The Effects of a Power-line Clearing on Birds of Dry Sclerophyll Forest at Black Mountain Reserve, Australian Capital Territory

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Census counts were made in dry sclerophyll forest, and a clearing along a power-line, at Black Mountain Reserve, A.C.T., on 156 days between March 1974 and April 1975. There were seasonal changes in both species and numbers in each site. There were more species and individual birds in the clearing than in the forest. Most of the forest birds used the clearing and five additional species colonised it. Colonists were mainly small passerines inhabiting dense undergrowth. Some species found in the clearing would not have been recorded if there had not been adjacent forest. The enrichment would almost certainly not apply to large tracts of cleared dry sclerophyll forest, nor would it have occurred in this case but for the management policies of the Reserve authorities.

Introduction

Routing of public utilities, such as sewerage and power lines, through bushland is a subject of public controversy, particularly where lack of co-ordination results in successive clearing by different agencies. Much of the controversy engenders argument based on emotion or vested interests, with little biological evidence being presented to either support or deny the point of view.

From March 1974 to April 1975 I conducted a census in Black Mountain Reserve, Australian Capital Territory, to gauge the effects of a public utility clearing on bird numbers and species composition of the avifauna. Black Mountain, although dedicated as a nature reserve, has at least 35 kilometres of utility-line clearings, made by six agencies, criss-crossing an area of *ca.* three square kilometres.

Study Area

Requirements of accessibility, restricted human activity, and location within a reasonably uniform and undisturbed "natural" area led to selection of a study area in the north west corner of the reserve (map squares 8995-9095 on the National 1: 50 000 grid). Here a power-line and sewerage easement clearing bisects a stand of dry sclerophyll forest. The area is a gently undulating plateau *ca.* 640-660 metres above sea level. Soils are shallow colluvial Ordovician sandstones with small outcroppings of bedrock on the eastern portion (Elliott and Douglas 1972). Rainfall is probably close to the Canberra mean of 550 mm annually. Except after rain there is little or no surface water. Temperatures are possibly less extreme than the Canberra mean.

Map (Fig. 1) shows the area and its permanent artificial features. The two major roads,

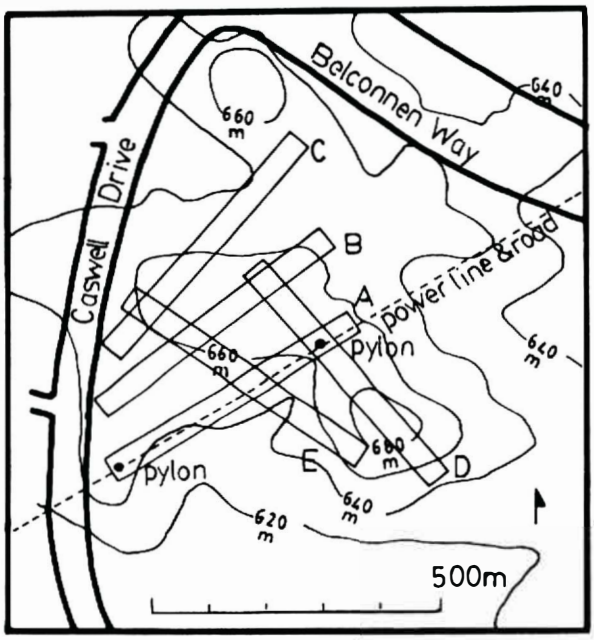

Figure 1. *Study area at Black Mountain, showing transects.*

despite constant traffic, appear to have no adverse effect. The reserve is fenced off and there is little evidence of recent degradation or weed invasion. The clearing, made in 1970, trends north-east/south-west and is 50 metres wide. Included in the clearing are a six-metres wide gravel access road, a buried sewerage line, an overgrown road used in the initial clearing, a telephone line on timber poles 100 metres apart and the power-line itself, mounted on towers 30 metres high and about 500 metres apart. The clearing has been ripped and left to regenerate. Official policy is to leave regrowth except for *Eucalyptus* spp. which will be coppiced by hand (Elliott and Douglas 1972). There are two fire trails in the area which are narrow and are overshadowed by the forest canopy.

European settlement has greatly altered the area. Shumack (1967) describes the area as a hunting ground for wallabies and a source of firewood in the late 19th Century. Old fence-posts indicate grazing but this appears to have been rough grazing, complete clearing having been carried out south-west of the area, where a savanna woodland now exists.

Vegetation is dry sclerophyll forest of the *Eucalyptus macrorhyncha/E. rossii* alliance as

Figure 2. *Typical dry sclelrophyll forest in study area.*

Figure 3. *Dense regrowth in power-line clearing.*

Figure 4. *Sparse forest cover with heathy understory in south-east of study area.*

Figure 5. *Power-line clearing looking South from centre of transect A.*

described by Pryor (1954). Pook and Moore (1966) show the smooth-barked *E. rossii* as dominant on north-facing slopes and the stringybark *E. macrorhyncha* dominant on the south. The *E. rossii* dominance covers most of the study area. Elliott and Douglas (1972) show the northern half of the study area as having larger sized trees and the southern half with smaller trees, for which shallowness of soils may be the cause. Figures 2-5 show details of vegetation in study area.

