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50 Volumes of Canberra Bird Notes
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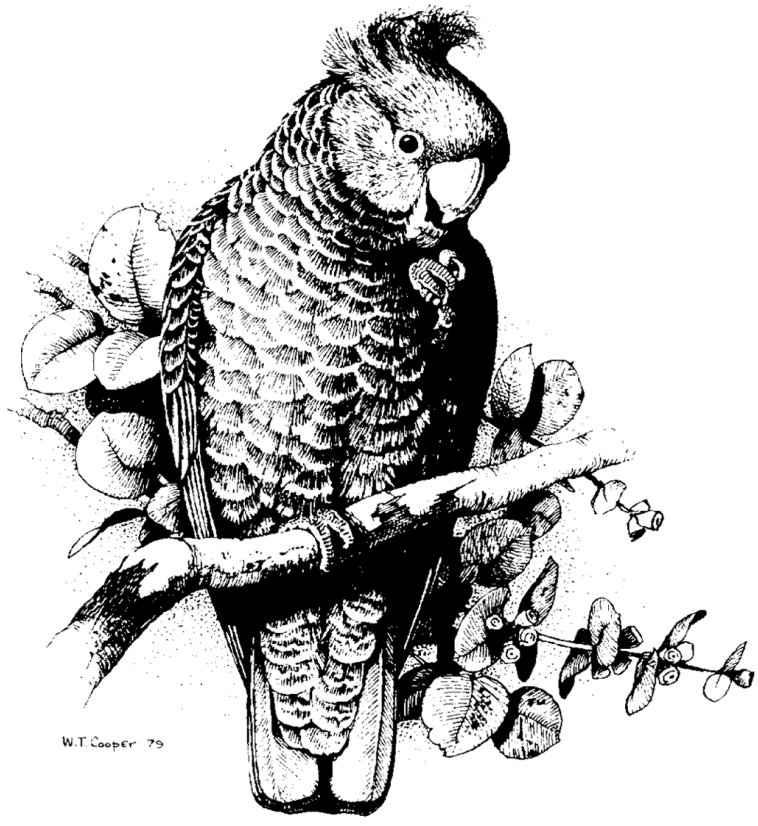

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PO Box 331, Jamison Centre, ACT 2614

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Contacts

General enquiries	cogoffice@canberrabirds.org.au	
President	president@canberrabirds.org.au	
Canberra Birds Membership	cogoffice@canberrabirds.org.au	
Canberra Bird Notes	CBN@canberrabirds.org.au; michael.lenz.birds@gmail.com	
Editors for issue 50(2)	**Julie Hotchin**	julie.hotchin@gmail.com
	Michael Lenz	6249 1109 (h)
	Kevin Windle	6286 8014 (h)
Gang-gang Newsletter Editors & Contact	**Zac Flegg, Gail Neumann;** gang-gang@canberrabirds.org.au	
COG Database Inquiries	cogoffice@canberrabirds.org.au	
COG Web Discussion List	canberrabirds-owner@canberrabirds.org.au	
Conservation Officer & Contact	**Jenny Bounds;** cogoffice@canberrabirds.org.au	
Garden Bird Survey Coordinator & Contact	**Chris Davey;** daveychris12@gmail.com	
Rarities Panel	**Barbara Allan**	6254 6520 (h)
Unusual bird reports	rarities@canberrabirds.org.au	
Records Officer	**Nicki Taws**	0408 210 736
Website	**Julian Robinson**; cogwebmaster@canberrabirds.org.au	
Woodland Project	cogwoodland@canberrabirds.org.au	

Other Canberra Birds contacts

Field Trips	**Sue Lashko**	6251 4485 (h)
Talks Program Organiser	**Jack Holland**	6288 7840 (h)
Distribution of CBN	**Dianne Davey**	6254 6324 (h)

Email us at cogoffice@canberrabirds.org.au if you have a general enquiry.

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CANBERRA BIRD NOTES 50(2) DECEMBER 2025, COMMEMORATIVE ISSUE

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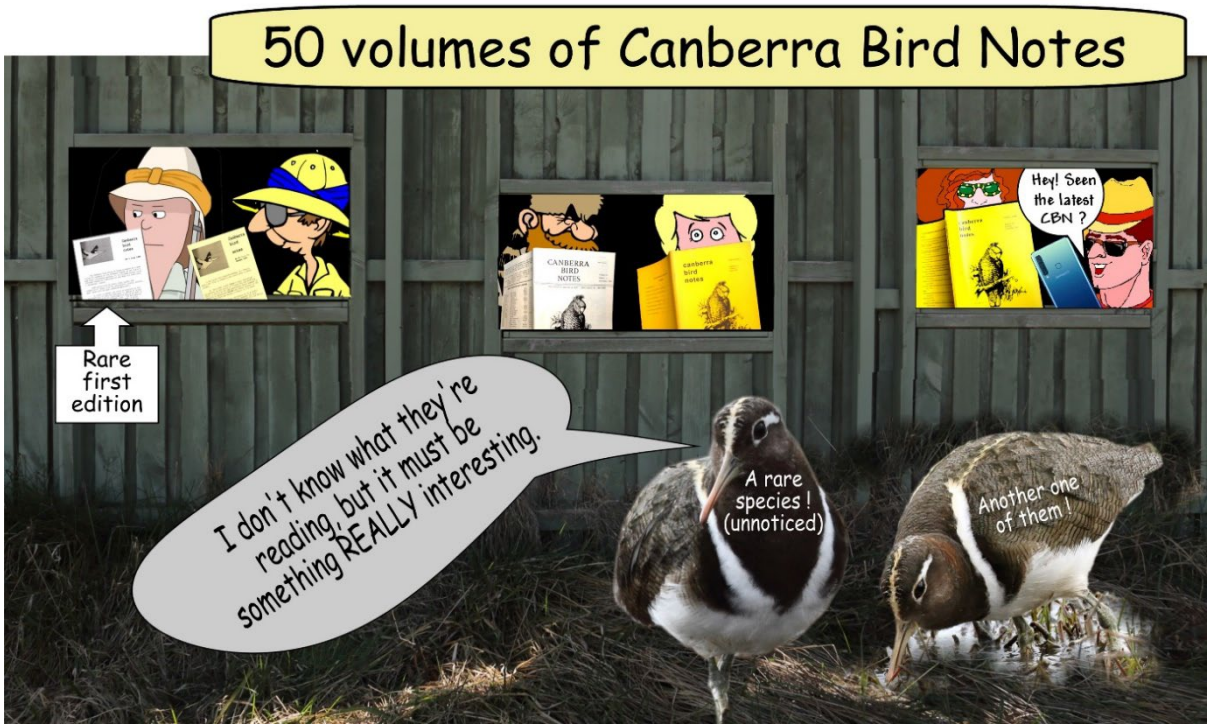

Cartoon by GEOFFREY DABB (geoffrey.dabb@gmail.com)

Canberra Bird Notes 50(2) (2025): 117-120

Introduction

KIM FARLEY (kimlouisefarley@gmail.com), President, Canberra Birds

and

JULIE HOTCHIN (julie.hotchin@gmail.com), Vice-President, Canberra Birds

We are delighted to present this Commemorative Issue of *Canberra Bird Notes* (*CBN*). It celebrates *CBN's* 50 volumes and 57 years of reporting research, bird observations and reflections on the birdlife of the Canberra region. This issue showcases the diversity and scope of *CBN* content over the last six decades by republishing some of the remarkable contributions from a range of its contributors, both amateur and professional. These articles also illustrate the contribution of *CBN* and Canberra Birds/Canberra Ornithologists Group (COG) to the knowledge and conservation of birdlife in our region.

Canberra Bird Notes originated when COG's predecessor, the ACT branch of the then Royal Australian Ornithologist's Union (RAOU, now Birdlife Australia) decided in July 1968 to replace its *Monthly Newsletter*. The aim of the new publication was to 'keep the contents predominantly local in flavour' (including south-eastern New South Wales in addition to the ACT) and to publish 'short notes, etc., of a more general nature which may otherwise go unpublished in our more established ornithological journals' (Chapman and Purchase 1968). As Neil Hermes points out in his contribution in this issue, from its beginning *CBN* has published field trip reports, articles, book reviews and notes of interest to members, showing a remarkable continuity of content. *CBN* has developed into a forum to publish research into many aspects of the biology, ecology and behaviour of the birds of our region.

Importantly, from the mid-1960s, an *Annual Report* on the birds of the district was published by COG's predecessor and then after 1968 this *Report* was published in an issue of *CBN*. The *Report* developed in scope and sophistication and was later published as a standalone issue for several decades (Fennell 2014).

Two strengths of *CBN* deserve particular mention. Firstly, its long history of publication enhances the value of its historical records, including anecdotes, notes, 'Odd Obs', and bird lists, all of which preserve unique historical data about the birdlife of our region. As Penny Olsen has observed in a similar context for *Emu – Austral Ornithology*, these records 'provide a sometimes quaint, occasionally surprising, often enlightening record of what we have lost, what we have changed, and what is and what has been forgotten' (Olsen 2002). One such example is the report from Richard Gregory-Smith in the July 1979 issue of *CBN*. He describes seeing a Brolga in flight while stopped at the Anzac Parade traffic lights near the Russell Offices. He regretted not getting a better look, but the lights changed and he had to drive on. Decades later, birders can still relate to that story. And we can all be surprised that Brolgas appeared in Canberra in living memory (Gregory-Smith 1979).

Second, *CBN* provides a forum for publication of local observations that often would not have been published in other ornithological journals. As *CBN* is an indexed journal, its articles are available to researchers internationally through scientific databases, which gives *CBN* content a potentially wide (and international) readership. Local observations published in *CBN* can also make important contributions to the knowledge of bird biology, finding their way for

example into the *Handbook of Australian, New Zealand and Antarctic Birds* (*HANZAB*) (e.g. Graham 1990, 1993, 1995). It is somewhat unusual for a publication from a small, regional bird group to have this wide reach and influence.

