contorta* bunch grass 20-30cm, 2-10%,
mature and immature.
Soil: Sand, yellowish-red (5YR 5/6) surface,
reddish yellow (7.5YR 6/8) at 10cm.

Species Recorded:

Stratum 1: *Codonocarpus continifolius*
Stratum 2: *Keraudrenia hermaniaefolia* *Calothamnus* sp. AAB 55
Stratum 3: *Aristida contorta*

Comments: Burnt 1976/77 summer. Before fire vegetation
was *Calothamnus* sp. AAB 55 Scrub. Site on
low dune.

BREAKAWAY COMPLEX

Loc. 6.1 22 September 1978 Trapline 1

Description: Dwarf Scrub D.

Code: nSDi

Details: *Atriplex vesicaria* and *Rhagodia baccata* shrubs
to 0.5m, 10-30%, mature.

Species Recorded:

Atriplex vesicaria

Rhagodia baccata

Comments: Outwash zone of Breakaway Complex. No evidence
of fire.

Loc. 6.2 22 September 1978 Trapline 1 (Plate 11)

Description: Open Low Scrub B over Open Dwarf Scrub D.

Code: nSBr.xSDr

Details:

Stratum 1: *Eremophila* sp. AAB 35 shrubs 1-1.5m, 2-10%,
mature.

Stratum 2: Mixed shrubs to 0.5m, 2-10%, mature.

Species Recorded:

Stratum 1: *Eremophila* sp. AAB 35

Stratum 2: *Atriplex vesicaria* *Ptilotus obovatus*
Cassia sturtii

Comments: Scree of breakaway. No evidence of fire.

Loc. 6.3 22 September 1978 Trapline 1

Description: Scrub over Low Scrub A over Dwarf Scrub D.

Code: aSi.aSAi.xSDi

Details:

Stratum 1: *Acacia ramulosa* shrubs 2-4m, 10-30%, mature.

- Stratum 2: *Acacia grasbyi* shrubs 1.5-2m, 10-30%, mature.
 Stratum 3: Mixed shrubs, to 0.5m, 10-30%, mature and immature.

Species Recorded:

- Stratum 1: *Acacia ramulosa*
 Stratum 2: *Acacia grasbyi*
 Stratum 3: *Ptilotus obovatus* *Sida calyxhymenia*

Comments: Lip of Breakaway. No evidence of fire.

Loc. 6.4 22 September 1978 Trapline 1 (Plate 12)

Description: Scrub over Dwarf Scrub C.

Code: aSi.xSCi

Details:

- Stratum 1: *Acacia ramulosa* shrubs 2-3m, 10-30%, mature.
 Stratum 2: Mixed shrubs 0.5-1m, 10-30%, mature.

Species Recorded:

- Emergents: *Acacia aneura*
 Stratum 1: *Acacia ramulosa* *Thryptomene* sp. AAB 11
 Acacia tetragonophylla *Eremophila latrobei*
 Eremophila leucophylla *Cassia chatelaineana*
 Stratum 2: *Ptilotus obovatus* *Maireana georgei*
 Solanum lasiophyllum

Comments: Visor zone of Breakaway Complex, 50m in from edge of breakaway. No evidence of fire.

APPENDIX II

PLANTS RECORDED FROM TOOLONGA AREA

AMARANTHACEAE

Ptilotus obovatus
Ptilotus polystachus
Ptilotus schwartzii

CAESALPINACEAE

Cassia chatelaineana
Cassia nemophylla
Cassia phyllodinea
Cassia sturtii
Labichea teretifolia

CASUARINACEAE

Casuarina acutivalvis

CELASTRACEAE

Psammoya ephedroides

CHENOPODIACEAE

Atriplex vesicaria
Maireana georgei
Rhagodia baccata

CHLOANTHACEAE

Pityrodia verbascina

CUPRESSACEAE

Callitris columellaris

EUPHORBIACEAE

Pseudanthus intricatus

GOODENIACEAE

Dampiera incana
Leschenaultia linearoides

GYROSTEMONACEAE

Gyrostemon ramulosus

HALORAGACEAE

Glyschrocaryon sp.

IRIDACEAE

Patersonia limbata

MALVACEAE

Hibiscus pinonianus
Sida calyxhymenia

MIMOSACEAE

Acacia aneura
Acacia colletioides
Acacia grasbyi
Acacia ligulata
Acacia longispinea
Acacia murrayana
Acacia ramulosa
Acacia roycei
Acacia tetragonophylla
Acacia wiseana

MYOPORACEAE

Eremophila clarkei
Eremophila duttonii
Eremophila latrobei
Eremophila leucophylla
Eremophila aff. *clarkei* AAB 28
Eremophila aff. *platycalyx* AAB 35
Eremophila sp. AAB 62

