

**BANDING PROJECT REPORT****No.2**

## Booringa Downs, Mitchell, Queensland

(Supplementary Data)

**Aim:** To document long-term and seasonal changes in the composition of the avian community, longevity of individuals within a species, numbers of sedentary and migratory species, and site fidelity among migrants in a private reserve on *Booringa Downs*.

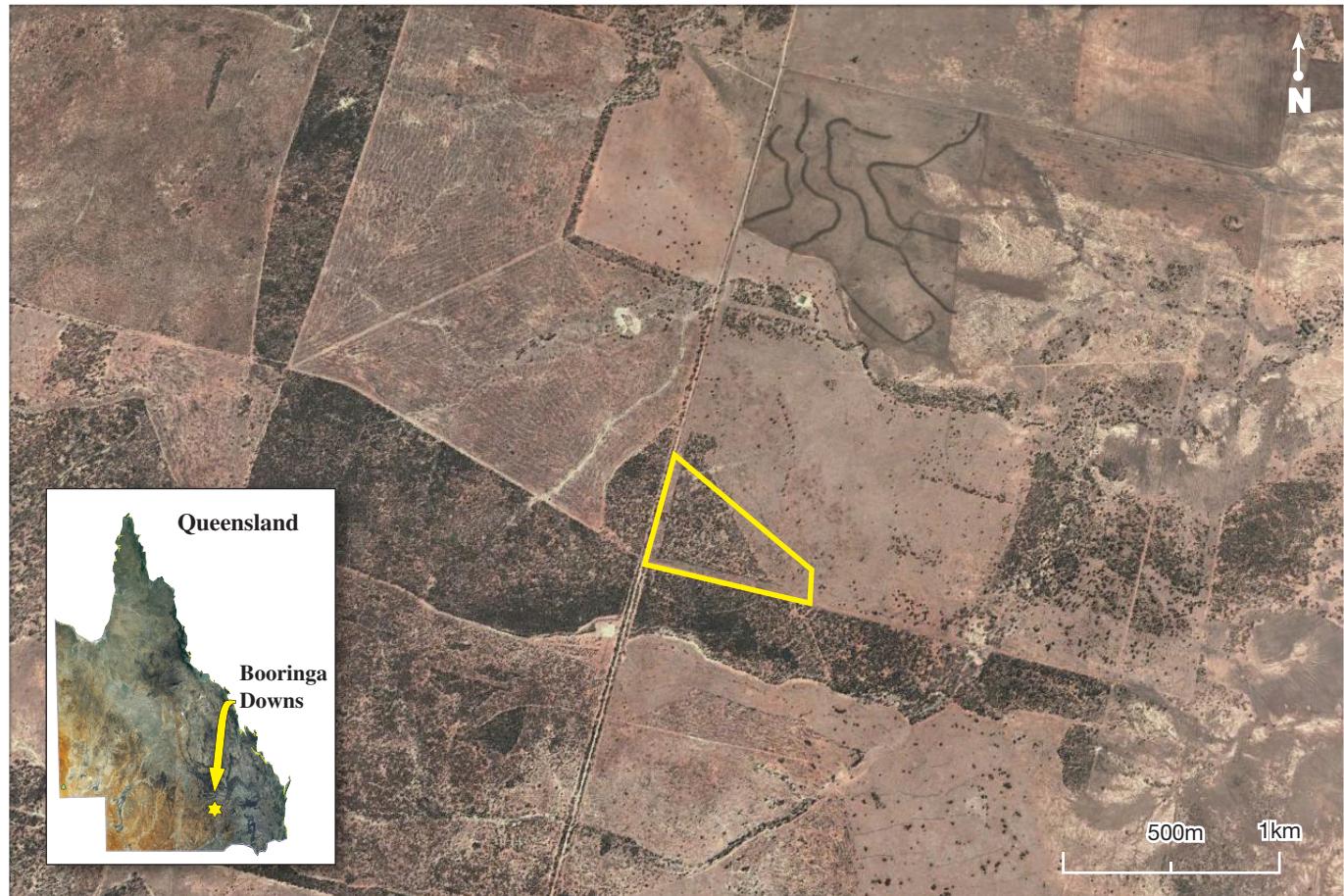
**Location:** 26°26.9'S; 147°49.0'E. Elevation 415 m asl. Approximately 15 kilometres north-east of Mitchell, Queensland.

**Description:** The study area is on the western edge of the Brigalow Belt Bioregion and the soils are predominantly sandy. The area is characterised by wet summers and dry winters, with a mean annual rainfall of 566 millimetres (Bureau of Meteorology). The western edge of the study site was approximately 500 metres long and bounded by a road. It extended eastwards in the shape of a truncated triangle for approximately 800 metres (Fig. 1).

