

Site fidelity of Rufous Whistlers *Pachycephala rufiventris rufiventris* on the Cumberland Plain, NSW

John Farrell¹, Alan Leishman² and Jeremy Webb³

¹73 Ellison Road, Springwood, New South Wales, 2777

²4/101 Centaur Street, Revesby Heights, New South Wales, 2212

³36 Greenbank Drive, Werrington Downs, New South Wales, 2747

Received: 7 April 2025

Accepted: 30 June 2025

Abstract. Banding and sighting data accumulated from 1965-2020 at seven sites across the north-west and south-east sectors of the Cumberland Plain were utilised to show that Rufous Whistlers *Pachycephala rufiventris rufiventris* frequented these sites from September to April and, except for a few isolated records in June, were absent from May to August. Many individuals returned for a number of seasons after initial banding with an average percentage return across all sites of 20.3% (range 16.7–33.0%). The average seasonal return of individual birds was 1.3 seasons (range 1.0–1.9). The longest duration recorded from initial banding to last recapture (14 seasons) was an individual that frequented the Humewood/Beulah Forest site. No individuals were recaptured away from their initial banding site on the Cumberland Plain or away from the Cumberland Plain. There was little difference between the sexes in the proportion that returned to their banding site.

Keywords: Rufous Whistler, site fidelity, Cumberland Plain NSW

INTRODUCTION

The Rufous Whistler *Pachycephala rufiventris* is one of eight species of *Pachycephala* found in Australia. It has been recorded across Australia (Barrett *et al.* 2003) and farther afield to New Caledonia. In Australia this species predominantly frequents open woodlands and dry sclerophyll forests, but can be found in a variety of habitats encompassing moist coastal areas and inland arid regions (Cooper *et al.* 2020). Of the four subspecies, *P. r. rufiventris* (hereafter Rufous Whistler) is the most widespread (Higgins and Peter 2003, Menkhurst *et al.* 2017), with a distribution extending from southern Queensland, south into New South Wales, Victoria, South Australia and southern Western Australia. It may also be found on some southern offshore islands, e.g. King Island in the Bass Strait and Kangaroo Island, off the coast of South Australia (Pizzey 1983).

Population movements have been recorded at many sites across New South Wales, Victoria and South Australia (see Higgins and Peter 2003 and Cooper *et al.* 2020 for a full list) where either full or partial migration has occurred. For example, in the Lofty Ranges, South Australia, the population of Rufous Whistlers comprised both resident birds and migrants (Department for Environment and Heritage 2008), while near Alice Springs they were classified as ‘resident’ and were recorded in all months of the year (Pascoe *et al.* 2019). In south-eastern Australia they are predominately summer breeding migrants (Bell and Ford 1987, Bridges 1994, Pizzey and Knight 1997) spending winter in Queensland and summer in Victoria and New South Wales (Higgins and Peter 2003) including the Cumberland Plain west of Sydney.

The main aims of this paper were to record arrival/departure times and return rates of Rufous Whistlers at selected sites on the Cumberland Plain utilising banding data collected over 55 years.

METHODS

Mist nets were used to capture and record a range of species in a longitudinal study monitoring the avian populations within seven sites across the Cumberland Plain (Fig. 1). These sites were in operation for a number of years over varying time periods and trapping was not necessarily continuous during those periods. Full *Project Reports* are published in Farrell and Leishman (2022). The time frames of individual studies are listed below:

(MA) The Australian (Mount Annan) Botanic Garden – 1986 to 2018.

(CA) Camden Airport – 2007 to 2020.

(AP) Humewood/Beulah Forest – 1973 to 1994.

(AB) Agnes Bank Nature Reserve – 1998 to 2009 (plus unpub. dat. 2012-13)

(WN) Wianamatta Nature Reserve – 2014 to 2017.

(WD) Windsor Downs Nature Reserve – 2010 to 2017.

(SV) Scheyville National Park – 1965 to 2016.

A range of vegetation communities is presently preserved within the three reserves (AB, WN, WD), national park (SV), botanic garden (MA) and Biobank Offset Site (AP) (taken from Tozer 2003). These communities include Cumberland Plain Woodland (SV), Castlereagh Scribbly Gum Woodland (SV, AB, WN, WD), Shale Gravel Transition Forest (SV, WN, AB, WD), Agnes Banks Woodland (AB), Cumberland Plain Shale Plain Woodland (SV, MA, AP), Castlereagh Swamp Woodland (WN, WD), Cooks River/Castlereagh Ironbark Forest (WN, AB, WD), Shale Hill Woodland (MA), Riparian Forest (CA) and Shale/Sandstone Transition Forest (CA, AP). Each site has a different combination and/or extent of coverage of these communities.

