TRENDS IN RAINFOREST BIRD COLONISATION OF KURANDA ENVIROCARE'S RESTORATION PLANTING ALONG THE BARRON RIVER

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Frontespiece – Victoria's riflebird (Photos courtesy RP and PS)

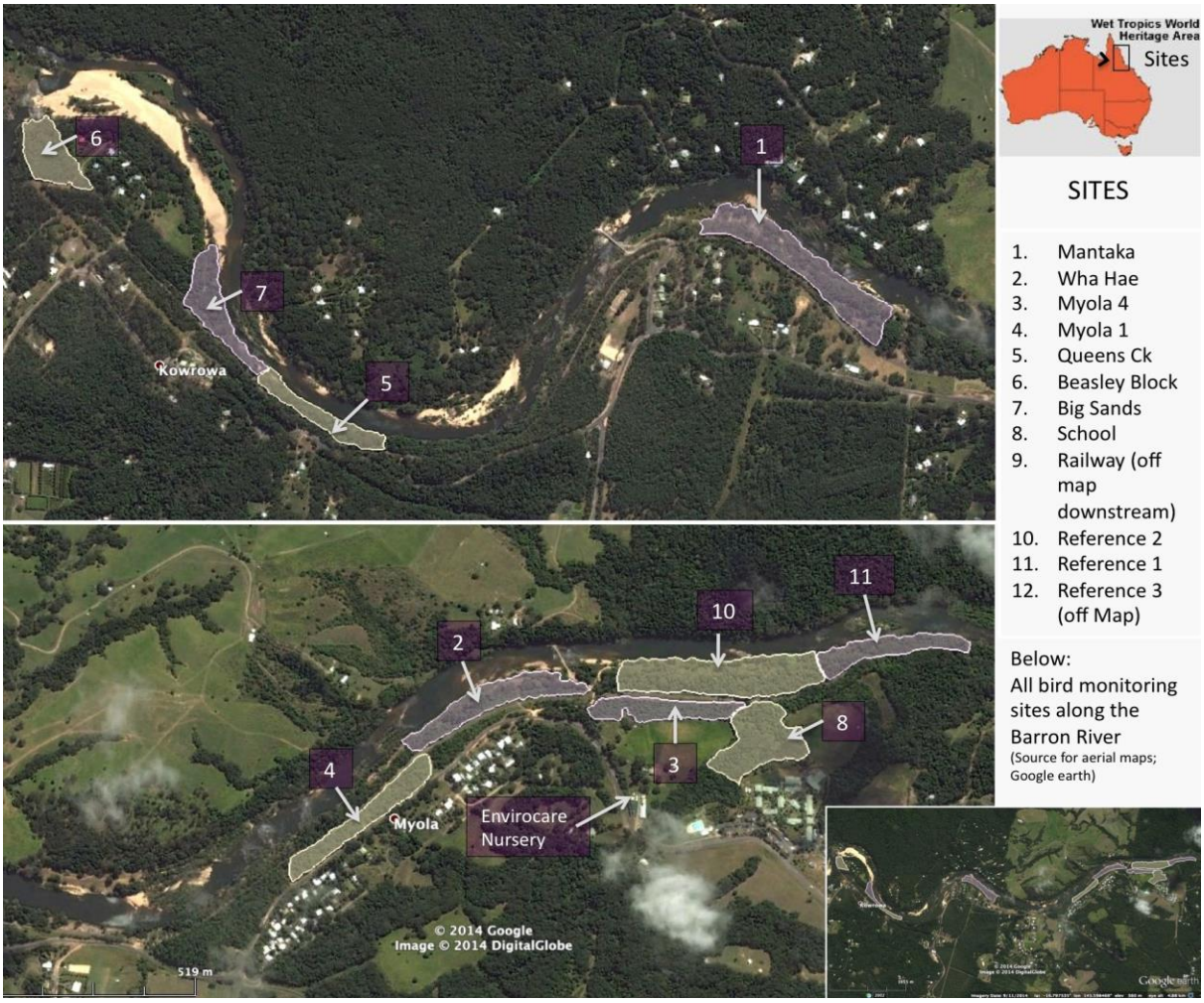


Fig 1 – Location of bird monitoring sites

EXECUTIVE SUMMARY

This report outlines preliminary results of bird monitoring completed by Kuranda Envirocare aimed at gaining a better understanding of the responses of rainforest birds to the restoration of rainforest corridors along the Barron River corridor. Currently, two sets of bird monitoring are underway. The first of these comprises measurement of all birds detected in three different aged stands aged 1, 3 and 5 years at Mantaka, Wha Hae and Myola 4 respectively. These are undertaken at approximately monthly intervals. The second comprises four counts undertaken during the breeding in 8 stands of varying age (1, 3, 5, 7, 11, 13, 17 and 19 years) and four older stands of about 40+, 50+, 60+ and 100+ years that provide comparisons as reference areas or "controls". This report focusses on the latter, the four breeding season counts of multiple aged stands which were undertaken in October-December 2014. Results of these surveys suggest that many rainforest 'specialist" species respond rapidly to newly planted linkages along the Barron. Others such as chowchillas and noisy pittas appear to be slower to respond and may require additional studies to determine appropriate plantings and other specific habitat needs.

1 BACKGROUND AND OBJECTIVES

The rainforests of the Kuranda area support a diverse avifauna, including about 35 species that are dependent on rainforests. Many of these are endemic to the Wet Tropics region (Crome 1985). A key biogeographic feature of this area is the Barron River and its riparian habitats which cut through what has been a very a very narrow section of wet tropics rainforest since the Ice Ages. The narrowness of this rainforest section of the Wet Tropics partly reflects local landforms and current climate, but it has also suffered considerable human induced loss and fragmentation of rainforest habitat, particularly over the past 150 years.

Kuranda Envirocare is actively restoring rainforest habitat along sections adjacent to the Barron River to provide corridors for wildlife species including rainforest birds.

The objectives of this monitoring document were derived following meetings with Kuranda Envirocare members. Key objectives are to:

1. measure general patterns of use of the revegetation corridors by rainforest birds over the years
2. better understand the habitat needs of rainforest specialists or "dependents" to enable adaptation of future restoration. This should include if possible the needs of the most sensitive species guilds to help guide future plantings and management.

2 THE MONITORING SITES

Twelve sites were used for the breeding season counts in October-December 2013 (Table 2.l). Eleven were located on the true right bank of the Barron River, with 7 of these being immediately adjacent to the river and four at 100-200 m distances from the river (Fig 1). Eight sites were known-age stands of up to 19 years of age. The other four sites were "controls" of

older and generally unknown age including the 12th site of old growth forest in Kuranda National Park at Stoney Creek Road, Speewah.

The sites were typically long (c.400 m) and narrow (50-100 m wide). Although the age of the stands generally influenced canopy height and intactness of canopy, this was not always the case. In fact, these and other parameters varied in other respects, notably slope, undergrowth complexity and presence/absence gullies. These and many other parameters were ranked on a simple scale designed to assist in interpreting responses of individual bird species at specific sites.