Table 1 summarizes the vegetation cover in the power-line clearing and forest and was derived from samples of five transects, one in the clearing and four in the forest, in which I conducted the census. I used the point-quarter method (Morista 1954) for estimating tree cover. For the shrub layer I used 20 x 100 m^2 quadrats in each transect and for the ground layer 30 x 1 m^2 quadrats in each. Nomenclature is from Gray and McKee (1966).

The shrub-layer is almost non-existent in the forest, and consisted mainly of scattered clumps of *Daviesia mimosoides, Acacia diffusa, A. buxifolia* and *Eucalyptus* saplings. These species also occur in the clearing, the *Eucalyptus* saplings and suckers being extremely dense. The ground-layer in the forest is patchy except in Transect E where shallow rocky soil inhibits tree-growth and permits of a dense heathy vegetation. Predominant plants in the ground-layer are legumes (e.g. *Pultenaea procumbens, Dillwynia retorta, Hardenbergia violacea*), Epacrids (e.g. *Leucopogon* spp., *Brachyloma daphnoides*) and grasses (e.g. *Poa* spp., *Danthonia* sp.). The ground layer is profuse in the clearing and *Grevillea alpina* has flourished, to the benefit of nectarivorous birds. There is also much debris, such as fallen logs, in the clearing.

Grey Kangaroos *Macropus giganteus* were frequently seen, but no other mammals, including feral cats and dogs were encountered. Few reptiles were seen except the smaller skinks.

Methods

Although widely-used elsewhere (e.g. Hickey 1943, Kendeigh 1944), census counts have rarely been used as a study technique in Australian ornithology. Most overseas examples have been of breeding birds in Holarctic temperate areas, where climate dictates synchronous breeding by a predominately migratory bird community. Thus most accounts are of populations based on territory-holding pairs. The peculiar-

TABLE 1

Percentage cover of tree, shrub and ground layers of vegetation, for five transects on Black Mountain Reserve, showing dominant species and their percentage of dominance.

Transect	Tree layer (4-15 m high)	Shrub layer (2-4 m high)	Ground layer (0-2 m high)
A (power-line clearing)	Nil	15% cover	69% cover
		Eucalyptus 52%	Legumes 43%
		Daviesia 36%	Grasses 36%
B (forest)	40% cover	3% cover	10% cover
	E. rossii 66%	*Daviesia* 82%	Legumes 17%
	E. macrorhyncha 30%		Epacrids 15%
			Grasses 48%
C (forest)	50% cover	4% cover	27% cover
	E. rossii 59%	*Daviesia* 79%	Legumes 56%
	E. macrorhyncha 38%	*Acacia* 21%	Epacrids 13%
			Grasses 27%
D (forest)	40% cover	2% cover	29% cover
	E. rossii 58%	*Eucalyptus* 29%	Legumes 25%
	E. macrorhyncha 42%	*Daviesia* 63%	Epacrids 22%
			Grasses 28%
E (forest)	27% cover	3% cover	47% cover
	E. rossii 53%	*Daviesia* 72%	Legumes 23%
	E. macrorhyncha 44%	*Acacia* 21%	Epacrids 8%
			Grasses 42%

ities of Australian breeding seasons, and the cooperative breeding so notable a feature of the avifauna (Rowley 1975) make year-round censusing desirable in the Australian environment.

Emlen (1971, 1977) considers that for estimating bird populations in all seasons the transect count is the best all-round method. This entails counting all birds seen in a narrow strip through which the observer passes. Yapp (1956) and Royama (1966) give the statistical basis for the method. Emlen gives several methods of transect-counts and I employed his "count in a narrow strip" method in which all birds seen in a 50 metre wide marked strip were counted. Emlen considered that such transects may be used to estimate absolute densities despite drawbacks such as density of vegetation, variations in observer skill and weather conditions. Enemar and Sjostrand (1967) however consider them more suitable for estimating relative population densities. In this study a comparison of relative density between the two habitats was the aim but I did attempt an estimate of absolute density.

One transect 500 x 50 m was selected on the power-line clearing which is 50 m wide. Unfortunately a second suitable sample was not available. The transect in the clearing was compared against four similarly-sized transects in the forest (through which the clearing had been cut). Transects are shown in Figure 1. All transects were marked into 50 x 50 m blocks, which were numbered on each corner. White cloth strips were hung along the boundaries. I attempted to count the clearing and two of the forest transects at least twice each week. All birds seen were recorded by block and transect number. No counts were taken in rain or high wind, all were between 07:00-09:00 hours, each transect was completed in 30 minutes and only birds inside the boundaries and "using" the transect (i.e. not just passing over it) were counted. Total counts were 156 clearing and 312 forest transects.