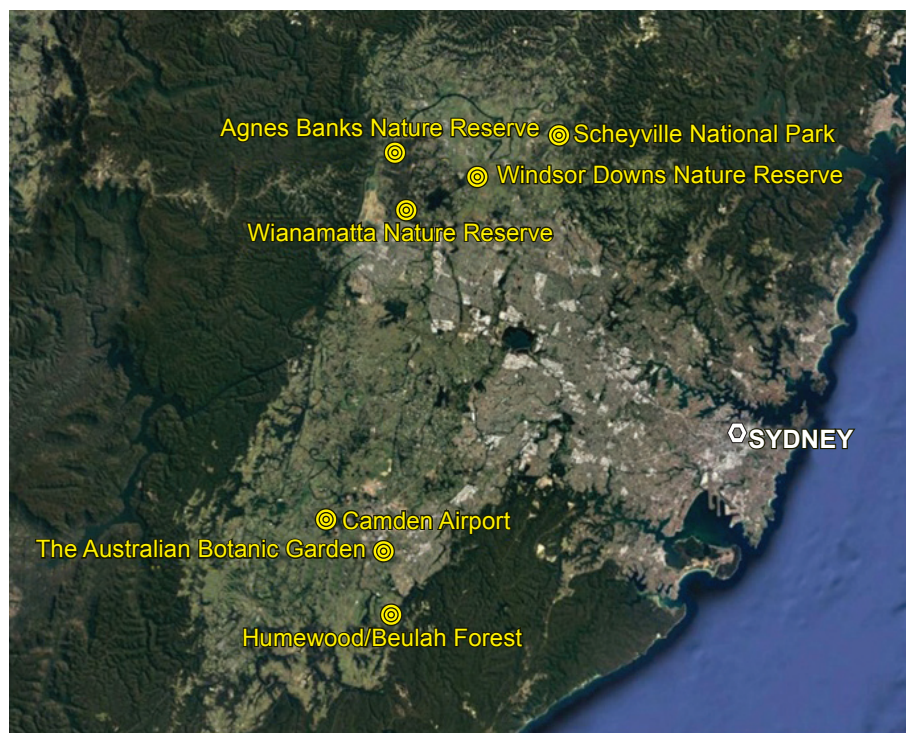


Figure 1. Location of sites across the Cumberland Plain.

Image courtesy of Google Earth.

Sightings and captures from all sites were tallied for each month to determine arrival and departure times. Overall percentage return rates were calculated for each site as the number of individual birds returning to the site during the years in operation divided by the total number of individuals banded. Individuals returning in subsequent seasons to their initial banding were tallied for each site and presented as a percentage of the total number of individuals that returned.

RESULTS

Arrival/Department Times

With only a few exceptions (several sightings and one trapped individual in June at Scheyville National Park), Rufous Whistlers first arrived at our sites during September and departed during April each year (Fig. 2). These arrival/departure times have remained consistent over the 55 years covered by our accumulated data.

Site Fidelity

The total number of Rufous Whistlers trapped at the seven sites was 827, with 168 individual birds returning in one or more subsequent seasons, giving an overall return of 20.3%. The sites, in order of percentage return of trapped individual Rufous Whistlers, are listed on Table 1.

The number and percentages of individual Rufous Whistlers returning in subsequent seasons after initial banding are presented in Table 2. These numbers include multiple returns of some individual birds. More than double the number of Rufous Whistlers returned to Scheyville National Park in the first season after banding compared with the other sites, but this was probably a reflection of the longer duration of the study at this site.

Table 1

Number of Rufous Whistlers trapped and re-trapped at seven sites across the Cumberland Plain. Sites listed in order from highest percentage to lowest.

Site	Total No. trapped	No. (%) of individual birds that returned in one or more seasons after banding	
Humewood/Beulah Forest	91	30	(33%)
Agnes Bank Nature Reserve	74	17	(23%)
Mount Annan Botanic Garden	88	18	(20.5%)
Windsor Downs Nature Reserve	102	20	(19.6%)
Scheyville National Park	437	77	(17.6%)
Wianamatta Nature Reserve	23	4	(17.4%)
Camden Airport	12	2	(16.7%)

The longest elapsed periods between initial banding and last recapture of an individual Rufous Whistler were recorded at Humewood/Beulah Forest (14 seasons) and Scheyville National Park (12 seasons) (Table 2). These two sites also had several individual birds that returned for five seasons after banding. This again probably reflects the longer duration of these two studies.