Table 2.1 – Monitoring sites October-December 2013 (blue = reference sites)

Site name	Planted	2013 age (y)	Area (ha)	Remnants	Length (m)	Map location
Mantaka	2013	0-1	1	Y	400	1
WhaHae	2010	3	2	Y	400	2
+Myola4	2008	5	2	N	400	3
Myola 1	2006	7	2?	N	400	4
Queens	2004	9	1.9	Y?	400	5
Beasley	2001	12	<2	N	300	6
Big Sands	1998	15	1.7	N?	400	7
School	1994	19	4	N?	400	8
Railway	-	40+	>4	N?	400	9
Ref 1	-	60+	4	Y	400	10
Ref 2	-	50+	4	Y	400	11
Ref 3	-	c.100	>4	Y	400	-

3 METHODOLOGY

The breeding season counts were undertaken on 12 mornings in October-December 2013. Three mornings during the same week were needed to complete one set of 12 counts, with counts centred on 28 October, 17 November, 24 November and 15 December. The counts began about one hour after dawn and ended about 3 hours later. Each site count was about 40 minutes in duration and involved a 30 min walk through the habitat, followed by a return walk of c.10 minutes to the start point, during which any additional species not detected in the first 30 minutes were counted. Counts erred on the conservative side, i.e. if there were doubts about whether an individual bird had been counted already we discounted the second sighting to avoid duplication. We also rotated start times as best we could so that on average the start time for each site was about 0830.

We selected fine weather mornings, avoiding gusty wind, rain and fog, and recorded cloud on 0 (nil) to 4 (complete cover) scale. Rainfall was recorded at the Envirocare Nursery at Myola. Typically we had 3-4 observers, one of whom (usually RS) was focused on recording while the rest used eyes and ears to record all species. Familiarization with bird calls was essential and our most experienced observer (RP) was present on all surveys. In the two youngest sites which had

some small remnant stands of rainforest, we kept the remnant counts separate to those of the young plantings.

We also noted feeding and nesting behavior of rainforest birds opportunistically while another KEC member, Mike Graham, kept separate records of the flowering and fruiting levels in Reference areas, Myola 4 and Wha Hae to assist in interpreting bird activity. In December-January the following environmental details were recorded on a 1-5 scale: slope, aspect, gullies, understory complexity, litter layer, logs, grass, termite mounds, closed canopy, eucalypts. We noted also keystone trees and their flowering and fruiting levels.

Analyses focus on guilds of birds e.g. fruit-doves, monarchs, cryptic understory birds, etc. Graphs are presented here of mean numbers detected per count.

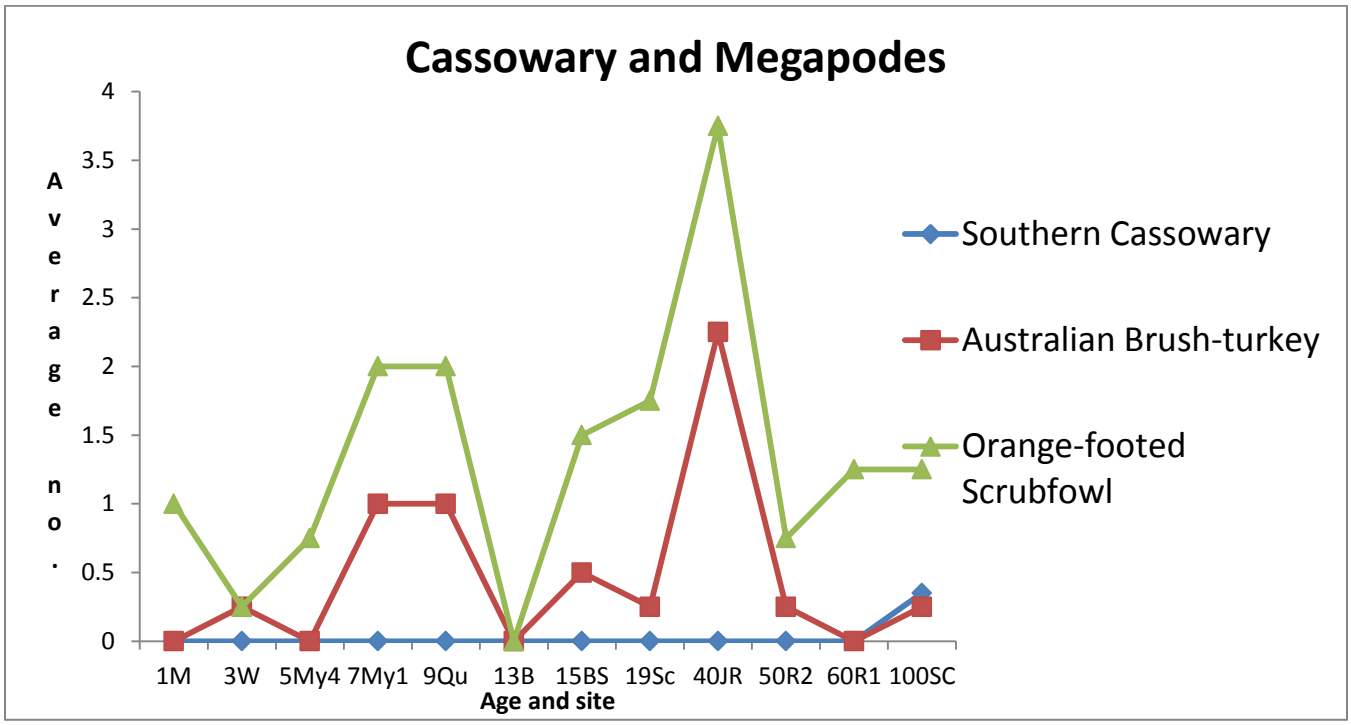
4 RESULTS AND DISCUSSION

To date 122 bird species have been recorded within or flying over the corridor. Another 23 aquatic species (cormorants, herons, ducks, etc.) have been recorded along the river, for a total of 145 species. These 145 species are summarized by Family in Appendix 1.

Trends in most of the rainforest guilds are graphed below. The horizontal axis denotes age and name of site (1M = 1 year Mantaka, 3W = 3 year Wha Hae, 5My = 5 year Myola 4, 7My = 7 year Myola 1, 9Q = 9 year Queens, 13B = 13 year Beasley Block, 17BS = 15 year Big Sands, 19 Sc = 19 year Myola School, 40JR = 40 years Jum Rum, 50R2 = 50 years Ref 2, 60Ref 1, 100SC = 100 years Stoney Creek Rd).