The study site consisted of an undisturbed area of diverse mixed woodland comprising Cypress Pine (*Callitris columellaris*), Belah (*Casuarina cristata*), Wilga (*Geijera parviflora*), Supple Jack (*Canthium coprosmoides*), Brigalow (*Acacia harpophylla*), Poplar Box (*Eucalyptus populnea*) and Quinine Tree (*Petalostigma pubescens*) with extensive areas of Currant Bush (*Carissa ovata*) understorey as well as *Hakea* spp. and various grasses.

During 2007, all the vegetation along the road on the western side of the site, as well as a strip along the western side, was cleared for a distance of about 100 metres (see Fig. 1). In addition, the vegetation surrounding the site as well as many of the trees in the site was cleared, and the area opened to cattle grazing.

The paddocks surrounding the site to the north and west are used solely for grazing. The area of woodland to the south, consisting predominantly of Cypress Pine, had been cleared



**Figure 1.** *Booringa Downs, Queensland*

Satellite Image Courtesy of Google Earth

**Table 1**

Number of banding days (total = 119) and number of hours nets were open (total = 1547 hours) per banding period. Length of nets erected per period = 134 metres.

|                        | Jun<br>1990 | Dec-Jan<br>1990-91 | Dec-Jan<br>1991-92 | Jun<br>1992 | Sept<br>1992 | Dec-Jan<br>1992-93 | Jan<br>1994 | Apr<br>1994 | Jan<br>1995 | Apr<br>1995 | Apr<br>1996 | Dec<br>1996 |
|------------------------|-------------|--------------------|--------------------|-------------|--------------|--------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Number of days banding | 5           | 7                  | 6                  | 4           | 3            | 6                  | 5           | 7           | 5           | 3           | 8           | 6           |
| Hours nets open        | 65          | 91                 | 78                 | 52          | 39           | 78                 | 65          | 91          | 65          | 39          | 104         | 78          |

|                        | Dec-Jan<br>1997-98 | Dec<br>1998 | Jul<br>1999 | Dec-Jan<br>2000-01 | Dec-Jan<br>2001-02 | Mar-Apr<br>2002 | Sept-Oct<br>2002 | Apr<br>2003 | Jul<br>2004 | Apr<br>2005 | Apr<br>2006 | Jun<br>2007 |
|------------------------|--------------------|-------------|-------------|--------------------|--------------------|-----------------|------------------|-------------|-------------|-------------|-------------|-------------|
| Number of days banding | 6                  | 4           | 5           | 4                  | 8                  | 4               | 3                | 4           | 4           | 4           | 5           | 3           |
| Hours nets open        | 78                 | 52          | 65          | 52                 | 104                | 52              | 39               | 52          | 52          | 52          | 65          | 39          |



Winter



Spring



Summer



Autumn

previously and was open to grazing during the study period. The nearest permanent water lies approximately 500 metres from the north-west corner of the site, where a bore-fed dam provides water for stock. Other water courses in the vicinity of the site are ephemeral, although a small dam on the south-east corner occasionally contained water after heavy rain.

**Status:** This reserved area was set aside by the Allen family, the owners of *Booringa Downs*, who maintained it in an undisturbed state until 2006 when the property was sold. The site has now been converted for grazing.

**Duration of Project:** June 1990 – June 2007. For specific banding periods see below.

## METHODS

Banding was carried out during 24 periods: 10 in summer, 7 in autumn, 5 in winter and 2 in spring (Table 1). Banding days within each period averaged five (range 3–5) with a total number of 119 days for the whole study. The banding days in each period were run consecutively.

Twelve nets were erected in random positions within the site each day – 10 nets were 31 millimetres mesh (total length 113 m) and 2 (total length 21 m) were 25 millimetres mesh. The total length of 134 metres was erected each day and nets were raised to a height of 2.7 metres. They were opened from just before sunrise until sunset and were continuously monitored. Nets were open for a total of 1547 hours for the whole study (Table 1).

So that comparisons could be drawn between banding periods, each period was counted as a single datum point. The total number of birds banded for each species trapped during each period was tallied and tabulated – bird retrapped during the period in which they were banded were only counted once. Capture rates for each species were calculated as: *Number of birds caught per number of hours nets were open per 100 metres of net erected (x10)*. The multiplication factor was added so that calculated numbers could be displayed to one decimal point.

To calculate the retrap percentage for each species the number of retrapped birds was divided by the total number trapped and displayed as a percentage – a retrapped bird was only counted once irrespective of the number of times it was trapped.

