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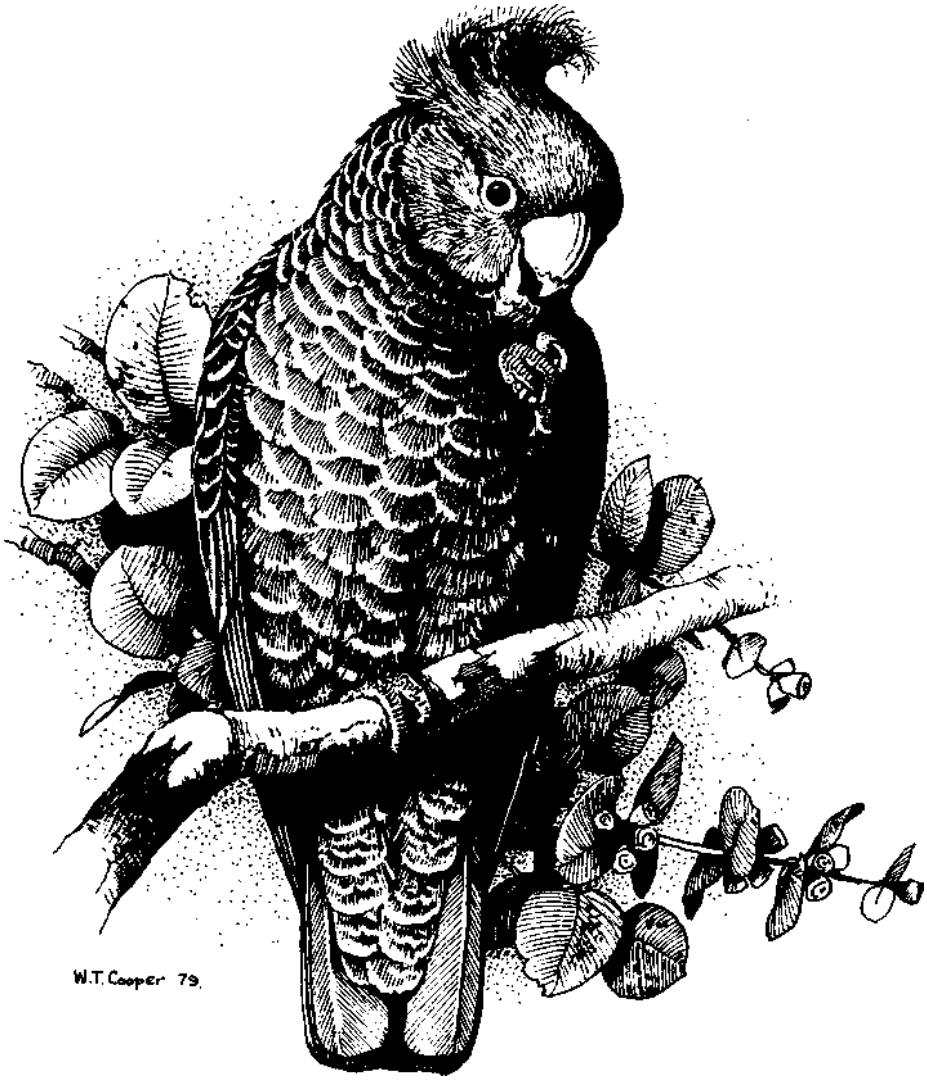

MURRUMBIDGEE RIVER CORRIDOR BIRD SURVEY

SUMMARY OF RESULTS

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Received 2 March 1987

1. INTRODUCTION

The Murrumbidgee River in the ACT will come under increasing pressure as the development of Canberra proceeds and as the demand for recreational facilities grows, but before this study was carried out, little was known of the birds of the river environs. In January 1985, the National Capital Development Commission (NCDC) engaged Canberra Ornithologists Group (COG) to undertake a survey of the birds of the Murrumbidgee River.

The study aimed to provide information on the birds, their distribution and seasonal movements, habitat requirements, and sensitivity to disturbance. Based on the findings at 18 survey sites, planning and management guidelines were drafted for the river as a whole. The findings of the study are contained in a 130-page report (COG 1986), a copy of which is held by COG and which is available to interested members.

This paper consists of edited extracts from the report, reproduced with the kind permission of the NCDC, for the benefit of the general COG membership.

This study was only made possible by the considerable efforts of over 50 participants who contributed their valuable time and talents. This abbreviated summary is dedicated to them.

Note on definitions

Throughout this report 'inner corridor' refers to the environment of the river, including the river channel, banks and margins which have a distinctive visual and ecological relationship with the river (NCDC 1981). For the purposes of this study, this includes an area extending 200 m on either side of the river.

The 'outer corridor' is a broader zone which can extend well beyond the river environment to include the entire river valley. It encompasses the primary zone of interaction between the river and its valley (NCDC 1981).

2. SUMMARY

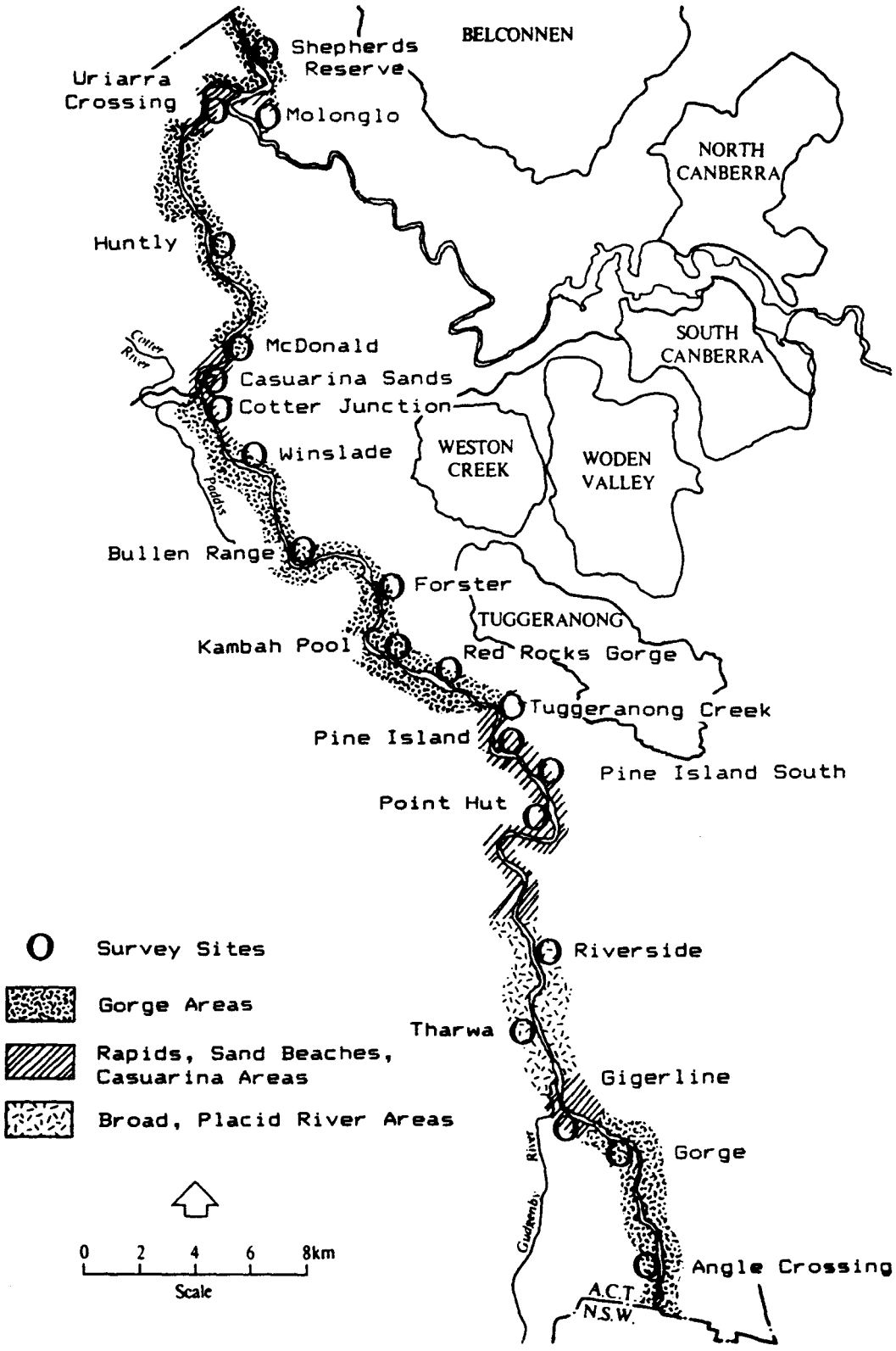
The main results of the survey and recommendations are as follows:

- The Murrumbidgee River Corridor supports a rich and varied avifauna of over 130 species.
- The most common 20 species form a unique riverine avifauna. The corridor is the main habitat for this avifauna in the ACT, and is prime habitat for two locally uncommon species, the Rainbow Bee-Eater and the Yellow Thornbill.
- The richest landbird habitats in the corridor are those in which the vegetation is varied in structure and composition. The richest waterbird habitats are areas where the river is slow-flowing and calm pools and sand-bars are found.
- The corridor is a major trunk route for autumn migration of honeyeaters.
- A number of rare and highly sensitive species use the corridor. Planning and management policies should take these species into account.
- A number of places along the river corridor have great potential as interpretational and educational sites.
- Exclusion of grazing and revegetation with naturally occuring plant species will greatly improve the inner corridor as habitat for birds.
- It is recommended that a Murrumbidgee Nature Park be established to facilitate the implementation of suitable management and conservation practices.
- Where development is planned in areas not specifically surveyed in this report, brief ornithological surveys should be carried out.

3. SURVEY METHODS

In all, 21 sites were selected for study (Map 1) of which 18 were included in the regular survey program. The remaining three sites, the Gorge, Red Rocks Gorge and Forster were surveyed during the breeding season on one occasion only. Access to these three sites is difficult and regular surveys were not practical.

MAP 1. LOCATION OF SURVEY SITES



All survey sites were situated on or near the bank of the river. Each consisted of two components, one vegetated and one riverine. The vegetated component was a strip 250 m in length and 40m wide along the bank (giving an area of 1 ha), measured from the lower limit of the vegetated parts of the river bank. The riverine area consisted of the adjoining 250 m stretch of the river itself and associated unvegetated areas, including beaches, sand-bars, snags, rocks, unvegetated parts of islets, etc. on both banks of the river below the vegetation line. The width of the non-vegetated component varied with the width of the river from site to site, but averaged about 50 m.

A total of 15 surveys were conducted at intervals over a twelve-month period to enable the seasonal variation of the avifauna to be studied. Surveys were conducted monthly with additional surveys in the spring and autumn to ensure that records of breeding and migration were as complete as possible. The surveys were carried out early in the morning when birds are most active, and therefore most readily detected. Survey dates are listed on page 131.

On each visit, each site was surveyed for 30 mins. The observers moved slowly from one end of the site to the other recording the number of birds of each species found within the riverine or vegetated inner corridor sample area. Care was taken to avoid double-counting birds which move about the site during the survey.

The number of birds recorded in a site provided a measure of population density, while the total number of species over the twelve-month period and the average number of species per visit gave an indication of avifaunal diversity. The use of standardised survey procedures allowed direct comparisons of the results from different sites and months to be made.

Birds observed outside the survey site but within the river corridor, those flying over the site but not hawking or hunting above it and those seen within the site but not within the 30 min survey period were also recorded. These records were used in compiling the complete species list for the area.

4. SPECIES LIST

All species observed in the Murrumbidgee River Corridor between 7 July 1985 and 1 June 1986 are shown in Table 1.

A total of 139 species was recorded, 133 of these were recorded in one or more of the 15 scheduled surveys of the

inner corridor. The other six species, Lewin's Rail, Crested Pigeon, Tawny Frogmouth, Brown Treecreeper, Yellow-tufted Honeyeater and Satin Bowerbird were recorded in the inner corridor between July 1985 and June 1986, but not during scheduled surveys (see CBN 12(2), 54, 60, 75, 77, 82 respectively).

A total of 196 bird species are recorded regularly in the Canberra area (COG 1985). The number of species recorded in the Murrumbidgee Corridor represents a considerable proportion (71%) of all species recorded regularly in the COG area of concern.

The following information is given for each species.

Abundance

The abundance of all species recorded within survey areas, expressed as the average number of birds per hectare, is shown in Table 1. Numbers of birds outside survey areas were not recorded, so it was not possible to calculate averages for these species. These are shown as a dash (--) in the table.

The most abundant species was the Yellow-faced Honeyeater (average = 10.98 birds/ha). This high figure was caused by several large flocks (up to 800 individuals) which were recorded only during the migration season.

The second most abundant species was the Superb Fairy-wren (average = 7.46 birds/ha). In spite of the fact that the Yellow-faced Honeyeater was the most abundant species overall, the Superb Fairy-wren may be considered to the dominant species in the inner corridor as it was a very widespread breeding resident, while the bulk of the honeyeaters are merely passage migrants. Other abundant species (average >=1 bird/ha) include Pacific Black Duck, Maned Duck, Crimson Rosella, Grey Fantail, White-browed Scrubwren, Brown Thornbill, Yellow-rumped Thornbill, Silvereye, European Goldfinch and Red-browed Firetail.

Habitat preference

The habitat preferences of each species is shown in the column labelled 'Habitat' in Table 1. Species are classified into those which use riverine habitats - R, vegetated habitats - V or both - V/R. For species which were not recorded within survey sites but which were still recorded within the inner corridor, their known habitat preferences are shown in parentheses.

Sensitivity

An indication of the sensitivity to disturbance of each species is given. For the sake of convenience and to assist with the formulation of conservation and planning strategies, four grades for sensitivity to human disturbance have been used: 0 - not sensitive, 1 - may be sensitive, 2 - sensitive and 3 - highly sensitive. These grades have been inferred from what is known of the biology of each species.

Special requirements

A very brief outline of special habitat requirements is shown for each species. In general these are particular environmental features on which a species is dependent, or with which it is usually associated. These requirements are expanded upon in the section below which deals with habitats.

