

## IV Vertebrate Fauna

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The vertebrate fauna of the Edjudina—Menzies Study Area was documented by intensive sampling in two survey areas and by opportunistic data recording in other locations within the Study Area. The two survey areas were selected to sample as many of the landform units as possible.

The Goongarrie (GG) survey area (29° 55'S, 121° 09'E) was selected because of its location near the boundary of the Coolgardie and Austin Botanical Districts and close to the South-west Vegetation Interzone (Beard 1978), and the proximity of Goongarrie National Park. This provided an opportunity to sample vertebrate assemblages in an area which is transitional between the eucalypt dominated woodlands of the South-west Botanical Province and the *Acacia* dominated woodlands and shrublands of the Eremaean Botanical Province.

The survey area is a complex mozaic (Figure 3) of Broad Valley, Salt Lake Feature, Sandplain and Dunefield. It has areas dominated by mallee (*Eucalyptus* spp.) and *Acacia* shrubland and large seasonally inundated saltlakes with halophytic vegetation on the margins.

The Yundamindra (YM) survey area (29° 18'S, 122° 25'E) is situated mainly on Yundamindra pastoral lease and slightly on Mt Celia pastoral lease. It is located in the Eremaean Botanical Province in the eastern part of the Austin Botanical District where the vegetation consists of elements that are transitional between the *Acacia aneura* (mulga) dominated woodlands and the low Woodland of *Acacia aneura/Eucalyptus youngiana* over *Triodia* of the Helms Botanical District to the east.

Lake Carey is a north-west—south-east aligned saltlake on the edge of the Yundamindra Study Area and is the dominant landform unit. Broad Valley and Undulating Plain are also well represented, and there are small areas of Granite Exposure, Hill and Breakaway.

Documentation of the vertebrate species occurring in the Goongarrie and Yundamindra Survey Areas was made during three survey periods, in March 1979, October 1980 and July 1981. Representative specimens of most species of amphibians, reptiles and small mammals were taken and lodged in the Western Australian Museum. These are catalogued as R65660-66004 and M17538-17596 (March 1979), R72555-72903 and M20035-20077 (October 1980) and R74598-74647 and M20201-20215 (July 1981). Methods of survey are documented by Biological Surveys Committee (1984).

The survey site number, fieldcode, coordinates, vegetation type and faunal sampling regime of both survey areas are listed in Tables 6 and 7. Sampling was intensive at survey sites where fenced pitlines, traplines and quadrats were used, and largely opportunistic at other sites. The selection of sample sites was intentionally non-random as all major vegetation types were to be sampled irrespective of their size. Other sites were chosen to supplement data from major

**Table 6.** Fauna sites of the Goongarrie Survey Area (GG)

Site No.	Field No. (GG)	Site Co-ordinates	Vegetation	Fauna Survey			
				FP 123	TL 123	BQ 123	OP 123
<b>DUNEFIELD</b>							
EM 3	R1,R2,R9,M1,B1	29 55 20 121 07 55	<i>Acacia coolgardiensis</i> Tall shrubland	XXX	XXX	XXX	XXX
<b>GRANITE EXPOSURE</b>							
EM 5a	GD,WQD	29 54 121 14	Dams on lithic complex	---	---	---	XXX
<b>SALT LAKE FEATURE</b>							
EM 9	R7,M4,B4	29 55 25 121 14 35	<i>Acacia aneura</i> Low woodland	XXX	XXX	XXX	XXX
EM9a	R8	29 55 10 121 14 45	<i>Cratystylis, Maireana</i> Low shrubland	XX-	---	---	XXX
<b>SANDPLAIN</b>							
EM 13	R3,R4,M2,B2	29 55 20 121 08 05	<i>Eucalyptus leptopoda</i> Mallee	XXX	XXX	XXX	XXX
EM 12	1st Fence	29 54 121 10	<i>Eucalyptus oldfieldii</i> Low woodland	---	---	---	XXX
<b>UNDULATING PLAIN</b>							
EM 15	M5,B5	29 53 40 121 10 45	<i>Casuarina cristata - Acacia aneura</i> Low woodland	---	XXX	XXX	XXX
<b>BROAD VALLEY</b>							
EM 22	R5,M3,B3	29 55 10 121 08 30	<i>Eucalyptus concinna</i> Mallee	XXX	XXX	XXX	XXX
EM 21	R6	29 54 00 121 10 10	<i>Casuarina cristata</i> Low woodland	XXX	---	---	XXX
EM 21a	M6	29 53 15 121 11 45	<i>Casuarina cristata - Acacia aneura</i> Low woodland	---	XXX	---	XXX

Site No., refers to vegetation descriptions listed in Appendix III. Field No., M = mammal, R = reptile, B = bird. Fauna Survey, FP = fenced pitline, TL = trapline, BQ = bird quadrat, OP = opportunistic sightings. Numbers indicate period of survey, 1 = 1st survey (March 1979), 2 = 2nd survey (October 1980), 3 = 3rd survey (July 1981).

**Table 7** Fauna sites of the Yundamindra Survey Area (YM)

Site No.	Field No. (YM)	Site Co-ordinates	Vegetation	FP 123	Fauna Survey			OP 123
					TL 123	BQ 123		
<b>BREAKAWAY</b>								
EM 1a		29 17 00 122 18 30	Banded Ironstone Breakaway	---	---	---	-XX	
<b>SALT LAKE FEATURE</b>								
EM 8	R1,R5,M1,B1	29 15 30 122 24 15	<i>Acacia aneura</i> Low woodland	XXX	XXX	XXX	XXX	
EM 11	R2	29 15 55 122 24 00	<i>Atriplex nana</i> Low shrubland	XXX	XXX	---	XXX	
EM 11a	B2	29 16 15 122 24 00	<i>Cratystylis subspinescens</i> Low shrubland	---	---	XXX	XXX	
<b>UNDULATING PLAIN</b>								
EM 14	B3,M5	29 16 35 122 24 00	<i>Eucalyptus clelandii</i> Low woodland	---	XXX	XXX	XXX	
EM 14a	R6	29 18 20 122 25 00	<i>Acacia stowardii</i> Low shrubland	-XX	---	---	XXX	
EM 14b	Camp/Creeks	29 20 122 25	<i>Acacia aneura</i> Low woodland	---	---	---	XXX	
EM 17a	Mine Hills	29 19 122 26	<i>Acacia aneura</i> Low woodland	---	---	---	XXX	
<b>BROAD VALLEY</b>								
EM 20a	R4,M4,B5	29 22 55 122 28 05	<i>Acacia aneura</i> Low woodland	XXX	XXX	XXX	XXX	
EM 19	R3,M3,B4	29 24 00 122 28 05	<i>Acacia aneura</i> Low woodland	XXX	XXX	XXX	XXX	

See Table 6 for explanation.

vegetation types or by investigating minor vegetation types. Detailed descriptions of the vegetation structure, floristics and soils of the sites sampled for fauna are presented in Appendix III.

The relative efficacy of sampling is illustrated in Figures 4-8. Figure 4 shows that there was little difference between the total number of reptile species at YM and GG, but GG had about 30 per cent more individuals for approximately the same collecting effort. It also shows that after the first survey period (March 1979) few additional species were added for each survey area. The last survey period (July 1981) added no additional species; in addition, few individuals were active because of the low winter temperature.