This issue is organised into the following six themes that reflect the nature and scope of research topics published in *CBN* over nearly 60 years:

1. *Canberra Bird Notes* and Canberra birding, 1968-2025
2. Reporting on the status of birds in the Canberra region
3. Monitoring our birds
4. Conservation, including sections on 'Iconic threatened species': the Little Eagle, Gang-gang Cockatoo and the Superb Parrot
5. Bird movements in the ACT
6. Birds of our region – biology, behaviour and breeding

Each theme comprises three parts: a short introduction written by an expert on the subject, one or more feature articles selected from earlier issues of *CBN* that demonstrate important research or key aspects of the theme, and a list of further relevant reading in *CBN*. (Note: the feature articles are reprinted in Calibri font).

We thank Jenny Bounds, Chris Davey, Stephen Debus, Kim Farley, Neil Hermes, Michael Lenz, Michael Mulvaney, Laura Rayner and Steve Read for accepting the invitation to write an introduction to each theme. These short pieces distil many years of research, comment on trends in avian research and methods, and draw out the significance of each theme for our understanding of our region's birdlife in the past and some implications for the future.

Selecting the featured articles took considerable thought and effort. Fifty volumes of *CBN* contain a wealth of fascinating and relevant articles and we could easily have selected double the number we could include here. To make the task more manageable, it was decided to consider only research articles, and not to include shorter 'Notes' or 'Odd Observations'. Importantly, the editorial team sought to cover the full history of *CBN* – so both older and more recent articles are included, by a range of authors. We also wanted to feature articles that demonstrate research of high quality and provide insights into a particular species or group of species, as well as articles that demonstrate the range of Canberra Birds/COG's activities. Many more articles deserved to be featured – look out for further feature articles to be reprinted in future issues of *CBN*.

As well as reading our selected feature articles, we hope that readers will delve into the lists of further reading and discover much that is new, or perhaps be reminded of important contributions from the past and the present. Readers might also be prompted to consider contributions they might like to write for future issues of *CBN*.

We congratulate and thank the seventeen past and current *CBN* editors. Producing a regular publication is hard work and we are indebted to all of them for their energy and dedication over the decades. Fifty volumes of *CBN* is an achievement of which Canberra Birds/COG can be proud. Special mention goes to the current editors, Michael Lenz and Kevin Windle, who accepted the challenge of producing this Commemorative Issue, along with guest editor Julie Hotchin who developed the concept for this Issue. Michael's knowledge of COG's history and his systematic approach, along with Kevin's deft turn of phrase were invaluable to the production of this issue. Geoffrey Dabb celebrates this Issue with a cartoon in his rare style, and we also thank Julian Robinson who designed the artwork for the cover.

A special thank you must also go to regular columnists, *T. alba* and *Stentoreus*, whose opinion pieces and 'birdy gleanings from cyberspace' (*Bracteatus* 2014) share information and observations that readers might not otherwise come across. Their columns in this issue comment on changes in birding practice germane to this Commemorative Issue. Philip Veerman, when editor, added his own line drawings of birds to illustrate some issues. Several of these drawings are reproduced in this issue.

We are indebted to everyone who contributes articles, notes, 'Odd obs', book reviews and other items to *CBN*. Your keen eyes, dedication and willingness to share your insights, reflections and research are the essential material without which *CBN* could no longer continue.

Finally, we encourage readers to consider submitting their own short notes, observations or articles for publication. *CBN*'s future depends entirely on contributions from the local birding community. If you observe unusual behaviour, a particular breeding event, or have an idea for a project, such as monitoring a certain species or area, the editors would like to hear from you. Both short notes and longer articles are welcome. The need to monitor our birds and assess their status is more important than ever against the background of widespread decline of many species locally and in wider Australia. These changes need to be documented, and for our region *Canberra Bird Notes* is the place to publish such results.

Table 1: Editors of 50 volumes of *Canberra Bird Notes*.[1]

Editors	**Period**
Graeme Chapman and David Purchase	Jul 1968 – Apr 1969
Graeme Chapman	Jun 1969
Anthony H. d'Andria	Sep 1969 – Jan 1973
Gerry F. van Tets	Apr 1973 – Jan 1974
Steve Wilson	Jan 1975 – Apr 1978
Barry Baker (acting)	Jul 1978 – Oct 1978
Steve Wilson	Jan 1979 – Mar 1981
Neil Hermes	Jun 1981 – Dec 1982
Peter Davidson	Mar 1983 – Dec 1985
Richard Gregory-Smith	Mar 1986
Philip Veerman	Jun 1986 – Dec 1988
David Purchase	Mar 1989 – Oct 1998
Harvey Perkins and Barbara Allan	Mar 1999 – Dec 2006
Barbara Allan	Mar 2007 – Jun 2007
Anthony Overs	Dec 2007 – Jun 2010
Beth Mantle	Dec 2010 – Jun 2011
Michael Lenz	Dec 2011 – Jul 2017
Michael Lenz and Kevin Windle	Dec 2017 - current

References

Bracteatus, D. (2014) The Canberra Bird Notes Columnists. *Canberra Bird Notes* 39, 50th Anniversary Issue: 80-81.

[1] From Hermes, N., Lenz, M. and Purchase, D. (2014) A Brief History of Canberra Bird Notes. *Canberra Bird Notes* 39, 50th Anniversary Issue, 75.

Chapman, G. and Purchase, D. (1968) Editorial. *Canberra Bird Notes* 2(2), 1.

Fennell, P. (2014) The Annual Bird Report: A Brief History. *Canberra Bird Notes* 39, 50th Anniversary Issue: 77-79.

Graham, B. (1990) Habitat requirements of two pairs of Hooded Robins near Canberra – A Preliminary Report. *Canberra Bird Notes* 15: 22-27.

Graham, B. (1993) Further notes on Hooded Robins near Canberra. *Canberra Bird Notes* 18: 23-9.

Graham, B. (1995) Hooded Robin: Bird of the year for 1991. *Canberra Bird Notes* 20: 49-57.

Gregory-Smith, R. (1979) Brolga in Canberra. *Canberra Bird Notes* 4(7): 24.

Olsen, P. (2002) Birds of A Feather: A Century of Austral Ornithology. *Emu – Austral Ornithology* 102: 1-3.

Canberra Bird Notes 50(2) (2025): 121-131

1. Theme: *'Canberra Bird Notes' and Canberra Birding, 1968-2025*

NEIL HERMES (hermes.neil@gmail.com)

I was wondering where to start on reflecting on the contribution that *Canberra Bird Notes* (*CBN*) has made to Canberra birding and the wider birding world in its 50 volumes over the past 57 years.

I pulled out my (print) July 1968 copy. It was edited by Graeme Chapman and David Purchase (both CSIRO staffers) and published by the Canberra Branch of the then Royal Australasian Ornithologists Union (now known as Birdlife Australia). The newsletter was to be an 'informal medium of communication'. Unpretentious from the start! It is amazing how that first publication (only 12 pages) already reflected many future roles of *CBN*. Several of these were outlined by Steve Wilson in 1997 and hold true today (Wilson 1997).

The July 1968 *CBN* had announcements about talks on extinct parrots and birding in New Guinea. Monthly meetings and their educational role were already a major part of the activities of the future Canberra Ornithologists Group (COG, now Canberra Birds). There were details about the upcoming national bird congress in Canberra, a precursor to COG's many roles in regional and national bird networks. There was an announcement of a bird art exhibition and of course a book review, all pointing to long-term interests. There was a short report of some bird-banding results, a forerunner to the significant role many COG members had in the evolution of bird banding across Australia in the following decades (see Clayton, 2014; Stokes, 2014; Wilson, 1994).

A note of particular interest highlights the substantial contribution *CBN* and many other COG activities have made through careful documentation of the changes in birds in Canberra. The July 1968 newsletter notes:

> Those who have never seen the Crested Pigeon (Topknot) Pigeon *Ocyphaps lophotes*, may be interested to learn that a small party has been resident around the Gungahlin area for some time…. Last year the party was only four, but two juveniles suddenly appeared indicating a successful nesting. Recently, as many as 12 have been seen…. Members are asked to keep a good lookout and report any other local sightings so that we can accurately record what may well be an increase in numbers and extension of range.

Members did keep a good look out. We have a well-documented expansion of this species and they are now regarded as a very common breeding resident.[2]

The longest article in the July 1968 newsletter was a detailed trip report for Pulletop Fauna Reserve. Thirteen members spent a weekend recording 63 species. Malleefowl were regularly seen. While COG and therefore *CBN* have always had a particular interest in birds in or close to the ACT, we have also had a wider regional perspective.

Since that first issue, *CBN* has played a pivotal role in documenting the development of both birdlife and birding in Canberra - not merely as a newsletter but publishing significant articles and keeping the local bird community in touch with wider trends and new information. This is reflected in its pages through, for example, debates on scientific collecting and taxonomy, or the publication of new sub-species in the 1990s (Frith, 1977; Schodde, 1988, 1989 and 1990). And although they evolved together from a strong professional scientific core, *CBN*

[2] https://canberrabirds.org.au/birds/crested-pigeon/

and COG have always been concerned with citizen science - structured, accurate, worthwhile and organised amateur science (see Lenz, 1991) - and *CBN* has played a very important role in encouraging and developing young authors (I should know). The article by Libby Robin featured in this issue (Robin 2002) surveys some of the contributions made by amateur (citizen) and professional scientists in Canberra to the story of Australian ornithology, in which *CBN* has played an important part.