Birds were banded using bands supplied by the Australian Bird and Bat Banding Scheme and morphometric details (tail, tarsus and wing lengths; weight) were also recorded for each bird.

## RESULTS AND DISCUSSION

Scientific names and taxonomic placement of captured species follow that of Christidis and Boles (2008) and are recorded on Table 2.

A total of 1862 individuals representing 82 species was captured and banded during the study period (Table 2). The overall capture rates varied from a maximum in December–January 1990–91 (24.5) to a minimum in September–October 2002 of just 1.5.

The avian community at the study site can be divided into three broad groups: the resident species, seasonally occurring species (migrants), and those that occurred irregularly (nomads) (Table 2). The Silveryeye *Zosterops lateralis* was the most commonly trapped species, followed by the Double-barred Finch *Taeniopygia bichenovii* and Spiny-cheeked Honeyeater *Acanthagenys rufogularis*. However, the Variegated Fairy-wren *Malurus lamberti*, Rufous Whistler *Pachycephala rufiventris*, Speckled Warbler *Chthonicola sagittata* and Splendid Fairy-wren *Malurus splendens* were the most frequently encountered species. Migrant species such as the Black-eared Cuckoo *Chalcites osculans*, Horsfield's Bronze-Cuckoo *Chalcites basalis* and Rainbow Bee-eater *Merops ornatus* were present mainly between September and April, although the Horsfield's Bronze-Cuckoo, Shining Bronze-Cuckoo *Chalcites lucidus*, Pallid Cuckoo *Cacomantis pallidus* and Fan-tailed Cuckoo *Cacomantis flabelliformis* were also captured during June. The latter group comprised mainly more western irruptive species, such as the Diamond Dove *Geopelia cuneata* (Jan. 1994), Budgerigar *Melopsittacus undulatus* (Jan. 1994), Black Honeyeater *Sugomel niger* (Jan. 1995), Crimson Chat *Epthianura tricolor* (Jan. 1994) and Zebra Finch *Taeniopygia guttata* (Dec.–Jan. 1992–3). These irruptions generally coincided with low rainfall or drought conditions to the west and movements of birds to more hospitable areas towards the coast.

The proportions of species that comprise the resident trapped population are displayed in Table 3. The proportions of individual species varied considerably over time but when averaged over the 24 banding periods the insectivores (principally the fairy-

Table 2

List of all species captured at the Boorlina Downs site showing: capture rates ( $\times 10$ ) for the 24 banding periods; whether resident (R), migrant (M) or nomad (N); total number banded; number retrapped and percentage retrapped.

**Table 2 (continued)**

List of all species captured at the Booringa Downs site showing: capture rates ( $\times 10$ ) for the 24 banding periods; whether resident (R), migrant (M) or nomad (N); total number banded; number retrapped and percentage retrapped.