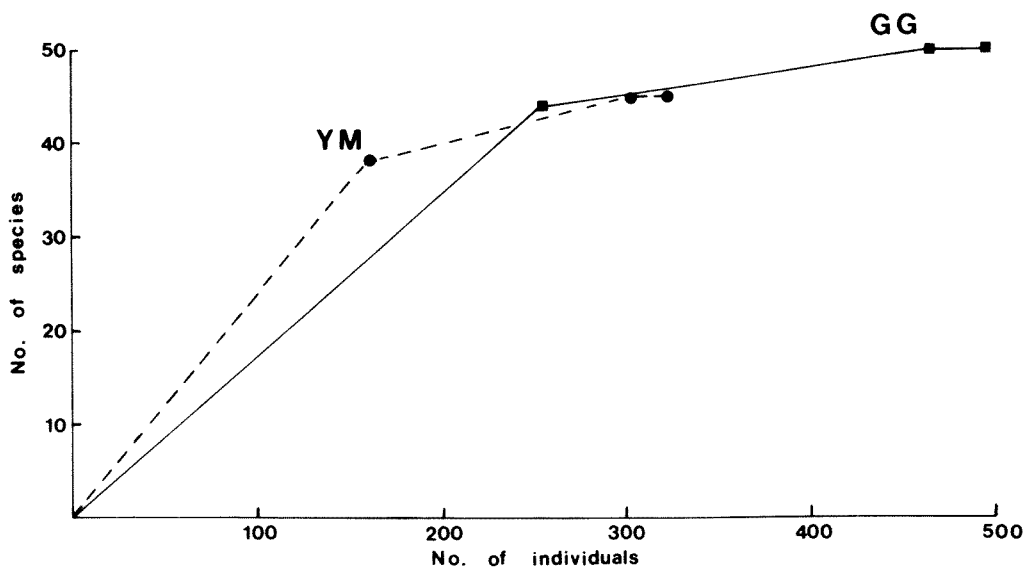
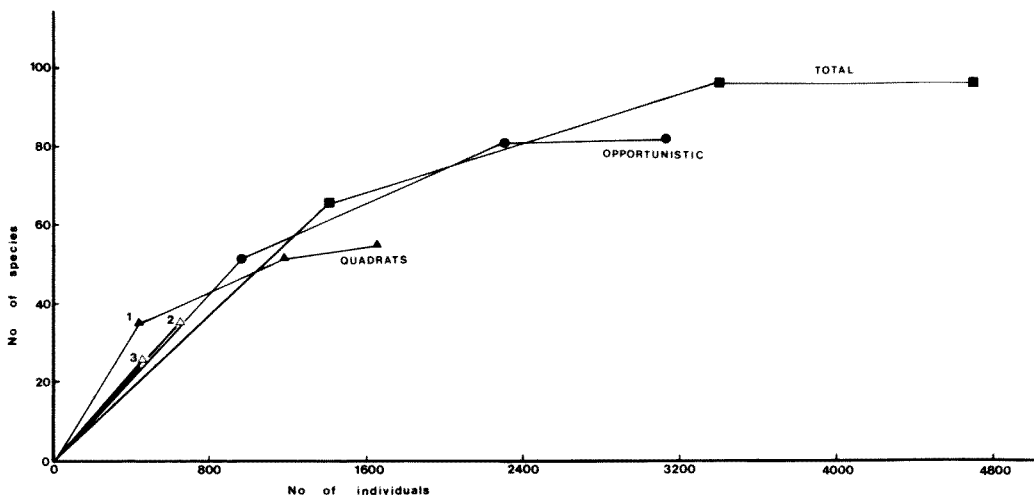


Figure 4 Number of reptile and amphibian species and the number of individuals caught at Goongarrie (GG) and Yundamindra (YM) study sites. Data are accumulated for the three study periods.

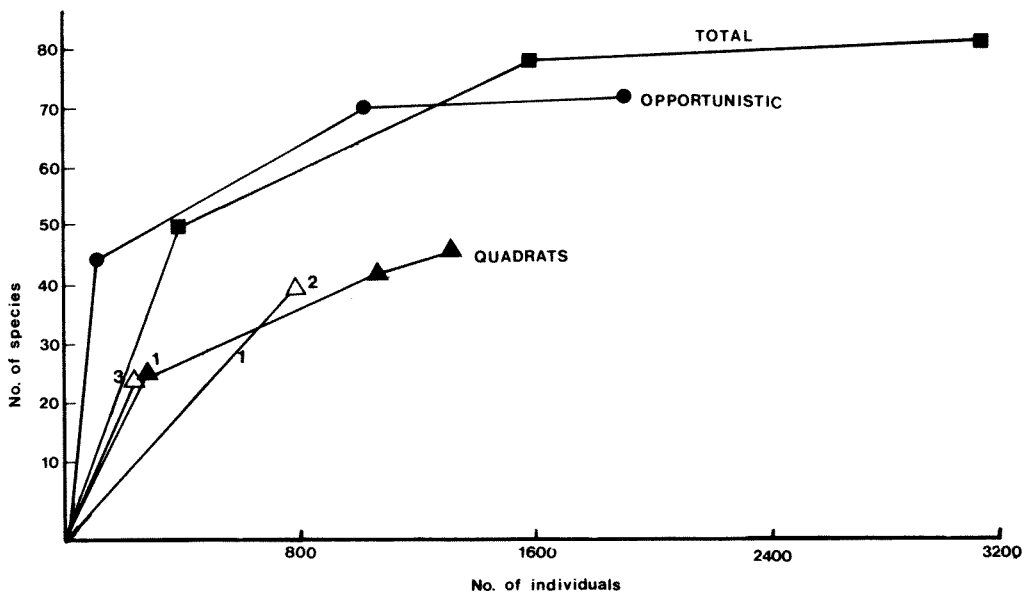
Figures 5 and 6 indicate the cumulative number of bird species and the total number of individuals recorded during each survey period at GG and YM respectively. During the first survey at GG, the combined quadrat and opportunistic recordings only included 65% of the total species recorded in the area. The first survey at YM only included 63% of total species recorded.

At GG the five bird quadrats (Figure 5) included 55% of the bird species recorded for the area. The five quadrats at YM (Figure 6) included 59% of species recorded for the area.

Figure 7 shows that at GG each quadrat was continuing to accumulate species during each survey period. It also shows that the mallee site EM22 had the highest total of individuals and had considerably more individuals in winter than any other site. Although there were considerable differences between the total



**Figure 5** The cumulative number of bird species and number of individuals recorded for the three study periods at Goongarrie (GG). Data collected on bird quadrats are indicated separately for each study period (1,2,3) and combined as quadrat totals. Data collected opportunistically is indicated separately and also combined with quadrat data.



**Figure 6** The cumulative number of bird species and number of individuals recorded for the three study periods at Yundamindra (YM). Data collected on bird quadrats are indicated separately for each study period (1,2,3) and combined as quadrat totals. Data collected opportunistically are indicated separately and also combined with quadrat data.

number of individuals at the five quadrat sites, differences between the total number of species were less pronounced.

The situation at YM (Figure 8) was similar in that each quadrat was continuing to accumulate species and there were considerable differences in total number of individuals. One site, a halophytic lake ecotone EM11a had considerably fewer species and a much lower number of individuals than the other sites.

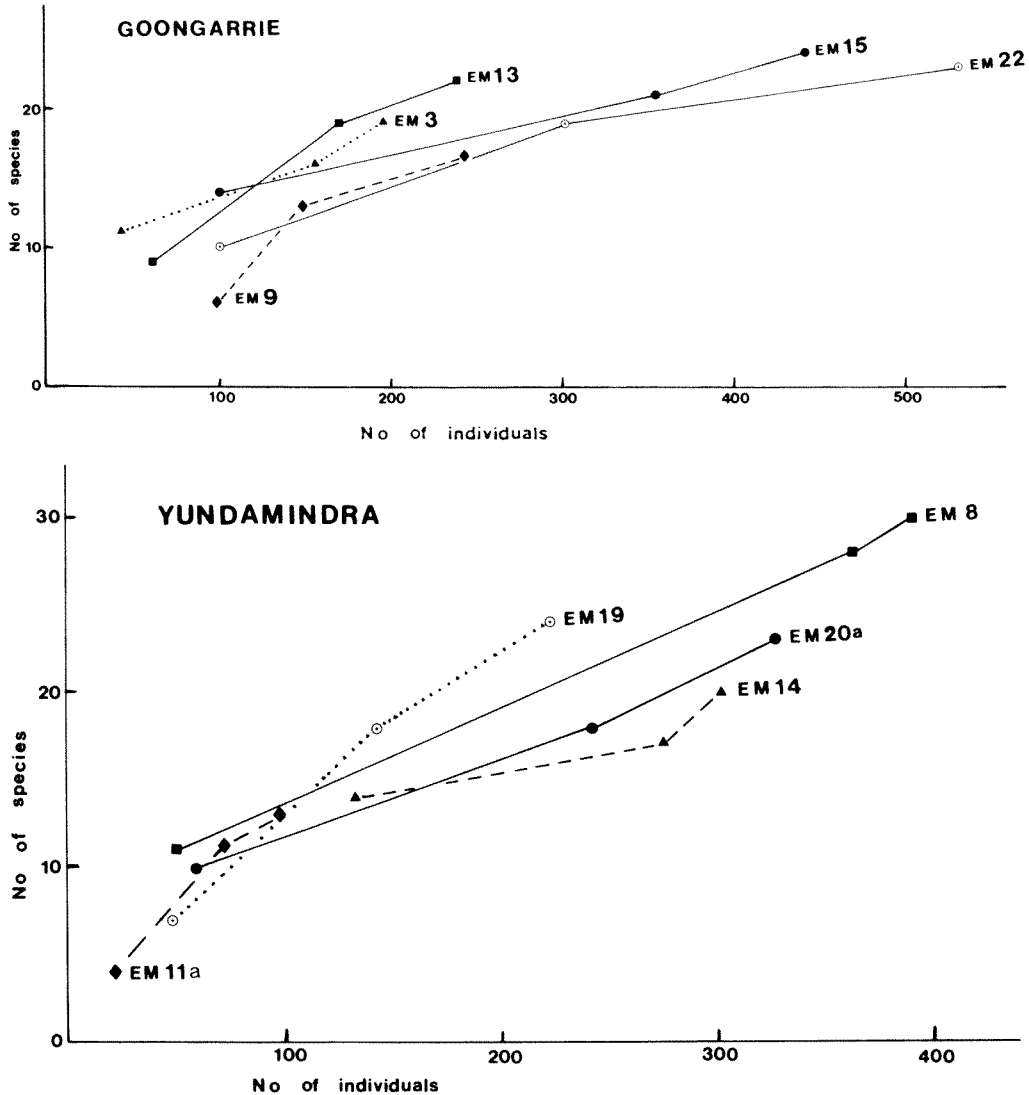


Figure 7 The accumulation during the three study periods of number of bird species and total number of individuals at each of the census quadrats at Goongarrie (GG) and Yundamindra (YM) Study Sites.