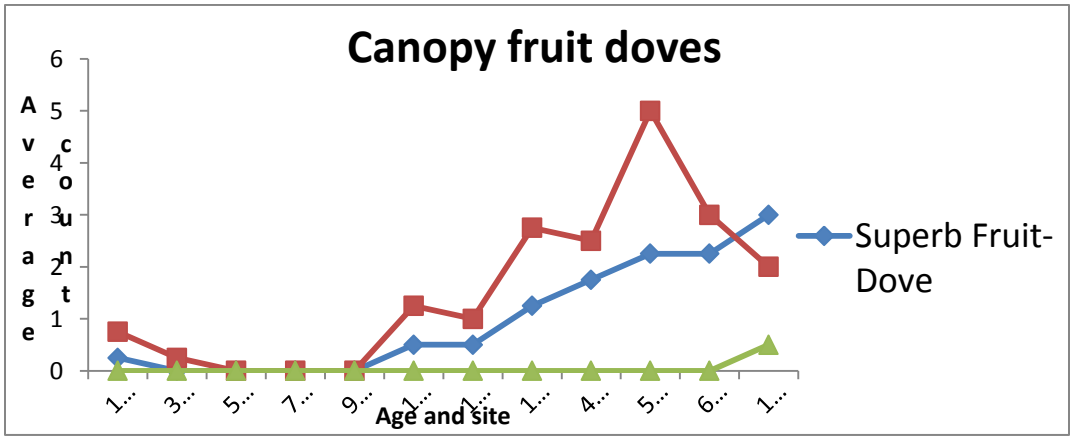
4.1 Southern cassowary and megapodes

Orange-footed scrubfowl and brush turkey are fairly common along the corridor especially near dwellings (note spikes in graph at Jum Rum, Myola 1 and Queens Block, all close to humans). Southern cassowary, however, have been recorded only in the reference areas (Stoney Creek Rd during this survey, and Barron Reference 1 outside the sampling days).



4.2 Canopy fruit doves

Wompoo and superb fruit doves are common in mature forest in the Kuranda Range area and it is interesting to note that they begin to use the restored areas within 10-12 years, with the Beasley Block (13 years old) now being visited by several individuals of each species. Superb fruit doves favour laurels while wompoo are attracted to quandong species and others. The occasional presence of these two species in the two young blocks (Mantaka and Wha Hae) reflects some old growth remnants there which contain quandong, figs and laurels. However, the monthly observations are beginning to detect wompoo in Myola 4 at Year 5 coinciding with quandong fruiting. Interestingly another less common fruit dove, the rose-crowned, was detected only in old growth forest at Stoney Creek Road.



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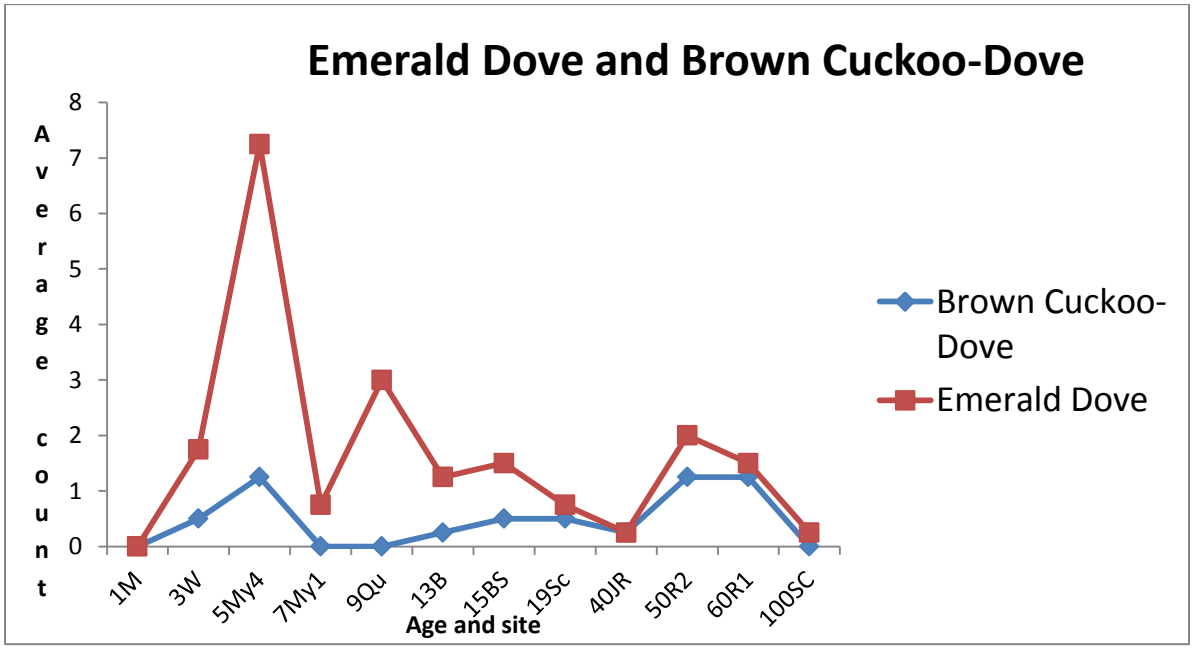
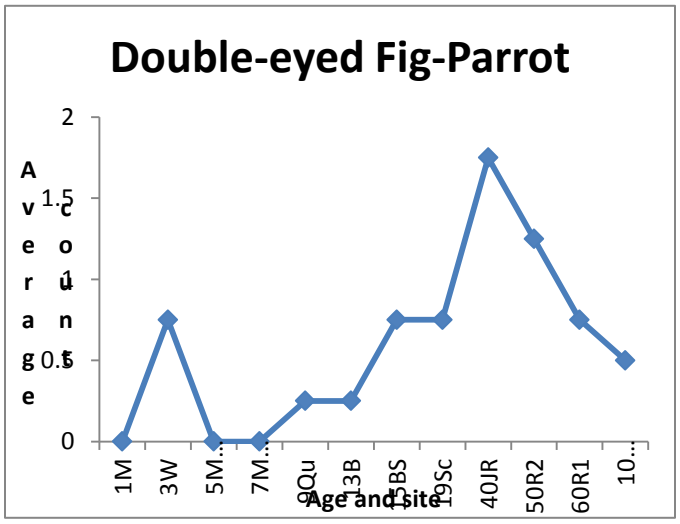
4.3 Understorey fruit doves

Emerald doves and brown cuckoo-doves are attracted to the newly planted areas within about 3 years of planting, with a brown cuckoo dove also recently being seen in one year old plantings at Mantaka. This rapid response appears to be a response to the fruiting of the pioneering species *Homolanthus guiniensis* and *Alphitonia petrei*.



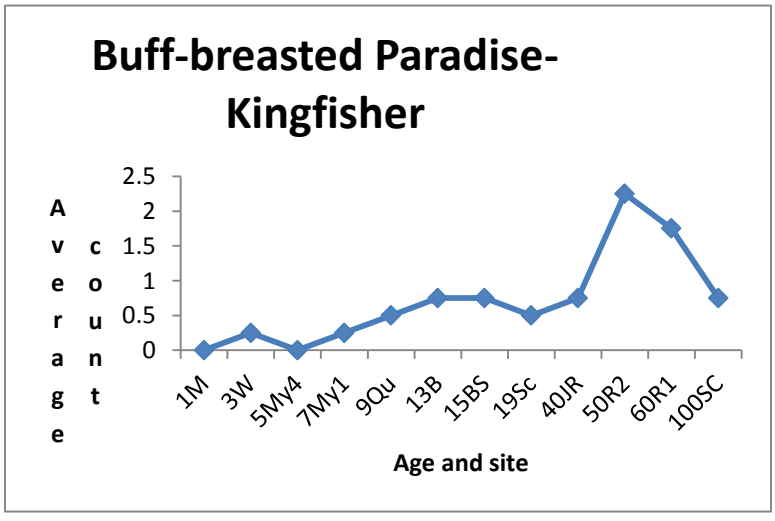
4.4 Double-eyed fig parrot

As with the canopy fruit doves, fig parrots are very mobile and can commute to remnants in the younger blocks, but begin to use the older blocks more frequently from about year 9 onwards.