The major difficulties were in avoiding counting of the same birds twice, and detecting birds in dense undergrowth. I found that, when disturbed, birds tended to fly out of the transect and I considered that few re-entered in time to be counted again. I certainly missed some birds in dense vegetation. As such vegetation was confined to the clearing, my results shown later in the paper, i.e. that the clearing harbours more birds than the forest, are further supported.

Few comparable data on bird densities in sclerophyll forests are available. Disney and Stokes (1976) estimated, in dry sclerophyll forest near Bathurst, N.S.W., an average population of *ca.* 49 birds per ten hectares. They also estimated the population of breeding birds at *ca.* 93 birds per ten hectares, after an intensive search for nests in the breeding season. Compared to these figures my estimates, shown later, appear low. However the composition of tree species in Disney and Stokes' study area (e.g. *Eucalyptus viminalis, E. dives*) suggests a more luxuriant vegetation than at Black Mountain. Recher *et al.* (1971) estimated an average population of 158 birds per ten hectares in dry sclerophyll forest in Tasmania. Their study was confined to the breeding season in an area of denser undergrowth and higher rainfall than at Black Mountain. Lamm and Calaby (1950) in a two-year study along the Murrumbidgee River near Canberra estimated a bird population of *ca.* 250-290 birds per ten hectares. However, their study area was a thin strip 10 km along the river, heavily vegetated and bordering both the waterway and open grassland.

Results

The bird species observed in the study area are shown in Appendix 1. The avifaunal list is not necessarily representative of Black Mountain Reserve as a whole. My area lacked deep south-facing gullies, savanna woodland, and the artificial growth present at Canberra Botanic Gardens (Anon 1970), all habitats elsewhere at Black Mountain that harbour species not recorded by me. Marchant (1973), working in the forest edge and woodland *ca.* 1 500 m to the south, recorded some breeding species not seen in my area.

The community comprises breeding residents, summer breeding migrants, wintering non-breeding migrants, passage migrants and other species either vagrant or seen too rarely for their status to be determined. Individuals within the above categories may not conform to the pattern e.g. a very few Grey Fantails *Rhipidura fuliginosa* winter and the odd pair of Gang-gang Cockatoos *Callocephalon fimbriatum* remain to breed. Because they almost certainly include different populations that are resident, wintering migrants

and passage migrants, the stripe-crowned pardalotes are considered as a separate group. All three local subspecies were recorded, *Pardalotus striatus striatus*, *P.s. substriatus* and *P.s. ornatus*.

Numbers of individuals

Appendix 1 gives the species recorded for the clearing and the forest, by months, in average numbers of birds per 10 hectares. The list is broken up into breeding residents, breeding migrants, stripe-crowned pardalotes, wintering migrants, passage migrants and "others" (vagrants or status unknown). In some cases species seen in the area but not actually within a transect are shown (marked 'P'). Some of the "others" are undoubtedly resident but the density of species with large home ranges, especially raptors, cannot be accurately counted by the methods used by me in this study. Also certain small species, such as White-browed Scrubwrens *Sericornis frontalis* and Speckled Warblers *S. sagittatus*, were possibly often overlooked.

The total numbers present, by months, are summarised in Table 2.

There are, except for April 1974, consistently more birds in the clearing than the forest (Wilcoxon Matched Pair—Signed-ranks test $p < 0.05$, difference significant). On average the clearing harbours a density of 20% more birds than the forest and in the main breeding period (October/November), almost twice as many. The high density in the clearing during the breeding season may be because the absence of understorey in the forest forces small nesting passerines to concentrate in the dense shrubbery of the clearing. For example, seven nests of the Grey Fantail were found in the clearing but none in the forest.

As shown in Appendix 1 the clearing harboured greater numbers of breeding residents, breeding migrants, wintering migrants and vagrants than did the forest. Stripe-crowned pardalotes were more numerous in the forest where at times they comprised a large proportion of birds present (40% in November 1974). As the pardalotes forage mainly on eucalyptus foliage their concentration in the forest is to be expected. Passage migrants, mainly Yellow-faced Honeyeaters *Lichenostomus chrysops*, were also more numerous in the forest, possibly for the same reason as the pardalotes.

Average biomass per 10 hectares, by seasons, is given in Table 3. Estimated weights for species were drawn from Hall (1974) and my own banding records. In a very few cases species' weights were estimates only. Table 3 shows that as well as supporting higher numbers of birds than the forest, the clearing usually supports a larger biomass.

Species diversity

The clearing harboured more species than the forest. Of the 69 species recorded 41 were shared

TABLE 2

Average number of birds per 10 hectares, by months between March 1974 and April 1975, for the clearing and the forest.