We should acknowledge the editors of *CBN* for their shepherding, encouragement and scientific advice. There have been seventeen CBN editors over the years, and many assistant editors. Three made decade-long contributions: David Purchase (1989-1998), Harvey Perkins (1999-2007), and since 2011 Michael Lenz, who is the longest-serving editor of all.

References:

Clayton, M. (2014) Bird banding in the ACT – The early years and my involvement. *CBN* (39), 58-62.

Frith, H. (1977) Some comments on scientific collecting. *CBN* 3(11), 2-6.

Lenz, M. (1991) The role of the amateur birdwatcher in Australia. *CBN* 16(1), 5-9.

Robin, L. (2002) Canberra's part in the history of Australian ornithology. *CBN* 27(2), 66-75.

Schodde, R. (1988) New subspecies of Australian birds. *CBN* 13(4), 119-122.

Schodde, R. (1989) The story behind the description in *Canberra Bird Notes* of new subspecies of birds. *CBN* 14(4) 90-91.

Schodde, R. (1990) Australian Ornithology – Past, present and future: A case for taxonomic and biogeographical research. *CBN* 15(3), 48-58.

Stokes, T. (2014) Coming through COG and bird banding in the 1960s and 1970s. *CBN* 39, 63-71.

Wilson, S. (1994) Birding in the ACT in the 1960s and 1970s. *CBN* 19(3), 37-45.

Wilson, S. (1997) The role of Canberra Ornithologists Group. *CBN* 22(2), 39-42.

Reprinted feature article, originally published in:

Canberra Bird Notes 27(2) (2002): 66-75

CANBERRA'S PART IN THE STORY OF AUSTRALIAN ORNITHOLOGY

Libby Robin

Centre for Resource and Environmental Studies Australian National University ACT 0200

In 1997, Dr Norman Wettenhall approached me to write a history of the discipline of ornithology in Australia to coincide with the centenary of the Royal Australasian Ornithologists' Union (RAOU), since 1996 known as Birds Australia (BA). I was based in Canberra and BA was in Melbourne, but he had no problems about this. The organisation was national and he wanted national coverage — and he didn't want a book about a club. Nor was he worried that I was not a practising ornithologist. He was seeking a popular history of people and ideas about birds. So *The Flight of the Emu* was born — with a title that evokes the major Australian journal of ornithology that is now in its second century. The flying was important too. It was for all the ideas about Australian birds that evolved in the twentieth century.

I quickly discovered that being in Canberra was no disadvantage to my task. Canberra and its people have made a disproportionate contribution to the national stories of Australian ornithology in the twentieth century. Because of its diplomatic mission, many people pass through Canberra with knowledge of birds in other places and a well-trained comparative eye. The Council for Scientific and Industrial Research (later CSIRO) had a large presence here from the 1920s, and the universities have attracted scientists since the 1940s — and many scientists, even those with no formal qualifications in zoology, are interested in birds.

Canberra's bird-rich location above all prompts an interest in birds in everyone who comes to visit or to live here. We are in a transitional zone between the inland (arid zone) and the coastal zone. We are also on the way up to the highest mountains, and so in the path of altitudinal migrations. And the suburban developments since the 1920s have changed dramatically the environments available to birds. We live in a well-watered, heavily treed oasis surrounded largely by dry open plains, and it attracts birds.

Norman Wettenhall (1915-2000) was very fond of Canberra. It was his place of annual escape from his busy paediatric practice in Melbourne. The Australian Paediatric Association, established in 1951, had a meeting every year in Canberra for about two decades. They chose Canberra because there were no paediatricians here at the time — everyone was away from home and therefore free to mingle and exchange ideas. Norman would skip a session or two, and make sure he visited Robert Carrick or someone else at the CSIRO Wildlife Survey Section and have a break from paediatrics. They would watch Carrick's magpies together along the drive at Gunghalin, and talk about ideas of territory and helpers at the nest.

The early years of Canberra and some of the `part-timers'

Wettenhall was one of many 'part-timers' who enjoyed Canberra. His first visit here was in about 1930 with his younger brother and his father (who was also a paediatrician). They

came to visit Sir Colin MacKenzie and the collections of the Australian Institute of Anatomy, which was then still being built (It is now Screen Sound, the National Film and Sound Archive). They camped on Acton Peninsula in chilly conditions in the May school holidays. 'My mother had died in 1928 (when Norman was only 12) and my father had two sons. I don't think he knew quite what to do with them, so we went camping,' he said in an interview (19 March 1998). Birding became an important hobby, and something that tided him through that difficult period. In 1999 he returned to see again MacKenzie's 'wet specimens' that had impressed him so much as a boy. The bottles of Australian animals preserved in formalin are now part of the Collections of the National Museum of Australia. The idea that one could and should study Australian fauna stayed with him. Although Norman's working life focused on human anatomy and physiology (particularly hormones), he read widely in ornithology, and was a particular supporter of studies of Australian birds.

The decision to situate the national capital in Canberra prompted other early visits to the area. In November 1921, before the city was built, the Melbourne journalist and popular nature writer, Charles Barrett (1922) visited the Federal Capital Territory, and documented the 'Birds around a Homestead'. He saw 'flocks of White-browed Babblers' and photographed the open paddocks with occasional trees that are favoured by the woodland birds which are in sharp decline today.

Gregory Mathews —*Birds of Australia*

The expatriate, independently wealthy Australian, Gregory Mathews, came to have a major influence on Canberra's place in Australian ornithological history. His story begins in the first decade of the twentieth century, when he decided to follow in the footsteps of Gould and produce a set of coloured plates of the birds of Australia. Richard Bowdler Sharpe, the Curator of Birds at the British Museum encouraged this, but suggested that before embarking on the expensive task of employing an artist and commissioning plates, he needed to prepare a full and up-to-date list of Australian birds. There were guides, but all were controversial. Mathews the perfectionist decided to build from scratch. He sent collectors out into all parts of remote Australia to supplement the collections at the British Museum. By the 1920s Mathews' collections eventually amounted to more than 40,000 skins and 5,000 reference books and journals. His *Birds of Australia with hand-coloured plates*, was published in fourteen volumes in London between 1910 and 1927. About this time he ran into financial difficulties and, having finished the plates, he sold the skins to another great collector, Lord Rothschild. Parting with them was a wrench, but the bitterest blow came soon after, when Rothschild himself, under financial pressure from an indiscreet ex-mistress, was forced to sell the whole Mathews collection along with his own. The Australian government, in the grip of a depression, failed to buy Rothschild out. Eventually 82,000 skins were boxed and sent to the American Museum of Natural History in New York in 1931. Mathews was not the only one upset. Rothschild's recently retired curator Ernst Hartert, who had moved to Berlin, ‘broke down and wept when he received the letter’ telling of the sale.

Mathews determined that although the skins had gone, the books at least should come to Australia. He presented his collection of ornithological reference books and journals to the new National Library of Australia in Canberra in 1939. He came out from England and lived in Canberra between 1940 and 1945 to supervise the safe-housing of his books. During those

war years he wrote an autobiography, *Birds and Books: the story of the Mathews ornithological library*, which was published in Canberra in 1942. In his time in Canberra, he also compiled a *List of Birds of the ACT* (1943). Many of the books in the Petherick Collection have the distinctive Mathews bookplate featuring Australian birds. The historical resources on Australian birds in the National Library of Australia are easily the best in the world, largely because of this collection, and because of the commitment of the library to continue subscribing to Mathews' major journals (including *Emu* and *Ibis*) in the many years since.

Tracking the visitors

Not all the visitors who came and went from Canberra were people. One of the favourite visitors beloved of Canberra birdos is the Yellow-faced Honeyeater *Lichenostomus chrysops.* A systematic interest in documenting our migratory birds dates from the 1940s. Donald W Lamm had two stints at the American Embassy in Canberra, the first from 1947 to 1950. He returned in 1960-64. He was an important influence on Canberra's birding community, bringing an international eye and a strong commitment to publishing findings. Lamm worked with CSIRO biologist John Calaby, better known as a mammalogist than a birdo, to undertake one of the earliest — possibly the very earliest — transect surveys used in Australian ornithology.

Between September 1947 and September 1949, Lamm and Calaby (1950) walked a section of the Murrumbidgee River corridor thirty-seven times, observing birds all the way. The transect-survey technique has become very important, as people have realised that active methods such as walking along a transect or searching an area turn up more birds than stationary observation. It was through this repeated, active survey that they were able to document the altitudinal migration of the honeyeaters as they escaped the mountains in autumn and returned for the summer. They published 'Seasonal Variation of Bird Populations along the Murrumbidgee in the Australian Capital Territory' in *Emu*.

This was an important model for surveying birds that inspired other studies elsewhere in Australia and complemented the later Brindabellas banding study, in which Lamm was also a participant in the 1960s. A number of COG members will be familiar with the transect survey method through participation in the more recent work of David Lindenmayer (2002) in an area near Tumut, New South Wales. He is studying the landscape ecology of patches of native vegetation embedded in forests of radiata pine using bird populations. Thanks to the efforts of the COG volunteers who made the numerous transect observations, he has amassed a very large data set with 165 sites and 90 species of birds. Such a method and the skilled observer base, has allowed him to map the changes in bird populations, not simply record presence or absence of a species. The results are complex. He has found a complex `reassemblage' of bird species in the disturbed areas, rather than a fixed or depleted community of birds. In other words, he did not find fewer birds, rather, he discovered that some bird species replaced others as the landscape changed.

Changing landscapes

Canberra itself is a radically changed landscape despite the fact that its hilltops have remained clad in bush, in accordance with Burley Griffin's original concept. Suburban development has been extensive — particularly since the 1960s when many government departments moved from Melbourne to Canberra. In 1964 Lake Burley Griffin replaced the racetrack near the Molonglo River and made a new year-round wetland habitat, more

reliable than Lake George. Lakes Ginninderra and Tuggeranong and the Gungahlin Pond have added additional water points in ensuing years. The suburban growth has provided many more trees. Most of Canberra has developed since the fashion for native gardens took off in the 1960s. The Society for Growing Australian Plants was established in 1957 in Victoria to encourage such gardening, and had spread to all states and the ACT by 1962. The idea of gardening for birds, by planting grevilleas and other nectar-rich native plants followed soon after.