MYRTACEAE

Baeckea sp. AAB 75
Calothamnus sp. AAB 55
Calothamnus sp. AAB 71
Calothamnus sp. AAB 78
Calytrix sp. AAB 74
Eucalyptus brachycorys
Eucalyptus dongarraensis
Eucalyptus foecunda
Eucalyptus gracilis
Eucalyptus jucunda
Eucalyptus oldfieldii
Eucalyptus ? *redunca* AAB 51
Melaleuca cordata
Micromyrtys rosea
Thryptomene urceolaris
Thryptomene sp. AAB 11

POACEAE

Amphipogon caricinus
Aristida contorta
Monochather paradoxa

PITTOSPORACEAE

Bursaria spinosa

PROTEACEAE

Banksia ashbyi
Banksia lindleyana
Banksia sceptrum
Grevillea eriostachya
Grevillea stenostachya
Hakea bucculenta
Hakea kippisteana

RESTIONACEAE

Ecdeiocolea monostachya
? gen. AAB 79

SANTALACEAE

Santalum acuminatum

SAPINDACEAE

Heterodendron oleifolium

SOLANACEAE

Solanum lasiophyllum
Solanum nummularium

STERCULIACEAE

Brachychiton gregorii
Keraudrenia hermaniaefolia
? gen. AAB 70

STYLOBASIACEAE

Stylobasium spathulatum

APPENDIX III

Indigenous vertebrates known from Kalbarri National Park, the proposed Wandana Nature Reserve and the proposed Toolonga Nature Reserve (see Bannister 1969 and Burbidge *et al.* 1978).

MAMMALS

	<u>Kalbarri</u>	<u>Wandana</u>	<u>Toolonga</u>
<i>Megaleia rufa</i>		X	X
<i>Macropus fuliginosus</i>	X	X	
<i>Macropus robustus</i>	X	X	X
<i>Petrogale penicillata</i>	X		
<i>Tarsipes spencerae</i>	X		
<i>Sminthopsis granulipes</i>	X		
<i>Sminthopsis hirtipes</i>	X		
<i>Sminthopsis crassicaudata</i>	X		
<i>Notomys alexis</i>		X	X
<i>Notomys mitchellii</i>	X		
<i>Pseudomys albocinereus</i>	X		
<i>Pseudomys hermannsburgensis</i>			X
<i>Chalinolobus gouldii</i>	X	X	X
<i>Eptesicus pumilis</i>	X		
<i>Nyctophilus geoffroyi</i>		X	
<i>Tadarida australis</i>		X	X
<i>Tachyglossus aculeatus</i>		X	X
	<hr/>		
Totals	11	8	7
	<hr/>		

BIRDS

	<u>Wandana</u>	<u>Toolonga</u>
Emu	X	X
Black-breasted Kite		X
Whistling Kite	X	X
Brown Goshawk	X	X
Collared Sparrowhawk	X	
Little Eagle	X	X
Wedge-tailed Eagle	X	X
Australian Hobby	X	
Australian Kestrel	X	X
Brown Falcon	X	
Mallee Fowl	X	X

	<u>Wandana</u>	<u>Toolonga</u>
Little Button-quail		X
Australian Bustard	X	
Banded Lapwing	X	X
Inland Dotterel	X	
Common Bronzewing	X	X
Crested Pigeon	X	X
Red-tailed Black Cockatoo	X	
Little Corella	X	
Galah	X	X
Cockatiel	X	X
Budgerigar		X
Port Lincoln Ringneck	X	X
Mulga Parrot	X	X
Bourke's Parrot	X	X
Pallid Cuckoo	X	X
Black-eared Cuckoo		X
Horsfield's Bronze Cuckoo	X	
Southern Boobook	X	
Tawny Frogmouth	X	
Australian Owlet-nightjar	X	X
Spotted Nightjar	X	X
Sacred Kingfisher	X	
Rainbow Bee-eater	X	
White-backed Swallow	X	
Tree Martin	X	X
Richard's Pipit	X	X
Black-faced Cuckoo-shrike	X	X
White-winged Triller	X	X
Chiming Wedgebill		X
Chestnut Quail-thrush	X	X
White-browed Babbler	X	X
Splendid Fairy-wren	X	X
Variiegated Fairy-wren		X
White-winged Fairy-wren	X	X
Rufous Songlark		X
Weebill	X	X
Western Gerygone		X
Inland Thornbill	X	X
Chestnut-rumped Thornbill	X	X
Yellow-rumped Thornbill	X	
Southern Whiteface		X
Redthroat	X	X
Red-capped Robin	X	X
Hooded Robin	X	X
Western Yellow Robin		X
Grey Fantail	X	
Willie Wagtail	X	X
Rufous Whistler	X	X
Western Shrike-thrush	X	X
Crested Bellbird	X	X
White-fronted Chat	X	
Crimson Chat	X	X