Month	Clearing	Forest
Mar.	47.8	34.7
April	56.9	63.0
May	43.9	32.9
June	63.4	37.8
July	45.9	39.8
Aug.	47.3	31.0
Sep.	57.3	55.0
Oct.	87.6	58.6
Nov.	83.2	49.0
Dec.	66.5	51.0
Jan.	87.0	55.0
Feb.	45.8	45.2
Mar.	55.3	54.2
April	58.8	55.2

(Means & S. D. = clearing 60.5 ± 15.4, forest 47.3 ± 10.4)

TABLE 3

Average biomass per 10 ha., and average individual weight of birds, for the clearing and the forest, by seasons.

	Average biomass (g per 10 ha.)	Average weight per individual
	Clearing	
Autumn 1974	3 886	77.7
Winter 1974	4 400	79.7
Spring 1974	2 952	39.5
Summer 1974/75	2 952	45.7
Autumn 1975	3 253	57.3
	Forest	
Autumn 1974	2 634	61.2
Winter 1974	2 454	67.1
Spring 1974	2 092	39.6
Summer 1974/75	3 018	61.6
Autumn 1975	3 800	69.8

by both habitats, 18 were confined to the clearing and 10 were confined to the forest. Most of the species confined to one habitat were vagrants whose presence on the day of count may have been by chance and not by preference for that habitat. I therefore separated "common" from "rare" species, using the definition of "common" according to Driscoll (1977) i.e. occurring more than 0.5% of all sightings of all species in both areas combined. Table 4 shows the numbers of common and rare species, by seasons, for each area.

The clearing not only shows more species but has a generally greater number of common species, indicating a richer diversity than the forest. Only in Autumn 1975 does the forest show greater diversity.

Table 5 gives the species recorded as common, in any one month, by habitats. In most cases (25 out of 37) common species utilise both habitats. Three species recorded in both habitats favour the forest and another two are confined to it. Two species recorded in both habitats favour the clearing and another five are confined to it. I consider that these last seven species probably would not have occurred in the area but for the presence of the clearing. The clearing has therefore possibly reduced the available habitat of five species but has introduced five to seven species into the area.

Seasonal change

The estimated numbers of birds (per 10 h.a.) of breeding residents, breeding migrants, wintering migrants, stripe-crowned pardalotes, passage migrants and "others" each month are shown in Figure 6. The trend is for numbers to reach their lowest in July-August, followed by a rise in September reaching a peak in

TABLE 4

Numbers of common and rare species recorded, by seasons, in the clearing and forest habitats.

	Common	Rare	Total
Autumn 1974			
Clearing	19	26	45
Forest	16	23	39
Winter 1974			
Clearing	17	9	26
Forest	12	13	25
Spring 1974			
Clearing	21	17	38
Forest	17	16	33
Summer 1974/75			
Clearing	15	13	28
Forest	11	19	30
Autumn 1975			
Clearing	12	21	33
Forest	13	21	34
Total			
Clearing	32	29	59
Forest	30	19	49

TABLE 5

Species recorded as "Common", in any one month, in the clearing and forest habitats.

	Clearing	Forest		Clearing	Forest
Crimson Rosella	Common	Common	Spotted Pardalote	Common	Common
Eastern Rosella	Common	Common	Striated Pardalote	Common	Common
Pallid Cuckoo	Common	Common	White-winged Chough	Common	Common
Laughing Kookaburra	Common	Common	Australian Magpie	Common	Common
Sacred Kingfisher	Common	Common	Pied Currawong	Common	Common
Black-faced Cuckooshrike	Common	Common	Australian Raven	Common	Common
Flame Robin	Common	Common	Shining Bronze-Cuckoo	Rare	Common
Scarlet Robin	Common	Common	White-throated Treecreeper	Rare	Common
Golden Whistler	Common	Common	Noisy Friarbird	Rare	Common
Rufous Whistler	Common	Common	Fantail Cuckoo	—	Common
Grey Shrike-thrush	Common	Common	Leaden Flycatcher	—	Common
Grey Fantail	Common	Common	Brown Thornbill	Common	Rare
Buff-rumped Thornbill	Common	Common	Silvereye	Common	Rare
Striated Thornbill	Common	Common	Stubble Quail	Common	—
Varied Sittella	Common	Common	Superb Fairy-wren	Common	—
Yellow-faced Honeyeater	Common	Common	Weebill	Common	—
White-eared Honeyeater	Common	Common	Red-browed Firetail	Common	—
Brown-headed Honeyeater	Common	Common	Double-barred Finch	Common	—
White-naped Honeyeater	Common	Common			

October-November. The increase in spring appears to result from arrival of migrants and build-up of numbers of young birds. Numbers then decline in February-March followed by a minor peak caused by passage migration.

Figure 6 shows seasonal change, for both habitats, for all groups except that there is a remarkable lack of increase of the numbers of breeding residents in the forest. A possible explanation is that small passerines favouring nest-sites in undergrowth may move into the dense shrubbery of the clearing during the breeding season.