Mount Annan Botanic Garden and Agnes Banks Nature Reserve showed the highest percentage (66.7% and 64.7% respectively) of individual birds that returned during the first season after initial banding. Return rates dropped dramatically after five seasons (Humewood/Beulah Forest), three seasons (Mount Annan Botanical Garden) and two seasons (Windsor Downs and Agnes Banks Nature Reserves). Scheyville National

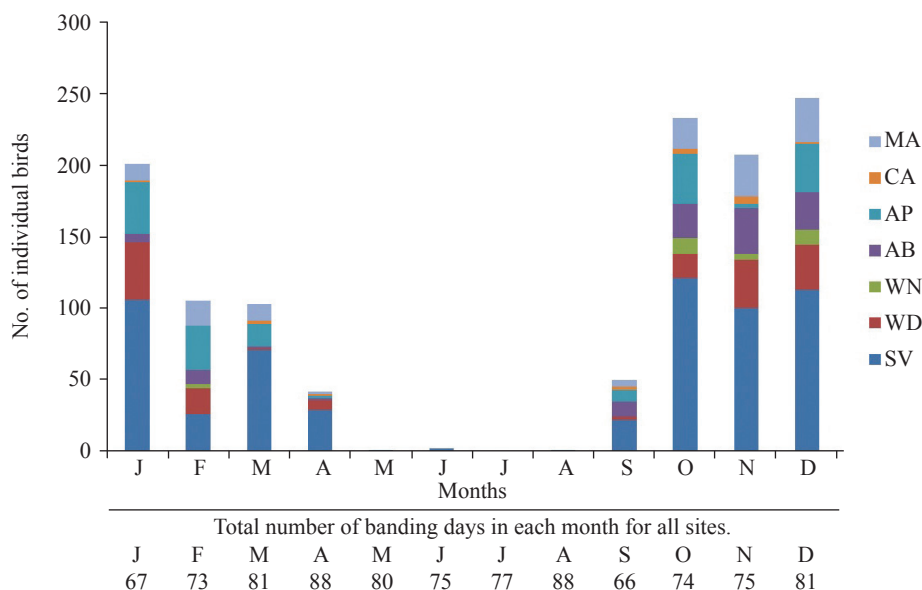


Figure 2. Numbers of captured Rufous Whistlers (including both new and recaptured individuals) from seven sites across the Cumberland Plain (MA = Mount Annan Botanic Garden; CA = Camden Airport; AP = Humewood/Beulah Forest; AB = Agnes Banks Nature Reserve; WN = Wianamatta Nature Reserve; WD = Windsor Downs Nature Reserve; SV = Scheyville National Park) and total number of banding days in each month.

Table 2

Number of returning Rufous Whistlers at the seven study sites; average returns/range; number of individuals returning per season and percentages. Sites listed in order of average number of seasons for returning birds.

Sites	Average No. of seasons returned	Range	Returns in <i>n</i> seasons after banding													
			1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th
Humewood / Beulah Forest	1.9	1-5	13	8	11	10	8	0	3	0	1	1	1	0	0	1
% of returning individuals			43.3	26.7	36.7	33.3	26.7	0	10	0	3.3	3.3	3.3	0	0	3.3
Mount Annan Botanic Garden	1.6	1-4	12	8	8	1	1	2								
% of returning individuals			66.7	44.4	44.4	5.6	5.6	11								
Scheyville National Park	1.5	1-5	27	28	17	10	10	7	6	4	1	0	1	1		
% of returning individuals			34.6	35.9	21.8	12.8	12.8	9	7.7	5.1	1.3	0	1.3	1.3		
Agnes Bank Nature Reserve	1.2	1-2	11	4	0	1	1	0	0	0	2	1				
% of returning individuals			64.7	23.5	0	5.9	5.9	0	0	0	12	5.9				
Windsor Downs Nature Reserve	1.2	1-3	12	5	1	3	1	1	1							
% of returning individuals			60	25	5	15	5	5	5							
Wianamatta Nature Reserve	1	1	4													
% of returning individuals			100													
Camden Airport	1	1-4	1	0	0	1										
% of returning individuals			50	0	0	50										
Total			80	53	37	26	21	10	10	4	4	2	2	1	0	1

Park data, however, showed a gradual decline over 12 seasons (Table 2).

