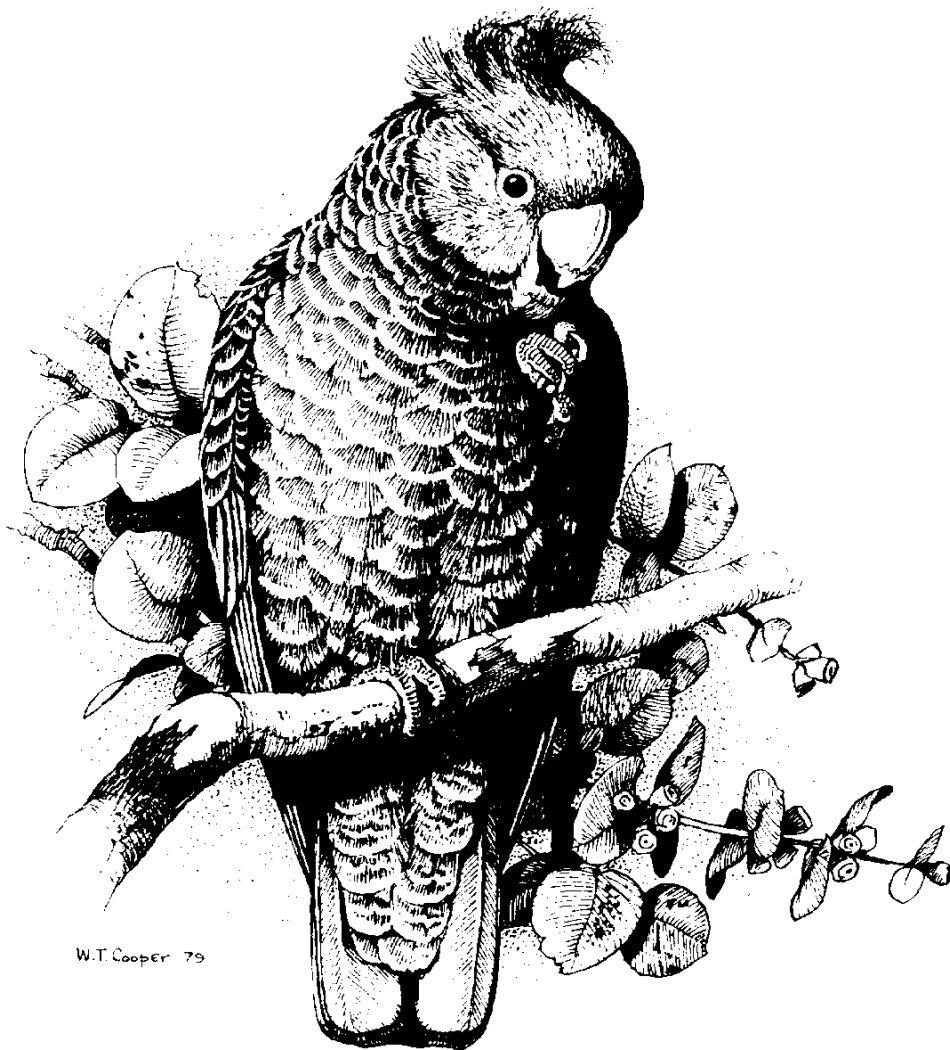


canberra bird notes

ISSN 0314-8211

Volume 42
Number 2
July 2017



W.T. Cooper 79

Registered by Australia Post 100001304

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ARTICLES

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AUSTRALASIAN SHOVELER DIVING

STEPHEN WALLACE

202 Tillyard Drive, Fraser ACT 2615, Australia
skcbf@bigpond.net.au

Abstract. Diving by Australasian Shoveler (*Anas rhynchotis*) is rarely reported. This paper focuses on the 86 dive cycles out of 97 dives in shallow water (0.7-0.8m) recorded on video from 6 to 20 June 2016 at Jerrabomberra Wetlands, Australian Capital Territory. Details are given of the technique used to dive, the time under water (3.9 to 12.4 seconds, average 7.8 seconds), the time between dives (as short as 2.3 seconds), the relationship between the time under water and time on the surface, and the dive rate (average 3.9 dives per minute). The results are compared to expectations from diving models.

Introduction

Diving by Australasian Shoveler (*Anas rhynchotis*) is rarely reported. Even rarer is information on the length of time spent under water. Black (1959), the only published information located, reported 'duration of submergence' for seven dives by birds on Lake Rotorua, New Zealand, as varying between 7 and 10 seconds with the majority (5) 8 or 9 seconds. These were timed using the second hand on a watch with the water depth estimated to be 6 to 8 feet (1.8-2.5m).

On 14 May 2016, Shorty reported Australasian Shovelers diving at Kellys Swamp. Observations of diving, by a number of observers, continued until 20 Jun 2016.

Terminology

The terminology used here aligns with Houston and Carbone (1992) except for the addition of dive sequence.

Heath *et al.* described extracting diving information from video footage of Common Eider (*Somateria mollissima*), defining the start of the dive as the point at which the bill broke the surface of the water and the end of the dive as the frame when the tail broke the surface, leaving a characteristic splash pattern. The end point they defined is specific to Eider, their deeper diving resulting in a steeper return to the surface (see Heath 2006) than shovelers, so a different method was defined. I also used a slightly different point for the start of the dive, one where the bird can no longer breathe (the point the bill goes under water). Any timing difference caused by the slightly different definition compared to Heath *et al.* would be minor (mostly one video frame or 0.04 of a second). The definitions of the start and end of dives used for recording times with stop watches and data loggers are not satisfactory for analysing videos.



Figure 1. Start (left) and end (right) of time under water.

Time under water: time from the point at which the bird's beak goes under water (bird no longer able to breathe) to when it surfaces with its beak emerging from the water but with the tip of the beak still submerged (bird able to breathe again) (see Figure 1);

Time above water/ time at the surface: time not spent under water;

Dive: time under water;

Dive cycle: time under water plus time above water before the next dive;

Dive sequence: sequential dives that could be attributed to a single bird.

The location

All my observations were made at Kellys Swamp, Jerrabomberra Wetlands, Australian Capital Territory. Fig. 2 shows the areas where diving was observed. Michael Maconachie, the ranger, estimated the maximum depth as 0.7 to 0.8 metres. Examination of the aerial photography on ACTMapi for 2014, a dry period, shows that the areas where diving was recorded coincide with the areas last to dry out, that is they are the deepest areas of the swamp. There is little variation in the depth at the dive locations.



Figure 2. Map of Kellys Swamp showing areas where diving was observed (Source of the base photo is ACTMapi 2016 Aerial photos).

Methods

Many videos of Australasian Shoveler diving were taken between 6 and 20 Jun 2016. Of these videos, 21 showed 97 cases where the bird could be tracked diving and returning to the surface and therefore timed. In most cases (86) the time spent on the surface before the next dive could also be determined. The information below focusses on these dive cycles.

As the video was shot at either 25 or 50 frames per second, timing information at intervals of 0.04 or 0.02 of a second could be gathered. Data on the time under water and the time on the surface were recorded to this level of accuracy but are presented here to a maximum of one decimal place (0.1 of a second).

The data were collected only where it was possible to identify the bird going under the water and coming to the surface. This was achieved when the bird was the only one diving or when plumage differences allowed the birds to be distinguished (male, female, male in eclipse plumage) or when the diving birds were separated by sufficient distance. Although it is not possible to know exactly how many of the birds on Kellys Swamp were diving, it is possible to say that it was at least 5.

Description of diving

Five dives were analysed in detail to determine the technique used. From the time the beak touches the water to the point where no part of the bird is visible varied from 0.50 to 0.58 of a second. The birds start by moving their heads forward. It proved difficult to determine when this commenced but is estimated to be 0.08 to 0.3 of a second before the beak touches the water. Most dives followed the same sequence (see photos in Figure 3):

1. Head starts to move forward
2. Beak is pushed under water
3. Head and then neck is pushed under water
4. Body starts to arch
5. Wings lift at the back, then tail lifts, the body starts to submerge and the wings start to spread
6. Wings continue to spread as body submerges further
7. Wings spread widest when only the tail is visible above the water. The feet sometimes cause a spray of water but this appears to be when a second kick is required (see Figure 4)
8. Bird fully submerged

In all but two of the dives recorded the wings were spread during the dive. For most dives the wings were still spread when the tips disappeared. In a couple the wings can be seen moving back towards the body just before the bird disappears. The birds bob back to the surface, rising gently over about 0.24 of a second. Wallace (2016a, 2016b) are videos of Australasian Shoveler diving.



Figure 3. Diving male Australasian Shoveler (the eight steps listed in the description of dives).



Figure 4. A large splash is produced in some dives as a result of a second kick. The first two images show the first kick.

Results

The results are presented in terms of the time under water, the time on the surface before the next dive, the relationship between these two measurements, and the dive rate. The percentage of time spent under water is also included and some data are presented grouped by dive sequence. Figure 5 summarises the results for dive cycles by dive sequence.

































Seq.		<i>Time underwater (under) and time at the surface (above)</i>	Min (sec)	Max (sec)	Range (sec)	Av (sec)	StdDev	Number of dives	Percent under water	Dive rate per minute
1	Above		2.9	13.0	10.1	6.2	4.64	4	47	5.1
	Under		5.4	5.7	0.3	5.6	0.13			
2	Above		3.2	5.1	1.9	4.1	0.97	3	58	6.3
	Under		5.4	5.6	0.2	5.5	0.08			
3	Above		3.0	10.3	7.3	6.0	2.42	12	54	4.6
	Under		5.4	8.9	3.6	7.0	1.04			
5	Above		8.2	19.4	11.3	15.0	5.13	4	30	2.8
	Under		3.9	8.4	4.5	6.4	1.96			
7	Above		4.4	11.0	6.6	6.8	2.81	6	52	4.2
	Under		6.7	8.1	1.4	7.4	0.64			
8	Above		8.0	8.4	0.4	8.2	0.25	2	56	3.3
	Under		9.3	11.2	2.0	10.3	1.39			
9	Above		4.7	4.7	0.0	4.7		1	54	5.8
	Under		5.6	5.6	0.0	5.6				
11	Above		2.7	4.8	2.1	3.2	0.72	7	62	7.0
	Under		5.0	5.8	0.8	5.3	0.34			
12	Above		6.0	6.0	0.0	6.0		1	59	4.1
	Under		8.5	8.5	0.0	8.5				
15	Above		4.8	4.8	0.0	4.8		1	56	5.6
	Under		6.0	6.0	0.0	6.0				
16	Above		2.8	22.5	19.7	6.8	4.75	21	61	3.4
	Under		8.6	12.4	3.8	10.7	0.88			
17	Above		4.5	25.0	20.5	11.0	9.46	4	38	3.4
	Under		5.2	7.7	2.6	6.7	1.16			
18	Above		2.3	20.2	17.9	8.8	6.99	7	43	3.9
	Under		5.4	8.1	2.7	6.6	0.98			
19	Above		3.0	10.9	7.9	6.0	3.44	6	56	4.3
	Under		7.1	8.8	1.7	7.8	0.80			
20	Above		3.5	4.1	0.5	3.8	0.36	2	62	6.0
	Under		5.6	6.9	1.3	6.2	0.91			
21	Above		10.6	29.4	18.9	19.9	8.28	5	30	2.1
	Under		7.8	9.3	1.4	8.5	0.55			
All cycles	Above		2.3	29.4	27.1	7.6	5.85	86	51	3.9
	Under		3.9	12.4	8.5	7.8	2.10			

Figure 5. Summary of dive cycles by dive sequence. Missing sequences (4,6,10,13,14) did not contain any complete dive cycles.

For the 86 dives which were part of dive cycles, the **time under water** varied from 3.9 to 12.4 seconds with an average of 7.8 seconds and standard deviation of 2.1 seconds. The majority (96%) were in the range 5 to 11 seconds, but the distribution is irregular. The 5 second range was the most frequent but there is another peak in the distribution at 7 seconds and another much smaller one at 11 seconds. This pattern was similar for all the 97 dives measured (3.9-12.4, average 7.8, standard deviation 2.1) (see Figure 6).

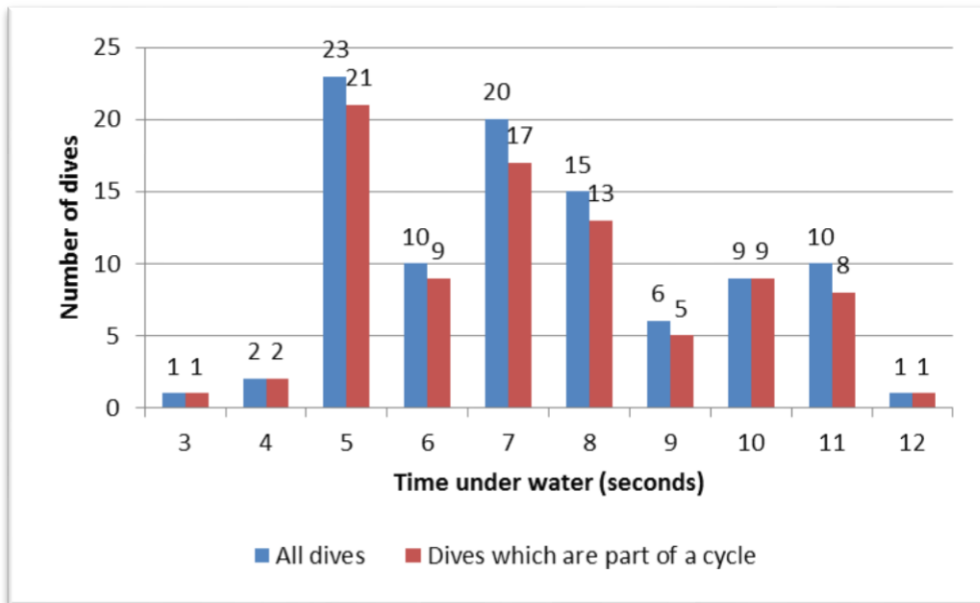


Figure 6. Distribution of time under water.

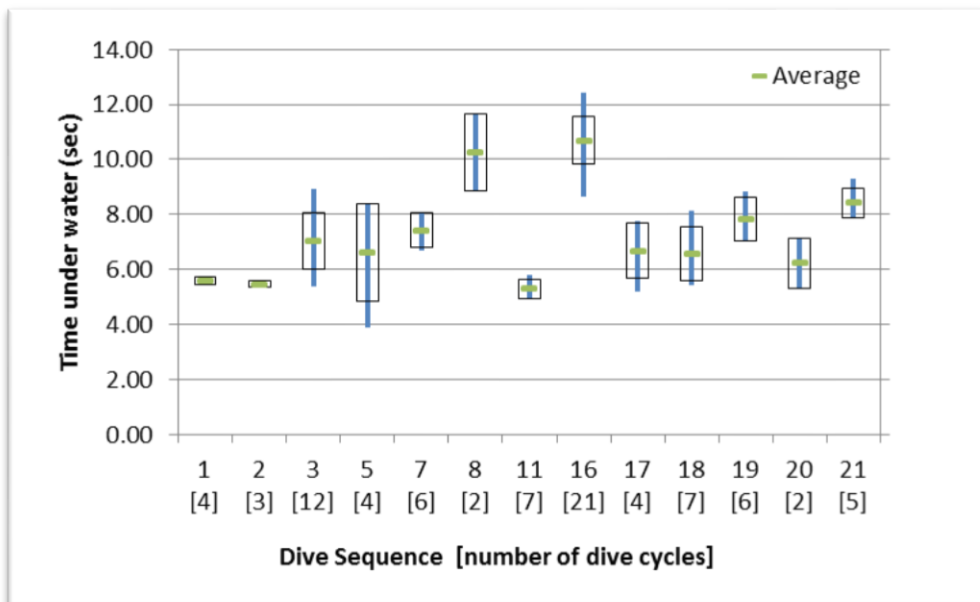


Figure 7. Range of dive times, average dive time and standard deviation box for dive sequences with more than one dive cycle.

The majority of dive cycles (97%) were part of a dive sequence containing 2 or more dive cycles. For these, the range of dive times by dive sequence is shown in Figure 7. While some show a very narrow range for the time under water, others are wide. The 7 dives in sequence

1 and 2 were all between 5.4 and 5.7 seconds, while sequence 5 varied between 3.9 and 8.4 seconds.

The shortest **time on the surface** between dives was 2.3 seconds, this between dives of 6.3 and 5.7 seconds. Figure 8 shows the distribution of times before the next dive. There is a clear high point with 21% at 4 seconds. Fifty one percent are in the range 3 to 5 seconds.

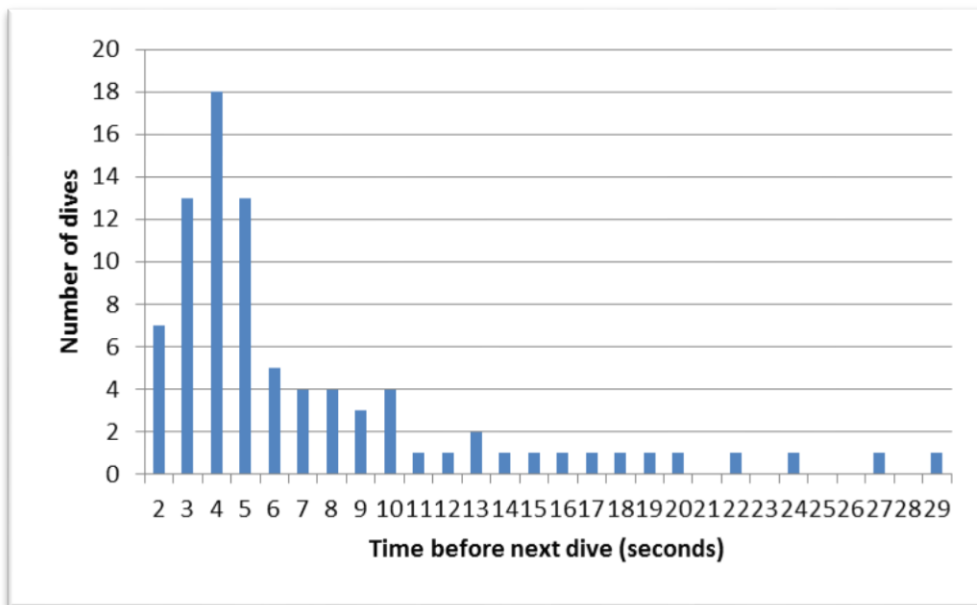


Figure 8. Distribution of time before the next dive.

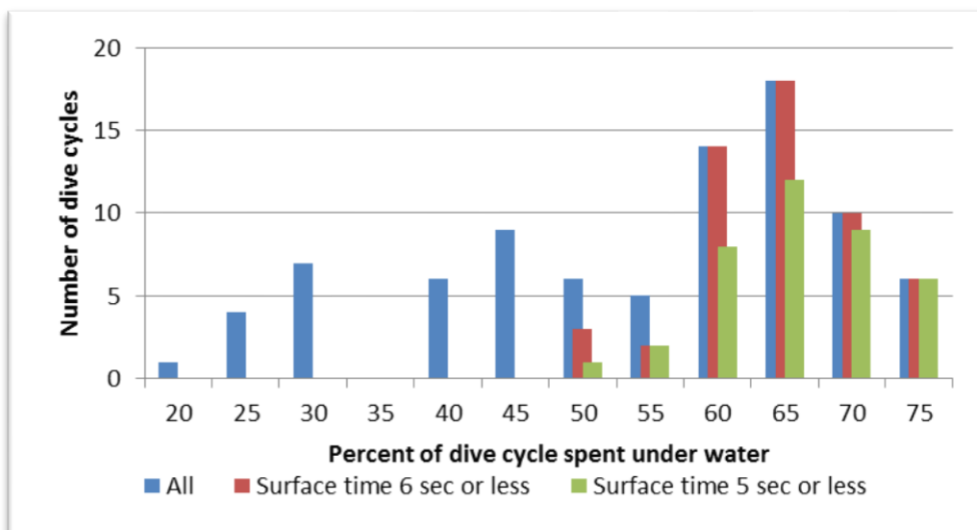


Figure 9. Distribution of the percentage of the dive cycle spent under water for different times on the surface between dives.

The **relationship between the time under water and time on the surface** has been the subject of many papers. When examined as the proportion of time under water (expressed here as a percentage), the data show a normal distribution, centred around 65%, for dives with up to 6 seconds before the next dive (Figure 9). When the higher values of the time between dives are added the distribution becomes more skewed and irregular. These longer times

between dives can be considered as breaks in diving, with the birds sometimes preening, surface feeding and moving areas. The maximum proportion of time under water of 77% may indicate the maximum proportion possible to allow for recovery before the next dive. The centre of the distribution (65%) may represent the optimum diving efficiency. Within each category, the time spent under water varied (see Figure 10).

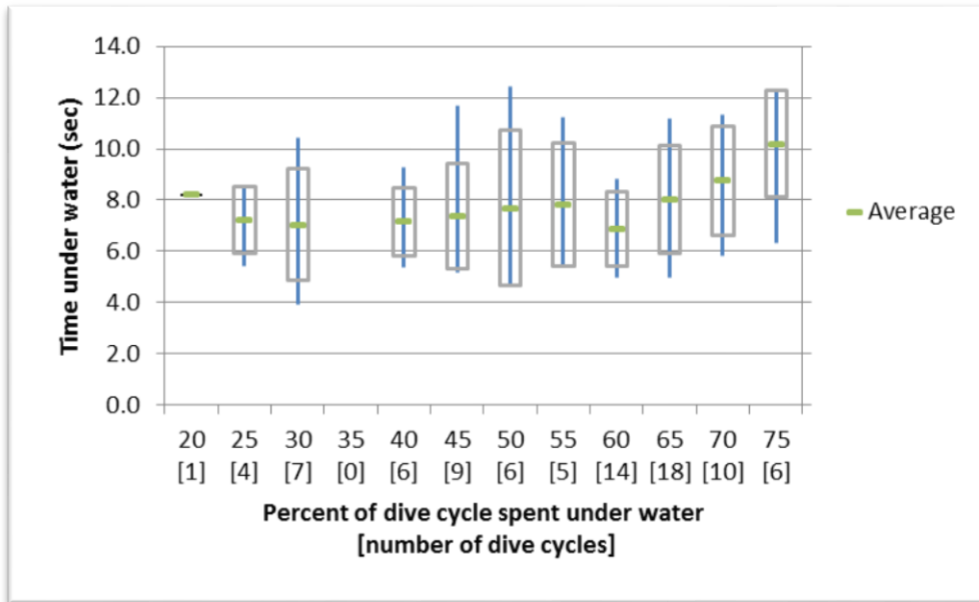


Figure 10. Range of dive times, average dive time and standard deviation box for the percent of dive cycle spent under water.

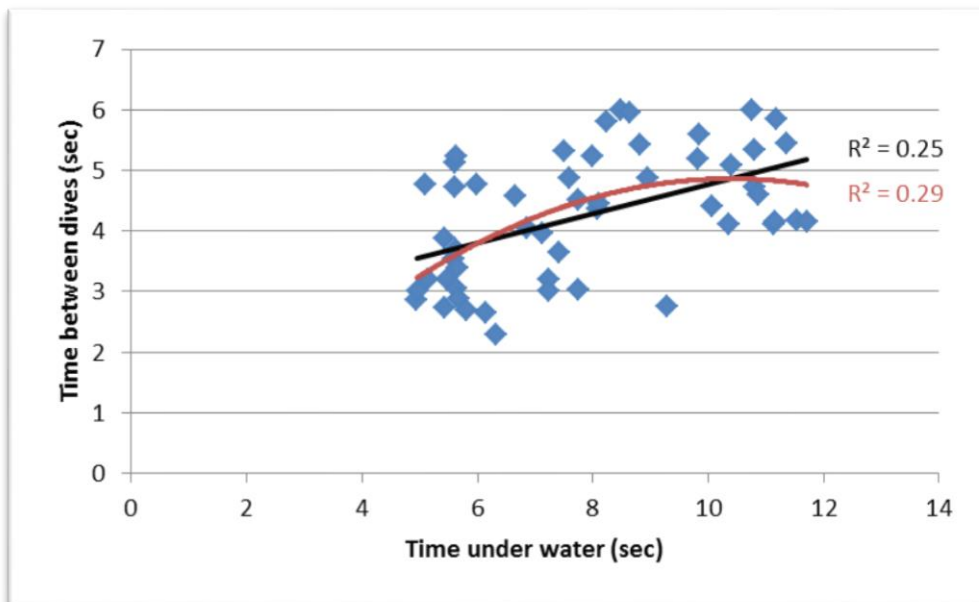


Figure 11. Relationship between time under water and time above water before the next dive for data where time between dives is 6 seconds or less ($r^2=0.25$ for linear with no intercept defined, $\text{Time between dives} = 0.2412 \times \text{Time under water} + 2.3605$; $r^2=0.29$ for 2nd order polynomial, $\text{Times between dives} = -0.0554 \times \text{Time under water}^2 + 1.1504 \times \text{Time under water} - 1.1084$).

There is a poor relationship between the time under water and the time before the next dive, even when the data are restricted to dives with a short time (6 seconds or less) before the next dive ($r^2=0.25$ for linear, no intercept defined; $r^2=0.29$ for 2nd order polynomial) (see Figure 11). Even though poor, this relationship is as good as some of the data used to develop the models used to predict diving behaviour.

Examining the data by dive cycle time does not provide increased understanding. Dive cycle times varied from 7.8 to 37.6 seconds with an average of 15.4 seconds and standard deviation of 6.5. The distribution was irregular with high points at 8, 10 and 12 seconds of 8 dives and a further high point of 9 dives at 15 seconds. Seventy two percent are in the range 8 and 16 seconds and 83% are in the range 8 to 19 seconds.

The **dive rate** (dives per minute), for the 16 dive sequences containing dive cycles, averaged 3.9 per minute with a range of 2.1 to 7.0. The relationship between the dive rate and the average time under water is shown in Figure 12. The third order polynomial fit (Average dive time = $0.11 \times \text{rate}^3 - 1.63 \times \text{rate}^2 + 6.51 \times \text{rate} + 0.52$) gives an R^2 of 0.50.

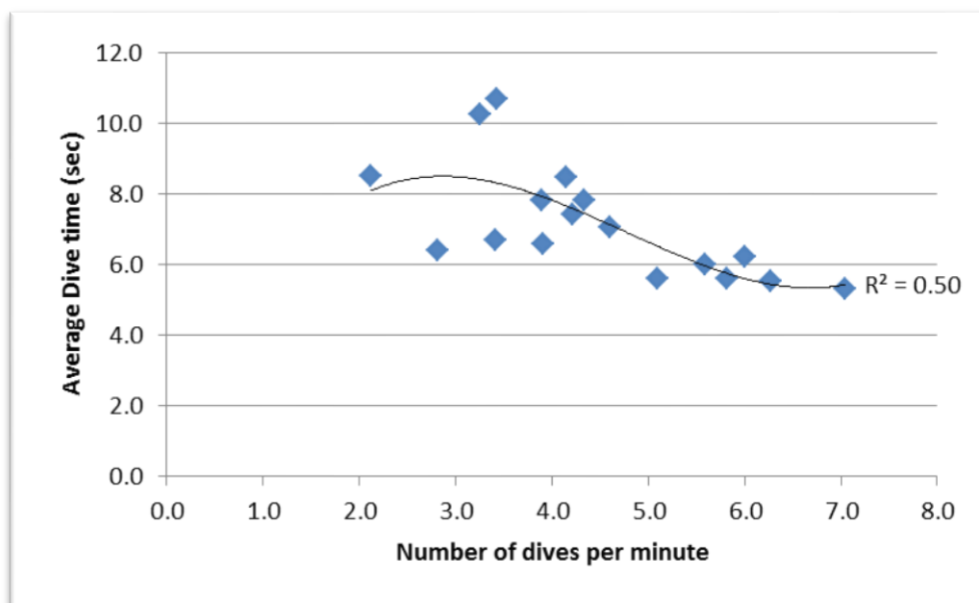


Figure 12. Relationship between the dive rate and the average dive time. Average dive time = $0.11 \times \text{rate}^3 - 1.63 \times \text{rate}^2 + 6.51 \times \text{rate} + 0.52$, $R^2 = 0.50$.

Discussion

Diving by Australasian Shoveler may be more common than the literature suggests. At least during the period of this study, diving was common behaviour. The birds were obviously feeding, chewing on their return to the surface in a number of videos. It is not clear what they were eating. Michael Maconachie advised that water samples he took in the week of 6 June contained mostly water fleas.

At times, the shovelers were seen diving around large groups of vortexing Pink-eared Duck (*Malacorhynchus membranaceus*) (Wallace 2016b). It is not clear whether this was because it provided some advantage or they were just trying to feed at the same spot. Hardhead (*Aythya australis*) when diving near the Pink-eared Duck vortexes showed some aggression

towards the shovelers, keeping them at a distance. Generally the Hardhead kept closer to the vortex, sometimes getting caught up in it (Wallace 2016c).

From the extensive literature on diving, including field testing of models, Heath *et al.* (2007) suggested that caution was required when applying predictions of models to assess foraging patterns in the wild because the models were not dynamic enough to allow for variation in physiological and environmental factors. The expectations from the models and field testing for the data reported here can be summarised as:

1. For a given time to dive to the bottom and return to the surface (travel time), the dives should be a consistent time and close to the optimal dive time (which should be close to the aerobic diving limit for the species) unless the water is shallow. Travel time should be consistent for the same depth of still water, as at Kellys Swamp.
2. The time spent on the surface recovering before the next dive should increase as the length of the dive increases.

My data generally support these expectations although the relationship between the surface time and the length of the dive is not strong. As Kellys Swamp is relatively shallow (estimated as 0.7 to 0.8 metres at the deepest point) the large range in dive times recorded in the same area by the same individual (see Fig. 6) indicates that, as expected, water depth was not a determinant of dive time. Thompson and Fedak (2001), studying seals, concluded that:

“there should always be a net benefit from terminating dives early if no prey are encountered early in the dive. The magnitude of the benefit was highest at low patch densities”.

The shallow water at Kellys Swamp may be the reason for the variation in dive times observed. However, if prey are not being located then multiple short dives at the same spot by the same bird, as observed at Kellys, would seem to be wasted effort. Repeated diving at the same spot would seem to indicate that food was present in sufficient quantity to justify the dives. While repeated short dives in the same spot may indicate that dives were terminated because food was plentiful, other factors may be influencing the dive length.

One possible explanation for the variation in dive times at Kellys is that only a small number of individuals are diving and that each has preferred dive times. The data do not support this. Fig. 7 shows that dive times for individuals varied. Sequence 8 and 16 look like they could be the same bird that preferred longer dives. However they were two different birds, one female and the other male.

Another possible explanation is that the time varied by location within the swamp but the data do not support this.

The dive times I recorded (2.3 to 12.4 seconds) extend those recorded by Black (7 to 10 seconds), but the methods used by Black (time recorded using the second hand on a watch), the small number of dives observed (7) and the deeper water may have contributed to this difference.

Videos of Northern Shoveler (*Anas clypeata*) diving (Forsyth 2008, Sask birder 2014) show that this species dives using a technique similar to the Australasian Shoveler. Forsyth's video

shows a male diving three times with the dives between 4.5 and 5 seconds, averaging about 4.8 seconds, while the other video shows a female diving three times with dives between 10 and 12.8 seconds, averaging about 11.6 seconds (my extraction of times for these dives is not as accurate as that for Australasian Shoveler because the source does not show frame times). These dive lengths are similar to those I recorded for Australasian Shoveler.

Even though not often recorded, it is clear that Australasian Shoveler are capable of diving for food in shallow water, spending up to 12.4 seconds under water per dive and in sequences of over 9 minutes

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Accepted 2 March 2017

BREEDING OF WHISKERED TERNS (*CHLIDONIAS HYBRIDA*) IN THE COG AREA OF INTEREST

MARTIN BUTTERFIELD¹

101 Whiskers Creek Rd Carwoola NSW 2620, Australia
martinflab@gmail.com

Abstract: In Summer 2016-17 Whiskered Terns (*Chlidonias hybrida*) were observed at an ephemeral marsh on the Hoskinstown Plain. They bred in the marsh and then departed. This report details the event and presents information about the history of the species in the COG Area of Interest.

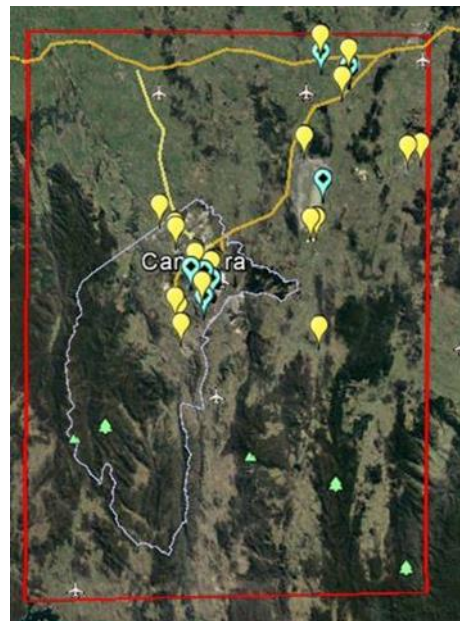
Status of the Whiskered Tern in COG's Area of Interest (AoI)

The COG Annual Bird Report lists (COG 2017) 4 species which include the word 'tern' in their Common Name. Of these 3 are classed as Non-breeding vagrants while the species of interest in this report is classified as "Rare, non-breeding visitor".

The distribution of records of this species in NSW and the ACT, held by eBird, is shown in Maps 1 and 2.



Map 1. Ebird distribution of Whiskered Terns in NSW and ACT.



Map 2. Sites of Whiskered Tern records in COG AOI.

Most records of the species within the ACT have come from the Fyshwick Sewage Ponds, while in the overall COG Area of Interest (COG AOI, boundary shown in Map 2 above) most other records have come from Lake Bathurst. (Note that eBird records for summer 2016-17 are not included here.) As many of the historical COG

¹ All photographs are by the author.

records predate eBird they are shown as plain ‘teardrops’ while the eBird records have a diamond.

In my area of particular interest (Carwoola, located between Queanbeyan and Captains Flat) I had only recorded the species once, in the 10 years I have lived in the area, prior to late 2016, observing a single bird from the road at Foxlow Lagoon on 12 Sep 2013.

