

Birds of the Bungle Bungle Area

by
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ANNOTATED SPECIES LIST

Species names and order follow Blakers *et al.* (1984).

* indicates species previously recorded in the Bungle Bungle National Park by Bob Taylor (Colreavy *et al.* 1989).

'A' indicates species recorded from Argyle (Dames and Moore 1982).

'R' indicates species recorded in Blakers *et al.* (1984) from the one degree block (17 to 18 S, 128 to 129 E) mostly comprising the Bungle Bungle area.

The survey sites where we recorded species are given in brackets after the scientific name. The land unit and floristic group in which the highest mean abundance was recorded is listed, except where this maximum mean abundance was less than 0.1 animals per quadrat (see Tables 12 and 13).

Two additional species recorded by JR Ford in April 1986 are listed.

Species not definitely recorded from the Bungle Bungle area are listed in square brackets.

Comments on the wider distribution of species within the Kimberley region are from Storr (1980).

*A EMU *Dromaius novaehollandiae*.
(1,9).

In low density throughout the Bungle Bungle area, except for the massif. Storr: Widespread but generally scarce in the Kimberley.

* HOARY-HEADED GREBE *Poliiocephalus poliocephalus*.

Not recorded during this survey. Bob Taylor recorded this species in pools of Red Rock Creek near Echidna Chasm just after the end of the wet season of 1986. Storr: Status uncertain, perhaps a rare winter visitor to the south of the Kimberley Division.

[AUSTRALASIAN GREBE *Tachybaptus novaehollandiae*.

Blakers *et al.* (1984) record it from the one degree blocks immediately to the south and north of the Bungle Bungle area. Storr: Moderately common in southern and eastern flatlands, especially about the lower and middle courses of major streams (Fitzroy, Ord and Sturt).]

*ARA AUSTRALIAN PELICAN *Pelecanus conspicillatus*.
(9).

Several flocks (5 to 15 birds) recorded along the Ord River (e.g. near Kitty's Knob). Storr: moderately common in open freshwater throughout the Kimberley.

*R DARTER *Anhinga melanogaster*.
(5,7).

Preferred land unit: Wickham rugged uplands. Recorded on most larger pools of the Ord River and Osmand Creek. Storr: Moderately common in eastern and southern flatlands, scarce or uncommon further north.

R LITTLE BLACK CORMORANT *Phalacrocorax sulcirostris*.

(5,7,9).

Preferred land unit: Nelson frontage.

Preferred floristic group: *E. camaldulensis*/*Melaleuca* open forest-*Aerva-Aristida*.

Common in small groups on pools of the Ord River and Osmand Creek. Storr: Moderately common in southern and eastern flatlands, especially about the lower courses of major streams, scarce in hilly north Kimberley.

*R LITTLE PIED CORMORANT *Phalacrocorax melanoleucos*.

(7,9).

Common in small groups on pools of the Ord River. Storr: Common on Lake Argyle, scarce to moderately common elsewhere.

*AR PACIFIC HERON *Ardea pacifica*.
(5,6,7).

Solitary birds seen around pools of Ord River and tributaries of the Panton. Storr: Moderately common in southern and eastern flatlands, scarce or uncommon in hilly north Kimberley.

*AR WHITE-FACED HERON *Ardea novaehollandiae*.
(2).

Solitary birds seen around pools on the Ord River and Osmand Creek. Storr: Moderately common in southern and eastern flatlands, scarce or uncommon in hilly north Kimberley.

[CATTLE EGRET *Ardeola ibis*.

Recorded by Storr at Old Lissadell.] Breeding lower Ord, Lake Kununurra (Jaensch 1988).

*R GREAT EGRET *Egretta alba*.
(5,9).

Solitary birds seen around pools of Ord River. Storr: Very common at Lake Argyle, moderately common elsewhere in southern and eastern flatlands and locally on coasts, uncommon in hilly north Kimberley.

LITTLE EGRET *Egretta garzetta*.
(9).

Solitary birds seen around pools of Ord River near Kitty's Knob. Storr: Moderately common in north-east and locally on coasts, uncommon elsewhere.

*AR RUFIOUS NIGHT HERON *Nycticorax caledonicus*.
(5,6,7,9).

Preferred land unit: Nelson frontage.

Preferred floristic group: *E. camaldulensis*/*Melaleuca* open forest-*Aerva-Aristida*.

Reasonably common around pools of Ord River and Osmand Creek, especially in areas with dense riparian vegetation. Storr: Very common in eastern and southern flatlands about lower and middle courses of larger streams, uncommon in hilly north Kimberley.

* BLACK BITTERN *Dupetor flavicollis*.
(5,7).

Reasonably common around springs (e.g. Wulwulji) and pools of Ord River and Osmand Creek, where dense riparian vegetation persists. Storr: uncommon to moderately common.

*AR BLACK-NECKED STORK (JABIRU) *Xenorhynchus asiaticus*.

(2,9).

Solitary birds about pools of Ord River and Osmand Creek. Storr: Moderately common on lower courses of larger rivers and locally on coast, but generally uncommon.

[GLOSSY IBIS *Plegadis falcinellus*.

Blakers *et al.* (1984) record it from the one degree blocks immediately to the south and north of the Bungle Bungle area. Storr: Nomadic, locally and seasonally common but generally uncommon in freshwater swamps and pools, about the lower Ord River (upstream to Argyle Downs).]

[R SACRED IBIS *Threskiornis aethiopica*.

Storr: Nomadic, locally common but generally uncommon to moderately common throughout the Kimberley.]

[A STRAW-NECKED IBIS *Threskiornis spinicollis*.

Recorded on farm dam near Lissadell homestead (Dames and Moore 1982). Blakers *et al.* (1984) record it from the one degree blocks immediately to the south and north of the Bungle Bungle area. Kilgour (1904) recorded it in flocks of 'tens of thousands' at Ord River Station in 1903. Storr: Common to moderately common in southern and eastern flatlands, scarce in hilly north Kimberley.]

[ROYAL SPOONBILL *Platalea regia*.

Blakers *et al.* (1984) record it from the one degree blocks immediately to the south and north of the Bungle Bungle area. Storr: Moderately common in eastern and southern flatlands, about the lower courses of major streams; scarce elsewhere.]

[YELLOW-BILLED SPOONBILL *Platalea flavipes*.

Blakers *et al.* (1984) record it from the one degree blocks to the immediate south, north, east and west of the Bungle Bungle area. Storr: Uncommon to moderately common about the lower and middle Fitzroy and Sturt Creek; scarce elsewhere, in freshwater lagoons, river-pools and large station dams.]

[R MAGPIE GOOSE *Anseranas semipalmata*.

Storr: Formerly very common but now only moderately common in north-eastern flatlands, formerly common but now uncommon in south-western flatlands, scarce elsewhere; ordinarily south to the middle Ord River (Old Lissadell).]

[A PLUMED WHISTLING-DUCK *Dendrocygna arcuata*.

Recorded at Smoke Creek in the Argyle survey (Dames and Moore 1982). Blakers *et al.* (1984) record it from the one degree blocks immediately to the south, east and north of the Bungle Bungle area. Storr: Locally and seasonally very common (but generally only moderately common) in southern and eastern flatlands.]

BLACK SWAN *Cygnus atratus*

Recorded at Island Yard on the Ord River by Alex Rogers. Storr: Not recorded in the Kimberley until recently (first listed record 1944), but becoming an increasingly frequent visitor.

* RADJAH SHELDUCK (BURDEKINDUCK) *Tadorna radjah*.

(5,9).

Several pairs observed on pools of the Ord River. Kilgour (1904) noted that in 1903 on the Ord River near Ord River station 'wherever there is a fair-sized hole in the river, one is sure to find a pair'. Storr: Formerly moderately common, now becoming uncommon in the north-east, no records from the south Kimberley since 1897; south to Old Lissadell.

A PACIFIC BLACK DUCK *Anas superciliosa*.

(9).

One small flock observed on pool of Ord River near Kitty's Knob. Storr: Moderately common in southern flatlands, uncommon to moderately common in north-eastern flatlands, scarce in hilly north Kimberley.

GREY TEAL *Anas gibberifrons*.

Solitary bird on pool of Ord River near Eagle Hawk Crossing (November 1989). Storr: Uncommon to common in southern flatlands, uncommon to moderately common in north-eastern flatlands (about the Ord River upstream to Old Lissadell), rare in north Kimberley.

[HARDHEAD (WHITE-EYED DUCK) *Aythya australis*. Blakers *et al.* (1984) record it from the one degree blocks to the immediate south and north of the Bungle Bungle area. Storr: Locally and seasonally common, but generally scarce, in southern and eastern freshwater lagoons and claypans.]

AR BLACK-SHOULDERED KITE *Elanus notatus*.

One bird observed at Echidna Chasm on 12 July 1989 (Paton⁴ personal communication). Single bird recorded during Argyle survey. Storr: Status uncertain, but probably a non-breeding visitor.

PACIFIC BAZA (CRESTED HAWK) *Aviceda subcristata*.

(7).

Pair observed in dense riparian vegetation along a tributary of the Osmand Creek (c. 5 km east of Mt. John); also seen at Wulwuldji Spring by N. Gambold and K. Menkhorst (November 1986). Storr: Status uncertain, but clearly rare.

*AR BLACK KITE (FORK-TAILED KITE) *Milvus migrans*.

(2,3).

Preferred land unit: Antrim lowlands.

Preferred floristic group: *Melaleuca* woodland-*Acacia-Aristida*.

Widespread but at low density throughout Park area. Storr: Locally very common (in settled areas), but generally common to moderately common; scarce in unsettled country.

A SQUARE-TAILED KITE *Lophoictinia isura*.

(6).

Single bird seen in south-west of Park. Storr: Moderately common near-west and north-east coast of Dampier Land, scarce to uncommon elsewhere; south to the lower Negri.

*A BLACK-BREASTED BUZZARD *Hamirostra melanosternon*.

(2,3,4,9).

Widespread but at low density throughout Park, usually singly or in pairs. Storr: Moderately common in arid and semi-arid south and east, scarce or uncommon in subhumid north-west.

*AR WHISTLING KITE *Haliastur sphenurus*.

(1,2,5,6).

Preferred land unit: Antrim lowlands.

Widespread but uncommon throughout Park. Storr: Very common in southern and eastern flatlands in vicinity of water, moderately common in hilly north Kimberley.

*AR BROWN GOSHAWK *Accipiter fasciatus*.

(2,7,8,9).

Preferred land unit: Nelson frontage.

Moderately common, especially in taller forests. Nest with young at Kurrajong Camp (November). Storr: Uncommon to moderately common, migratory.

*A COLLARED SPARROWHAWK *Accipiter cirrhocephalus*.

(2,5,6,9).

Preferred land unit: Headley lower slopes.

Uncommon, mostly in denser riparian forests, especially about waterholes. Storr: Uncommon to moderately common.

* GREY GOSHAWK *Accipiter novaehollandiae*.

(2).

Two individuals in dense riparian forest along Osmand Creek. Storr: Scarce to uncommon, extending south along the Ord River to the lower Behn.

R WHITE-BELLIED SEA-EAGLE *Haliaeetus leucogaster*.

(2,5,7,9).

Preferred land unit: Antrim lowlands.

Single birds around waterholes of Ord River and Osmand Creek. Storr: Moderately common on tidal waters; scarce on freshwaters, ascending the Ord River to Lake Argyle.

⁴ J. B. Paton - (private individual) Adelaide

*AR WEDGE-TAILED EAGLE *Aquila audax*.
(3,5,6,7).

Widespread but at low density. Storr: Moderately common in pastoral country; uncommon in subhumid north-west, scarce in sandy deserts.

* LITTLE EAGLE *Hieraaetus morphnoides*.
(3).

Single bird seen at Goosehole. Storr: Uncommon to scarce in lightly wooded country, especially grassy plains about the lower and middle courses of the Fitzroy and Ord Rivers.

*A SPOTTED HARRIER *Circus assimilis*.
(9).

Single bird observed in grassland near Kitty's Knob. Recorded in 1987, 1988 and 1989 by Bob Taylor around Kurrajong, Fowlhouse and the new Three-ways. Storr: Moderately common in southern arid and semi-arid flatlands, uncommon in north-eastern flatlands, scarce in hilly north Kimberley.

[MARSH HARRIER *Circus aeruginosus*.

Blakers *et al.* (1984) record it from the one degree blocks to the immediate south and north of the Bungle Bungle area. Storr: Non-breeding visitor to the greater part of the Kimberley; uncommon about the lower Ord River (upstream to Kununurra).]

A PEREGRINE FALCON *Falco peregrinus*.
(1,4,9,10).

Preferred land unit: Buchanan frontage.

Preferred floristic group: *E. aspera* low woodland-*Acacia-Triodia*.