## Amphibians and Reptiles

Four amphibians and 67 reptiles were recorded from the Goongarrie and Yundamindra study sites (Table 8) making this the richest herpetofaunal area in the Eastern Goldfields. There was, however, very little similarity in the composition of the herpetofauna at these sites with only 25 (37%) of the reptiles and none of the amphibians in common.

The collection of *Neobatrachus wilsmorei* at Goongarrie is a significant south-easterly extension of its known range, while *Pseudophryne occidentalis* is near the inland extreme of its range.

These study areas are the type localities for two lizard species. The skink *Ctenotus greeri* has its type locality at EM19 site on Yundamindra Station; this species is also known from Mt Windarra and the Warburton area. An ecotone between EM22 and Lake Goongarrie is the type locality of the gecko *Gehyra purpurascens*.

The low number of reptiles in common between the two sites is indicative of the transition between the principally south-western fauna of Goongarrie and the dominant Eremaean elements of the Yundamindra fauna. Species such as *Diplodactylus intermedius*, *D. maini* and *Lerista picturata* are at their north-easterly and inland extremes of their range at Goongarrie while *L. macropisthopus*, *Varanus caudolineatus* and *V. giganteus* are at the south-eastern limits of their distribution. The population of *Ctenotus brooksi* at Goongarrie represents a south-western isolate of an eremaeian species, while *Diplodactylus ciliaris*, *D. strophurus* and *Nephrurus laevisimus* are all at the south-western edge of their distributional limits. The skinks *Ctenotus helenae*, *C. calurus* and *Egernia striata* are at their most southerly limits while *C. severus* is at its most south-easterly limit at Yundamindra.

The contrast in the faunas between the sites is best illustrated in the skinks where only 8 (31%) of the 26 species are common to both areas. Several species are replaced by their ecological homologues between these two sites e.g. *Ctenotus atlas* and *C. quattuordecimlineatus*, *Lerista picturata* and *L. desertorum*, and *Diplodactylus intermedius* and *D. ciliaris*. The latter species pair are parapatric at Goongarrie with *D. intermedius* occupying the mallee and *D. ciliaris* the mulga areas. The congeners, *Ctenotus uber* and *C. leonhardii*, are parapatric at both Goongarrie and Yundamindra with the former always occurring on loams associated with higher geological surfaces and the latter on the heavy clays and loams of lower surfaces. Particularly high numbers of the gecko *Nephrurus laevisimus* and dragon *Ctenophorus fordi* were recorded from EM3 and adjacent sites EM13 and EM22 making these potentially important study populations.

The *Eucalyptus transcontinentalis* mallee over *Triodia* at the Goongarrie faunal camp (EM22) has one of the richest reptile assemblages in the Eastern Goldfields with 19 lizards and 3 snakes recorded. An additional 6 species of lizard and one snake were recorded in the structurally similar *E. oldfieldii* mallee over *Triodia* at the nearby site of EM19. The mallee/mulga — *Triodia* site EM19 at Yundamindra has an exceptionally rich assemblage of *Ctenotus* species, with 6 being sympatric.

**Table 8.** Amphibians and reptiles at Goongarrie (GG) and Yundamindra (YM) survey areas indicating number of species and individuals caught in each sample site. The first figure indicates the number caught in fenced pit lines; the second figure indicates the number caught opportunistically; single figures indicate opportunistic collecting only. Numbers for the three survey periods are combined. Vegetation types are listed in Tables 6 and 7 and described in Appendix III.

Landform Code	Goongarrie													Yundamindra										
	D	G	G	L	L	S	S	S	U	V	V	V		B	L	L	L	U	U	U	V	V		
Vegetation Code (EM)	3	5a	5a	9	9a	13	13	12	15	22	21	21a	Other	NP	1a	8	11	11a	14	14a	17a	20a	19	Other
<b>LEPTODACTYLIDAE</b>																								
<i>Limnodynastes spenceri</i>																				8				
<i>Neobatrachus sutor</i>	0/1			5/0	10/0	1/0	1/1																	
<i>N. wilsmorei</i>				11/0			0/1	2				2/0												
<i>Pseudophryne occidentalis</i>		2																						
<b>GEKKONIDAE</b>																								
<i>Diplodactylus ciliaris</i>		2																		0/2	1	1/0		
<i>D. conspicillatus</i>																							6/2	
<i>D. granariensis</i>								1		0/1	1/1	1												
<i>D. intermedius</i>								2																
<i>D. maini</i>								3		1/1	0/1			X										
<i>D. pulcher</i>		3							1					X										
<i>D. squarrosus</i>																				0/4	3		1/0	
<i>D. strophurus</i>																4/3	1/0	3		1/0	3	1/1		4
<i>Gehyra purpurascens</i>										0/2				X										
<i>G. variegata</i>	1/0	6	9			1/0		2	1	1/3		2		X	1	0/1					15	0/1	0/1	3
<i>Heteronotia binoei</i>		3	4						2				2	X							34			1
<i>Nephruros laevisissimus</i>	18/0					12/0	6/0	1		0/2				2										
<i>N. vertebralis</i>															1/1	1/0								
<i>Phyllurus milii</i>			2																		9			
<i>Rhynchoedura ornata</i>				1/0		2/0		7		1/1	1/0			X	2/0									
<b>PYGOPODIDAE</b>																								
<i>Delma nasuta</i>	1/0									1/0														
<i>Lialis burtonis</i>								1																
<i>Pygopus nigriceps</i>								1			1/0		1								1	1/0		
<b>AGAMIDAE</b>																								
<i>Ctenophorus caudicinctus</i>															12									
<i>C. cristatus</i>										0/5				X										
<i>C. fordi</i>	22/4					22/1	19/1			13/3	2/0		4											



Table 8 contd.

Landform Code	Goongarrie													Yundamindra										
	D	G	G	L	L	S	S	S	U	V	V	V	B	L	L	L	U	U	U	V	V			
	Vegetation Code (EM)	3	5a	5a	9	9a	13	13	12	15	22	21	21a	Other	NP	1a	8	11	11a	14	14a	17a	20a	19
<i>C. inermis</i>																								1
<i>C. reticulatus</i>		8	5	0/2	1/0				4				4	X						2	0/1	2	4/0	1
<i>C. salinarum</i>			1												0/2	2/3	1							
<i>C. scutulatus</i>				1/1	1/0		0/3		1	1/2	3/4	2	X									0/1		
<i>Moloch horridus</i>		1			0/1		0/1	2	1															
<i>Pogona m. minor</i>	0/1			0/2			0/1	4	3	0/1	1/1	1	X	0/2	1/1	1	1					1/1		
<i>Tympanocryptis cephalo</i>																		1						
SCINCIDAE																								
<i>Cryptoblepharus carnabyi</i>									4			1								0/1				
<i>C. plagiocephalus</i>										0/3	0/1		X											
<i>Ctenotus atlas</i>	1/3					2/0	1/0			3/1	1/0		X											
<i>C. brooksi</i>	23/1																							
<i>C. calurus</i>																							1/0	
<i>C. greeri</i>																							6/6	
<i>C. helenae</i>																							1/0	
<i>C. leonhardii</i>				1/4	8/1								X	0/2	0/5	4							1	
<i>C. pantherinus</i>																							3/1	
<i>C. quattuordecimlineatus</i>																							10/1	
<i>C. schomburgkii</i>	3/1			1/0		5/0	4/0			3/2	3/0		1	X	14/1	2/1						0/2	5/6	
<i>C. severus</i>															1								6	
<i>C. uber</i>									6		1/0	1	X						2/1	2	5/1			
<i>Egernia depressa</i>									10	0/1	0/2											4/0		
<i>E. formosa</i>		1	2						5															
<i>E. inornata</i>	2/1					1/0	1/1	1			1/0	1												
<i>E. striata</i>																							1/1	
<i>Eremiascincus richardsonii</i>																					1	1		
<i>Lerista desertorum</i>																							6	1/1 0/6
<i>L. macropisthopus</i>			2							0/1														
<i>L. muelleri</i>									2	0/1	1/0				3/2							9	0/1	
<i>L. picturata</i>			2																					
<i>Menetia greyii</i>	1/0	3	1	0/1		0/1	0/1		1	1/1	1/0		X										1	
<i>Morethia butleri</i>		2	2						2			2	X						2		6			
<i>Omolepida branchialis</i>								1		0/2														
<i>Tiliqua occipitalis</i>						1/0		1																

Table 8 contd.