Wilson 1999 states for this species that “The maximum reported was a flock of 28 at Lake Burley Griffin on 9 October 1994.”

The breeding range of the species shown in the New Atlas of Australian Birds (Barrett *et al.* 2003) is shown in Map 3.



Map 3. Location of Whiskered Tern breeding sites in Australia (Barret *et al.* 2003).

In terms of historical breeding records in the COG AOI Frith 1976 states that the species “bred at Lake Bathurst in early November”, 1963. (It is of interest that Frith 1969 cites the date of breeding as November 1964: as the relevant contributors to this work are now deceased it was not possible to establish why the date changed. However the revised date is taken as more accurate.)

Events in late 2016

On 6 Nov 2016 Michael Lenz reported to the COG Chatline that he had observed Whiskered Terns (*Chidonias hybrida*) and Red-necked Avocet (*Recurvirostra novaehollandiae*) on Lake George. Four days later Garry Moffitt observed a Red-necked Avocet in an ephemeral marsh on the Hoskinstown Plain (at that stage with very high water levels). Two days after that sighting he reported Whiskered Terns at the same site. At least 8 terns were present, hawking over the Marsh.

Somewhat later 12 birds were seen.



Figure 1. Whiskered Tern in flight.

On 9 December Garry Moffit reported that he had observed the birds appearing to build nests. They were flying in to reedy areas carrying grass or reeds and appearing to build nests similar to those of the small grebes which also nest on this marsh (when there is water). This description closely matched the description of nesting given in HANZAB Higgins and Davies 1996.

We visited the marsh on 10 December 2016. There was still a large extent of water, although the area had dropped from the maximum extent in October, as the weather had become warmer and drier. While there was quite a large area of open water, reeds and sedges covered a significant proportion of the surface.



Figure 3. Habitat with birds on marsh vegetation.



Figure 4. Nesting bird.

Through telescopes we could see at least 10 birds, or pairs of birds, sitting on nests through the reeds.

Overall we counted at least 40 terns sitting on nests or flying over the marsh. As the flying birds were constantly moving over a 7 hectare (estimated using the polygon

feature of Google Earth) site and some of the sitting birds were obscured by the reeds, I regard this as a conservative count. However, we felt it unlikely there were more than 50 birds present at that time.

As some of the birds did not appear to be in breeding plumage but possibly had at least some of the features of White-winged Black Terns *Chidonias leucopterus* we consulted Michael Lenz who joined us at the Swamp on 29 December. Michael confirmed that all birds were Whiskered Terns.

We estimated that there were at least 65 terns present on that date. We also noted that from time to time flocks of ~20 terns would leave the marsh and fly over surrounding paddocks, obviously feeding on the copious insects on the dense grass which was at least 1m high in much of the surrounding area. During a brief interval in which a nest was left unattended, an egg was clearly visible in the nest to which we could get closest (without wading into the water, which apart from being unpleasant for us would have unduly disturbed the birds).

The marsh was checked as time permitted. On one occasion the number of terns seen was estimated as possibly 80. On 9 January two chicks were seen in the nearest nest and digiscoped images taken.



Figure 4. Adult Whiskered Tern with 2 chicks.

At least one of these chicks was still present, and close in size to the attendant adult bird, during a visit on 24 January. By that time the number of terns visible in the reeds had declined significantly but I estimated that there were still 50 birds present. I considered that the birds were far more aggressive than they had been on previous visits. I am unsure whether this was due to the current stage of the breeding event or the presence, during the last two visits of a Spotted Harrier (*Circus assimilis*) patrolling over the paddocks and the marsh.

Garry visited the marsh on 6 February and estimated that 50-60 terns were still present. However when I visited on 13 February there was not a single tern observed. Possibly the birds had left as a result of one or more of:

- the breeding event being completed and the birds followed some instinctive directive to return to their more usual locations; or

- very hot weather (I recorded maxima of 40+°C for 2 days between these two visits);
- the water level in the marsh dropping to a level that was unsatisfactory to the terns, perhaps by reducing the supply of food (while many grasshoppers were still present, and the birds appeared to be feeding above the grass as well as in the marsh, according to HANZAB grasshoppers form a low proportion of the observed diet of this species);
- the appearance of a Spotted Harrier and (on 13 February) a Swamp Harrier (*Circus approximans*) over the marsh;
or
- cattle having access to the marsh (which was not the case earlier in the season, despite the site being leased for grazing).

Michael Lenz has provided a summary of information on the duration of breeding events for this species in Europe (Limbrunner *et al.* 2007) which is shown in Table 1. HANZAB (Higgins and Davies 1996) only refers to European data on breeding, suggesting that at the time of compiling that volume there had been few studies of this species breeding in Australia..

Table 1: Duration of stages of breeding events.

Stage	Duration (days)	
	min.	max.
Nest building	?	?
Incubation	18	21
Young in nest	21	26
Fledgling period	14	21
Total	53	68

Our observations were not rigorous enough to compare at a detailed level with those values. However the period between the first sighting of the birds nest building (9 December 2016) and a date (9 February 2017) midway between the last sighting of the terns and their absence being noted is 62 days. This fits nicely between the shortest and longest total durations from the European data. Subject to assumptions that:

- egg laying commenced soon after nest building was observed; and
- the birds departed as the chicks stopped being fed by parents (*i.e.* achieved independence)

This would seem to offer support for the first hypothesis above: the time had come to depart!

Other recent sightings in COG AOI

On 29 December 2016 Frank Antram reported 95 Whiskered Terns at Wollgorang Lagoon near Breadalbane (<http://ebird.org/ebird/australia/view/checklist/S33260649>).

Michael Lenz followed up this report on 2 Jan (<http://ebird.org/ebird/australia/view/checklist/S33399219>) and reported 110 terns visible, with 2 birds sitting, at possible nest sites in distant reeds.

Frank Antram revisited Wollogorang Lagoon (<http://ebird.org/ebird/australia/view/checklist/S33816326>) on 21 Jan reporting that water levels had dropped with birds even further from the road. He recorded an estimate of 50 Whiskered Terns for this visit.

Michael Lenz visited this Lagoon on 15 February commenting that “only a relatively small area left under water; cattle now present around and in lagoon; observations only from road at distance, also heat haze developing; only larger waterbirds could be identified”. He recorded no Whiskered Terns during this visit.

Several observers submitted records to eBird for Lake Bathurst and/or The Morass in late 2016. While they included Silver Gull, none of the records included Whiskered Tern. Thus despite the historical occurrence of the species at these sites they appeared to have not been used this summer.

Summary

A resumé of historical records of the occurrence and breeding of the species in NSW generally and the COG AOI is given as background to this very unusual event. This report provides details of the appearance and breeding activities of Whiskered Terns on the Hoskinstown Plain in Summer 2016-17. A summary of records at a broadly similar site in the most northern part of the AOI indicates that events there were similar in nature and timing. In particular the timing of disappearance of the terns appears very similar.

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Accepted 21 April 2017

LITTLE EAGLES IN THE AUSTRALIAN CAPITAL TERRITORY DURING TWO BREEDING SEASONS: 2015 AND 2016

JERRY OLSEN^{A, B}, SUSAN TROST^C AND GEOFFREY DABB^D

^A*Institute for Applied Ecology, University of Canberra, ACT 2601, Australia*

^C*44 Wybalena Grove, Cook ACT 2614, Australia*

^D*24 Brockman Street, Narrabundah, ACT 2604, Australia*

^B*To whom correspondence should be addressed. Jerry.Olsen@canberra.edu.au*

Abstract. *In two breeding seasons, 2015 and 2016, breeding attempts (eggs or young) were reported to us for Little Eagles in the ACT. Strathnairn fledged no young in 2015 and 1 in 2016. Campbell Park fledged 1 young in 2015 and 1 in 2016 making a total of 3 young across two breeding seasons. In contrast, Wedge-tailed Eagle territories we checked near the city in 2016 fledged 11 young from 9 territories.*

1. Introduction and Methods

In previous reports (e.g. Olsen *et al.* 2010) we discussed the collapse of breeding Little Eagles *Hieraaetus morphnoides* in the ACT and possible links to suburban development and breeding Wedge-tailed Eagles *Aquila audax*. Here we present data for the 2015 and 2016 breeding seasons. Methods followed those used in Olsen *et al.* (2010).

2. Results

2.1. Little Eagle

Black Mountain: The nests on Black Mountain (Con Boekel northern side, J. Olsen unpublished data for the southern slope of Black Mountain) were not used.

Campbell Park/Jerrabomberra Wetlands: The territory near Campbell Park Offices (Michael Lenz) fledged 1 young in 2015 and 1 in 2016 (Fig. 1).

Lions Youth Haven: The Little Eagle pair at Lions Youth Haven in Kambah (Nick Webb) was not present however a pair of Wedge-tailed Eagles was resident on this territory and they fledged 1 young in 2015 and 1 in 2016.

Dunlop and Strathnairn: The Little Eagle nest at Dunlop (Roger Curnow) was not used. The nest at the Strathnairn Art Galleries (Peter Christian) failed in 2015 and fledged 1 young in 2016, about three weeks later than is normal for this territory, and for other Little Eagles in the area. Late breeding pairs of raptors are generally less successful than early breeders, and their fledglings have lower survival (Newton 1986). The last date we saw the Strathnairn fledgling was 4 Feb 2017 (Rosemary Blemings).

In 2015, after the Strathnairn nest failed, JO banded and radio-tagged the adult male. In the first weeks this male ranged from Uriarra East on the Murrumbidgee River in the south to the CSIRO Field Station near Fraser and Spence in the north, the home range previously used by the North ACT Little Eagle pair (see below and Figure 1).

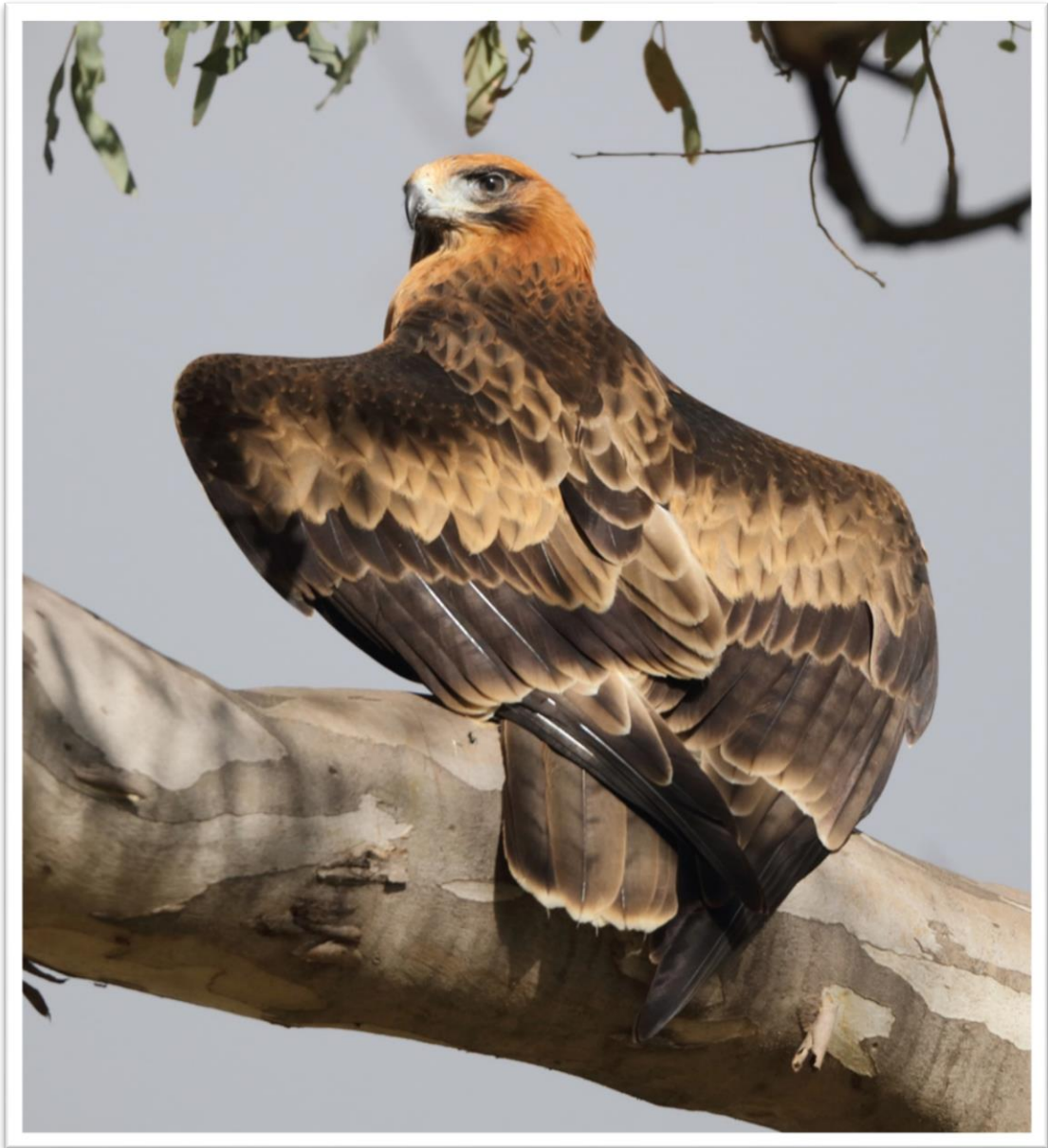


Figure 1. Campbell Park fledgling (*Geoffrey Dabb*).

North ACT: A Little Eagle pair reported to us at the CSIRO Field Station in 2014 was checked by JO and Sue Trost. It fledged 1 young in 2014 but the pair disappeared soon after and no breeding pairs were found after 2014, though the radio-tagged Strathnairn male ranged over this area in 2015 (Figure 1).

2.2. Floaters

‘Floaters’ are individuals or pairs that have failed to find a breeding territory. They reside in low-quality areas between the home ranges of breeding pairs, in this case, between breeding pairs of Little Eagles and Wedge-tailed Eagles. Newton (1979,

1998, 2013) uses the term ‘floaters’ and ‘non-breeders’ interchangeably, perhaps indicating a stage in a bird’s life-cycle that can lead to acquiring a breeding territory.



Figure 1 – Approximate first few weeks ranging behaviour (inside the yellow dashed line) of the Strathnairn Little Eagle male radio-tagged in 2015.

2.2.1. Land’s End

In 2016 a pair of Little Eagles was observed by Chris Davey near a nest for several days in woodland at Land’s End. There was no observation of incubating, or evidence of eggs or young; and no evidence of courting behaviour was reported (Little Eagles tend to be noisy and obvious in courtship, JO and ST unpublished, S. Debus pers comm). This woodland contains a traditional Brown Goshawk *Accipiter fasciatus* territory and ST and JO checked this woodland for raptor nests each year from 2005 to 2013. There were a number of nests built by goshawks and Australian Ravens *Corvus coronoides* but none by Little Eagles. On 19 December 2016 JO and ST visited this woodland and observed a Little Eagle fly from a nest tree previously used by Brown Goshawks, but found no evidence of a breeding event, *i.e.* prey remains under any of the nests. We found no Little Eagles there on a visit 21 Jan 2017.

A Little Eagle pair nested on the Land’s End property in 2011 but not close to this location (Chris Davey) and no other breeding pairs were found at Strathnairn, Pegasus or Dunlop that year. This 2011 male was observed foraging west to Stockdill Drive and returning with prey to Land’s End, over home range later used by the radio-tagged Strathnairn male in 2015. This illustrates that territory borders for Little Eagles in the ACT are currently fluid; they can change in different years

according to the behaviour of nearby pairs of Wedge-tailed Eagles or Little Eagles. There is no evidence to link the 2016 Land's End pair to the disappeared pair at the CSIRO Field Station territory, but this could be determined through radio-tracking.

The behaviour of the 3 pairs of Wedge-tailed Eagles and the Strathnairn Little Eagles that border Land's End may, in part, determine if this pair breeds. If this becomes a breeding territory, it will be important for the success of any attempted breeding to ban any development from a minimum of 1 km of this site.

2.2.2. Mount Mugga/Red Hill/Woden area.

At least one individual Little Eagle has been repeatedly seen around the Mount Mugga/Red Hill/Woden area. We failed to locate a Little Eagle nest but there are two Wedge-tailed Eagle nests close by. This Little Eagle could be a floater. However, JO and ST watched this individual for two days in 2015 and believe he was attached to the Campbell Park breeding pair. That is, home ranges are changing each year for Little Eagles in the ACT. In this example, the former 3 breeding pairs resident in the 1990s at: 1) Campbell Park/Jerrabomberra, 2) Mt Mugga/O'Malley and 3) Isaacs Ridge - appear now to be one breeding pair in one large home range.

2.2.3. Mount Stromlo/Rivett

An individual Little Eagle was seen repeatedly in the area of Mount Stromlo/Rivett (Michael Maconachie and Anthony Moore) but no nest was found and this needs to be followed up.

2.3. 2015 and 2016 breeding success

The total then, for the 2015 and 2016 breeding seasons, was 3 young fledged from 2 territories in two breeding seasons: 0.75 young per territory per year, or 0.6 young per territory per year if the Land's End pair is counted for 2016. This is low productivity for this species (Olsen 2014), even compared to recent years such as 2008 when a total of 4 young were fledged from 4 breeding territories in one year (Olsen *et. al.* 2009) and lower than the productivity for 11 territories in the early 1990s.

2.3. Wedge-tailed Eagle

We monitor as many Wedge-tailed Eagle territories as possible near Canberra because two possible causes of the decline of Little Eagles in the ACT could be habitat loss from urbanisation, and Wedge-tailed Eagles usurping Little Eagle territories. In 2016 we checked 9 Wedge-tailed Eagle territories (Fig. 3) around Canberra. They fledged a total of 11 young, 1.2 young per territory per year, high productivity for this species (Olsen 2014).

The pair of Wedge-tailed Eagles that attempted to breed near the Glenloch Interchange in 2014 but failed (probably because of disturbance from photographers and bird watchers) found a secluded spot and fledged 1 young in 2016.

A different pair built a new nest in 2016 near Gungahlin Hill and this pair also fledged 1 young. Gungahlin Hill was previously a Little Eagle territory until around 2003, but in the 1960s was a Wedge-tailed Eagle territory (Leopold and Wolfe

1970). This Wedge-tail pair may have been displaced from Lawson as the pair that bred there around 2004 was displaced by disturbance and suburban growth.



Figure 3. Belconnen Wedge-tailed Eagle nest, 28 Sep 2016 (Jerry Olsen, Susan Trost).

3. Discussion and Conclusions

Little Eagles still breed at low levels in the ACT. Because of increased urbanisation, and, possibly, interference from displaced Wedge-tailed Eagles, Little Eagle home range sizes, shapes and borders are changing each year. Consequently, home range data from one year will not necessarily apply to the next year, or a few years after. For example, in 2015 the radio-tagged Strathnairn male used part of the home range of the (abandoned) CSIRO Field Station pair in 2014.

The statutory Action Plan for protection of the Little Eagle as a vulnerable species (ACT Government 2013) noted that the main threat to the species was loss of habitat which was ‘mostly due to the encroachment of urban development on remnant woodland and grassland’. The ‘primary conservation issue’ was stated to be ‘retention of adequate foraging and breeding habitat’.

Among proposed actions was giving ‘identified nest sites and foraging sites a high priority for protection’, and to ‘protect known previous nest sites ... with a buffer’.

None of the ‘buffers’ observed by ACT real estate developers and planners are based on science. They are arbitrary and always too small. For example, the Molonglo Valley real estate development considered ‘buffers’ for breeding raptors there. Pre-development, east (upstream) of Coppin’s Crossing we found 5 raptor species breeding along the river in 2004 – 2005: Wedge-tailed Eagle, Brown Goshawk,

Collared Sparrowhawk *Accipiter cirrocephalus*, Brown Falcon *Falco berigora*, and Black-shouldered Kite *Elanus notatus*, and we gathered prey remains from all of these (E. Fuentes and J. Olsen unpublished data). All these pairs have now disappeared, so the prey data we gathered there is now historic and cannot be replicated, unless the planned Molonglo River Reserve is a success and all 5 species return to the river as breeders.

ACT eagles, including Little Eagles, use rivers for foraging and nesting. ACT rivers, including the Molonglo and Murrumbidgee contain more biodiversity than any artificial constructions, such as Mulligan's Flat, will ever contain. Eagles should be used as 'umbrella' species to protect ACT rivers and nearby environments from development (Olsen 2014).

We would expect the ACT government to conform to its own Action Plan, without the need for many hours of work from volunteers and constant representations by concerned members of the public. All documented breeding events, and all trapped, banded, and radio-tagged Little Eagles in the ACT in 2015 and 2016 were the result of the work of volunteers.

Acknowledgements

Thanks to COG members, especially Martin Butterfield, Rosemary Blemings, Con Boekel, Steve Holliday, Chris Davey, Barbara Allan, Michael Lenz, Peter Christian, Roger Curnow, Rod Mackay and Graeme Clifton. Thanks also to Rob Armstrong, David Drynan and the ABBBS, James Overall, Bernd Gruber, Renee Brawata, Kym Bradley, Tom Long, Michael Maconachie, Brett McNamara and Darren Rosso, and to Greg Hayes. Stephen Debus and McComas Taylor gave much appreciated advice.

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Accepted 3 April 2017

BREEDING SUCCESS OF TAWNY FROGMOUTHS IN RELATION TO RAINFALL.

STUART RAE

*Research School of Biology, Division of Evolution, Ecology and Genetics, Australian National University, Acton, ACT 2601, Australia
stuart@stuartrae.com*

Abstract: *The number of Tawny Frogmouth (*Podargus strigoides*) fledged was recorded for 357 breeding attempts in the Australian Capital Territory between 2007-2016. The mean annual brood size for all pairs was 1.4 (range 1.1-1.7) and 1.8 (1.4-2) per pair that reared young. The most frequent brood size was two, in all years except 2016 when it was one. Breeding success was inversely correlated with the total rainfall in the area in July and September, and both months in 2016 had above average rainfall. The number of rain days in September also adversely affected breeding, September being the main month when eggs were laid. There might have been direct effects such as rain restricting foraging effort, or indirect effects on the abundance or catchability of invertebrates, their main food.*

Introduction

The effects of heavy rainfall in winter and early spring 2016 on birds breeding in the Canberra region were discussed by Lenz (2016). Large numbers of waterbirds moved out of the area, probably to breed in flooded wetlands in inland Australia, and some migrant and nomadic landbirds which breed in the region might also have been attracted to move west to breed in 2016. There has been some documentation of the effect of rainfall on resident birds. Lenz gave an account of poor breeding success by Pied Currawongs (*Strepera graculina*) and suggested that other early nesting species may have been affected similarly, but no relevant information was available. However, two long-term studies have given contrasting results of rainfall on breeding birds in the area. Olsen and Olsen (1989) found that persistent rain and low temperatures in the three to four months between egg-laying and to a week or so after hatching had an adverse effect on breeding success of Peregrine Falcons (*Falco peregrinus*), because nest sites were flooded so eggs and young chicks got cold and died. By contrast, Cockburn et al (2008) found that reproductive success of Superb Fairy-wrens (*Malurus cyaneus*) increased in years with higher rainfall, probably because they gained more food when there was higher abundance of small invertebrates after rain. So rain impacts on breeding success can be expected to vary according to nest sites, hunting methods or other behaviour.

The breeding behaviour of Tawny Frogmouths (*Podargus strigoides*) has been monitored in the Australian Capital Territory since 2006 (Rae 2009). The study is ongoing, planned as an indefinite long-term study to investigate possible effects on the bird's breeding success, e.g. weather, other environmental factors and the population structure. In 2016, there was record-high rainfall in winter and early spring, especially June, July and September (Bureau of Meteorology 2017). Tawny Frogmouths are early breeders in the area, with the main egg-laying period in

September and fledging period in November (Rae 2012), so they might have been affected by such heavy rainfall. Therefore, this study aimed to determine whether high rainfall in winter and early spring affected their breeding success.

Methods

The woodlands at Black Mountain and Mounts Ainslie and Majura were surveyed for Tawny Frogmouths and their nests each year following the methods used by Rae (2009) and (Rae and Rae 2013). The habitat on Black Mountain is southern tableland dry sclerophyll forest and at Mounts Ainslie and Majura it is southern tableland grassy woodland (Keith 2004). Clusters of nest sites used between years, which were within close proximity of one another and closer than the distance between nest clusters, were classed as one breeding site (Watson and Rothery 1986). All identified breeding sites and the whole of each woodland study area were surveyed each year by the author. Other breeding sites in suburban trees or woodland remnants were found by the author or indicated by other observers (see Acknowledgments).

Breeding success was measured as the number of young fledged from each breeding attempt. In the Canberra region Tawny Frogmouths are single brooded, but can relay following loss of eggs or chicks. Breeding attempts by pairs were only considered as such if eggs were known to have been laid. The young were counted in the nest when large and near to fledging, then again when they were out of the nest and closely attended by the adults. The annual mean breeding success of all breeding attempts per annum was tested for correlation and regression with the mean monthly rainfall and number of rain days per month for June–November, as recorded at Canberra Airport (Bureau of Meteorology 2017). As some rainfall figures were well outside the usual range, analyses were done with log-transformed data to normalise the residuals. The nearest breeding site to the weather station was 3 km and the farthest 22 km.

Results

The number of breeding sites monitored per year, 2007–2016, varied between 18–53 and in every year some were unoccupied by pairs. Some sites were occupied by single birds. Altogether, there were 357 breeding attempts from 420 potential annual breeding sites. The mean number of chicks in the fledged broods ranged between 1.1 (2016) and 1.7 (2007) per breeding pair ($\bar{x} = 1.4$), 1.4–2.0 per successful breeding attempt ($\bar{x} = 1.8$) (Table 1). Most fledged broods were of two chicks except in 2016 when it was one, and that was also the only year when no broods of three were reared (Fig. 1).

Fewer chicks were reared per breeding pair in years when there was higher total rainfall in July ($r = -0.89$, $P < 0.01$, $n = 10$,) and September ($r = -0.77$, $P < 0.01$, $n = 10$) (Fig. 2). This relationship for successful breeding pairs was only significant for September rainfall ($r = -0.68$, $P = 0.03$, $n = 10$). In the years 2007–2015, without 2016, the year which had by far the most rainfall, the relationship was still significant ($r = -0.66$, $P = 0.03$, $n = 9$). The breeding success of successful pairs was also lower in years when there were more days with rain in September ($r = -0.73$, $P = 0.02$). There were no relationships between rainfall or number of rain days and breeding success in any other months, June – November.

Table 1. Fledged Tawny Frogmouth brood sizes in the Canberra region 2007 – 2016.

Year	No. breeding pairs	Mean no. chicks fledged per breeding pair	No. breeding pairs that failed to rear chicks	Mean no. chicks fledged per successful pair
2007	15	1.7	3	2.0
2008	20	1.3	4	1.8
2009	34	1.4	5	1.7
2010	45	1.2	14	1.8
2011	36	1.5	4	1.7
2012	35	1.2	9	1.7
2013	38	1.4	10	1.9
2014	44	1.6	9	2.0
2015	48	1.5	10	1.9
2016	42	1.1	8	1.4
All years	357	1.4	76	1.8

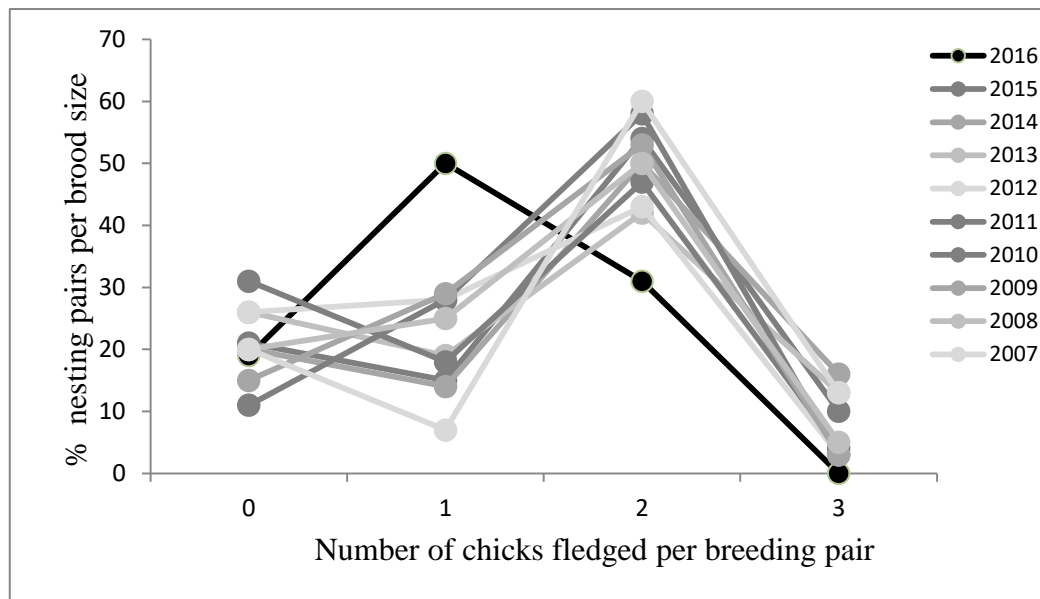


Figure 1. The proportions of fledged Tawny Frogmouth brood sizes per annum 2007 – 2016.

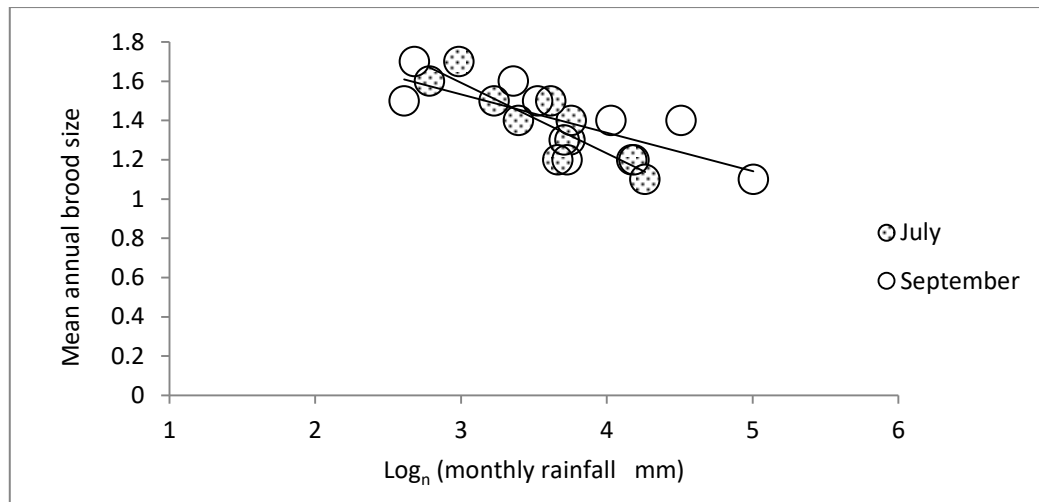


Figure 2. The breeding success of Tawny Frogmouth pairs in relation to rainfall in July and September in 2007 – 2016.

Discussion

This study has shown that Tawny Frogmouth breeding success in the Canberra region is adversely affected by high rainfall in winter and spring. The success rate was lowest in the wettest year, 2016, which had the third-highest winter rainfall on record for the Canberra region. The most frequent brood size that year was one, compared with two in all other years. Overall, the mean brood size per breeding attempt was similar to the national figure of 1.4 chicks reared (Higgins 1999).

Tawny Frogmouth breeding success was inversely related to the total rainfall in the Canberra region in July and September and the number of days with rain in September. September in 2016 was the wettest, with more than twice the mean monthly rainfall, and breeding success that year was the lowest. The influence of high rainfall in September might have been because that is the main month when eggs are laid, and the birds' hunting ability might have been impaired by the rain. Or it might have affected the abundance or availability of their food. Thereby, the female frogmouths might not have had enough food intake and energy resources to form larger clutches, or more viable eggs in wetter years. July is mid-winter in the study area and the strategies used by Tawny Frogmouths for overwintering are to build up fat reserves in autumn (McCulloch 1975, Rose 1986) and go into torpor when cold and invertebrates are likely less available (Körtner et al 2001). The fitness of a female bird prior to laying can affect its breeding success (Perrins 1970), so perhaps higher rainfall in July might affect Tawny Frogmouth fitness. If invertebrates were less available in wet winters, and the birds spent less time hunting or more time in torpor, they would likely be in less fit condition in spring prior to breeding. Therefore, high rainfall in winter might reduce their feeding and subsequent body condition in spring, leading to poorer breeding success.

Measuring breeding success in years of extreme weather events can show how birds are affected in those years alone. However, as shown here, long-term studies can provide data for many years over a greater range of environmental conditions, providing data for analysis to test perceptions of effects in any one year. Rainfall does have an effect on Tawny Frogmouth breeding success, but the mechanisms are not known. Air temperature might also affect breeding success; both air temperature

and rain might have restricted foraging effort or limited thermoregulation. Or there might have been indirect effects on the abundance and catchability of invertebrates, their main prey, *e.g.* grass was lusher in wet years, which would have obstructed Tawny Frogmouths hunting on the ground. This study did not account for laying dates in individual breeding attempts, nor re-lays if early clutches or broods were lost or predated. Further studies are aimed at these possible causes and effects on Tawny Frogmouth breeding success.

Acknowledgements

The following people helped monitor breeding attempts and advised the author of nest locations: Diana Tracy, Duncan Rae, Stephanie Haygarth, Matthew Higgins, Jack Holland, Jean Casburn, Darryl Beaumont, Bruce Lindenmayer, Bill Slade. Penny Olsen, Rob Magrath and Duncan Rae helped improve the manuscript with valuable comments on earlier versions.

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Tawny Frogmouth family (Stuart Rae).