Changes in Vegetation Communities

Over the period of this research many changes have occurred to the seven sites: fires, both hazard reduction and wildfires, have affected Scheyville National Park, Windsor Downs Nature Reserve, Agnes Banks Nature Reserve and Wianamatta Nature

Reserve; invasive weed species have encroached upon all sites, particularly Scheyville National Park and Camden Airport; flooding at Scheyville National Park and Camden Airport caused scouring of creek banks/riparian vegetation; and grazing by stock within Scheyville National Park, Windsor Downs Nature Reserve and Humewood/Beulah Forest adversely affected the natural vegetation. The Humewood/Beulah Forest was the only site not affected by any form of fire over ten years prior to the study or at any time during the study.

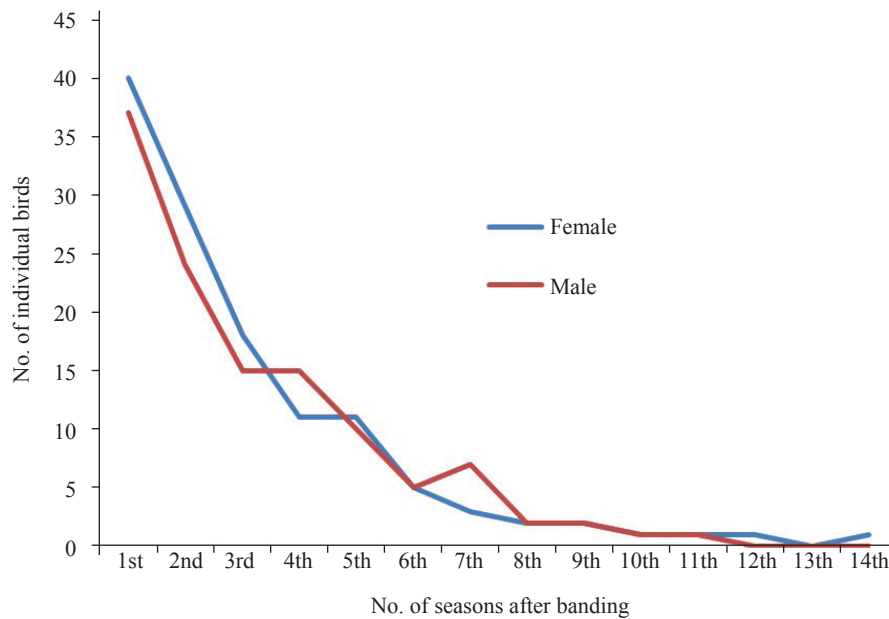


Figure 3. Number of female and male Rufous Whistlers recaptured from the first to the fourteenth season after banding from all sites combined.

The periodic sampling over time, the variety of vegetation communities and especially the changes that have occurred within these communities make the comparison of sites extremely difficult and out of the scope of this paper.

Sex

The percentage of females versus males returning to the site of their initial capture was 49.4% and 48.8%, respectively. The numbers of females and males returning in each season after banding were very similar, with slightly more females returning for the first three seasons (Fig. 3).

Movements

Although many Rufous Whistlers returned to their Cumberland Plain banding sites over many seasons, none was recaptured at another of the Cumberland Plain sites or away from its initial banding site. Within eastern Australia, only 19 Rufous Whistlers have been recaptured away from their initial banding sites (ABBBS 2024). Even though two individuals were recorded travelling considerable distances (206 km and 224 km), none has shown movements from NSW northwards into Queensland (or vice versa) in a particular season to indicate migration routes. Migration patterns on the east coast of Australia have been established primarily on observation data from the many studies cited in Higgins and Peter (2003).

DISCUSSION

Studies utilising capture/recapture and/or colour banding data from both inland and eastern Australian sites indicate that the return rate of Rufous Whistlers varies. In a resident population at Alice Springs it was calculated as 14.9% (Pascoe *et al.* 2019), while two studies of a migratory population at Eastwood Forest (now Imbota Nature Reserve) in the New England District it was 66.7% (Bell and Ford 1987) and 90.4% for adult males, 71.1% for sub-adult males and 83.6% for

females (Bridges 1994). In the Brindabella Ranges, ACT, the percentage return was 13.6% (Horey and Wilson 1971) and 20.7% (Tidemann *et al.* 1988), while in the Blue Mountains, NSW, it was 55.6%, although captured/recaptured numbers were small (Hardy and Farrell 1990). The overall average for the sites on the Cumberland Plain was 20.3% (range 16.7–33%), which falls between those from northern Imbota Nature Reserve and the Brindabella Ranges. This may be a consequence of the distance travelled to the more southern sites each season with the associated perils of predation.