Migratory patterns clearly show up in Figure 6. Breeding migrants are virtually gone by April and do not arrive in force until October. A very few Grey Fantails and Fan-tailed Cuckoos *Cuculus pyrrhophanus* remain throughout the winter. Wintering migrants arrive in April and are mostly gone by the end of August, some overlap occurring with summer migrants. Passage migrants, mainly Yellow-faced Honeyeaters show a northwards movement in April and a return movement in September-October. Stripe-crowned pardalotes also passed through in great numbers but their status was difficult to ascertain. The three subspecies are hard to identify and there also may be different populations (i.e. resident and migrant) among the locally breeding subspecies *P.s. ornatus*.

In general seasonal change accords with that shown by Lamm and Calaby (1970).

Conclusion

The study showed that construction of the power-line clearing has resulted in an increase in numbers of individual birds on the clearing-site formerly covered by dry sclerophyll forest. The clearing has not eliminated any species occurring in the area. Most of the original avifauna is able to forage in the clearing. The few species that do not are thinly-distributed ones for which the habitat lost to the clearing may not be a significant proportion of their home ranges. As a result of the clearing "new" species have colonised and others, such as magpies and ravens have probably increased in numbers. The power-line seems to have benefited the avifauna of Black Mountain Reserve.

Aside from the many vagrants recorded in the clearing, the species that have colonised are

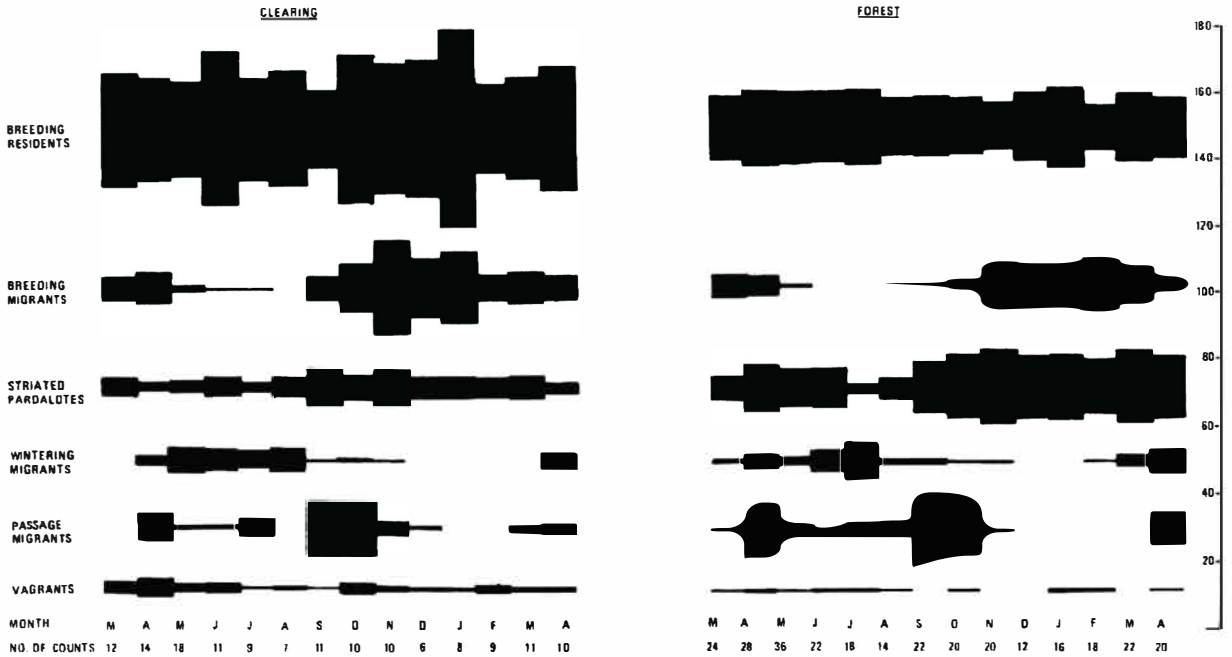

Figure 6. *Average population density (individuals per 10 hectares).*

those chiefly found in dense undergrowth, particularly along streams. Two of the colonising species, the Superb Fairy-wren *Malurus cyaneus* and Red-browed Firetail *Emblema temporalis*, were the two most abundant species found by Lamm and Calaby (1950) along the Murrumbidgee River.

It would be unwise to extrapolate my conclusions to large cleared tracts of dry sclerophyll forest. Many species recorded in the clearing were only there because of the presence of adjacent forest. Of the 25 species common in both clearing and forest 12 are breeding residents that require either tall trees or hollow limbs for nesting and would accordingly disappear from a large cleared tract. The edge-effect present in the power-line clearing, would be far less significant in an extensive cleared area. The power-line pylons also attract many large birds such as ravens.

The main reason for the diverse and abundant avifauna in the clearing is the dense undergrowth. Eventually the area would return to the original forest if manual clearing of trees above three metres was not maintained. Thus the present management helps to maintain the increased diversity of birds. Elsewhere many public utilities could not afford such labour-intensive control measures.