Accepted 24 April 2017

Canberra Bird Notes 42(2) (2017): 146-155

BEHAVIOUR OF A CONGREGATION OF WEEBILLS IN THE ABSENCE OR PRESENCE OF LARGE HONEYEATERS

MICHAEL LENZ

117/50 Ellenborough Str., Lyneham, ACT 2602, Australia
 michael.lenz.birds@gmail.com

Abstract. *In the autumn to winter of 2007 a group of Weebills (*Smicrornis brevirostris*) had gathered in Henty Street, Braddon, ACT, on the northern edge of Haig Park. The highest number of Weebills recorded was 22. In the core area (Henty/Wise Street) 93 mature Argyle Apple trees (*Eucalyptus cinerea*) were available and used for foraging. The linear foraging territory comprised an area of 2.04 ha. At times the group moved further East to Corroboree Park in Ainslie, adding a further 1.58 ha and ca. 20 trees the birds used for foraging. The absence of large aggressive honeyeaters such as Red Wattlebird (*Anthochaera carunculata*) and Noisy Miner (*Manorina melanocephala*) in this drought year enabled the Weebills to stay at this site for many weeks. In 2008 no Weebills appeared but notable numbers of Red Wattlebirds and Noisy Friarbirds were present with a peak in May. They were attracted to the area by a significant outbreak of lerp insects on the foliage of eucalypts. Weebills returned in 2009, but their behaviour had changed. They called far less and were more secretive. Noisy Miners more regularly visited parts of the core area in Henty Street. The Weebills had adjusted their behaviour to reduce as much as possible encounters with the Noisy Miners.*

1. Introduction

The Weebill (*Smicrornis brevirostris*) is a common breeding resident in more open forests in our area (Taylor and Canberra Ornithologists Group 1992), present “wherever eucalypts occur on the tablelands of the ACT, and in private gardens” (Wilson 1999). Results from the Garden Bird Survey (GBS) run by the Canberra Ornithologists Group (COG) indicate that numbers in Canberra’s gardens are lowest in November/December and peak in June (Veerman 2006; Duncan McCaskill, pers. commun, see Fig. 1).

Although the Weebill is regularly recorded by observers during surveys, overall it is a species that does not arouse much interest. It is usually encountered in pairs, family groups or in small flocks. The COG data base includes records of larger numbers of Weebills, of 20 or more birds. However, these are invariably cumulative numbers from surveys where several pairs or small parties are observed and only the total number is entered in the record. Seldom will observers find groups of Weebills with more than 10 birds (see also Higgins and Peter 2002).

The year 2007 in the Canberra region was characterized by below average rainfall and temperatures at the highest ever recorded since measurements began in Canberra in 1939/40 (Davis and Lindesay 2011). Weebills appeared in Canberra suburbs in autumn and winter far more frequently than I had ever noticed before. Areas I visited more regularly included Ainslie, Dickson, Braddon and the ANU. For example in our

then garden in Ainslie up to 5 birds were seen in early April. Normally the species was absent except for the odd records of single birds. At the end of April 2007 a flock of Weebills had congregated at the northeastern edge of Haig Park in Braddon and could be observed until the beginning of July. My absence from Canberra from later in July onwards terminated the observations. In the two subsequent years I visited the area again over autumn and winter to see whether there was any repeat of Weebills coming to Haig Park. But as in 2007, I could not follow through with my observations to the end of winter. This article summarises my observation at this site.

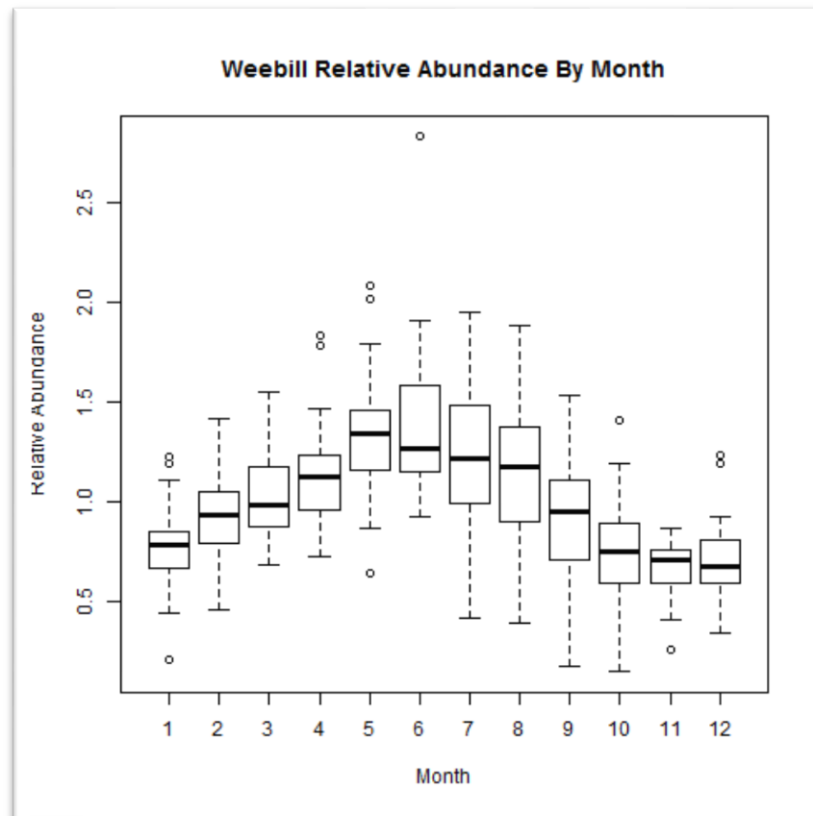


Figure 1. Box-whiskers plot of monthly *Relative Abundance* of the Weebill over 35 years of the Garden Bird Survey (GBS). (Graph prepared by Duncan McCaskill). Month 1 is January, month 12 is December. The monthly *relative abundance* is the monthly abundance divided by the mean of the monthly abundances for that year. This gives a more stable measure of seasonal variation, because it eliminates variation of total abundance from year to year (Duncan McCaskill, pers. commun.). [Box-whiskers plot: The heavy horizontal bar is the median, the limits to the box are approximately the values of the first and third quartile (*i.e.* 50% of the values) and the whiskers are the values of the most extreme observation that are no more than plus or minus 1.5 times the interquartile range away from the median.]

2. Location

Haig Park is a suburban park planted with 14 rows of exotic trees and some shrubs. Planting began in 1921. It extends on either side of Northbourne Avenue into Turner (West) and Braddon (East). The eastern part (see Fig. 2) is bordered on its northern edge by the East/West section of Henty Street. Along this stretch of Henty Street a row of Argyle Apples (*Eucalyptus cinerea*) had been planted on both sides of the

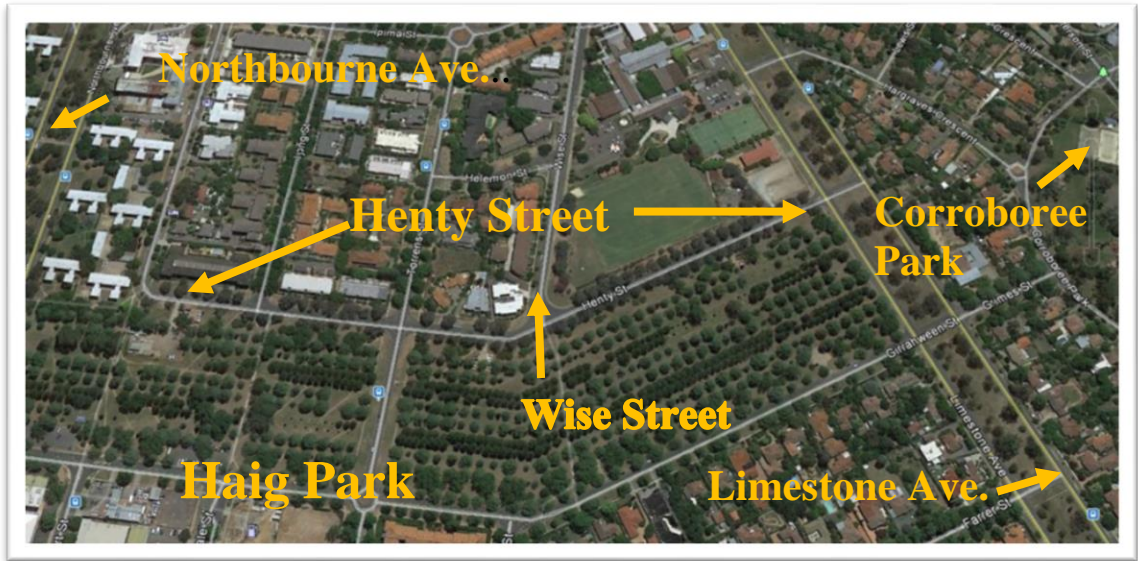


Figure 2: The eastern section of Haig Park (looking northwards from Civic) and the part of Henty Street with the Argyle Apple trees.



Figure 3: Example of the stand of Argyle Apples in Henty Street (corner Torrens Street, looking West towards Northbourne Ave.).

street, probably at the same time as the other trees in Haig Park. At a later date a further nine trees were planted in Wise Street, a street coming off Henty Street to the North. The trees in Wise Street connect to those in Henty Street. The total number of Argyle Apples available to and used by the Weebills was 93.

There are some gaps in the rows of trees. Over time some trees have died and been taken out and some of those have been replaced but not necessarily successfully.

During the observation period a pair of Galahs (*Eolophus roseicapillus*) ringbarked one mature Argyle Apple completely. The tree subsequently died.

3. Results

3.1. Observations in 2007

The Weebills foraged in the rows of Argyle Apples. They could be found at any point along Henty Street (see Fig. 4). They would frequently cross from one side of the road to the other or reverse the direction in which they moved along the lines of trees. They usually turned around once they reached the last trees at either end. They stayed as a close group. However, at times, when coming to Limestone Avenue (see Figs. 1 and 4) they continued and flew into eucalypts on the median strip of Limestone Avenue and from there into the eucalypts of the northern half of Corroboree Park.

Table 1. Number of Weebills observed at Haig Park during autumn and winter of 2007.

Date (2007)	No. Weebills	Other species loosely associated with the Weebills (Mixed Feeding Flock (MFF))
27 Apr	11	?
03 May	11	?
16 May	13	2 White-eared Honeyeater, 1 White-plumed Honeyeater, 2 Yellow-rumped Thornbills
17 May	13	1 White-eared Honeyeater, 1 White-plumed Honeyeater
29 May	13	1 White-eared Honeyeater, 2 White-plumed Honeyeaters
05 Jun	13	1 White-eared Honeyeater, 2 White-plumed Honeyeaters
07 Jun	17	1 Spotted Pardalote
08 Jun	13	1 White-plumed Honeyeater, 2 Yellow-rumped Thornbills, 1 Brown Thornbill
10 Jun	16	2 White-plumed Honeyeaters, 1 Fuscous Honeyeater, 1 Eastern Spinebill, 1 Willie Wagtail, 3 Silvereyes, 3 Striated Pardalotes, 5 Spotted Pardalotes, 7 Yellow-rumped Thornbills, 1 Grey Fantail
19 Jun	22	1 White-plumed Honeyeater
26 Jun	13	3 Yellow-rumped Thornbills
02 Jul	11	1 Willie Wagtail
03 Jul	13	2 Spotted Pardalotes
Observer absent from Canberra after 03 Jul		



Figure 4. Foraging area of the Weebills: Solid arrows: core area (Henty/Wise Street); Stippled arrows: area occasionally used (a section of Limestone Ave. and Corroboree Park).

Usually they stayed at the most 10 minutes in Corroboree Park. Due to the less structured alignment of the trees and also the presence of aggressive Noisy Miners (*Manorina melanocephala*) the group members became more scattered (see also Sect. 3.1.1.) and soon returned to Henty Street. There they quickly assembled again into a tighter group and continued foraging.

Between 11 and 22 Weebills were recorded at the site (see Table 1). The birds could be counted best when they moved from one side of the street to the other or when crossing a road intersection. Table 1 also lists the species which at times formed a loose mixed feeding flock (MFF) together with the Weebills. This MFF was especially diverse on 10 Jun 2007 with 10 species in total (Table 1).

Occasionally a few Weebills would also fly into a pine tree or a *Photinia* bush adjoining the southern row of Argyle Apples. However, this appeared to be more accidental.

The details of the foraging area (using Google Earth Pro for measurements) of the group of Weebills are given in Table 2. There are no comparative figures of winter foraging areas available for the Weebill (Higgins and Peter 2002).

Table 2. Features of the foraging area at Haig Park used by the group of Weebills.

Features of the foraging area	Core area* (Henty/Wise Str.)	Extension (Limestone Ave./ Corroboree Park)	Total
Foraging area (ha)	2.04	1.58	3.62
Max. linear distance birds moved (km)	0.77	0.44	1.17
No. trees used	93	ca. 20	113

* The outer width of the eucalypt canopy and the length of the streets with trees provide the dimensions for the foraging territory.

3.1.1. Factors that allowed the Weebills to use the Haig Park site

The Argyle Apples in Henty Street are normally the home of several Red Wattlebirds (*Anthochaera carunculata*) throughout the year. In all likelihood, the wattlebirds would have interfered with such a large group of Weebills. In the autumn of the drought year 2007 many Red Wattlebirds had left Canberra. Most likely they had joined the exceptionally large numbers of this species congregating at and migrating along the South Coast (*e.g.* Richard Allen, COG chat line 2 May 2007). The seasonal changes in relative abundance of Red Wattlebirds in the GBS are shown in Fig. 5, the abundance pattern for 2007 in Fig. 6. In 2007 numbers declined steadily to a lowest point in June. The peak in March to May evident from the long-term data (Fig. 5) when the species migrates (Veerman 2006) did not occur in 2007. Many birds had left our region already right from the end of the breeding season in January.

On 10 Jun 2007 one Red Wattlebird appeared in Henty Street, the first in a long time. It was seen chasing some pardalotes. Later in the morning three Noisy Miners entered Henty Street. Upon their calls the entire group of Weebills went instantly quiet and sheltered in a *Photinia* bush. They stayed there until the miners had disappeared. The miners had flown in from Corroboree Park. But at that stage such visits to Henty Street were a rare exception.

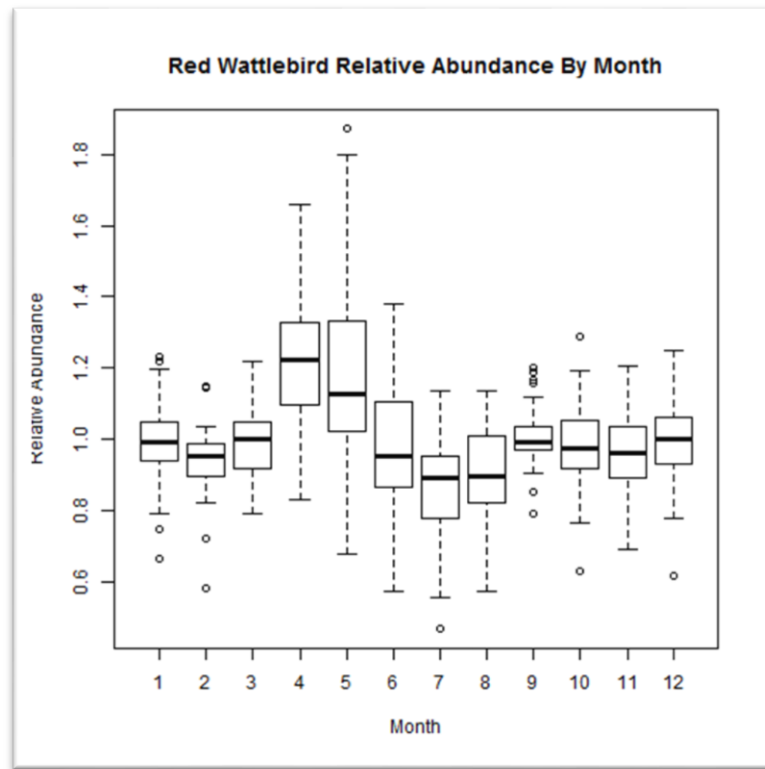


Figure 5. The seasonal *relative abundance* of the Red Wattlebird over 35 years of the Garden Bird Survey (GBS). (Graph prepared by Duncan McCaskill). See Fig. 1 for further explanations. Month 1 is January, month 12 is December.

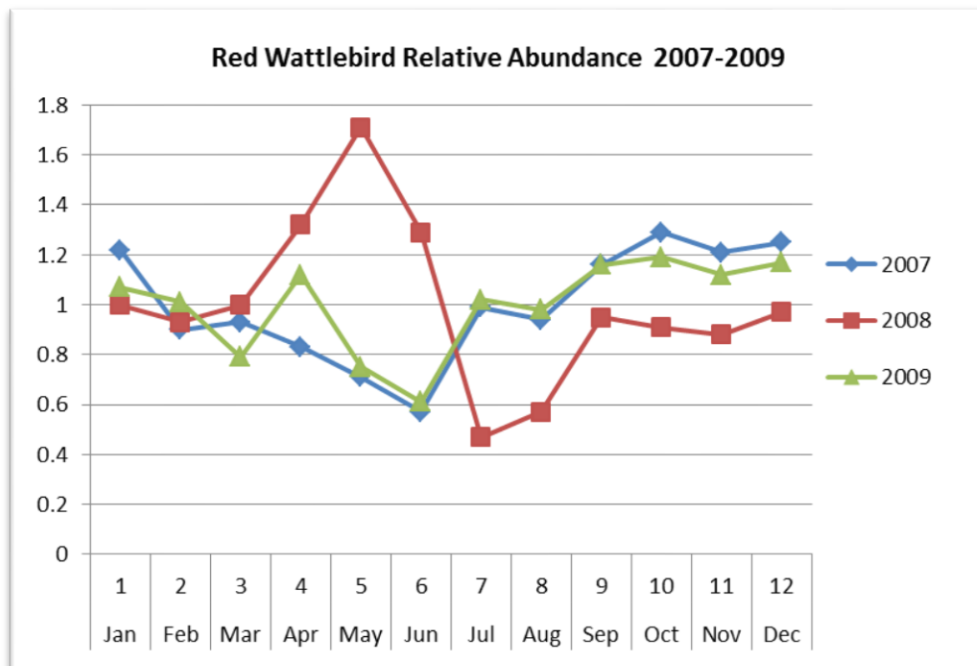


Figure 6. The *relative abundance* of the Red Wattlebird in the GBS in 2007. 2008 and 2009.

3.2. Observations in 2008

In the autumn and winter of 2008 the situation was very different. 2008 was again a year with below average rainfall (Davis and Lindesay 2011). Grey Box trees (*Eucalyptus microcarpa*) on the median strip of Limestone Avenue (between Cowper and Henty Street) and Argyle Apples in Henty Street were flowering and carried a high load of lerp insects on the foliage. A significant number of Red Wattlebirds and some Noisy Friarbirds (*Philemon corniculatus*) were visiting this 300 m long stretch of Limestone Avenue and the eastern end of Henty Street from April to July, feeding mainly on the lerps. On 4 May a maximum of 200 Red Wattlebirds were present. Numbers of Noisy Friarbirds ranged from 2 to 10 right up to the end of July. Also Sulphur-crested Cockatoos (*Cacatua galerita*), Crimson Rosellas (*Platycercus elegans*) and Pied Currawongs (*Strepera graculina*) utilized this food source. They stripped lerps from the Grey Box leaves by sliding the leaves through their bills. Australian Ravens (*Corvus coronoides*) were seen removing lerps from foliage of small branches that had dropped to the ground after parrots had chewed them off.

The abundance of Red Wattlebirds in suburbia was exceptionally high in May 2008 as the GBS results indicate (Fig. 6) in line with the observations at Limestone Avenue/Henty Street. Birds were mostly active there in the morning. Birds appeared to come out of the surrounding suburban gardens and later in the day also dispersed in various directions back into the suburbs.

In 2008 no Weebills were detected at the areas occupied in 2007. However, it is impossible to tell whether the birds did not come to the area at all or whether the lasting presence of the large honeyeaters prevented them from settling at the site. The abundance of lerps may well have attracted them. But it is also possible that lerps were abundant in other areas, thus negating the need for the Weebills to gather again in Haig Park and its surroundings.

3.3 Observations in 2009

In 2009 rainfall was again below average and it was a particularly hot year in which “maximum temperatures tended to be higher than average for most of 2009” (Davis and Lindesay 2011).

Weebills returned to Henty Street at the end of April and reached a maximum of 18 birds in mid June (Table 3). However, there was a notable change in their behaviour compared to 2007. The group was much quieter and more secretive, to the point that on several occasions I failed to record them (Table 3).

Only a few Red Wattlebirds were seen in the area at the times Weebills were observed. GBS data indicate a peak in April, albeit a much lower one than in 2008 (see Fig.6). The key reason in the change of Weebill behaviour has to be that small numbers of Noisy Miners from Corroboree Park visited the eastern part of Henty Street (chiefly between Limestone Avenue and Wise Street) quite regularly. Weebills responded as once observed in 2007 (see Sect. 3.1.1.) by either stopping calling, or even sheltering in bushes away from the Argyle Apples. And when the Weebills resumed foraging (usually after Noisy Miners had left the area) the birds dispersed rather than forming a close group, thus making themselves less noticeable and less of a target for Noisy Miners should the latter return. At the time Noisy Miners were seen chasing pardalotes out of Argyle Apples. There may also have been similar

interactions with Weebills, although I noticed only Weebills modifying their behaviour to avoid and at least reduce the chances of encounters with Noisy Miners. But I assume, one consequence of the change in behaviour was, that on various visits I failed to notice the Weebills (see Table 3) although the birds had clearly not left the area as they were still present on subsequent visits.

Table 3. Number of Weebills observed at Haig Park during autumn and winter of 2009.

Date (2007)	No. Weebills	Other species loosely associated with the Weebills
23 Apr	heard	
28 Apr	7	
30 Apr	Not located	
12 May	9 (very quiet)	2 Spotted Pardalotes
16 May	9	2 Spotted Pardalotes
18 May	10	
20 May	Not located	
23 May	4 (dispersed)	1 White-plumed Honeyeater
26, 28 May	Not located	
29 May	8	
02 Jun	14	1 White-plumed Honeyeater, 6 Spotted Pardalotes
03 Jun	Not located	
06 Jun	8	
13, 16 Jun	Not located	
19 Jun	18	
20 Jun	10	1 White-plumed Honeyeater, 1 Eastern Spinebill, 6 Spotted Pardalotes

In this context it is also notable that fewer species associated with the Weebills forming a MFF (Table 3). The more frequent presence of aggressive larger honeyeaters has to be considered as a major factor in reducing species diversity and impacting on MFF formation.

4. Conclusions

The observations on the Weebills illustrate once more how much the absence or presence of larger aggressive species of honeyeaters, notably of Noisy Miners, can shape bird communities (see *e.g.* Dow 1977, Debus 2008). In the absence of such honeyeaters not only could Weebills congregate, but mixed feeding flocks could form readily and stay. When Noisy Miners were present Weebills modified their behaviour to reduce the chances of detection by miners.

Acknowledgements

Thanks go to Duncan McCaskill who kindly prepared several graphs and provided other data from the Garden Bird Survey. Jack Holland and Anthony Nicholls gave comments that improved the manuscript.

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Accepted 29 March 2017

MAGPIE GEESE AT TIDBINBILLA NATURE RESERVE

JOHN BUNDOCK¹

10 Shackell Place, Wanniasa, ACT 2903, Australia
j.bundock@homemail.com.au



Magpie Geese descending to Black Flats Dam, Tidbinbilla NR, 1 Apr 2014.

Magpie Geese (*Anseranas semipalmata*) are a feature of Tidbinbilla Nature Reserve. All the world's ducks, swans and geese are close enough to fit into one family (*Anatidae*) while the Magpie Goose, with its knobbed head, hooked bill, looped trachea and half-webbed feet, rates a family of its own (*Anseranatidae*) (Low 2014). Magpie Geese mate for life. Commonly, the male has two females. All three share in nest building and care of young. Both females lay eggs in the same nest. The eggs hatch in 24-25 days.

In the wild, the geese use their feet to bend down tall grasses to reach the seed heads, straining beaks full of mud to secure food items and digging in the soil with their bills for underground rush bulbs. They will upend and feed in water up to 700 mm deep, or move far from water and graze on young grass. In the Northern Territory dry season, they dig in the hard, sun-baked soil (Frith 1982).

Reporting on a visit to the Western Districts of Victoria, a correspondent of the *Sydney Mail* (Anonymous 1876a) observed: "overhead the magpie geese and black duck gyrated *Hamilton* wantonly in large flocks." Michael Sharland (1932), writing in the *Sydney Morning Herald*, commented: "...the great flocks that were once known along the Murray and many Riverina swamps are gone, probably to return no more."

Before 1900 Magpie Geese were widely distributed. Birds in the south were shot for food and poisoned when they invaded crops. Their habitat was altered or destroyed by grazing animals and swamp drainage. They had disappeared from Victoria and South Australia by 1911 and soon afterwards in other southern regions. (Frith 1982). A flock was observed flying over Queanbeyan in October 1864. It was noted: "The occurrence is a very rare one here unless the birds were driven from their usual

¹ All photos by the author.

resorts by the tempestuous weather which prevailed at the time” (Anonymous 1864). The *Goulburn Herald* reported in 1868 that three shooters had bagged 42 black and wood duck, 5 plover, 7 snipe and 3 wild geese, “the latter being extremely rare birds in this locality” (Anonymous 1868c). Rare visits by Magpie Geese, usually in wet seasons, were being recorded in the Southern Monaro into the early 1900s (Anonymous 1914).

In the 1950s the Commonwealth Government set up a rice project at Humpy Doo, in the Northern Territory. There were complaints that Magpie Geese were eating a large portion of the crop. The Army, spraying them with Bren-gun fire, failed to dissuade them so, in 1957, 50 geese were flown from the Northern Territory to Canberra to be studied by CSIRO’s Wildlife Division in Gungahlin to find ways of controlling their numbers.

Harry Frith was in charge of CSIRO’s study. He made himself unpopular with rice-growers by concluding that bad farming practices were the main culprit for the rice-crop failures. He found that the geese ate only a small amount of rice, which was anyway going rotten (Anonymous 1957, 1966).

The Waterfowl Enclosure opened at Tidbinbilla in 1980 and soon afterwards Magpie Geese eggs were obtained from the Northern Territory Conservation Commission and hatched. In 1983, when the first eggs were laid on an island at Tidbinbilla Wetlands, a fox took the laying bird. Tidbinbilla staff collected the eggs, which were incubated under a bantam hen (Anonymous 1980, 1984, 1994; orig. communication from Don Fletcher; email from Scott Ryan to John Bundock, 6 Nov 2015). Eggs were also taken and raised artificially on other occasions, including 1987, a year when a Magpie Goose successfully raised 5 goslings (National Parks Association of the ACT 1987).



Magpie Geese. Black Flats Dam 31 Dec 2016.

Predators take a heavy toll on Magpie goslings at Tidbinbilla. In late December 2016 a trio of Magpie Geese hatched at least 10 goslings on Black Flats Dam. By 5 January 2017, only 6 remained. Within another 10 days, all had disappeared (John Bundock, pers. obs.).

1980 hatchlings. Originally the geese were pinioned to stop them flying away. None of All magpie geese now at Tidbinbilla Nature reserve are descended from the original the geese presently there have been pinioned. (Scott Ryan, pers. commun.) Although they are strong flyers, they have not expanded to other wetlands in the Canberra area.

**Black Flats Dam 5 Jan 2017.****Pond 4 Tidbinbilla 25 Sep 2014.****References**

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Accepted 2 April 2017

**OBSERVATIONS ON THE ROOSTING BEHAVIOUR OF
THE RED-RUMPED PARROT IN THE CHAPMAN AREA.
I. ROOST FLIGHTS FROM 2005 TO 2016**

JACK HOLLAND

8 Chauvel Circle Chapman, ACT 2611, Australia

jandaholland@bigpond.com

***Abstract:** Detailed observations on the roost flight pathway of the Red-rumped Parrot traced for over a distance of 1 km in Rivett and Chapman during 2016 are described in this Part, and compared with available records dating back to the start of 2005. This includes the behaviour and numbers of birds involved in the roost flights centred on Angophora St Rivett. This flyway was active throughout 2016, including during the breeding season. Detailed in Part II are observations for three nearby roost sites (within 750 m of the flyway at their closest point) and associated flyways found during 2016. Part III details observations on changes to a previous roost flyway and an associated new roost site in early 2017, containing a higher number of birds than found in 2016. It also gives the highest numbers of Red-rumped Parrots recorded to date for other sites.*

1. Introduction

The accidental discovery of a roost site of the Red-rumped Parrot (*Psephotus haematonotus*) on 8 Apr 2016 (see Part II) reminded me of how few times I had observed a roosting site for this species despite regularly seeing them on their roost flights since early 2005. I started paying much closer attention to both, and the results of the roost flight observations, as well as comparison with earlier sightings, are described below. Observations made for three nearby roost sites and associated flyways found during 2016 are detailed in Part II. Part III describes a new roost site and further clarifying observations made in the first half of 2017.

2. Methodology

The results from all the roost sites and flyways described in the three parts of this paper were derived from initial ad hoc and incidental observations which were followed up until their significance became clear. After this more regular checks, generally over a longer time, were made. I deliberately chose the best conditions (clear and calm) for these, so to the extent possible the observations were “standardised” to take into account variables such as timing on a day, weather (clear, cloud cover, wind, fog etc.) and season (including for sunrise).

Through regular checking of the flyway based on Angophora St, Rivett it was relatively easy to adjust the time of my arrival to around when the first birds were coming in and count the peak as they came through (usually between daybreak and sunrise). Up to mid September 2016 (and in April-May 2017 - see Part III) this was helped by many birds staying together in the 28 Angophora St staging tree, and usually the best counts (often there were more in there than it appeared) were made

as they flew out of the tree. There may have been a few birds come through before and some after but I'm confident that I would have captured at least 80% of the birds, and more on many occasions.

Because of the early sunrise, for the October to December 2016 counts I was able to arrive around 10 minutes before they came and leave up to 10 minutes after the last bird had gone through, so that I was pretty certain I had counted all that had passed, at least at that point. This may have biased the numbers to be slightly higher compared with those obtained previously (they did seem to come through in smaller numbers over a longer time, and at least for a while in October flew straight past the tree).

3. Observations

3.1. *Angophora St/Woollum Crescent-Darwinia Terrace lane/Kathner grove* (morning counts)

2.1.1. Start of year to end of June 2016

Once the roost site in Perry Dr, Chapman, had been discovered on 8 Apr, more attention was paid to the roost flights I had seen intermittently since the beginning of the year about 750 m away in Angophora St, Rivett. The latter observations for the first half of 2016 are summarised in Table 1. Initially the details kept were few, as they were made as I walked our dogs past the area relatively quickly. It was not until 5 May 2016 that the significance of the medium sized, spreading tree (about 10 m high and of similar width) at the front of 28 Angophora St as a staging post was recognised. At the time this tree was partly bare, with what seemed some tassel-like foliage (later these were identified as the catkin-like flowers of a species of ash, most likely the Desert Ash, *Fraxinus angustifolia*). Therefore the birds in there were difficult to count. The most accurate counts were achieved as birds entered or especially as they flew out of the tree.

The number of birds using this staging tree rose significantly to at least 60 on 11 May. Unfortunately details for the next month were lost through a computer failure, but from memory based on around weekly observations from 30 to 45 birds were observed at this staging tree (note: often called the 28 Ang tree from now on). They often came in from two slightly divergent directions, in a narrow arc from slightly to the N of the street, including some flying over the lower end of Woollum Cres, through to slightly to the S (on the Pavonia St side), with birds also coming straight up Angophora St.

The continuation in an almost due westerly direction in a short straight line up Angophora St to where it bends more sharply to the SW and then over the laneway that runs from Woollum Cres to between 23 and 25 Darwinia Tce (called Wool/Tce lane from now on) was first confirmed on 12 Jun. The extension in the other direction over Rivett Oval, the retirement home opposite the Rivett shops, across Bangalay Cres and the bare trees at No 67 at the lower end of Woollum Cres was confirmed from 16 Jun. The continuation in a straight line up the grove of gum trees at the start of Kathner St, Chapman (called Kathner grove from now on), into the Chapman horse paddocks was not confirmed until 16 Jul, though it was a known previous route (see Table 6 below). The known part of the roost flyway is > 1 km long as outlined in Map 1.

Table 1. Summary of morning observations at the Angophora St - Wool/Tce lane - Kathner grove roost flyway from mid January to late June 2016.

Date	Time (h)	No.	Comments
15 Jan	Early	30	Mid Angophora St, first record of birds here in 2016
13 Feb	?	?	Entry in my notes "still lots Angophora/Terrace/Rafferty St up to this date"
1 Mar	Early	Lots	First seen over corner Croton St/Woollum Crescent (possibly roosting there?) and later at the adjacent mid Angophora St
18 Apr	06:46	30	Flew over Angophora St/Woollum Cres lane towards Chapman horse paddocks
5 May	06:45	40	10 flew up Angophora St from the staging tree at the front of No 28, over 30 were still left in there – the first time the importance of this tree was realised
11 May	06:53	60	Birds were entering and leaving the 28 Ang tree, with over 50 in there at one time.
11 Jun	--	--	Details from the previous month lost due a computer failure – see text
12 Jun	07:08-07:17	25	Flying over Wool/Tce lane in groups of up to 10, none in 28 Ang tree at 07:17.
14 Jun	07:02-07:10	55	2 already up Ang St near top Woollum Cres, and a few already in 28 Ang tree, but from 07:05-07:07 about 50 arrived in groups of 10-15, plus a few more stragglers, about 20 had left by 07:10.
16 Jun	07:15-07:24	10	Seen flying over Rivett oval/retirement home (opposite Rivett shops) and across Bangalay Cres, but just a couple in 28 Ang tree around 07:24.
19 Jun	07:12-07:25	30	None in 28 Ang tree, 4 flew from 67 Woollum Cres, then at least 3 from the bushes at the corner with Croton St (roosting there?) towards the 28 Ang tree, where at least 25 were counted, with a few still coming in or leaving.
23 Jun	07:15-07:23	25	Heard in bare trees at 67 Woollum Cres and 8 flew up Ang St at 07:17. Heard at 28 Ang tree on approach, then over 17 came in 3 groups from 07:21-07:23.
27 Jun	07:22-07:30	50	Over 4 birds flew up from Bangalay Cres to the bare trees at 67 Woollum Cres, then over 30 in small groups (<10) from there towards 28 Ang tree from 07:23-07:25 with several from NE (from Croton St roost?) in on approach. Then around 50 left towards Wool/Tce lane in similar sized groups.