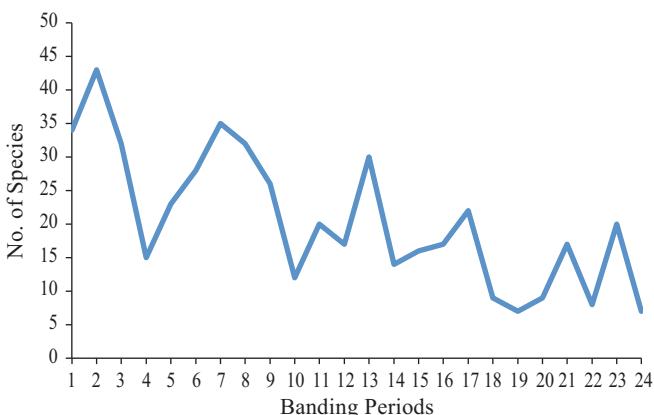
| Common name               | Scientific Name                  | R, M<br>or N | Jun<br>1990 | Dec-Jan<br>1990/91 | Jan<br>1991/92 | Jun<br>1992 | Sept<br>1992 | Dec-Jan<br>1992/93 | Jan<br>1993/94 | Apr<br>1994 | Jan<br>1994/95 | Apr<br>1995 | Jan<br>1995/96 | Apr<br>1996 | Dec<br>1996/97 | Jan<br>1997/98 | Dec<br>1997/98 | Jan<br>1998/99 | Apr<br>1999 | Jul<br>1999 | Dec-Jan<br>2000/01 | Mar-Apr<br>2001/02 | Feb<br>2002 | Apr<br>2003 | Jul<br>2003 | Apr<br>2004 | Jul<br>2004 | Apr<br>2005 | Jul<br>2005 | Apr<br>2006 | Jul<br>2006 | Apr<br>2007 | Jul<br>2007 | Total<br>banded | No-re-<br>trapped | % re-<br>trapped |
|---------------------------|----------------------------------|--------------|-------------|--------------------|----------------|-------------|--------------|--------------------|----------------|-------------|----------------|-------------|----------------|-------------|----------------|----------------|----------------|----------------|-------------|-------------|--------------------|--------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------|-------------------|------------------|
| Spiny-cheeked Honeyeater  | <i>Acanthagenys tenuirostris</i> | R            | 1.4         | 2.5                | 0.8            |             |              |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Crimson Chat              | <i>Epthianura tricolor</i>       | N            |             |                    |                | 0.5         |              |                    |                | 0.1         | 0.8            | 0.1         | 0.6            |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Black Honeyeater          | <i>Sugomel niger</i>             | N            |             |                    |                |             |              |                    |                | 0.1         | 0.2            | 0.1         | 0.6            | 1.3         |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Brown Honeyeater          | <i>Lichenostomus indistincta</i> | R            | 0.2         | 1.4                |                |             |              |                    |                | 0.1         | 0.2            | 0.5         | 0.5            | 0.3         | 0.1            |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Brown-headed Honeyeater   | <i>Melithreptus brevirostris</i> | R            | 0.4         |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Blue-faced Honeyeater     | <i>Entomyzon cyanotis</i>        | R            |             |                    |                | 0.1         |              |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Noisy Friarbird           | <i>Philemon corniculatus</i>     | R            |             |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Little Friarbird          | <i>Philemon citreogularis</i>    | R            | 0.3         |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Striped Honeyeater        | <i>Plectrohynchus lanceolata</i> | R            | 2.5         | 0.1                | 0.2            |             |              |                    |                | 0.2         |                |             |                | 0.1         | 0.1            | 0.1            |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Grey-crowned Babler       | <i>Pomatorhinus temporalis</i>   | R            | 0.3         |                    |                | 0.9         | 0.1          |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Varied Sittella           | <i>Daphoenositta chrysopera</i>  | N            |             |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Black-faced Cuckoo-shrike | <i>Coracina novaehollandiae</i>  | R            |             |                    |                | 0.1         |              |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Ciedabird                 | <i>Conacina tenuirostris</i>     | M            |             |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| White-winged Triller      | <i>Lalage sueurii</i>            | M            | 0.2         | 0.1                |                |             |              |                    |                | 2.9         | 1.6            | 0.1         |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Rufous Whistler           | <i>Pachycephala rufiventris</i>  | R            | 1.3         | 0.7                | 0.3            |             |              |                    | 0.1            | 0.2         | 0.2            | 0.5         | 0.3            | 0.6         | 0.1            | 0.9            |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Grey Shrike-thrush        | <i>Colluricinclla harmonica</i>  | R            | 0.1         |                    |                |             |              |                    |                |             |                |             |                |             |                |                | 0.2            | 0.1            | 0.1         |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Crested Bellbird          | <i>Oreocica gutturalis</i>       | N            | 0.1         |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Olive-backed Oriole       | <i>Oriolus sagittatus</i>        | M            | 1.8         |                    |                |             |              |                    | 0.2            | 0.1         | 0.1            |             |                |             |                |                | 0.1            |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Masked Woodswallow        | <i>Artamus personatus</i>        | N            | 0.1         |                    |                |             |              |                    |                |             |                |             |                |             |                |                | 0.5            | 0.1            |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| White-browed Woodswallow  | <i>Artamus superciliosus</i>     | N            | 0.2         |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                | 0.2            | 0.1         | 0.9         | 0.1                | 0.1                | 0.5         |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Little Woodswallow        | <i>Artamus minor</i>             | N            | 0.2         |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                | 0.2            | 0.1         | 0.1         | 0.1                | 0.1                | 0.2         |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Grey Butcherbird          | <i>Cracticus torquatus</i>       | R            | 0.1         |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                | 0.4            | 0.2         | 0.1         | 0.1                | 0.1                | 0.1         |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Pied Butcherbird          | <i>Cracticus nigrogularis</i>    | R            | 0.1         |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                | 0.1            | 0.1         | 0.1         | 0.1                | 0.1                | 0.1         |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Australian Magpie         | <i>Pica pica</i>                 | R            | 0.6         |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                | 0.1            |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Pied Currawong            | <i>Cracticus torquatus</i>       | R            | 0.5         | 0.1                |                |             |              |                    |                |             |                |             |                |             |                |                |                | 0.2            | 0.3         | 0.3         | 0.3                | 0.3                | 0.3         |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Grey Fantail              | <i>Sturnella magna</i>           | R            | 0.1         |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                | 0.1            | 0.1         | 0.1         | 0.1                | 0.1                | 0.1         |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Willie Wagtail            | <i>Rhipidura albiscapa</i>       | R            | 0.1         | 0.2                | 0.1            | 0.1         | 0.4          | 0.2                |                | 0.1         | 0.1            | 0.1         | 0.1            | 0.1         | 0.1            | 0.1            | 0.1            | 0.1            | 0.1         | 0.1         | 0.1                | 0.1                | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         | 0.1         |                 |                   |                  |
| Leaden Flycatcher         | <i>Sericornis frontalis</i>      | M            |             |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Magpie-lark               | <i>Grallina cyanoleuca</i>       | R            | 0.1         | 1.4                |                |             |              |                    |                |             |                |             |                |             |                |                | 0.5            |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| White-winged Chough       | <i>Corcorax melanorhamphos</i>   | R            | 0.1         |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                | 0.1            | 0.2         |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Apostlebird               | <i>Sturnidea cinerea</i>         | R            | 0.2         | 0.5                |                |             |              |                    |                |             |                |             |                |             |                |                |                | 0.1            | 0.2         |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Jacky Winter              | <i>Micromecia fasciitarsis</i>   | R            | 0.6         | 0.4                | 0.9            |             |              |                    |                | 0.2         | 0.1            | 0.1         | 0.2            |             |                |                |                | 0.1            | 0.1         |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Red-capped Robin          | <i>Petroica goodenovii</i>       | R            | 0.3         | 0.2                |                |             |              |                    |                |             |                |             |                |             |                |                |                | 0.1            | 0.1         |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Hooded Robin              | <i>Melanodryas cucullata</i>     | R            |             |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                |                | 0.1         | 0.1         |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Eastern Yellow Robin      | <i>Eopsaltria australis</i>      | R            |             |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                |                | 0.1         |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Rufous Songlark           | <i>Chalcites mathewsi</i>        | R            | 1.6         | 1.1                | 3.7            |             |              |                    |                | 0.4         | 0.7            | 0.2         | 1.8            |             |                |                |                | 0.8            | 0.5         |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Silvereye                 | <i>Zosterops lateralis</i>       | R            | 0.1         | 0.2                | 0.7            |             |              |                    |                | 0.2         | 0.2            | 0.1         | 0.1            | 0.2         |                |                |                | 0.1            | 0.1         |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Tree Martin               | <i>Petrochelidon nigricans</i>   | R            | 0.8         | 1.1                | 0.3            | 1.7         | 0.3          | 1.9                | 0.9            | 0.4         | 2.6            | 0.6         | 0.7            | 1.7         |                |                |                | 0.3            | 0.2         |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Mistletoebird             | <i>Dicaeum hirundinaceum</i>     | N            |             |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Zebra Finch               | <i>Taeniopygia guttata</i>       | R            |             |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| Double-barred Finch       | <i>Taeniopygia bichenovii</i>    | R            |             |                    |                |             |              |                    |                |             |                |             |                |             |                |                |                |                |             |             |                    |                    |             |             |             |             |             |             |             |             |             |             |             |                 |                   |                  |
| <b>Totals</b>             |                                  |              | <b>17.0</b> | <b>24.5</b>        | <b>15.6</b>    | <b>5.5</b>  | <b>10.5</b>  | <b>8.0</b>         | <b>20.8</b>    | <b>8.0</b>  | <b>12.5</b>    | <b>6.7</b>  | <b>3.2</b>     | <b>3.5</b>  | <b>11.3</b>    | <b>10.8</b>    | <b>3.3</b>     | <b>7.5</b>     | <b>4.4</b>  | <b>2.4</b>  | <b>1.5</b>         | <b>10.6</b>        | <b>5.7</b>  | <b>3.7</b>  | <b>6.7</b>  | <b>2.1</b>  | <b>1862</b> | <b>197</b>  | <b>10.4</b> |             |             |             |             |                 |                   |                  |