What have these changes meant for birds? It would be difficult to answer that question if we did not have the detailed work of Don Lamm and David White (1949), 'Changing status of Avifauna in the ACT'. Lamm and White documented the avifauna in the pre-lake era, comparing it with earlier observations, including those of George Bennett who travelled extensively in the Yass area in the 1830s and kept excellent natural history notes. The next observations were from the 1920s, when Charles Barrett's notes appeared and also an important list by DP Jones (1929), 'List of Birds of Canberra, the Federal Territory', based on his observations from 1913-28 around Duntroon. Barrett and Jones were both conscious of setting `benchmarks' before the city was built, Barrett commenting that 'bird life should remain plentiful on the plains and among the hills long after the city has been built and peopled'. Lamm and White also incorporated the Mathews survey from the 1940s, and personal records and anecdotal observations of change from people like Francis Ratcliffe, who had arrived in Canberra in the 1930s. Lamm was well aware of the value of documenting bird-life in the regions of rapidly developing cities, noting that these are not always predictable, and citing the American examples of the increase in robins (*Turdus migratorius*) on the east coast with city developments. But he and White could not have known just how timely their survey was with the rapid change that followed in the next decade.

Professional ornithology in the ACT from the 1950s

The establishment of the CSIRO Wildlife Survey Section at Gungahlin in 1949 brought a core group of some of the best ornithologists in Australia (and internationally) to Canberra. Birds were a genuine personal interest of the first Officer-in-Charge, Francis Ratcliffe, and a professional as well as personal interest of the first Chief Harry Frith (Wildlife became a Division in 1962, about a year after Frith had taken over as Officer-in-Charge). Although the Section had little time and no financial support for curiosity-driven research, there were enough birds regarded as 'pests' to ensure that considerable ornithological work was undertaken officially, much of it near Canberra. Robert Carrick’s work on territory in magpies was one of the reasons why the Australian Bird Banding Scheme (ABBS) was established in Canberra under the auspices of CSIRO.

‘Unofficial' ornithology was also important for these professionals. Ian Rowley, working initially as technical officer to Carrick’s magpie project, used his unofficial time at weekends, lunchtimes and in the evenings to begin a lifetime's work on fairy-wrens. Later, he also colour-banded ravens (*Corvus coronoides* and *C. mellori*) and White-winged Choughs *Corcorax melanorhamphus* and studied their territorial and co-operative breeding behaviour over a ten-year period near Canberra. The chough studies continue to the present with the work of Andrew Cockburn, Rob Heinsohn and their students at the Australian National University (see, for example, Heinsohn and Cockburn (1994))

The banding scheme provided an important bridge between amateur and professional ornithologists. The idea that big international questions could be tackled by observing Australian birds justified the commitment of the CSIRO to a scheme 'to harness the mass effort of the large numbers of amateurs interested in the field study of birds', as Robert Carrick wrote in his first ABBS report. Whilst in most states, banding in the 1950s and 60s focused on waders and seabirds, the land-locked ACT team was interested in passerines, particularly the migrating honeyeaters. Steve Wilson, an indefatigable bander and enthusiast, took up the challenge of mist-netting. Before mist-nets, cuckoos and swifts had been regarded as ‘untrappable'. By the time Warren Hitchcock (1964) was reporting on the first ten years of the ABBS, 34,000 birds had been trapped in mist-nets, a significant number of them in the Brindabella mountains at dawn in very chilly conditions. From April 1961 until May 1982 Wilson conducted 292 banding trips to New Chums Road. A computer analysis of the 10,540 birds captured and banded between 1961 and 1979 showed 52 different species, with a total of 4,597 retrapped later (Tidemann, Wilson and Marples 1979)

1963 ACT Branch of RAOU

Wilson was at the heart of Canberra birding activities from their inception, and his enthusiasm continues to the present. On 25 November 1963, a group including John McKean and Warren Hitchcock from CSIRO Wildlife, Don Lamm and Stephen Marchant met at Wilson's home in Narrabundah and decided to establish an ACT branch of the national body, RAOU.

The driving force for this initiative was the newly-arrived geologist Stephen Marchant, who came from England to the Bureau of Mineral Resources in May 1963. Like Lamm he was widely travelled. He had done war service in New Guinea and New Britain, and had also worked in Africa, Egypt and South-east Asia. Although he was not trained as an ornithologist, he had been active in the Cambridge University Bird Club in 1936, and quickly sought out the local Canberra birding community through the artist-ornithologist, Betty Temple-Watts, who was married to one of Marchant's colleagues at BMR. Within two months Steve Wilson had enlisted him in the Brindabella mist-netting trips. It was Stephen Marchant who observed that while there were branches of the RAOU in every state, the ACT did not have one and so the meeting was convened to address this lack. Marchant found himself Chairman of the new group, much to his surprise. 'I thought that I was too recent an arrival in Australia or ACT,' he commented.

The national Nest Record Scheme was a particular initiative of this era. Marchant modelled this closely on a similar scheme run by the British Trust for Ornithology, and ran it himself for most of the 1960s. It was very much dominated by Canberra and district records for many years.

1969 Foundation of COG

By 1966, Marchant felt that while the Nest Record Scheme and the banding was progressing, the national organisation in Melbourne was stagnating, and needed a new constitution, and influx of new ideas. Through the ACT branch he sent 'An Appeal for a Critical Review of the Affairs of the Union' to the national council in Melbourne for discussion at the annual meeting. This very tough but fair document panicked one conservative member of council, who hid it in the RAOU library until the Council meeting, by which time it was too late to discuss it. The result was major ructions in a national council that was very disorganised, and

trying hard to not change. Some changes came, despite resistance, and the RAOU meeting in Canberra in 1968 was the beginning of a new style of scientific congress, with a tightly organised field trip. But the journal *Emu* still lagged behind current scientific practice, and the financial affairs of the RAOU were a disaster.

Eventually the RAOU did get its affairs in order and on 15 April 1970 approved revised Articles of Association, which abolished State branches. There is more than a little irony in the fact that this led to the group most active in the RAOU reform process breaking away to become the Canberra Ornithologists Group (COG). However, the two groups remained close and most COG members remained *Emu* subscribers, especially as, from 1969, Stephen Marchant had taken over as editor and tightened up the style of the journal.

Canberra's international face — 1974

When the International Ornithological Congress agreed to have its first-ever southern hemisphere meeting in Canberra in 1974, the young city of Canberra and its local ornithologists found themselves under international scrutiny. The conference's official sponsors were the RAOU (whose affairs were put in order only just in time) and the Australian Academy of Science. It would never have worked, however, without the leadership of Harry Frith and his team from CSIRO Wildlife (including all their families) and the local birding community, including COG and the Australian National University Biological Society. Almost all the international and interstate delegates attended one or other of the two-day tours near Canberra (Tidbinbilla and Burrinjuck Park) on Wednesday 14 August, despite the fact that it was snowing.

Local support was critical from day one, when a last-minute transport strike stranded delegates on their way to the Congress, including the President, who was stuck in Perth. The opening session had to be delayed for eight hours and the whole first day's proceedings were rescheduled over the rest of the week. In the meantime, those who had arrived had to be entertained. A busload of ornithologists went birding at a property called `Nanima' near Yass that afternoon, courtesy of Mr M Darmody, who obliged at very short notice.

International Ornithological Conferences had been held every four years since 1884, but only once before had they been outside Europe, and that was to the very well-endowed and long-established Cornell University in upstate New York. Canberra was a real newcomer in such company, many of the buildings used by the delegates having been built only a year or two before the conference. Despite the bitter weather (August was probably not the best month to choose, but was dictated by the needs of the mostly European and North American delegates), the air-traffic strike and a narrowly-averted blockade on oil for heating, the conference survived to be a grand success. The bird-rich city of Canberra was much appreciated by those who had travelled from afar.

The theme of the conference, 'the two hemispheres', served to highlight the new and emerging work on birds from the southern hemisphere. The idea of ‘Gondwanan radiations' — bird families like the Corvids that had evolved in the south and migrated north — was a new and exciting one for many from the north. Co-operative breeding strategies, relatively common in Australian birds but unusual in Europe and North America, were also much discussed.

Canberra Garden Birds Survey and the Atlas of Birds of the Australian Capital Territory

In 1981 COG commenced an important longitudinal study of the avifauna of suburban gardens, a study which continues to this day. The results from the first 17 years of this survey were published by COG in *Birds of Canberra Gardens*. At that stage, an astonishing 44,000 weeks of observations in 270 gardens went into discovering that more than 200 species had been seen in suburban gardens (or above them, in the case of eagles), well up on the 174 species recorded in 1950 by Lamm and White. The idea of garden observations has caught on elsewhere too. The Bird Observers' Club of Australia 'Birds & Gardens Survey' was undertaken at regular intervals between 1988 and 2000, mapping the relations between birds and plants, predominantly in Melbourne gardens, and trying to identify what attracts native birds to gardens. Sydney is the focus of the latest in these projects, with its Birds in Back Yards (BIBY), which began in 1999. Birds Australia's Southern New South Wales and ACT Group (SNAG) is sponsoring this project In Queensland, Peter Woodall coordinated garden bird surveys in 1979-80 and again in 1999-2000 for the Queensland Ornithological Society (now Birds Queensland). Building on 200,000 observations made between 1 September 1986 and 31 August and 1989, the Canberra Ornithologists Group on commission from the National Capital Development Commission (later the National Capital Planning Authority), created the 1992 ACT Bird Atlas.