Reasonably common throughout, especially about the massif. Storr: Uncommon in hilly north-west Kimberley, scarce elsewhere.

*A AUSTRALIAN HOBBY (LITTLE FALCON) *Falco longipennis*.
(2,3,5).

Preferred land unit: Elder cuestas.

Widespread but uncommon. Storr: Moderately common (at least in winter) in southern flatlands, uncommon in north-east flatlands, scarce in hilly north Kimberley.

* GREY FALCON *Falco hypoleucos*.
(1,6,7).

Preferred land unit: Headley lower slopes.

Widespread, at low density. Recorded also at Piccaninny Gorge by J. B. Paton (11 July 1989). Storr: Scarce in the south-west, rare elsewhere.

*AR BROWN FALCON *Falco berigora*.
(1,2,3,5,6,7).

Preferred land units: Wickham rugged uplands, Antrim lowlands, Elder cuestas, Nelson low rises.

Common and widespread. Storr: Generally common on lightly wooded plains.

*A AUSTRALIAN KESTREL *Falco cenchroides*.
(2,4,5).

Widespread but at low numbers, over grasslands and open woodlands. Storr: Uncommon to moderately common resident and moderately common to very common autumn-winter visitor in south and east; uncommon winter visitor in hilly north Kimberley.

*A BROWN QUAIL *Coturnix australis*.
(1,3,9).

Preferred land unit: Elder cuestas.

Preferred floristic groups: *E. brevifolia* open woodland-*Cassia-Plectrachne*; *E. collina* woodland-*Acacia-Triodia*. Locally common, in both spinifex and tussock grasslands (e.g. at Kurrajong Camp). Storr: Common in long grass of subhumid and semi-arid zones.

AR LITTLE BUTTON-QUAIL *Turnix velox*.
(3,6,10).

Preferred land units: Elder cuestas, Buchanan sandplain. Reasonably common in both spinifex and tussock grasslands. Storr: Highly nomadic; very common in good seasons on arid southern plains, but generally uncommon to moderately common.

A RED-CHESTED BUTTON-QUAIL *Turnix pyrrhothorax*.
(9).

Preferred land unit: Nelson cracking clay plains.

Several birds in spinifex and tussock grasslands at Kitty's Knob. One bird caught by hand when spotlighting. At Argyle, three birds were observed on black-soil plains. Storr: Status uncertain, perhaps a drought refugee from interior of eastern Australia. About a dozen records from the Kimberley region.

CHESTNUT-BACKED BUTTON QUAIL *Turnix castanota*.

One individual recorded by J R Ford 5 km west of Park boundary on Calico Springs track, April 1986.

[BLACK-TAILED NATIVE-HEN *Gallinula ventralis*.

Blakers *et al.* (1984) record it from the one degree blocks immediately to the south and north of the Bungle Bungle area. Storr: Uncommon visitor to freshwater swamps in south and east flatlands; about the lower and middle courses of the Ord River.]

[PURPLE SWAMPHEN *Porphyrio porphyrio*.
Storr: Common in north-eastern flatlands about the lower and middle Ord River; upstream to Lissadell.]

[EURASIAN COOT *Fulica atra*.
Blakers *et al.* (1984) recorded it from the one degree blocks immediately to the north, south and west of the Bungle Bungle area. Storr: Scarce to moderately common in southern and eastern flatlands in freshwater lagoons and river pools.]

AR BROLGA *Grus rubicundus*.
(7,9).
Preferred land unit: Nelson interfluvial lower slopes.
Single birds and pairs in pools and grassland along the Ord River and Osmand Creek. Storr: Common in well-watered north-eastern and southern flatlands; uncommon to moderately common in hilly country and on south-western coastal plains.

*AR AUSTRALIAN BUSTARD *Ardeotis australis*.
(3,6,9).
Preferred land units: Nelson cracking clay plains, Nelson interfluvial lower slopes.
Reasonably common and widespread, especially in tussock grasslands. Storr: Nomadic; uncommon to very common on southern plains; less numerous in semi-arid and subhumid zones.

* BUSH THICK-KNEE (SOUTHERN STONE-CURLEW) *Burhinus magnirostris*.
(2).
We recorded only two birds, in open woodland over tussock grassland near Red Rock. Muir (1983) heard birds on the Ord River and at the Bungle Bungle massif. Storr: Uncommon to moderately common in subhumid and semi-arid zones, and near coast in arid zone; scarce or absent in arid interior.

AR MASKED LAPWING (SPUR-WINGED PLOVER) *Vanellus miles*.
(9).
In small groups near pools and in short grasslands along Ord River. Storr: Moderately common in north-eastern and southern flatlands, rare in hilly north Kimberley.

[RED-KNEED DOTTEREL *Erythrogonys cinctus*.
Blakers *et al.* (1984) record it from the one degree blocks immediately to the south and north of the Bungle Bungle area. Storr: Uncommon in north-eastern flatlands (about the lower and middle Ord River); south-eastern and south-western flatlands.]

*AR BLACK-FRONTED PLOVER *Charadrius melanops*.
(1,2,3,5,6,9,10).
Preferred land unit: Antrim lowlands.
Preferred floristic group: *E. camaldulensis-Melaleuca* open forest-*Aerva-Aristida*.
Common in small groups on shingle beaches around pools in all watercourses. Storr: Common in well-watered eastern and southern flatlands; generally scarce or absent in hilly north Kimberley, except on floodplains of large rivers where moderately common.

A BLACK-WINGED STILT *Himantopus himantopus*.
(9).
Three birds on pool of Ord River at Eagle Hawk Crossing (November 1989). At Argyle, four birds recorded at Smoke Creek (Dames and Moore 1982). Storr: Nomadic; common on north-eastern and south-eastern flatlands (including the Ord River south to Old Lissadell).

[A WOOD SANDPIPER *Tringa glareola*.
Blakers *et al.* (1984) record it from the one degree blocks immediately to the south and north of the Bungle Bungle area. At Argyle several birds were recorded around ephemeral pools. Storr: Uncommon visitor in north-eastern flatlands (about lower and middle Ord River upstream to Argyle Lagoon) and south-western flatlands; scarce elsewhere.]

COMMON SANDPIPER *Tringa hypoleucos*.
(9).
Single birds at two isolated pools on the Ord River near Kitty's Knob. Storr: Moderately common visitor to greater part of Kimberley.

[GREENSHANK *Tringa nebularia*.
Blakers *et al.* (1984) record it from the one degree blocks immediately to the south and north of the Bungle Bungle area. Storr: Moderately common on north-eastern flatlands (the Ord River south to Old Lissadell), south-western flatlands and coasts.]

[ORIENTAL PRATINCOLE *Glareola maldivarum*.
Blakers *et al.* (1984) record it from the one degree blocks immediately to the south and north of the Bungle Bungle area. Kilgour (1904) reported large flocks on the plains of Ord River Station during the wet season. Storr: Common visitor to the greater part of the Kimberley.]

A AUSTRALIAN PRATINCOLE *Stiltia isabella*.

The manager of Ord River Station (Don Haddon) recorded many birds in flocks on black-soil plains of the Station and the Park near Eagle Hawk Crossing (October 1989). Storr: Nomadic; uncommon to common in well-watered southern and north-eastern flatlands, absent or scarce in hilly north Kimberley.

[WHISKERED TERN *Chlidonias hybrida*.

Blakers *et al.* (1984) record it from the one degree blocks immediately to the south and north of the Bungle Bungle area. Storr: Nomadic; during and after the wet season a common visitor to freshwater swamps in south-western flatlands and north-eastern flatlands (about the lower and middle Ord); in the dry season retreating to permanent freshwaters (e.g. lagoons and river-pools on and near the Ord River).]

*AR PEACEFUL DOVE *Geopelia placida*.

(1,2,3,5,6,7,8,9,10).

Preferred land unit: Antrim lowlands.

Preferred floristic group: *Melaleuca* woodland-*Acacia-Aristida*.

Very common throughout the Park, especially in tussock grasslands with forest or woodland overstorey. Storr: Moderately common to very common over most of the Kimberley.

*AR DIAMOND DOVE *Geopelia cuneata*.

(3,5,6,9,10).

Preferred land unit: Nelson cracking clay plains.

Preferred floristic group: *E. brevifolia* open woodland-*Cassia-Plectrachne*.

Common throughout the Park, especially in spinifex and degraded tussock grasslands with relatively open woodland overstorey. Storr: Common in arid zone, moderately common in semi-arid zone, generally uncommon in subhumid zone.

*A BAR-SHOULDERED DOVE *Geopelia humeralis*.

(2,3,5,7,9).

Preferred land unit: Antrim lowlands.

Preferred floristic group: *E. ptychocarpa* forest-*Pandanus-Heteropogon*.

Common in riparian forests and dense shrublands throughout the Park. Storr: Common on coastal plains, common to moderately common along the largest rivers (e.g. lower and middle Ord), but uncommon, scarce or absent in much of the interior.

* COMMON BRONZEWING *Phaps chalcoptera*.

(1,2,3,6,9).

Preferred land unit: Headley lower slopes.

Moderately common and widespread, favouring *Acacia* thickets. Storr: Moderately common in north-western subhumid zone, uncommon elsewhere.

[FLOCK BRONZEWING *Phaps histrionica*.

Storr: Common on open black-soil plains, occurring in the greater part of the Kimberley.]

*AR CRESTED PIGEON *Ocyphaps lophotes*.

(1,2,3,5,8,9).

Preferred land unit: Buchanan frontage.

Preferred floristic group: *E. brevifolia* open woodland-*Cassia-Plectrachne*.

Common in open woodlands over tussock grasslands throughout the Park. Storr: Common in arid zone and parts of semi-arid zone, scarce elsewhere.

*R WHITE-QUILLED ROCK-PIGEON *Petrophassa*

albipennis.

(1,4,7,10).

Preferred land unit: Buchanan frontage.

Preferred floristic group: *E. aspera* low woodland-*Acacia-Triodia*.

Reasonably common about rocky ranges throughout. Storr: Common in hilly north and central Kimberley; south to Lake Argyle.

*AR SPINIFEX PIGEON *Petrophassa plumifera*.

(1,3,5,6,7,9,10).

Preferred land unit: Buchanan uplands.

Preferred floristic group: *Acacia farnesiana* open shrubland-*Aerva-Aristida*.

Common in spinifex throughout the Park. Storr: Common in arid zone; uncommon to moderately common in semi-arid zone.

*AR RED-TAILED BLACK-COCKATOO

Calyptorhynchus magnificus.

(2,7,8,9).

Preferred land unit: Wickham rugged uplands.

Preferred floristic group: *E. ptychocarpa* forest-*Pandanus-Heteropogon*.

Reasonably common in taller forests, especially where *Eucalyptus ptychocarpa* is abundant. Storr: Generally common throughout most of the Kimberley.

*AR GALAH *Cacatua roseicapilla*.

Uncommon, occurring in small flocks in woodland areas (e.g. at Kurrajong Camp). Bob Taylor has recorded it in small numbers from Fowlhouse, Osmand Creek and the Ninety Kilometre fence in 1987, 1988 and 1989. Storr: Common in well-watered parts of arid zone and in pastoral country in semi-arid, scarce elsewhere.

*AR LITTLE CORELLA *Cacatua sanguinea*.

(2,3,5,7,9).

Preferred land unit: Antrim lowlands.

Preferred floristic group: *E. camaldulensis*/*Melaleuca* open forest-*Aerva-Aristida*.

Common and widespread, with large flocks (to 200 birds) drinking at isolated waterholes on the Ord River in November. Storr: Very common in flatlands about larger watercourses in arid and semi-arid zones, uncommon in subhumid zone.

*AR SULPHUR-CRESTED COCKATOO *Cacatua galerita*.
(1,2,3,5,6,7,8,9).

Preferred land unit: Antrim lowlands.

Preferred floristic group: *E. camaldulensis-Melaleuca* open forest-*Aerva-Aristida*.

Widespread and reasonably common, especially in taller riparian forests. Storr: Uncommon, mainly in the subhumid and semi-arid zones.

*AR RED-COLLARED LORIKEET *Trichoglossus rubritorquis*.
(1,2,9).

Preferred land unit: Buchanan sandplain.

Uncommon and restricted mainly to tall and dense riparian forests. Storr: Nomadic; common in subhumid zone and wetter half of semi-arid zone, scarce elsewhere.

*AR VARIED LORIKEET *Psitteuteles versicolor*.
(3,5,8,9).

Preferred land unit: Antrim lowlands.

Preferred floristic group: *Melaleuca* low open woodland-*Acacia-Aerva*.

Uncommon, restricted mainly to relatively tall open forests. Storr: Nomadic; common in wetter half of subhumid zone, moderately common in subhumid zone and drier half of semi-arid zone, scarce to moderately common elsewhere.