Status summary

The following elements have been used to summarise the status of each species recorded in the inner corridor:

-- Distribution:

Rare	recorded at fewer than 4 sites
Uncommon	recorded at 5-9 sites
Common	recorded at 10-13 sites
Very Common	recorded at 14-18 sites

-- Breeding status:

Non-breeding	does not breed in inner corridor
(Breeding)	assumed breeding - constantly present during breeding season
Breeding*	probably breeding - birds recorded carrying nesting material, giving territorial song, defending territory, etc.
Breeding	Confirmed breeding - nests with eggs or young, dependent fledglings, etc.

-- Occurrence:

Visitor	Only visits the river corridor

	sporadically. Occurrence in the corridor is largely accidental.
Resident	Inhabits the river corridor year-round. Most are sedentary species.
Summer migrant	Spends the warmer part of the year (generally from August-September to March-April) in the river corridor, migrates to the warmer parts of Australia and South-east Asia.
Autumn passage migrant	Passes along the river corridor in autumn. These species are mainly breeding summer migrants in areas adjacent to the river. Inward spring passage not recorded.
Winter migrant	Spends the winter in the river corridor, moves to the higher country in spring, returning to the corridor in autumn.
Spring passage migrant	Passes along the river corridor in the spring. These are mostly breeding summer migrants in areas adjacent to the corridor. The return autumn passage of these species was not recorded.

5. COMPARISON OF SITES

Vegetated habitats

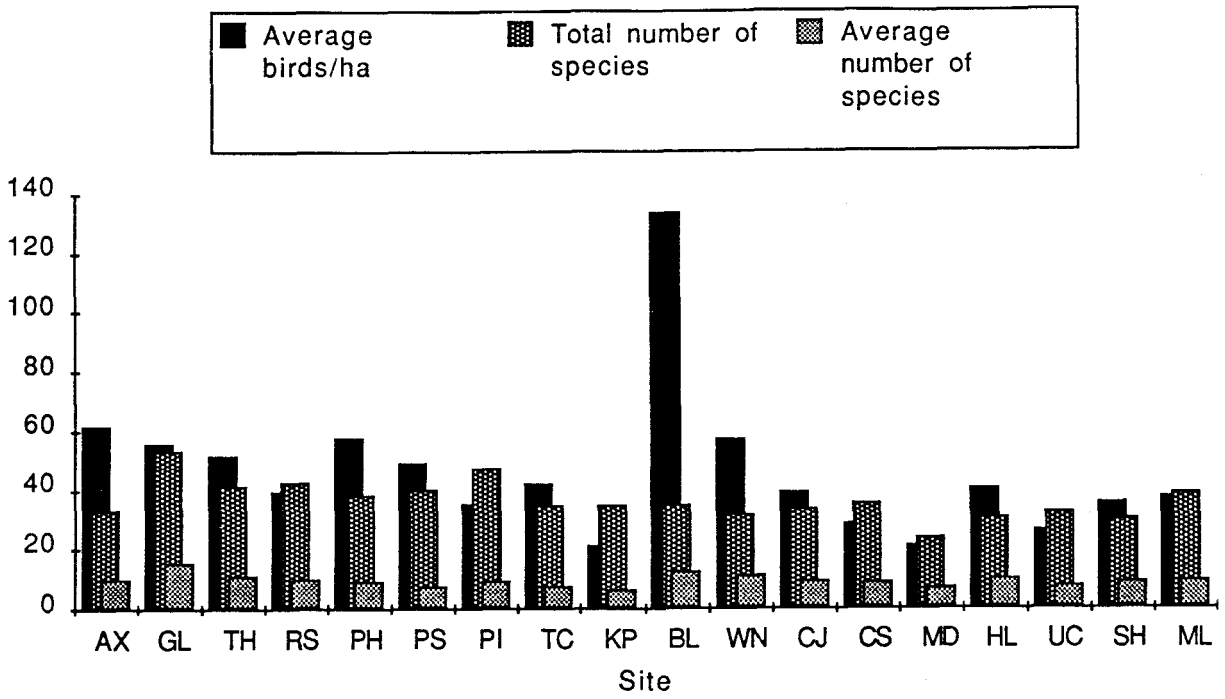
The average number of birds, the total number of species and the average number of species in vegetated habitats at each site are shown in Fig. 1. The average number of birds is probably the least reliable of these three measures as the presence of a single large flock can severely bias the results for a particular site. For example, the high average number of birds at Bullen Range (133) is largely the result of the presence of a flock of 800 migrating Yellow-faced Honeyeaters during one survey.

The other two variables are much more valuable indicators of diversity. The total number of species varied from 53 at Gigerline where the habitats were well-structured and varied, to 23 at McDonald which was steep and rocky with poor vegetation. The overall average for all points was 35.9. Gigerline also had the highest average number of species (15.1) per survey, while the lowest was at Kambah Pool with 6.3. The overall average number of species per site per visit was 9.2.

In the figures below, the following abbreviations have been used to identify survey sites:

AX	Angle Crossing	BL	Bullen Range
GL	Gigerline	WN	Winslade
TH	Tharwa	CJ	Cotter Junction
RS	Riverside	CS	Casuarina Sands
PH	Point Hut	MD	McDonald
PS	Pine Island South	HL	Huntly
PI	Pine Island	UC	Uriarra Crossing
TC	Tuggeranong Creek	SH	Shepherds Reserve
KP	Kambah Pool	ML	Molonglo