The *Atlas*, edited by McComas Taylor and COG, documented 226 species (including 11 aviary escapees). The fine scale of the Atlas and the seasonal coverage in all cells (and monthly coverage in most) ensured that COG was one of the leaders in Australia in bird-atlassing. Although counting was not part of the actual procedure, the reporting rate was analysed closely so that status (very common to very rare) could be represented. 'Common' was not necessarily an indicator of great numbers, but was correlated with reporting rates, reflecting the spread of species and their visibility to observers. Annual reports in *Canberra Bird Notes* (published since 1975) and summaries associated with the Waterbird and Garden Bird Surveys provided some historical background and incidental records. The presentation of the atlas also broke new ground. Rather than the standard 'dots-in-the-box' technique, they presented the distributions using a contouring method to indicate areas of high to low probability. The new national atlas due out in 2002 from Birds Australia will have seasonal maps, but could not hope for the detail of the fine-scaled ACT *Atlas*.

Reflecting on Canberra's contributions to Australian ornithology

This brief survey, far from exhaustive, makes evident some of the outstanding contributions made by the local amateur and professional ornithological community in Canberra to the national birding effort over the twentieth century. The signs are already there that this will continue in the twenty-first. As the first President of Birds Australia this century is the Canberra ecologist and birdo, Henry Nix, I feel that the last word should be with Steve Wilson, whose reflective work *Birds of the ACT: Two Centuries of Change* (published by COG in 1999) gathers together and summarises much of the data generated in projects mentioned above, and many others. Steve and his wife, Nonie, exemplify the amazing initiative and drive of Canberra's ornithologists. Unfussed by the challenges of new technologies, Steve, aged 86, went out and bought a computer to do this project, which they then undertook together with remarkable teamwork, Nonie typing the text while Steve operated the mouse.

References:

Barrett, C. (1922) Birds around a Homestead. *Emu* 21: 257-263.

Heinsohn, R and Cockburn, A (1994) Helping is costly to young birds in cooperatively breeding White-winged Choughs *Proceedings of the Royal Society of London: Biological Sciences* 256, No. 1347: 293-8.

Hitchcock, W (1964) First ten years of the ABBS. *Australian Bird Bander* 2: 38- 42.

Jones, DP (1929) List of Birds of Canberra, the Federal Territory. *Emu* 28: 252-5.

Lamm, DW and Calaby, JH (1950) Seasonal Variation of Bird Populations along the Murrumbidgee in the Australian Capital Territory. *Emu* 50: 114-22

Lamm, DW and White, D. (1950) The Changing Status of Avifauna in the Australian Capital Territory. *Emu* 49: 199-204.

Lindenmayer, DB, Cunningham, RB, Donnelly, CF, Nix, H and Lindenmayer, BD (2002) Effects of forest fragmentation on bird assemblages in a novel landscape context. *Ecological Monographs* 72: 1-18.

Marchant, S. (2002) A brief history of the 1966 proposal for reform of the RAOU. *Canberra Bird Notes* 27: 14-24

Mathews, GM (1943) List *of Birds of the ACT*. Commonwealth Forestry Bureau Leaflet No. 53, Canberra.

McKelvie, JN (1957) Note on Birds of the Australian Capital Territory. *Emu* 57: 36.

Robin, Libby (2001) *The Flight of the Emu A hundred years of Australian ornithology 1901-2001.* Melbourne University Press, Carlton.

Taylor, McComas and the Canberra Ornithologists Group (1992*) Birds of the Australian Capital Territory - An Atlas.* COG/NCPA, Canberra.

Tidemann, SC, Wilson, SJ and Marples, TG (1979) Some results from a long-term bird-banding project in the Brindabella Range, ACT. *Corella* 12: 1-6.

Wilson, SJ (1999) *Birds of the ACT Two Centuries of Change.* Canberra, COG.

Wilson, SJ, Lane, SG and McKean JL (1964) *The Use of Mist Nets in Australia*, Division of Wildlife Research Technical Paper No. 8, Melbourne, CSlRO, 3-26.

Further reading on *'Canberra Bird Notes' and Canberra Birding, 1968-2025,* in *Canberra Bird Notes:*

Baldwin, M. (1977) Scientific Collecting – Good or Bad? Reduction of the number of specimens essential. *CBN* 3(12) 16-17.

Cairns, M. (1971) The camera as a field notebook. *CBN* 1(12), 2-9.

Calaby, J. (2000) List of birds of the ACT. *CBN* 25(1), 1-22.

Cowan, A. (1977) Scientific Collecting – Good or Bad, continued. *CBN* 3(10) 6-8.

Dabb, G. (2021) Before photography: the Northern Shoveler in Canberra and in 'The Birds of America' by John James Audubon (1785-1851). An example of the action scene in bird art. *CBN* 46)1), 45-50.

Er, K. (1995) Counting terrestrial birds – a bird-watchers dilemma? *CBN* 20(4), 89-97.

Hurrell, J. (2024) 2023 – My big bird year for the ACT. *CBN* 49(1), 1-15.

Lenz, Michael. (1979) Bird recording in the ACT – The need for improvement and a change in policy. *CBN* 4(7), 2-9.

McDonald, David. (1996) Etymology of Jizz. *CBN* 21(1), 2-11.

McDonald, D. (2014) The etymology of "Jizz" reconsidered. *CBN* 41(2), 113-117.

Purchase, D. (2014) The formation and operation of the ACT branch of the RAOU (1964 to 1970). *CBN* 39, 36-52.

Schodde, R. (1977) Scientific collecting – Good or bad? *CBN* 3(9), 2-6.

Schodde, R. (1978) Scientific collecting – Good or bad? *CBN* 4(1) 10-12.

Schodde, R. (1985) New light on the taxonomy and biogeography of Australian birds. *CBN* 10(3), 97-103.

Smith, A. (2008) A record of the first big year for the ACT. *CBN* 33(3), 125-135.

White, D. (1998) Birding in the National Capital City fifty years ago. *CBN* 23(2), 31-33.

Wilson, S. (1978) Scientific Collecting – Good or Bad. *CBN* 4(5), 7-10.

Wilson, S. (2000) The Calaby list – Comments. *CBN* 25(1), 23-26.

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2. Theme: Reporting on the *Status of Birds in the Canberra Region*

KIM FARLEY (kimlouisefarley@gmail.com), President of Canberra Birds

Since its inception, *Canberra Bird Notes* (*CBN*) has provided readers with a wealth of articles that report on the status of the birds of our region. The production and publication of these reports is a testament to both COG and *CBN*'s very strong contribution to the knowledge and conservation of birds of the ACT and our Area of Interest (AoI) in south-eastern NSW.
The reports of status (often, but not always, taking into account abundance, distribution and breeding) are of several types.

The first and earliest were usually, but not always, one-off articles about a particular species of interest to the author. This type of report continues to the present day and is an important and often fascinating part of *CBN* content. The best of these reports are closely researched reviews of the status of an individual species or groups of species. The specific content is determined by the author – but the articles variously include background about the species or group of species, descriptions and results of survey or research work, discussion, sometimes speculation and/or recommendations for future action. Illustrative articles included here selected from among many excellent pieces are Jack Holland on the Eastern Koel (1996) and J.L. Gardner and Peter Marsack on the Speckled Warbler (2006). Esteban Fuentes and Jerry Olsen's article on the breeding status of birds of prey in the Canberra region was and is a local example of a well-conducted study and expertly presented paper that highlighted the uniqueness of Canberra as the home of 12 species of raptor.

However, from April 1972, thanks to the collective endeavours of Grahame Clark, Henry Nix and Steve Wilson, a series of reports on the status of 'everyday' and more common species in Canberra and district was compiled and published in *CBN*. The first of these reports on 'The status of birds in Canberra and District' is republished below to demonstrate this early summative reporting. Continuing through most of that decade, each article presented a brief overview for the multiple species in each report. The compilers sourced their data from field guides, the scientific literature and local records of sightings. Sightings recorded in the Observation Book, updated at COG's monthly meetings were also included as were members' reports, many of which appeared in *CBN*. Reading through the series up to 1979, one can sense the authors' enjoyment in their task. The series reads like a field guide to birds of the ACT, with local locations and local breeding information included where available.

These reviews of the status of our local birds must have been of great value to everyday birders at the time, but they also provided what was probably a unique contribution to the knowledge of the status of selected species in one discrete part of Australia. That all of this was done without a database (in the modern sense) and with only a limited number of observers makes the contribution even more noteworthy.

By the end of the 1970s, and in recognition of the value of these earlier status reviews, a more comprehensive approach was adopted. In January 1980 the first *Annual Bird Report* was published, covering the status of local birds for the year 1978-79. That project must have been a daunting task, since it attempted to describe the current and changing status of as many local species as possible. In the report's introduction, the compilers considered that, to some degree, their attempt had failed, especially in the reporting of very common species They noted that the material available to them did not allow a fair assessment of the local situation for many

species. Some species were omitted altogether, due to lack of data. The judgment of the compilers of their own effort in 1980 is way too modest, as their contribution was substantial. Concurrently, COG was taking an increasingly systematic approach to data collection and reporting. Influential to this process was Michael Lenz's 1979 article about improving COG data collection and reporting (Lenz 1979). As well as leading to the start of the Water Birds and Garden Bird Surveys, this meant that for the first time there was enough quality data to enable more comprehensive status reports to be produced.

Work on this more systematic approach to data collection and reporting continued well into the 1980s and was accompanied by the creation of databases for the storage and extraction of data. It also included introduction of the grid system for the ACT and COG AoI in 1986. This encouraged observers to explore the area designated by squares on this grid irrespective of where they were, and also offered opportunities for standardised extraction and reporting of data.