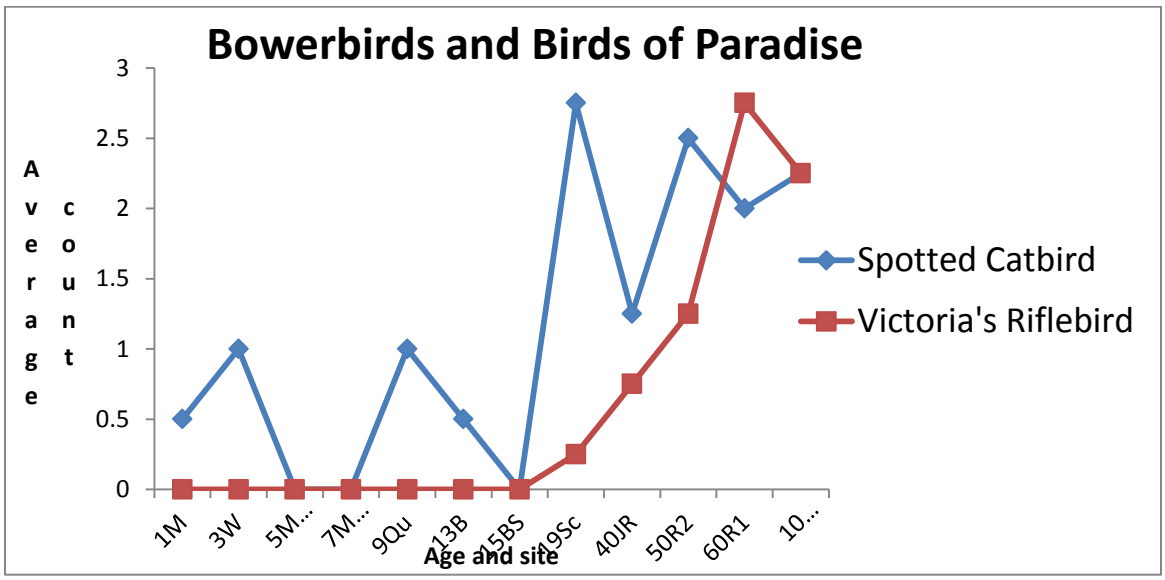
4.5 Buff-breasted Paradise Kingfisher

This rainforest kingfisher appears to respond quickly to revegetation especially if there are termite mounds in the sites. During this survey we found nests in 3 year old Wha Hae, 7 year old Myola 1 and the 13 year old Beasley Block. By 9-15 years of age the average encounter rates for paradise kingfishers were in fact similar to those in some of the control blocks.



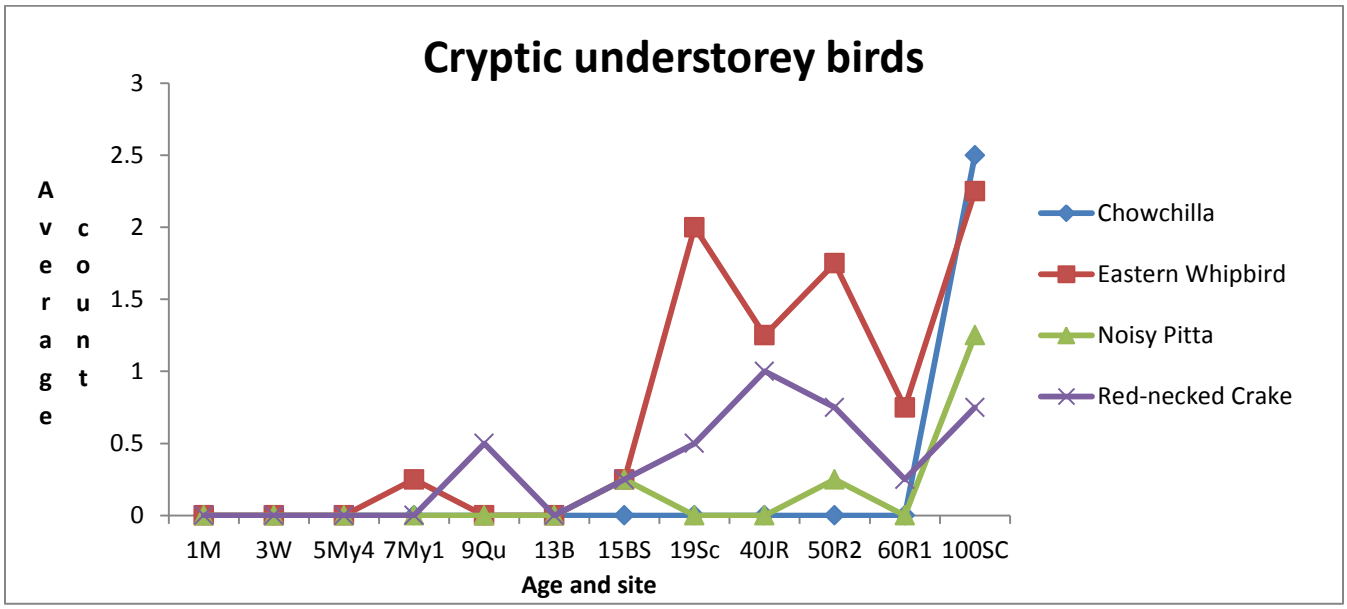
4.6 Bowerbirds and Birds of Paradise

Spotted catbirds were found in the small old growth remnants within the younger stand blocks (Mantaka and Wha Hae) and were also found using planted stands at 11 years of age. By contrast Victoria's Riflebird appeared to be a slow colniser, not being recorded in this survey until the 19 year stage (School Block). Note however that we have detected a few catbirds and riflebirds foraging in the Myola 4 block in trees of 5 years of age.