*AR RED-WINGED PARROT *Aprosmictus erythropterus*.
(1,2,3,5,6,7,8,9).

Preferred land unit: Headley lower slopes.

Preferred floristic group: *E. ptychocarpa* forest-*Pandanus-Heteropogon*.

Common in small groups, especially in relatively tall forests by watercourses. Storr: Moderately common to common, particularly in subhumid zone.

*AR COCKATIEL *Nymphicus hollandicus*.
(1,2,3,5,6,9).

Preferred land unit: Buchanan sandplain.

Preferred floristic group: *E. collina* woodland-*Acacia-Plectrachne*.

Reasonably common throughout the Park, usually in small groups. Storr: Nomadic; scarce to common in arid and semi-arid zones.

*AR BUDGERIGAR *Melopsittacus undulatus*.
(1,2,3,5,9).

Preferred land unit: Elder cuestas.

Preferred floristic group: *E. brevifolia* open woodland-*Cassia-Plectrachne*.

Common, especially in open woodland over spinifex. Storr: Nomadic, common in arid and semi-arid zones, irregular in subhumid zone.

*AR NORTHERN ROSELLA *Platycercus venustus*.
(1,2,3,5,6,8).

Preferred land unit: Buchanan frontage.

Preferred floristic group: *E. collina* woodland-*Acacia-Plectrachne*.

Reasonably common and widespread, mostly in open forests. Storr: Locally common in subhumid and semi-arid zones; south to Texas Downs and Lake Argyle.

*A PALLID CUCKOO *Cuculus pallidus*.
(3,6,7,9).

Preferred land unit: Nelson cracking clay plains.

Widespread in low numbers, mostly in open forests. Storr: Nonbreeding visitor throughout the Kimberley.

R BRUSH CUCKOO *Cuculus variolosus*.
(9).

Preferred land unit: Nelson frontage.

Occasional birds in taller forests (e.g. near Osmand Valley Homestead), in wet season survey only. Storr: Uncommon, mainly in subhumid and semi-arid zones.

[A BLACK-EARED CUCKOO *Chrysococcyx osculans*.

At Argyle, single birds in low woodland. Storr: Nonbreeding visitor; uncommon in arid and semi-arid zones, scarce in subhumid zone.]

HORSFIELD'S BRONZE-CUCKOO *Chrysococcyx basalis*.

(3,5,6,9,10).

Preferred land unit: Nelson cracking clay plains.

Uncommon but widespread in woodlands and open forests. Storr: Moderately common in south-eastern and semi-arid zones, scarce in subhumid.

COMMON KOEL *Eudynamis scolopacea*.

(9).

Preferred land unit: Nelson frontage.

Uncommon, only recorded in wet season survey in tall riparian and open forest near the Ord River. Storr: Moderately common in subhumid zone, uncommon in semi-arid zone; south to Lake Argyle.

* CHANNEL-BILLED CUCKOO *Scythrops novaehollandiae*.

(2,8).

Preferred land unit: Wickham rugged uplands.

Uncommon, solitary or in pairs in tall riparian forests and gorges (e.g. Winnama Gorge). Storr: Uncommon visitor to semi-arid zone, rare in subhumid zone.

*A PHEASANT COUCAL *Centropus phasianus*.
(2,7).

Uncommon, solitary or in pairs in tussock grasslands.
Storr: Moderately common in subhumid zone, uncommon
in semi-arid, scarce in arid; south to Texas Downs.

*AR SOUTHERN BOOBOO *Ninox novaeseelandiae*.
(3,4,5,7,8,10).

Preferred land units: Wickham rugged uplands, Elder
uplands, Elder cuestas.

Common and widespread, frequently found sheltering in
caves and crevices of the massif. Storr: Common in most
of the Kimberley.

*A BARKING OWL *Ninox connivens*.
(2,7).

Preferred land unit: Wickham rugged uplands.
Uncommon, we recorded it only in the Osmand valley,
although Muir (1983) heard it on the Ord River near Spring
Creek. Storr: Common in most of the Kimberley.

A BARN OWL *Tyto alba*.
(3,9).

Preferred land units: Nelson frontage, Nelson low rises,
Nelson interfluvial lower slopes.

Common on black-soil plains and open tussock grasslands.
Storr: Uncommon, occurring as a winter visitor through
most of the Kimberley.

*A TAWNY FROGMOUTH *Podargus strigoides*.
(1,3,5,6,8,10).

Preferred land unit: Wickham rugged uplands.
Reasonably common throughout Park. Storr: Common,
occurring through most of the Kimberley.

A AUSTRALIAN OWLET-NIGHTJAR *Aegotheles*
cristatus.
(1,6,9).

Preferred land unit: Nelson frontage.
Uncommon but widespread, occurring in most wooded
habitats. Storr: Moderately common through most of the
Kimberley.

*A SPOTTED NIGHTJAR *Caprimulgus guttatus*.
(1,3,5,6,7,8).

Preferred land unit: Headley lower slopes.
Common and widespread especially in spinifex covered
hills. Storr: Uncommon resident and moderately common
winter visitor, occurring through most of the Kimberley.

[FORK-TAILED SWIFT *Apus pacificus*.

Blakers *et al.* (1984) record it from the one degree blocks
immediately to the south and north of the Bungle Bungle
area. Storr: Common visitor.]

AZURE KINGFISHER *Ceyx azurea*.
(2,5,7).

Preferred land unit: Antrim lowlands.
Preferred floristic group: *E. camaldulensis*/*Melaleuca* open
forest-*Aerya-Aristida*.

Reasonably common along pools of the Ord River and
Osmand Creek, especially where there is dense riparian
vegetation. Storr: Uncommon in subhumid zone, scarce in
semi-arid zone; south to the middle Ord (Brook Creek).

*AR BLUE-WINGED KOOKABURRA *Dacelo leachii*.
(1,2,6,7,8,9).

Preferred land units: Wickham rugged uplands, Antrim
lowlands.

Preferred floristic group: *E. ptychocarpa* forest-*Pandanus*-
Heteropogon.

Widespread and reasonably common in taller forests,
especially in relatively dense riparian vegetation. Storr:
Moderately common, in most of the Kimberley.

*AR RED-BACKED KINGFISHER *Halcyon*
pyrrhopygia.
(2,3,5,6,7,8,10).

Preferred land unit: Antrim rugged uplands.
Reasonably common and widespread in most vegetation
types. Storr: Common in arid and semi-arid zones, scarce
in subhumid zones.

*A SACRED KINGFISHER *Halcyon sancta*.
(8,9,10).

Preferred land unit: Nelson frontage.
Preferred floristic group: *Lysiphyllum* low woodland-
Acacia-Cenchrus.

Reasonably common and widespread, wet season survey
only. Storr: Migrant, occurring through most of the
Kimberley.

*AR RAINBOW BEE-EATER *Merops ornatus*.
(1,2,3,4,5,6,7,8,9,10).

Preferred land unit: Buchanan frontage.
Preferred floristic group: *Acacia* spp. tall shrubland-*Triodia*.
Common and widespread throughout the Park. Storr: Very
common winter visitor and passage migrant; in summer,
moderately common in arid and semi-arid zones but scarce
in subhumid zone.

*A DOLLARBIRD *Eurystomus orientalis*.
(8,9).

Preferred land units: Wickham rugged uplands, Nelson
frontage.

Preferred floristic group: *Livistona* open forest-*Acacia*-
Germania.

Uncommon, solitary or in small groups, especially around
taller riparian forests; only recorded during wet season.
Storr: Breeding visitor, moderately common in most of the
Kimberley.

*A SINGING BUSHLARK *Mirafra javanica*.
(8,9).

Preferred land units: Nelson cracking clay plains, Nelson interfluvial lower slopes.

Preferred floristic group: *Lysiphillum* low woodland-*Acacia-Cenchrus*.

Common in tussock grasslands, especially on black soil and eroded plains. Storr: Very common in arid zone on black-soil plains; common on alluvial and other grassy plains of arid and semi-arid, patchily distributed and generally uncommon in the subhumid zone.

*A TREE MARTIN *Cecropis nigricans*.
(5,9).

Uncommon, in small flocks (2 to 5 birds) in open forests and around waterholes. Storr: Nonbreeding visitor, very common in dry season near coast, scarce to moderately common elsewhere.

*AR FAIRY MARTIN *Cecropis ariel*.
(3,9,10).

Preferred land unit: Buchanan sandplain.

Preferred floristic group: *E. collina* woodland-*Acacia-Triodia*.

Moderately common and widespread. Nests are common on the massif. Storr: Nomadic, locally common but generally uncommon, occurring through most of the Kimberley.

*AR RICHARD'S PIPIT *Anthus novaeseelandiae*.
(5).

Uncommon, restricted mainly to degraded tussock grasslands. Storr: Locally common in arid zone, but generally uncommon to moderately common; absent to uncommon in semi-arid zone.

*AR BLACK-FACED CUCKOO-SHRIKE *Coracina novaehollandiae*.
(1,2,3,4,5,6,7,8,9,10).

Preferred land unit: Antrim lowlands.

Preferred floristic group: *E. camaldulensis*/*Melaleuca* open forest-*Aerva-Aristida*.

Common and widespread, occurring in all vegetation types. Storr: Common through most of the Kimberley.

*AR WHITE-BELLIED CUCKOO-SHRIKE *Coracina papuensis*.
(1,2,3,5,6,7,8).

Preferred land unit: Wickham rugged uplands.

Preferred floristic groups: *Livistona* open forest-*Acacia-Germania*; *Lysiphillum* woodland-*Carissa-Heteropogon*.

Common and widespread, especially in relatively tall forests. Storr: Common in subhumid zone, uncommon in arid and semi-arid zone; south to Texas Downs and the Behn.

*AR GROUND CUCKOO-SHRIKE *Coracina maxima*.
(3).

Uncommon, singly or in pairs, in tussock grasslands and degraded areas. Storr: Locally common or moderately common in arid zone, but generally uncommon.

*AR WHITE-WINGED TRILLER *Lalage sueurii*.
(1,2,3,5,6,7,9,10).

Preferred land unit: Antrim rugged uplands.

Preferred floristic group: *Acacia farnesiana* open shrubland-*Aerva-Aristida*.

Common and widespread, occurring in all habitats. In large flocks at flowering *Grevilleas* on massif in July. Storr: Common to very common in arid and semi-arid zones, uncommon to moderately common in subhumid zone.

R RED-CAPPED ROBIN *Petroica goodenovii*.
(6).

One bird seen in open woodland. Storr: Non-breeding winter visitor. Uncommon to moderately common in pindan of western arid zone, scarce elsewhere; north to Christmas Creek and Old Billiluna.

[HOODED ROBIN *Melanodryas cucullata*.

Blakers *et al.* (1984) recorded it from the one degree blocks to the immediate north and east of the Bungle Bungle area. Storr: Uncommon, in northern interior, south-western and south-eastern.]

A JACKY WINTER *Microeca leucophaea*.
(2).

Preferred land unit: Buchanan sandplain.

Recorded only in *Lysiphillum* woodland adjacent to the Osmand, where it was quite common. Storr: Common in open forests and woodlands of the semi-arid zone and in pindan of the western arid zone, scarce to uncommon in the rest of the arid zone and in the subhumid zone.

[WHITE-BROWED ROBIN *Poecilodryas superciliosa*.
Kilgour (1904) reported this species as common along the riverbanks of the Ord River near Ord River Station around 1903. It now appears to be absent in this area (Smith and Johnstone 1977). Storr: In dense riparian vegetation, formerly common but now scarce on the Fitzroy and Ord River (upstream to Brook Creek), common on Drysdale, uncommon in subhumid zone.]

*AR RUFOUS WHISTLER *Pachycephala rufiventris*.
(2,3,5,6,7,8,9,10).

Preferred land unit: Nelson frontage.

Preferred floristic group: *Melaleuca* woodland-*Acacia-Aristida*.

Widespread and common in all areas of woodland and forest. Storr: Common throughout the Kimberley, excluding sandy deserts.

* SANDSTONE SHRIKE-THRUSH *Colluricincla woodwardi*.

(1,3,4,6,7,10).

Preferred land unit: Buchanan frontage.

Preferred floristic group: *E. aspera* low woodland-*Acacia-Triodia*. Widespread and reasonably common in all rocky habitats. Storr: Common to moderately common in subhumid and semi-arid zones.

CRESTED BELLBIRD *Oreoica gutturalis*.

Not recorded in this survey. J. R. Ford heard at least one calling in 'wattle scrub about watercourses' about 5 km west of Three-Ways in April 1986.

*AR GREY SHRIKE-THRUSH *Colluricincla harmonica*. (1,2,3,5,6,7,9,10).

Preferred land unit: Antrim lowlands.

Preferred floristic group: *E. camaldulensis*/*Melaleuca* open forest-*Aerva-Aristida*.