Nevertheless, in this case, the construction of the power-line has both quantitatively and qualitatively enriched the avifauna of the area. Any opponents against construction of some similar project could be ill-advised if they quoted destruction of avian wildlife as their major argument.

Acknowledgements

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APPENDIX 1

Average bird population density, by month, per 10 ha., in power-line clearing and dry sclerophyll forest, Black Mountain A.C.T.

Part 1 — Power-line clearing transect (2 169 sightings)

Breeding residents	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Turnix varia Painted Button-quail	1.3	0.3									1.0	0.4	0.4	
Phaps chalcoptera Common Bronzewing	0.3												1.5	0.4
Platycercus elegans Crimson Rosella	1.7	2.8	5.8	5.8	3.6	4.0	5.8	2.4		1.3	2.0	1.3		0.8
Platycercus eximius Eastern Rosella	2.0	P	0.4	0.4	1.3				0.8	0.7	2.0			0.4
Dacelo novaeguineae Laughing Kookaburra	P	0.3	P	0.4	P		P	0.4	0.8	2.0	P		0.7	1.2
Petroica multicolor Scarlet Robin	0.3	0.3	0.7	2.9	1.3	1.7	0.4		0.4					2.0
Malurus cyaneus Superb Fairy-wren	3.7	0.6	2.7	8.4	4.4	2.3	2.2	11.2	18.8	16.0	27.5	9.3	4.7	6.0
Sericornis sagittatus Speckled Warbler				1.5	P			0.4			1.0			0.4
Acanthiza pusilla Brown Thornbill	3.3	4.9	4.9	9.8	6.0	7.4	4.4	14.4	11.6	9.3	9.0	9.3	9.5	8.0
Acanthiza reguloides Buff-rumped Thornbill	4.0	10.0	4.7	5.8	6.2	1.1	4.0	6.8	4.8	6.7	11.5	0.4	5.1	4.8
Acanthiza lineata Striated Thornbill	1.6	1.1	0.7			1.7	0.7	1.2						2.0
Daphoenositta chrysoptera Varied Sittella			1.1			2.9						1.8	0.7	1.2
Climacteris leucophaea White-throated Treecreeper									0.4		1.0		0.7	1.2
Melithreptes brevirostris Brown-headed Honeyeater		P	0.9	3.6			0.4		0.4		1.0			1.2
Pardalotus punctatus Spotted Pardalote		3.4	3.1	4.0	1.3	1.1	2.2	1.6					1.1	1.2
Emblema temporalis Red-browed Firetail	0.7	0.9		0.7	2.2									2.0
Poephila bichenovii Double-barred Finch	0.7		1.1									6.7	6.2	0.8
Corcorax melanorhamphos White-winged Chough	9.0	1.1	P							4.0				4.0
Gymnorhina tibicen Australian Magpie	3.7	4.6	0.9	0.7	3.5	8.0		4.0				1.8	4.4	2.4
Strepera versicolor Grey Currawong	1.0	0.3	P								P			
Corvus coronoides Australian Raven	0.3	0.6	2.0	2.9	3.1	3.4	1.8	1.6	0.8	1.3	3.0	1.3	0.7	P
TOTAL	33.6	31.2	29.0	46.9	32.9	33.6	21.9	44.0	38.8	41.3	59.0	32.3	35.7	40.0
Breeding migrants														
Cuculus pallidus Pallid Cuckoo	0.3								0.4	1.3	0.5	0.4		
Cuculus variolosus Brush Cuckoo														
Cuculus pyrrhophanus Fan-tailed Cuckoo														
Chrysococcyx basalis Horsefield's Bronze-Cuckoo									0.4					
Chrysococcyx lucidus Shining Bronze-Cuckoo													0.7	
Halcyon sanota Sacred Kingfisher								1.2	1.6	0.7				
Eurystomus orientalis Dollarbird								0.4	0.8	1.3				
Coracina novaehollandiae Black-faced Cuckoo-shrike	1.3	0.3	0.2				1.1	1.2	1.2	1.3	1.5	0.4	2.2	0.8
Pachycephala rufiventris Rufous Whistler	1.3	1.7					0.3	2.4	5.2	4.0	4.5	0.9	2.5	
Myiagra rubecula Leaden Flycatcher														
Rhipidura fuliginosa Grey Fantail	3.0	6.0	0.9	0.3	0.4	1.1	5.8	10.8	18.4	8.0	14.5	4.4	4.0	6.8
Gerygone olivacea White-throated Gerygone								0.4						
Philemon corniculatus Noisy Friarbird										0.7	0.5	0.4		
Oriolus sagittatus Olive-backed Oriole	0.3	0.8												
Artamus cyanopterus Dusky Woodswallow														
Total	6.2	8.8	1.1	0.3	0.4	1.1	7.2	16.4	28.0	17.3	21.5	6.5	9.4	7.6