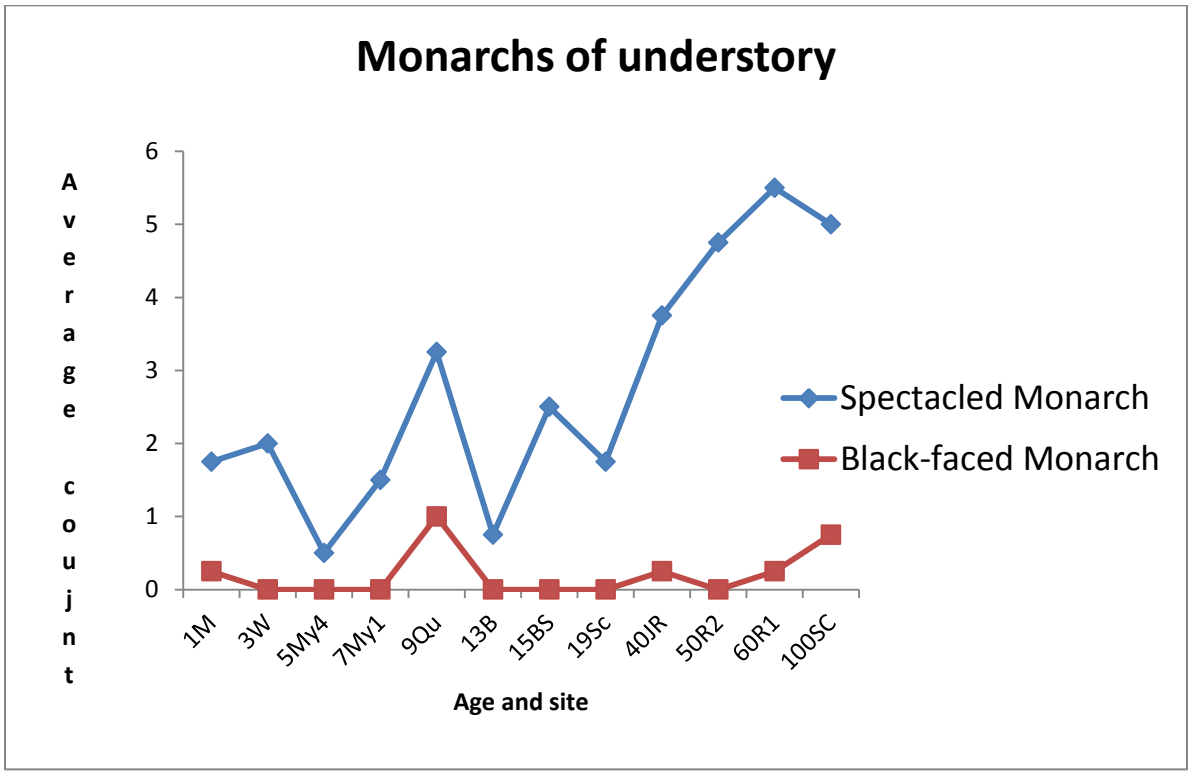
4.7 Cryptic understory birds

Rainforest understory birds are often the most sensitive to environmental change in the tropics. This suite in the Wet Tropics includes red-necked crakes and eastern whipbirds which have responded to some existing plantings, e.g. Myola 1 and school block, which is encouraging. However, it's the noisy pitta and chowchilla which are clearly slow to respond to restoration projects and probably the two that we should be concerned about with respect to providing suitable habitat including addressing long term corridors in a changed climate. One noisy pitta was detected using the gully area of 15 year-old Big Sands block one morning and was interacting with other pittas directly across the river and further upstream via repeated calling.



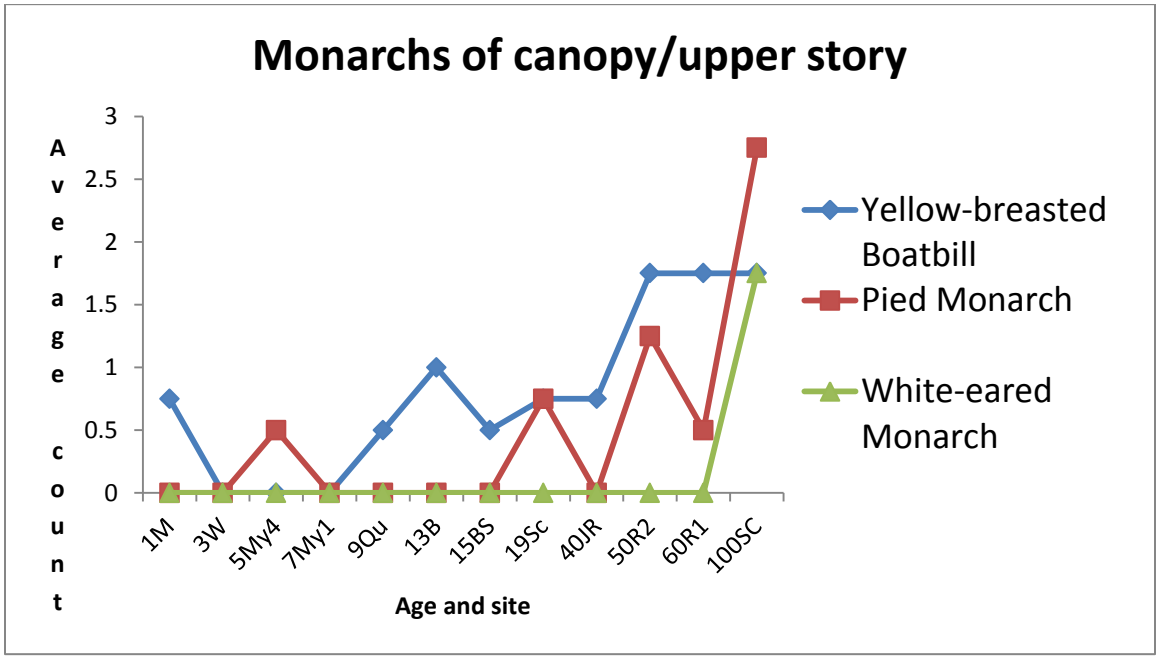
4.8 Monarch flycatchers of the understory

This group was dominated numerically by the spectacled monarch, which is the common monarch of the rainforest. It was recorded in all sites and begins to utilize young plantings at an early stage, e.g. we have seen them in Mantaka plantings at year 1, although most sightings there are still in remnants. Black-faced monarch is relatively rare and the spike in the Queens Block is due to seeing members of the same pair their repeatedly.



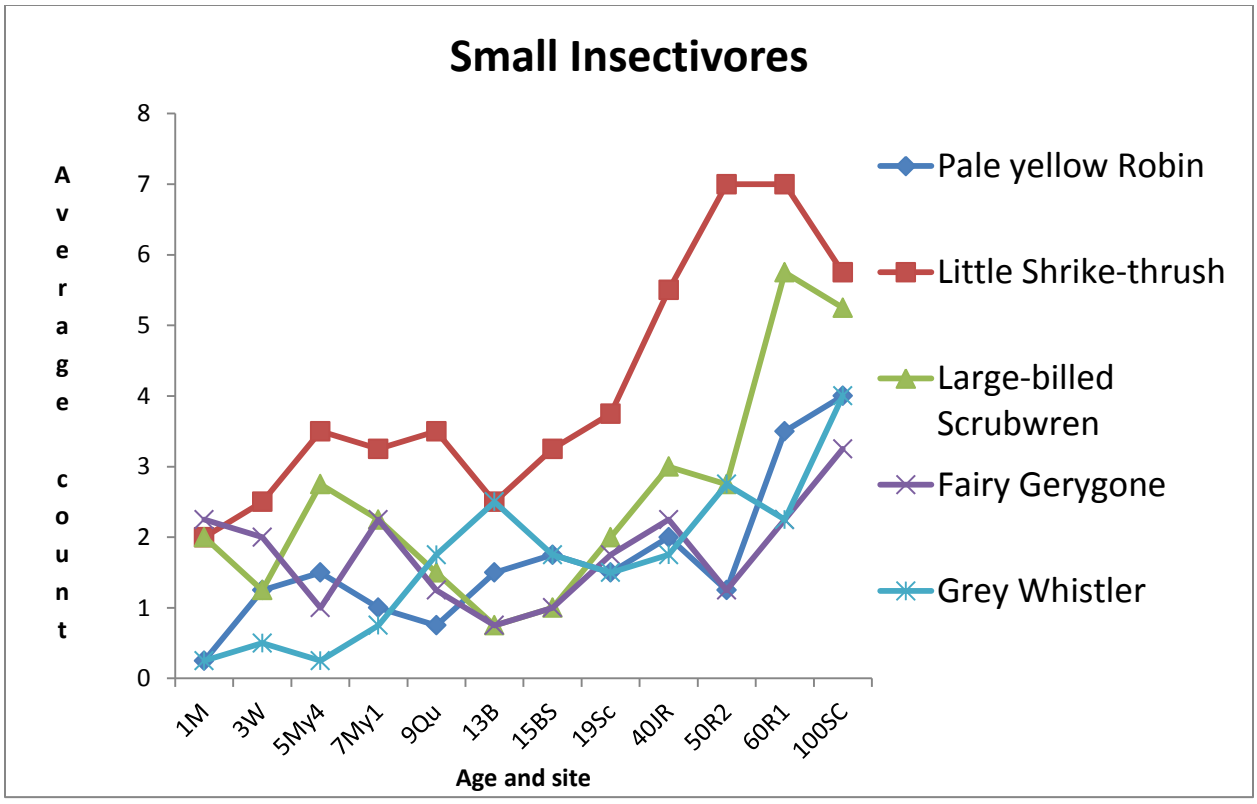
4.9 Monarch flycatchers of canopy and upper understory