**Table 3**  
Percentage and each species of the total resident population for each banding period - only residents are counted as a large influx of migrants/nomads would skew the percentage of resident birds.

Table 3 (*continued*)

Percentage and each species of the total resident population for each banding period - only residents are counted as a large influx of migrants/nomads would skew the percentage of resident birds.

**Table 4** Number of birds retrapped in a banding period subsequent to their initial capture. Oldest age calculated from time of banding to last recapture.



**Figure 2.** Number of species trapped per banding period.

wrens (19.4%); thornbills, Weebill *Smicrornis brevirostris* and Speckled Warbler (14.5%); robins and Rufous Whistler (6.2%) and honeyeaters (32.6%) constituted the largest groups with the granivores at 9.8 percent.

#### Longevity

The total re-trap percentage for all birds was 10.4 percent (Table 2). As expected the species with the highest percentage re-trap were the residents of the site, in particular, the three Fairy-wren species, Speckled Warbler, Rufous Whistler and the Chestnut-rumped *Acanthiza uropygialis* and Inland Thornbill *A. apicalis* (Table 2).

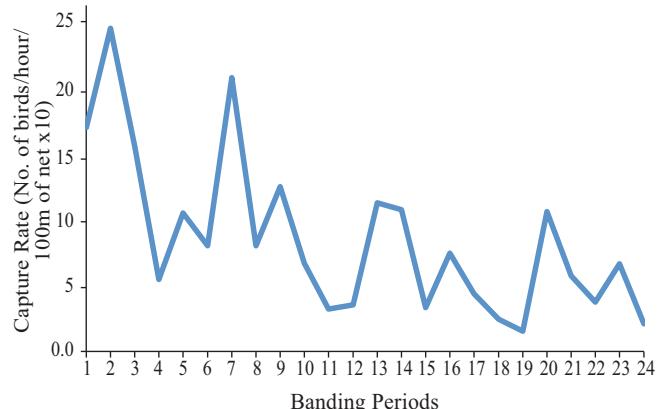
Maximum recorded ages after banding of all retrapped species are shown in Table 4. The oldest records (taken that at capture each individual was aged as 1+) of particular note were: an Inland Thornbill 12+ years (this bird, initially banded in June 1990 was recaptured six times); a Rufous Whistler 9+ (adult female 2+ trapped four times between 1990 and 1997); a Brown-headed Honeyeater *Melithreptus brevirostris* 9+ (banded in December 1997 and retrapped in 2006); a Chestnut-rumped Thornbill 9+ (banded in June 1992 and retrapped in 1999); a Splendid Fairy-wren 8+ (banded in December 2000 and retrapped in 2007); a Bar-shouldered Dove *Geopelia humeralis* 8+ (banded in December 1991 and retrapped in 1997); an Australian Owlet-Nightjar *Aegotheles cristatus* 8+ (banded in December 1990 and retrapped in 1992 and 1996) and a Noisy Miner *Manorina melanocephala* 8+ (banded in September 1992 and retrapped in 1996 and 1998).

Some resident individuals, particularly among the Maluridae, were re-trapped up to five times.

#### Total Capture Rates

Although there were considerable annual and seasonal fluctuations in the species composition of the avifauna during the 18-year study period, the most obvious trend is a reduction in both capture rates and diversity (Table 2; Figs 2 and 3 respectively). The lowest capture rate and diversity recorded in 2007 may have been due to anthropogenic disturbance and habitat alteration, but prior to this, the area was relatively undisturbed.

Rainfall is probably the only environmental variable that fluctuated considerably between both months and years. Bureau



**Figure 3.** Total capture rate per each banding period.

of Meteorology rainfall records for Mitchell indicate that total rainfall and distribution of rainfall are highly variable. Since records began in 1884 the highest annual total was 1304 millimetres (1950) and the lowest 236 millimetres (1946). Annual totals for the study period are shown in Figure 4; the highest rainfall was 738 millimetres (1998) and the lowest 306 millimetres (2002). No clear patterns emerge when rainfall is compared with the overall capture rates (Figs 2 and 4), although analyses at species level may establish possible correlations. Rainfall has certainly been proposed as a factor influencing seasonal movements of honeyeaters (Keast 1968, 1984) and the nomadism of many Australian arid zone species relates to good breeding in wet years and subsequent dispersal (Nix 1976; Newton 2008).