As a result of these and other innovations, the Annual Bird Report (ABR), as we know it today, and one of the jewels in COG's crown, was produced from 1980 until 2020. The ABR reports on a standardised set of items and provides a brief text overview and summary statistics for every species in our region along with comments on geographic distribution, seasonal variation in occurrence on a month-by-month basis throughout the year, long term variation in occurrence, and breeding times (Fennell 2014).

For technical and personnel reasons, the ABR has not been released during the 2020s but will be produced again in the future. An annual status report using eBird data will be published, and we will resume reporting from our survey programs. Most members now use eBird to record their observations, and along with the eBird data contributed by visiting birders, students and local non-members, this dataset is overwhelmingly the largest source of data about birds in Canberra and adds to the knowledge of local birds. Notwithstanding this, eBird data is not a replacement for the data collected through our structured survey programs. Rather, its semi-structured data can be seen as complementary to our structured survey data. Until the development and production work to resume producing an ABR has been finalised, status reports for local species, drawn from the 2017 ABR, continue to be available on the Bird Info page on the Canberra Birds website (https://canberrabirds.org.au/birds/).

The history of COG, of *CBN*, and of the reporting of the status of birds in *CBN* has been one of change: of taking the opportunities afforded by new technologies and tools, of meeting and embracing challenges, and of our evolution as an organisation - for the benefit of our members and volunteers, and ultimately for the benefit of our local birds.

References

Fennell, P. (2014) The Annual Bird Report: A Brief History. *Canberra Bird Notes* 39, COG 50th Anniversary Issue: 77-79.

Lenz, M. (1979) Bird recording in the ACT – The need for improvement and a change in policy. *Canberra Bird Notes* 4(7): 2-9.

Lenz, M. (1980) Bird report, 1 July 1978 to 30 June 1979. *Canberra Bird Notes* 5(1): 2-23.

Reprinted feature articles (5) published in:

Canberra Bird Notes 2(2) (1972): 1

EDITORIAL

The need for a review of the status of birds in the A.C.T. district has been realised for a long time but nothing concrete eventuated until the appointment of an *ad hoc* sub-committee charged with this task. The first fruits of that step appear on page 8 of this issue - ten species in the orders Casuariiformes, Podicipitiformes and Pelecaniformes are dealt with. It is stressed that these notes represent the sub-committee's findings and are by no means definitive. Readers who disagree are urged to speak up, preferably in print.

Canberra Bird Notes 2(2) (1972): 8-10, 12-13

THE STATUS OF BIRDS IN CANBERRA AND DISTRICT

Preparation of the second edition of "A Field-List of the Birds of Canberra and District" highlighted the fact that our knowledge of the status of birds in the Canberra district is far from complete. The C.O.G. Committee therefore appointed a sub-committee for the purpose of scanning all the available literature and recording what is known about the status of each species in the area. The sub-committee consists of G.S. Clark, H.A. Nix and S.J. Wilson. The term 'Canberra and District ' is taken to cover the area within an easy day's return car trip from Canberra, roughly that shown on the map in the centre pages of the second edition of the field-list.

The following notes are the collation of all records available to the sub-committee. Readers may disagree on some of the points and in such a case they are asked to let the sub-committee know. Alternatively they could write a letter or article for Canberra Bird Notes stating how and why they disagree. The status of many birds is not fully known and the sub-committee would be grateful for all information received, especially if it contradicts established ideas. Sources that have been used include all the references listed as well as those records placed in the observation book which have been well documented. Annual bird-lists of the Canberra Branch of the RAOU and *Canberra Bird Notes* have also been used as source materials.

A proper determination of status for some species would require regular observations in one area over a long period. This is one way in which members can help as the area can be a garden or a lunchtime walk. Anybody interested in doing this and willing to help should get in touch with one of the committee members. Regular observations of common birds in one area contribute more to our knowledge of status than records of first occurrences in the A.C.T.

CASUARIIFORMES

EMU *Dromaius novaehollandiae*

The emu was a former resident in the district but with increased settlement it disappeared. There are no recent published records of wild birds.

LITTLE GREBE *Podiceps novaehollandiae*

A very common breeding resident. It frequents lakes, creeks, rivers, dams and swamps - anywhere there is an open stretch of water, which can be quite small in extent. The breeding period seems to be from the beginning of October to the end of February. There is an apparent increase in numbers on open water in winter. Whether this is just birds of the year flocking or whether all birds flock is uncertain.

HOARY-HEADED GREBE *Podiceps poliocephalus*

A common breeding resident. Although it shares the same habitats as the Little Grebe it is more often found on open water, such as large lakes. It is gregarious and nests in colonies in such areas, unlike the Little Grebe which nests in pairs on dams and backwater. The Hoary-headed appears to be highly nomadic as numbers fluctuate considerably. Breeding takes place from early November to January. Colonies have been recorded at Lake George and Lake Bathurst.

GREAT CRESTED GREBE *Podiceps cristatus*

Like the Hoary-headed, this grebe is found on large bodies of water, and it breeds on Lakes George and Bathurst. It appears to be nomadic on these two lakes as numbers may fluctuate considerably, *e.g.* 447 were present at Lake George on August 4, 1963 (Lamm, 1965), but there are nearly always some birds there. For Lake Burley Griffin there are occasional reports of up to four birds at a time from all parts of the lake except the Central Basin. The breeding season in the district extends from the beginning of November to the end of January.

PELECANIFORMES

PELICAN *Pelecanus conspicillatus*

The Pelican is present throughout the year and is fairly common on the local lakes, but numbers decrease winter. It has attempted to breed twice at Lake George.

The breeding season appears to be from early August to the end of November, but it is probably dependent on rainfall and water levels. Numbers at Lake Burley Griffin have increased steadily since the lake was established. Although, the species has been present there throughout the year, there are no records between December 1970 and December 1971 apart from single birds in February and March. This is presumably due to construction work in the bird's favourite haunt around Jerrabomberra Creek.

DARTER *Anhinga rufa*

An uncommon breeding resident which is localised in occurrence. It is found on lakes, large dams and rivers where the water is placid. It has nested in Lake Burley Griffin (Molonglo River) area, and the nesting season appears to be from early January to almost the end of February. Although the bird is not common, there are regular reports of its presence in the Molonglo River and occasional reports from Lake George. It has not been recorded at Lake Bathurst.

BLACK CORMORANT *Phalacrocorax carbo*

This is a very common bird on the local lakes, though less common on the rivers and dams. Breeding extends from October to February, and the last record nesting in our area was at Lake Bathurst in February 1964. Numbers reach a peak from September to November with only scattered individuals between March and July.

LITTLE BLACK CORMORANT *Phalacrocorax sulcirostris*

A common resident which may breed. This is a bird of lakes, rivers and occasionally dams. There have been unconfirmed reports of breeding in our area but no information is available. The species is less common than *carbo*, but as in that species numbers tend to decrease in autumn and early winter.

PIED CORMORANT *Phalacrocorax varius*

An occasional visitor on the larger bodies of water. Birds may occur throughout the year singly or in small groups (maximum recorded: 6) with a tendency towards more records in summer (this may be due to increased bird-watching activity then). A record of the Black-faced Cormorant *Phalacrocorax fuscescens* in Jones (1929) probably referred to this species.

LITTLE PIED CORMORANT *Phalacrocorax melanoleucos*

A very common resident on all stretches of open water including rivers and small dams. Breeding has been recorded only from the Molonglo River, although it may nest elsewhere from early January to the end of February. Unlike the 'black' cormorants (*carbo* and *sulcirostris*) this species' numbers increase in winter and decrease in spring.

Canberra Bird Notes 30(2) (2005): 65-72

BREEDING STATUS OF BIRDS OF PREY LIVING IN THE CANBERRA REGION 2002-03

ESTEBAN FUENTES AND JERRY OLSEN

Applied Ecology Research Group University of Canberra, ACT

Abstract Canberra has always been a city of raptors. With eleven species currently breeding within the city limits and at least six more as sporadic visitors, the city is a unique major urban centre in the world in its diversity and abundance of birds of prey. In 2002, we started a study on the general ecology of the local raptors. We used surveys through suitable habitat, incidental observations, public reports and the knowledge of historical sites to locate as many occupied territories as possible and monitor them, mainly throughout the breeding season. We found 12 species breeding in the Canberra Area, 11 of them within the city limits. The species with more territories located were the Brown Falcon, Peregrine Falcon, Nankeen Kestrel and Wedge-tailed Eagle. We also present some information on other species of raptors that were observed but not confirmed breeding in the area.

Introduction

One important limitation of most local and international raptor studies is that most of them take a species-specific approach or they focus on a limited number of species. In Australia there are only three serious studies of communities of birds of prey, two by Baker-Gabb and one by Aumann. Baker-Gabb studied the breeding ecology of twelve species in north-west Victoria (1983a) and the breeding ecology and behaviour of seven species wintering in coastal Victoria (1983b). Aumann worked on the raptor assemblages of the Northern Territory, particularly their habitat use (200la), food habits (2001b), structure (2001c) and breeding biology (2001d).

The Australian Capital Territory (ACT) and surrounding areas is home to several species of raptors, even within the urban limits of the city of Canberra (Olsen & Olsen 1990). The area has attracted a great deal of scientific interest, with some of the first major studies of any raptor in the country (Leopold & Wolfe 1970), and the establishment of a Raptor Research Group in 1980 (Olsen 1981). The general ecology of four of the local species is well known: Wedge-tailed Eagle *Aquila audax* (Leopold & Wolfe 1970), Peregrine Falcon *Falco peregrinus*, (Olsen 1992, Olsen & Tucker 2003, Olsen et al. 2004), Nankeen Kestrel *F. cenchroides* (Olsen *et al.* 1979, Bollen 1991) and Southern Boobook *Ninox novaeseelandiae* (Olsen & Trost 1997, Olsen & Taylor 2001, Olsen *et al.* 2002a, 2002b), but information about the other species is very limited.