Widespread and common in all areas of woodland and forest. Storr: Uncommon to moderately common throughout most of the Kimberley.

*R LEADEN FLYCATCHER *Myiagra rubecula*. (7,8).

Preferred land unit: Wickham rugged uplands.

Preferred floristic groups: *Livistona* open forest-*Acacia-Germania*; *E. ptychocarpa* forest-*Pandanus-Heteropogon*. Uncommon, restricted mainly to tall riparian forests. Storr: Common in subhumid zone, uncommon to moderately common in wetter half of semi-arid zone, scarce in driest part of range.

*AR RESTLESS FLYCATCHER *Myiagra inquieta*. (2,5,6,7,8,9,10).

Preferred land unit: Nelson frontage.

Preferred floristic group: *E. camaldulensis*/*Melaleuca* open forest-*Aerva-Aristida*.

Common and widespread, occurring through all habitats. Storr: Moderately common in most of the Kimberley.

* GREY FANTAIL *Rhipidura fuliginosa*.

Not recorded in this survey, but Bob Taylor has recorded it in every year from 1986 to 1989 in riparian areas (e.g. Wulwulji Springs, 'Frog Hollow', Osmand Range and 'Fowlhouse'). One collected by J. R. Ford at base of massif, April 1986. Storr: Uncommon winter visitor, scattered records.

*AR NORTHERN FANTAIL *Rhipidura rufiventris*. (2,5,7,8).

Preferred land unit: Wickham rugged uplands.

Preferred floristic group: *E. ptychocarpa* forest-*Pandanus-Heteropogon*.

Reasonably common, though restricted mostly to denser riparian vegetation. Storr: Common and widespread in the subhumid zone, locally moderately common in the wetter half of the semi-arid zone.

*AR WILLIE WAGTAIL *Rhipidura leucophrys*. (1,2,3,5,6,7,8,9,10).

Preferred land unit: Nelson frontage.

Preferred floristic group: *E. camaldulensis*/*Melaleuca* open forest-*Aerva-Aristida*.

Common and widespread occurring through all vegetation types. Storr: Uncommon to moderately common in subhumid zone, common in semi-arid, scarce in arid zone.

*AR GREY-CROWNED BABBLER *Pomatostomus temporalis*.

(2,3,5,6,9,10).

Preferred land unit: Elder cuestas.

Preferred floristic group: *E. brevifolia* open woodland-*Cassia-Plectrachne*.

Common and widespread, especially in dense scrub, woodland and open forest areas. Storr: Common in semi-arid and arid areas, uncommon in subhumid zone.

* SPINIFEXBIRD *Eremiornis carteri*. (3,6).

Preferred land unit: Nelson low rises.

Uncommon, restricted to spinifex grasslands. We recorded it also in spinifex on stony hills on the Spring Creek Track about 8 km west of Three-ways. Storr: Moderately common in arid southern interior, north to the Hardman Range.

GOLDEN-HEADED CISTICOLA *Cisticola exilis*. (9).

Preferred land unit: Nelson cracking clay plains.

Recorded only in tussock grasslands on black-soil plains adjacent to the Ord River, though relatively common there. Storr: Common in subhumid zone, uncommon to moderately common in semi-arid zone, scarce in arid zone; south to Ord River Station.

*A RUFOUS SONGLARK *Cinclorhamphus mathewsi*. (2,9).

Preferred land unit: Nelson cracking clay plains.

Uncommon, in tussock grasslands with or without tree layer. Storr: Uncommon to moderately common in arid and semi-arid zones, scarce in subhumid zone.

[PURPLE-CROWNED FAIRY-WREN *Malurus coronatus*.

Kilgour (1904) reported it 'almost wherever there is water' around Ord River Station in 1903. Storr: Formerly the greater part of the Kimberley; south to the upper Ord (Ord River Station), where now it is apparently extinct (Smith and Johnstone 1977).]

* VARIEGATED FAIRY-WREN *Malurus lamberti*. (4,6,7,10).

Preferred land units: Wickham rugged uplands, Buchanan uplands.

Preferred floristic group: *Lysiphyllum* woodland-*Carissa-Heteropogon*.

Reasonably common and widespread, especially in spinifex about sandstone ranges. Storr: Moderately common in subhumid and semi-arid zones.

*AR RED-BACKED FAIRY-WREN *Malurus melanocephalus*.
(1,3,5,6,8,9,10).

Preferred land unit: Nelson cracking clay plains.

Preferred floristic group: *Lysiphyllum* low woodland-*Acacia-Cenchrus*.

Common and widespread in tussock grasslands and spinifex. Storr: Common in subhumid and semi-arid zones, uncommon and patchily distributed in arid zones.

*AR WEEBILL *Smicrornis brevirostris*.
(2,3,5,6,7,8,9,10).

Preferred land unit: Antrim rugged uplands.

Preferred floristic group: *Lysiphyllum* woodland-*Carissa-Heteropogon*.

Common and widespread in most forest and woodland habitats. Storr: Moderately common throughout most of the Kimberley.

*A VARIED SITTELLA *Daphoenositta chrysoptera*.
(1,2,6,9).

Preferred land unit: Nelson frontage.

Preferred floristic group: *Hakea* low woodland-*Acacia-Cenchrus*.

Reasonably common and widespread in most open forest and woodland habitats. Storr: Uncommon to moderately common in most of the Kimberley.

*AR BLACK-TAILED TREECREEPER *Climacteris melanura*.
(1,2,3,5,6,9).

Preferred land unit: Antrim rugged uplands.

Preferred floristic group: *E. collina* woodland-*Acacia-Triodia*.

Common and widespread in most woodland and open forest habitats. Storr: Common in semi-arid interior, uncommon in Dampier Land and arid zone, scarce in north-west and humid zone.

*AR SILVER-CROWNED FRIARBIRD *Philemon argenticeps*.
(1,2,4,6,7,8).

Preferred land unit: Buchanan frontage.

Preferred floristic group: *Livistona* open forest-*Acacia-Germania*.

Reasonably common and widespread, mostly in taller open forests. Storr: Common in subhumid zone; south to Lake Argyle; uncommon to moderately common in semi-arid zone.

*AR LITTLE FRIARBIRD *Philemon citreogularis*.
(1,2,3,4,5,6,7,8,9,10).

Preferred land unit: Nelson frontage.

Preferred floristic group: *E. collina* woodland-*Acacia-Triodia*.

Common and widespread in all woodland and open forest habitats. Storr: Common to very common in semi-arid zone, generally uncommon in arid zone, scarce in subhumid zone.

[R BLUE-FACED HONEYEATER *Entomyzon cyanotis*.
Storr: Locally common but generally uncommon and patchily distributed; in subhumid zone and wetter half of semi-arid zone, south to Lake Argyle.]

*AR YELLOW-THROATED MINER *Manorina flavigula*.
(1,3,4,5,7,8,9,10).

Preferred land unit: Buchanan sandplain.

Preferred floristic group: *E. collina* woodland-*Acacia-Plectrachne*.

Common and widespread in taller open forests. Storr: Moderately common to common in arid and semi-arid zones.

*AR SINGING HONEYEATER *Lichenostomus virescens*.
(3,4,5,7,9).

Preferred land unit: Nelson cracking clay plains.

Preferred floristic group: *Lysiphyllum* low woodland-*Acacia-Cenchrus*.

Reasonably common and widespread, especially in *Lysiphyllum* woodlands. Storr: Moderately common to very common in arid zone, uncommon and patchy in semi-arid, scarce or absent in subhumid zone.

*AR WHITE-GAPED HONEYEATER *Lichenostomus unicolor*.
(2,5,7,8,9).

Preferred land unit: Nelson frontage.

Preferred floristic group: *Livistona* open forest-*Acacia-Germania*.

Reasonably common in denser riparian forests, springs and well-vegetated gorges. Storr: Locally common in subhumid zone and denser vegetation of semi-arid zone.

R GREY-HEADED HONEYEATER *Lichenostomus keartlandi*.
(1).

Only one pair seen, in flowering *Grevillea* in gorge of Bull Creek. Storr: Uncommon to moderately common in arid southern interior.

*AR GREY-FRONTED HONEYEATER (YELLOW-FRONTED HONEYEATER) *Lichenostomus plumulus*. (1,3,4,6,7,8,9,10).

Preferred land unit: Elder cuestas.

Preferred floristic group: *E. collina* woodland-*Acacia-Triodia*.

Very common in most woodland vegetation throughout Park. Storr: Moderately common in arid and semi-arid interior.

*AR YELLOW-TINTED HONEYEATER *Lichenostomus flavescens*. (2,5,6,7,8,9).

Preferred land unit: Antrim lowlands.

Preferred floristic group: *E. camaldulensis*/*Melaleuca* open forest-*Aerva-Aristida*. Patchily common, especially in riparian *Eucalyptus camaldulensis* forests. Storr: Moderately common to very common, over most of the Kimberley.

*AR BLACK-CHINNED HONEYEATER (GOLDEN-BACKED HONEYEATER) *Melithreptus gularis*. (1,3,5,6,7,9).

Preferred land unit: Elder cuestas.

Preferred floristic group: *E. camaldulensis*/*Melaleuca* open forest-*Aerva-Aristida*.

Reasonably common and widespread. Storr: Nomadic, uncommon to moderately common in arid and semi-arid zones, scarce visitor to subhumid zone.

*AR WHITE-THROATED HONEYEATER *Melithreptus albobularis*. (2,7,8,10).

Preferred land unit: Antrim lowlands.

Preferred floristic group: *Livistona* open forest-*Acacia-Germania*.

Reasonably common and widespread, especially in denser and taller forests. Storr: Moderately common; in subhumid and semi-arid zones.

*AR BROWN HONEYEATER *Lichmera indistincta*. (1,2,4,5,6,7,8,9,10).

Preferred land unit: Nelson frontage.

Preferred floristic group: *E. ptychocarpa* forest-*Pandanus-Heteropogon*.

Very common in all woodland and open forest habitats. Storr: Very common throughout most of the Kimberley.

A BAR-BREASTED HONEYEATER *Ramsayornis fasciatus*. (7).

Preferred land unit: Wickham rugged uplands.

Preferred floristic group: *E. ptychocarpa* forest-*Pandanus-Heteropogon*.

Uncommon, recorded only in paperbark forests of Osmand Creek area. Storr: Moderately common in subhumid and semi-arid zones; south to Lake Argyle.

*AR RUFOUS-THROATED HONEYEATER *Conopophila rufogularis*. (4,5,7,8,9).

Preferred land unit: Nelson frontage.

Preferred floristic group; *Lysiphyllum* low woodland-*Acacia-Cenchrus*.

Moderately common, especially in *Lysiphyllum* woodlands, but large flocks collecting around flowering trees in many other habitats. Storr: Moderately common to common in subhumid zones, uncommon and patchy in arid zone.

*AR BANDED HONEYEATER *Certhionyx pectoralis*. (9).

Preferred land unit: Nelson frontage. Uncommon, occurring at low density in woodlands and open forests. Bob Taylor has observed it breeding in all years from 1986 to 1989, at Bellburn Creek, Kurrajong and the northern gorges. Storr: Nomadic, locally common in semi-arid zone but generally uncommon, scarce in subhumid zone.

*AR MISTLETOEBIRD *Dicaeum hirundinaceum*. (1,2,3,4,5,6,7,8,9,10).

Preferred land unit: Buchanan frontage.

Preferred floristic group: *E. aspera* low woodland-*Acacia-Triodia*.

Very common and widespread, in all woodlands and open forests. Storr: Common in subhumid zone, moderately common in semi-arid and arid zones.

AR RED-BROWED PARDALOTE *Pardalotus rubricatus*. (1,3,5,6,9,10).

Preferred land unit: Elder cuestas.

Preferred floristic group: *E. brevifolia* open woodland-*Cassia-Plectrachne*.

Common and widespread, especially in relatively tall riparian open forests. Storr: Common in arid and semi-arid zones.

*AR STRIATED PARDALOTE *Pardalotus striatus*. (1,2,3,4,5,6,7,8).

Preferred land unit: Buchanan frontage.

Preferred floristic group: *Melaleuca* woodland-*Acacia-Aristida*.

Common and widespread in all woodlands and open forests. More abundant in dry season. Storr: Common through most of the Kimberley.

* PAINTED FIRETAIL *Emblema picta*. (3,5,6,8,10).

Preferred land unit: Nelson low rises.

Preferred floristic group: *Acacia farnesiana* open shrubland-*Aerva-Aristida*.

Common and widespread in spinifex. Storr: Locally common in hilly arid interior, but generally uncommon, scarce and patchy in hilly semi-arid country.

*A CRIMSON FINCH *Neochmia phaeton*.
(7,9).

Preferred land unit: Wickham rugged uplands.
Preferred floristic group: *Melaleuca* woodland-*Acacia-Aristida*.