From mid June more time was spent there, as detailed in Table 1. Sometimes numbers were down, suggesting either a possible breaking up of the roost flight activity or perhaps a timing problem, but the higher numbers on 27 Jun at a slightly later time (possibly due to the fog closing in) ruled out both possibilities. While there were some slight variations in this time, the general pattern described above was followed, except for the suggestion of birds roosting at the more westerly corner of Croton St and Woollum Cres (2 Croton St/opposite 38 Woollum Cres, see 8 in Map 1). As can be seen from Table 1, this was first suspected on 1 Mar, and also on 19 and 27 Jun, but roosting did not occur there on 24 Nov (see Table 5 below). However, observations made in May 2017 (see Part III) confirmed that this site was being used to roost and to initially stage, at least at certain times of the year, rather

than being part of a roost flyway, but with some birds flying directly up Woollum Cres.

3.1.2. July to early August 2016

The pattern of high counts with occasional lower ones (not always a timing issue, see for example 7 Jul) continued throughout July to early August (Table 2). As well as some larger groups (from 15-25 birds) coming through, some birds left the staging tree towards Pavonia St, which runs roughly parallel to S of Angophora St, over the laneway that runs between them and 22 and 24 Angophora St (called Ang/Pav lane from now – see Map 1). Some birds also flew over the laneway that runs between 23 and 25 Angophora St to Woollum Cres on the opposite side of it (called Ang/Wool lane from here on). This second alternative exit route rather than up Angophora St was first noticed on 18 Apr (see Table 1).

Table 2. Summary of morning observations at Angophora St - Wool/Tce lane - Kathner grove roost flyway from early July to early August 2016.

Date	Time (h)	No.	Comments
1 Jul	07:16-07:25	60	3 birds left 28 Ang tree on approach, with a few more still in there, and a further 6 coming in, then 50 came in from the bare trees at 67 Woollum Cres (incl. a group of 20). Around 50 then left.
7 Jul	07:15-07:21	25	10 birds flew from the bare trees at 67 Woollum Cres to the 28 Ang tree. Several came in from the Pavonia St side, then about 10 left towards Pavonia St and around 5 up Ang St. Some more came in and then 10 left up Ang St.
10 Jul	07:30	bb3	Over 23 Darwinia Tce house, N side of Wool/Tce lane
12 Jul	07:10-07:22	45	Several heard W of Ang/Wool lane, then over 20 in 28 Ang tree, over 5 came in. None in the bare trees at 67 Woollum Cres, but around 15 came through (from Rivett oval?) in small groups, there were still many in the 28 Ang tree with 27 leaving straight up Ang St, at least 7 remained.
16 Jul	07:15-07:26	43	Over 20 flew low over 27 Darwinia Tce up Kathner grove, followed by 12 over 25 Darwinia Tce. Then none until 8 flew over Ang/Wool lane, but there were still at least 3 (quiet) left in the 28 Ang tree.
22 Jul	07:12-07:22	45	Heard in the 28 Ang tree, then a few flew in (from several directions) and about 10 out, 8 birds came from further down Ang St (see above text), plus several from 67 Woollum Cres. A Pied Currawong flushed 33 birds, all went up Ang St.
27 Jul	07:19-07:23	0	Nothing heard on approach from Pav/Ang lane, none in 28 Ang tree and no birds seen, timing similar to 22 Jul, but possibly too late.
28 Jul	07:03-07:15	16	3 over Ang/Wool path, at least 1 in the 28 Ang tree on approach, with 10 coming in quietly up Ang St in quick succession. Then two in bare trees 67 Woollum Cres flew up Angophora St, but none left in 28 Ang tree.
29 Jul	07:03-07:09	80	Heard in the 28 Ang tree from Ang/Pav lane, with some local movement. Many in there and over 75 flew out towards the Wool/Tce lane in groups of up to 15-20, around 5 still in the tree, with 1 still coming up from 67 Woollum Cres.
3 Aug	07:05	1	Only 1 over 25 Tce, no others observed, including in 28 Ang tree at 07:18.
4 Aug	06:56-07:12	75	Heard on approach and then 9 flew from the 28 Ang tree up Ang St. A few still came in, then 57 birds in groups of up to 25 flew out up Ang St. There were at least 5 still in there, and 3 more came up. All were gone at 07:12.
5 Aug	07:16	8	Over Ang St end of Ang/Pav lane



Map 1. Flight paths of Red-rumped Parrots. Key for sites mentioned in the text: 1 – Mop top bushes Perry Dr side of 1 Rafferty St; 2 - Staging conifer at 126 Perry Dr; 3 - Conifers front of 127 Perry Dr; 4 – 31 Monkman St; 5 - Roosting area 8-16 Goodenia St, with Sollya Pl mid opposite; 6 - Laneway between Burgan Pl and Darwinia Tce; 7 – Staging/roost tree and Photinias; 8 – Sharp end of Rivett park; 9 – Roost site corner Monkman St and Chauvel Circle; 10 – Staging river oak at 21 Ordell St; 11 - 44 Monkman St.

From 12 Jul I began to go up and down Angophora St trying to maximise the time spent in the area. Only once were birds observed resting/roosting in Angophora St. This was on 22 Jul with 5 coming from a bare tree at No 39, and 3 from a camellia against the house at No 43. The latter is the only time in 2016 that a roost site for this flyway was confirmed, though one was suspected several times at the corner of Croton St (see Table 1 and associated text above).

At the time I thought the lack of observing any activity on 27 Jul and then the low numbers on 28 Jul were related to timing or to a possible decrease in the flyway activity, but under similar timing and clear cold conditions as the latter date, the 80 birds seen on 29 Jul ruled out both of these possibilities. This was the highest number counted for 2016.

3.1.3. Early August to mid September 2016

With the right timing, slightly lower numbers of between 50 to 63 birds were counted for the rest of August (see Table 3). The general pattern was as described above,

except that on a number of occasions birds seemed reluctant to leave the staging tree at 28 Angophora St. A Magpie-lark (*Grallina cyanoleuca*) was seen to harass the birds in the tree on 18 Aug. Apart from the Pied Currawong (*Streptera graculina*) on 22 Jul (see Table 2) and possibly Red Wattlebirds (*Anthochaera carunculata*) on 26 Aug and 1 Sep (see below), this was the only time this behaviour was observed.

Table 3. Summary of morning observations at Angophora St - Wool/Tce lane - Kathner grove roost flyway from early August to mid September 2016.

Date	Time (h)	No.	Comments
8 Aug	06:52-07:09	55	Heard on approach before Ang/Pav lane, many in the 28 Ang tree and 25 flew up Ang St, others were reluctant to leave, with at least 30 in there. 2 came in from Ang/Wool lane, but none up Ang St, or in 67 Woollum Cres bare trees.
9 Aug	06:55-07:12	63	8 birds flew low up Kathner grove, then 20 over 25 Darwinia Tce and the Wool/Tce lane, and then another 10, with some going to the 25 Tce tree. Then nothing until 23 flew out of the 28 Ang tree, with still a couple in there.
12 Aug	06:49-06:58	58	Heard in bare trees at 67 Woollum Cres, 1 flew in and 3 left up Ang St. Heard in the 28 Ang tree, then 13 flew in up Ang St. Others were reluctant to leave, but 38 left up Ang St in groups of up to 18, with at least 12 remaining.
17 Aug	06:49-07:04	6	4 birds at E side Wool/Tce lane, 1 bird in gum at 10 Woollum Cres went back towards the 28 Ang tree, then 2 high over Wool/Tce lane.
18 Aug	06:46-06:51	50	The 28 Ang tree was quiet on approach, estimated around 10 in there, but 16 flew out. Then many came in, but at least 25 flew out almost immediately due to a Magpie-lark harassing them. Another 7 had flown out by 06:51.
20 Aug	07:04-07:12	4	Heard going up Ang St, but nothing in 28 Ang tree at 07:10, but 4 flew up other (Woollum Cres) side and then heard going up Ang St.
22 Aug	06:53	3	3 over 21 Darwinia Tce to horse paddocks
26 Aug	06:31-06:42	55	Complex - see text.
27 Aug	06:45-07:05	0	Foggy, so not out until later, but nothing over Wool/Tce lane, nor in the 28 Ang tree, or on subsequent return via Ang/Wool lane.
1 Sep	06:30-06:48	35	Lower numbers and pattern possibly changing – see text.
5 Sep	06:32-06:50	4	1 up Wool/Tce lane, but no other birds (including 14 Woollum Cres conifer) to 06:38, then 4 birds still in the 28 Ang tree, flushed up Ang St at 06:50.
7 Sep	06:32-06:47	1	Nothing in the 28 Ang tree etc, and only 1 bird flew high up from the lower end of the street at 06:40 when I went down and up Ang St.
8 Sep	06:30-06:52	0	Nothing in 28 Ang tree, possibly heard over E end of Pavonia St at 06:38, then maybe 3 flew low up Ang St, but no birds in the 28 Ang tree seen or heard.
9 Sep	06:45	1	No birds at the 28 Ang tree except at least 1 heard high overhead at 06:47.
11 Sep	06:16-06:38	18	Up early, possibly 1 to 67 Woollum Cres bare trees at 06:29, then 4 low past at 06:34, and then 16 out/past the 28 Ang tree up Angophora St.

With the sun rising earlier, getting the timing right became more difficult, as shown by the 20 Aug entry in Table 3. On the clear and frosty morning of 26 Aug I got there earlier and at 06:31 h one bird was already in the bare small tree at 21 Angophora St, but only 2 flew out of the 28 Ang staging tree, where none were present. I thought this was due to the presence of a couple of aggressive Red Wattlebirds (RWBs), but then between 06:37 and 06:40 h 42 birds came from the

lower end of Woollum Cres, but with none seeming to come from the bare trees at No 67. Eleven more arrived at 06:41 h, many of the birds sat in the sun in the 28 Ang staging tree but soon flew up the street in two close flocks of about 25 and 30. The importance of timing is also underlined when no birds were seen on 27 Aug even though I was there only slightly later than the previous day (I had been taking into account the foggy conditions).

With similar timing I caught the roost flight on 1 Sep, but numbers were reduced and the pattern seemed to be changing. At 06:30 h one bird came through 15 Angophora St, but there were none in the 28 Ang staging tree, with again RWBs present. Around 6 birds flew in at 06:34 h, but no more arrived and none were in the 67 Woollum Cres bare trees. On return a few were heard overhead, but there were none in the 28 Ang tree. Then from 06:42-06:44 h 24 birds flew low up Angophora St over the Ang/Wool lane to a large conifer at 14 Woollum Cres about 150 m further on, with few if any stopping at the 28 Ang staging tree.

This was the only time this conifer on the edge of the flyway was used as a staging tree. On four subsequent visits at very similar timing I only recorded between 0-4 birds (see Table 3). Despite going at a slightly earlier time on 11 Sep I surprisingly did not find birds until nearly 06:30 h, with possibly up to 20 birds moving through, but coming up the street or on the Pavonia St side stopping only very briefly, if at all, in the 28 Ang staging tree.

At the time I thought this changing pattern and the lower numbers recorded using the roost flyway would mean that when I came back after a month's absence it would be no longer used. However, this was not the case (see Section 3.1.4).

3.1.4. Mid October to Mid December 2016

The big surprise was, given the signs in early September (see Table 3 and text above), that the morning roost flights up Angophora St were still continuing, albeit with a few subtle changes. This was confirmed following a few unexpected observations, in particular that of at least 14 parrots flying low and fast under the Kathner grove trees down the Wool/Tce lane at a surprisingly early time, from 16:52-16:56 h on 11 Oct (see Table 5 and text).. The complete count observations summarised in Table 4 were made without dogs, allowing me to stand at the best vantage point at the S end of the Ang/Wool lane. As noted in the Methodology Section above these longer observation times may have slightly biased total numbers.

The count of 55 birds on 14 Oct proved to be the highest made in this period (and the highest since 12 Aug – see Table 3). At the start of this period very few birds seemed to be stopping at the 28 Ang staging tree, which now had very much more leaf development. Instead most birds now seemed to be coming to the S of it over the house there and the front of the one at No 26, in an almost due westerly direction and about 20° from the former preferred flyway between mid June to mid August through the bare trees at 67 Woollum Cres. Many parrots were flying through very low and fast and were often hard to see and count properly, especially before light was adequate, but some did stop in the smaller trees past and to the W of the 28 Ang staging tree on both sides of the street, as well as occasionally in the large gums in front of 18-20 Angophora St (see Map 1, and Fig. 1).



Figure 1. View of Angophora St, Rivett, with the staging tree on the left, and the larger trees not used on the right, as opposed to the smaller ones in the background.

On 3, 11 Nov, 8 and 18 Dec, some birds flew to the ground and fed there for some time, similar to the birds that were regularly observed on the lane between the start of Burgan Pl and Darwinia Tce (see Tables 3 and 4 of Part II). Also from early November the 28 Ang staging tree started to be utilised more and by 18 Nov the majority stopped there, if only briefly.

The above pattern continued until at least 18 December with little drop-off and with 35 to 55 birds regularly estimated on the fuller counts. Given this was during the breeding season this confirms communal roosting is a whole-year round phenomenon. The observations made on 20, 22, 25 Nov, 1 and 18 Dec, about an hour after the birds were making their morning roost flights, are likely part of the increased activity observed from mid November in other previously quiet areas (see Section 2.3 of Part II).

3.2. Angophora St/Woollum Cres-Darwinia Tce lane/Kathner grove roost flyway (afternoon counts)

Only a few observations were made of the afternoon return roost flights, especially before mid October (see Table 5). This was possibly simply a matter of timing. The historical records certainly show that significant numbers were making quite late return roost flights, particularly in Apr 2012 and May and Jun 2014 (see Table 6).

The afternoon records of 11 Jun and 20 Jun are the only winter times where birds were observed in the staging tree. It is possible that they returned much earlier in the day, as may be suggested by the surprisingly early time of just before 17:00 h on 11 Oct (note daylight saving had already started). This was the day after I returned from a month away and was one of the main clues (in addition to those seen in Angophora

St that morning – see Table 4) that morning and evening roost flights were still occurring despite the indications to the contrary in early September.

Table 4. Summary of morning observations at Angophora St - Wool/Tce lane - Kathner grove flyway from mid October to mid December 2016.

Date	Time (h)	No.	Comments
11 Oct	06:32-06:47	7	5 birds disturbed from lawn at 19 Ang St*, flew towards Wool/Tce lane, no birds in the 28 Ang tree or down and up street, perhaps heard several times, until 2 flew close by 28 Ang tree up street.
14 Oct	06:08-06:40	55	Heard in small tree front of 21 Ang St on approach, then up to 55 birds came through in small groups of not more than 5 from 06:12 to 06:34, low and fast (see text). Almost all flew over 21 Ang tree (some stopping briefly), though some low up Ang St. Some late stragglers were in the 28 Ang tree, also a few seen there towards end in bare trees rear of 24 Ang St.
15 Oct	06:31-06:46	2	Flew out of 25 Darwinia Tce tree at 06:31 but nothing else until 1 up from 28 Ang tree at 06:46.
19 Oct	06:31-06:55	3	On verge of 5 Angophora St, then 1 flew start of Ang/Wool lane at 06:35, but no others down street or back through Ang/Wool lane by 06:55.
20 Oct	05:57-06:35	42	1 bird through low at 06:08, then 24 birds by 06:15, all low (not more than 6 together) over gap between 26 - 28 Ang houses, with some stopping at 21 Ang St tree. A break to 06:18 when 2 birds over 22-24 Ang St to large gum on verge of 20 Ang St. Then some stragglers until 4 to the 20 Ang tree, 1 to 21 Ang tree, and 5 late ones to small gum on the verge of 19 Ang at 06:32.
27 Oct	05:54-06:20	42	First call over at 05:57, then 4-5 through fast and low straight up Ang St, rest in similar groups over 26 Ang house, with some stopping briefly in 21 Ang tree and then closer to 06:10 some stopping in 28 Ang tree.
3 Nov	05:41-06:05	35	Heard in the 28 Ang tree at 05:46, then birds (max group of 6) coming through low and fast over 26 Ang house to 05:57. Some stopped in 28 Ang tree towards the end and also in smaller trees at 22-24 Ang St etc where some were seen dropping down to the Ang/Pav lane, 6 birds were flushed from there at 06:05.
11 Nov	05:34-06:10	48	First 7 birds through at 05:47, then others in small groups stretching out to 06:10 including 1 over 25 Ang (N side of St). 6 birds dropped to front 24 Ang St at 05:49, several only briefly but others not until I flushed them later. Others heard in low trees including calling 21 Ang tree at 06:03.
18 Nov	05:25-06:05	50	Nothing until heard in the 28 Ang tree at 05:38, then birds came in small groups of up to 5 to 06:01. Most of these stayed briefly in the 28 Ang tree, some went straight through and 1 went to the 22 Ang tree at 05:46, and 1 over there later. A few stopped in the 21 Ang tree, an early one going briefly back to 28 Ang tree.
20 Nov	06:30-06:34	2	Single bird flew from 27 Darwinia Tce to gum at front at 06:30, then at least one other at 12 Woollum Cres at 06:34.
22 Nov	06:29	2	2 heard then dropped to road at 46 Ang St (opp lower end corner Woollum Cres)
25 Nov	06:45	2	Heard around back of 46 Ang St, then 1 flying high down Pav St to gum tree.
26 Nov	05:26-06:00	41	First 2 birds at 05:37 to bushes at 24 Ang St, then heard at 05:38 in 28 Ang tree, followed by birds all coming up S side of Ang, with numbers slowing towards the end (05:57). Many stopped in the staging tree and also in other trees straight or after including 21 Ang St, gum at 20 Ang St and gum behind 22 Ang St.
1 Dec	06:45	3	Birds flying over 5 Woollum Cres towards horse paddocks

Table 4 continued.

Date	Time (h)	No.	Comments
8 Dec	05:18-06:00	47	Nothing until heard 05:34, soon 8 came through low to 19 Ang trees/bushes, then 28 Ang tree used more with numbers decreasing over time. 6 birds stopped on the 24 Ang St verge at 05:50 (2 briefly there around 05:40) from where they flew low towards 20 Ang at 05:55, with no more birds to 06:00. 3 birds came from N side of Ang St (Croton St roost?), and flew quite high over 22-24 Ang St around 05:50.
18 Dec	05:25-06:00	42	Nothing until heard going to 22 Ang rear gum at 05:35, then 2 N side Ang at 05:37 and heard in 28 Ang tree at 05:38. All through by 05:53, mostly in 28 Ang tree or straight through, some late ones went to the 23 Ang trees/bushes, or the 20 Ang front gum, with 4 dropping to 26 Ang St verge at 05:45, flying off at 05:48.
18 Dec	06:23-06:25	5	Heard in big gum edge 25-27 Tce verge, 3 birds flew to wires opposite but reluctant to fly far.

*Most of the spots/trees mentioned in this table are past and to the W of the 28 Ang staging tree on both sides of the street.

Table 5. Summary of afternoon observations Angophora St/Woollum Cres-Darwinia Tce lane/Kathner grove roost flyway.

Date	Time (h)	No.	Comments
11 Jun	16:32	2	Flew into 28 Angophora St staging tree
17 Jun	16:41-16:50	2	No birds in staging tree but 2 diagonally opposite in bare tree on verge of 31 Ang St. No birds came over Wool/Tce lane area to 16:50.
20 Jun	16:24-16:34	8	No birds came down Angophora St for about 10 minutes but 8 quiet birds were seen in the 28 Ang tree at 16:28.
11 Aug	16:20	1	Heard at Kathner grove but no birds seen flying through
11 Oct	16:52-16:56	14	Birds in groups of up to 5 flew low and fast under the Kathner grove trees down Tce/Wool lane – unexpected and surprisingly early
13 Oct	17:00	1	Heard only, at W end of Kathner grove
25 Oct	17:10	1	Heard rear of 16 Woollum Cres, then 1 bird flew wrong way up Tce/Wool lane, then possibly calling in verge tree Ang St opposite W end Woollum Cres
27 Oct	17:10	1	Heard once only, Kathner grove
24 Nov	19:37-19:57	0	No birds coming to river oak or tea trees corner 2 Croton St/opposite 38 Woollum Cres, only heard from large gum at 20 Ang St around 19:34.
25 Nov	19:32-20:00	29	Observed from front of 27 Ang St, birds seen mainly flying high and straight down St from 19:35, except for 6 on N side of St and 4 low over 26/28 Ang houses. Towards end (around 19:49), some going into the 28 Ang tree briefly.
26 Nov	17:22-17:28	6	1 over Ang/Pav lane at 17:22, then heard rear 22 Ang St gum and 27 & 29 Ang St gum trees, 28 Ang staging tree and 30 Ang St exotics, at least 6 could be heard to 17:28. Then 2 flew up to the lower (ENE) end of the laneway that runs between Chauvel Circle and Percy Crescent from top Ang at 17:37.
8 Dec	17:09	2	Flew to Kathner Grove up Wool/Tce lane (see Sect. 2.3 of Part II).

Only a few afternoon observations were made until late November when I made a special effort first to clarify whether the dense cover at the more westerly corner of Croton St and Woollum Cres (2 Croton St/opposite 38 Woollum Cres) was being used as a roost site. No birds were seen between 19:37 to 19:57 h on 24 Nov, confirming that, at least in late spring, this area was not being used (Table 5). Despite some earlier evidence (see Table 1 and associated text), birds were rarely seen coming from this NE direction during the very many early morning roost flights observed (only on 19 and 27 Jun – see Table 1, and 8 Dec – see Table 4). However,

Part III describes observations made in May 2017 that confirmed that this general area was being used to roost or possibly to stage.

In contrast, birds were confirmed using the Angophora St roost flyway the following evening on 25 Nov, with the 29 birds comparing reasonably with the 41 counted the next morning (see Table 4). The failure to find many birds doing the afternoon roost flight previously was possibly due to some birds returning earlier (see e.g. Table 5, 11 Oct and 26 Nov, and particularly in the Goodenia St area in November - see Table 5 of Part II), and that only a few birds stopped at the 28 Angophora St staging tree.

3.3. Historical records of Red-rumped Parrot roost flights 2004-2005 to end 2015

3.3.1. Definitely associated with roost flights

The first observations I made on Red-rumped Parrot roost flights were described in Holland (2005) and are summarised in the first three rows of Table 6. All observations were made in Chapman/Duffy on either side of Hindmarsh Drive, including at or close to the corners with Eucumbene Dr or Darwinia Tce. Holland (2005) notes that during this period smaller numbers of parrots were often at this spot, and may have been the remnants of larger groups. It seemed to be a matter of timing, with the birds flying out just as the sun was coming up. As noted a number of times above for 2016, getting there at exactly the right time could be difficult particularly either side of equinox when sunrise times change rapidly.

Table 6 includes my observations of the higher numbers which appear to be clearly related to roost flights. All records through to 15 Jan 2008 were from this same area. This was the last time my notes indicate larger numbers in this locality, though the 60 observed flying over the paths down to the underpass between 307 and 311 Hindmarsh Drive on 15 Feb 2009 may have been part of this general flyway. I recall this was the highest number I counted there over a few weeks, but I have rarely, if ever, seen the same numbers at either spot since, despite, at least initially, walking through regularly. Evidence that this area is no longer a roost flyway is that on 19 Dec 2016, when standing at the corner of Hindmarsh/Eucumbene Drives and Darwinia Tce, nothing was seen or heard coming through from 05:30 to 6:00 h, the peak time for birds using the Angophora St flyway (see 18 Dec entry in Table 4). Further evidence is that on 2 Jun 2017 nothing was seen or heard when going down Hindmarsh Dr from here to No 307 and back from 06:52 to 07:06 h, again during the time when the roost site at the corners of Woollum Cres and Croton St was active (see Part III).

Interestingly, five days after my last record there, on the afternoon of 20 Jan 2008, for the first time 35 birds were observed in Kathner grove, an important area along the current major roosting flyway, as noted above (see Map 1). However, the next sighting was not until 21 Mar, when 70 birds were seen leaving (staging?) there towards the Chapman horse paddocks early in the morning. Most of the records in Table 6 from this time were made along this route, particularly at the Kathner St/Kathner grove end, though sometimes my notes, e. g. 25 and 26 Nov 2008, are not precise as to the exact location or time. The reason for the apparent route switch is unclear, perhaps it allowed more staging opportunities than the previously used barer area, when often the birds seemed to be flying over much higher than when using the current flyway

Table 6. Historical records of Red-rumped Parrot roost flights 2004-2005 to end 2015.

Year	Date	Time (h)	No.	Where and Comments
2004-2005	1 Feb	06:30	34	In three groups flying SW out of Duffy in the direction of the Chapman horse paddocks and NW Cooleman Ridge
	8 Feb	06:35	70	Corner Hindmarsh & Eucumbene Drives, with 40 flying out and the remainder staying in the trees on the edge of Duffy
	11 Mar	06:50	40	Flew into the roadside trees along start of Eucumbene Drive Duffy where they stayed for at least 5 min.
2005-2006	9 Dec	06:00	20	Corner Hindmarsh & Eucumbene Drives
	7 Jan	18:30	20	Corner Hindmarsh & Eucumbene Drives
	8 Jan	am	25	Corner Hindmarsh & Eucumbene Drives
	13 Jan	18:30	40	On ground in newly burnt area, cnr. Hindmarsh and Eucumbene Dr
	17 Feb	06:50	50	In small groups of ≤ 15 corner Hindmarsh and Darwinia Tce
2006-2007	4 Oct	06:15	20	Cnr Hindmarsh (and Eucumbene?) Drives
	12 Apr	am	Many	Cnr Hindmarsh (and Eucumbene?) Drive
2007-2008	15 Jan	06:10	20	Cnr Hindmarsh and Eucumbene Drives
	20 Jan	pm	35	End of Kathner grove
	21 Mar	07:00	70	End of Kathner grove towards horse paddocks in groups of 5-35
2008-2009	25 Nov	early	Many	Chapman horse paddocks etc (also on 26 Nov)
	15 Feb	am	60	Flying over paths between 307 and 311 Hindmarsh Drive
	13 Jun	07:40	55	Coming out of tree backyard of 25 Darwinia Tce, flew up K grove
2009-2010	15 Sep	am	Many	Rivett, leaving in small groups, roosting?
2010-2011	8 Aug	07:30	15	Start Kathner St (also on 15 Aug)
	8 Feb	06:15	40	Pavonia St Rivett
2011-2012	10 Apr	17:25	60	Flying high from end Kathner grove into Rivett
	12 Apr	17:30	90	Gathering end Kathner grove, flying in small groups to Rivett
	12 May	07:00	30	Flying from Rivett to Kathner grove
2012-2013	11 Aug	07:20	12	Laneway rear 6 Percy Crescent, flying in from Rivett
	29 Mar	07:25	20	Flying through Kathner grove
2013-2014	10 Mar	07:05	25	Flying over cnr Goodenia St/Burgan Pl towards Cooleman Ridge

Table 6 continued

Year	Date	Time (h)	No.	Where and Comments
2014-2015	4 Nov	06:30	15	On roost flight at start Kathner St
	25 Mar	am	??*	“From roost Angophora St”
	27 May	16:35	60	On roost flight through Kathner grove
	7 Jun	07:05	28	Over 22 high over 22 Ang St (near staging tree) with > 6 still there
	15 Jun	16:19	30	On roost flight (presumably Kathner grove) - cloudy
2015-2016	12 Jul	07:38	25	Wool/Tce/ path

* Unfortunately my notes do not give any indication of time or numbers.

From their behaviour I had suspected the parrots were roosting on the Duffy side of Hindmarsh Drive in 2005. The question of possible “roosting” in Rivett first came up on 15 Sep 2009, and then not until 25 Mar 2015 (again my notes are not clear as to location or time of both). However, the sighting of over 28 birds in mid Angophora St near the staging tree on 7 Jun 2015, seems to have been the first indication of the events that would unfold there during 2016. The 40 parrots seen in Pavonia St early on the morning of 8 Feb 2011 are also an important indicator of the extent of the flyway. Interestingly there are only 4 observations of evening roost flights along this flyway in Table 6, on 10 and 12 Apr 2012, 27 May and 15 Jun 2015. The 12 Apr 2012 count of 90 birds remains the highest ever recorded along this particular flyway, and I recall that they flew quite high over open ground from the horse paddocks end of the grove rather than relatively low as observed in 2016, as well as slightly to the N. Also interesting is that on several occasions at least they were seen staging in Kathner grove or in the tree at 25 Darwinia Tce, adjacent to the Wool/Tce lane.

Also important is that in the past roost flights have been observed in all months (Table 6), as was the case for 2016 (see Section 3.1.4), at least for the major flyway involving Angophora St. Finally the observation of 25 flying over the corner of Goodenia St/Burgan Pl towards Cooleman Ridge early on 10 Mar 2014 is an important indicator of activity seen there during 2016 (see Tables 3-5 and associated text of Part II). Again this was the highest number of birds counted during my several observations at this location around that time.

3.4.2. Historical records which may or may not have been associated with roost flights

Table 7 summarises high numbers of birds seen that may or may not have been associated with roost flights. In February 2005 they were part of post-breeding feeding flocks, and as described in Holland (2005), their presence was often the first sign of a mixed feeding flock. They were also part of a feeding flock on 5 Feb 2006 and the 60 seen earlier on 15 Jan 2006 were certainly feeding, and were seen at a time (06:50 h) when they may have recently arrived on a roost flight. This was also likely to be the case for those birds seen in Rivett on 27 Oct 2006, though that observation was made at a much earlier time than for a late evening roost flight, but they may have been birds returning early, as noted particularly for the Goodenia St

birds (see Table 5 of Part II). While these are the only instances where an accurate time record was kept, other observations of birds feeding in a flock were probably the high numbers recorded on 14 Jun 2008, and 15 Jan 2016. In contrast in 2016, no more than 8 (see Tables 3-5 of Part II) or 10 (see Section 3 of Part II) were ever observed feeding as opposed to flying through, or resting in the trees.

Table 7. Historical records of Red-rumped Parrot that may or may not have been part of roost flights 2004-2005 to 2015-2016.

Year	Date	Time (h)	No.	Where and Comments
2004-2005	23 Feb	am	20	End of Kathner St dam*
2005-2006	15 Jan	06:50	60	25 end of Kathner St dam and a further 35 birds 200 m uphill
	5 Feb	am	25	Kathner St fence/edge of Chapman horse paddocks - feeding flock
2006-2007	27 Oct	17:15	25	Path between Rivett Primary School and Reformed Church
	23 Dec	am	15	W Cooleman Ridge
2007-2008	17 Nov	am	Many	Cooleman Ridge, rear 30 Chauvel Circle
2008-2009	19 Jul	am	25	End Kathner St
	14 Jun	am	40	Lower (ENE) end of the laneway that runs between Chauvel Circle and Percy Crescent
2009-2010	17 Jul	am	16	Laneway rear 6 Percy Crescent
	24 Oct	am	Many	Laneway rear 6 Percy Crescent
	20 Mar	am	20	Kathner St
2010-2011	17 Jul	am	16	Percy Crescent
2011-2012	2 Dec	am	Many	End of Kathner St dam
2015-2016	15 Jan	am	70	Stirling

*My post on the COG chat line on this date indicates they were part of a mixed feeding flock which a sparrowhawk/goshawk flushed into the air. Further, the parrots had been very commonly feeding there over the summer.

4. Discussion

For the Discussion and references see Part III Holland, this issue, p. 183.

Accepted 13 June 2017

Canberra Bird Notes 42(2) (2017): 172-182

OBSERVATIONS ON THE ROOSTING BEHAVIOUR OF THE RED-RUMPED PARROT IN THE CHAPMAN AREA. II. OTHER ROOST SITES AND FLIGHTS IN 2016

JACK HOLLAND

8 Chauvel Circle Chapman, ACT 2611, Australia
jandaholland@bigpond.com

Abstract: Detailed observations on the roosting behaviour and associated roost flights of Red-rumped Parrots in three discrete areas of Chapman, Rivett and Duffy during 2016 are described. These include dates for occupation of, and the numbers of birds in, these roosts. This complements the preceding paper (Part I) on the roost flights centred on Angophora St Rivett, where very little roosting was recorded. Part

III contains details of observations on a modified roost flight and associated new roost site in 2017 containing higher number of birds than found in 2016, as well as the highest numbers for other sites to date. The three sets of observations are then discussed and compared with the available literature.

1. Introduction

After the accidental discovery of a roost site of the Red-rumped Parrot (*Psephotus haematonotus*) on 8 Apr 2016 I started paying much closer attention to finding roost sites and better documenting the roost flights which I had been noting from early 2005. The results of the former are described below, including similar roosting observations by Jean Casburn around her home in Duffy. Details of the Angophora St and historical roost flyways are dealt with in Part I and observations made in the first half 2017 involving a modified roost flyway and new roost site as well as higher numbers of birds than in 2016 are in Part III.

2. Methodology

This was largely as has been described in Part I. For the Perry Dr/Rafferty St roost site generally less time was spent for the morning counts (Table I) due to difficulties with timing, the lower numbers of birds involved and the more complex behaviour. Observations made in the mornings at the Goodenia St site (see Table 3) were mainly incidental, usually made over short periods, except for the full count on 2 Dec which was similar to those made in Angophora St in spring/early summer (see Part I). This also applies to all the counts made in Table 2 and for the late evening roost counts in Table 4, the remainder in the latter table being incidental observations made over a shorter period earlier in the afternoon.