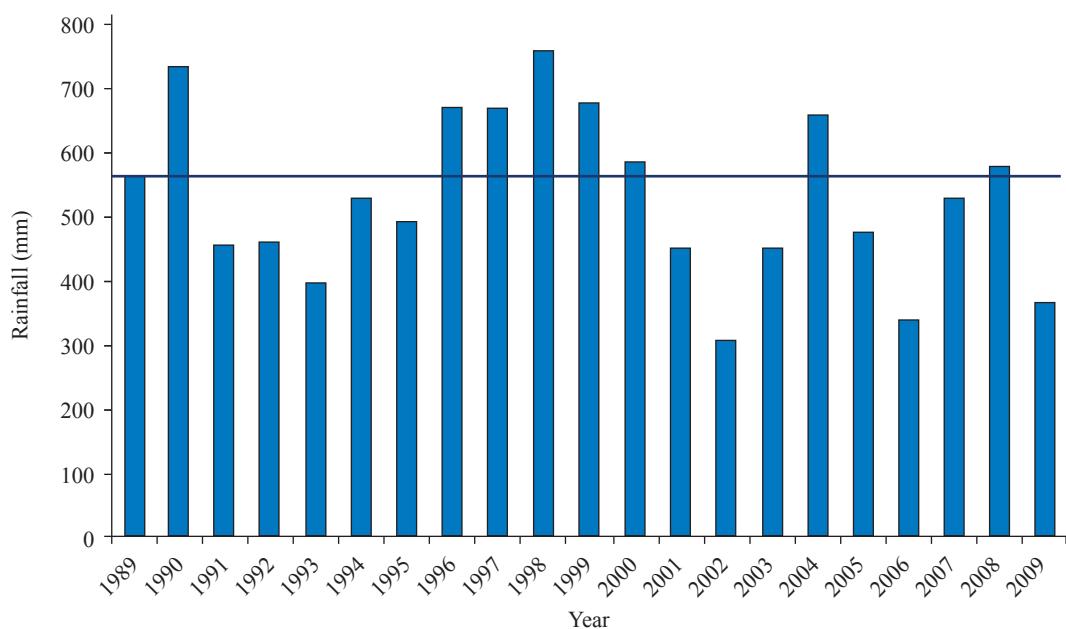
Notwithstanding the overall declines however, capture rates were usually higher in December-January, largely due to the influx of migrant species (Table 2). Very few of the migrant cuckoo species were captured after 1994.

#### Species capture rates

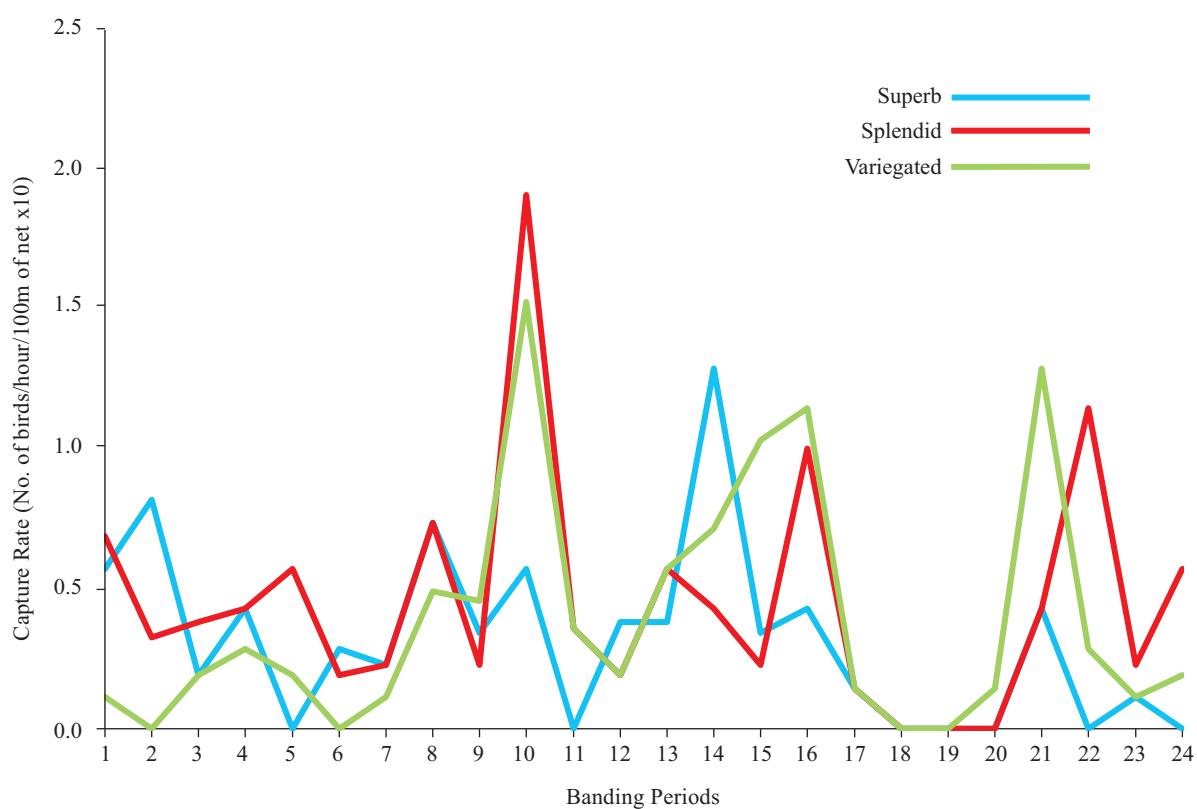
The three species of the Maluridae (Superb *Malurus cyaneus*, Variegated and Splendid Fairy-wren) vary in abundance (Fig. 5) over time, although, the Superb Fairy-wren (except for two visits: Dec. 1998 and Dec.-Jan. 1990–91) was generally less abundant than the other two species. It is noteworthy that they record higher capture rates and proportion of the resident community in April–June.