FIG. 1. COMPARISON OF SITES: VEGETATED HABITATS

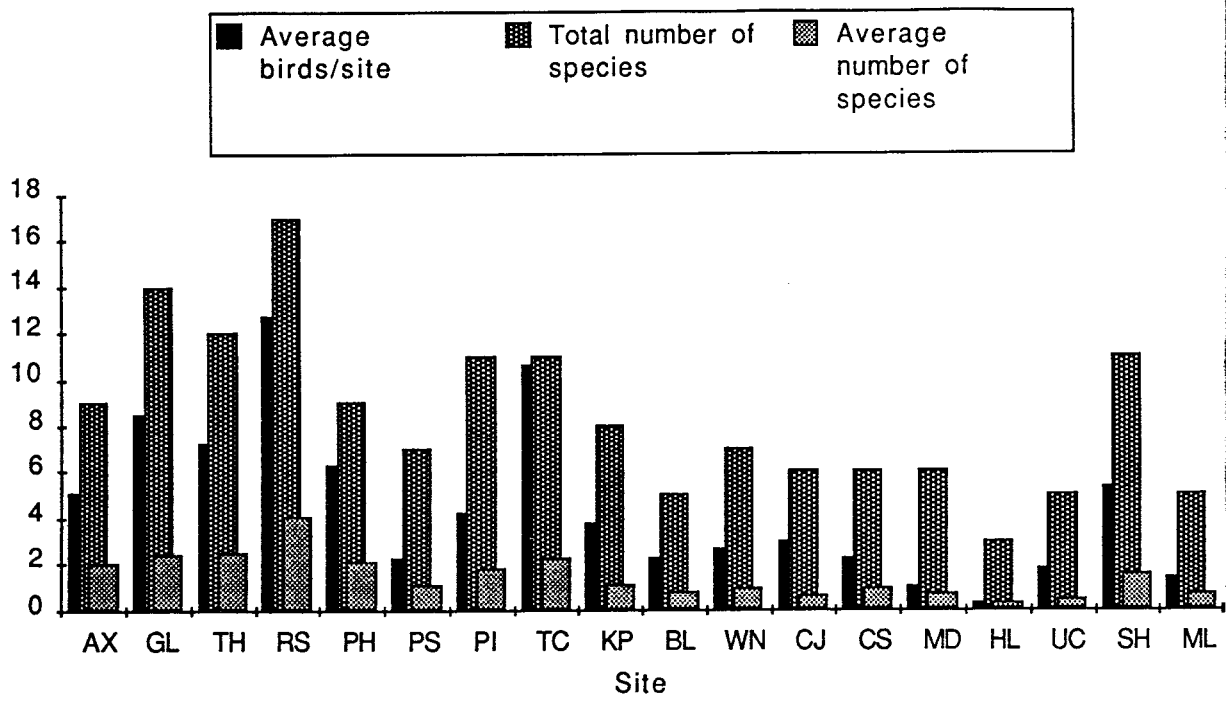


Riverine Habitats

The average number of birds, total number of species and the average number of species in riverine habitats at each site are shown in Fig. 2. The average number of birds in riverine habitats at each site is more useful as an indicator of abundance than the average number of birds in vegetated habitats because riverine habitats are not subject to large influxes of migratory species.

The highest average number of birds in riverine habitats was recorded at Riverside (12.7) where the river was broad and still, with muddy banks and sand-bars. The lowest was at Huntly (0.3) where the river was fast-flowing and rocky . The overall average was 4.5. Riverside had the highest total number of species (17). Huntly had the lowest (3). The overall average was 8.4. Riverside also had the highest average number of species per visit (4.1) and Huntly was the lowest with 0.3. The overall average number of species in riverine habitats was 1.5.

FIG.2 COMPARISON OF SITES: RIVERINE HABITATS



Inner Corridor

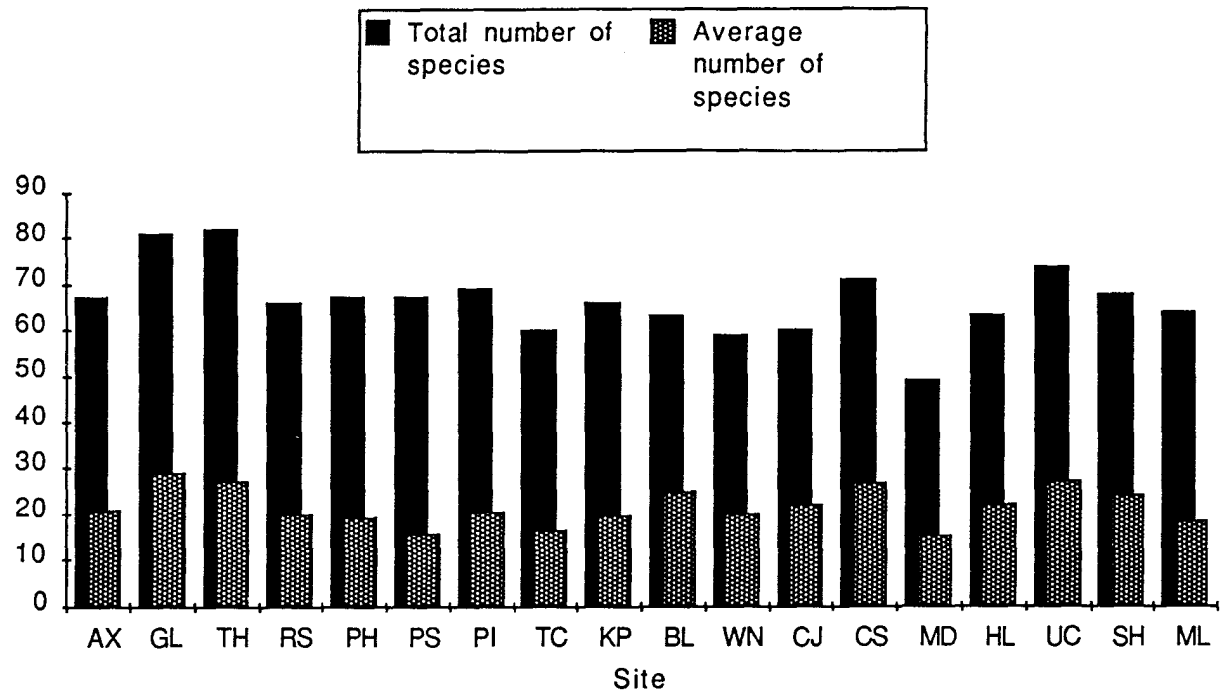
The total number of species recorded in the inner corridor and the average number per visit are shown in Fig.3. Eighty-two species were recorded in the inner corridor at Tharwa and 81 were recorded at Gigerline, making these two sites the richest of the 18 surveyed on a regular basis. The average aggregate number of species at all sites combined, for any one survey was 66.4.

Factors contributing to the diversity at these sites include the presence of still, slow flowing pools with sand bars, good vegetation cover with a variety of vegetation layers - grasses, shrub layer and trees, and relatively good

outer corridor conditions. All of these factors make a site attractive to birds.

Gigerline had the highest average number of species (28.9) while the lowest was 15.5 at McDonald where the river-banks sloped very steeply and were poorly vegetated. The overall average was 21.6 species per site.

FIG. 3 COMPARISON OF SITES: INNER CORRIDOR



6. HABITAT ANALYSIS

Some abundant species, such as the Yellow-faced Honeyeater and Rufous Whistler are so widely and evenly distributed in the corridor that no particular correlation is evident.

There is a strong correlation between many species of waterbird and the presence of large still pools. Grebes, ducks, coots, waterhens and moorhens spend much of their time feeding or resting on open water. This is only possible if the water is not flowing rapidly. The three species of cormorant also show a strong correlation with sites with pools.

Large, still bodies of water attract air-borne insects. Insectivorous species such as the Rainbow Bee-eater,

Dollarbird, Welcome Swallow and both the Tree and Fairy Martin show a strong preference for sites with still pools for this reason.

Moorhens, coots, lapwings and plovers spend part or all of their time feeding on vegetable matter, insects and other invertebrates on damp ground near water. Not surprisingly, these species show a strong correlation with sites where extensive sand bars are found.

There is a strong correlation between the presence of Yellow-tailed Black-Cockatoos and Gang-gang Cockatoos and casuarinas, as both birds feed on the fruit of these trees.

Ground-feeding parrots, including Galahs, Eastern Rosellas and Red-rumped Parrots, grassland birds (Richard's Pipit) and birds generally associated with open habitats (Willie Wagtail, Yellow-rumped Thornbill, Common Starling, Australian Magpie-lark, Australian Magpie and Australian Raven) all show a strong correlation with sites that abut open grazing land.