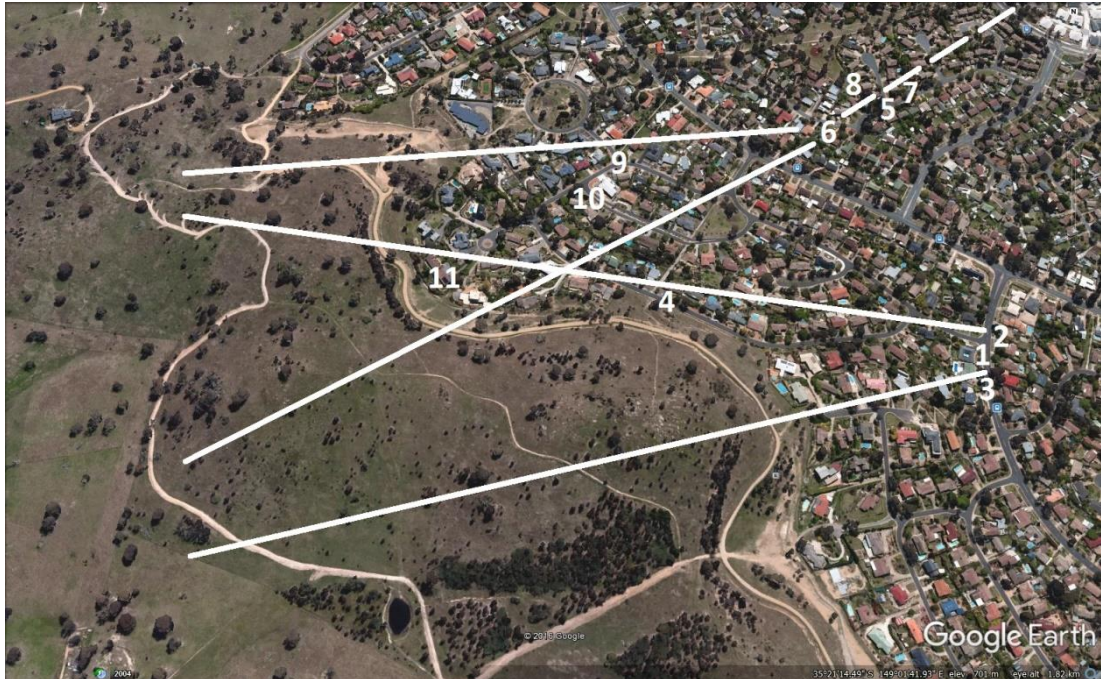
3. Observations

3.1. Roost and staging site, corner of Perry Drive/Rafferty Street, Chapman

3.1.1. Autumn/winter 2016 observations

On 8 Apr 2016 while walking past the corner of Perry Drive and Rafferty St, Chapman, I flushed several Red-rumped Parrots from three dense exotic bushes (4 m round manicured balls of foliage on 2 m by 20-25 cm straight bare trunks commonly known as mop top Robinias) on the Perry Dr verge of the house at 1 Rafferty St. The parrots flew up to a 15 m high (and 10 m wide) open conifer at the front of 126 Perry Dr on the opposite side of the street, where at least another 15 birds had gathered.

The subsequent observations made at this site and the surrounding area are summarised in Table 1. Initially it was the main roost site found (see below), with a few birds (maximum of 12) observed roosting in, or emerging from, the dense bushes and trees on either side of Perry Dr at the corner with Rafferty St (called the Perry/Rafferty roost from now on). By mid May the Robinias had lost their leaves and birds switched mainly but not exclusively to conifers. It was the furthest site (600 m) from our house, and it proved difficult to get the timing for observations right. Timing may have been a factor for my conclusion that the Perry/Rafferty roost was no longer used towards the end of August 2016. However, later evidence from November 2016 (see Section 2.1.2 below) possibly suggests continuing use. As described in Part III, the highest numbers counted roosting at this site were in May 2017.



Map 1: Red-rumped Parrot roost sites and flyways. Key for Sites mentioned in the text: 1 – Mop top bushes Perry Dr side of 1 Rafferty St; 2 - Staging conifer at 126 Perry Dr; 3 - Conifers front of 127 Perry Dr; 4 – 31 Monkman St; 5 - Roosting area 8-16 Goodenia St, with Sollya Pl mid opposite; 6 - Laneway between Burgan Pl and Darwinia Tce; 7 – Staging/roost tree and Photinias; 8 – Sharp end of Rivett park; 9 – Roost site corner Monkman St and Chauvel Circle; 10 – Staging river oak at 21 Ordell St; 11 - 44 Monkman St

Compared with the roost flyway centred on Angophora St, Rivett described in Part I, the pattern of arrival seemed to be more complex and harder to predict. Birds approached the main staging conifer (called the 126 staging conifer from here) from a number of different directions. However, at the time it did not seem to have been part of a major roost/flyway, with a maximum of only 30 birds observed in the 126 staging conifer on two occasions.

From May to August 2016 the general direction of leaving was to the W/WSW towards Cooleman Trig, in an arc between Monkman St and the N end of Titheridge Pl. Conifers along Rafferty St to the corner with Monkman St (and on one occasion further along to Sorlie Place) also seemed to be used to stage to a minor extent (see Map 1, note this takes into account important observations made from March to May 2017 – see Part III). As for the major Angophora St flyway, the final destination remains unknown, with very few if any birds recorded, at least to mid November, in monthly surveys on the SW side of the NW part of Cooleman Ridge, where they seemed to be heading.

As the extent of the roosting/staging became clearer more time was spent observing the behaviour, which could be quite complex and unpredictable. For example, on 13 Jun 3 birds left the 126 staging conifer at 07:05 h, but 4 soon returned. No birds were in the driveway conifer on the Perry Dr side of 2 Rafferty St, nor in the larger conifer on the verge of 128 Perry Dr. However, a couple of birds were coming from the very

dense conifers at the front of 127 Perry Dr. As usual due to the foliage it was hard to determine the number of birds in the 126 staging conifer, but around 30 (in groups of up to 12) flew out from 07:10-07:13 h along Monkman St, plus a few from a conifer between 1 and 3 Rafferty St, and from a larger one at the corner of 5 Rafferty and Monkman Sts. Previous indications (as well as later on 27 and 30 May 2017), were that these trees may be used for roosting or initial staging.

Observations on subsequent visits 5-9 days apart to the end of July are summarised in Table 1. The numbers of birds observed seemed lower from the start of July, this may have been an artefact of the timing, but the peak number of 20 seen on 15 Jul was at a similar time. The clear and very frosty conditions may have delayed them, though my other observations point to cloud cover being a bigger delaying factor. In addition, getting there earlier on the warmer morning of 31 Jul did not find any activity until 07:08 h.

Also with similar timing on the warmish morning of 6 Aug, nothing was heard on approach around 07:03 h, or when under the 126 staging conifer until 1 flew up Perry Dr at 07:09 h to gums at the front of 122 Perry Dr, but flew back (possibly with some others) at 07:10 h. At least 2 birds could be seen near the top of the conifer, then 3 flew out in the usual direction at 07:13 h, with at least 1 still in there and 1 calling from bare poplars across Perry Dr. This bird flew across at 07:16 h, and 2 others flew to conifers at the bottom of Monkman St, but stayed only briefly. Another one was heard in a conifer at 1 Sorlie Place.

Clearly, the numbers were low, in particular compared with the near maximum number of 75 counted at Angophora St at only a slightly earlier time two days before on 4 Aug (see Table 2 of Part I). It seemed no longer to be a roosting/staging spot. This was confirmed by checking on 13 Aug and at later dates to the end of October.

3.1.2. November 2016 – roost active (again?)

However, on 16 Nov at 05:32 h, while inspecting the middle of the three Robinias on Perry Dr (by now with full foliage), I flushed 3 birds from it to the 126 staging conifer. From 05:35 h birds started calling from the other two mop top Robinias and particularly from the dense conifers at the front of 127 Perry Dr. Only small numbers emerged from the Robinias, with only one going to the 126 staging conifer, and most went to the 127 Perry Dr conifers, all had flown out the back of these towards Titheridge Pl at 05:41 h. There were at least 12 birds, possibly up to 15.

Roosting here was confirmed on the early morning of 22 Nov with similar timing (but taking care not to disturb the birds). Again the movement was complex, with different staging trees such as the medium exotic at the front of 124 Perry Dr being used, after small numbers of birds (usually pairs) emerged from the roosts in the mop tops and conifers. No movement was observed down the usual roost flight path, with instead four going at about 90° down Perry Dr in a southerly direction, and two in a SSE direction to the top of Rene St.

Table 1. Summary of autumn and winter observations at the corner of Perry Dr/Rafferty St.

Date	Time (h)	No.*	Comments
8 Apr	06:34	15	Includes several flushed from dense mop top top Robinias – see above text
21 Apr	06:36-06:39	30	About a dozen flushed from the Robinias joined others in the 126 staging conifer.
7 May	06:50	15	Seen leaving 126 staging conifer
25 May	?**	?**	Several birds flushed from opposite side (including conifer at the Perry Dr side of 2 Rafferty St), still went to 126 staging conifer.
6 Jun	?**	?**	Several flushed out of dense bushes/trees both sides of Perry Dr to 126 staging conifer. As for 25 May the birds flew out in a W direction slightly divergent to Rafferty St towards the top of Monkman St/Cooleman Trig.
13 Jun	07:05-07:15	30	More complex, see text below
22 Jun	07:18-07:24	15	At approach about 6 birds in 126 staging conifer, some more flew in including singles from some distance away, nothing could be seen/flushed from close by trees except birds heard cnr Monkman/Rafferty Sts, few had left by 07:24.
28 Jun	07:16-07:20	15	Heard on approach, 10 birds left 126 staging conifer at 07:17, a few more were heard and seen, 5 left at 07:20, with no other birds heard there.
3 Jul	07:13-07:22	5	Heard on approach; 1 out at 07:16, 2 in at 07:18 but soon out again; 1 bird in there from 07:19. Then calls opposite bottom Monkman St at 07:22.
9 Jul	07:13-07:24	11	Heard on approach, 2 separately flushed from 126 Perry Dr bushes but few in 126 staging conifer at 07:15, 6 flew out at 07:16 towards the top Titheridge Pl, 2 left and 1 more in from further away. 2 birds up from Monkman St at 07:24.
15 Jul	07:14-07:16	20	Ten left staging conifer at 07:14-07:15, 1 flushed to there from bushes at 128 Perry Dr, and then 8 left at 07:16, still a couple in there but did not see leave.
26 Jul	07:11-07:20	2	Heard on approach on other side of Perry Dr, then 1 from 128 Perry Dr bushes to 126 staging conifer at 07:14, at least 2 possibly there but no birds came out.
31 Jul	07:03-07:15	7	No birds until 1 flew in at 07:08, several in there, and 1 flew out at 07:11, still some calling in there and 3 came in from NW side of Perry/Rafferty at 07:13. Then 6-7 out over lower Monkman St at 07:15.
6 Aug	07:03-07:20	7	Complex – see text below
13 Aug	06:58-07:08	3	Quiet on approach, but then 3 birds flew along normal route (from staging conifer?) over the bottom of Monkman St at 06:59, no birds in there to 07:08.
21 Aug	06:59	3	Quite dark, high cloud, light drizzle, 3 seen at 43 Monkman at 06:59, but nothing around the 126 Perry Dr area about 200 m away to the E.
29 Aug	06:40	0	Nothing at 126 Perry Dr etc to 06:48

*In the staging conifer at 126 Perry Dr unless otherwise noted.

**Exact details lost through computer failure.

Roosting was confirmed on the only evening count on 29 Nov. This involved about 19 birds. As described in Table 2 there was an even more complex pattern but it was similar to that being observed in Goodenia St around the same time (see Table 4 below). Observations at this roost site involving higher numbers were also made during May 2017 (see Part III).

Table 2. Summary of November observations at the corner of Perry Dr/Rafferty St.

Date	Time	No.	Comments
16 Nov	05:29-05:50	12	Roosting confirmed again – see text above.
22 Nov	05:25-05:50	12	Complex activity from 05:29 to 05:48 – see text above.
29 Nov	19:39-20:05	19	Birds were first heard calling in the 126 staging conifer at 19:42 as 4 came in from the N along Perry Dr, then some more came in including to the smaller exotic tree at 124 Perry Dr or the mid Robinia. Several then flew out along Rafferty St, but most went to the far conifer at 127 Perry Dr. Activity seemed to be over at 19:49, but then birds were heard again in the 126 staging conifer and several more came in over the next few minutes. None appeared to come from the assumed roost flyway, all seemingly from the opposite direction and some back from the 127 Perry Dr conifers. Then slowly birds went in pairs to the mid or lower mop top Robinias (about 2:1 ratio) by 20:03.

3.2. *Goodenia St including corner with Burgan Pl and lane to Darwinia Tce*

3.2.1. Morning counts late June to early December 2016

The other main spot to those described above and in Part I where I saw Red-rumped Parrots in 2016 was in Goodenia St Rivett, in particular at the corner with Burgan Pl and the lane from there leading to Darwinia Tce (called the Burgan/Tce lane from here). This site is about midway between the above site and the roost flyway described in Part I. The observations of the higher number of birds are summarised in Table 3.

To early September numbers were relatively low (maximum of 8), but sightings were consistent, with 1-2 birds also seen on five occasions between 3 Jul and 3 Sep. Failure to find birds at the site (on four occasions from 23 Aug to 9 Sep) was possibly due to timing or weather conditions. It is also possible they did not feed/rest before flying to Cooleman Ridge on some days. The one roosting observation on 19 Aug could not be further confirmed by mid September as my timing was such that birds were already in the Burgan/Tce lane on arrival. To early September I obtained no evidence for a potential roost flyway all the way up Goodenia St similar to Angophora St described in Part I (note also 10 Mar 2014 observation in Table 6 and the associated text of Part I), though they always left in a SW direction over Darwinia Tce, and up the start of Rafferty St towards Cooleman Ridge (see Map 1).

On return from holidays in mid October the pattern was much the same (see summary of higher numbers in Table 3). There were 7 occasions when no birds could be found (from 18 Oct to 23 Nov), and also 2 observations of 1 and 2 birds on 6 and 28 Nov, respectively. Again this may have been related to timing, though they were similar times to those in Table 3 (note seven of these low counts were made in November). The observations over 3 Monkman St on 25 Oct and of birds heard further up this street at No 17 on 6 Nov were in a direct line from the observations made in mid Ordell St on 2 Jul (see Table 3), adding further evidence for them flying to Cooleman Ridge (see Map 1).

Some evidence for a flyway along Goodenia St came from the morning observation on 16 Nov. However, this was the only such observation made in 2016, with also only limited evidence for an extension in this direction in 2017 (see Part III). The 6 birds observed on 2 Dec were from the only early morning count of the roost

described in Section 3.2.2. Morning visits to this site were less frequent up to 20 Dec, but no birds were seen.

Table 3. Summary of observations from Goodenia St including corner with Burgan Pl and lane to Darwinia Tce, morning counts late June to early December 2016.

Date	Time (h)	No.	Comments
25 Jun	07:15	2	In large bare tree mid Burgan/Tce lane, flew out over start Rafferty St at 07:16
2 Jul	07:23-07:24	7	4 birds flew up from Darwinia Tce across mid Ordell St, then a further 3 to a bare tree there for about 1 minute, then flew up towards Cooleman Ridge*.
30 Jul	07:06	7	Thick and close fog, heard from Tce side of Burgan/Tce lane, then birds left bare trees and flew up start of Rafferty St.
19 Aug	06:50	2	Light frost, flushed from Photinia bush at the Goodenia St end of the lane between Sollya and Geebung Places, flew up Goodenia St.
20 Aug	06:50	4	Heard in bare trees Burgan/Tce lane, then flew low up over Tce and start Rafferty St
24 Aug	06:57	8	Birds flushed from bare apple trees bottom of Burgan/Tce lane, went up lane.
2 Sep	06:32-06:46	7	1 bird from apple trees, then 6 on ground at Burgan Pl end of lane, flew into bare tree and then back into apples. Nothing in Photinia or lane on return.
4 Sep	06:34	5	3 on ground and 2 in bare apples at Burgan Pl end of Burgan/Tce lane
13 Oct	06:37	6	Flew low up from sharp end Rivett park/Goodenia St through Burgan/Tce lane
16 Oct	06:50	8	6 flew low up Burgan/Tce lane, 2 more heard at 06:52.
17 Oct	06:34-06:37	7	At least 6 birds in still bare large trees mid Burgan/Tce lane, most dropped into adjacent garden, then heard in Goodenia St, at the corner of Sollya Pl.
25 Oct	06:35-06:58	8	6 birds on grass mid Burgan/Tce lane, flew up into still bare large tree and then up towards the start of Rafferty St, 2 birds a bit further down flew to the tree, then 2 (same?) flew over 3 Monkman St towards Cooleman Ridge at end.
31 Oct	06:27	6	Flushed birds from ground just before big tree in Burgan/Tce lane, wheeled around and flew low towards Tce, no birds there at 06:52.
3 Nov	06:34	6	Flushed from ground etc in Burgan/Tce lane, flew towards Tce
5 Nov	06:37-06:51	4	At far (Burgan) end of lane, 2 on ground, then flew to large tree, 2 in apple tree flew higher towards Tce. None at 06:51.
16 Nov	06:32-06:39	2	2 birds flew SW up bottom (NE) end of Goodenia St briefly to small gum edge of Nos 26-28, flew in meandering fashion to mid St, then seen/heard at 06:39 in Casuarina at No 8. No birds in Tce/Burgan lane at 05:56, 06:23, 06:41.
2 Dec	05:26-05:49	6	First bird from opposite side to 2 Sollya Pl conifer at 05:35, then heard in adjacent Photinia and 1 went to staging tree at 05:37, possibly 1 from the lane one later. 1 flew to above conifer at 05:42, 2 seen near top staging tree, 2 left conifer at 05:43, and then 2 flew straight out of Photinia. .

*Assumed to come from Burgan/Tce lane as pretty much a direct line

3.2.2. Evening counts early November to early December 2016

The first early evening observations were not made here until 8 (when I first found them flying down Goodenia St) and 15 Nov. The accidental discovery on 17 Nov of around 20 birds gathering and then appearing to go to roost in the 100 m or so of Goodenia St NE from the corner with Burgan Pl, at the much later time from 19:38

to 19:51 h, gave the first real evidence that they were roosting in the denser deciduous trees/bushes there. On three further occasions birds were also seen in the area about 2 hours before the late evening roost observations (19, 21 and 28 Nov), hence the double entries for these days in Table 4. These and other records in Table 4 are the main examples of birds returning early (see also Tables 5 and 7 of Part I), though they could not be found there at a similar time from 30 Nov, possibly because the evenings had become longer.

Again the pattern of entering the roost seemed to be complex, with at first the medium size deciduous tree (an ash about 10 m high and about 5 m wide) adjacent to 2 Sollya Pl (opposite 14 Goodenia St) thought to be the roost tree, then other nearby trees as well. However, later evidence suggests the ash was also used as a staging tree, with initially at least some birds using the Photinia (5 m high and wide) in the lane between Sollya and Geebung Place (about 15 m away). This was the same bush as for the single morning roost observation (see 19 Aug entry in Table 3). Later a 6 by 4 m Photinia adjacent to the staging tree (separated only by a slightly smaller bottlebrush) was favoured. Numbers were variable and seemed to drop to only 4 birds on 7 Dec (in line with the 6 counted in the morning on 2 Dec - see Table 3), but the observation on 17 Dec confirmed continued use, and also that the main staging tree was still used to roost.

3.3. *Other sightings in the Chapman/Rivett area*

My Garden Bird Survey (GBS) site is only 250 m away from the middle of the Burgan/Tce lane (and 200 m from the 2 July sightings in Ordell St - see Table 3), and 350 m away at the closest point from the Wool/Tce lane and Kathner grove flyway (see Part I). However, during 2016 there were very few Red-rumped Parrots recorded in the GBS site, with only 1-2 birds in 13 of the 26 GBS weeks to 2 July. This continued in 2016-2017, with only 1-2 birds being recorded in 7 of the first 20 weeks, except for the 6 recorded flying over on 2 Nov. In general, birds were rarely observed outside of these flyways, with the few records mostly being from the N side of the corner of Angophora St and the Chapman side of Darwinia Tce.

This seemed to change from mid November with birds recorded in my GBS site every week to March 2017 when the modified flyway along the SE corner of my GBS site was first discovered – see Part III). More birds were also seen in my monthly surveys on both NW Cooleman Ridge and Narrabundah Hill, but particularly at other spots such as in Kathner St and the dam at the end of it, where in 4 observations up to 5 birds were seen from 22 Nov to 8 Dec. As noted in Table 7 in Part I this was an area where up to 60 birds have been present previously, particularly in Jan-Feb of 2005 and 2006. However, the maximum number of at least 10 feeding or flying around was a bit further up the slope at the NW end of Cooleman Ridge on 18 Dec.

Note that these sightings were made when numbers using the Angophora St flyway were still close to 50 (see Table 6 of Part II). The reason for this change in behaviour is not clear but may possibly be related to the seeding grasses providing a closer food source. It should be noted that 2016 was not a typical year: a number of times during 2004-2005 to the end of 2015 Red-rumped Parrots were the most conspicuous birds in my GBS site, especially in March 2009 towards the end of the long drought (Holland, in prep)

Table 4. Summary of observations from Goodenia St including corner with Burgan Pl and lane to Darwinia Tce, evening counts from early November to early December.

Date	Time (h)	No.*	Comments
8 Nov	17:12	4	Heard, then seen flying high NE down Goodenia St
15 Nov	17:15	2	At least 2 calling in gums front of 10 Goodenia St, did not seem to move.
17 Nov	19:38-19:51	21	Heard at start Burgan Pl, 3 flew from deciduous tree at No 1 to smaller one at No 4, then 4 flew down from there towards sharp end of Rivett park at 19:40. 2 flew down Goodenia St from ground at Burgan/Tce lane and then 2 flew into large conifer at cnr 2 Sollya Pl. At 19:47 3 flew into adjacent staging/roost tree (opp 14 Goodenia) and another 2 soon after. At 19:49 2 flew into the 2 Sollya Pl conifer, then 5 flushed from sharp end Rivett park to there. Possibly some double counting, but solid roosting evidence, as later confirmed.
19 Nov	17:19	8	6 at sharp end Rivett park at 17:19, then 2 in Burgan/Tce lane 17:23.
19 Nov	19:30-20:00	11	3 birds in bare apple end Burgan/Tce lane flew to gum at 6 Burgan Pl, then 1 from same spot flew to gum 12 Burgan Pl at 19:34, joined by another 3. Then 1 flew down Goodenia St to staging/roost tree opposite No 14 at 19:42, and 3 flew in at 19:44. 1 came in from Casuarina St direction at 19:47, then 6 down Goodenia St at 19:49. There was quite a bit of interchange between the deciduous tree at the front of 16 Goodenia St, but no other birds seen/heard.
20 Nov	17:33	2	Birds at sharp end Rivett park at 5:33, did not check later (storms)
21 Nov	17:42-17:47	6	3 up path over N end of Rivett park at 17:42, plus 1 heard further down, then at least 2 at front 6 Burgan Pl at 17:44 and 2 to 8 Goodenia St Casuarina.
21 Nov	19:31-19:58	6	No birds until 1 up Goodenia St to smallish exotic front of 6 Burgan Pl, then 2 straight down lane to staging/roost tree at 19:41, 2 more at 19:43, and at 19:47 one to Casuarina, then flew down to the tree. Then 2 up from staging/roost tree to gum at sharp end Rivett park, 1 flew down to former and other 2 circled, then left towards Casuarina St. On approach to the staging/roost tree 1 flew down into the Photinia about 15 m away at 19:53, and 3 more to there at 19:55. 4 seen in there were flushed out, including into staging/roost tree.
25 Nov	17:27	2	2 down Goodenia St stopped short in tree 1 Sollya Pl, and then moved around.
28 Nov	17:30	2	2 sharp end Rivett park at 5:30, seemed to want to stay put.
28 Nov	19:46-20:05	18	Heard in 8 Goodenia St Casuarina on approach, a few already in staging/roost tree, plus in neighbouring ones. By 19:50, 7 in staging/roost tree, then at least 11 came in (max 3 together) to 20:00, after which at least a dozen birds started dropping into adjacent Photinia. 2 flew out to the 2 Sollya Pl conifer, another 2 to dense foliage at 12 Goodenia and 2 to the Sollya/Geebung lane Photinia.
30 Nov	17:30	0	No birds at sharp end Rivett park etc
1 Dec	17:30	0	No birds Rivett park sharp end (or on 4 Dec at 17:18, or 12, 13 Dec at 17:40).
7 Dec	19:40-20:05	4	2 down into staging/roost tree at 19:43, another 2 at 19:45 after 1 had dropped into Photinia, then 2 dropped in there at 19:47. Quite a bit of interchange of a small number of birds between the Photinia and staging/roost tree until 20:01.
17 Dec	19:50-20:15	10	On approach several flew down from Casuarina at No 8. 3 birds were noisily flying around at 19:52, then flew in staging/roost tree at 19:56. Noisy at first, then quieter after 20:00, but 1 flew in from side at 20:03, 3 at 20:07, 2 to No 16 denser tree at 20:09 (plus a couple across) and 1 in low at 20:11 (all down Goodenia St). 2 seen perched quite in the open, none went to the Photinias.

3.4. Roost site in Tullaroop Street Duffy

3.4.1. Observations

After mentioning in my May 2016 *Gang-gang* column that I had been observing Red-rumped Parrots roost flights and had found a roost site, Jean Casburn contacted me to say that she had a roost site in her GBS site centred on her house at 18 Tullaroop St Duffy. This was important information as it was close to the area around Hindmarsh Drive where I used to see the morning (and occasional afternoon) flights from the start of 2005 to early 2008 (see Part I including Table 6).

Jean kindly checked her notes and found that in 9 GBS weeks from 3 Jun 2015 to 16 Jan 2016 she had counted from 4 to 20 birds in the late afternoon flying about in groups or seen using a Chinese Elm down from the Coliban Place corner. Then in 6 GBS weeks from 5 Mar to 6 Jun she noticed between 9 and 25 birds perching in the deciduous tree across the road in front of her house, before going individually into the conifer next to the perch tree. On 9 and 10 Jun she did not see the birds come to roost, nor did she hear them, but on 11 Jun 14 birds were already moving into the conifer at 17:00 h.

After this Jean paid closer attention and on 12 Jun between 16.30 h and 16.50 h, 48 Red-rumped Parrots appeared gradually in the staging tree in front of her house, with a few of these slipping in to roost in the conifer close by. At 16:49 h, all the birds lifted up simultaneously and circled closely together before splitting into two groups. At this moment an Australian Hobby (*Falco longipennis*) zoomed around in front of the house close to the staging tree and disappeared around the house opposite.

She did not see the Hobby again, and half of the group returned quickly to the tree and into the deciduous tree next door on her side of the street. These birds gradually slipped into the roosting conifer one or two at a time. Shortly afterwards and during this period, stragglers from the group that had split away gradually moved straight into the conifer from elsewhere, but she did not see the full flock return. She could hear some down the street for a short while. One bird decided to use a camellia bush in the garden next door. She confirmed that 17:00 h seemed to be the latest the birds go to roost, as it was now almost dark. She also noted that 3 Common Starlings (*Sturnus vulgaris*) shared the conifer.

On 23 Jun Jean noted that from 16:45 h birds were much more circumspect in their approach to their roost in the conifer. Approximately 10 birds arrived independently in three deciduous staging trees in front of and next to her house. They were hard to spot even with binoculars, because at this time of day just on dark they camouflaged very well against the branches of the trees. Their calls were loud and piercing even from indoors. Silently they flew very rapidly into the roost tree at intermittent times. Then an occasional bird would swiftly fly straight to the roost tree from somewhere up the street.

On 24 Jun (and at 16:30 h on 27 and 28 Jun) no birds were seen, but on 26 Jun 25 birds in the staging tree were frightened off by a Galah (*Eolophus roseicapillus*). At 16:30 h 7 birds returned to the tree then flew into the conifer after a short while. A little later 2 more returned and entered the conifer. On 29 Jun 2 birds slipped into the conifer from behind the house opposite. At 17:00 h 4 birds came into the staging tree then went into the conifer at 17.10 h.

On 6 Jul Jean noted that she had not seen or heard any Red-rumped Parrots in her GBS since, but on 19 Jul she was surprised by a flock of 30 that flew in front of her and into a deciduous tree two houses down on her side of the street. They settled there for perhaps five minutes until a Red Wattlebird (*Anthochaera carunculata*) persistently attacked them and drove them in different directions. They came back in groups a few times but eventually gave up. Five minutes later a group of about 15 landed in the next tree a bit further along the street and after a short while suddenly disappeared. She went outside again after five minutes and heard calling from inside the conifer, but from the sounds it appeared only a few birds were in there.

On 29 Jul Jean reported that there was still a flock of 30 birds around after 17:00, but wheeling around and scattering from one or two of the staging trees. Some went behind the house opposite, probably into dense bushes. She noticed they were still pretty skittish before settling. On 30 Aug she noted that she could still hear them sometimes, but had not seen any.

However, on 3 Dec 2016 at 19.30 h she watched 11 Red-rumped Parrots, with 9 going quickly in ones and twos into the conifer from the staging tree across the street, or directly in, from the southern end of Tullaroop St. Two of the birds flew up from the same direction and then past the conifer. All this happened in the space of 15 or 20 minutes and she suspected that some birds had been using the roost tree all along.

On 30 Apr 2017 Jean watched for the arrival of Red-rumped Parrots into the staging trees in her GBS site from 16:15 h. In small lots 27 birds appeared on the top of 2 deciduous trees. By 17:10 h they were still there until a couple of Sulphur Crested Cockatoos (*Cacatua galerita*) and a few Galahs screamed around their tree. This frightened the birds and they flew off in all directions. She then saw a Collared Sparrowhawk (*Accipiter cirrocephalus*) perched in that same tree awaiting an opportunity to catch one the birds still in hiding. Any remaining birds left and flew long distances away calling in distress. The perching Red-rumped Parrots were not previously worried by the arrival in their tree of 6 Australian King-Parrots (*Alisterus scapularis*) and quite a few Crimson Rosellas (*Platycercus elegans*).

On 15 May Jean noted that the number of Red-rumped Parrots had increased during the past weeks from about 27 to 40. A few of them flew into a mop top Robinia (as for the Perry /Rafferty roost site – see above) and a few into a low Banksia bush close by to the Oak staging tree one house away. The remainder appeared to go back into the same Conifer across the road from her house, as they did in 2016.

3.4.2. Comments

Jean's observations are interesting and valuable. They complement mine, in particular relating to evening (morning observations were not made) roost sites and sizes. The choice of roost sites in conifers or medium size bushes such as camellias are similar to my observations, and deciduous bushes which may have otherwise been used are of course bare in winter. However, the numbers seen, *e. g.* on one occasion 48 birds, are similar to those routinely seen in the morning on the Angophora St roost flyway, and larger than any evening flight or roosts counts I made in 2016 (maximum of 29 birds on the roost flight of 25 Nov, see Table 5 of Part I). However, up to 90 birds were seen doing this in earlier years (see Table 6 of

Part I), and in 2017 up to 75 birds were roosting at the Perry/Rafferty site, with more than 50 also doing so at the corner of Monkman St/Chauvel Circle roost where up to 110 birds using the flyway were counted (see Part III).

The apparent break up around the end of July/early August is similar to my observations at Perry Dr (see Table 1), though in both cases it is possible that roosting continued and timing may have been an issue, given the birds Jean saw going to roost on 3 Dec, and my rediscovery of the Perry Dr site being used in November (see Table 2).

The harassment by an Australian Hobby, Collared Sparrowhawk, Galah and Red Wattlebirds also has some parallels, though I observed this only a few times (see Table 3 and associated text of Part I) in the many observations I made. I never confirmed other birds sharing the roost as Jean did with the Common Starlings on 12 Jun, though use of the same roost site by this and other species with the Magpie-lark was often observed in 2015 (Holland 2015a, b)

3. Discussion

For the Discussion and references see Part III Holland, this issue, p. 183.

Accepted 13 June 2017

Canberra Bird Notes 42(2) (2017): 183-194

OBSERVATIONS ON THE ROOSTING BEHAVIOUR OF THE RED-RUMPED PARROT IN THE CHAPMAN AREA. III. ROOST SITES AND FLIGHTS TO THE END OF MAY 2017

JACK HOLLAND

8 Chauvel Circle Chapman, ACT 2611, Australia
[*jandaholland@bigpond.com*](mailto:jandaholland@bigpond.com)

Abstract: *Observations are detailed on a modified roost flyway and associated new roost site in Chapman for Red-rumped Parrots from January to the end of May 2017. Higher numbers of birds were recorded than found anywhere in 2016. The highest numbers for two of the other sites in Chapman and Rivett reported in Parts I and II are also provided. The three sets of observations are then discussed and compared with the available literature.*

1. Introduction

For the first two months of 2017 I no longer searched deliberately for local Red-rumped Parrots (*Psephotus haematonotus*), but incidental observations suggested the Angophora St flyway (see Part I) and the Goodenia St roost and associated flyway (see Part II) were still active. This paper details increased activity during March to the end of May 2017, and describes a modified flyway for the latter, including a new roost site in Chapman with much higher numbers of birds than previously recorded.

The highest number of birds was also observed at both the Angophora St flyway (see Part I) and Perry/Rafferty roost (see Part II).

2. Methodology

This was similar to that described in Parts I and II. For the modified flyway and roost site at the corner of Monkman St and Chauvel Circle initial ad hoc/incidental observations were made until their significance became clear, followed by (from early April) full evening counts from before the birds came until after they had left/settled to roost. As the main purpose was to confirm they were active at the time counts at the Angophora St flyway and Perry/Rafferty roost site were carried out over shorter periods and thus probably less complete, even though on one occasion at each site higher numbers than in 2016 were counted. This also applies to observations at the corners of Croton St and Woollum Cres as the main purpose was to confirm a roost site there.

3. Observations

3.1. Activity at a new roost site corner of Monkman St and Chauvel Circle, Chapman involving a modified Goodenia St flyway

Small numbers of birds continued to be seen in the Goodenia St roost area, the adjacent Burgan/Tce lane, and in the roost flyway towards Cooleman Ridge. On three occasions birds were also seen or heard around the small park at the corner of Rafferty and Ordell Sts to the S of the flyway shown in Map 1 (see Part II). However, an important observation was also made around 06:35 h on 11 Feb, with first 1 bird seen at the corner of Monkman St and Chauvel Circle, and then 5 birds a bit further up Monkman at the corner with 21 Ordell St. These were just to the N and on the edge, respectively of the assumed roost flyway.

Around 07:00 h on 5 Mar many birds could be seen or heard at 21 Ordell St, and also around the same time on 19 and 21 Mar, with on the former occasion 7 birds also seen flying up Monkman St to there. Around 07:05 h on 24 Mar birds were seen and heard in the larger (>20 m high) of the 2 closely planted Casuarinas there, with few if any in the adjacent large gum. Then up to 50 birds came up Monkman St in groups of <10 birds, including some appearing to come from a small, dense Maple tree (8 m high by 5 m wide towards the base) on the verge of 9 Monkman St.