Pied monarchs and yellow-breasted boatbills are specialist old growth forest birds so it is encouraging that they have been found utilizing planted areas from years 5 (Myola 4) and years 9 (Queens) respectively. Yellow-breasted boatbills have also been found in remnant old growth stands in Mantaka and more recently Wha Hae and so are probably using younger trees as corridors.



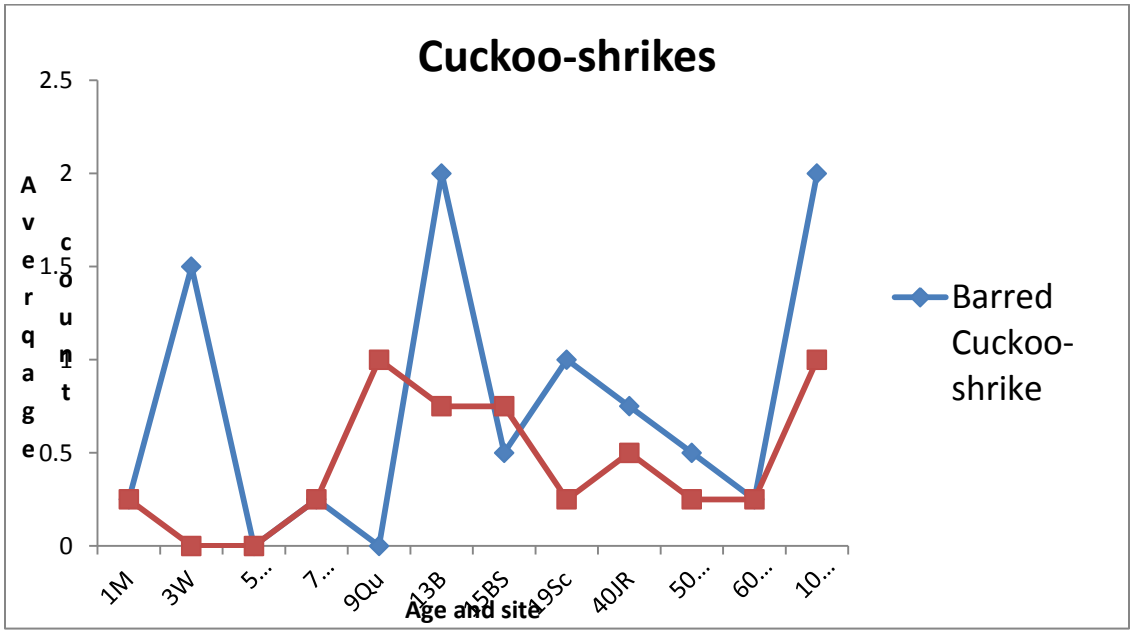
4.10 Small Insectivores

Several small rainforest insectivores occur in the area, at least two of which are rainforest specialists – pale yellow robin and large-billed scrub-wren. Counts of all five species correlate positively with age of the planted stands.



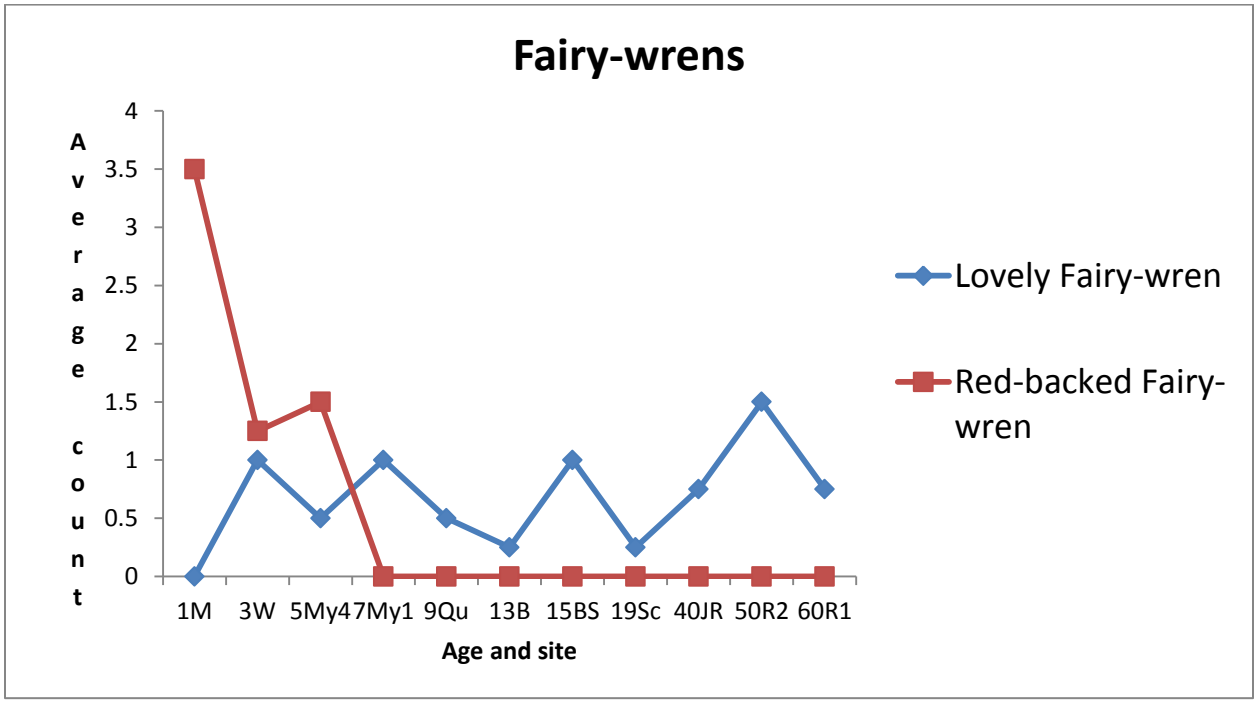
4.11 Cuckoo-shrikes

Cuckoo-shrikes are very mobile birds and are quick to utilize newly fruiting trees of their choice, hence wide variations in our detection rates between stands.