Though the presence of most of the local raptor species is well known, the same is not true for their breeding status (COG 2003, 2005, B. Allan pers. comm.), making unclear which species are breeding locally and which are only visitors or non-breeding residents. In order to remedy this deficiency, the aim of this paper is to report the presence and breeding activity of the raptor community near Canberra.

Methods

Study area

The urban area of the city of Canberra covers most of the northern part of the ACT. Most of the undeveloped hill and ridge areas in and around urban Canberra are protected nature reserves that together cover an area of approximately 5720 hectares. The main vegetation associations here are dry sclerophyll forest, open forest, and woodland. On the outskirts of the city the area is mainly farmland with two protected corridors along the Molonglo and Murrumbidgee rivers, which are up to 4 km wide and along the full length of the ACT section of the rivers. The vegetation here is dominated by River She-oaks *Casuarina cunninghamiana*. The Namadgi National Park covers much of the rest of the territory on the southern end (106 000 ha). The habitat here is mainly wet sclerophyll forest, dry forest with open grassy valleys on the lower elevations and alpine woodland on the higher areas.

More details on the study area can be found elsewhere (Taylor & COG 1992, Olsen *et al.* 2006).

Survey

In August 2002 we started a long-term study on the general ecology of the raptor community living in the Canberra region (Figure 1). Our goal was to find the maximum number of territories possible in order to estimate aspects such as breeding success, food habits and habitat selection. We performed intensive searches through suitable habitat and also revisited sites located on previous surveys (Leopold & Wolfe 1970, Olsen 1992, Olsen & Rehwinkel 1995, Olsen unpublished data). Surveys were performed in the following locations: Canberra Nature Parks; along the Molonglo and Murrumbidgee Rivers; some areas of Namadgi National Park; Googong and Burrinjuck Dams; around Lake George; some city parks, ovals and golf courses; and several hectares of farmland, both inside and outside Canberra's city limits. Incidental observations of nests or birds (whose nest was located later) were also included. We also received reports from the public and staff of ACT Parks and Conservation, which were then followed up and checked for occupied territories. The combination of all these sources and methods has been previously recommended in order to maximize the number of raptor territories located (Lehman et al. 1998).

We used a global positioning system (mean accuracy 6.1 ± 2.1 m, n=129) to record the location of nests found and to measure some habitat-related features. To minimize the effect of the investigator on productivity, disturbance was minimized in early stages, so nests were only climbed - when possible - after the nestlings had reached a certain age in order to be banded. We made at least two visits to each nest during the season, with the exception of most peregrine sites that were often visited just once, since their location was already known and they are part of an ongoing monitoring program (see Olsen 1992, Olsen & Tucker 2003, Olsen *et al*. 2004 and Olsen *et al.* 2006). We assigned the territories to different land uses according to the following categories: a) Urban nature reserves (inside the city limits, mostly Canberra Nature Parks); b) Non-urban reserves (river corridors, Namadgi National Park, Burrinjuck Dam and Googong Foreshores); c) Farmland; d) Urbanized (suburbs, ovals, parks golf courses and school campuses in the city); and e) Other areas (forestry, military-related, industrial).

Here, we report the number of occupied breeding territories, which are defined as areas that contain one or more nest within the home of a pair of mated birds (see Steenhof 1987).

These territories are said to be "breeding" or "active" when eggs are laid. Finally, we also include comments on other non-breeding species observed in the area. For the purposes of this paper when we refer to raptors we include both the diurnal (Order Falconiformes) and nocturnal (Order Strigiformes) birds of prey.

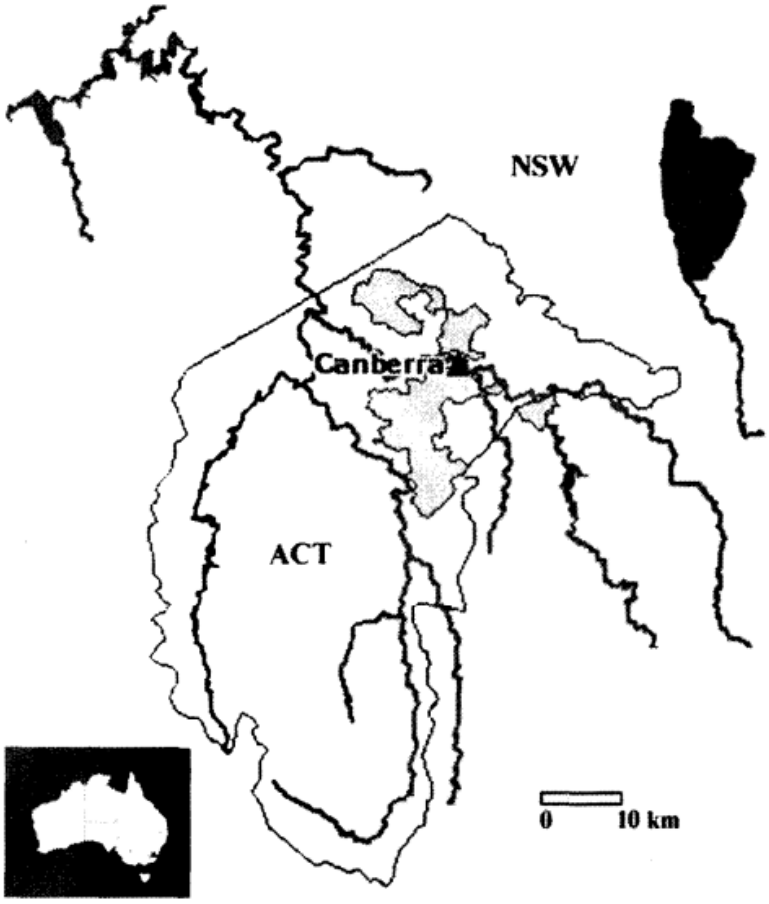

Fig. 1. The Canberra region (34° 45'- 35°47' S, 148° 40' — 149° 50' E).

Results

We located 148 occupied breeding territories of 12 species (Table 1). All species bred within the city limits during this period, with the exception of the White-bellied Sea-Eagle *Haliaeetus leucogaster.*

Most of the territories located were on farmland and non-urban reserves (67% of total), with the urban area being the one less represented (Figure 2).

Other species observed but not found breeding during the period of study were Swamp Harrier *Circus approximans*, Barn Owl *Tyto alba*, Black Kite *Milvus migrans* and Black Falcon *Falco subniger*. At least two Swamp Harrier pairs were observed in Namadgi National Park and another at Jerrabomberra wetlands. We suspect these birds are breeding but no nest could be confirmed. Several individual Barn Owls were observed, most of them in the north-east section of Canberra, particularly near Fyshwick and Pialligo. One Black Kite was

observed north of Queanbeyan in November 2003; and one Black Falcon lived on farmland in the south-east of the city for at least two weeks in late December 2002.

Table 1. Number of occupied raptor territories located and monitored in the Canberra region in the 2002 and 2003 breeding seasons.

Species		Number of occupied territories located 2002-2003
Black-shouldered-Kite	*Elanus axilaris*	3
Whistling Kite	*Haliastur sphenurus*	2
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	4
Brown Goshawk	*Accipiter fasciatus*	14
Collared Sparrowhawk	*Accipiter cirrhocephalus*	8
Wedge-tailed Eagle	*Aquila audax*	39
Little Eagle	*Hieraaetus morphnoides*	6
Brown Falcon	*Falco berigora*	20
Australian Hobby	*Falco longipennis*	5
Peregrine Falcon	*Falco pcregrinus*	21
Nankeen Kestrel	*Falco cenchroides*	21
Southern Boobook	*Ninox novaeseelandiae*	7

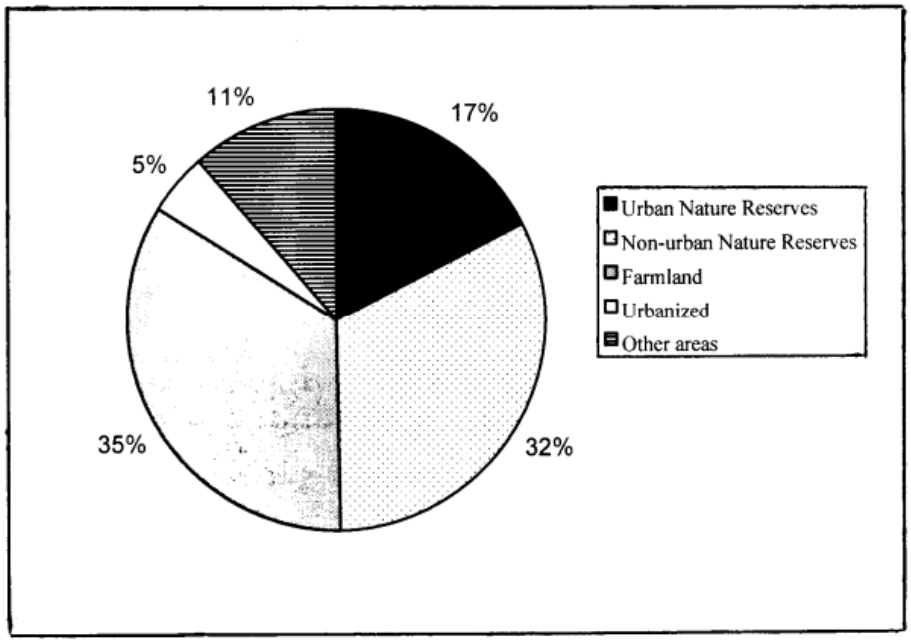

Fig 2. Distribution of the raptor territories found in Canberra across five categories of land.