This posed the question whether it was a new or modified flyway. An important observation on 20 Mar had been “quite a few” birds flying in a WSW direction between Goodenia St and the main Rivett walking path to the N of this around 07:00 h (see point 8 in Map 1 of Part II). Apart from the 16 Nov entry in Table 3 of Part II, this is one of the few observations supporting an extension of this flyway to the ENE, other sightings being 2 birds seen flying up Goodenia St on 29 Jan 2017, as well as heard opposite Geebung Pl on 22 Feb.

Further evidence that it was also a roost site came on the darkish morning of 28 Mar, when no birds were seen or heard in the trees at 21 Ordell St at 07:09 h, but a number of birds were then flushed from the corner of Monkman St and Chauvel Circle, including from the 9 Monkman St Maple. At least 10 birds were in this area at 07:08 h on the foggy morning of 29 Mar and were reluctant to move from their roosts sites. While small numbers continued to be seen around here, at 06:11 h (now standard

time) on 2 Apr over 20 birds were flushed from the 9 Monkman St Maple as part of the over 45 birds going to the Casuarina at 21 Ordell St.

The above observations were all incidental, but on the evening of 5 April I made the first attempt to make a full count of the number of parrots using this area. I stood opposite the 9 Monkman St Maple from where I could easily see birds coming down from the 21 Ordell St trees direction. From 17:29 to 17:52 h up to 110 birds were counted, with about half going straight through or over towards Rivett and the others stopping in the trees around the corner with Chauvel Circle. This remains the highest number I have ever counted at one spot locally, but could be an overestimate as from about 17:50 h there was much redistribution between the trees, the main ones being the group of seven small to medium ash trees on the eastern side of the corner on the verge of 12 Monkman St, the exotics and gum at No 7, and the 9 Monkman St Maple. It is assumed most of these birds (around 50) roosted here.

A summary of the observations made at this site is given in Table 1. Incidental observations of small numbers of birds continued to be made before (and after) 13 Apr when the next full evening count was carried out, this time resulting in only 48 birds. The next count was on 19 Apr with 103 birds. At least 4 birds were flushed after from two mop top Robinias (*i.e.* those favoured at the Perry/Rafferty roost) at 4 Chauvel Circle, possibly from where some of the birds were flushed on 28 Mar (see above).

The afternoon of 27 Apr was cloudy with a cold SE breeze blowing, and activity was slow from 16:48 h with most of the 47 birds coming down between 17:05 and 17:17 h. As noted in Table 1 some of the roosting birds may also have come behind me from the Chauvel Circle direction. The afternoon of 6 May was also cloudy with a moderate SW breeze. Just a few birds were seen and heard (but including some in reverse direction back to the 21 Ordell St Casuarina) from 16:38 h, with the main activity from 17:05 to 17:13 h (see Table 1).

The afternoon of 13 May was quite warm but cloudy, and numbers were well down (Table 1) with around half coming behind me over 44 Chauvel Circle and with some birds stopping only briefly in the 12 Monkman St ash trees. There were even fewer birds seen on the clear and warm afternoon of 20 May, with none now stopping at the roost site, though use of the fly path slightly to the N was confirmed.

Very few birds were subsequently seen around and over this roost site when walking past at times when they could be expected to be there. From 14 May I also looked for birds around the known Goodenia St roost site (see Part II), but there were only small numbers (maximum of six on 29 May) observed, and with only 1 roosting bird flushed from the Photinia next to the Goodenia St staging tree at 07:05 h on 25 May.

There were no observations made from this site up to the end of March 2017, except for the morning of 12 Mar when 3 parrots were reluctantly flushed by shaking the mop top Robinias at 07:01 h, they did not go to the staging conifer but were later heard from there. At 06:27 h on 2 Apr several birds were seen at the top of Titheridge Pl (in the roost flyway, see Map 1 in Part II), and then heard around the roost site around 06:35 h. At 06:50 h on 23 Apr birds were heard at 31 Monkman St, and 10 flew W, with 1-2 still calling in the lane next to 44 Monkman St, 300 m

further W, at 06:57 h. On the cold and clear morning of 28 April 5 birds flew to a dead tree around 120 m W of 44 Monkman St at 06:45 h, and at least 6 were seen leaving from the tree to the W at 06:47 h.

Table 1. Summary of the main observations at the corner of Monkman St/Chauvel Circle from March to end of May 2017.

Date	Time (h)	No.	Comments
24 Mar	07:05	50	Birds were coming up Monkman St, an underestimate as more at 21 Ordell St.
2 Apr	06:11	45	Birds going up Monkman St, including from Maple at No 9, to 21 Ordell St.
5 Apr	17:28-17:52	110	First attempt at full count – see text above. Around half may have roosted at the corner of Monkman St and Chauvel Circle.
13 Apr	17:15-17:40	48	Coming down from 21 Ordell St, with over half going to the 9 Monkman St maple (with much squabbling as the late arrivals joined in) and nearby trees..
19 Apr	17:05-17:35	103	Again around half (mainly the later arriving birds) went to roost at 9 Monkman St Maple.
27 Apr	16:48-17:22	47	Only 2 seen going to the 9 Monkman St Maple, though at the end there were at least 10 in there. They, and the at least 4 in 12 Monkman St ash trees, which went into the 4 Chauvel Circle mop tops Robinias at the end, may have come in from 7 Monkman, or from behind me down Chauvel Circle as on 13 & 20 May.
6 May	16:38-17:16	38	Most over to Rivett, some to 7 Monkman St trees but only about 10 to 9 Monkman St Maple, a couple went to the 12 Monkman St ash trees (not yet totally bare), and at least 1 flushed from Robinias (also still reasonably dense)
12 May	07:04	30	Flew from 21 Ordell St trees up to Cooleman Ridge slightly across Monkman St.
13 May	16:36-17:01	20	At least half of the birds came in behind me over 44 Chauvel Circle around 16:55, 6 going to 12 Monkman St ash. Nothing in 9 Monkman St maple (now very red-coloured but still fairly dense), or in the mop top Robinias.
20 May	16:30-17:03	9	5 birds high over between 42 & 44 Chauvel Circle over towards Rivett at 16:32, then only 4 high over from 21 Ordell St, 2 at 16:49 and 16:53, resp. None to ash trees (now bare except for tassels), or maple (now half bare and see through).

3.2. Activity associated with the roost site and flyway at the corner of Perry Drive/Rafferty St Chapman - intersection of the two flyways

At 06:55 h on the clear and still, light frosty, morning of 11 May over 55 birds were seen flying high in a loose group over the top steps of the path going to Cooleman Trig 50 m S of 31 Monkman St. They were going W roughly along the main track (see flyway in Map 1 of Part II). Birds were then heard in the tree in the 44 Monkman St lane and 1 flew out at 07:03 h. This was further evidence that the two flyways from Goodenia St and Perry Dr intersected and possibly merged as suggested by the 23 Apr observation above. Importantly it also suggested that the Perry Drive roost was active again. This was confirmed the next day (12 May, see Table 2), with 75 birds counted, well exceeding the previous maximum of 30 associated with this site in 2016.

The much lower number of around 20 birds flushed there on 18 May (see Table 2) is likely to be an underestimate as other roosting sites discovered on 27 and 30 May

(for details see Table 2) were not checked. While the latter in particular was an incomplete count, both confirmed that once the Robinias started to lose their leaves, birds used a wider area for roosting, as suggested in 2016 (see Part II).

Table 2. Summary of 2017 observations associated with the roost site at the corner of Perry Dr/Rafferty St.

Date	Time (h)	No.*	Comments
11 May	06:55	55	Flying high in flyway in a westerly direction (see details in text above).
12 May	06:43-06:52	75	Birds were flushed, most from the mop top Robinias (still pretty dense) and almost all went into the 126 Perry Dr staging conifer to 06:45. Over 50 seen going high over houses between Monkman St and top of Titheridge Pl at 06:47, still some calling in tree in latter at 06:52.
18 May	06:47-06:53	20	Again flushed from Robinias (with sparser foliage), again went to 126 staging conifer but did not see leave.
27 May	06:51-06:58	25	Around 10 flushed from bushes (mainly privet) at the boundary between 3 & 5 Rafferty St to the large conifer between Nos 1 and 3. They were reluctant to move from there, but after checking Robinias, adjacent conifers and 126 staging conifer (all quiet), 2 did go to latter. Then quite a few heard in both conifers on verge of 128 Perry and Perry side of 2 Rafferty at 06:58, again very reluctant to move out.
30 May	07:01-07:04	15	Heard several birds in conifers cnr Monkman/5 Rafferty Sts at 07:01, and others coming out from between Rafferty/Darwinia Tce, heading towards mid Sorlie Pl. Note: an incomplete count.

Where they go is unclear, with none observed in surveys of NW Cooleman Ridge on 11 and 13 May, and very few in earlier surveys there in 2017. This is consistent with 2016 data, in particular the high number of birds associated with the Angophora St flyway (see Part I)

3.3. Activity associated with the flyway centred on Angophora St Rivett

3.3.1 Counts associated with the 28 Angophora staging tree

For the first two months of 2017 incidental observations, mostly involving small numbers of birds (≤ 10), suggested that the Angophora St flyway continued to be active. This was supported by higher numbers on three occasions, with over 30 and 40 birds observed around the 28 Ang tree (see Table 3). On the cloudy, windy morning of 9 Feb 14 birds were also seen at the lower end of Pavonia St flying towards this tree at 06:45 h.

After the new flyway/roost site described in Section 3.1 was first detected, the number of birds involved on 24 March (see Table 1) raised the question whether it was the Angophora St flyway going in a different direction. This was supported by the absence of birds there between 06:50 – 07:10 h on 22, 23 and 25 Mar. Five birds were seen enter and leave the 28 Ang tree at 07:08 h on 27 Mar, and subsequent incidental observations supported that at least small numbers were still using this flyway. However, it was the observation of over 25 birds seen over the Wool/Tce lane at 06:45 h on 24 April that led me to check more thoroughly.

At 06:41 h on the morning of 26 Apr about 15 birds came up Angophora St, most from 28 Angophora staging tree. Only a few more came in, but at least 65 left in groups of up to 8 to 06:50 h, most straight to the Wool/Tce lane direction, but around 6 towards the end went to the lawn on the 24 Angophora St verge. This was not a complete count as there were some birds still in 28 Ang staging tree, giving a total of at least 85 birds, a higher count than any in 2016. The morning of 3 May was clear but with a cold SE blowing, which may have been responsible for the much lower count at much the same time as on 26 April (see Table 3). Notably most of the birds seemed to be coming from the corner of Croton St/Woollum Cres direction (see 8 in Map 1 of Part I and Section 3.3.2 below).

The morning of 7 May was clear and still after strong early morning winds, and 68 birds could be counted, with the birds coming up from the more normal direction (see Map 1 in Part I). The morning of 13 May cleared after early cloud, and most of the birds again came from diagonally across the street from the corner of Croton St/Woollum Cres direction.

This confirmed that this flyway was fully active when a significant number of birds roosted and used the modified Goodenia St and Perry/Rafferty flyways not more than 750 m away.

Table 3. Summary of 2017 observations at 28 Angophora staging tree.

Date	Time (h)	No.	Comments
26 Jan	06:37	30	Birds on grass verge of 24-26 Angophora St, then flushed to the 28 Ang tree.
23 Feb	06:46	40	Erupted from the 28 Ang tree.
26 Apr	06:41-06:50	85	Flew into or from 28 Ang tree, still a few left in there at end – see text above.
3 May	06:37-06:50	31	About 5 birds were already heard at the top Angophora St/Woollum Cres, and then several groups of up to 10 coming across the street to 28 Ang tree. None left in there at 06:46 but several singles etc high over up Angophora St.
7 May	06:42-06:55	68	Birds came up flyway described in Map 1 of Part I, many went from the 28 Ang tree to the verge at 24 Angophora St (not there on return at 07:01 h)
13 May	06:53-07:08	50	36 were counted to 07:00, most in from diagonally across the street. On return 44 were counted leaving up Angophora St from 07:05, perhaps a few left in. As at least 6 had left earlier, over 50 birds, probably many more.

3.3.2. Confirmation of a roost site between the corners of Croton St and Woollum Cres

The 3 and 13 May observations (see Table 3 and associated text above) suggested that some of the parrots were going to the 28 Ang staging tree from the Croton St direction where a roost site had been suspected but never confirmed in 2016 (see Part I). At 06:52 h on the darkish morning of 15 May they were heard at the corner opposite 38 Woollum Cres, but the birds seemed to be a bit further in than the previously suspected roost site. Some were flushed from around the front of 2 Croton St, from where they moved to the large (12 x 6 m) Casuarina at the corner, as well as the similar sized gum on the opposite side. While many were reluctant to come out,

at least 20 were estimated to be in these trees until 06:55 h, after which they flew out towards the 28 Angophora St staging tree.

However, at around 06:52 h on the clearer morning of 17 May, only 2 flew to the gum opposite, though some could be heard at the rear of 4 Croton St. The morning of 19 May was very grey with rain forecast, and nothing was seen or heard around 2 Croton St from 06:54-06:58 h, but from 7:04-7:05 h three groups totalling around 35 birds seemed to come from behind the house and flew high over towards the 28 Ang staging tree.

This was surprising as there appeared to be very little cover there, and approaching from the opposite direction than usual, at 07:01 h on the morning of 24 May birds could be heard in the bushes behind 58 Croton St (which backs onto No 4 as the street does a near complete loop). Several flew from there, and then birds were heard in the trees along Woollum Cres, with over 30 moving into the large bare tree on the verge of 32 Woollum Cres by 07:05 h. Due to the foggy conditions the birds were reluctant to move from there, and at 07:09 h there were just a few in the 28 Angophora staging tree and the gums at No 20, though many more could be heard flying up between Angophora St and Woollum Cres towards Kathner grove.

At 06:55 h on 31 May only a few birds could be heard in the bushes at the front of 2/4 Croton St, then around 07:00 h close to 40 birds came over, nearly all seemingly from behind 4 Croton St, and then flew up Woollum Crescent. At 06:59 h on 1 Jun birds (impossible to count as the view is obscured) could be seen and heard leaving the dense bushes at the rear of 58 Croton St/edge with No 56. Importantly none were seen come over from deeper in Rivett.

These observations spread over May 2017 finally confirmed that this site is used to roost and to initially stage, at least at certain times of the year, rather than being a stopping point of a roost flyway. However, on some occasions birds flew along Woollum Cres from there directly towards Kathner grove rather than across to the 28 Angophora St staging tree.

4. Discussion

4.1. Summary and discussion of the three Parts

The three Parts of the paper provide information on five separate roosting sites and associated roost flyways. The centres for three of them, the flyway in Angophora St and roosts in Goodenia St Rivett and Perry Dr/Rafferty St Chapman, are within about 700 m in a roughly straight NNW/SSE line. A fourth, in Tullaroop St Duffy, is about 500 m N at its closest point from the Angophora St flyway. A further roost site on the corner of Monkman St and Chauvel Circle Chapman was active from mid March to mid May 2017. The evidence suggests that the flyway associated with this roost was most likely a variant of the flyway based on Goodenia St roost (only 400 m away), and also that it intersected and probably merged with the one from the Perry/Rafferty roost. A suspected 2016 roost site used at certain times of the year at the corners of Croton St/Woollum Cres Rivett associated with the Angophora St flyway was also confirmed in 2017.

Based on many records from early 2005, historically there has also been a major flyway along Hindmarsh Dr, but with possible exception of Feb 2009 there have been no records since Jan 2008. The lack of any recent sightings there, including checks on 19 Dec 2016 and 2 Jun 2017, suggests birds now only use the more southern flyway along Angophora St.

The Angophora St route was the major flyway, regularly involving up to 80 birds early in the mornings before or around sunrise. It has been traced for at least 1 km from Rivett Oval, over the retirement home opposite the Rivett shops, along Angophora St until it bends significantly to the SW, then over the houses, close to or over the laneway between Woollum Cres and Darwinia Tce, up Kathner St Chapman and along the grove of gum trees extending in a straight line about 100 m into the Chapman horse paddocks (see Map 1 of Part I). Where the parrots go beyond this is unclear. Few birds were ever recorded in monthly surveys along the southern boundary of Narrabundah Hill, in the general direction in which they headed.

This flyway was shown to operate for all of 2016 and also in the first half of 2017; with upwards of 50 birds regularly using it. It involved at least one major staging post, a spreading ash tree of medium size in the front garden of 28 Angophora St about halfway along the route described above. This tree was particularly used in winter when it was still not totally bare due to the catkin-like flowers present. It is not clear why it was favoured, a deciduous tree of similar size on the opposite side of the street at No 31 as well as three much larger eucalypts at No 29 and one at No 27 were only used once in the evening (see 26 Nov entry in Table 5 as well as Fig. 1 of Part I). Other staging trees were the bare ones at 67 Woollum Cres (again in winter) and after 16 Oct trees on the W side of 28 Angophora St including the large gums on the verge of Nos 18-20 (see Table 4 of Part I). Also used were those at 25 or 27 Darwinia Tce on the S side of the Wool/Tce lane, and historically in the evenings those of the Kathner grove.

In contrast to the others below, in 2016 there was limited roosting recorded along this flyway, with one confirmed sighting of 3 birds (see 22 Jul entry in Table 2 of Part I) as well as suspected roosting on 3 occasions in 2016 at the more westerly corner of Croton St and Woollum Cres. However, further evidence obtained in May 2017 confirmed that this site was being used to roost and to initially stage, at least at certain times of the year, rather than being a stopping point on a roost flyway. Also birds sometimes flew directly from here towards Kathner grove rather than to the 28 Angophora St staging tree.

The main 2016 roost site was on either side of Perry Dr at the corner with Rafferty St Chapman. This involved up to 30 birds. Some birds roosted in the dense mop top Robinias and in other dense bushes and conifers on Perry Dr, in particular when the former lost their leaves. A relatively open large conifer in the front garden of 126 Perry Dr was used as the main staging tree, though not exclusively. Birds also arrived from a number of directions further away. However, they mostly exited in W/WSW direction towards the top of Monkman St/Cooleman Trig/Titheridge Pl. In 2016 this was only followed for a distance of less than 150 m, but was significantly extended in 2017 (see Map 1 and discussion in Section 3.1.1 in Part II, and discussion in Section 3.2 above). It was thought this roost and staging site broke up in August 2016. However, checking in mid November revealed around a dozen birds

were again using the Robinias and conifers for roosting and staging. Use was also shown from March to the end of May 2017, with a maximum of 75 birds roosting there in mid May, much higher than any of the numbers recorded in 2016.

Another roost site discovered quite late in 2016 was in Goodenia St Rivett, roughly midway between the two above. Initially from mid August up to 8 birds were found in the bare trees or on the ground in the nearby laneway between Burgan Pl and Darwinia Tce, in the morning about the same time as those seen in the Angophora St flyway. From early November some late afternoon records revealed a roost site for up to 20 birds on either side of the street between 10-16 Goodenia St. Birds used trees for staging and roosting, also dropping down into largish Photinias, either in the laneway between Sollya and Geebung Places, or later adjacent to the staging tree.

This site was had much foliage compared with the more open Perry Dr site (see Figs. 1 and 2, respectively). The main flyway determined in 2016 was for about 300 m to the SW following the Burgan/Tce lane, over Darwinia Tce, and then over towards the saddle of Coleman Ridge via the start of Monkman St, mid Ordell St and SW corner Monkman St.

From mid March to mid May 2017, a further roosting site at the corner of Monkman St and Chauvel Circle Chapman, and associated staging tree, a Casuarina at 21 Ordell St (on the corner with Monkman St), was active along the N edge of the then presumed Goodenia St flyway. This involved up to 110 birds, the largest number ever counted on a local flyway, with on at least 2 occasions over 50 birds roosting there. This again was a surprisingly open site (the 9 Monkman St Maple is quite isolated), with the trees used all quite small except for the staging Casuarina at 21 Ordell St.



Figure 1, Photo of Goodenia St roost site, with staging/roost tree in the background on the left hand side of the street.



Figure 2. Perry Drive roost site, with the 126 staging conifer, the larger tree on the left, and the mop top Robinias on the right behind the light pole, with the 127 Perry Dr conifers behind them.

As birds also still came from and went to Rivett it has been concluded to be a variant of the Goodenia St flyway with a new roost site (I've never suspected one or seen evidence of this or the flyway there before). Other new observations allowed the trace of this flyway to Cooleman Ridge. The drop off in numbers here (see Table 1 above), and the associated build up in numbers at the Perry/Rafferty roost and extension of its flyway (Table 2) indicates that the two flyways intersect and probably merge on Cooleman Ridge (see Map 1 in Part II), and may have involved a simple switch of direction by the birds.

The switching of roost sites and flyways observed during 2017 indicates a much more dynamic situation than suggested from the observations in 2016 (in particular the Angophora St flyway which was in constant use during 2016 and to the end of May 2017). The use of roost sites seems to be more fluid, probably dependent on the cover available, with the one at the corner of Monkman St and Chauvel Circle only active for about 2 months.

While it is hard to determine the maximum number of birds in 2016, it would appear to have been upwards of 75 birds. The 2017 observations also involved much higher numbers of birds with an estimate of at least 150 during April/May. .

The records of still up to 50 birds using the Angophora St flyway in spring, and birds in the two roost sites in November probably involve non-breeding birds, but I have very few records of this species breeding in the area (Holland, in prep), and certainly none in 2016. Unfortunately I have no detailed information of the sex ratios of the birds using the flyways or the roosts from October to December as the birds flew through too fast or it was often too dark to see them properly while trying to count them. However, my recollection is that those that dropped down to feed (see 3 and 11 Nov and 8 Dec entries Table 5 of Part I) were pairs, as were many of the birds seen using the Perry Dr and Goodenia St roosts (Tables 2 - 4 of Part II). I have to assume these to be non-breeding pairs, as the only record I can recall of birds being predominantly males was that made on the slope at the NW end of Cooleman Ridge on 18 Dec (see Section 3.3 of Part II).

Records for the site in Tullaroop St Duffy were kindly provided by Jean Casburn for my inclusion in this paper. Up to 48 birds were encountered, mainly in June and July 2016. Thereafter the roost seemed to break up, though birds were also seen roosting on 3 Dec, and up to 40 in May 2017. Numbers without detailed observations of behaviour from June 2015 were also available. In this case the main roost tree seemed to be a conifer in Jean's GBS site, with a large deciduous tree used as the main staging tree before the birds dropped in to the conifer roost. Again this is a relatively bushy site, though quite bare it was still active in winter, in particular compared with the sites in Goodenia and Monkman Sts, probably due to the conifer available for roosting. No roost flyway observations were made but the site is close (<150 m) from the E boundary of Narrabundah Hill from where I would suspect they would be coming, consistent with my other observations.

4.1. Comparison with the literature

I have not been able to find much in the literature on Red-rumped Parrots' roost flights or roost behaviour, most of it coming from HANZAB (Higgins, 1999) which has summarised information mainly from 2 unpublished BSc (Hons) theses from the University of New England in 1962 and 1976. As these are not readily accessible references, I have extracted the relevant information below:

They roost on inner branches of trees or shrubs with dense foliage, often round wetlands or besides roads. Usually on main branches close to the trunk, and less often, at the end of the branch among foliage. On waking at dawn, preen, scratch, stretch or rest, often leave the roost in small groups of 1-4 and congregate nearby to continue preening, perch leaning forward, some occasionally feed or drink nearby before moving off from roosting area, in flocks of 2-20, to feeding ground, where birds from different roosting areas congregate in trees before flying to the ground to feed. After feeding small and large groups fly to roosting areas; the first groups to stop feeding in the afternoon and leave are large and often stop in trees en route to roost, but later groups are small and fly direct to roosting area. At roosting area, congregate on bare branches close to roost, where preening and other maintenance behaviour, courtship feeding and allopreening are common, till finally move into the roost trees; latecomers arrive singly or in twos from long distances and go direct into roosting trees. There is much activity and some aggression at roosts at warmer evenings from late summer to autumn, as birds move about and jostle for position; during late autumn to winter, activity not so marked, in bad weather, roosting much quieter and earlier. Some mild aggression occurs at gatherings after leaving the roost; aggression common in roost trees before settling.

The above is largely consistent with the observations described above, for example the use of shrubs or trees with dense foliage besides roads (Perry Dr, Goodenia St and Monkman St), congregation after leaving the roost (staging trees in Angophora St, Perry Dr, and Ordell St) before flying out to feed, some occasionally feeding nearby before moving off from the roosting area (mainly Burgan/Tce lane). The stopping in trees on the way back to the roost (Kathner grove and Ordell St), latecomers arriving singly or in twos from long distances going direct into roosting trees (Goodenia St and Perry Dr) are also consistent. Jean Casburn has mostly made observations of behaviour before going into the roost, which are also consistent with the above. However, there is no information about closeness of roost sites, and on consistent use of roost flyways and their use year round, or for the observations of

birds feeding made mainly near the Goodenia St roost site in the evenings about 2 hours before roosting time.

The only local roost flight information that I am aware of followed a COG chat line post by Megan Mears on 5 Aug 2016 that she had counted almost 60 Red-rumped Parrots on their roost flight near her home in Watson. She indicated (personal communication of 7 Aug 2016) that her highest count was 88 in June, very similar to my maximum above. She indicated it was Michael Lenz who alerted her to them flying over, and by now she was quite tuned in to their call and flight path. In contrast to my observations she also had an idea where they were feeding, and that they were sometimes seen in numbers in a former sheep paddock and another open paddock near the petrol station on Northbourne Ave. On 8 Aug, near to Prime Television in Watson, Megan noted more of them in roost flight close to dusk. While she did not count them, she indicated these would be missed in the place where she usually counted. Different flyways are possible in Watson, similar to my experience in Chapman/Rivett.

In March 2017 Megan began making more detailed observations on the major roost site involving around 200 birds close to the Stirling and Northbourne Ave traffic lights.

Acknowledgments

My sincere thanks go to Jean Casburn for both collecting the data on the roost site near her house in Duffy and for allowing me to use this information as described Section 3.4 of Part II, having declined several offers to be a co-author. I would also like to thank Megan Mears for providing the roost flight information in Watson noted above, and especially for subsequent discussions and correspondence. My thanks also go to Steve Read, Prue Buckley, Steve Holliday and John Leonard for their help in identifying the 28 Angophora St staging tree.

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Accepted 13 June 2017

THE CANBERRA BIRD BLITZ 2016

BARBARA ALLAN

47 Hannaford St, Page, ACT 2614, Australia
allanbm@bigpond.net.au

Abstract. *This paper describes the conduct and outcomes of the Canberra Ornithologists Group's twelfth "bird blitz", held on 29-30 October 2016, and provides comparisons with the eleven previous blitzes. In 2016, 311 datasheets were submitted, from 88 grid cells; 166 bird species were recorded, 75 of them breeding. Highlights included the first blitz record of the Apostlebird.*

Introduction

On the last weekend in October 2016 (Saturday 29 and Sunday 30), the Canberra Ornithologists Group (COG) held its twelfth annual "bird blitz". In this exercise, we aim to record all species of wild bird present in the ACT over that weekend, to obtain a broad indication of their abundance, and to record breeding status. To achieve this, we set out to conduct a minimum of one 20-minute 2-hectare survey within each of the 165 grid cells covering the ACT (a 2.5-minute grid on lines of latitude and longitude, so each cell measures approximately 3.5 km by 4.5 km). A subsidiary aim of this exercise is to encourage more of our members to get out, survey and submit records.

The data collected are entered in the COG database, and subsequently contributed to the BirdLife Australia database. They are available for scientific purposes and as an input to Canberra land use planning.

Conduct of the blitz

Participants register for their preferred locations or grid cells on a first-in, best-dressed basis. In the allocation process, some site preference is given to members who survey given sites on a regular basis. More tardy volunteers are cajoled by the organiser into surveying the remaining sites. Less experienced birders may accompany more experienced birders who indicate a willingness to take them along. And as a modest inducement to participants, a variety of prizes are on offer, courtesy of our members. One difference in the conduct of the 2016 blitz was the number of eBird participants who may or may not have realised their records were contributing to the blitz outcome.

Participants are allowed to choose their preferred methodology from the three BirdLife Australia survey options: a 20-minute/2-ha survey; within 500 m of a central point, for >20 mins; or within 5 km of a central point, for >20 mins. Incidental records are also welcomed, as are the various options from eBird.

Results and discussion

Operational issues

We enjoyed fair birding weather until mid-afternoon on the Sunday when it rained. Most trails in Namadgi National Park were accessible. Unlike 2013, we did not conduct training classes to assist newcomers.

Data were recorded as has been the case since the first blitz in 2005 on hard-copy datasheets, but also now compiled from eBird records, from BLA Birddata, and from Canberra Nature Map. While the increasing popularity of the various means of electronic recording is evident, it does create its own issues of compatibility of methodology and consistency in moderation practices, as well as presenting a huge logistical challenge to COG's data manager.

Level of participation and coverage

At least 80 named COG members and friends took part in the 2016 blitz. Seven of the eBirders whose records were included may or may not have intended to contribute to the blitz (a list of known participants is at Table 1). As noted before, this probably equates to about 100 participants if unnamed companions are taken into consideration. Nine of the named individuals participated for the first time. Congratulations must go to the nine individuals who have supported the blitz each year since its inception: Ian Anderson, Daryl Beaumont, Matthew Frawley, Stuart Harris, Shirley Kral, Bruce Lindenmayer, Gail Neumann, Philip Veerman and Tony Willis, as well as the author.



Figure 1. Number of participants and grid cells.

Datasheets were received from 88 grid cells. Our best coverage was in 2007, when we managed 122 grid cells. Observers clearly prefer surveying areas where they can be assured of seeing good numbers of bird species – an understandable but, for blitz purposes, somewhat regrettable choice. As usual Jerrabomberra Wetlands NR and several central Canberra nature reserves attracted most coverage. Nevertheless the grid cells surveyed covered most habitat types, so I believe we have a representative sample of ACT avifauna for the weekend. Map 1 shows the grid cells covered, while Table 2 provides the comparisons between blitz years.

Datasheets submitted

In the 2016 blitz, a total of 311 eligible datasheets were received, 129 in hard copy, and the remainder from electronic databases. Regrettably some participants “misaid” their records before submitting them so the actual total should have been higher. Datasheet numbers have fluctuated over the 12 years of the blitz from a previous high of 359 in 2013 to a low of 242 in 2006. The actual number each year appears to have more to do with the types of surveys undertaken, and the relative proportion of lengthy surveys. It is at times a difficult trade-off for our blitzers between covering many grid cells and hence generally adopting the “20-minute, two-hectare” survey, and covering fewer areas but doing so more intensively over a longer period with a “within 500m” survey. The situation is further muddled now with eBird contributions largely avoiding this classification.

Type of survey

As usual, participants were given the option of choosing their survey type to best fit the grid cell or location they were surveying and to allow for personal preference and time or other constraints. Without closer analysis, it is impossible to be definitive about the effects of survey type on outcomes. In the case of the blitz, which is essentially a citizen science exercise involving observers of differing levels of expertise, it is likely that the time spent at each site has a greater bearing on the numbers of species recorded, or the breeding status.

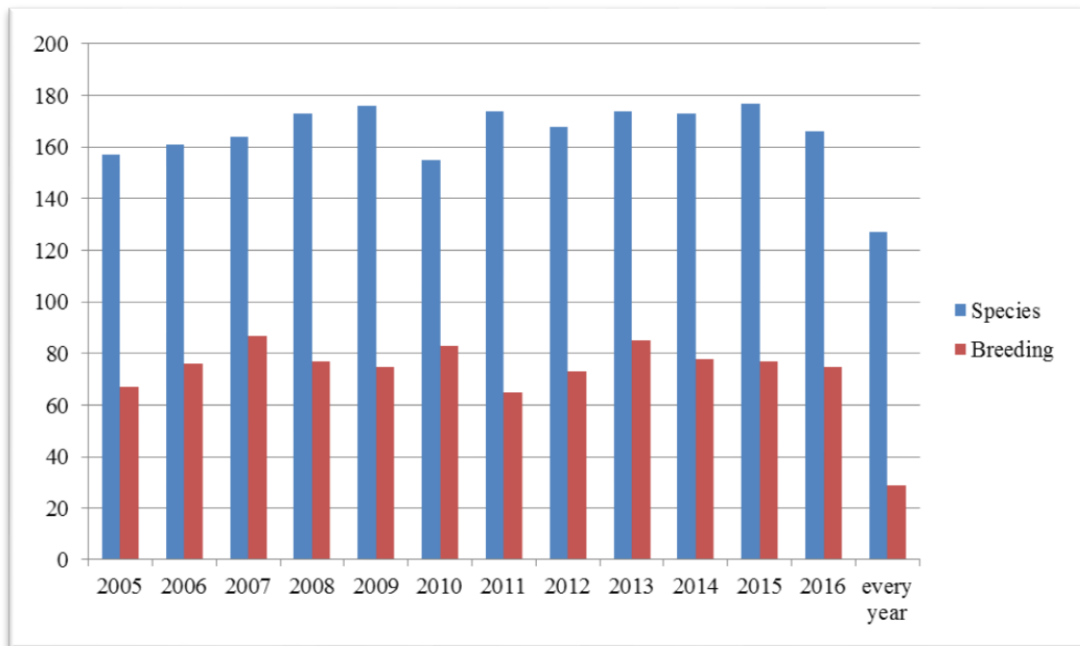


Figure 2. Number of species recorded, and recorded breeding.

Species recorded

As Figure 2 and Table 2 show, 166 bird species were recorded over the two blitz days in 2016, 11 fewer than last year. When all blitz years are considered together, 215 species have been recorded at least once, while 127 species have been recorded every year. By way of comparison, the species total for all of the financial year 2015-16 and the whole of COG’s area of concern, as recorded in the Annual Bird Report,

was 247 from 291 grid cells (COG 2017). There have been blitz breeding records every year for only 29 species; while 138 species have been recorded as breeding at least once in the blitz.