Eastern Yellow Robin and several species of honeyeater show preference for sites with dense undergrowth. The Clamorous Reed-Warbler correlated strongly with the presence of extensive reed-beds, as these are its prefered breeding habitat. The Australasian Grebe may also benefit from the protection afforded by the reed-beds.

Those species which nest in hollow limbs and trunks (Laughing Kookaburra, Dollarbird, Spotted and Striated Pardalote) were found to correlate with sites where eucalypts are found in the vicinity as these usually offer an abundance of suitable nest sites.

Nectar-feeding birds like the Crescent and New Holland Honeyeaters and the Eastern Spinebill all correlated strongly with those sites where substantial grevillea thickets were found.

Sites adjacent to grazing land, those with reed-beds, open canopy and sandy soil have a greater total number of species in vegetated habitats than average. Sites with large still pools, sandbars and reeds have more species in riverine habitats than average.

The average number of species in vegetated habitats is higher in sites with sandy soil, with eucalypts or with grevilleas. The factors that contribute to a high average number of species in riverine habitats appear to be the same as those that contribute to high total numbers.

TABLE 1. SPECIES LIST OF THE MURRUMBIDGEE INNER CORRIDOR

SPECIES		HAB-ITAT	BIRDS /ha	TOTAL SITES	SENSI-TIVITY	REQUIREMENTS	BREEDING AND STATUS
Hoary-headed Grebe	*Poliocephalus poliocephalus*	R	0.01	3	1	still pools	rare visitor
Australasian Grebe	*Tachybaptus novaehollandiae*	R	0.03	9	1	still pools	uncommon visitor
Australian Pelican	*Pelecanus conspicillatus*	R	0.01	1	1	still pools	rare visitor
Great Cormorant	*Phalacrocorax carbo*	V/R	0.19	13	2	still pools, casuarinas	very common non-breeding resident /visitor
Little Black Cormorant	*Phalacrocorax sulcirostris*	R	0.03	6	2	still pools	uncommon non-breeding resident
Little Pied Cormorant	*Phalacrocorax melanoleucos*	V/R	0.19	17	2	still pools	very common non-breeding resident /visitor
Pacific Heron	*Ardea pacifica*	(R)	0.00	3	2	muddy banks	rare visitor
White-faced Heron	*Ardea novaehollandiae*	V/R	0.18	13	1	still pools	very common breedings resident /visitor
Great Egret	*Egretta alba*	(R)	0.00	1	2	-	rare visitor
Rufous Night Heron	*Nycticorax caledonicus*	V	0.00	3	2	willows for roosting	rare non-breeding summer migrant
Sacred Ibis	*Threskiornis aethiopica*	R	0.01	4	1	-	rare visitor
Black Swan	*Cygnus atratus*	R	0.01	1	1	still pools	rare visitor
Pacific Black Duck	*Anas superciliosa*	V/R	1.55	13	1	islets for breeding	very common breeding resident
Mallard	*Anas platyrhynchos*	R	0.01	2	0	-	rare non-breeding resident (escaper)
Grey Teal	*Anas gibberifrons*	R	0.01	2	1	still pools	rare visitor
Maned Duck	*Chenonetta jubata*	V/R	1.25	13	1	grass adjoining pools	very common breeding resident
Muscovy Duck	*Cairina moschata*	R	0.00	2	0	-	rare non-breeding resident (escaper)
Black-shouldered Kite	*Elanus notatus*	(V)	0.00	1	1	hunts over open ground	rare visitor
Whistling Kite	*Haliastur sphenurus*	(V)/R	0.01	5	2	hunts along river	uncommon breedings resident
Brown Goshawk	*Accipiter fasciatus*	V/R	0.06	13	2	large eucs for nesting	common breeding resident
Collared Sparrowhawk	*Accipiter cirrhocephalus*	R	0.00	1	1	pines/cas. for nesting	rare visitor
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	(V/R)	0.00	1	1	hunts along river	rare visitor
Wedge-tailed Eagle	*Aquila audax*	(V)	0.00	14	3	undisturbed nest site	very common breeding resident
Little Eagle	*Hieraaetus morphnoides*	(V)	0.00	11	2	large trees for nesting	common (breeding) resident

TABLE 1. CONTINUED

SPECIES		HABITAT	BIRDS /ha	TOTAL SITES	SENSITIVITY	REQUIREMENTS	BREEDING AND STATUS
Spotted Harrier	*Circus assimilis*	(V)	0.00	1	1	hunts along river	rare visitor
Marsh Harrier	*Circus aeruginosus*	(V/R)	0.00	2	1	hunts along river	rare visitor
Peregrine Falcon	*Falco peregrinus*	(V)/R	0.00	4	3	undisturbed nest site	rare breeding resident
Australian Hobby	*Falco longipennis*	(V)	0.00	2	1	-	rare visitor
Brown Falcon	*Falco berigora*	V	0.01	12	2	-	common (breeding) resident
Australian Kestrel	*Falco cenchroides*	V	0.01	13	2	hunts over open ground	common breeding* resident
Brown Quail	*Coturnix australis*	V	0.04	1	1	coarse, dense grass	rare visitor
Lewin's Rail	*Rallus pectoralis*	(V/R)	–	-	2	reed-beds	rare visitor
Dusky Moorhen	*Gallinula tenebrosa*	R	0.06	5	1	still pools	uncommon non-breeding visitor/resident
Eurasian Coot	*Fulica atra*	R	0.06	6	1	still pools	uncommon non-breeding visitor
Masked Lapwing	*Vanellus miles*	V/R	0.06	6	2	sand-bars, Ruddy banks	uncommon non-breeding visitor/resident
Red-capped Plover	*Charadrius ruficapillus*	R	0.01	1	1	sand-bars	rare visitor
Black-fronted Plover	*Charadrius melanops*	R	0.27	9	2	sand-bars	uncommon (breeding) resident
Common Sandpiper	*Tringa hypoleucos*	R	0.00	1	1	sand-bars	rare visitor
Feral Pigeon	*Columba livia*	(V)	0.00	1	0		rare visitor
Common Bronzewing	*Phaps chalcoptera*	V	0.01	2	1	often found with acacias	rare visitor
Crested Pigeon	*Ocyphaps lophotes*	(V)	–	-	1	irruptive	probably rare non-breeding resident
Wonga Pigeon	*Leucosarcia melanoleuca*	(V)	0.00	1	1	usually in wet forest	rare visitor
Yellow-tailed Black-Cockatoo	*Calyptorhynchus funereus*	V	0.18	13	3	feeds on casuarina nuts	common non-breeding visitor /resident
Sang-gang Cockatoo area	*Callocephalon fimbriatum*	V	0.04	8	1	only found in Cotter	uncommon non-breeding visitor /resident
Galah	*Cacatua roseicapilla*	V/R	0.26	17	0	feeds on open ground	very common breeding resident
Sulphur-crested Cockatoo	*Cacatua galerita*	V/R	0.34	18	0	roosts by water	very common breeding* resident
Australian King-Parrot	*Alisterus scapularis*	V	0.04	5	0	generally restricted to Cotter area	uncommon non-breeding resident /visitor
Crimson Rosella	*Platycercus elegans*	V	1.11	18	0	-	very common breeding* resident