Landform Code	Goongarrrie														Yundamindra									
	D	G	G	L	L	S	S	S	U	V	V	V	B	L	L	L	U	U	U	V	V			
	3	5a	5a	9	9a	13	13	12	15	22	21	21a	Other	NP	1a	8	11	11a	14	14a	17a	20a	19	Other
VARANIDAE																								
<i>Varanus caudolineatus</i>		1	1	1/0										X						0/1		4/2		
<i>V. giganteus</i>		1																				1		
<i>V. gouldii</i>		1		0/1	0/1					0/2	2						0/1			0/2		1/0		
<i>V. panoptes</i>																				0/1				
<i>V. tristis</i>											3													
TYPHLOPIDAE																								
<i>Ramphotyphlops hamatus</i>															1/0					1/0				
<i>R. waitii</i>															1/0					0/2				
ELAPIDAE																								
<i>Demansia reticulata</i>										0/2														
<i>Denisonia fasciata</i>		1	1																					
<i>Pseudonaja modesta</i>						1/0				0/3			1	X										
<i>P. nuchalis</i>								1					2								1			
<i>Rhinoplocephalus monachus</i>										1/0										0/1	3			
<i>Vermicella bertholdi</i>																							1/0	
<i>V. fasciolata</i>																							1/0	

Twenty species were recorded from Goongarrie National Park. Except for *Diplo-dactylus strophurus* a species at its southern distributional limit, all species from the National Park were also recorded at the Goongarrie study site. *D. strophurus* was collected in shrubs surrounding Deadmans Soak just inside the western Park boundary.

## Birds

The surveys of the Goongarrie (GG) and Yundamindra (YM) Study Areas recorded 108 species of birds. This is considerably more than has been recorded by us in other parts of the Goldfields during this study. They comprised 44 non-passerines and 64 passerines of which 28 and 45 species respectively were common to both areas. Tables 9 and 10 list these species and indicate the number of times each species was sighted and the total number of individuals in different vegetation types during each survey.

Of the total, 101 species were recorded at GG and 76 at YM; 73 of these (or 67%) were common to both areas. A higher percentage of non-passerines (35%) was restricted to one area compared to passerines where only 28% were not recorded at both areas. Half of the non-passerines recorded only at GG were associated with semi-permanent water in dams (see Tables 9 and 10).

Most differences in the assemblage of passerines at the two sites are due to major habitat differences between the sites. GG is located close to the climatically determined 'Eucalyptus-Acacia line' where the South-western Phytogeographic Interzone meets the southern part of the Austin Botanical District of the Eremaean Botanical Province (Beard 1980). This is the mulga-eucalypt line of Gardner (1942) and often mentioned by Serventy and Whittell (1967) as a major boundary determining bird distributions. The GG study area consisted of elements of eucalypt woodland and shrub-mallee characteristic of the South-west Botanical Province as well as *Acacia aneura* and *Casuarina cristata* woodlands of the Eremaean Province. The study site at YM is situated in the Eremaean Botanical Province and is dominated by *A. aneura* low woodlands characteristic of the Austin Botanical District. Here there was only a small representative area of Low Woodland of *Acacia aneura/Eucalyptus youngiana* over *Triodia basedowii* impinging from the Helms Botanical District to the east.

Passerines characteristic of vegetation of the South-west Botanical Province and recorded at GG but not further north at YM included *Cinclosoma castanotum*, *Gerygone fusca*, *Malurus pulcherrimus*, *Lichmera indistincta*, *Meliphaga ornata*, *M. leucotis*, *Melithreptus brevirostris* and *Corvus coronoides*. Eremaean passerines recorded at YM but not at GG included *Cinclosoma castaneothorax*, *Acanthiza robustirostris*, *Epthianura aurifrons* and *Chlamydera maculata*. Other typically eremaean species recorded at either site were *Rhipidura albicauda* (GG), *Climacteris affinis* (GG, YM), *Certhionyx variegatus* (GG, YM), *Myzomela nigra* (GG), *Meliphaga plumula* (GG, YM), *Artamus personatus* (GG, YM), *A. superciliosus* (GG, YM) and *Corvus orru* (GG, YM).

**Table 9.** List of birds at Goongarrie survey site indicating numbers seen in each sample site. The intensive study sites (quadrats) are shown in the first columns followed by opportunistic observations. The first figure indicates the total number of individuals, the second figure indicates the number of observations. The three survey periods (March 1979, October 1980 and July 1981) are indicated as column 1, 2, and 3 respectively for each sample site. The number of observation days for the quadrat data was 5 and for the opportunistic data was 7. Goongarrie National Park was examined only in October (4 days) and July (3 days).

Locations	Quadrats							Opportunistic										Salt Lake Margins	Freshwater	Goongarri National Park
	EM3	EM9	EM13	EM15	EM22	EM3	EM5a	EM9	EM13	EM12a	EM15	EM14b	EM22	EM21	EM21a					
CASUARIIDAE <i>Dromaius novaehollandiae</i> Emu	X		8 1	X	X	1 1	2 1	T			3 3	5 2	2 1		1 1	T	16 4	21 3	21 5	60 10
ARDEIDAE <i>Ardea pacifica</i> Pacific Heron																	1 1	2 2		
49 <i>Ardea novaehollandiae</i> White-faced Heron																	21 10	4 2		
ANATIDAE <i>Tadorna tadornoides</i> Mountain Duck																	14 7			
<i>Anas superciliosus</i> Black Duck																	40 4	A		
<i>Anas gibberifrons</i> Grey Teal																	2 1	2 1		
<i>Chenonetta jubata</i> Wood Duck																	21 2			
ACCIPITRIDAE <i>Accipiter fasciatus</i> Brown Goshawk				1 1													1 1			1 1
<i>Accipiter cirrocephalus</i> Collared Sparrowhawk																	1 1			1 1
<i>Aquila morphnoides</i> Little Eagle					X												2 2	B		1 1

Table 9 contd.

## Quadrats

## Opportunistic

Locations	Quadrats										Opportunistic							Goongarri National Park	
	EM3	EM9	EM13	EM15	EM22	EM3	EM5a	EM9	EM13	EM12a	EM15	EM14b	EM22	EM21	EM21a	Salt Lake Margins	Freshwater		
<i>Aquila audax</i> Wedge-tailed Eagle												1 1 1 1							3 2
<i>Circus assimilis</i> Spotted Harrier												1 1		1 1					4 <sup>H</sup> 4
FALCONIDAE <i>Falco longipennis</i> Australian Hobby													1 1						1 1
<i>Falco berigora</i> Brown Falcon	1 1			1 1		1 1					1 1	1 1	2 1					2 2	1 1
<i>Falco cenchroides</i> Australian Kestrel							3 1 1 1												5 4
PHASIANIDAE <i>Coturnix novaezelandiae</i> Stubble Quail												1 1							
MEGAPODIIDAE <i>Leipoa ocellata</i> Mallee Fowl																			old nest
TURNICIDAE <i>Turnix velox</i> Little Button-quail	X		8 7			2 1						5 2 <sup>A</sup>							8 5
RALLIDAE <i>Gallinula ventralis</i> Black-tailed Native Hen																		2 1	
CHARADRIIDAE <i>Vanellus tricolor</i> Banded Plover							1 1					4 1							
<i>Charadrius ruficapillus</i> Red-capped Plover																		15 3	
<i>Charadrius melanops</i> Black-fronted Plover																		1 1	

Table 9 contd.