	<u>Wandana</u>	<u>Toolonga</u>
Mistletoebird	X	X
Striated Pardalote	X	X
Singing Honeyeater	X	X
Grey-fronted Honeyeater	X	X
Brown-headed Honeyeater		X
White-fronted Honeyeater	X	X
Yellow-throated Miner	X	
Spiny-cheeked Honeyeater	X	X
Pied Honeyeater		X
Zebra Finch	X	X
Australian Magpie-lark	X	
Masked Wood-swallow		X
Black-faced Wood-swallow	X	X
Pied Butcherbird	X	X
Grey Butcherbird	X	X
Australian Magpie	X	
Grey Currawong	X	
Little Crow	X	X
<hr/>		
Totals	68	61
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REPTILES

	<u>Kalbarri</u>	<u>Wandana</u>	<u>Toolonga</u>
<u>Chelidae</u>			
<i>Chelodina steindachneri</i>	X		
<u>Gekkonidae</u>			
<i>Crenadactylus ocellatus</i>		X	
<i>Diplodactylus alboguttatus</i>	X	X	X
<i>Diplodactylus michaelsoni</i>		X	
<i>Diplodactylus pulcher</i>		X	X
<i>Diplodactylus spinigerus</i>	X	X	
<i>Diplodactylus strophurus</i>			X
<i>Diplodactylus ornatus</i>	X	X	
<i>Gehyra variegata</i>	X	X	X
<i>Heteronotia binoei</i>	X	X	X
<i>Nephrurus levis occidentalis</i>	X	X	
<i>Phyllurus milii</i>	X		
<i>Rhynchoedura ornata</i>		X	X

Kalbarri Wandana Toolonga

Pygopodidae

<i>Aprasia smithi</i>		X	X
<i>Delma nasuta</i>		X	
<i>Lialis burtonis</i>	X	X	
<i>Pygopus lepidopodus</i>	X	X	
<i>Pygopus nigriceps</i>		X	X

Agamidae

<i>Amphibolurus adelaidensis</i>	X		
<i>Amphibolurus inermis</i>	X	X	X
<i>Amphibolurus maculatus</i>			
<i>maculatus</i>	X	X	
<i>Amphibolurus minor</i>	X	X	X
<i>Amphibolurus parviceps</i>	X		
<i>Amphibolurus reticulatus</i>	X		X
<i>Amphibolurus scutulatus</i>	X	X	X
<i>Moloch horridus</i>	X	X	X
<i>Lophognathus longirostris</i>	X		

Scincidae

<i>Cryptoblepharus carnabyi</i>	X		X
<i>Cryptoblepharus</i>			
<i>plagiocephalus</i>	X	X	X
<i>Ctenotus alleni</i>	X	X	X
<i>Ctenotus fallens</i>	X		
<i>Ctenotus leonhardii</i>			X
<i>Ctenotus lesuerii</i>	X		
<i>Ctenotus mimetes</i>		X	
<i>Ctenotus p. pantherinus</i>			X
<i>Ctenotus schomburgkii</i>	X		X
<i>Ctenotus severus</i>			X
<i>Lerista connivens</i>			X
<i>Lerista elegans</i>	X		
<i>Lerista lineopunctulata</i>	X	X	
<i>Lerista macropisthopus</i>	X	X	X
<i>Lerista muelleri</i>	X		X
<i>Lerista nichollsi</i>	X	X	
<i>Lerista planiventralis</i>	X		
<i>Lerista praepedita</i>		X	X
<i>Menetia greyii</i>	X		X
<i>Menetia surda</i>	X		X
<i>Morethia butleri</i>	X	X	
<i>Morethia lineocellata</i>	X		
<i>Morethia obscura</i>		X	X
<i>Omolepida branchialis</i>		X	
<i>Eremiascincus richardsonii</i>	X		
<i>Tiliqua occipitalis</i>	X	X	
<i>Tiliqua rugosa</i>	X	X	

	<u>Kalbarri</u>	<u>Wandana</u>	<u>Toolonga</u>
<u>Varanidae</u>			
<i>Varanus caudolineatus</i>			X
<i>Varanus eremius</i>	X	X	X
<i>Varanus gouldii</i>	X	X	
<i>Varanus tristis</i>	X		
<u>Typhlopidae</u>			
<i>Typhlina bituberculata</i>		X	
<i>Typhlina leptosoma</i>	X		
<u>Boidae</u>			
<i>Liasis childreni</i>	X		
<u>Elapidae</u>			
<i>Demansia reticulata</i>	X		
<i>Denisonia monachus</i>	X	X	
<i>Pseudechis australis</i>	X		
<i>Pseudonaja modesta</i>	X	X	X
<i>Pseudonaja nuchalis</i>	X	X	X
<i>Vermicella bertholdi</i>		X	
<i>Vermicella bimaculata</i>	X		X
<i>Vermicella fasciolata</i>		X	
<i>Vermicella littoralis</i>	X		
<i>Vermicella semifasciata</i>		X	
	<hr/>		
Totals	50	41	31
	<hr/>		