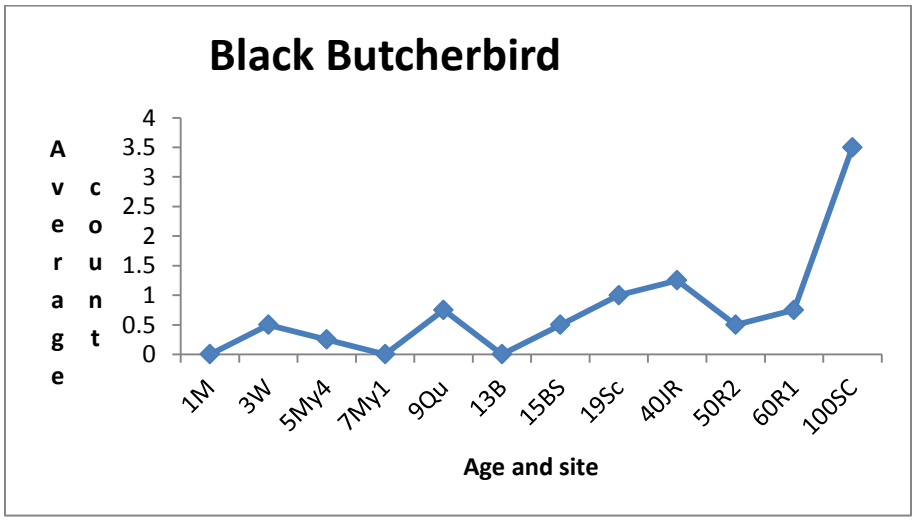
4.12 Fairy-wrens

Lovely fairy-wrens are associated with rain forest edges and were recorded at all except one of the restoration sites. Red-backed fairy-wren are, however, characteristic of more arid areas of inland Australia and were recorded at only the youngest of the restoration sites where there was extensive grass.



4.13 Black Butcherbird

Black butcherbirds appear to use stands increasingly with the age of stands,



CONCLUSION AND RECOMMENDATIONS

The above analyses show that there is a general trend towards increased numbers of rainforest birds being recorded in the older planted stands. Some species appear to be particularly rapid at responding, but others are slow, perhaps because of different needs other than simply stand age. It is possible that factors such as understorey complexity, different timing of key fruiting species, and other species-specific needs, e.g. availability of termite mounds for paradise kingfisher nesting, may be the key driving factors for some bird species.

We recommend that KEC undertakes simple studies e.g. follow the progress of bird colonization of some of the younger stands over the years to test appropriate null hypotheses, e.g.

- the influence of stand age versus presence/absence of mature remnants on seasonal use by frugivorous species
- the influence of stand age versus understorey complexity on colonization by eastern whipbird, noisy pitta, red-necked crakes, chowchillas and other cryptic understorey birds
- the influence of pioneering fruit species e.g. *Alphitonia* and *Homolanthus,* versus later fruiting species, e.g. *Elaeocarpus* and *Ficus,* on different dove species and other guilds
- the influence of stand age versus availability of termite mounds on paradise kingfisher colonization rates and nesting
- the influence of stand age versus habitat complexity on nesting frequency of rainforest birds generally.

These hypotheses could be tested with a simple sampling design, e.g.

- Sample the youngest stands (Mantaka, Wha Hae and Myola 4) and a control (Oak Forest) and one or more reference areas (Ref 2 and/or Stoney Creek Rd)
- Sample many times annually, i.e. 6+
- Monitor fruiting levels at least bi-monthly
- Quantify other habitat features, e.g. understorey complexity, litter layers, presence of gullies, logs, etc.
- Describe the habitat when key species are encountered, e.g. the cryptic understorey species.

With improved understanding of species habitat needs, it may be possible to promote habitat types in order to encourage colonization by the most sensitive species.

ACKNOWLEDGEMENTS

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APPENDIX 1 - BIRDS OF ENVIROCARE'S BARRON RIVER CORRIDOR OCTOBER 2012-APRIL 2014

Group	Species	Provisional status, Br = breeding Yr = age in years of new plantings
CASSOWARY	Southern Cassowary	One adult in rainforest near Myola, 2012
MEGAPODES	Orange-footed Scrubfowl	Common throughout, Br
	Australian Brush-turkey	Common throughout, Br
QUAIL	Brown Quail	Rare visitor to grassland areas
DUCKS	Hardhead	Common on Barron River
	Pacific Black Duck	Common on Barron River
	Grey Teal	Common on Barron River
GREBES	Australian Little Grebe	Occasionally fishing in Barron River
DOVES	Superb Fruit-Dove	Common in rainforest from about Yr 10, Br
	Rose-crowned Fruit-Dove	Rare, only in mature rainforest
	Wompoo Fruit-Dove	Common in rainforest from about Yr 10, Br
	Topknot Pigeon	Present in forest with quandong, laurels
	White-headed Pigeon	Uncommon, most forested habitats
	Brown Cuckoo-Dove	Common in rainforest from about Yr 2, Br
	Peaceful Dove	Common in more open areas, Br
	Bar-shouldered Dove	Common including in new plantings, Br
	Emerald Dove	Common in rainforest from about Yr 2, Br
NIGHTJARS	Australian Owlet-nightjar	Uncommon rainforest edge, woodland
	Large-tailed Nightjar	Present rainforest edges
SWIFTS	Australian Swiftlet	Common throughout
	Fork-tailed Swift	Commonly overhead in summer
	White-throated Needletail	Commonly overhead in summer
DARTER	Australasian Darter	Commonly roosting along river edge
CORMORANTS	Great Cormorant	Occasionally flying along river
	Little Black Cormorant	Commonly fishing in river
	Little Pied Cormorant	Commonly fishing in river
PELICANS	Australian Pelican	Occasionally visiting river
HERONS	White-necked Heron	Uncommon along Barron River
	White-faced Heron	Common along Barron River
	Eastern Great Egret	Uncommon along Barron River
	Little Egret	Uncommon along Barron River
	Intermediate Egret	Uncommon along Barron River
	Cattle Egret	Occasionally flying over Barron River
	Nankeen Night-Heron	Rare Barron River, roosting in leafy trees
IBIS	Straw-necked Ibis	Occasionally along Barron River
KITES	Eastern Osprey	Occasionally fishing in Barron River
	Pacific Baza	Uncommon over most habitats