Locally abundant (e.g. Wulwuldji Spring) in dense pandanus. Storr: Locally common but generally uncommon to moderately common and patchy in subhumid and semi-arid zones; south to Lake Argyle and the Negri.

*AR ZEBRA FINCH *Poephila guttata*.
(3,5,6,9,10).

Preferred land unit: Nelson low rises.
Preferred floristic group: *Acacia farnesiana* open shrubland-*Aerva-Aristida*.

Widespread and common, especially in tussock grasslands. Storr: Very common in arid zone, moderately common in drier half of semi-arid zone.

*AR DOUBLE-BARRED FINCH *Poephila bichenovii*.
(2,5,6,7,8,9,10).

Preferred land unit: Antrim lowlands.
Preferred floristic group: *E. camaldulensis*/*Melaleuca* open forest-*Aerva-Aristida*.

Reasonably common and widespread, especially in wetter areas with dense shrub layer. Storr: Generally common in semi-arid zone and along the lower and middle Ord River drainage, uncommon to moderately common in subhumid zone.

*AR MASKED FINCH *Poephila personata*.
(5,6,9).

Preferred land unit: Antrim rugged uplands.
Uncommon. Occurring in open forests and woodlands above tussock grass, usually solitary or in small groups. Storr: Uncommon, south to Lake Argyle and the Negri.

*AR LONG-TAILED FINCH *Poephila acuticauda*.
(1,2,3,5,6,8,10).

Preferred land units: Al, Antrim rugged uplands.
Preferred floristic group: *Lysiphyllum* woodland-*Carissa-Heteropogon*.

Common and widespread, especially in open forests and woodlands above tussock grasslands. Storr: Moderately common throughout most of the Kimberley.

*A PICTORELLA MANNIKIN *Lonchura pectoralis*.
(1,3,9).

Preferred land unit: Nelson cracking clay plains.
Uncommon and patchily distributed, mostly in tussock grasslands. J. B. Paton recorded it also from Kurrajong Camp (10-12 July 1989). Storr: Nomadic, uncommon to moderately common (least plentiful in upper Ord River drainage), mainly semi-arid and arid interior.

[CHESTNUT-BREADED MANNIKIN *Lonchura castaneothorax*.

Storr: Nomadic, locally common but generally uncommon, in northern and north-western Kimberley. It became established in the north-eastern flatlands (the Ord River upstream to Old Lissadell) between 1910 and 1960.]

A GOULDIAN FINCH *Erythrura gouldiae*.

One juvenile reported drinking at bird bath at Bellburn Creek, early dry season 1989 (Alex Rogers). Storr: Scarce to moderately common in subhumid and semi-arid zones.

*AR OLIVE-BACKED ORIOLE *Oriolus sagittatus*.
(2,7,8).

Preferred land unit: Wickham rugged uplands.
Preferred floristic group: *E. ptychocarpa* forest-*Pandanus-Heteropogon*.

Uncommon, mostly in riparian open forests, especially where figs occur. Storr: Nomadic, uncommon to moderately common in subhumid and semi-arid zones, scarce in arid zone.

*AR GREAT BOWERBIRD *Chlamydera nuchalis*.
(1,2,4,5,6,7,8,9,10).

Preferred land unit: Wickham rugged uplands.
Preferred floristic group: *Livistona* open forest-*Acacia-Germania*.

Common and widespread in all open forest and woodland habitats. Storr: Common throughout most of the Kimberley.

*AR AUSTRALIAN MAGPIE-LARK *Grallina cyanoleuca*.
(1,2,3,5,7,8,9).

Preferred land unit: Elder cuestas.
Preferred floristic group: *E. camaldulensis*/*Melaleuca* open forest-*Aerva-Aristida*.

Common and widespread, especially in open forests over tussock grasslands, particularly in recently burnt areas. Storr: Very common in well-watered parts of arid and semi-arid zones, moderately common in dry season in subhumid zone.

WHITE-BREADED WOOD-SWALLOW *Artamus leucorhynchus*.

(2,5,9).
Preferred land unit: Antrim lowlands.
Preferred floristic group: *E. camaldulensis*/*Melaleuca* open forest-*Aerva-Aristida*.

Uncommon, near waterholes on Ord River and Osmand Creek. Storr: Scarce to uncommon and patchily distributed over greater part of the Kimberley.

* MASKED WOOD-SWALLOW *Artamus personatus*.
(4,5).

Preferred land unit: Eu.

Preferred floristic group: *E. cliftoniana* low open woodland-*Acacia-Triodia*.

Very common in large flocks about flowering *Grevillea* on massif in July 1989. Uncommon elsewhere. Storr: Highly nomadic, moderately common to very common in dry season in arid and semi-arid zones.

*A WHITE-BROWED WOOD-SWALLOW *Artamus superciliosus*.
(4).

Preferred land unit: Eu.

Occasional birds associated with the large flocks of Masked Wood-swallows around flowering *Grevillea* on Bungle Bungle massif in July 1989. Storr: Rare visitor, only recorded in west Kimberley.

*AR BLACK-FACED WOOD-SWALLOW *Artamus cinereus*.
(1,2,3,5,6,7,8,9,10).

Preferred land unit: Nelson cracking clay plains.

Preferred floristic group: *Lysiphyllum* low woodland-*Acacia-Cenchrus*.

Very common and widespread, in small groups, in all habitats. Storr: Very common in arid zone and drier half of semi-arid zone, scarce to moderately common elsewhere.

*AR LITTLE WOOD-SWALLOW *Artamus minor*.
(1,2,3,4,5,7,8,9,10).

Preferred land unit: Antrim lowlands.

Preferred floristic group: *E. collina* woodland-*Acacia-Triodia*.

Reasonably common and widespread, especially in open woodlands on stony hills. Storr: Locally common in hilly parts of the semi-arid zone, but generally uncommon.

* GREY BUTCHERBIRD *Cracticus torquatus*.
(7).

Only two birds recorded, in open forest near Mt. John, though Muir (1983) recorded this species from the massif and between the massif and Ord River Station. Storr: Moderately common in dense vegetation in subhumid zone and wetter half of semi-arid zone south to Mt. King, with unconfirmed reports from Argyle Downs.

*AR PIED BUTCHERBIRD *Cracticus nigrogularis*.
(1,2,3,4,5,6,7,8,9,10).

Preferred land unit: Buchanan frontage.

Preferred floristic group: *E. collina* woodland-*Acacia-Plectrachne*.

Very common and widespread in all open forest and woodland habitats. Storr: Common throughout most of the Kimberley.

*AR AUSTRALIAN MAGPIE *Gymnorhina tibicen*.
(1,3,5,8,9).

Preferred land unit: Buchanan sandplain.

Uncommon, in small numbers in open forests and woodlands with a relatively open tussock grass understorey. Storr: Locally moderately common, but generally uncommon in hilly semi-arid and arid interior.

A LITTLE CROW *Corvus bennetti*.
(1,3,6,7).

Preferred land unit: Elder cuestas.

Uncommon, mostly in degraded open woodland country around the Ord River and spinifex woodlands in the south of the Park. Storr: Moderately common in arid zone.

*AR TORRESIAN CROW *Corvus orru*.
(1,2,4,5,7,8,9,10).

Preferred land unit: Antrim lowlands.

Preferred floristic group: *Melaleuca* woodland-*Acacia-Aristida*. Common and widespread in most woodland and open forest habitats. Storr: Common in more populated parts of arid and semi-arid, uncommon in subhumid zone.

Notable species

Two species recorded in the Bungle Bungle area are included in the most recent comprehensive list of 'rare, endangered and extinct' birds of Australia (Brouwer and Garnett 1990).

The Grey Falcon is considered rare throughout the continent. We recorded this species at three study sites (Bull Creek, near Turner Station and Mt. John), incidentally at Bellburn Creek and near Calico Springs, and J.B. Paton also recorded it during our survey period at Piccaninny Gorge. These records suggest a reasonably large population in the Bungle Bungle area, although population sizes and distribution may fluctuate widely depending on continental weather conditions (Blakers *et al.* 1984).

The Gouldian Finch is suffering a rapid decline throughout most of its known range (tropical savanna woodlands from the Kimberley to Queensland) and is now regarded as endangered (Tidemann *et al.* in press). The Bungle Bungle area would lie at the southern (inland) edge of its range, although this species may make substantial nomadic postbreeding movements. Its presence in the study area is based on only one record of one individual, and the Bungle Bungle area probably has little conservation significance for this species.

Two species, Purple-crowned Fairy-wren and White-browed Robin, formerly known from riverside vegetation of the Ord River in the Bungle Bungle area (Kilgour 1904) are now presumed extinct there (Smith and Johnstone 1977), and are undergoing substantial reductions elsewhere (Storr 1980). The loss or decline of these species is probably attributable to the degradation of riparian (especially pandanus) habitats by stock (Smith and Johnstone 1977; Rowley 1988).

Additional species

Included in the annotated species list are several water birds not yet definitely recorded from the Bungle Bungle area, but which most probably do occur there at least seasonally. Their absence is at least partly owing to limited surveying in the Ord River and Osmand Creek systems.

Nomadism is a feature of many bird species of semi-arid northern Australia (Davies 1986), and the Bungle Bungle bird fauna probably includes a substantial number of such species. As a consequence of the relatively unpredictable and transitory nature of such visits, we recorded few of these nomads (although our records of Red-chested Button-quail, Red-capped Robin, Masked Wood-swallow and White-browed Wood-swallow fit this pattern). Other semi-arid or arid visitors would probably include Flock Bronzewing, Brown Songlark (*Cinclorhampus mathewsi*), Black-eared Cuckoo, Crimson Chat (*Ephthianura tricolor*), Black Honeyeater (*Certhionyx niger*), Pied Honeyeater (*Certhionyx variegatus*) and Black Falcon (*Falco subniger*) (e.g. Storr 1981). Flocks of the migratory Fork-tailed Swift and Oriental Pratincole would also be expected over the Bungle Bungle area during the wet season.

Other than these groups of nomadic species, this survey is probably comprehensive. Some species not recorded merit comment. The Hooded Robin (*Melanodryas cucullata*) may occur in low densities in woodlands or *Acacia* thickets, but its distribution is characteristically patchy in northern Australia (Storr 1977, 1980; Ford 1978). The White-throated Gerygone (*Gerygone olivacea*) may also be present in low numbers in relatively tall *Eucalyptus* open forest, though it too has a characteristically patchy distribution. We recorded no Grass-wrens (*Amytornis* spp.) despite extensive searches in apparently suitable habitat (spinifex among boulders).

Distributional patterns within the Bungle Bungle area

The number of bird species recorded at the 10 study sites is listed in Table 14. The two sites on the Ord River, at Kitty's Knob (site 9) and Blue Holes (site 5), were richest in species. This is in part owing to the wide range of habitats at these sites, including pools suitable for

waterbirds. Site 4 (on the plateau of the Bungle Bungle massif) had by far the fewest species.

Twenty-five species were recorded at only one site (Table 14), with 12 of these recorded only at site 9.

There is wide variation in bird species diversity between land units (Table 15). Nelson frontage and Antrim lowlands have the highest diversity. The uplands of Elder and Buchanan land units have fewest species.

The proportion of Torresian to Eyrean species also varies substantially between land units. The northern gorges of Wickham land unit and the riverside Antrim lowlands, Nelson frontage and Buchanan frontage support relatively many Torresian species. Eyrean species comprise a relatively higher proportion of Elder cuestas and Nelson low rises.

The distribution of bird species across land units is given in Table 12. A group of, mainly Torresian, species is largely restricted to the Wickham, Antrim lowlands and Nelson frontage land units. Examples of these species include Rufous Night Heron, Dollarbird, Leaden Flycatcher, Northern Fantail, White-gaped Honeyeater and Crimson Finch. Twenty species occurred most abundantly in the Nelson frontage unit, 20 in Antrim lowlands and 17 in Wickham. Another group of species is also most abundant in these land units, but occurs also across a broad range of land units (e.g. Double-barred Finch, Great Bowerbird, Peaceful Dove, Restless Flycatcher, Torresian Crow).

A third group of species occurs almost ubiquitously across the land units studied. Such widespread species include Rainbow Bee-eater, Willie Wagtail, Little Friarbird, Australian Magpie-lark, Black-faced Wood-swallow and Black-faced Cuckoo-shrike.

A small group of species also has widespread distribution but with reduced abundance in the Wickham, Antrim lowlands and Nelson frontages: examples include Grey-fronted Honeyeater, Red-browed Pardalote and Spinifex Pigeon.

The relatively tall *Eucalyptus* open forests of Buchanan frontage and Buchanan sandplains are preferred habitat for Pied Butcherbird, Northern Rosella and Yellow-throated Miner.