## Quadrats

## Opportunistic

Locations	Quadrats															Opportunistic		Goongarri National Park				
	EM3	EM9	EM13	EM15	EM22	EM3	EM5a	EM9	EM13	EM12a	EM15	EM14b	EM22	EM21	EM21a	Salt Lake Margins	Freshwater					
RECURVIROSTRIDAE <i>Cladorhynchus leucocephala</i> Banded Stilt																4 3 <sup>C</sup>						
<i>Recurvirostra novaehollandiae</i> Red-necked Avocet																	48 7					
COLUMBIDAE <i>Geopelia cuneata</i> Diamond Dove		1 1																				
<i>Phaps chalcoptera</i> Common Bronzewing										1 1			2 2		1 1	1 1	8 1	2 2				
19 <i>Ocyphaps lophotes</i> Crested Pigeon	2 1	X X 1	4 1			6 2		2 1				2 1				1 1	9 5	10 6	8 5			
PSITTACIDAE <i>Platycercus zonarius</i> Ring-necked Parrot		X 1	1 1	4 2		1 1	2 1	7 3			2 2	2 1	1 1	2 6	1 3	1 1	1 1	79 5	1 1	7 3		
<i>Platycercus varius</i> Mulga Parrot	X 1	X 1	2 1	2 1		3 1	2 1	2 1		2 1					2 1				7 4	15 5		
<i>Neophema bourkii</i> Burke's Parrot																2 1	9 2	6 3	2 2			
<i>Neophema splendida</i> Scarlet-breasted Parrot										2 1												
<i>Melopsittacus undulatus</i> Budgerigar	1 1	5 1	X 1	X 1	X 2 1							15 4	6 2	19 2	12 2	26 5		1 1 <sup>B</sup>	59 8	10 2	206 54 <sup>H</sup>	
<i>Nymphicus hollandicus</i> Cockatiel					9 1							4 2	2 1			4 1	2 1	20 3	52 17	143 49		
<i>Cacatua roseicapilla</i> Galah				X			7 2					4 2	4 2	2 1	2 1	62 5	2 1	63 5	73 17	175 4	75 28 <sup>E</sup>	52 4

Table 9 contd.

## Quadrats

## Opportunistic

Locations	Quadrats															Opportunistic			Goongarri National Park		
	EM3	EM9	EM13	EM15	EM22	EM3	EM5a	EM9	EM13	EM12a	EM15	EM14b	EM22	EM21	EM21a	Salt Lake Margins	Freshwater				
CUCULIDAE <i>Cuculus pallidus</i> Pallid Cuckoo																				2 2	
<i>Chrysococcyx osculans</i> Black-eared Cuckoo	1 1 1 1		X	X 1 1	1 1	1 1 1 1			2 2		1 1		4 1 4 1							4 4	
<i>Chrysococcyx basalis</i> Horsfield's Bronze Cuckoo		1 1	5 5	2 2		X			1 1		1 1		1 1		2 <sup>D</sup> 2	1 1				5 5	
STRIGIDAE <i>Ninox novaeseelandiae</i> Boobook Owl																				2 2	
PODARGIDAE <i>Podargus strigoides</i> Tawny Frogmouth						1 1														2 2	
AEGOTHELIDAE <i>Aegotheles cristatus</i> Australian Owllet-nightjar																				2 3 2 3	
CAPRIMULGIDAE <i>Eurostopodus argus</i> Spotted Nightjar																				1 1	
ALCEDINIDAE <i>Halcyon pyrrhopygia</i> Red-backed Kingfisher																				1 1	2 <sup>H</sup> 2
MEROPIDAE <i>Merops ornatus</i> Rainbow Bee-eater	X		X																	5 3	8 1
HIRUNDINIDAE <i>Chaeromoeca leucosterna</i> White-backed Swallow																				3 1	2 1
<i>Hirundo neoxena</i> Welcome Swallow	X																			2 1	4 1

Table 9 contd.

## Quadrats

## Opportunistic

53

Locations	EM3	EM9	EM13	EM15	EM22	EM3	EM5a	EM9	EM13	EM12a	EM15	EM14b	EM22	EM21	EM21a	Salt Lake Margins	Freshwater	Goongarri National Park		
<i>Hirundo nigricans</i> Tree Martin	7 1																3 1	1 1		
<i>Hirundo ariel</i> Fairy Martin	5 1																		1 1	
MOTACILLIDAE <i>Anthus novaeseelandiae</i> Richard's Pipit		2 2			2 2 2 2							1 1				2 1	3 2		2 2 2 2	
CAMPEPHAGIDAE <i>Coracina maxima</i> Ground Cuckoo-shrike					6 1							2 1							4 1	
<i>Coracina novaehollandiae</i> Black-faced Cuckoo-shrike		X				11 3		2 2			15 1	2 2	5 7 2 5						12 8	
<i>Lalage sueurii</i> White-winged Triller		X	2 2	2 2	12 11 <sup>E</sup>			1 1			1 1	9 6	2 2		6 1	6 2			25 15 <sup>EG</sup>	
PACHYCEPHALIDAE <i>Microeca leucophaea</i> Jacky Winter					11 5 8 4								4 2 6 2 2 6			2 <sup>A</sup> 1			1 1 1 1	
<i>Petroica goodenovii</i> Red-capped Robin		2 1 2 1	5 5	11 63 8 10 41 7	8 8		2 1 2 1	1 1	3 3		15 9 8 8	2 1 2 1	1 11 <sup>F</sup> 1 6		4 3 <sup>G</sup>	2 1			31 17 <sup>A</sup>	6 4
<i>Petroica cucullata</i> Hooded Robin				2 2															1 1	
<i>Pachycephala rufiventris</i> Rufous Whistler	X			10 9	2 14 2 14	1 1					3 3		4 12 4 10		1 1	1 1			14 13	3 3
<i>Colluricincla harmonica</i> Grey Shrike-thrush	4 6 <sup>F</sup> 3 6	X	1 X 1 1 1	X	8 8	2 1 3 2 1 3			1 2 1 1 2 1		1 2 1 1 2 1		6 3 6 3		1 1				5 4 5 4	
<i>Oreoica gutturalis</i> Crested Bellbird	X X 1 1	X	2 1 X 2 1	4 3	2 2	1 1 1 1	4 1 4 1		1 1	5 2 1 4 2 1	1 1	4 3 5 3 3 5	1 1 1 1 1 1	3 6 4 3 6 4		1 1 1 1			11 8 10 8	



Table 9 contd.

## Quadrats

## Opportunistic

Locations	EM3	EM9	EM13	EM15	EM22	EM3	EM5a	EM9	EM13	EM12a	EM15	EM14b	EM22	EM21	EM21a	Salt Lake Margins	Freshwater	Goongarri National Park
MONARCHIDAE <i>Rhipidura albicauda</i> White-tailed Fantail					1 1								12 <sub>F</sub> 6					1 1
<i>Rhipidura leucophrys</i> Willie Wagtail					1 1			1 1				2 1 1 1	1 3 1 3			4 2	1 1 1 1	2 2
ORTHONYCHIDAE <i>Cinclosoma castanotum</i> Chestnut Quail-thrush				1 1	X X								1 1 1 1					
<i>Pomastostomus superciliosus</i> White-browed Babbler			1 1				2 1				4 1	9 3			3 1			2 2 1 1
ACANTHIZIDAE <i>Aphelocephala leucopsis</i> Southern White-face				22 41 24 4 10 6							19 8 29 3 3 6	8 1			9 11 3 4			14 <sub>H</sub> 9 5 2
<i>Smicrornis brevirostris</i> Weebill	11 6 10 6 3 6		21 4 5 11 2 3		54 57 44 28 29 20	2 2 5 1 1 3			10 7 3 5 3 3				44 30 40 20 12 16	2 <sub>E</sub> 1	2 1			30 9 18 3
<i>Acanthiza apicalis</i> Broad-tailed Thornbill	4 8 11 3 6 6		4 7 8 3 4 6	9 3 6 4 2 4	6 6 3 4 4 2	4 11 2 7			4 4 1 3 3 1	2 <sub>A</sub> 1			1 1		2 1			4 14 <sub>G</sub> 3 7
<i>Acanthiza uropygialis</i> Chestnut-rumped Thornbill	2 1 1 1	8 <sub>F</sub> 10 4 3	1 10 9 1 4 4	14 40 13 7 17 7	7 25 3 10		3 1	2 <sub>E</sub> 7 1 3	3 1	2 1	1 6 12 1 2 4	2 3 1 2	7 7 3 3		6 4 3 2	2 <sub>H</sub> 3 1 1		38 27 14 9
<i>Acanthiza chrysorrhoa</i> Yellow-rumped Thornbill		4 2	2 1	10 22 <sub>E</sub> 11 5 14 4							2 3 1 1		1 1					
<i>Acanthiza iredalei</i> Samphire Thornbill																		2 1
<i>Sericornis brunneus</i> Redthroat	1 1 3 1 1 2		5 8 1 4 6 1	2 2 2 2			1 <sub>F</sub> 2 1 2		2 2			2 2	1 1					4 2 4 2

Table 9 contd.