Part 2 — Dry sclerophyll forest transects (3 390 sightings)

Breeding residents	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Turnix varia	0.3									0.7		0.7	0.6	
Phaps chalcoptera	0.2	0.2							0.2		1.2	0.2		0.4
Platycercus elegans	4.2	3.7	5.3	3.5	6.0	3.9	5.6	7.6	4.2	1.3	5.8	2.7	4.3	4.6
Platycercus eximius	0.8	0.1	0.1	0.6		0.6	1.5	1.2	0.6	1.3	0.8	0.2	1.1	1.0
Dacelo novaeguineae	0.8	1.3	0.7	0.2	0.7	0.3	0.6	0.6	0.4	2.3		0.5		0.2
Petroica multicolor	1.0	1.6	0.5	1.1	0.7	0.6	0.3	0.2	1.4	1.4	0.3	0.4	1.3	0.6
Malurus cyaneus														
Sericornis sagittatus			P		0.4	0.3				P				
Acanthiza pusilla	0.7	0.2	0.1	0.6					0.4			0.5	0.2	
Acanthiza reguloides	1.3	1.0	1.6	2.3	1.1	1.5	0.6	1.2	1.6		2.5	0.7	1.5	1.2
Acanthiza lineata	0.5	1.8	1.0	0.8	1.1	1.4	0.3	0.2			0.8	0.4	1.7	2.2
Daphoenositta chrysoptera	0.5	0.6	0.8	0.9	2.4	0.9	0.9	0.2	0.8	2.7	0.5	0.5	0.7	0.6
Climacteris leucophaea	1.6	1.3	4.0	3.7	3.8	2.3	3.3	2.8	2.8	5.0	6.3	4.9	2.6	3.2
Melithreptus brevirostris			0.1	1.8	2.2									
Pardalotus punctatus	2.0	9.2	4.7	4.2	2.9	4.8	2.8	2.2	0.4	0.4		0.7		0.8
Emblema temporalis														
Poephila bichenovii														
Corcorax melanorhamphos	3.5	P	0.7				0.6			3.7	4.8	1.0	4.2	1.8
Cymorhina tibicen	0.7	0.7	0.2		0.2								0.7	0.6
Strepera versicolor	0.5	1.0	0.2		0.2			0.2				0.2		0.4
Corvus coronoides	0.3		0.3				0.6		0.2	1.0	0.8		0.3	
Total =	18.9	22.7	20.3	19.7	21.7	16.6	17.1	16.4	13.0	19.8	23.8	13.6	19.2	17.6
Breeding migrants														
Cuculus pallidus	0.2							0.4	0.8	1.3	1.0	0.4	1.1	
Cuculus variolosus								0.2	0.4					
Cuculus pyrrhophanus	0.5					0.3	0.5		0.8			0.9		
Chrysococcyx basalis											0.5	0.2	0.2	0.2
Chrysococcyx lucidus	0.5	0.1						0.6	0.4	0.3		0.2	0.7	
Halcyon sancta								0.2	1.2	1.7	1.3	0.9		
Eurystomus orientalis														
Coracina novaehollandiae	1.4	0.7					0.5	1.2	2.8	1.7	1.5	2.0	2.2	0.4
Pachycephala rufiventris	1.0	1.7						3.8	5.2	2.7	2.8	2.4	2.0	1.2
Rhipidura albiscapa	0.8	0.3						0.2	0.4	0.3	1.0	0.7	0.2	
Rhipidura fuliginosa	1.2	3.7	0.7					0.4	1.0	3.3	2.4	6.0	2.7	1.8
Gerygone olivacea														
Philemon corniculatus	0.7	0.3						0.2	0.6	1.0	1.5	2.0	1.5	0.4
Oriolus sagittatus	P								0.2			0.2	0.4	
Artamus cyanopterus	0.5	P											P	
Total	6.8	6.8	0.7			0.3	1.0	7.2	13.8	12.3	12.0	15.9	11.0	4.0

Part 1 — Power-line clearing.