The black-soil plains of the Nelson cracking clay unit support a distinctive bird fauna including Singing Honeyeater, Singing Bushlark, Australian Bustard and Golden-headed Cisticola. Eleven species are most abundant in this land unit, with some of these species occurring almost as abundantly in the Nelson low rises unit.

A small group of species is restricted mostly to the sandstone spinifex of Elder uplands, Buchanan frontage

and Buchanan uplands. Characteristic of this group are Variegated Fairy-wren, Peregrine Falcon, Sandstone Shrike-thrush and White-quilled Rock Pigeon.

Bird species typically occurred across several land units. No common species (found with an average abundance of greater than 1 per quadrat in at least one land unit) was restricted to only one land unit.

As with land units, there is wide variation between floristic groups in their bird species diversity (Table 16). Highest diversity, with between 15 and 20 species per quadrat, was in the groups *E. ptychocarpa* forest-*Pandanus-Heteropogon*, *Melaleuca* woodland-*Acacia-Aristida*, *Hakea* low woodland-*Dodonea-Triodia*, *Lysiphyllum* low woodland-*Acacia-Cenchrus* and *Melaleuca* low open woodland-*Acacia-Aerva*. The group *E. brevifolia* low open woodland-*Acacia-Triodia* was relatively depauperate, averaging fewer than five bird species per quadrat.

There is a high proportion of Torresian species in all floristic groups where native tussock grasses dominate the understorey: *Livistona* open forest-*Acacia-Germania*, *E. ptychocarpa* forest-*Pandanus-Heteropogon*, *Lysiphyllum* woodland-*Carissa-Heteropogon* and *Melaleuca* woodland-*Acacia-Aristida*. Eyrean species make up a relatively high proportion of the species occurring in *E. brevifolia* low open woodland-*Acacia-Triodia* and *E. brevifolia* open woodland-*Cassia-Plectrachne*.

The distributional patterns of birds across floristic groups (Table 13) is broadly similar to that for land units (Table 12). The relatively tall and dense vegetation of floristic groups *Livistona* open forest-*Acacia-Germania*, *E. ptychocarpa* forest-*Pandanus-Heteropogon* and *Melaleuca* woodland-*Acacia-Aristida* supports high densities of many Torresian species, such as Dollarbird, Silver-crowned Friarbird, Bar-shouldered Dove, Northern Fantail, Bar-breasted Honeyeater and Crimson Finch. In the low woodland group dominated by *E. aspera*-*Acacia-Triodia*, and associated with sandstone outcrops, the White-quilled Rock-pigeon, Sandstone Shrike-thrush and Peregrine Falcon were relatively abundant. The tussock grasslands and low woodlands of floristic group *Lysiphyllum*-*Acacia-Cenchrus* were favoured by Rufous-throated Honeyeater, Singing Bushlark, Red-backed Fairy-wren, Singing Honeyeater and Black-faced Wood-swallow. Tall woodlands of *E. collina*-*Acacia-Plectrachne* contained highest densities of Northern Rosella, Pied Butcherbird, Cockatiel and Yellow-throated Miner. No bird species occurred at their highest density in the low woodland floristic groups dominated by *E. brevifolia*-*Acacia-Triodia*, *E. opaca*-*Grevillea pyramidalis*-*Triodia* or *E. cliftoniana*-*Cajanus-Plectrachne*.

Biogeographic patterns

The total of 149 species now known from the Bungle Bungle area is moderate compared with 21 other surveyed areas across north-western Australia (Fig. 10), although only two (Mitchell Plateau and Dampier Peninsula) of the eight other Western Australian sites have higher bird species totals. The Bungle Bungle list notably contains few waterbirds, a consequence of both the restricted area and variety of waterbodies and the relative lack of survey effort around these.

The bird species composition of the Bungle Bungle area is very similar to that recorded for nearby semi-arid areas, notably Argyle, Keep River, Victoria River Downs and, slightly less so, Drysdale, Gregory, Katherine Gorge, Pine Creek, Edgar Ranges and Kakadu Stage III (Fig. 10). Its bird fauna is more similar to distant semi-arid areas (Mt. Isa, Lower MacArthur) than to relatively close coastal humid areas (Mitchell Plateau) or relatively close arid areas (Great Sandy Desert, Tanami). Indeed, 141 of the 149 bird species of the Bungle Bungle area were also recorded in the Lower MacArthur region, more than 1000 km distant.

The Bungle Bungle landbird fauna has a substantially higher component of Torresian (35 per cent) than Eyrean (16 per cent) species, with just under half of the species having relatively ubiquitous distributions. This composition is similar to that of Argyle, Dampier Peninsula and Victoria River Downs. Eyrean species contribute a much higher proportion to the bird fauna of Edgar Ranges and, especially, Great Sandy Desert and Tanami. In higher rainfall areas of the Kimberley, there are fewer Eyrean species (e.g. Mitchell Plateau 5 per cent, Prince Regent 2 per cent, Drysdale 6 per cent), and the bird fauna of these areas, and high rainfall areas of the Top End, is predominantly Torresian.

This gradation of bird species composition with rainfall gradient is evident in the ordination of bird species lists from across north-western Australia (Fig. 11). The five most arid sites - Hamersley, Edgar Ranges, Great Sandy Desert, Tanami and Mt. Isa - cluster at one end of the gradient. The Bungle Bungle area is included in a group of sites - Victoria River Downs, Argyle, Gregory, Keep River and Drysdale - in a zone with some monsoonal influences but with substantial semi-arid vegetation. Sites with slightly higher rainfall - Katherine Gorge, Pine Creek and Umbrawara - form a related group. Longitude has little influence on the bird species composition of sites in this comparison: for example, on their bird species composition, the Lower MacArthur and Dampier Peninsula form one group, and Mitchell Plateau and Kakadu another.

Related to this change in bird species composition along the rainfall gradient, several species characteristic of coastal or higher rainfall areas reach their local southern (inland) range limits in the Bungle Bungle area. These include a few species with rain forest affinities (Woinarski 1988) whose occurrence in the Bungle Bungle area is restricted largely to pockets of relatively dense riparian vegetation (e.g. Wulwuldji Springs, Bream Gorge). Examples of such species include Pacific Baza, Common Koel, Black Bittern, Bar-shouldered Dove, Bar-breasted Honeyeater, Crimson Finch and Northern Fantail. Nonetheless this is a very small component of the Kimberley rain forest avifauna, and the absence in the Bungle Bungle area of species such as Green-backed Gerygone, Yellow Oriole, Varied Triller, Little Shrike-thrush and Torresian Imperial-Pigeon is notable. Such species are probably absent because of the isolation, small size and floristic impoverishment of the denser forest vegetation of the gorges and springs of the Bungle Bungle area (Johnston and Burbidge 1991).

Another group of bird species reaching their inland range limits around the Bungle Bungle area is that characteristic of relatively tall *Eucalyptus* open forests. Such species include Northern Rosella, Silver-crowned Friarbird, Grey Butcherbird, Leaden Flycatcher, White-bellied Cuckoo-shrike and Masked Finch.

The White-bellied Sea-eagle and Radjah Shelduck may also extend no further upstream in the Ord River system than pools around Blue Holes, although their occurrence may vary substantially depending on the regional distribution of water.

Inland species for which the Bungle Bungle area forms an approximate northern limit include Red-capped Robin, Spinifex Bird, Grey-headed Honeyeater and Red-chested Button-quail. The Spinifex Bird is probably resident in the Park, but the other three species are more nomadic, visiting the Bungle Bungle area in response to particularly favourable or unfavourable conditions in their more usual arid or semi-arid range.

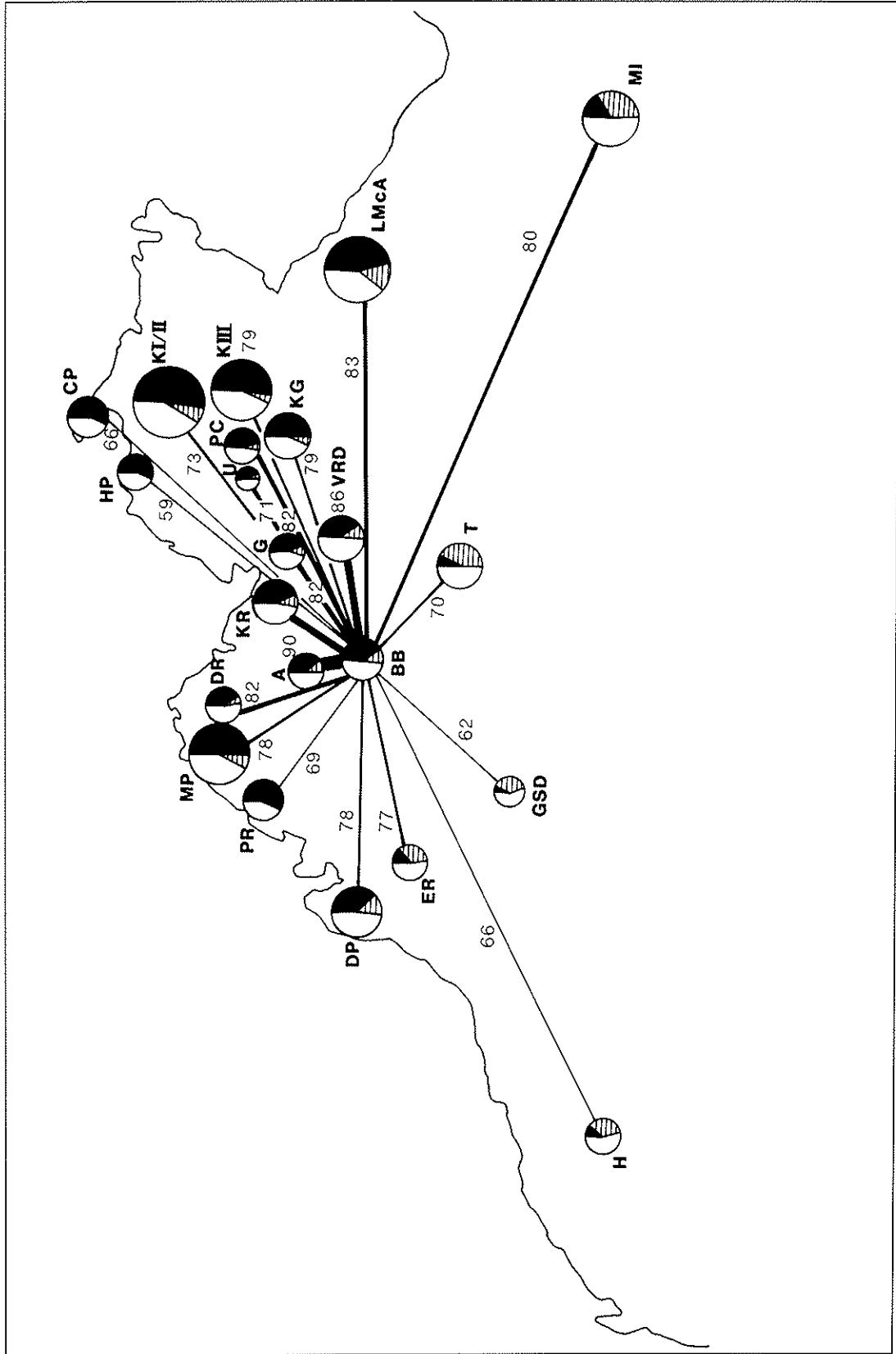


Figure 10

Network diagram showing similarity of the land bird fauna of the Bungle Bungle area with other surveyed regions of north-western Australia. Conventions as for Figure 8. Number of species recorded: H (Hammersley) = 106; DP (Dampier Peninsula) = 138; ER (Edgar Ranges) = 105; GSD (Great Sandy Desert) = 95; PR (Prince Regent River) = 117; MP (Mitchell Plateau) = 151; DR (Drysdale) = 109; BB (Bungle Bungle) = 125; A (Argyle) = 103; KR (Keep River) = 124; T (Tanami) = 123; VRD (Victoria River Downs) = 128; G (Gregory) = 106; U (Umbravara) = 89; KG (Katherine Gorge) = 129; KI/II (Kakadu Stages I & II) = 155; KI/II (Kakadu Stages I & II) = 102; CP (Cobourg Peninsula) = 114; LMCA (Lower MacArthur) = 161; MI (Mt. Isa) = 143.