## Quadrats

## Opportunistic

Locations	Quadrats															Opportunistic			Goongarri National Park
	EM3	EM9	EM13	EM15	EM22	EM3	EM5a	EM9	EM13	EM12a	EM15	EM14b	EM22	EM21	EM21a	Salt Lake Margins	Freshwater		
MALURIDAE																			
<i>Malurus splendens</i> Splendid Fairy-wren			15 3 8 1	2 6 13 1 4 4					3 3 1 1		8 5 3 3							10 10 3 3	
<i>Malurus pulcherrimus</i> Blue-breasted Fairy-wren	5 4 1 1		4 11 3 5																
<i>Malurus leucopterus</i> White-winged Fairy-wren		14 3 5 1										2 1				12 5 A	2 5 1 2	7 8 2 3	
SYLVIIDAE																			
<i>Cincloramphus mathewsi</i> Rufous Songlark												2 1 1 1			2 1			19 9 E	
<i>Cincloramphus cruralis</i> Brown Songlark																		7 5 H	
DAPHOENOSITTIDAE																			
<i>Daphoenositta chrysoptera</i> Australian Sittella			X						1 1			2 1						1 1	
CLIMACTERIDAE																			
<i>Climacteris affinis</i> White-browed tree creeper														1 1	1 1			3 2 2 2	
DICAEIDAE																			
<i>Dicaeum hirundinaceum</i> Mistletoe bird	1 1	2 1 1 1	X		X			1 1	2 2			1 3 1 2	3 1 3 1	1 1				4 1 4 1	
PARDALOTIDAE																			
<i>Pardalotus striatus</i> Striated Pardalote	1 1				X									1 1				11 4 6 1	
MELIPHAGIDAE																			
<i>Lichmera indistincta</i> Brown Honeyeater																		1 1	
<i>Certhionyx niger</i> Black Honeyeater	3 2		7 5 F	2 1		1 1					1 1								

Table 9 contd.

## Quadrats

## Opportunistic

Locations	EM3	EM9	EM13	EM15	EM22	EM3	EM5a	EM9	EM13	EM12a	EM15	EM14b	EM22	EM21	EM21a	Salt Lake Margins	Freshwater	Goongarri National Park		
<i>Certhionyx variegatus</i> Pied Honeyeater			2 1								3 1					4 3		19 5 <sup>E</sup>		
<i>Meliphaga virescens</i> Singing Honeyeater		X X		2 1	1 1		1 1	3 2	1 1			3 3	2 1			1 1	5 5	6 3	2 2	3 2
<i>Meliphaga ornata</i> Yellow-pluméd Honeyeater					141 39								89 18						8 1	
<i>Meliphaga plumula</i> Yellow-fronted Honeyeater													12 5			3 2				
<i>Meliphaga leucotis</i> White-eared Honeyeater			3 2						1 1											
<i>Meliphaga brevirostris</i> Brown-headed Honeyeater					5 3								7 5	7 2					2 2 <sup>F</sup>	
<i>Phylidonyris albigrons</i> White-fronted Honeyeater	10 68 14 7 36 2	16 3	8 33 5 4 21 1	1 2 1 1 1 1	9 43 6 4 28 4	13 20 6 9			5 15 3 3 5 2	4 1		8 1 5 1	41 19 26 20 7 7	7 2	1 5 1 2	21 2			44 2 7 1	
<i>Manorina flavigula</i> Yellow-throated Miner		1 11 60 1 4 5			X 22 4			13 4 20 3 1 3					6 46 2 6	3 1					13 22 4 5 <sup>G</sup>	
<i>Acanthagenys rufogularis</i> Spiny-cheeked Honeyeater	13 X 9	5 X 3	X 2 X 2	X 6 X 6	X 1 8 1 8	3 6 1 2 4 1	2 1		1 1 1 1	2 2 12 2 2 4		4 14 5 2 6 3	6 7 6 4	14 11 19 11 5 17	1 5 1 3	3 1 2 1	20 6	8 11 2 2 4 2	17 3 13 3	
<i>Anthochaera carunculata</i> Red Wattlebird		1 1														5 2				
<i>Ephianura albifrons</i> White-fronted Chat																	15 2		14 5 <sup>AE</sup>	
<i>Ephianura tricolor</i> Crimson Chat		X						2 1				18 7			17 2	6 2			48 26 <sup>FH</sup>	
PLOCEIDAE <i>Poephila guttata</i> Zebra Finch	X			2 1		2 1 1 1						2 2 1 1	2 1				46 8 4 3		7 5 <sup>FG</sup>	

Table 9 contd.

## Quadrats

## Opportunistic

Locations	EM3	EM9	EM13	EM15	EM22	EM3	EM5a	EM9	EM13	EM12a	EM15'	EM14b	EM22	EM21	EM21a	Salt Lake Margins	Freshwater	Goongarri National Park	
GRALLINIDAE <i>Grallina cyanoleuca</i> Magpie-lark																	1 1		
ARTAMIDAE <i>Artamus cinereus</i> Black-faced Woodswallow												6 1			1 1	8 5 <sup>F</sup>		12 14 6 7	
<i>Artamus personatus</i> Masked Woodswallow	X 1 1		X									31 3	18 3			14 5 <sup>F</sup>		74 <sup>E</sup> 27	
<i>Artamus superciliosus</i> White-browed Woodswallow																		4 <sup>H</sup> 2	
CRACTICIDAE <i>Cracticus torquatus</i> Grey Butcherbird	1 1		X		X X	1 1		1 1	1 1				4 2 3 4 2 3			1 1 <sup>C</sup>		4 6 4 6	
<i>Cracticus nigrogularis</i> Pied Butcherbird	X 3 1	X 3 3	2 2			1 1	1 1 <sup>E</sup> 2 1 1 <sup>E</sup> 1	3 5 3 3	1 1		1 1	1 3 1 2	2 3 2 2			2 2		9 7 6 6	
<i>Cracticus tibicen</i> Australian Magpie		X						4 2										2 1	
<i>Strepera versicolor</i> Grey Currawong		X		1 1				3 2						1 1		1 1		3 1 2 1	
CORVIDAE <i>Corvus orru</i> Australian Crow												2 1	2 2						
<i>Corvus bennetti</i> Little Crow		140 2	X				7 1	2 7 1 3			10 3	3 1 2 1	3 4 1 1					340 87 4 5	27 60 14 11

A Includes adults with young

B Includes adult incubating

C Juveniles only

D Fledgling being fed by foster parent

E Nestlings not included in count

F Eggs not included in count

G Nest building

H Breeding but no other data

**Table 10.** List of birds at Yundamindra survey site indicating number seen in each sample site. For explanation of data see Table 9.

Site	Quadrats					Opportunistic										Mills
	EM8	EM11a	EM14	EM20a	EM19	EM1	EM8	EM11	EM11a	EM14	EM14a	EM14b	EM17a	EM20a	EM19	
CASUARIIDAE <i>Dromaius novaehollandiae</i> Emu		T			X				T		* * 8 10 1 2				6 2	
ACCIPITRIDAE <i>Accipiter fasciatus</i> Brown Goshawk					X										2 2	
<i>Aquila morphnoides</i> Little Eagle					X									1 1	2 2	
<i>Aquila audax</i> Wedge-tailed Eagle	X		X X				2 2			4 1 2 1	2 1		1 1 1 1			
<i>Circus assimilis</i> Spotted Harrier																2 2
FALCONIDAE <i>Falco berigora</i> Brown Falcon	1 1			1 1	X		2 2				2 1 2 1		1 1 1 1	1 1 1 1	4 2	1 1
<i>Falco longipennis</i> Australian Hobby	1 1															
<i>Falco cenchroides</i> Australian Kestrel	2 2				X						5 5		2 2		2 2	1 1
TURNICIDAE <i>Turnix velox</i> Little Button-quail														2 1		
OTIDAE <i>Otis australis</i> Australian Bustard		X									4 1					
CHARADRIIDAE <i>Vanellus tricolor</i> Banded Plover								9 1							3 1 1 1	

Table 10 contd.

## Quadrats

## Opportunistic

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Site	EM8	EM11a	EM14	EM20a	EM19	EM1	EM8	EM11	EM11a	EM14	EM14a	EM14b	EM17a	EM20a	EM19	Mills
<i>Sterna hybrida</i> Whiskered Tern																1 1
COLUMBIDAE <i>Phaps chalcoptera</i> Common Bronzewing	1 1															2 16 1 5
<i>Ocyphaps lophotes</i> Crested Pigeon	X						7 1 5 1			1 1	3 2 3 1		4 7 3 3	1 6 1 1		1 6 1 1
PSITTACIDAE <i>Platycercus zonarius</i> Ring-necked Parrot	1 1 1 1		8 5 2 4 1 1		9 4		7 5			6 4 1 2	8 23 4 4	8* 19 4 4		1 2 1 1	1 6 1 5	
<i>Platycercus varius</i> Mulga Parrot				10 2	2 1							11 1		4 2		
<i>Neophema bourkii</i> Bourke's Parrot														4 2		
<i>Melopsittacus undulatus</i> Budgerigar	128 6	X	X 8 1	9 1	X		42 4		19 2	1 2 1 1	9 1		2 1	8 1	28 6	
<i>Nymphicus hollandicus</i> Cockatiel	1 1	X	X		X		3 31* 1 7		5 1		2 1				2 1	
<i>Cacatua roseicapilla</i> Galah	2 1	1 1	23 3 3 2	X	X		2 1			18 2	6 902 1 6	8 4	2 4 1 2	2 1	4 2	6 25 3 2
CUCULIDAE <i>Cuculus pallidus</i> Pallid Cuckoo	1 1		X		1 1					1 1				1 1		
<i>Chrysococcyx osculans</i> Black-eared Cuckoo				2 2	1 1											
<i>Chrysococcyx basalis</i> Horsfield's Bronze Cuckoo	1 1	3 3			3 3											
PODARGIDAE <i>Podargus strigoides</i> Tawny Frogmouth														R		

Table 10 contd.