	Whistling Kite	Commonly overhead
	Black Kite	Occasional overhead and roosting
	Brahminy Kite	Occasionally fishing in Barron River
	White-bellied Sea-eagle	Occasionally fishing in Barron River
	Brown Goshawk	Occasionally in open forest
	Grey Goshawk	Occasionally in rainforest
	Collared Sparrowhawk	Occasionally in open forest
FALCONS	Brown Falcon	Rare visitor to open forest
	Australian Hobby	Rare visitor to open forest
RAILS	Red-necked Crake	Common in rainforest and grassland, Br
	Buff-banded Rail	Rare along grassy riverbanks
	Pale-vented Bush-hen	Uncommon along grassy riverbanks, Br
STONE-CURLEWS	Bush Stone-Curlew	Uncommon incl. in young rainforest stands
	Pied Stilt	Uncommon along Barron River
PLOVERS	Black-fronted Dotterel	Uncommon but regular along Barron River
	Masked Lapwing	Common along Barron River
SANDPIPERS	Common Sandpiper	Summer migrant to Barron River edges
PARROTS	Red-tailed Black-Cockatoo	Wet season visitor, often on cadagi
	Sulphur-crested Cockatoo	Common throughout
	Rainbow Lorikeet	Common in eucalypts and paperbarks
	Scaly-breasted Lorikeet	Common in eucalypts and paperbarks
	Double-eyed Fig Parrot	Uncommon in rainforest from c.Yr 10, Br
	Australian King Parrot	Uncommon in rainforest
	Pale-headed Rosella	Rare visitor in open forest in Mantaka area
CUCKOOS	Pheasant Coucal	Uncommon along forest edges, grassland
	Channel-billed Cuckoo	Uncommon migrant visiting fruiting figs
	Eastern Koel	Uncommon passage migrant
	Shining Bronze-Cuckoo	Uncommon autumn-winter migrant
	Little Bronze-Cuckoo	Common throughout
	Brush Cuckoo	Common wet season visitor to rainforest
	Fan-tailed Cuckoo	Uncommon in open forest
OWLS	Lesser Sooty Owl	Present in rainforest
KINGFISHERS	Azure Kingfisher	Uncommon in forest and river edge
	Laughing Kookaburra	Uncommon in eucalypt woodland
	Blue-winged Kookaburra	Rare visitor to eucalypts Mantaka area
	Forest Kingfisher	Common in open woodland, Br
	Sacred Kingfisher	Rare along Barron River
	Buff-breasted Paradise-Kingfisher	Common in rainforest from Yr 2, Br
BEE-EATERS	Rainbow Bee-eater	Common overhead most habitats
ROLLERS	Dollarbird	Uncommon summer migrant most habitats
PITTAS	Noisy Pitta	Rare in mature rainforest, one in Yr 15
FAIRY-WRENS	Lovely Fairy-wren	Uncommon rainforest edges from Yr 3
	Red-backed Fairy-wren	Common in grassland of open woodland, Br

PARDALOTES	Striated Pardalote	Uncommon in woodland Mantaka area
SCRUB-WRENS	Large-billed Scrubwren	Common in rainforest from Yr 3, Br
	Fairy Gerygone	Common in rainforest from Yr 3, Br
	Large-billed Gerygone	Uncommon in riparian forest
	Brown Gerygone	Uncommon in mature rainforest
HONEYEATERS	Blue-faced Honeyeater	Uncommon in eucalypts
	Helmeted Friarbird	Common throughout
	Noisy Friarbird	Uncommon in woodland, forest edges
	Macleay's Honeyeater	Common in rainforest from Yr 3
	Yellow-spotted Honeyeater	Common in rainforest from Yr 2, Br
	Graceful Honeyeater	Common in rainforest from Yr 2, Br
	Yellow-faced Honeyeater	Common in eucalypts Mantaka area
	Yellow Honeyeater	Uncommon in riparian flowering trees
	White-throated Honeyeater	Uncommon in eucalypt woodland
	White-naped Honeyeater	Rare visitor to eucalypts Mantaka area
	Brown Honeyeater	Common in riparian vegetation of Barron
	Brown-backed Honeyeater	Common in paperbarks along Barron, Br
	Dusky Honeyeater	Common throughout, Br
	Scarlet Honeyeater	Uncommon in eucalypts of Mantaka area
WHIPBIRD	Eastern Whipbird	Uncommon in rainforest from Yr 7
	Chowchilla	Present c.100 m from restoration areas
ROBINS	Eastern Yellow Robin	Uncommon in open woodland
	White-browed Robin	Rare in rainforest plantings c.Yr 2-12
	Lemon-bellied Flycatcher	Rare visitor to eucalypt woodland
	Pale yellow Robin	Common in rainforest from Yr 3, Br
SHRIKE THRUSH	Little Shrike-Thrush	Common in rainforest from Yr 2, Br
WHISTLERS	Golden Whistler	Uncommon visitor to mature rainforest
	Grey Whistler	Common in rainforest from Yr 2, Br
	Rufous Whistler	Common in woodland Myola-Mantaka
FANTAILS	Northern Fantail	Common in woodland Myola-Mantaka
	Grey Fantail	Common in winter in rainforest from Yr 5
	Rufous fantail	Common in winter in rainforest from Yr 3
	Willie Wagtail	Common along forest edges
MONARCHS	Leaden Flycatcher	Common in eucalypt woodland, Br
	Satin Flycatcher	Uncommon spring migrant in woodland
	Yellow-breasted Boatbill	Uncommon in rainforest from Yr 9
	Black-faced Monarch	Rare in rainforest from c.Yr 3
	Spectacled Monarch	Common in rainforest from Yr 2, Br
	Pied Monarch	Uncommon in rainforest, rarely from Yr 5
	White-eared Monarch	Uncommon in mature rainforest
	Magpie-lark	Common on forest edges, Br
	Spangled Drongo	Common throughout, Br
ORIOLES	Olive-backed Oriole	Uncommon visitor to forest and woodland

	Figbird	Common in rainforest from Yr 5, Br
RIFLEBIRDS	Victoria's Riflebird	Uncommon in rainforest from Yr 5
BOWERBIRDS	Spotted Catbird	Uncommon in rainforest from Yr 5
CUCKOO-SHRIKES	Black-faced Cuckoo-shrike	Uncommon in eucalypt woodland
	Barred Cuckoo-shrike	Common in rainforest, erratic in plantings
	White-bellied Cuckoo-shrike	Common in eucalypt woodland, Br
	Cicadabird	Common in rainforest from Yr 7
TRILLERS	Varied Triller	Common in rainforest and woodland
WOODSWALLOWS	White-breasted Wood-swallow	Common over most habitats
BUTCHERBIRDS	Black Butcherbird	Common in rainforest from Yr 3, Br
CROWS	Torresian Crow	Rare visitor flying over
SWALLOWS	Welcome Swallow	Common along Barron River
CISTICOLAS	Golden-headed Cisticola	Uncommon in grassland
	Tawny Grassbird	Uncommon in grassland
FINCHES	Double-barred Finch	Uncommon in well-grassed areas
	Red-browed Finch	Common in well-grassed areas, Br
	Nutmeg Mannikin	Common in well-grassed areas, Br
	Chestnut-breasted Mannikin	Common in well-grassed areas, Br
SUNBIRDS	Yellow-bellied Sunbird	Common in most habitats, Br
MISTLETOEBIRD	Mistletoebird	Common in most habitats
SILVEREYES	Silvereye	Common in rainforest from Yr 3, Br
STARLINGS	Metallic Starling	Common wet season visitor to rainforest