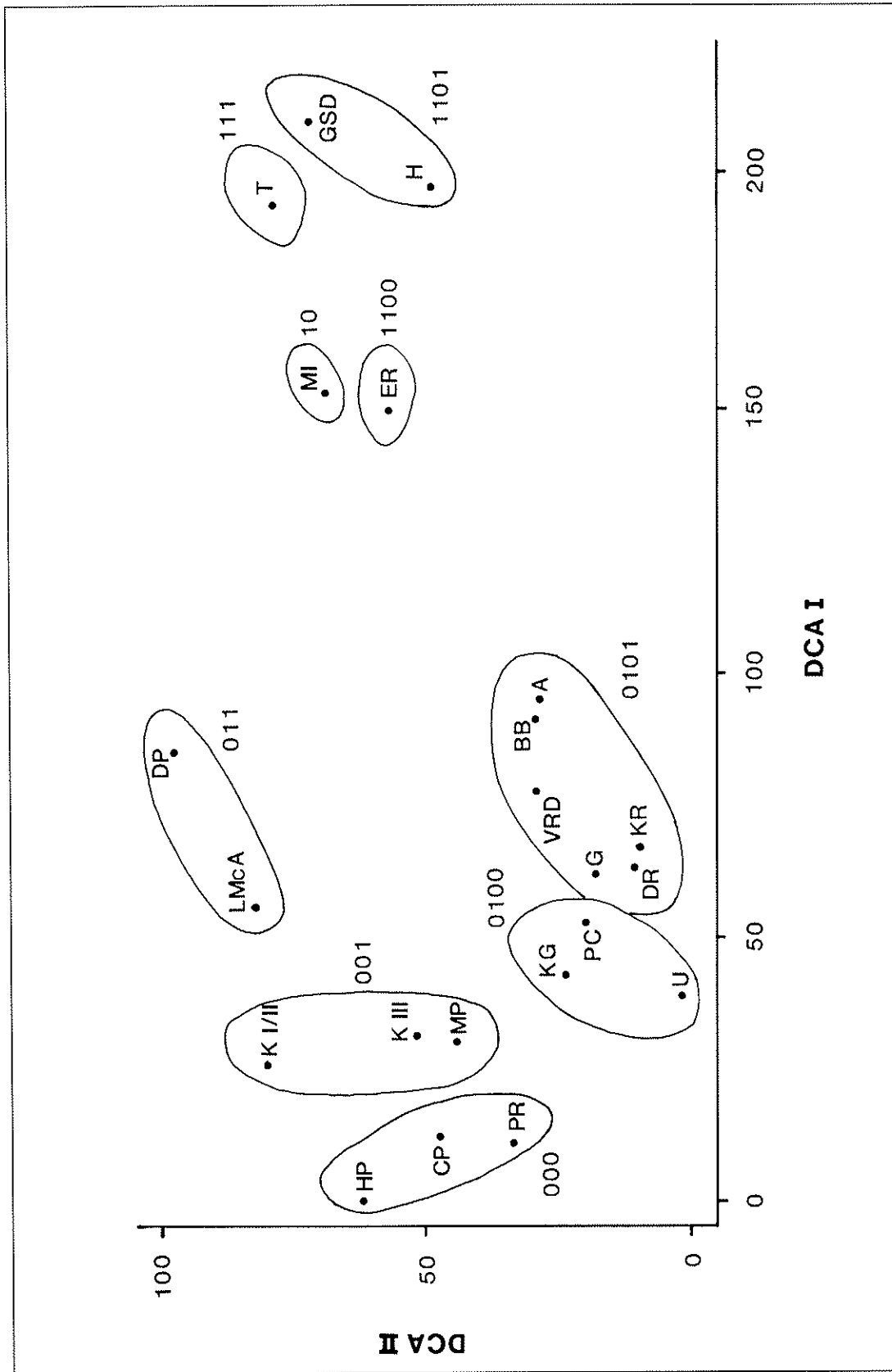


Figure 11

Ordination of the land bird fauna of 22 areas surveyed in north-western Australia. Lines enclosing points represent TWINSpan groups. Symbols as for Figure 10. Eigenvalues for DCA 1 0.27, for DCA 2 0.07.

Table 12

Distribution of bird species across land system units ^(a). Values in body of table are mean abundance per quadrat. Species are included only if they have a mean abundance of >0.1 per quadrat in at least one land system unit. p indicates mean abundance of <0.5. Asterisks denote the proportion of quadrats in which the species was recorded: *>25%, **>50%, ***>75%.

	LAND SYSTEM												
	Wk.	Al.	Nf.	Au.	Hl.	Bp.	Bf.	Bu.	El.	Eu.	Nr.	Ns.	Nl.
Barking Owl													
Darter	p												
White-bellied Sea-eagle	p	p											
Red-tailed Black Cockatoo	p	p											
Tawny Frogmouth	0.6												
Channel-billed Cuckoo	p												
Leadren Flycatcher	p*												
Bar-breasted Honeyeater	p												
Sulphur-crested Cockatoo	p	0.8*											
Northern Fantail	0.9*	p											
Azure Kingfisher	p												
Rufous Night-heron	p		0.7**										
Brown Goshawk	p		p*										
Little Black Cormorant	p		p*										
Black-fronted Plover	p												
Bar-Shouldered Dove	2.1	3.1**	0.7*										
Dollarbird	p		p*										
White-gaped Honeyeater	1.0*	p	4.3**										
Crimson Finch	1.8		1.7*										
Brush Cuckoo			0.7**										
Common Koel			p*										
Banded Honeyeater			0.7*										
Blue-winged Kookaburra	p				p								
White-throated Honeyeater	0.6*	1.2*				p							
Olive-backed Oriole	0.6*	0.5				p							
Yellow-tinted Honeyeater	0.7	9.7**	2.3**		1.2								
Long-tailed Finch	0.5	1.0*		1.0		0.5	p						
Brown Falcon	p												
Silver-crowned Friarbird	1.1**	p				p	2.9*						p
Double-barred Finch	4.6*	6.8**	2.0**	p	3.6**		1.4*	1.1*					
Great Bowerbird	1.0*	p	0.7*		p*	p	p*	p*					p
Whistling Kite		p		p									
Black Kite		0.5											
Red-collared Lorikeet		p				p							
Red-winged Parrot	0.8*	0.6			1.4**		p						p
White-bellied Cuckoo-shrike	0.5*												
Collared Sparrowhawk		p		p									
Grey Shrike-thrush	0.5	1.0*	p*	p	0.8**								p
Little Corella		p											p

Table 12 (cont.)

LAND SYSTEM													
	Wk.	Al.	Nf.	Au.	HI.	Bp.	Bf.	Bu.	El.	Eu.	Nr.	Ns.	Nl.
Australian Magpie		P				P							
Jacky Winter		P	2.7***			P					P		
Sacred Kingfisher		P											
Varied Lorikeet		0.5							P				
Spotted Nightjar				P	P*	0.7					P		
Fairy Martin						0.7							
Masked Finch				P									
Grey Falcon					P								
Australian Owllet-nightjar			P*		P								
Peaceful Dove	P	3.7**	10.0***	1.0*	4.0***	1.7*	0.6*	0.9*	0.8*		P		
Restless Flycatcher	P	1.7**	3.0***	0.8*	P	P					1.3*	4.8*	
Striated Pardalote	P	1.4*	3.4**	0.6	P*	1.1*	5.4*		P	0.5*			
Brown Honeyeater	P	14.1**	11.3***	4.0**	22.6***	6.3*	17.4***	P	P	20.3***	P		4.0
Mistletoebird	P	1.7**	2.2**	P	0.6*	P*	2.3**	1.9***	P	1.3**	0.8*		0.5*
Torresian Crow	P*	1.7*	P*	P		P	0.6*			P			
Rufous Whistler	P	1.1*	2.9***	P	2.8***	0.8*		P	1.0*		0.8*		0.8
Rainbow Bee-eater	P	0.8*	0.9*	0.7*	1.3**	0.5*	1.7**	1.6***	P	P*	P*	P	
Willie Wagtail	P*	2.2***	2.7***	0.6*	1.4***	P			1.0**		1.8*	P	
Little Friarbird	P	1.7*	2.6***	0.6	1.4***	6.5***	12.1**	0.7**	0.6*	2.1*	P		1.3**
Northern Rosella	P	0.8		P	P	3.3**	4.7**		1.0*				
Crested Pigeon	P	0.5*		0.5		P	2.0*		0.6*				
Weebill	P	3.5**	2.1*	4.2**	1.4*	1.1			P		0.5		0.5
Pied Butcherbird	P	0.8*	1.3**	0.8*	0.8*	2.9***	3.3**	P	1.5**	0.8*	0.8*	P	
Black-faced Cuckoo-shrike	P	1.0*	P*	P	0.8**	P	P*	P*	P	P	P	P	0.5
Black-chinned Honeyeater	P	P	P*	P	0.6	P			1.7**				
Australian Magpie-lark	P	1.7**	1.0**	P		P	0.9*		1.8**				
Little Wood-swallow	P	0.9*		0.7		0.7			0.5	P	0.5*	P	1.0*
White-winged Triller	P	1.5*		3.5*	P				P*	P	1.1**	P	
Grey-crowned Babbler	P	1.9*	0.7*	P	2.2*	P			5.5**		1.4*	3.0**	2.0***
White-breasted Wood-swallow	P	0.5											
Australian Hobby		P							P				
Varied Sittella			1.0*		0.8*	P	P						
Grey-fronted Honeyeater	P	1.8*		1.5	6.6***	5.4**	2.3**	2.6***	6.5***	1.8*	P	0.5	
Red-browed Pardalote	P	P	P*		0.6**	P	P*	P*	1.1**		0.9	3.8	
Emu													
Cockatiel		0.6	0.7*	P		1.4	0.7*		0.5		P		
Budgerigar		1.0*	5.3*	0.8		1.0	1.6*		12.2***		5.9*	0.8*	
Black-tailed Treecreeper		P		1.2		0.5	0.7*		0.7*		P		
Yellow-throated Miner	P	1.0	0.7*	P		10.1**	8.9**		2.0**	P	0.8*	2.5*	
Little Crow									P		P		
Painted Firetail				0.6	P	0.5					2.1*		
Little Button-quail						P			P				

Table 12 (cont.)

	LAND SYSTEM												
	Wk.	Al.	Nf.	Au.	Hl.	Ep.	Bf.	Bu.	El.	Eu.	Nr.	Ns.	Nl.
Brown Quail													
Red-backed Kingfisher									0.7				
Common Bronzewing													
Southern Boobook													
Variegated Fairy-wren													
Peregrine Falcon													
Sandstone Shrike-thrush													
White-browed Wood-swallow													
Masked Wood-swallow													
White-quilled Rock-pigeon													
Diamond Dove													
Spinifex Pigeon													
Barn Owl													
Pallid Cuckoo													
Horsfield Bronze-cuckoo													
Spinifex Bird													
Red-backed Fairy-wren													
Black-faced Wood-swallow													
Rufous-throated Honeyeater													
Zebra Finch													
Singing Bushlark													
Singing Honeyeater													
Pictorella Mannikin													
Rufous Songlark													
Australian Bustard													
Red-chested Button-quail													
Golden-headed Cisticola													
Brolga													

(^a) Land systems: Eu = Elder uplands, Bf = Buchanan frontage, Bu = Buchanan uplands, Au = Antrim rugged uplands, Ep = Epworth lower slopes, Nf = Nelson cracking clay plains, Al = Antrim lowlands, El = Elder uplands, Nl = Nelson lowlands, Nr = Nelson rugged uplands, Ns = Nelson interfluvial lower slopes, Nf = Nelson frontage

Table 13

Distribution of bird species across floristic groups ⁽¹⁾. Values in body of table are average abundance per quadrat. Asterisks denote the proportion of quadrats per group in which the species was recorded: *>25%, **>50%, ***>75%.

	2	1	4	3	5	11	16	12	6	7	10	8	9	14	17	15	13
Darter	p*			P													
Little Black Cormorant				0.5*													
Brown Goshawk		p*	P	P													
Black-fronted Plover				1.8*													
Rufous Night-heron	P		P	1.0*	P			P									
Bar-shouldered Dove	6.8**		4.2**	4.8*	0.8			P									
Red-tailed Black Cockatoo	2.2*	P	P	P	P												
Sulphur-crested Cockatoo	1.0**	P*	0.5*	2.3**	P												
White-breasted Wood-swallow			P	1.0				P									
Channel-billed Cuckoo		P*															
Azure Kingfisher			P	0.5*													
Blue-winged Kookaburra	1.2*		P		P*	P											
Little Corella				1.3*						P							
Dollarbird		1.4**	P	P	P												
Leaden Flycatcher	0.6**		P		P												
Northern Fantail	2.8***		2.0**	P*	0.5*	P											
White-gaped Honeyeater	1.6***		2.0**	0.7*	0.8*	0.9			0.8								
White-throated Honeyeater	1.6**		2.0**	1.7*	P									P			
Bar-breasted Honeyeater	4.0*		0.5		P												
Crimson Finch	2.6*		2.7	1.3													
Olive-backed Oriole	1.2**		1.1*		0.7*												
Silver-crowned Friarbird	1.8***		2.0**	0.6*	0.5*							0.8	0.6	1.1	1.0*		
Yellow-tufted Honeyeater			8.6**	15.8***	0.8*	1.2		P	0.5	P							
Double-barred Finch	7.2***	1.2*	10.3***	13.0**	2.2*	3.6**		P	P						2.0*	1.3*	
Great Bowerbird	1.4***	1.8**	P	1.0*	0.8*	p*	P	P				p	p*	P	p*	0.7*	
Black Kite			0.6									p					
Red-winged Parrot	2.0**		P	0.6*	1.8*	0.9*	1.4**		P				p				
White-bellied Cuckoo-shrike		0.8*	0.6*	0.5	0.8*		P	P				P	P				
Grey Shrike-thrush	0.6*		1.0*	2.0*	0.8*	0.8**	P	P				P	P				

Table 13 (cont.)