TABLE 1. CONTINUED

SPECIES		HAB-ITAT	BIRDS /ha	TOTAL SITES	SENSI-TIVITY	REQUIREMENTS	BREEDING AND STATUS
Eastern Rosella	Platycercus *eximius*	V/R	0.34	16	0	prefers more open areas	very common breeding* resident
Red-rumped Parrot	*Psephotus haematonotus*	V	0.14	10	1	prefers more open areas	common breeding resident
Pallid Cuckoo	*Cuculus pallidus*	V	0.04	12	1	-	common spring passage migrant
Fan-tailed Cuckoo	*Cuculus pyrrhophanus*	V	0.04	12	/(breeding) 1	common in casuarinas	summer migrant common breeding summer migrant
Horsfield's Bronze-Cuckoo	*Chrysococcyx basalis*	V	0.04	13	1	-	common breeding summer migrant
Shining Bronze-Cuckoo	*Chrysococcyx lucidus*	*V*	0.04	12	1	-	common breeding summer migrant
Southern Boobook	*Ninox novaeseelandiae*	V	0.01	2	1	hollow limbs for nesting	rare visitor
Tawny Frogmouth	*Podargus strigoides*	*(V)*	--	-	1	-	rare breeding resident
White-throated Needletail	*Hirundapus caudacutus*	*(V/R)*	0.00	2	0	aerial insects	rare non-breeding summer migrant
Laughing Kookaburra	*Dacelo novaeguineae*	V	0.13	16	1	breeds in hollow limbs	very common breeding* resident
Sacred Kingfisher	*Halcyon sancta*	V	0.00	6	1	breeds in hollow limbs	uncommon breeding* summer migrant
Rainbow Bee-eater	*Merops ornatus*	V	0.68	18	1	digs nests in sandy soil	very common breeding summer migrant
Dollarbird	*Eurystomus orientalis*	V	0.06	11	1	breeds in hollow limbs	common breeding summer migrant
Skylark	*Alauda arvensis*	V	0.00	6	1	open paddocks	uncommon (breeding) resident
Welcome Swallow	*Hirundo neoxena*	V/R	0.77	17	0	feeds over water	very common breeding summer migrant /resident
Tree Martin	*Cecropis nigricans*	V/R	0.33	7	1	feeds over water	uncommon breeding summer migrant
Fairy Martin	*Cecropis ariel*	V/R	0.14	3	1	feeds over water	rare spring passage migrant
Richard's Pipit	*Anthus novaeseelandiae*	V	0.02	8	1	open paddocks	uncommon (breeding) resident
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	V	0.01	15	1		very common (breeding) summer migrant
Cicadabird	*Coracina tenuirostris*	V	0.00	1	1	-	rare spring passage migrant
White-winged Triller	*lalage sueurii*	V	0.01	4	1	-	rare (breeding) summer migrant
Blackbird	*Turdus merula*	V	0.35	18	0	needs some dense cover	very common breeding resident
Rose Robin	*Petroica rosea*	V	0.01	4	1	-	rare non-breeding winter migrant
Flame Robin	Petroica *phoenicea*	V/R	0.14	15	2		very common breeding winter migrant

TABLE I. CONTINUED

SPECIES		HAD-ITAT	BIRDS /ha	TOTAL SITES	SENSI-TIVITY	REQUIREMENTS	BREEDING AND STATUS
Scarlet Robin	*Petroica multicolor*	V	0.20	16	1	prefers more open areas	very common non-breeding winter migrant
Red-capped Robin	*Petroica goodenovii*	V	0.00	1	2	-	rare breeding* resident
Hooded Robin	*Melanodryas cucullata*	V	0.01	2	2	usually in euc.woodland	rare visitor
Eastern Yellow Robin	*Eopsaltria australis*	V	0.24	15	2	needs dense cover	very common breeding resident
Jacky Winter	*Microeca leucophaea*	V	0.01	3	2	-	rare visitor
Golden Whistler	*Pachycephala pectoralis*	V	0.06	13	1	-	common non-breeding winter migrant
Rufous Whistler	*Pachycephala rufiventris*	V	0.91	18	1	-	very common breeding summer migrant
Grey Shrike-thrush	*Colluricincla harmonica*	V	0.15	17	1	needs some cover	very common breeding* resident
Leaden Flycatcher	*Myiagra rubecula*	V	0.07	7	2	usually in euc. woodland	/winter migrant uncommon breeding summer migrant
Restless Flycatcher	*Myiagra inquieta*	(V)	0.00	6	2		uncommon breeding resident
Grey Fantail	*Rhipidura fuliginosa*	V	1.39	18	1	needs some cover	very common breeding summer migrant/resident
Willie Wagtail	*Rhipidura leucophrys*	V/R	0.17	16	0	feeds in open areas	very common breeding summer migrant /resident
Eastern Whipbird	*Psophodes olivaceus*	V	0.01	2	1	usually in wet forest	rare visitor
Clamorous Reed-Warbler	*Acrocephalus stentoreus*	V/R	0.11	7	1	breeds in large reedbeds	uncommon breeding* summer migrant
Golden-headed Cisticola	*Cisticola exilis*	(V)	0.00	1	1	rank grass by water	rare visitor
Rufous Songlark	*Cinclorhamphus mathewsi*	V	0.01	4	2	breeds in open woodland	rare (breeding) summer migrant
Superb Fairy-wren	*Malurus cyaneus*	V/R	7.46	18	1	dense cover/open ground	very common breeding resident
White-browed Scrubwren	*Sericornis frontalis*	V/R	1.52	18	1	dense cover	very common breeding resident
Speckled Warbler	*Sericornis sagittatus*	V	0.01	1	2	usually in dry woodland	rare (breeding) visitor/resident
Weebill	*Smicrornis brevirostris*	V	0.02	8	1	feeds in euc. canopy	uncommon breeding* resident /visitor
Western Gerygone	*Gerygone fusca*	V	0.01	4	1	euc.woodland	rare (breeding) summer migrant
White-throated Gerygone	*Gerygone olivacea*	V	0.00	7	1	euc. woodland	uncommon (breeding) summer migrant