Spiny-cheeked Honeyeaters, one of the more abundant species, were almost entirely absent from April to July. A similar pattern, although not as marked, was observed for Striped *Plectrorhyncha lanceolata*, Brown *Lichenura indistincta* and Brown-headed Honeyeaters (Table 2).

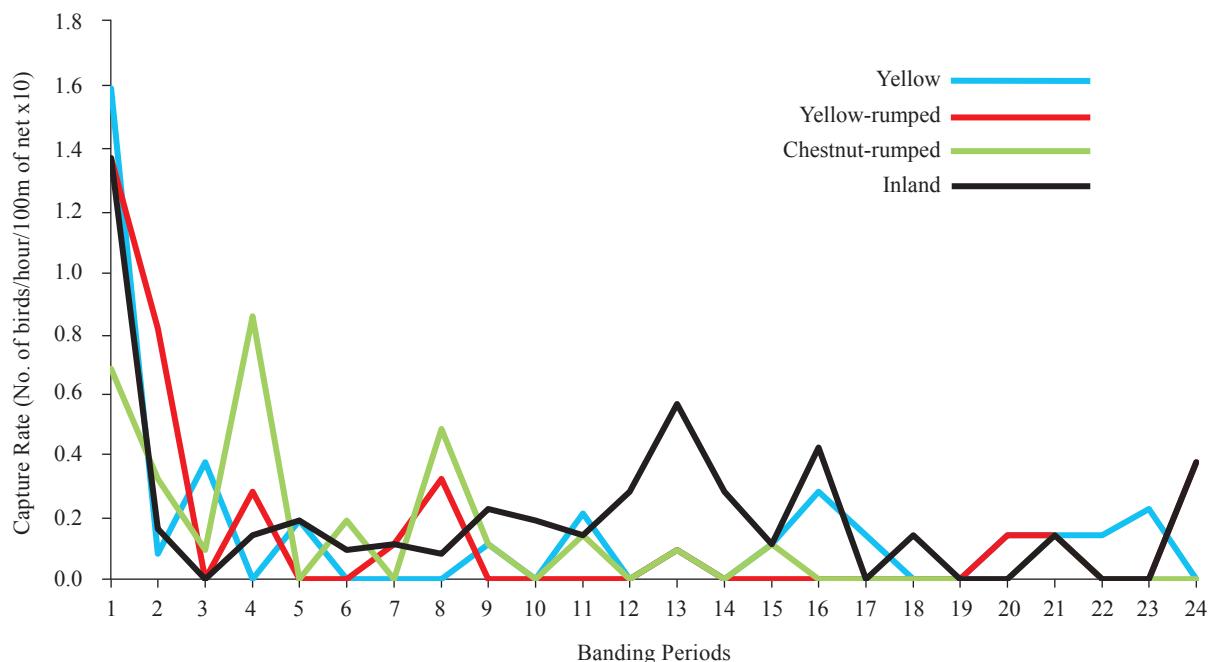
Among the acanthizids (Yellow *Acanthiza nana*, Yellow-rumped *A. chrysorrhoa*, Chestnut-rumped and Inland Thornbill) there were fluctuations in individual proportions of the resident community and capture rates (Fig. 6). The Yellow, Yellow-rumped and Chestnut-rumped Thornbill's overall capture rates were comparable (3.7, 3.6 and 3.2 respectively) while the Inland Thornbill's overall capture rate (5.0) was higher. Its proportion, across the study, remained relatively constant when compared with the other thornbills whose capture rates fluctuated more widely.



**Figure 4.** Yearly rainfall from 1989 to 2009 for Mitchell. Horizontal line indicates yearly average. (Bureau of Meteorology).



**Figure 5.** Capture rates of three species of fairy-wren for each banding period.



**Figure 6.** Capture rates for each species of thornbill per banding period.

The Speckled Warbler was present throughout the study period with no apparent seasonality. Other common species (e.g., Rufous Whistler and Noisy Miner) also formed a relatively consistent proportion of the resident community. Similarly the granivorous Double-barred Finch was common throughout the study period, although usually more abundant in December–January. Many of the insectivorous species (e.g., the robins and flycatchers) were more abundant in the first half of the study.

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