## Quadrats

## Opportunistic

Site	EM8	EM11a	EM14	EM20a	EM19	EM1	EM8	EM11	EM11a	EM14	EM14a	EM14b	EM17a	EM20a	EM19	Mills
<b>AEGOTHELIDAE</b>																
<i>Aegotheles cristatus</i> Australian Owlet-nightjar			X				1 1			2* 2*	1 2 1 1	2 2				
<b>CAPRIMULGIDAE</b>																
<i>Eurostopodus argus</i> Spotted Nightjar						2 1										
<b>ALCEDINIDAE</b>																
<i>Halcyon pyrrhopygia</i> Red-backed Kingfisher												1* 1*	6* 6*	1 1		
<b>MEROPIIDAE</b>																
<i>Merops ornatus</i> Rainbow Bee-eater				X	X									2 1	2 1	
<b>HIRUNDINIDAE</b>																
<i>Chaeramoeca leucosterna</i> White-backed Swallow													2 1			
<i>Hirundo neoxena</i> Welcome Swallow																2 2 1 1
<i>Hirundo nigricans</i> Tree Martin																
<b>MOTACILLIDAE</b>																
<i>Anthus novaeseelandiae</i> Richard's Pipit		1 2 1 2						5 2 3 1	11 4 2 3		10 6 7 5		30 6 10 5			
<b>CAMPEPHAGIDAE</b>																
<i>Coracina maxima</i> Ground Cuckoo-shrike		X							3 1		31 9		2 1 1 1			
<i>Coracina novaehollandiae</i> Black-faced Cuckoo-shrike	2 2		1 1	3 2 3 2	2 3 2 3		5 4			3 3	5 4	4* 2*	1 1	5 4	4 3	
<i>Lalage sueurii</i> White-winged Triller	36 14			26 3			3 2				3 1			8 2		
<b>PACHYCEPHALIDAE</b>																
<i>Microeca leucophaea</i> Jacky Winter			1 1		X 4 8 4 5						1 1				3 2 5 1 2 5	

Table 10 contd.

## Quadrats-

## Opportunistic

Site	EM8	EM11a	EM14	EM20a	EM19	EM1	EM8	EM11	EM11a	EM14	EM14a	EM14b	EM17a	EM20a	EM19	Mills
<i>Petroica goodenovii</i> Red-capped Robin	2 2 X		1 1	7 19 6 5 16 5	5 14 3 5 11 2	3 2	1 1				2 3 2 3		1 1	12* 3 7 3	7 6	
<i>Petroica cucullata</i> Hooded Robin	2 1	1 1	X							1 1	1 1			1 1		
<i>Pachycephala rufiventris</i> Rufous Whistler					X X										1 6 1 6	
<i>Colluricincla harmonica</i> Grey Shrike-thrush					1 X 1 1 1										2 1 2 1	
<i>Oreoica gutturalis</i> Crested Bellbird	1 X 1	X	X 8* X 7	3 1 2 1	X 2 3 2 3	2 2	4 1 4 1		1 1 1 1	2 1 3 2 1 3	5 5	1 1		5 1 5 1	2 4 4 2 4 3	
MONARCHIDAE <i>Phipidura leucophrys</i> Willie Wagtail	9 6						3 3				1 1 1 1	2 1	1 1			2 2
ORTHONYCHIDAE <i>Cinlosoma castaneothorax</i> Chestnut-breasted Quail-thrush		1 1		2 1					1 1					1 1		
<i>Pomatostomus superciliosus</i> White-browed Babbler												3 1				
ACANTHIZIDAE <i>Aphelocephala leucopsis</i> Southern Whiteface	2 2			8 22 15 2 8 3			2 1							3 4 1 1	5 1	
<i>Smicromis brevirostris</i> Weebill				6 1 3 1	17 32 25 9 17 10										8 17 7 4 6 3	
<i>Acanthiza apicalis</i> Broad-tailed Thornbill				2 1	1 2 1 2											
<i>Acanthiza uropygialis</i> Chestnut-rumped Thornbill	7 19 15 1 8 6			29 45 26 8 15 8	21 14 20 9 5 7		5 7 2 3				3 1			14 12 5 4	11 22 4 8	
<i>Acanthiza chrysorrhoa</i> Yellow-rumped Thornbill	7 3			1 7 1 3	4 1		2 1									



Table 10 contd.

## Quadrats

## Opportunistic

Site	EM8	EM11a	EM14	EM20a	EM19	EM1	EM8	EM11	EM11a	EM14	EM14a	EM14b	EM17a	EM20a	EM19	MHs
<i>Acanthiza robustirostris</i> Slaty-backed Thornbill				2 4 1 2	3 2											
<i>Pyrholaemus brunneus</i> Redthroat	X						1 1									
MALURIDAE <i>Malurus leucopieris</i> White-winged Fairy-wren	6 7 7 2 2 1	11 8 23 6 5 6					12 4 4 2 2 1	3 1	6 18 3 5		1 1					
SYLVIIDAE <i>Cincloramphus cruralis</i> Brown Songlark		2 2	3 2					7 3	5 4		7 4		8 6	1 1		
DAPHOENOSITTIDAE <i>Daphoenositta chrysoptera</i> Australian Sittella					6 1											
CLIMACTERIDAE <i>Climacteris affinis</i> White-browed Tree-creeper					2 2									2 1		
DICAEIDAE <i>Dicaeum hirundinaceum</i> Mistletoebird	X <sup>3</sup> 3						1 1 1 1									
PARDALOTIDAE <i>Pardalotus striatus</i> Striated Pardalote					2 1							1* 1				
MELIPHAGIDAE <i>Certhionyx variegatus</i> Pied Honeyeater		2 1	2 1													
<i>Meliphaga virescens</i> Singing Honeyeater	2 3 1 3	X X	1 3 X 1 2 X	1 X 1 X	2 2		3 3		1 1 1 1	2 3 2 2 2 2		2 1 1 1	2 2	1 1 1 1		4 2
<i>Meliphaga plumula</i> Yellow-fronted Honeyeater			21 10 13 14 7 8	2 1	3 2					2 10 1 7						
<i>Phylidonyris albifrons</i> White-fronted Honeyeater	2 2	1 1	2 1 1 1		2 X 2 X										1 1 1 1	

Table 10 contd.

Site	Quadrats					Opportunistic										
	EM8	EM11a	EM14	EM20a	EM19	EM1	EM8	EM11	EM11a	EM14	EM14a	EM14b	EM17a	EM20a	EM19	Mills
<i>Manorina flavigula</i> Yellow-throated Miner	9 1 2 5 1 1		2 1	13 1	X X		3 6 2 1			3 5 2 1	11 4 7 1	17* 81 6* 7	1 1	1 27 1 2	3 9 2 2	3 6 1 1
<i>Acanthagenys rufogularis</i> Spiny-checked Honeyeater	1 7 1 4		2 7 1 6	4 1 3 1	2 4 1 2 4 1		1 1			2 2	1 1 1 1	1 1 1 1	2 2	5 4	1 3 1 1 3 1	1 1
<i>Anthochaera carunculata</i> Red Wattlebird				X	X									2 2	1 1	
<i>Epthianura aurifrons</i> Orange Chat		2 X 1							1 2 1 1							
<i>Epthianura tricolor</i> Crimson Chat	65 15		6 89 1 2 20 1	16 4			10 4		18 2	2 32* 24 1 6* 3	18 6 3 1		6 2	13 5		
PLOCEIDAE <i>Poephila guttata</i> Zebra Finch	13 15 2 8	9 2	10 1		X		8 3			2 1					4 2	10 2
63. GRALLINIDAE <i>Grallina cyanoleuca</i> Magpie-lark	X						2 1				12 6	1 6 1 3	2 1			6 1 3 1
ARTAMIDAE <i>Artamus personatus</i> Masked Woodswallow		X	X	30 2	X				NO	SO				42 7	SO	
<i>Artamus superciliosus</i> White-browed Woodswallow				X										2 1		
<i>Artamus cinereus</i> Black-faced Woodswallow	7 X 3	1 1	24 19 X 7 12				3 3 2 2		6 3	8 4 2 2	6 19 4 7		7 4 5 2	1 1		25 1
CRACTICIDAE <i>Cracticus torquatus</i> Grey Butcherbird	X		1 1	X X	1 1 1 1		3 3			1 1	4* 2*	3 4 3 4		5 1 1 5 1 1	2 4 2 4	
<i>Cracticus nigrogularis</i> Pied Butcherbird	6 5	X X	X X X		1 1	1 1	3 1 3 2 1 3			2 2 1 2 2 1	10* 13 10* 10	1 1			3 2	1 1 1 1
<i>Cracticus tibicen</i> Australian Magpie											1 2 1 1		1 8 1 4	1 1		3 2

Table 10 contd.