SPECIES

TABLE 1. CONTINUED

		HAB-IIAT	BIRDS /ha	TOTAL SITES	SENSI-TIVITY	REQUIREMENTS	BREEDING AND STATUS
Brown Thornbill	*Acanthiza pusilla*	V/R	1.63	18	1	dense cover	very common breeding resident
Buff-rumped Thornbill	*Acanthiza reguloides*	V	0.45	16	1	sore cover	very common breeding resident
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*	V	1.67	17	1	often in open areas	very common breeding resident
Yellow Thornbill	*Acanthiza nana*	V	0.44	12	1	only in casuarinas	common breeding resident
Striated Thornbill	*Acanthiza lineata*	V	0.29	10	1	often in euc. canopy	common (breeding) resident
Southern Whiteface	*Aphelocephala leucopsis*	(V)	0.00	2	1	open land with dead trees	rare breeding resident
Varied Sittella	*Daphoenositta chrysoptera*	V	0.04	6	1	forest - trunk-feeder	uncommon breeding* resident
White-throated Treecreeper	*Climacteris leucophaea*	V	0.27	17	1	forest - trunk-feeder	very common (breeding) resident
Red-browed Treecreeper	*Climacteris erythrops*	(V)	*0.00*	1	1	forest - trunk-feeder	rare visitor
Brown Treecreeper	*Climacteris picumnus*	(V)	--	-	2	woodland, fallen timber	rare visitor
Red Wattlebird	*Anthochaera carunculata*	V	0.03	12	0	-	common (breeding) resident/autumn passage migrant
Noisy Friarbird	*Philemon corniculatus*	V	0.15	17	1	usually feeds in eucs	very common breeding* summer migrant
Noisy Miner	*Manorina melanocephala*	(V)	0.00	3	1	-	rare visitor
Yellow-faced Honeyeater	*Lichenostomus chrysops*	V	10.98	18	1		very common breeding summer migrant/autumn passage migrant
White-eared Honeyeater	*Lichenostomus leucotis*	V	0.05	17	1		very common winter/autumn passage migrant
Yellow-tufted Honeyeater	*Lichenostomus melanops*	(V)	--	-	1	migrates along river	rare autumn passage migrant
Fuscous Honeyeater	*Lichenostomus fuscus*	(V)	0.00	1	1	migrates along river	rare passage migrant
White-plumed Honeyeater	*Lichenostomus penicillatus*	V	0.14	9	1	permanent water	uncommon breeding resident
Brown-headed Honeyeater		(V)	0.00	1			rare passage migrant
White-naped Honeyeater	*Melithreptus brevirostris* *Melithreptus lunatus*	V	0.36	14	1	-	very common breedings summer migrant/passage migrant

TABLE 1. CONTINUED

SPECIES		HAB-ITAT	BIRDS /ha	TOTAL SITES	SENSI-TIVITY	REQUIREMENTS	BREEDING AND STATUS
Crescent Honeyeater	*Phylidonyris pyrrhoptera*	V	0.04	6	1	often with grevilleas	uncommon
New Holland Honeyeater	*Phylidonyris novaehollandiae*	V/R	0.12	19	1	often with grevilleas	common (breeding) resident
Eastern Spinebill	*Acanthorhynchus tenuirostris*	V	0.52	17	1	often with grevilleas	very common breedings resident /winter migrant
White-fronted Chat	*Ephthianura albifrons*	V	0.01	2	2	sand-bars	rare breeding summer migrant
Mistletoebird	*Dicaeum hirundinaceum*	V	0.76	14	1	requires casuarinas	very common breeding summer migrant
Spotted Pardalote	Pardalotus punctatus	V	0.03	13	1	-	common (breeding) resident
Striated Pardalote	Pardalotus striatus	V	0.12	17	1	-	very common (breeding) resident
Silvereye	*Zosterops lateralis*	V	4.15	18	0	-	very common breeding summer migrant
European Goldfinch	*Carduelis carduelis*	V	1.43	18	0	thistles, casuarinas	very common breeding summer migrant
House Sparrow	Passer domesticus	V	0.01	5	0	buildings for nesting	uncommon breeding resident
Red-browed Firetail	Emblema *temporalis*	V/R	3.27	18	1	dense cover	very common breeding resident
Diamond Firetail	*Mesa guttata*	(V)	*0.00*	1	1	-	rare visitor
Double-barred Finch	*Poephila bichenovii*	V	0.07	4	1	open areas	rare (breeding) resident
Common Starling	*Sturnus vulgaris*	V	0.13	14	0	feeds in open paddocks	very common breeding resident
Olive-backed Oriole	*Oriolus* sagittatus	(V)	0.00	2	1	-	rare visitor
Satin Bowerbird	Ptilonorhynchus *violaceus*	(V)	--	-	1	-	rare visitor
White-winged Chough	*Corcorax melanorhamphos*	V	0.10	7	0	feeds on open ground	uncommon breeding resident
Australian Magpie-lark	*Grallina cyanoleuca*	V/R	0.21	14	1	feeds on open ground	very common breeding resident
Dusky Woodswallow	Artamus *cyanopterus*	V	0.11	13	1	often near water	common breeding summer migrant
Grey Butcherbird	*Cractious torquatus*	(V)	0.00	2	1	prefers woodland/forest	rare visitor
Australian Magpie	*Gymnorhina tibicen*	V	0.57	18	0	open ground/large trees	very common breeding resident
Pied Currawong	*Strepera graculina*	V	0.16	18	0	-	very common breeding resident
Grey Currawong	*Strepera versicolor*	(V)	*0.00*	*4*	1	-	rare visitor
Australian Raven	*Corvus coronoides*	V	0.22	18	0	prefers open paddocks	very common breedings resident
Little Raven	*Corvus mellori*	(V)	0.00	4	1	prefers open paddocks	rare visitor

7. MIGRATION

Using data collected during intensive surveys of migrations on three days in April and May, it is possible to sketch out the major routes along the corridor (see Map 2), but not all routes may be used on a particular day. The choice of routes appears to be influenced by weather conditions, such as wind direction, etc.

A number of points deserve mention:

i. The pivotal role of the Cotter River valley. The Cotter serves as a direct link between the low, dry river corridor and the high wet forests of the western ACT. All four major migration routes that cross Canberra are branches of the northern route and they all appear to stem from the Cotter.

ii. The central and southern routes. These two very important routes had not been recorded previously. A significant percentage of the total number of honeyeaters using the corridor migrate along these two routes.

iii. The ubiquity of migration. Before this survey was conducted, migration was known to take place at three or four points along the river. It is now clear that nearly every part of the river corridor is used.