Bridges (1994) stated that the higher return rate for Imbota Nature Reserve was due to the high quality of habitat for this species, i.e. food resources, refuge from predators and nesting sites. The order of our study sites listed in Table 1 may also reflect the quality of the sites for foraging and breeding as the site at Scheyville National Park, in operation spanning over 54 years, recorded a lower percentage return rate than the top four sites, which have been in operation for less than half that time.

As in Bridges' (1994) study at Imbota Nature Reserve the proportion of females versus males returning to their banding site showed no significant difference.

ACKNOWLEDGEMENTS

The authors thank all those participants listed in *Birds of the Cumberland Plain – Australian Avian Communities through Time* who helped gather all the data utilised in this study. Tony Hunt is thanked for his comments on an early draft of the paper. The paper has been enhanced by comments from Richard Noske and an anonymous reviewer. The ABBBS supplied all the bands utilised in these studies over many years and is also thanked. This research was carried out under the following licences: J. Farrell – ABBBS Project No., 1331-06; Banding authority, A1331; Ethics approval, RVF 24/324; Scientific licence, SL100707 – A. Leishman – ABBBS Project No. A 656/2 and A656/7; Banding authority, A 656; Ethics approval, RVF22/4602; Scientific licence, SL 100621.

REFERENCES

- ABBBS. (2024). Australian Bird and Bat Banding Scheme database, Department of Climate Change, Energy, the Environment and Energy, Canberra, accessed 06 May 2024.
- Barrett, G., Sillocks, A., Barry, S., Cunningham, R. and Poulter, R. (2003). *The New Atlas of Australian Birds*. RAOU, Hawthorn East, Victoria.
- Bell, H.L. and Ford, H.A. (1987). Fidelity to breeding-site in four migratory species near Armidale, New South Wales. *Corella* **11**: 1–5.
- Bridges, L. (1994). Territory and male fidelity in a migratory population of the Rufous Whistler *Pachycephala rufiventris*. *Emu* **94**: 156–165.
- Cooper, R., McAllan, I., Brandis, C. and Curtis, B. (2020). *An Atlas of the Birds of NSW and the ACT*. Vol. 3. Eastern Spinebill to Common Greenfinch. NSW Bird Atlassers Inc. Woolgoolga, NSW.
- Department for Environment and Heritage (2008). Adelaide and Mount Lofty Ranges, South Australia. Threatened Species Profile. Rufous Whistler *Pachycephala rufiventris rufiventris*. Government of South Australia.
- Farrell, J. and Leishman, A. (Eds) (2022). *Birds of the Cumberland Plain – Australian Avian Communities through Time*. Australian Bird Study Association Inc., Sydney.
- Hardy, J.W. and Farrell, J.R. (1990). A bird banding study in the Blue Mountains, New South Wales I. Overview. *Corella* **14**: 1–15.
- Higgins, P.J. and Peter, J.M. (Eds) (2003). *Handbook of Australian, New Zealand and Antarctic Birds: Volume 6: Pardalotes to Shrike-thrushes*. Oxford University Press, Melbourne.
- Horey, G.M. and Wilson, S.J. (1971). A banding project in the Brindalbella Ranges, Australian Capital Territory. *Corella* **9**: 27–33.
- Menkhorst, P., Rogers, D., Clarke, R., Davies, J., Marsack, P. and Franklin, K. (2017). *The Australian Bird Guide*. CSIRO Publishing, Clayton South, Victoria.
- Pascoe, B.A., Schlesinger, C.A., Pavey, C.R. and Morton, S.R. (2019). Assessment of avian site fidelity in arid Acacia shrubland based on a ten-year mark-recapture study in central Australia. *Corella* **43**: 8–18.
- Pizzey, G. (1983). *A Field Guide to the Birds of Australia*. W. Collins Sons & Co. Ltd. Sydney.
- Pizzey, G. and Knight, F. (1997). *The Field Guide to the Birds of Australia*. Angus and Robertson, Sydney.
- Tidemann, S.C., Wilson, S.J. and Marples, T.G. (1988). Some results from a long-term bird-banding project in the Brindabella Range, ACT. *Corella* **12**: 1–6.
- Tozer, M. (2023). The native vegetation of the Cumberland Plain, western Sydney: systematic classification and field identification of communities. *Cunninghamia* **8(1)**: 1–75.