Site	Quadrats					Opportunistic											Mills
	EM8	EM11a	EM14	EM20a	EM19	EM1	EM8	EM11	EM11a	EM14	EM14a	EM14b	EM17a	EM20a	EM19		
<i>Strepera versicolor</i> Grey Currawong					X						2 1	2 1 2 1			1 1		
PARADISAEIDAE <i>Ptilonorhynchus maculatus</i> Spotted Bowerbird																1 1	
CORVIDAE <i>Corvus orru</i> Australian Crow		X							1 1								
<i>Corvus bennetti</i> Little Crow	6 1	X X 1 X	4 1	X 1	X X X X	X	X 1 1 X		25 4 1 3 2 1		4 3 1 1	4 12 12 1 1 2	19 31 5 9	15 6 4 2	1 11 1 3	4 1 2 1	16 5 2 1 3 1

T tracks  
 NO numerous overhead  
 SO several overhead  
 \* breeding data  
 R feathers only

Tables 9 and 10 indicate that a total of 4681 individuals of 95 species were recorded at GG (those recorded on Goongarrie National Park are excluded) compared to 3966 individuals of 76 species at YM for approximately the same observation time. The mean number of individuals per species at GG was 49.2 compared to 52.1 at YM. Thus, although YM had considerably fewer species than GG, the density per species was about the same.

In addition to the individuals mentioned above, a total of 74 species (Table 9) were recorded during the two surveys (totalling five days) of Goongarrie National Park. These comprised a total of 1443 individuals. Taking into account the number of recording days in the Park as a comparison with data from outside (see above), the mean number of individuals per species in the Park was 58.5:

At both GG and YM the non-passerines are dominated by granivores. The 43 species of non-passerines at GG totalled 1162 individuals of which 787 (68%) consisted of the seven species of psittacids. This can be compared to the YM data where the 32 species of non-passerines totalled 872 individuals; of these the 6 species of psittacids included 687 individuals or 79% of the total.

There are considerable differences between passerine populations and feeding guilds at GG and YM. The 59 passerine species at GG comprised 3563 individuals and a mean of 61.4 per species compared to 2301 individuals of 50 species with a mean of 46.02 at YM. A dominant component recorded at both areas comprised the nectarivores with 32.7% of individuals at GG and 26.2% at YM. The small foliage gleaning insectivore, *Smicrornis brevirostris* constituted 10.0% of all passerines recorded at GG, but only 5.1% at YM. The omnivore, *Corvus bennetti*, was a dominant species at GG comprising 16.9% of all passerines recorded compared to only 8.3% at YM.

There were considerable seasonal differences in numbers of individuals recorded at GG and YM (Tables 9 and 10). At YM *Anthus novaeseelandiae* was not recorded in March and was most abundant in October, *Coracina novaehollandiae* was mainly present in October, *Lalage sueurii* and *Cincloramphus cruralis* were only recorded in October, *Pardalotus striatus* and *Anthochaera carunculata* were only recorded in July when low numbers reached this area as nomads from further south, *Epthianura tricolor*, an eremaeon nomad, was numerous in October, and *Grallina cyanoleuca* was more abundant in July.

At GG, *Coracina novaehollandiae* was absent in July, *Lalage sueurii*, *Cincloramphus mathewsii* and *C. cruralis* were only recorded in October, *Pardalotus striatus* was not recorded in March, *Certhionyx niger* and *C. variegatus* were not recorded in July, *Meliphaga ornata* was common in July, but not recorded in March or October, *M. plumula* was only recorded in October, *Phylidonyris albifrons* was more abundant in October, and *Epthianura tricolor*, *Artamus personatus* and *A. superciliosus* were present in October.

The surveys of the GG and YM recorded breeding data for 48 species of birds; these data are listed in Appendix IV. Most breeding records were obtained in October 1980 following good rains in May, June and July (see ombrothermic data, Figure 2).

## Mammals

Twenty-five species of mammal from 11 families were recorded from the survey areas at Goongarrie and Yundamindra (Table 11). Nineteen species (76%) were common to both areas.

Little previous information had been recorded on the mammals of this region. Records of the Western Australian Museum (Kitchener and Vicker 1981) indicated that only the Euro, *Macropus robustus* and the bats *Chalinolobus gouldii*, *Nyctophilus geoffroyi* and *Eptesicus pumilus* had been collected in the degree square encompassing Goongarrie and only the goat *Capra hircus* and Euro had been documented in the degree square encompassing Yundamindra. The bat *E. pumilus* was not recorded by us at either study area although its distribution suggests it should occur there.

The record of *Macropus filiginosus* from the edge of Lake Carey at Yundamindra represents one of the most inland occurrences of this species. It was recorded as individuals or in small groups during each of the first two trips (March 1979, October 1980). The two *Sminthopsis* species, *S. crassicaudata* and *S. dolichura*, were sympatric in three trapping sites (Table 11). The small *Ningau ridei* was restricted to sandy soils with *Triodia*. It was difficult to determine the species of *Notomys* from Goongarrie. Both *N. alexis* and *N. mitchellii* occur together with some specimens having intermediate characteristics; this population is in need of further study as it lies on, and adjacent to, an isolated sanddune with some distinctive south-western floral elements. Two species of *Pseudomys* occur at Goongarrie but they occupy different substrates; *P. hermannsburgensis* occurs on sandy soils higher up the landform, while *P. bolami* occupies the loams on the lower elements. There are marked vegetation differences between the habitats of these two remarkably similar species (Kitchener *et al.* 1984).

The Goongarrie fauna sites EM21, EM9, EM21a, EM9a and EM15 are all subject to grazing by sheep as they occur in the Jeedamyra pastoral lease, while all sites at Yundamindra are on that station's grazing lease. Additionally, large numbers of goats, with some herds in excess of 40 individuals, were recorded on the Yundamindra sites, placing heavy browsing pressure on the vegetation of this region. Rabbits were uncommon on all trips and were generally only seen adjacent to rock outcrops. Camel tracks were observed in October 1980 on the edge of Lake Goongarrie near EM22 and fresh scratchings and tracks of an echidna were recorded at EM15.



Table 11 contd.

Landform Code: Vegetation Code (EM)	Goongarrie											Yundamindra							Trip Totals M O J		
	D	G	L	L	S	S	U	V	V	V	NP	L	L	U	U	U	V	V			
	3	5a	9	9a	13	13	15	22	21	21a	NP	8	11	14	14a	17a	20a	19			
<i>Nycticeius balstoni</i>		1													6				6		
<i>Nyctophilus geoffroyi</i>		3													4	9			4	1	8
<b>MURIDAE</b>																					
<i>Mus musculus</i>	2		2			4						3	1	6			1	3	3	1	2
<i>Notomys alexis</i>	9					2		1	1	2		5	8						1		
<i>N. mitchellii</i>	3								1			1		3							
<i>Pseudomys</i>																					
<i>hermannsburgensis</i>	1					2						2		1			2	7	7	2	3
<i>P. bolomai</i>										3		3									
<b>CANIDAE</b>																					
<i>Canis familiaris</i>							T		T					T					T		
<i>Vulpes vulpes</i>	T	S <sub>1</sub>					T		T	S <sub>1</sub>		S <sub>1</sub>	T				S <sub>1</sub>	T		S <sub>1</sub>	T
<b>FELIDAE</b>																					
<i>Felis catus</i>	T													T							
<b>BOVIDAE</b>																					
<i>Capra hircus</i>		C										C			S <sub>3</sub>	S <sub>3</sub>		S <sub>3</sub>	S <sub>3</sub>	S <sub>3</sub>	S <sub>3</sub>
<i>Ovis aries</i>			S <sub>3</sub>	S <sub>3</sub>					S <sub>3</sub>			S <sub>3</sub>	S <sub>3</sub>	S <sub>3</sub>		T		S <sub>3</sub>	S <sub>3</sub>	S <sub>3</sub>	S <sub>3</sub>
<b>CAMELIDAE</b>																					
<i>Camelus dromedarius</i>								T*						T							
<b>LEPORIDAE</b>																					
<i>Oryctolagus cuniculus</i>	T	S <sub>3</sub>	S <sub>1</sub>							S <sub>2</sub>		S <sub>1</sub>	S <sub>2</sub>	S <sub>2</sub>			S <sub>2</sub>		1	S <sub>2</sub>	1