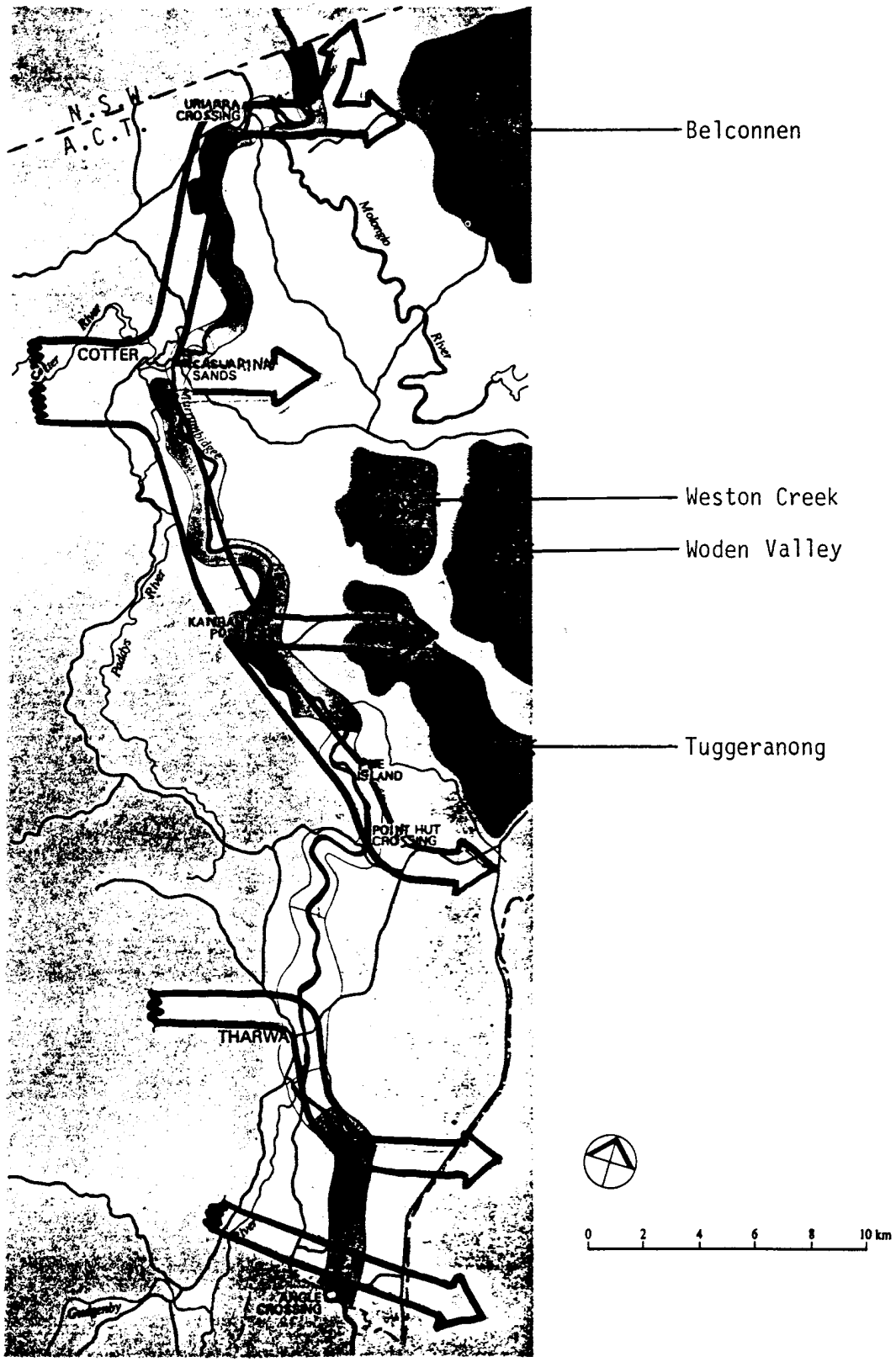
vi. Return migration in spring. Two small flocks of White-naped Honeyeaters were recorded migrating upstream at Gigerline and Angle Crossing in spring. These are the first records of return migration in the river corridor.

v. The river may also be a migration corridor for species other than honeyeaters. Great Cormorants, Pacific Black and Maned Ducks, Silvereyes and Red-browed Firetails were all recorded moving along the corridor. At this stage, it is impossible to determine to what extent these represent local or long-range movements.

8. SEASONAL VARIATION

The first summer migrants, including Fan-tailed Cuckoo, Welcome Swallow, Tree Martin, Clamorous Reed-Warbler and Western Gerygone, began to arrive in early August. By early September the Pallid Cuckoo, Horsfield's and Shining Bronze-

MAP 2. HONEYEATER MIGRATION ROUTES ALONG THE MURRUMBIDGEE RIVER



Cuckoos, Fairy Martin, Black-faced Cuckoo-shrike, Rufous Songlark, Yellow-faced Honeyeater and Dusky Woodswallow had arrived.

At the end of September the first Rainbow Bee-eater, White-throated Gerygone, Noisy Friarbird and Mistletoebird were recorded. During the month, large numbers of Rufous Whistlers arrived; none were present on 1 September but they were recorded at 11 sites on 29 September. A significant influx of Yellow-faced Honeyeaters also took place during September and by the end of the month, they were present in all 18 sites. Grey Fantails, Willie Wagtails, Yellow-rumped Thornbills, Silvereyes and European Goldfinches became increasingly common in the inner corridor as spring progressed.

The late summer migrants, the Dollarbird, White-winged Triller and Leaden Flycatcher, had arrived by late October, by which time the winter migrants including the Rose and Scarlet Robins, Golden Whistler and White-eared Honeyeater had departed.

The last summer arrivals were the Sacred Kingfisher and Olive-backed Oriole which were not recorded until 10 November. The last winter migrant, the Flame Robin was last recorded in the inner corridor on 8 December.

. The total number of species recorded in the inner corridor reached a peak in late spring. Early summer saw a slight drop, but numbers remained relatively stable through the summer and early autumn.

Many summer migrants were departing during March and by early April the Sacred Kinfisher, Bee-eater, Dollarbird, Tree Martin, Clamorous Reed-Warbler and White-throated Gerygone had all disappeared. The numbers of Silvereyes and Grey Fantails also began to fall rapidly. At the same time, winter migrants such as the Flame and Scarlet Robins, Golden Whistler and White-eared Honeyeater reappeared.

During April and May large numbers of honeyeaters of a variety of species migrated along the river corridor resulting in an increase in the total number of species recorded.

9. CONCLUSIONS AND RECOMMENDATIONS

The areas of most consistently high value are located between Gigerline and Pine Island South. Here the river is broad and flows slowly. There are many still pools with

shallow, gently sloping muddy banks. Extensive sand bars are common. The vegetation is varied and well-structured: open areas with grasses, shrubs, young trees, mature trees and old trees.

The northern sections of the river are characterised by fast-flowing water and steep banks with less varied vegetation, with the result that the avifauna is generally poorer than in the southern portion.

The following recommendations are made:

1. Murrumbidgee Nature Park

To facilitate the planning, management and conservation of the river corridor, it is strongly recommended that the entire inner corridor be included in a Murrumbidgee Nature Park and managed in a manner similar to the Canberra Nature Park.

2. Interpretation

Gigerline, Point Hut, the Pine Island - Kambah Pool walking trail, the Cotter and Uriarra Crossing all present ideal opportunities for development as interpretational sites.

3. Areas of high sensitivity

Three specific localities near Red Rocks Gorge, Forster and the Cotter are considered to be particularly sensitive. Steps should be taken to ensure that human disturbance is excluded from these areas. Walking trails may need to be closed to the public during the breeding season.

4. Further studies

River profile and the composition of vegetation communities are two factors which have a strong influence on avifaunal value of a site. These factors may vary greatly over short distances. Pockets of ornithological value may be found even in corridor units of generally low value. It is recommended that brief avifaunal studies be undertaken in the early planning stages of any particular development in the inner corridor.

5. Revegetation

Revegetation of the inner corridor using species which are native to the corridor will greatly improve many

areas as habitat for birds.

6. Exclusion of Grazing

Grazing causes problems of erosion, soil compaction and revegetation. It is recommended that grazing be excluded from the inner corridor.

7. Pine Plantations

It is generally acknowledged that pine plantations are poor habitat for birds. It is recommended that the proposal (NCDC 1983) to expand plantations in the river corridor be dropped.

11. REFERENCES

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10. APPENDIX. MURRUMBIDGEE SURVEY **DATES** 1985-86.

1985	1986
7 July	12 January
4 August	2 February
1 September	2 March
29 September	6 April
20 October	20 April
10 November	4 May
24 November	1 June
8 December	

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