Highlights of the 2016 blitz



The standout record for the 2016 blitz was of the lone Apostlebird *Struthidea cinerea* in North Watson (see photo to left by **Julie Clark**). Granted, it had been recorded in that location since September 2016 but as a “first” for the ACT it was pleasing that it stayed around – though quite what it was doing here remains a mystery as North Watson is about 100 km south of the

species’ known range It was also pleasing that at least some of the Bush Stone-curlews *Burhinus gallarius* which had been introduced into the Sanctuary at Mulligans Flat remained to be counted.



Other pleasant surprises were records of Pied Butcherbird *Cracticus nigrogularis*, a species which appears to be extending its range into our area; a hybrid White-cheeked-New Holland Honeyeater at Jerrabomberra Wetlands NR; (see photo to left by **Geoffrey Dabb**) and infrequently recorded Lewin’s Honeyeater *Meliphaga lewinii* and Great Crested Grebe *Podiceps cristatus*. Some

high country specialists also appeared this year, including Olive Whistler *Pachycephala olivacea*, Red-browed Treecreeper *Climacteris erythroptis* and Rufous Fantail *Rhipidura rufifrons*.

Species most commonly recorded

The Australian Magpie *Gymnorhina tibicen* (with 232 records, involving 1282 individuals) remained its usual preeminent position as “most common” species. It

was followed by the Crimson Rosella *Platycercus elegans* (204 records), Pied Currawong *Strepera graculina* (183), Magpie-lark *Grallina cyanoleuca* (175), Sulphur-crested Cockatoo *Cacatua galerita* (172), Grey Fantail *Rhipidura fuliginosa* (167), Australian Raven *Corvus coronoides* (159), Superb Fairy-wren *Malurus cyaneus* (157), Galah *Eolophus roseicapillus* (157), and Red Wattlebird *Anthochaera carunculata* (146). (see Collage below).



**Photos and Collage of the most commonly recorded species during the 12th blitz
(Geoffrey Dabb)**

No surprises here. These species represented the top ten in last year's blitz, albeit in a slightly different order. Apart from being widespread, they are all readily identifiable.

Species recorded only once in blitz 2016

While it was gratifying to record some species which are often overlooked or which are simply not always present in the ACT, it was sobering to note that there were only single records of 21 species. While many of these, such as Peaceful Dove *Geopelia striata* and Yellow-tufted Honeyeater *Lichenostomus melanops* are thought to be present all year but in low numbers, and others such as Great Crested Grebe are merely occasional visitors, single records of Swamp Harrier *Circus approximans* and Hoary-headed Grebe *Poliiocephalus poliocephalus* give pause for thought.

Species not recorded in blitz 2016

Forty species which had previously been recorded in the blitz were not recorded in 2016. Inevitably, species known to be present in the ACT over the blitz weekend

sometimes fail to be recorded. “Resident” crakes and rails can be elusive, as was the case in 2016 with a complete absence of crakes and rails. The only egret to be recorded was the Cattle Egret *Ardea ibis*, while there were also no records of the Nankeen Night Heron *Nycticorax caledonicus*, Straw-necked Ibis *Threskiornis spinicollis* or Red-kneed Dotterel *Erythrogonys cinctus*. Other species with quite restricted distribution in the ACT, such as Chestnut-rumped Heathwren *Calamanthus pyrrhopygia*, were not recorded in 2016. Several of our occasional visitors did not visit over the blitz weekend, including Channel-billed Cuckoo *Scythrops novaehollandiae*. Waders are always a hit-and-miss proposition for the blitz weekend, mostly the latter on this occasion. And there were few recordings of arid-zone specialists, suggesting that conditions to our west had not deteriorated badly by October 2016. But the lack of records of the Hooded Robin *Melanodryas cucullata* and the Glossy Black-Cockatoo *Calyptohynchus lathami* reflects a more worrying decline as also reported in COG’s Annual Bird Report.

Of concern was the absence of some of our high-country specialists, including Spotted Quail-thrush *Cinclosoma punctatum*, Bassian Thrush *Zoothera lunulata*, Pilotbird *Pycnoptilus floccosus* and Wonga Pigeon *Leucosarcia melanoleuca*. Our survey did not coincide with the efforts of a banding team, responsible for previous good returns. We did not have as many observers in the high country and they did not spend as long there as in some years. But it does appear that the 2003 fires are probably a continuing influence here.

Breeding

As Table 2 and Fig. 2 show, in the 2016 blitz 75 species of bird were recorded as “breeding” – that is a generous interpretation, including the widest parameters recorded such as “display” and “inspecting hollow”. The highest breeding we have recorded in the blitz was 87 species in 2007 and the lowest, 65 species in 2011. As usual, the species most commonly recorded as breeding were either relatively large and/or conspicuous ones, namely (in order of frequency) Australian Magpie *Cracticus tibicen*, Common Starling *Sturnus vulgaris*, Magpie-lark *Grallina cyanoleuca*, Pied Currawong *Strepera graculina*, and White-winged Chough *Corcorax melanorhamphos*.



Southern Whiteface *Aphelocephala leucopsis*.

Arguably the most pleasing breeding record was that of an occupied nest of a Yellow-tufted Honeyeater *Lichenostomus melanops* along the Naas Valley fire trail (see phot to left by **Stuart Harris**), a species never before recorded as breeding in the blitz and very rarely more generally. Another noteworthy breeding record was the nest of a White-fronted Chat *Epthianura albifrons* at the National Arboretum and only the second blitz breeding record of a

ACT-listed vulnerable and endangered species

If we exclude the Swift Parrot *Lathamus discolor* which is unlikely to be here in late October, and the Australian Painted Snipe and Regent Honeyeater which are seriously rare in the ACT, of the bird species listed as vulnerable or endangered in the ACT, the Glossy Black-Cockatoo (recorded in only three previous blitzes, most recently in 2008) and for the first time, the Hooded Robin, were not recorded during the 2016 blitz.

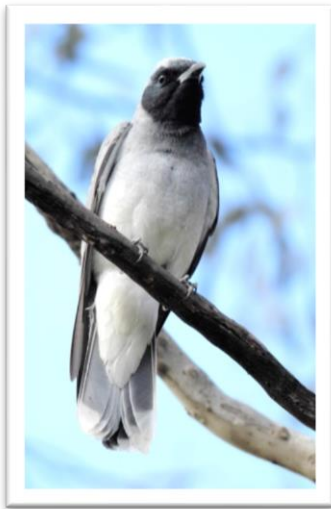


Photos and Collage of the vulnerable and endangered species in the ACT (Geoffrey Dabb)

The most widely recorded of the “vulnerables” was the Scarlet Robin *Petroica boodang* with 18 records of 1-4 birds, from 13 grid cells, the majority of which were in Namadgi NP. Its recording rate of 5.5% was well below the highest rate of 9.6% recorded in 2012. There were two breeding records, both of dependent young, in Mulligans Flat and Narrabundah Hill. The next most frequently recorded of the vulnerables was the Varied Sittella *Daphoenositta chrysoptera* with 13 records of 1-5 birds largely from peri-urban nature reserves in 6 grid cells, at an improved reporting rate of 4.0%. Sittella numbers have varied considerably over the 12 blitz years, ranging from a low of 7 in 2011 to a high of 38 in 2006, and 30 this year. Encouragingly the sittella was recorded breeding, with dependent young at Kama NR. Records of the White-winged Triller *Lalage tricolor*, however, plummeted from last year’s 25 to 4, from 4 locations: the Namadgi Visitors Centre, Naas Rd, Callum Brae and Umbagog District Park. The recording rate for this species has been highly variable, at 1.2% this year, to a low of 1.1% in 2010 and a high of 14.1% in 2013. And there were no breeding records. The Superb Parrot *Polytelis swainsonii* appears to be holding its own adequately. There were 8 records of 1-7 birds from six grid cells, all in north and north-west Canberra. Its reporting rate of 2.4% was up from the 0.8% of the first blitz but below the 4.9% of 2013. No breeding was recorded.

The picture for the other vulnerables is less positive. The Brown Treecreeper *Climacteris picumnus* was only recorded twice, from 7 grid cells in the south of the territory, with a maximum of 4 birds at one location. Its reporting rate of 0.6% was the lowest recorded in the blitz. Its decline has been variable, however, The Little Eagle *Hieraaetus morphnoides* appears to be stable for the moment at very low numbers: there were 3 records of 1-2 birds, from 3 grid cells. The west Belconnen nest was again active. The Hooded Robin appears to be faring the least well of our vulnerable species, not being recorded at all after a single record only in last year's blitz, while the Glossy Black_Cockatoo has not been recorded in a blitz since 2008.

A case study: the Black-faced Cuckoo-shrike



One of the surprises of the 2016 blitz, perhaps to be repeated over the whole 2016-17 year, was the prevalence of the Black-faced Cuckoo-shrike *Coracina novaehollandiae* (see photo to the left by **Geoffrey Dabb**). There were 136 records of this species, compared with 107 last year, and it was widespread, from 60 grid cells. Its reporting rate of 41.5% was 36% up on the blitz average. The 323 individuals formed by far the highest number in any blitz. In addition, there were 6 breeding records. The reasons for this apparent population boom are unclear.

Trends

While the number of records and reporting rate of the majority of species fluctuate, in some cases markedly from year to year, after twelve blitzes, trends are emerging for certain species, trends which are for the most part also reflected in COG's Annual Bird Reports. I have chosen the reporting rate as the most helpful indicator of trends and have highlighted only those species with sufficient records to make sense of possible movements.

Many of the ducks and other waterbirds are doing very well, perhaps thanks to the increasing number of urban wetlands being created, particularly in north Canberra. The Little Black Cormorant *Phalacrocorax sulcirostris*, for example, whose reporting rate was 2.3% in the first blitz, had reached 4.6% in 2016; the Little Pied Cormorant *Phalacrocorax melanoleucos* 6.1% from 3.1%.

The raptors represent a mixed picture. The Nankeen Kestrel *Falco cenchroides* continues to do well, at a reporting rate of 11.6% against its 7.4% in 2005 and against its blitz average of 9.5%. But the Australian Hobby *Falco longipennis*, the Peregrine Falcon *Falco peregrinus*, the Whistling Kite *Haliastur sphenurus* and even the Brown Goshawk *Accipiter fasciatus* are all down from their 2005 and average reporting rates.

Amongst the parrots, the greatest increasers were the Little Corella *Cacatua sanguinea* and the Rainbow Lorikeet *Trichoglossus haematodus*. Amongst the

cuckoos, the Eastern Koel *Eudynamys orientalis* continued its upward path (reporting rate now 4.3% compared with 0.4% in 2005) while the Pallid Cuckoo *Cacomantis pallidus* declined to 3.4% from 6.1%. “Pest” species including the Australian White Ibis *Threskiornis molucca* and the Spotted Dove *Streptopelia chinensis* showed serious increases though the Common Starling *Sturnus vulgaris* and the Common Myna *Sturnus tristis* were roughly stable.

The robins were mixed, with the Eastern Yellow up but the Flame down to 4.6% from 11.2% in 2005. Other small woodland birds fared variously. The Diamond Firetail *Stagonopleura guttata* dropped from 2.2% in 2005 to 1.2% in 2016

Conclusions and lessons for the future

Blitz 2016, like its predecessors, has increased significantly the amount of data about Canberra’s birds. Several of the grid cells surveyed would in all probability not have been covered but for the targeted effort of the blitz. The blitz data are made available to the managers of Canberra’s national park and nature reserves. A lesson to be drawn from the blitz is that, when prompted, more of our members will get out, survey and submit datasheets and perhaps revisit favoured spots.

There is, inevitably, an element of “luck of the day” in terms of the results but the long-term trends are already being highlighted. The blitz breeding observations are particularly useful in fleshing out a more detailed overall picture of bird breeding in Canberra. And given the tendency of our vulnerable species to be patchily distributed, the additional blitz information about where they are and in what numbers is highly valuable.

Acknowledgements

First and foremost, thanks must go to all COG members who participated in the 2016 blitz, and particularly to those who put in two full days of birding in remote sites. The assistance of staff at Namadgi National Park in providing advice, and access to areas behind locked gates, is greatly appreciated. Thanks also go to Jaron Bailey for extracting and manipulating blitz data from the COG databases and from eBird, to Nicki Taws for provision of the map, and to Geoffrey Dabb for his wonderful photographs. And sincere thanks too to all those COG members who donated prizes.

References

Canberra Ornithologists Group (2016) Annual Bird Report: 1 July 2014 to 30 June 2015. *Canberra Bird Notes* 41.

Table 1. Known blitz participants 2016.

Barbara Allan	Alistair Drake	R McCurran
Mark Allen	Carmen Drake	Megan Mears
Richard Allen	Muriel Story Edwards	Thomas Merklng
Ian Anderson	Matt Frawley	Judy Middlebrook
Frank Antram	Paul Gatemby	Peter Milburn
Ian Baird	Bill Graham	Martyn Moffat
Lia Battison	Jeannie Gray	Heather Murray
Cedric Bear	Horst Hahne	Tony Nairn
Daryl Beaumont	Kay Hahne	Gail Neumann
Sue Beatty	Lindsay Hansch	Desley O'Mara
Catherine Bennett	John Harris	Harvey Perkins
Linda Beveridge	Stuart Harris	Maree Philip
Con Boekel	Jack Holland	Dominique Potvin
Suzi Bond	Bron King	Lucy Randall
Jenny Bounds	Adam Kral	Steve Read
John Brennan	Shirley Kral	Margaret Robertson
Martin Butterfield	David Landon	Alastair Smith
Ryu Callaway	Fleur Leary	Margaret Strong
Jean Casburn	Michael Lenz	Nicki Taws
Brian Chauncy	Bruce Lindenmayer	Alan Thomas
Grahame Clark	Joan Lipscombe	Mieke van den Bergh
Julie Clark	Trevor Lipscombe	Philip Veerman
Mark Clayton	Noel Luff	Ben Walcott
Cate Cousland	Rod Mackay	Ros Walcott
Roger Curnow	Alison Mackerrads	Shorty Westlin
Geoffrey Dabb	Paul Mackerras	Tony Willis
Christine Darwood	Liam Manderson	Kevin Windle
Chris Davey	Duncan McCaskill	Wendy Whitham

Table 2. Species recorded during the 2005 - 2016 blitzes.

[X=present;*=breeding]

Common name	05	06	07	08	09	10	11	12	13	14	15	16
Emu	X		X	X			X	X			X	X
Stubble Quail		X			X		X		X	X	X	X
Brown Quail		X	X	X	X		X	X	X	X	X	X
Indian Peafowl	X			X		X			X	X	X	X
Magpie Goose				X	X						X	
Musk Duck	X	X*		X*	X*		X	X		X	X	
Freckled Duck								X	X	X	X	
Black Swan	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Australian Shelduck											X*	X*
Australian Wood Duck	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*

Table 2 continued

Common name	05	06	07	08	09	10	11	12	13	14	15	16
Pink-eared Duck		X	X		X			X	X	X	X	X
Australasian Shoveler	X	X*	X	X*	X	X*	X*	X	X*	X	X*	X
Grey Teal	X*	X	X*	X*	X	X*	X	X*	X	X	X*	X*
Chestnut Teal	X	X	X*	X	X	X	X	X	X	X	X	X
Northern Mallard and hybrids	X	X	X	X	X	X	X	X	X	X	X	X
Pacific Black Duck	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Hardhead	X	X	X*	X	X	X	X	X	X	X	X	X
Blue-billed Duck	X	X		X	X		X			X	X	
Australasian Grebe	X*	X	X*	X*	X	X*	X*	X*	X*	X*	X	X*
Hoary-headed Grebe	X	X	X	X	X	X	X	X	X	X	X	X
Great Crested Grebe	X									X		X
Rock Dove	X	X	X	X	X	X	X	X	X*	X*	X	X*
Spotted Dove				X	X	X	X	X*	X*	X*	X	X
Common Bronzewing	X	X	X	X*	X	X*	X	X	X	X	X	X
Brush Bronzewing					X							
Crested Pigeon	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Peaceful Dove	X	X		X	X		X		X	X		X
Wonga Pigeon	X			X				X			X	
Tawny Frogmouth	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Australian Owllet-nightjar				X			X	X	X	X	X	X
Australasian Darter	X	X*	X*	X*	X*	X*	X*	X	X	X*	X*	X*
Little Pied Cormorant	X	X	X*	X*	X*	X*	X*	X	X	X	X	X
Great Cormorant	X	X	X	X	X	X	X	X	X	X	X	X*
Little Black Cormorant	X	X	X	X	X	X*	X	X	X	X	X	X
Pied Cormorant			X	X	X		X		X	X	X	X
Australian Pelican	X	X		X	X	X	X	X	X	X	X	X
White-necked Heron		X	X		X		X	X	X	X	X	X
Eastern Great Egret		X	X	X	X	X	X	X	X	X	X	
Intermediate Egret				X		X	X	X		X	X	

Table 2 continued

Common name	05	06	07	08	09	10	11	12	13	14	15	16
Cattle Egret		X					X	X	X	X	X	X
White-faced Heron	X*	X*	X*	X	X	X*	X*	X	X	X	X*	X
Little Egret				X			X					
Nankeen Night Heron	X	X	X	X	X	X	X	X	X	X	X	
Glossy Ibis		X	X				X				X	
Australian White Ibis	X	X	X*	X*	X*	X*	X	X	X	X*	X	X
Straw-necked Ibis		X	X	X	X		X		X	X	X	
Royal Spoonbill		X	X	X	X	X			X	X	X	X
Black-shouldered Kite	X	X	X	X	X		X	X	X	X	X	X
White-bellied Sea-Eagle			X	X			X		X	X	X	
Whistling Kite	X	X	X*	X	X		X*	X	X	X	X	X
Brown Goshawk	X*	X*	X*	X*	X*	X*	X	X	X	X	X*	X*
Collared Sparrowhawk	X	X	X*	X	X	X	X	X	X	X	X	X
Spotted Harrier								X	X	X		
Swamp Harrier	X	X	X	X		X	X	X	X*	X	X	X
Wedge-tailed Eagle	X	X	X	X	X*	X*	X	X*	X	X*	X	X*
Little Eagle	X	X	X	X*	X*	X*	X	X	X*	X*	X*	X*
Nankeen Kestrel	X*	X*	X*	X*	X	X	X*	X*	X*	X*	X	X*
Brown Falcon	X	X	X*	X	X	X	X	X*	X	X	X	X
Australian Hobby	X	X	X*	X*	X*	X*	X	X	X*	X	X	X
Peregrine Falcon	X	X	X	X	X	X*	X*	X	X	X*	X*	X
Brolga											X	
Purple Swamphen	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Buff-banded Rail		X		X	X				X			
Lewin's Rail								X				
Baillon's Crake				X	X		X		X	X		
Australian Spotted Crake			X		X	X	X		X	X	X	

Table 2 continued

Common name	05	06	07	08	09	10	11	12	13	14	15	16
Spotless Crake								X		X		
Black-tailed Native-hen					X		X	X				
Dusky Moorhen	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Eurasian Coot	X*	X	X*	X*	X*	X*	X*	X	X	X*	X*	X*
Black-winged Stilt			X		X				X		X	
Bush Stone-curlew										X	X	X
Black-fronted Dotterel	X	X	X	X	X	X*	X	X*	X*	X	X*	X
Red-kneed Dotterel		X	X	X	X				X*	X	X*	
Banded Lapwing					X							
Masked Lapwing	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Australian Painted Snipe							X	X				
Latham's Snipe	X	X	X	X	X	X	X	X	X	X	X	X
Pectoral Sandpiper									X			
Bar-tailed Godwit			X									
Sharp-tailed Sandpiper	X		X		X		X		X	X		
Painted Button-quail	X			X	X	X	X	X				
Caspian Tern											X	
Whiskered Tern				X	X							
Silver Gull	X*	X*	X*	X	X	X	X	X	X	X	X*	X*
Glossy Black-Cockatoo	X	X		X								
Yellow-tailed Black-Cockatoo	X	X	X	X*	X	X	X	X	X*	X*	X*	X
Gang-gang Cockatoo	X	X	X	X	X*	X	X*	X	X	X*	X	X*
Major Mitchell's Cockatoo			X									
Galah	X*	X*	X*	X*	X*	X*	X	X*	X*	X*	X*	X*

Table 2 continued

Common name	05	06	07	08	09	10	11	12	13	14	15	16
Long-billed Corella				X		X	X		X	X*	X	X*
Little Corella	X*	X*	X*	X*	X	X	X	X*	X*	X*	X	X*
Sulphur-crested Cockatoo	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Cockatiel					X							
Rainbow Lorikeet	X	X	X	X*	X	X	X	X	X	X	X	X
Australian King-Parrot	X	X	X	X*	X	X*	X*	X*	X*	X*	X	X
Superb Parrot	X	X*	X*	X	X*	X*	X	X	X	X	X	X
Crimson Rosella	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Eastern Rosella	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Red-rumped Parrot	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Blue-winged Parrot											X	
Turquoise Parrot					X							
Eastern Koel			X	X		X*		X	X	X	X	X
Channel-billed Cuckoo						X						
Horsfield's Bronze-Cuckoo	X	X*	X	X	X*	X	X	X	X	X	X	X
Black-eared Cuckoo											X	
Shining Bronze-Cuckoo	X*	X*	X	X	X	X	X	X	X*	X	X*	X
Pallid Cuckoo	X	X	X	X	X	X	X	X*	X	X	X*	X
Fan-tailed Cuckoo	X	X	X*	X	X	X	X	X	X	X*	X*	X
Brush Cuckoo	X	X	X	X	X	X	X	X	X	X	X	X
Powerful Owl					X						X	
Southern Boobook	X			X		X		X	X	X	X	X
Eastern Barn Owl							X					
Laughing Kookaburra	X*	X*	X	X	X*	X	X	X	X*	X	X*	X*
Red-backed Kingfisher			X	X								

Table 2 continued

Common name	05	06	07	08	09	10	11	12	13	14	15	16
Sacred Kingfisher	X*	X*	X*	X	X*	X*	X	X*	X*	X*	X*	X*
Rainbow Bee-eater	X	X	X*	X*	X	X*	X*	X	X*	X*	X	X
Dollarbird	X	X	X*	X	X*	X*	X	X*	X	X*	X	X
Superb Lyrebird	X	X	X	X	X	X	X	X	X	X	X	X
Red-browed Treecreeper	X	X	X		X	X			X			X
Brown Treecreeper	X	X	X*	X*	X*	X	X	X*	X	X	X	X
Satin Bowerbird	X	X	X	X*	X*	X	X	X	X*	X*	X*	X*
Superb Fairy-wren	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Pilotbird	X				X	X	X		X*			
White-browed Scrubwren	X*	X*	X*	X*	X*	X	X*	X	X*	X*	X*	X*
Chestnut-rumped Heathwren						X		X				
Speckled Warbler	X*	X	X*	X*	X*	X*	X*	X	X	X	X*	X
Weebill	X*	X	X*	X*	X	X*	X*	X	X*	X	X*	X*
Western Gerygone	X	X	X	X	X	X	X	X	X	X*	X	X*
White-throated Gerygone	X*	X	X*	X	X	X*	X	X*	X*	X*	X*	X
Striated Thornbill	X*	X*	X*	X	X*	X*	X*	X*	X*	X*	X*	X*
Yellow Thornbill	X	X	X	X	X*	X*	X	X	X	X	X	X*
Yellow-rumped Thornbill	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Buff-rumped Thornbill	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Brown Thornbill	X	X*	X*	X	X*	X*	X*	X*	X*	X*	X*	X*
Southern Whiteface	X	X*	X	X	X	X	X	X		X		X*
Spotted Pardalote	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Striated Pardalote	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*

Table 2 continued

Common name	05	06	07	08	09	10	11	12	13	14	15	16
Eastern Spinebill	X*	X*	X	X	X	X	X	X	X*	X*	X	X
Lewin's Honeyeater												X
Yellow-faced Honeyeater	X	X*	X	X*	X*	X	X	X	X*	X	X	X
White-eared Honeyeater	X*	X	X*	X*	X*	X	X	X	X*	X	X*	X
Yellow-tufted Honeyeater	X						X		X	X	X	X*
Fuscous Honeyeater	X*	X	X*	X*	X	X*	X	X*	X	X*	X*	X
White-plumed Honeyeater	X*	X*	X*	X*	X*	X*	X	X*	X*	X*	X	X
Noisy Miner	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Red Wattlebird	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
White-fronted Chat					X	X	X	X			X	X*
Crescent Honeyeater				X	X	X	X		X*		X	X
New Holland Honeyeater	X	X*	X*	X	X	X	X	X	X	X	X*	X
Brown-headed Honeyeater	X	X	X	X*	X	X	X*	X*	X	X	X	X*
White-naped Honeyeater	X	X	X	X*	X*	X	X	X*	X*	X*	X*	X
Noisy Friarbird	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X
Painted Honeyeater										X		
Spotted Quail-thrush	X	X	X	X	X	X	X	X	X	X	X	
Eastern Whipbird		X	X	X	X	X	X	X	X	X	X	X
Varied Sittella	X*	X*	X*	X	X*	X*	X	X*	X*	X*	X*	X*
Black-faced Cuckoo-shrike	X	X*	X*	X*	X*	X*	X*	X*	X*	X	X*	X*
Cicadabird				X	X	X		X	X		X	X
White-winged Triller	X*	X*	X*	X	X	X	X	X*	X*	X*	X*	X
Crested Shrike-tit	X	X*	X	X	X	X	X	X	X	X	X*	X
Olive Whistler							X					X
Golden Whistler	X	X	X	X	X	X	X	X	X*	X	X	X

Table 2 continued

Common name	05	06	07	08	09	10	11	12	13	14	15	16
Rufous Whistler	X*	X*	X*	X*	X	X*	X	X	X*	X*	X*	X
Grey Shrike-thrush	X	X*	X*	X*	X	X*	X	X	X	X	X	X*
Olive-backed Oriole	X	X	X*	X*	X	X*	X	X	X*	X*	X*	X
Masked Woodswallow		X	X	X	X		X	X	X			
White-browed Woodswallow		X*	X*	X	X		X	X	X	X		
Dusky Woodswallow	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Grey Butcherbird	X*	X*	X	X	X*	X*	X*	X*	X*	X*	X*	X*
Pied Butcherbird										X		X
Australian Magpie	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Pied Currawong	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Grey Currawong	X	X	X*	X*	X*	X*	X	X*	X*	X*	X*	X*
Rufous Fantail	X		X	X	X	X	X		X			X
Grey Fantail	X*	X*	X	X*	X*	X*	X*	X*	X*	X*	X*	X*
Willie Wagtail	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Australian Raven	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Little Raven	X*	X	X*	X*	X*	X*	X*	X*	X	X	X*	X*
Leaden Flycatcher	X*	X*	X*	X*	X	X*	X*	X*	X*	X*	X*	X*
Satin Flycatcher	X	X	X	X	X	X	X	X	X	X	X	X
Restless Flycatcher	X	X	X		X		X	X	X	X		X
Magpie-lark	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
White-winged Chough	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Apostlebird												X
Jacky Winter	X	X*	X	X	X	X	X	X	X	X	X	X
Scarlet Robin	X*	X*	X	X*	X*	X	X*	X	X*	X*	X	X*
Red-capped Robin	X	X*	X*	X	X	X*	X	X	X	X	X	X
Flame Robin	X	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Rose Robin	X	X	X	X	X	X	X		X	X	X	X
Hooded Robin	X*	X*	X*	X	X*	X	X*	X	X*	X	X	

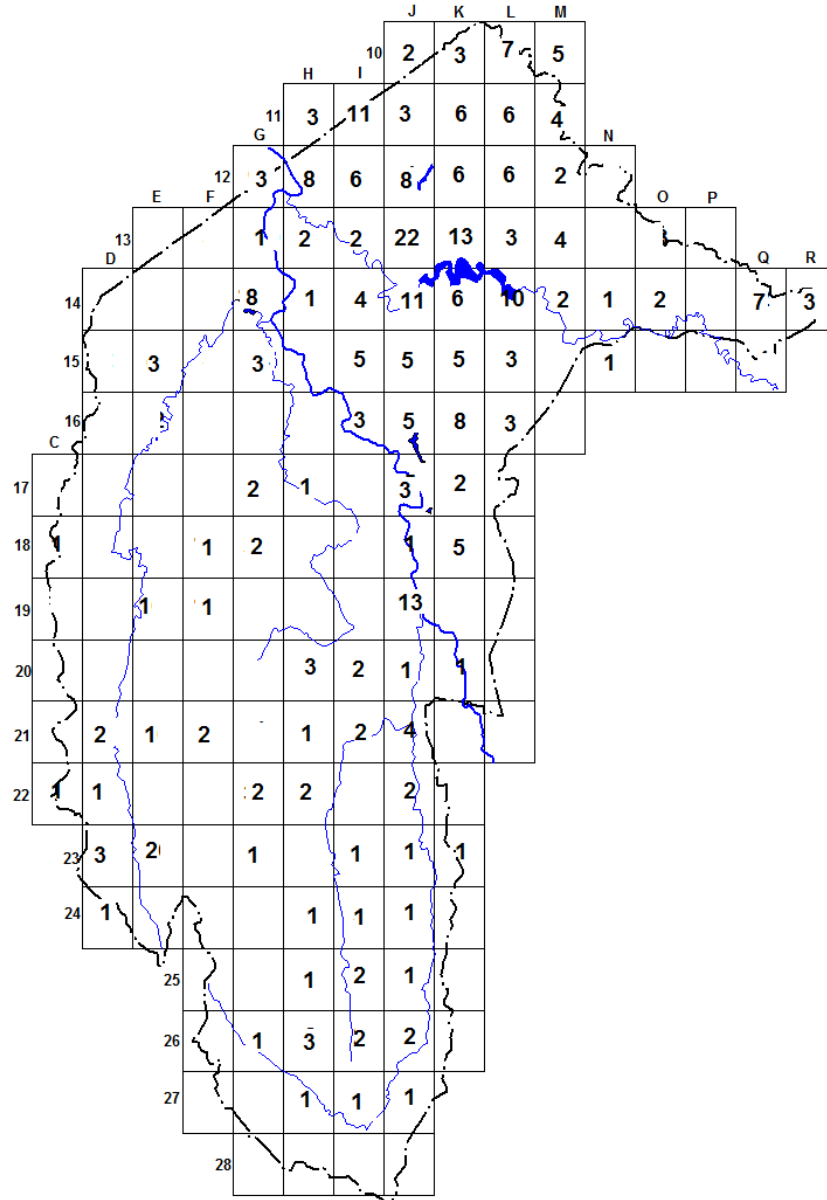
Table 2 continued

Common name	05	06	07	08	09	10	11	12	13	14	15	16
Eastern Yellow Robin	X*	X*		X	X	X	X	X*	X*	X*	X	X*
Eurasian Skylark	X	X	X	X*	X	X	X	X*	X	X	X	X
Golden-headed Cisticola	X	X	X	X	X	X*	X	X*	X	X*	X	X
Australian Reed-Warbler	X*	X	X	X	X*	X*	X*	X*	X*	X*	X	X
Little Grassbird	X	X	X	X	X*	X	X	X	X	X	X	X
Rufous Songlark	X	X	X	X	X	X	X*	X*	X	X	X	X
Brown Songlark	X*	X	X*	X	X		X	X				
Silvereeye	X	X	X*	X	X	X*	X	X*	X*	X	X*	X
Welcome Swallow	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Fairy Martin	X	X	X*	X*	X*	X*	X*	X*	X*	X	X*	X*
Tree Martin	X*	X*	X*	X*	X*	X*	X	X*	X*	X*	X*	X*
Bassian Thrush	X	X		X	X			X	X*		X	
Common Blackbird	X*	X	X*	X	X	X	X*	X*	X*	X	X*	X
Common Starling	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Common Myna	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Mistletoebird	X*	X	X	X	X*	X*	X	X*	X	X	X	X
Double-barred Finch	X	X*	X*	X*	X	X	X*	X	X	X	X	X*
Red-browed Finch	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X	X*
Diamond Firetail	X	X	X	X	X	X	X	X	X	X	X	X
House Sparrow	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*	X*
Australasian Pipit	X	X	X*	X*	X*	X*	X*	X	X*	X*	X	X*
European Goldfinch	X	X*	X	X	X	X	X	X	X	X	X	X
Common Greenfinch	X				X	X	X	X	X*	X	X	X

Notes

Domestic ducks and geese, which frequent the lakes, have been excluded, as have domestic chickens even when recorded far from civilisation. The peafowl have been included as they appear to be a naturally reproducing “wild” population, in suburbia. The “mallards” group has been lumped as their exact identity cannot be assured – it probably includes crosses with domestic as well as wild birds. The Emu, Brolga and Magpie Geese are – or were - probably part of the semi-captive population at Tidbinbilla Nature Reserve. The Bush Stone-curlews are included as, though initially introduced to the Sanctuary at Mulligans Flat Nature Reserve, they are free to roam.

Map 1. Blitz coverage 2016.



Accepted 15 June 2017

NOTES

Canberra Bird Notes 42(2) (2017): 214-215

TREE MARTIN (*PETROCHELIDON NIGRICANS*) NESTING IN A PEDESTRIAN ROADWAY UNDERPASS IN FORDE, ACT, AUSTRALIA

DAVID REES

PO Box 406, Gungahlin, ACT 2912, Australia;

[*dprbirdlist@gmail.com*](mailto:dprbirdlist@gmail.com)

On 24 Dec 2014 I was observing birds along the storm water drainage system in Forde, ACT, which runs parallel with Mulligan's Flat Road which divides the Gungahlin suburbs of Forde and Bonner. In a pedestrian roadway underpass at the corner of Hibberd Crescent (-35 09 41.86 S, 149 08 43.21 E), where it runs parallel with Mulligans Flat Road (Fig. 1), I observed a number of mud nests made by Martins (*Petrochelidon* spp.) They were clustered about a metal light unit in the roof of the tunnel (being the underside of the concrete roadway) (Fig. 2).



**Figure 1. The underpass under Mulligans Flat Road, looking north from Forde-
arrow marks the nesting colony (*David Rees*).**

These nests were occupied (and presumably made by) Tree Martins (*Petrochelidon nigricans*). This species typically nests in hollow spouts or knotholes in branches or trunks of trees, where nests are concealed. Occasionally it nests in and on man-made structures (Higgins *et al.* 2006a). This behaviour is in marked contrast with that of the related species the Fairy Martin (*Petrochelidon ariel*) which favours nesting in man-made structures, such as culverts under roads and tunnels (Higgins *et al.*

2006b). It was therefore somewhat surprising to see Tree Martins nesting out in the open like this.