	Mar.	Apr.	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Stripe-crowned pardalotes														
Pardalotus striatus. Striated Pardalote (includes *P.s. ornatus, P.s. striatus* and *P.s. substriatus*)	4.3	2.3	2.9	5.1	3.1	5.1	10.9	7.6	10.4	6.0	5.5	5.8	7.3	3.6
Wintering migrants														
Calocephalon fimbriatum Gang-gang Cockatoo														
Petroica phoenicea Flame Robin			0.7					0.8	0.4					
Pachycephala pectoralis Golden Whistler		2.0	2.7	1.8	1.4	0.3							0.4	0.8
Colluricincla harmonica Grey Shrike-thrush		0.3	0.8	0.7	1.3		0.3							0.4
Anthochaera carunculata Red Wattlebird		P	0.4											P
Lichenostomus leucotis White-eared Honeyeater		P	1.3	3.6	1.3	1.7	0.3							0.8
Strepera graculina Pied Currawong			1.7	1.1	0.3	4.4		0.4						2.4
Total *		2.3	7.6	7.2	4.3	6.4	0.6	1.2	0.4				0.4	4.4
Passage migrants														
Lichenostomus chrysops Yellow-faced Honeyeater		6.0	1.1		0.9		9.5	8.8	0.4					2.0
Melithreptes lunatus White-naped Honeyeater		0.4	P	1.5	1.6		6.6	4.0						
Zosterops lateralis Silvereye		1.4						2.8	3.6	0.7			1.5	
Total *		7.8	1.1	1.5	4.5		16.1	15.6	4.0	0.7			1.5	2.0
Vagrants or Unknown status														
Accipiter fasciatus Brown Goshawk														
Hieraaetus morphnoides Little Eagle								0.4						
Falco longipennis Australian Hobby	0.3	0.5						0.4						
Coturnix novaezelandiae Stubble Quail	1.3			0.7					0.8			0.9	0.3	
Eolophus roseicapilla Galah		0.3						1.6						
Cacatua galerita Sulphur-crested Cockatoo														
Ninox novaeseelandiae Southern Boobook														
Petroica rosea. Rose Robin			0.2											
Rhipidura rufifrons Rufous Fantail								0.4						
Rhipidura leucophrys Willie Wagtail														
Cinclorhamphus mathewsi Rufous Songlark										0.7				
Sericornis frontalis White-browed Scrubwren											1.0			0.8
Smicrornis brevirostris Weebill	0.7	2.0	0.2	0.3										
Gerygone fusca Western Gerygone		0.3												
Acanthiza chrysorrhoa Yellow-rumped Thornbill	0.7		0.4											
Acanthiza nana Yellow Thornbill														
Lichenostomus virescens Singing Honeyeater												0.3		
Lichenostomus penicillatus White-plumed Honeyeater			0.2		0.3									
Acanthorhynchus tenuirostris. Eastern Spinebill		0.3	0.2											
Sturnus vulgaris Common Starling		0.8	0.6											
Grallina cyanoleuca Australian Magpie-Lark									0.8					
Corvus mellori Little Raven		P					0.3							
Unidentified	0.7	0.1	0.2	1.4	0.4	1.1	0.3						0.7	0.4
Total *	3.7	4.5	2.2	2.4	0.7	1.1	0.6	2.8	1.6	0.7	1.0	1.2	1.0	1.2

Part 2 — Dry sclerophyll.

	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Stripe-crowned pardalotes Total =	7.1	13.0	5.8	11.4	2.4	5.7	14.7	18.2	21.4	17.6	18.2	13.6	20.7	17.2
Winter migrants														
Calamanthus fuliginosus	P	P	P		0.4			0.2					P	
Petroica phoenicea			0.2				0.5		0.2	1.3				
Pachycephala pectoralis		1.1	1.2	1.1	1.8	0.6	0.3	0.6	0.4					1.4
Colluricincla harmonica	0.7		0.4	0.7	0.4	0.3	0.2						0.2	1.0
Anthochaera carunculata	P	P	P			0.3							0.7	0.2
Lichenostomus leucotis		0.3	0.4	0.7	1.1									0.2
Stropera graculina	0.3	2.7	0.3	3.1	7.5	2.3	0.2				1.0		2.4	4.6
Total =	1.0	4.1	2.5	5.0	11.2	3.5	1.2	0.8	0.6	1.3	1.0		3.3	7.4
Passage migrants														
Lichenostomus chrysops	0.2	15.3	1.0		0.4		11.3	9.0	0.2					8.6
Melithreptus lunatus	P	0.3	2.1	0.7	3.5	4.6	9.6	6.6						
Zosterops lateralis														0.2
Total =	0.2	15.6	3.1	0.7	3.9	4.6	20.9	15.6	0.2					8.8
Vagrants or Unknown status														
Accipiter fasciatus					0.2									
Hieraaetus morphnoides														
Falco longipennis		0.3												
Cotumix novaezealandiae														
Cacatua roseicapilla														
Cacatua galerita	P		P									0.9		
Hirundo novaeseelandiae	0.5										1.0	0.2		
Petroica rosea														
Rhipidura rufifrons								0.2						
Rhipidura leucophrys														0.2
Cinclorhamphus mathewsi														
Sericornis frontalis														
Smicrornis brevirostris														
Gerygone fusca														
Acanthiza chrysorrhoa														
Acanthiza nana			0.1											
Lichenostomus virescens														
Lichenostomus penicillatus														
Acanthorhynchus tenuirostris		0.1	0.1											
Sturnus vulgaris														
Gralina cyanoleuca														
Corvus mellori	P	P	P											
Unidentified		0.4	0.1	0.4	0.4	0.3		0.2						
Total	0.5	0.8	0.3	0.4	0.6	0.3		0.4			1.0	1.1		0.2