	2	1	4	3	5	11	16	12	6	7	10	8	9	14	17	15	13
Peaceful Dove	4.8***	p	14.2***	6.5***	3.5**	4.0***	1.4*	4.1**	p	1.3*	0.9*	0.5*	1.1*	p*			
Restless Flycatcher	p		1.5**	3.3***	p*	p	0.6*	0.5*	p								
Striated Pardalote	1.6*	p	5.6***	2.8**	0.5*	p*	0.6*			1.3*	p	3.4**					
Brown Honeyeater	39.8***	1.2*	13.6***	22.0***	11.2***	22.6***	18.7***	3.6**	13.4*	8.6*	2.7	8.6*	11.8**	1.3***	p	6.0***	
Mistletoebird	3.0***	1.4**	3.9***	1.0*	p*	0.6*	1.1**	p*	1.0**		p*	p*	0.5*	2.3***	4.0***		
Torresian Crow	0.8*	p	1.9**	1.5***	0.5*	p	p						p	p	1.0**		
Sacred Kingfisher	p		p	0.5	p		0.6										
Rufous Whistler	3.2***		4.0***	0.8**	1.0**	2.8***	p	1.6**	p	1.1*	0.7*						
Long-tailed Finch			1.2*	0.5	1.5*		0.6			0.6		0.7*	p				
Varied Lorikeet	0.6		p	1.8	p		p			p							
Spotted Nighthjar	p				p	p*	p										p*
Rainbow Bee-eater	0.8	1.8**	1.0*	1.5**	0.5*	0.6*	0.6*	p	1.0**	p	0.7*	p	2.3***	2.0**	p		
Willie Wagtail	p		1.8**	4.3***	0.6*	1.4***	0.5*	1.9**	1.1**	1.0**	p*			p*			
Little Friarbird	3.0***	p	3.1**	4.0***	1.0*	1.4***	1.6*	0.9*	6.8*	1.5*	3.0**	12.3***	7.7***	p*	0.7**	0.7*	
Northern Rosella			0.9*		1.1*	p	p			1.7**	2.3**	5.8**					
Crested Pigeon			0.5*		0.8		0.6		p	1.3*	p	0.8*					
Weebill	1.2*	1.6	1.3*	6.5***	1.4*		5.8**	0.7	1.1*	1.6*				2.2***		1.4*	
Pied Butcherbird	p		1.6**		0.6*	0.8*	0.9*	0.9**	p	2.0**	2.3**	4.1***	2.5***	0.3*	0.7**		
Black-faced Cuckoo-shrike		p	0.7*	1.8**	p	0.8**	p	p*	p	p	p*		0.5*	p*			
Tawny Frogmouth					p*					p							
Varied Sittella			p		0.8*			0.6					p				
Black-chinned Honeyeater	p		1.5**	p	0.6		p	0.6*		1.3**	p						
Rufous-throated Honeyeater	p		0.6	2.0	p	p	0.6	15.5***						p			
Australian Magpie-lark			0.9*	2.0**	p		p	0.7**	1.5**	1.9**		0.6*					
Little Wood-swallow			p	0.5	0.8		p	1.0*	p	1.0	p	1.7**					
White-winged Triller			0.6*	0.8		p	1.5*	0.6*	5.9**	p*	0.7*						p
Grey-crowned Babbler			1.2*	3.0*	2.0	2.2*	p	2.4**	3.0*	4.6**							
Grey-fronted Honeyeater		p		5.2**	6.6***	2.3*	p	2.0	1.1	4.9**	11.1***	1.3		2.9***	2.3**		
Red-browed Pardalote					0.6**	p	p	0.5*		1.0**	p		p				
Diamond Dove			2.0**		1.2**	p	0.8	10.5***	1.5**	10.8**	2.0**			p			
Spinifex Pigeon					p	1.4*	0.5	2.1**	0.5	p*	0.7			1.7**	1.2**		
Pallid Cuckoo				p		p	p			p*							
Horsfield Bronze-cuckoo				p		p	p			p							p*

Table 13 (cont.)

	2	1	4	3	5	11	16	12	6	7	10	8	9	14	17	15	13
Singing Bushlark																	
Fairy Martin									2.5*			1.7*					
Red-backed Fairy-wren					0.6	0.6		4.1*	7.3**	3.3	0.6*		1.5*		1.4*		
Singing Honeyeater			p						2.7**	1.0*							
Black-faced Wood-swallow			0.8	3.0*	p	0.6*		2.4***	7.8**	7.1***	2.8**	1.3*		0.6*		3.2***	
Zebra Finch						p		2.9	0.7	20.3***	9.5*	p		p	1.3*		
Painted Firetail						p	p	0.9		2.4*		0.7*		p		p	
Brown Quail									p		0.6	0.6	p*				
Red-backed Kingfisher								p	p	p	p	p*					
Spinifex Bird					p					0.5*							
Australian Bustard									p*								
Emu																	
Cockatiel								0.5	p	2.5**	0.5		p*	p			
Budgerigar			0.6	1.3*				0.7*	6.9**	0.8	11.6***	1.3*	2.6**				
Black-tailed Treecreeper								0.9	p	0.9	0.5*	1.1*	p				0.6
Yellow-throated Miner				1.3	0.5*			p	1.8*	2.6*	1.5**	6.6**	17.0***				
Common Bronzewing						p							p				
Southern Boobook	p	p											p	p*			
Variegated Fairy-wren																	
Peregrine Falcon						1.5*		p						p	0.6*		
Sandstone Shrike-thrush				p													0.7**
Masked Wood-swallow																	1.7***
White-quilled Rock-Pigeon							24.6*	0.9		1.5							0.7*
																	2.0**

(*) Description of floristic groups: 2 = *E. psychocarpa* - *Pandanus* - *Heteropogon*, 1 = *Livistona* - *Acacia* - *Geranium*, 4 = *Melaleuca* - *Acacia* - *Aristida*, 3 = *E. camaldulensis*/*Melaleuca* - *Aerva* - *Aristida*, 5 = *Lysiphylum* - *Carissa* - *Heteropogon*, 11 = *Hakea* - *Dodonea* - *Triodia*, 16 = *E. cliftoniana* - *Acacia* - *Triodia*, 6 = *Lysiphylum* - *Acacia* - *Cenchrus*, 7 = *Acacia* - *Aerva* - *Aristida*, 10 = *E. brevifolia* - *Cassia* - *Plectrachne*, 8 = *E. collina* - *Acacia* - *Triodia*, 9 = *E. collina* - *Acacia* - *Plectrachne*, 14 = *E. cliftoniana* - *Cajanus* - *Plectrachne*, 17 = *Acacia* - *Triodia*, 15 = *E. aspera* - *Acacia* - *Triodia*, 13 = *E. brevifolia* - *Acacia* - *Triodia*.

Table 14

The number of bird species recorded per study site, and the number of these recorded for only one site.

SITE	NO. BIRD SPP.	NO. RESTRICTED SPP.
1	52	1 Grey-headed Honeyeater
2	65	3 White-faced Heron, Grey Goshawk, Jacky Winter
3	63	2 Little Eagle, Ground Cuckoo-shrike
4	25	1 White-browed Wood-swallow
5	73	1 Richard's Pipit
6	61	2 Square-tailed Kite, Red-capped Robin
7	67	3 Pacific Baza, Bar-breasted Honeyeater, Grey Butcherbird
8	49	0
9	89	12 Little Egret, Pacific Black Duck, Spotted Harrier, Masked Plover, Brush Cuckoo, Golden-headed Cisticola, Banded Honeyeater, Red-chested Button-quail, Common Sandpiper, Common Koel, Black-headed Stilt, Australian Pelican
10	42	0

Table 15

Average number of bird species per quadrat for the land systems surveyed.

LAND SYSTEM		SYMBOL	NO. QUADRATS	NO. BIRD SPECIES		
				<i>Total</i>	<i>Torresian</i>	<i>Eyrean</i>
ANTRIM	rugged uplands	Au	12	10.0	2.3 (22.5%)	1.7 (16.7%)
ANTRIM	lowlands	Al	21	19.3	7.2 (37.5%)	1.1 (5.7%)
BUCHANAN	uplands	Bu	7	7.7	2.3 (29.7%)	1.6 (2.1%)
BUCHANAN	sandplain	Bp	17	10.8	3.1 (28.8%)	1.9 (17.6%)
BUCHANAN	frontage	Bf	7	12.0	4.0 (33.3%)	2.1 (17.5%)
ELDER	uplands	Eu	16	6.7	1.6 (24.4%)	0.6 (9.0%)
ELDER	cuestas	El	10	15.4	2.6 (16.9%)	3.7 (24.0%)
HEADLEY	lower slopes	Hl	5	15.2	4.2 (27.6%)	2.4 (15.8%)
NELSON	cracking clay plains	Ns	4	15.3	4.3 (27.9%)	2.5 (16.3%)
NELSON	interfluvial lower slopes	Nl	1	9.0	2.0 (22.2%)	0 (0%)
NELSON	frontage	Nf	3	23.0	8.0 (34.8%)	1.3 (5.7%)
NELSON	low rises	Nr	12	12.9	1.8 (13.5%)	3.4 (26.4%)
WICKHAM	rugged uplands	Wk	35	13.4	6.1 (45.8%)	0.5 (3.7%)

Table 16

Average number of bird species per quadrat for the floristic groups.

FLORISTIC GROUP	NO. OF BIRD SPECIES		
	Total	Torresian	Eyrean
1. <i>Livistona</i> - <i>Acacia holosericea</i> - <i>Germania</i>	9.6	4.0 (42%)	0.2 (2%)
2. <i>E. pythocarpa</i> - <i>Pandanus</i> - <i>Heteropogon</i>	18.8	10.8 (57%)	0
3. <i>E. camaldulensis</i> / <i>Melaleuca</i> - <i>Aerva</i> - <i>Aristida</i>	26.3	11.0 (42%)	0.8 (3%)
4. <i>Melaleuca leucadendra</i> - <i>Acacia eriopoda</i> - <i>Aristida</i>	19.9	8.8 (44%)	0.5 (3%)
5. <i>Lysiphyllum</i> - <i>Carissa</i> - <i>Heteropogon</i>	14.4	6.1 (42%)	1.0 (7%)
6. <i>Lysiphyllum</i> - <i>Acacia holosericea</i> - <i>Cenchrus</i>	16.6	3.8 (23%)	2.5 (15%)
7. <i>Acacia farnesiana</i> - <i>Aerva</i> - <i>Aristida</i>	13.9	2.0 (14%)	4.3 (31%)
8. <i>E. collina</i> - <i>Acacia stipuligera</i> - <i>Triodia spicata</i>	13.1	3.9 (30%)	2.3 (18%)
9. <i>E. collina</i> - <i>Acacia tumida</i> - <i>Plectrachne pungens</i>	9.7	3.2 (33%)	1.8 (19%)
10. <i>E. brevifolia</i> - <i>Cassia</i> - <i>Plectrachne pungens</i>	14.5	2.6 (18%)	3.3 (23%)
11. <i>Hakea arborescens</i> - <i>Dodonea</i> - <i>Triodia wiseana</i>	15.2	4.2 (28%)	2.4 (16%)
12. <i>E. opaca</i> - <i>Grevillea pyramidalis</i> - <i>Triodia pungens</i>	11.1	2.7 (24%)	1.6 (14%)
13. <i>E. brevifolia</i> - <i>Acacia retivenia</i> - <i>Triodia intermedia</i>	3.6	0	1.4 (39%)
14. <i>E. cliftoniana</i> - <i>Cajanus</i> - <i>Plectrachne pungens</i>	7.2	2.3 (32%)	0
15. <i>E. aspera</i> - <i>Acacia eriopoda</i> - <i>Triodia microstachya</i>	9.3	3.3 (36%)	1.0 (11%)
16. <i>E. cliftoniana</i> - <i>Acacia spp</i> - <i>Triodia spicata</i>	6.5	1.3 (20%)	0.8 (12%)
17. <i>Acacia spp</i> - <i>Triodia spicata</i>	8.4	2.7 (32%)	1.7 (20%)