On 24 Dec 2014, seven nests were present and occupied. The site was occupied again during the summer of 2015/16, on 25 Jan 2016 there were five occupied nests present. Nests were also present in Jan 2017. Being within easy reach of anybody with a short stick, the nests had been subjected to some vandalism.



Figure 2. Detail of nesting site (frame grab from video taken 25 Jan 2016) showing nests and a bird entering (David Rees).

The nesting site is close to the storm water drainage line along Mulligans Flat Road which drains into Yerrabi Pond in Gungahlin. This consists of a linear reedy wetland that would provide ample insect life for these birds to feed on during warmer months. Mature native trees are not present at the breeding location, though there are some about 110m to the northwest in Bonner. It is unclear if these trees contained suitable nesting holes for these birds. The large expanse of grassy woodland and mature trees that is Mulligans Flat Nature Reserve is about 400m to the southeast. A combination of an ample food supply combined with limited choice for nesting locations in the immediate environs of this resource may have compelled these birds to nest in this manner in a pedestrian underpass.

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Accepted 10 March 2017

Canberra Bird Notes 42(2) (2017): 216-217

PROBABLE BREEDING ATTEMPT BY RED-NECKED AVOCET AT LAKE BATHURST

MICHAEL LENZ

117/50 Ellenborough Street, Lyneham ACT 2602, Australia
michael.lenz.birds@gmail.com

The status of the Red-necked Avocet (*Recurvirostra novaehollandiae*) in COG's Area of Interest is described as "non-breeding vagrant" (Canberra Ornithologists Group 2017). The species is most frequently recorded at Lake George and Lake Bathurst albeit at irregular intervals and in varying numbers (Kamprad and Lenz 2014).

Red-necked Avocets are opportunistic breeders when conditions are suitable, e.g. often after heavy rains flooded areas may be chosen for nesting (Marchant and Higgins 1993). Many years may pass between breeding in a given area. Since the commencement of regular visits to Lake Bathurst in 1980 as part of the COG waterbird surveys, Red-necked Avocets have never attempted to breed there.

In the second half of 2016 the species was sighted in small numbers at Lake Bathurst feeding in some recently re-flooded areas of the lake. On 21 Aug 6 birds were present (Mary Appleby), on 9 Nov 4 birds foraged at the southern end of the so-called East Basin (M. Lenz).

During a visit by the author on 16 November 7 birds were seen. Of those 5 foraged as a group in a bay, one bird was feeding in the same bay close to a small island that had formed within that bay after re-flooding, but the seventh bird was sitting on bare, sandy ground between a few rocks on that island. Parts of the island had grass cover. A Black Swan (*Cygnus atra*) was sitting on a nest a few metres away from the avocet.

Similar to Black-winged Stilt (*Himantopus himantopus*), Red-necked Avocets are seen mostly on their feet, except when incubating eggs. On rare occasions birds may also sit down on sandbanks for a rest (M. Lenz, pers. obs. in South Australia). Another exception may be in situations where pairs nest close together, and the partner of a nesting avocet may sit down briefly on the ground near its nest as a neighbour approaches on its (albeit small) territory before charging at the intruder (Holland and Minton 2012). However, this situation did not apply at Lake Bathurst with only a single 'nesting' pair.

As I approached the bay, the group of 5 birds moved away quite quickly. The single bird near the island, the assumed partner, also retreated somewhat but gave tooting alarm calls. The sitting bird was on full alert with its neck stretched and watching me, but importantly, it remained seated on the presumed nest. It has to be kept in mind that nests of Red-necked Avocets are frequently just shallow scrapes with sparse lining of vegetation (Hollands and Minton 2016), i.e. an incubating bird would sit just at or only slightly above ground level as was the case here.

The differences in avoidance behaviour of the three sets of avocets as I approached – the group of 5 birds moving quickly away, the assumed partner staying closer and

warning, and the incubating bird being alert but most reluctant to leave, clearly indicated to me that a pair of Red-necked Avocet had chosen to nest on this island.

I retreated and watched the bird on the island from a greater distance through a telescope. No attempt was made to disturb the breeding bird any further. Circumstances did not permit to stay in this particular area for longer than 10 min. In that time the sitting bird stayed in the position described above.

However, it was evident that water around the island was very shallow. The lake had not filled as much after the good rainfall in 2016 (Lenz 2016) as hoped. With the hot and windy weather at this time of year, it would not take long for any shallow water to dry up and any land predator could reach the island. It remained to be seen whether the avocets would manage to hatch young.

Revisiting the area on 14 Dec together with Peter Milburn we found that the water around the island had indeed dried up rendering the island accessible to land predators. We found tracks of at least one dog (larger than fox tracks) and no signs of avocets or of the swans. The swan nest had been torn apart. But interestingly an intact swan egg was found a few metres away from the nest. No remains from a possible Avocet nest could be traced.

We do not know when between the two visits the dog(s) reached the island. There were no bird remains, not even feathers that would indicate that adult birds (avocet, swan) had been attacked. The birds possibly either got away in time or more likely gave up their nests of their own accord as the water around the island receded and it no longer remained a safe nest site. The dog tracks were certainly centred at both nest sites. Remaining eggs may have been taken by the dog(s): predators other than a dog could have done so as well, especially the smaller avocet eggs.

In 36 years of surveying Lake Bathurst, I believe this was the first time that Red-necked Avocets had given indications of breeding.

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Accepted 11 June 2017

COLUMNIST'S CORNER

Canberra Bird Notes 42(2) (2017): 218-20

Canberra Bird Notes: Thoughts on the December issue

The quality of *Canberra Bird Notes* has steadily improved. *Stentoreus* was so impressed by the contents of the issue of December last that he is convinced the proposal to give our journal wider online exposure (see page 193 of that issue) is overdue. A brief review of those contents follows.

The celebrity Powerful Owl that was seen over a 20-month period in a Canberra park deserved to be recorded, as it is in the comprehensive note by Terry Munro, Terry Bell, and John Bundock. However, the designation of the site as 'Haig Park', recalls the continuing controversy over the commemoration of the British general associated with the carnage of World War One. The owl was last seen in General Haig's park exactly 100 years after the terrible Battle of the Somme.

Which bird species has the highest annual number of recorded nests in Inner Canberra? Surely the Silver Gull, according to the serial reporting by Chris Davey and Peter Fullagar. On 19 September 2013 there were 463 nests on Spinnaker Island, and 328 on 28 October 2015.

By contrast there was only a single report of a nest of a New Holland Honeyeater paired with a hybrid NHH x White-cheeked Honeyeater. (See the article by Geoffrey Dabb.) Not many of those around, in fact that may be the only such nest that has found its way into the literature anywhere.

Canberra is well-known as the Australian capital for reduction of Common Myna numbers. A comprehensive article by Bruce Lindenmayer explains that 'CIMAG' ('Canberra Indian Myna Action Group') uses the name 'Indian Myna' because the general public throughout Australia know the bird by that name. Perhaps.

People who do not regard Canberra as of particular interest as a waterbird venue should read Julie Clark's report on breeding activity in the newish residential precinct of east Gungahlin. In that unlikely spot in spring 2015, Julie recorded breeding Australian Spotted Crake, Spotless Crake, Buff-banded Rail and Lewin's Rail - and obtained photographs.

And, then, something else not usually associated with Canberra, we have the long-running mystery of the Australian Brush-turkey. Did it, or did it not, ever occur hereabouts? David McDonald reviews the literature on that question, having been prompted by the recent appearance of a single specimen at Bywong, origin unknown.

Back on the subject of local waterbirds, Michael Lenz examined the irregular ebb and flow of numbers of the common species over cycles of several years. The extreme fluctuation is attributed, perhaps not too surprisingly, to rainfall patterns, in particular, most recently, to record-breaking rainfall in winter and spring of 2016.

Canberra is on the fringe of Superb Parrot distribution, and the continuing seasonal advance of the species into the suburbs is illustrated by Megan Mears' account of a night roost in North Watson. This was made up of more, perhaps quite a few more, than 40 birds.

Martin Butterfield's description of migrant arrivals is accompanied by informative tables. Of particular interest is the biogeographical region to which the observations relate. This is given as the area (map provided) covered by the *Stony Creek Gazette*, an area of irregular shape, with Carwoola in the north and Yanununbeyan in the south. Clearly subscribers to the *Gazette* are better served with information about their local bird movements than most rural areas around the ACT.

In the category of 'Notes' (once known as 'Odd Obs' in less formal times) we have three items: (1) Craig Robertson, a regular visitor to Canberra, describes the many bird species making use of a single gum tree in Gungahlin; (2) John Harris tells us about an incident where two Magpie-larks behaved aggressively towards some pelicans; (3) John Leonard reports a magpie chasing microbats, without success it seems.

The journal has two regular columnists. In the December edition, I (*Stentoreus*) offered a literary tale recalling birdwatchers of some 72 years ago. In retrospect, I might have been guilty of a little name-dropping, having brought Lord Alanbrooke, Prince Nobusuke Takatukasa, Alec Chisholm and the Duke of Gloucester into the one story. At least I left out General Haig.

I am unable to summarise adequately the wide range of interesting topics covered by my colleague *Tyto Javanica* in his *Cyberspace* column. Of particular note, I thought, were the bird-related Facebook pages to which he directed our attention. One of those was 'Crap Bird Photography' (4,289 members). Does Crap Bird Photography, I wonder, go out of its way to distinguish itself from 'Bird Photography Australia' (10,624 members) or is it a special interest subdivision of the larger group?

The report by President Alison Russell-French occupies six pages and is a useful source of information on what COG gets up to in a busy year. Then, there is a report about the deserved award of the Steve Wilson Memorial Medal (for contributions to COG) to David McDonald and Jack Holland. The issue is rounded off with a Rarities Panel bulletin that includes the aforementioned Brush-turkey from Bywong and a lone Apostlebird from North Watson.

I might offer a comment or two about the geographic setting of the described bird behaviours. Some are out in Canberra's rural surrounds like Martin Butterfield's 'arrivals', some relate to the region generally, like the coming and going waterbirds of Michael Lenz. For the rest, there seems, on the basis of that single issue, to be a bias towards the part of Canberra north of 'The Lake'. Only the bat-hunting magpie of Hughes is definitely to the south. The nesting gulls of Spinnaker Island are regarded as on neutral ground for this purpose.

While the alert observers of Gungahlin are to be commended, it is the smaller North Watson precinct, at the extreme limit of what might be called 'inner Canberra', that deserves special mention. Not only is that the site of Megan Mears' flocking Superb

Parrots, but it is, or was, the regular haunt of the mysterious solitary Apostlebird pictured on the last page of the issue under discussion. Moreover, COG members of longer standing might remember when 'North Watson' was spoken of, with some excitement, as the nesting site of no less than 4 pairs of Regent Honeyeaters, in the 1990s. (You'll find that covered, of course, in an earlier *CBN*.)

Stentoreus

Canberra Bird Notes 42(2) (2017): 220-222

Birding in Cyberspace, Canberra Style

In previous columns, I have referred to **online journals and newsletters**. One of my favourites is ***Decision Point Online*** <http://decision-point.com.au/>, edited by David Salt from the ANU and published with funding support from the ARC Centre of Excellence for Environmental Decisions (CEED). Apparently, it has over 6,000 subscribers, worldwide.

The May 2017 issue of *Decision Point* marks a significant milestone, being issue no. 100. Articles in that issue that jumped out to me, and that you may also find of interest, include 'Using maths to decide when to put dogs on leashes: reducing the threat to our endangered migratory shorebirds' by Kiran Dhanjal-Adams; 'A biodiversity offset accounting system' by Fleur Maseyk (University of Queensland); and 'Reflecting on risk & uncertainty' by Gwen Iacona (University of Queensland). Highly recommended.

eBird's Latest News, 4 May 2017, was titled **April Millions** <http://ebird.org/content/ebird/news/millions0417/>. It highlights the attaining of two key milestones (my emphases): 'Last month brought two major milestones for eBird, amazingly each of the same bird species! On 8 April, Bill Thompson submitted a checklist from Massachusetts that included a Red-tailed Hawk: *the 400-millionth sighting in eBird*. A couple weeks later, Suzanne Pudelek added a photo of a Red-tailed Hawk from Michigan—*the 3-millionth bird photograph in the Macaulay Library*. These exciting benchmarks are a testament to the amazing contributions from you, the global community of eBirders. We're profoundly grateful for everything that you do as a part of eBird. Thank you. Half-billion, here we come.'

I suggest that an exclamation mark would have properly ended the final sentence of the news report!

Fatbirder <http://fatbirder.com/> describes itself as follows:

'Fatbirder is the premier birders' web resource about birds, birding, birdwatching & birding software. Whether you are looking for facts about hummingbirds, songbirds, shorebirds or raptors in your backyard or are planning a trip or birding tour it's the site for you. There are tens of thousands of links on two thousand pages about birding everywhere in the world; a page for every country & state & every bird family.'

It is a wonderful resource, useful to birders in many ways. In the past I have mentioned its **Top 1000 Birding Websites** component <http://www.birdingtop500.com/>. It shows **BirdForum** <http://www.birdforum.net/> as the largest, with an average total of 969,882 page views per month at the time of writing (May 2017), including 175,304 unique page views per month. That's a lot of birding traffic! BirdForum describes itself as '...the net's largest birding community, dedicated to wild birds and birding, and is absolutely FREE! You are most welcome to register for an account, which allows you to take part in lively discussions in the forum, post your pictures in the gallery and more.' Its top menu items include Forums: the world's largest birding and wildlife community; Gallery: thousands of photos from all over the world, Blogs: Start your own online diary or read others'; Opus: encyclopaedia of birds, bird sounds and birding locations; Equipment Reviews: read reviews and make your own review of all birding equipment; and so it goes on.

Surfbirds <http://surfbirds.com/> is another prominent online birding portal. In March it posted an updated **Bird Listing Software Review 2017**, authored by Gerco Hoogeweg <http://surfbirds.com/Features/birding-software-review-0217.html>. The review covers what the author understands to be the most popular birding software options, assessing the following packages on a wide range of criteria: eBird, Bird Journal, Birder's Diary, Birders Notebook, iGoTerra, Observation.org, Scythebill and Swift. Having read these reviews I remain inclined to stick with eBird Australia <http://ebird.org/content/australia/>, even though some of the other software packages have excellent features not found there.

The **Nicobar Pigeon** *Caloenas nicobarica* has recently been in the news. This is 'a pigeon found on small islands and in coastal regions from the Andaman and Nicobar Islands, India, east through the Malay Archipelago, to the Solomons and Palau. It is the only living member of the genus *Caloenas* and the closest living relative of the extinct dodo', to quote Wikipedia.

It all began with a photograph being sent to the Broome Bird Observatory, apparently taken on 29 March 2017, of a bird at One Arm Point on the Dampier Peninsula. A Nicobar Pigeon was sighted in the same area by prominent WA birder George Swann on 8 April, the first ever record of the species on the Australian mainland.

Then came the release of the wonderful new *Australian Bird Guide*, authored by Menkhorst, Rogers & Clarke and illustrated by Davies, Marsack & Franklin (CSIRO Publishing, Melbourne, 2017 <http://www.publish.csiro.au/book/6520/>). The authors explain, in their section on 'Constructing the guide', that they decided to include vagrant species in the main body of the *Guide*, rather than (as some other authors have done) relegate them to an appendix. '...we stopped automatically adding new species to the book at the end of February 2013...At the time of writing (November 2015), only two confirmed vagrant species could not be included in the book (Eurasian Wigeon and Nicobar Pigeon)...' (p. 2).

In late April, birder/blogger Chris Watson interviewed Rohan Clarke, one of the authors of *The Australian Bird Guide*, about the book <https://www.chriswatson.com.au/blog/the-australian-bird-guide>. Watson asked 'So

what's going to be the bird that grips you off the most when it turns up and it's not in the book?'. Clarke replied, 'Well Nicobar Pigeon didn't waste any time! That's interesting in the sense that, it had been recorded back in the 1980s [1989 on an oil rig in the Timor Sea] but wasn't submitted until quite late; as in, we were well into the writing process so it was one of the first to miss the cut effectively. But none of us were too concerned because we just weren't going to get another one. So to have one on the mainland is probably gripping in the sense that it's probably more deserving of a spot than some of the things on the offshore islands'.

On May 4th Nigel Jackett posted to the Australian Twitchers Facebook Group <https://www.facebook.com/groups/718576241555767/> 'The Nicobar Pigeon was recently caught at One Arm Point (25km from Chile Ck) and is being detained in Broome, due to the Department of Agriculture listing it as a "prohibited organism". It appears it is destined for the WA Museum.' (Over a week later the ABC and other news outlets ran the story as well, with *The Australian* newspaper embellishing the story somewhat, referring to 'numerous sightings' of this species in the area.)

Over the next couple of days there were 49 posts on the Australian Twitchers Facebook Group on this matter! Opinion was sharply divided between 1) those supporting this bird being euthanised for biosecurity reasons, noting that it is classified, under WA law, as a 'Declared Pest, Prohibited', and 2) those who consider it to be a genuine part of Australia's avifauna, albeit a vagrant species, a bird that should be returned to where it was located, and liberated there. Someone in the latter camp created the Twitter hashtag *#freethenipi* !

T. Javanica

This column is available online at <http://canberrabirds.org.au/publications/canberra-bird-notes/>. There you can access the web sites mentioned here by clicking on the hyperlinks.

Details on how to subscribe to *Birding-Aus*, the Australian birding email discussion list, are on the web at <http://www.birding-aus.org/> . A comprehensive searchable archive of the messages that have been posted to the list is at <http://bioacoustics.cse.unsw.edu.au/archives/html/birding-aus>.

To join (subscribe to) the *CanberraBirds* email discussion list, send an email message to canberrabirds-subscribe@canberrabirds.org.au. The subject line and body of the email can be left empty.

To unsubscribe, either permanently or temporarily, send an email message to canberrabirds-unsubscribe@canberrabirds.org.au. If you wish to re-subscribe after being unsubscribed temporarily, simply follow the 'subscribe' instructions above.

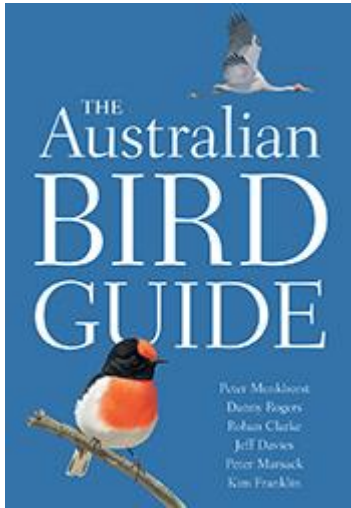
The *CanberraBirds* list's searchable archive is at <http://bioacoustics.cse.unsw.edu.au/archives/html/canberrabirds>.

BOOK REVIEW

Canberra Bird Notes 42(2) (2017): 223-227

The Australian Bird Guide. By Peter Menkhorst, Danny Rogers, Rohan Clarke, Jeff Davies, Peter Marsack and Kim Franklin. CSIRO Publishing, Clayton South, 2017. ISBN 9780643097544; RRP \$49.95.

Reviewed by HARVEY PERKINS, *Kambah, ACT (hdpphd@gmail.com)*



It must have been close to five years ago – I’d just finished weighing, measuring and taking moult details of an Inland Thornbill at a banding site at Weddin Mountains National Park near Grenfell in central NSW. Peter asked if he could get some photos of the bird before I released it; he needed some good close up photos to compare with other races of the species, and with the Brown Thornbill, to inform his paintings for the new CSIRO field guide.

That was when the reality of this rumoured new guide settled into my consciousness. But I couldn’t get much out of Peter as to when it would be released, or how it would differ from the existing clutch of field guides readily available to the Australian birding community.

Now, finally, the wait is over. The gestation seems to have had its complications, but the trials and tribulations of production and the drawn-out anticipation of the book-consuming public are vindicated by the final product. It is bold and beautiful, it’s meaty, beaty, big, and bouncy and, as promised, it boldly goes where no guide has gone before.

It is not immune to certain pitfalls, but these are generally minor, or sometimes just at odds with subjective preferences. Key amongst these (for me) are the size of the book, the sequence in which the species are presented, and its suitability for a broad bird-watching audience.

Structure of the book

There’s no doubt this is a big book for a field guide. Indeed, I’m sure it is no accident that the word ‘field’ is omitted from the title. At 1.475 kg and dimensions of 250 x 175 cm, it is easily the heftiest of the currently available field guides; almost 20% bigger than the next biggest (Pizzey and Knight), and almost twice the weight of Simpson & Day’s guide. But it is jam-packed with detailed information and as a ‘bird guide’ it is superlative. It’s just that it’s not going to fit into even the biggest pocket, and it would add considerably to the weight of a small day-pack.

As expected, the book begins with a suite of introductory information (30 or so pages, divided into four ‘chapters’), followed by the species accounts (500 pages), with plates opposite and distribution maps at the bottom of the species description pages. These are followed in turn by a checklist of species, a glossary, and index. The inclusion of all these elements is standard for a good modern field guide, but the presentation and detail is excellent.

The introductory section begins with a chapter called *Constructing the Guide* which includes detailed and informative background on the rationale, development and production of the book, as well as information on how to use it – well worth reading as it does place the book as a whole and the approaches taken into perspective. This is followed by a second chapter, *Identifying birds*, which includes the best guide to the field anatomy and, especially plumage aspects of a bird, I've ever seen in a field guide; and then one on bird-watching (sorry – birding!) in Australia. Finally, there is an essay by Leo Joseph, written in his classic approachable style, on the current state of avian taxonomy: the recent upheaval of avian phylogenetics as a result of modern DNA technologies, from which he progressively focusses in on several Australian species groups that present taxonomic conundrums, and how they relate to biogeography, gene flow and changing climate – sounds like Leo.

A key to abbreviations and symbols is rather hidden where it closes out the introductory section, or maybe it begins the species accounts section, but I can't help thinking this would probably be better placed in the first chapter with the other information on how to use the Guide.

Taxonomy and sequence

The authors have chosen to follow the International Ornithological Congress (IOC) species taxonomy (with a cut-off date for publication purposes of version 5.4, 24 October 2015). This will please many (myself included), though possibly not all users of the Guide, but I am left disappointed, despite detailed explanations, that they then chose to deviate from a systematic sequence for the species accounts. Instead, a broadly habitat- or 'biome'-based approach has been used, with 'marine and coastal birds' covered first, followed by 'freshwater birds', and then the 'land birds'. Within these major groupings, species are arranged very roughly according to recent/current taxonomies but not reliably, and efforts have also been made on occasion to place similar-looking species together despite being sometimes very widely separated taxonomically. This leads to some odd results: the swallows and swifts, for example, are grouped together part-way through the land birds, and the desert-dwelling Inland Dotterel and all the freshwater waders become 'marine and coastal birds'.

This approach might be generally useful to novice or early-stage birders, or even those who don't know their taxonomy particularly well, but I remain unconvinced of its merit and it seems at odds with the overall tone of the book, which is geared very much to the more advanced birder. It makes it inefficient for pretty much anyone to locate a particular species. The authors seemed to recognise this and so have provided several means by which a given species can be located. Hence, there is a (beautiful) pictorial guide to bird groups on the inside front covers (following the biome theme), and an alphabetical quick reference to bird 'groups' at the beginning of the Guide (p. vi). And of course there is an index of all species (common and binomial combined in the one index) at the back (pp. 549-566), but group names are not included so you'll need to know the exact name of your particular species, as used in this guide (which, for English names, follows the Birds Australia Working List of Australian Birds (version 2) (WLAB)).

Those with a phylogenetic bent will be pleased that the checklist of species on pages 532-545 does follow the IOC v5.4 sequence.

Choosing a cut-off point in time for taxonomic change is unavoidable, and IOC v5.4 is reasonably recent. But given we are now up to v7.2, there are inevitably some

recent splits or revisions that have not been included. The long-anticipated split of the Grey-faced Petrel *Pterodroma gouldi* from the Great-winged Petrel *P. macroptera*, for example, only occurred in v6.3. Interestingly, though, there appear to be some revisions that occurred by or prior to the cut-off point which have nevertheless not been included. The Torresian Kingfisher *Todiramphus sordidus* was split from the broader Collared Kingfisher complex in v5.4, but it is still included as Collared Kingfisher *Todiramphus chloris* in the Guide. And the Helmeted Friarbird still includes three subspecies, including the Hornbill Friarbird (*yorki*) which was split, albeit controversially, some time prior to v2.4.

Species accounts

The species accounts, together with the plates and distribution maps, of course make up the bulk of the book and are its key strength. The text accounts are detailed and more extensive than any other Australian field guide. While starting off with basic descriptive information, they quickly develop a more nuanced and behavioural account of the species, and subspecies where relevant, creating a more meaningful and useful ‘picture’ to assist with identification. This is where the combined extensive knowledge of the three authors really shines through.

In contrast to most field guides (as opposed to handbooks), measurements are included for wing length, bill length and weight. These are probably less useful to the average birder than the more typical indication of total body length, whatever shortcomings that might have. Small icons and abbreviations are used to provide an indication of the ‘likelihood of encounter’ (a variably filled circular icon), conservation status where relevant, or if the species occurs in Australia only as a vagrant.

In addition to the individual species texts there are ‘group boxes’ scattered throughout. These are excellent, providing succinct, densely informative nuggets of information about distinctive groups of species, sometimes at family level but often at a finer taxonomic level to maintain relevance.

Also useful is the inclusion of a table on page 440 (despite reference in the corvid group box to page 410) of the main corvids occurring in a number of cities. I just wish it went further and included more towns where identification of resident corvids can be a problem, particularly to the visitor passing through.

Plates

The plates can make or break a field guide. It is clear that a huge amount of work has gone into these by the three highly-regarded artists. They are beautifully executed, highly detailed, and multiple images are used to ensure as much as possible that all identification features, resting and flight images, various age differences, and morphs and subspecies are covered. I found the plates to be highly consistent in style between artists, more so than I was expecting, and it is a nice touch that each plate has the artist’s initials at the bottom.

The sheer number of images per species makes the plates a little cluttered at times, but fine lines are used effectively to separate adjacent species. The paintings of the birds follow what I call the ‘profile predilection’, where all the images are essentially in profile and all facing the same way. This certainly has its advantages when directly comparing similar species, but I have always had a preference for plates that present the birds in a less strictured way, where the artist has free rein to position the

bird in whatever pose they deem most useful to highlight identification features, or is most typical in a behavioural sense, or best conveys the jizz of that particular bird.

There has been a fair bit of comment on social media since the book was first released about the print quality of the plates. There is undoubtedly some variation in tonal quality and colour intensity between plates, and, it seems, between individual books. Some of the shearwater plates have a distinct brownish tone, some other seabirds have a very bluish tone to them. Many of the plates appear rather muted, though not all. It is difficult to know how much of this is due to the print process rather than a reflection of the way the plates themselves have been executed. In general, the images are probably best regarded as representing the birds as they might appear in subdued light rather than in bright sunshine.

I did directly compare each plate of the two copies of the book I have (one a pre-publication review copy from CSIRO, the other bought from QBD books in late May, so as different in terms of print runs as I'm likely to find at this stage) and it seems that the main problem is indeed around the degree of brown or blue tint, and, to a lesser degree, colour intensity. Variation was most noticeable on pages 59 (shearwaters), 79 (storm petrels), 99 (jaegers), 103 (gulls), 109 (terns), 191 (night herons), 195 (bitterns), 227, (kites), 323 (swifts), 417 (whipbirds) and 429 (woodswallows).

Maps

The distribution maps are all placed at the bottom of each page of species accounts. They are exquisitely detailed and include all subspecies ranges in different colour schemes and core and non-core ranges with different intensities. The main issue with them is their small size, particularly given the amount of information they try to convey. My steadily aging eyes certainly struggle with reading the subspecies identification keys. Map coverage varies according to need; hence Tasmania is omitted from many maps, or is displayed solely for its endemic species. And regional maps are used appropriately throughout, so a map of north-eastern Australia only is used for many of the wet tropics species, and so on. The information on how to use the maps (on pages 6-7) is comprehensive and really useful in getting maximum information from the maps, which can get quite complex, so, do yourself a favour...

Due to space limitations, vagrants do not have maps, but details of occurrences are usually provided in the text. And on occasion two non-overlapping species might share a map (for example the Lesser Noddy and Grey Ternlet, and some members of the quail-thrush group). So long as there is no confusion, this is a sensible and sometimes necessary approach.

The occasional oversight appears to have slipped through unfortunately, such as the *ypsilophora* subspecies of the Brown Quail which, although described in the text, is not treated separately on the map. And the distributions of the two subspecies of the Silver-backed Butcherbird (*argenteus* and *colletti*) are reversed.

General

So - there are some errors in the book, but for a first edition there seem to be relatively few. More frustrating than any outright and obvious errors are situations where you are left feeling unsure or not completely satisfied. A few examples follow. Spinifex Pigeon: there has been ongoing uncertainty around the finer taxonomy of this species for quite some time. The Guide doesn't help much as the text and plates

refer only to the subspecies *plumifera* and *ferruginea*. The third subspecies, *leucogaster*, while included on the distribution map, has no other supporting information.

Great-winged Petrel: annotations against the image of the head of subspecies *gouldi* indicate “bill much deeper than in *gouldi*” (whereas it should be deeper than in *macroptera*). There is also a typo in the additional annotation “buoyant on sea surface”.

Blue Bonnet: the Naretha Blue Bonnet *Northiella narethae* has recently been split from the other Blue Bonnet taxa and has been treated as a full species accordingly. However, the English name Blue Bonnet for *Northiella haematogaster* has been retained (in accordance with WLAB) in preference to the now distinguishing Eastern Blue Bonnet (IOC). Furthermore, the three remaining subspecies of Blue Bonnet are all included on the distribution map, but there is no mention of *pallescens* in the text or on the plate, so no indication of how it differs from the other two.

But these are relatively minor quibbles. I certainly haven't searched the book exhaustively to find errors, and I'm sure more will surface over time with the willing assistance of the birding community. Future print runs or editions will undoubtedly weed out such glitches, and for now they do not significantly detract from what is otherwise a huge accomplishment and an extraordinarily detailed and useful book.

Indeed, it is the detail which will appeal to most people who buy the book, who, I believe, will predominantly be fairly advanced or aspiring birders. On the other hand, this level of detail, the density of information, the inclusion of rarely seen vagrants throughout the species accounts, the deliberation on subspecies differences, may actually be overwhelming and even a little intimidating for a novice birder.

Another strong positive for the book is its price: at \$49.95 RRP, it is exceptionally good value. I was expecting it to be much more, and given the discounted prices already seen at various outlets there is little to dissuade any birder from buying this guide, even if they already have an Australian field guide (or two, or three, or ten or more in various editions!).

Bottom line? This is a big, beautiful book which will be a very welcome addition to any birder's library. Although I doubt I'll be taking it into the field very much (though I'm sure it will make it to the back seat of the car), if I'm after further information, either after seeing a bird I'm not particularly familiar with or in preparation for a birding trip, it will almost certainly be the guide to which I turn first.

Accepted 31 May 2017

Note from CSIRO Publishing: CSIRO Publishing is aware that a small percentage of the first print run has been affected by printer errors impacting some of the colour plates. **These copies are being replaced on request.**

Please contact publishing.sales@csiro.au if you have one of these copies.

RARITIES PANEL NEWS

The record to note in this group is that of the Tawny Grassbird, first recorded by Kim Larmour on 29 December 2016 at Jerrabomberra Wetlands NR and subsequently recorded and photographed by many. Thanks to all those who submitted reports. This is a new addition to the ACT bird list and a relatively surprising one, as the Tawny Grassbird is generally found in more temperate coastal regions to our north. Kim reported that she was familiar with the species from the NSW Central Coast. The Tawny is larger than our more familiar Little Grassbird, has patterned upperparts, a long tail and a rusty coloured crown.

And it was a delight to receive news of two more Australian Painted Snipe in our AoI, a male and a female, first reported by Mark and Kay Clayton from Lake Rd, Bungendore on 2 Feb 17, and subsequently seen and photographed by many. This snipe's status is "endangered" federally and it has not been recorded in our area since the influx of 2014.

The Black-faced Monarch was a juvenile, the first for some time in our area of interest. This essentially coastal species does reach our area from time to time, usually in the east of our AoI. It reached the Panel via Canberra Nature Map, as did the Turquoise Parrot record. "Turqs" are being recorded somewhat more commonly at present. Photographs are of great assistance in confirming their identity.

The Panel was unable to endorse a record of another possible "first" for the ACT. The standard of proof is naturally higher for such records and even if the observers are highly experienced, sometimes they fail to see crucial identification features. It is always useful to have such accounts to hand, however.

And the Panel continued its practice of assisting members of the general public who present requests for identification of sometimes surprisingly common species.

ENDORSED LIST 90, JUNE 2017

Australian Painted Snipe *Rostratula Australia*

2; 2 Feb 17; Mark Clayton; Lake Rd, Bungendore

Turquoise Parrot *Neophema pulchella*

1; 29 Jan 17; Ollie Orgil; Naas Valley Fire Trail, NNP

Black-faced Monarch *Monarcha melanopsis*

1; 19 Mar 17; Yvona Booker; Bywong

Tawny Grassbird *Megalurus timoriensis*

1; 29 Dec 16; Kim Larmour; Jerrabomberra Wetlands NR GrL14

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Canberra Bird Notes

Canberra Bird Notes is published three times a year by the Canberra Ornithologists Group Inc. and is edited by Michael Lenz with support by Kevin Windle. Paul Fennell edits the first issue/year, the Annual Bird Report. Major articles of up to 5000 words are welcome on matters relating to the status, distribution, behaviour or identification of birds in the Australian Capital Territory and surrounding region. Please discuss any proposed major contribution in advance. Shorter notes, book reviews and other contributions are also encouraged. All contributions should be sent to one of those email addresses:

CBN@canberrabirds.org.au or michael.lenz.birds@gmail.com

Please submit contributions in *Times New Romans*, with 12 points Font Size and 'No Spacing'.

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We are referring to 'contributors' rather than 'authors' as sometimes we publish photographs, as well as written content.

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