Discussion

Although our data showed that most nests were located in farmland and nonurban nature reserves, these results should be taken with caution. The main goal of the survey was to locate as many territories as possible, for which we used the variety of methods described above, which produced an unequal sampling effort across areas. For instance, areas at higher elevation in Namadgi National Park were harder to survey, and it is likely that many nests were missed there. Contrastingly, urban territories or nests located on roadsides are easier to find. It is possible that the large number of territories located in some of these land use areas is an outcome of these biases.

Our results overall coincide with previous surveys (Olsen 1992, Olsen & Rehwinkel 1995), confirming the presence of a diverse community of breeding raptors in the Canberra region. One difference is the lack of confirmed breeding pairs of Swamp Harriers, for which at least one territory was located - in Mitchell - in the early 1990s (Olsen 1992). We also failed to locate breeding territories of another species, the Powerful Owl *Ninox strenua*, which is a common breeding resident on higher elevations in Namadgi National Park (Olsen & Rehwinkel 1995). On the number of times that we checked the historically known nest sites or played calls we didn't get any response. Though no pairs of Barn Owls were located breeding in the present study, it is possible that both Barn Owls and Swamp Harriers will be confirmed as breeding species in future surveys. These two raptors together with the Powerful Owl and the 12 species reported here are thus likely to form the complete breeding community of birds of prey in the Canberra region.

In an urban context, the raptor breeding community is very diverse, represented by 11 species, with only the White-bellied Sea-Eagle missing. This is unlike most urban centres worldwide, where only one or few species are present (see Bird *et al.* 1996). Species such as the Peregrine Falcon, American Kestrel *Falco spaverius* or the Osprey *Pandion haliaetus* are well known for their ability to adapt to urban environments (Cade et al. 1988, Palmer 1988). The opposite is true for members of the genera *Accipiter, Aquila*, or *Elanus*, which rarely nest in urban environments (Bloom & McCrary 1996). However, in Canberra, these three "non-urban" genera are represented by four species (Collared Sparrowhawk *Accipiter cirrhocephalus*, Brown Goshawk *Accipiter fasciatus*, Wedge-tailed Eagle, Black-Shouldered-Kite *Elanus axillaris*), plus seven more from which some are known to tolerate some level of human activity (*e.g.* Peregrine Falcon and Nankeen Kestrel).

We believe that the presence of this diverse community is an outcome of the complex mosaic of habitat and prey available to them. The mixture of suburbs rich in vegetation, several urban nature reserves and large areas of farmland provide the raptors with a large choice of nesting sites, and at the same time provide food and shelter for several species of birds, mammals, reptiles, fish and insects (native and exotic) that the raptors take as prey. Without this complexity the diverse raptor community simply wouldn't be there.

This diversity shouldn't be taken lightly, since it is a potential indicator of a broader plant and animal community (Newton 1979). Factors such as urban development and recreational activities on nature reserves are a potential threat to this diversity and need to be evaluated. Future studies should focus on the effect such activities may have on the local raptors, both inside and outside the city.

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References

Aumann, T. (200la). Habitat use, temporal activity patterns and foraging behaviour of raptors in the south-west of the Northern Territory. Australia. *Wildlife Research* 28: 365-378.

Aumann, T. (2001b) An intraspecific and interspecific comparison of raptor diets in the south-west of the Northern Territory, Australia. *Wildlife Research* 28: 379-393.

Aumann, T. (2001c) The structure of raptor assemblages in riparian environments in the south-west of the Northern Territory, Australia. *Emu* 101: 293-304.

Aumann, T. (2001d) Breeding biology of raptors in the south-west of the Northern Territory, Australia. *Emu* 101: 305-315.

Baker-Gabb, D.J. (1983a) The Breeding Ecology of Twelve species of Diurnal raptor in North-Western Victoria. *Australian Wildlife Research* 10: 145- 160.

Baker-Gabb, D.J. (1983b) The Feeding Ecology and Behaviour of Seven Species of Raptor Overwintering in Coastal Victoria. *Australian Wildlife Research* 11: 517-532.

Bird, D.M., Varland, D.E. & Negro, J.J. (1996) *Raptors in Human Landscapes*. Academic Press: London.

Bloom, P.H. & McCrary, M.D. (1996) The Urban Buteo: Red-shouldered Hawks in Southern California. In: Bird, D.M., Varland, D. & Negro, J.J., eds, *Raptors in Human Landscapes*. Academic Press, London: 31-39.

Bollen, C. (1991) Breeding behaviour and diet of the Australian Kestrel *Falco cenchroides* on the Southern Tablelands of New South Wales. *Australian Bird Watcher* 14: 44-50.

Cade, T.J., Enderson, J.H., Thelander, C.G. & White, C.M., eds. (1988) *Peregrine Falcon Populations: Their Management and Recovery*. Peregrine Fund, Boise, Idaho.

Canberra Ornithologists Group (2005) Annual Bird Report: 1 July 2003 to 30 June 2004. *Canberra Bird Notes* 30: 1- 64.

Canberra Ornithologists Group (2003) Annual Bird Report: 1 July 2002 to 30 June 2003. *Canberra Bird Notes* 28: 125-188.

Lehman, R.N., Carpenter, L.B., Kochert, K. & Kochert, M.N. (1998) Assessing the relative abundance and reproductive success of shrubsteppe raptors. *Journal of Field Ornithology* 69: 244-256.

Leopold, A.S. & Wolfe, T.O. (1970) Food habits of the Wedge-tailed Eagles, Aquila audax, in South-eastern Australia. *CSIRO Wildlife Res.* 15: 1-17.

Newton, I. (1979) *Population Ecology of Raptors*. T. & A.D. Poyser: Berkhamsted.

Olsen, J. (1981) Preliminary report of the ACT Raptor Group. *Canberra Bird Notes* 6 (3): 78-79.

Olsen, J. (1992) *Raptors in Namadgi, Canberra Nature Parks, the Murrumbidgee River Corridor and on the Googong Foreshore, ACT with special emphasis on the Peregrine Falcon*. Report to the ACT Parks and Conservation Service.

Olsen, J., Debus, S., Rose, A.B. & Hayes, G. (2004) Breeding success, cliff characteristics and diet of Peregrine Falcons at high altitude in the Australian Capital Territory. *Corella* 28: 33-37.

Olsen, J., Fuentes, E., Rose, A.B. & Trost, S. (2006) Food and Hunting of Eight Breeding Raptors Near Canberra 1990-1994. *Australian Field Ornithology* 23: 77-95.

Olsen, J., Marcot, B.G. & Trost, S. (2002a) Do Southern Boobooks *Ninox novaeseelandiae* Duet?. In: Newton, I., Kavanagh, R., Olsen, J. & Taylor, I., eds. *The Ecology and Conservation of Owls*. CSIRO, Melbourne.

Olsen, J. & Rehwinkel, R. (1995) *Peregrines and Powerful Owls in Namadgi and Tidbinbilla*. Report for the National Estates Grants Program.

Olsen, J. & Taylor, S. (2001) Winter Home Range of an adult female Southern Boobook *Ninox novaeseelandiae* in Suburban Canberra. *Australian Bird Watcher* 19: 109-114.

Olsen, J. & Trost, S. (1997) Territorial behavior of the Southern Boobook *Ninox novaeseelandiae*. In: Duncan, J.R., Johnson, D.H. & Nichols, T.H., eds. *Biology and Conservation of Owls of the Northern Hemisphere.* USDA Forest Service General Technical Report NC190, St. Paul, MN, USA: 308-313.

Olsen. J., Trost, S. & Hayes, G. (2002b) Vocalisations used by Southern Boobooks *Ninox novaeseelandiae* in and adjoining Aranda Bushland, Canberra, Australia. In: Newton, I., Kavanagh, R., Olsen, J. & Taylor, I., eds. *The Ecology and Conservation of Owls*. CSIRO, Melbourne.

Olsen, J. & Tucker, A.D. (2003) A brood-size manipulation experiment with Peregrine Falcons, Falco peregrinus, near Canberra. *Emu* 103: 127-132.

Olsen, P. & Olsen, J. (1990) Bush Capital: Canberra, City of raptors. In: Newton, I., Olsen, P. & Pyrzakowski, T., eds. *Birds of Prey*. Golden Press Pty Ltd, NSW.

Olsen, P., Vestjens, J.M. & Olsen, J. (1979) Observations on Development, Nestling Chronology, and Clutch and Brood Size in the Australian Kestrel *Falco cenchroides* (Ayes: Falconidae.). *Emu* 79: 133-138.

Palmer, R.S. (1988) *Handbook of North American Raptors*, Vol. 4 *Diurnal Raptors*. Yale University Press, New Haven.

Steenhof, K. (1987) Assessing raptor reproductive success and productivity. In Giron Pendelton, B.A., Millsap, B.A., Kline, K.W. & Bird, D.M., eds, *Raptor Management Techniques Manual*. (National Wildlife Federation: Washington, D.C.): 157-170.

Taylor, M., & Canberra Ornithologists Group (1992) *Birds of the Australian Capital Territory, An Atlas.* Canberra Ornithologists Group and the National Capital Planning Authority, Canberra.

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WHY MIGHT SPECKLED WARBLERS BE DECLINING? OBSERVATIONS FROM THE ACT

J.L. GARDNER AND P.R. MARSACK

7 Dakin Place, Hackett ACT 2602'

School of Botany & Zoology, Australian National University

Abstract

The speckled warbler Chthonicola sagittata *is one of a number of species declining from the highly fragmented temperate woodlands of eastern Australia. The species has recently been upgraded nationally to "Near Threatened" and in NSW and Victoria to "Vulnerable", in recognition of its decline. Here we summarise findings from a three-year demographic study of an ACT population of Speckled Warblers and report on several aspects of their biology that may make the species vulnerable to population decline in fragmented landscapes. First, the species occurs at low population density and is a specialist in terms of nesting and foraging behaviour. Second, despite being multi-brooded with the potential to fledge up to three broods each season, females have low reproductive success. Low success results mainly from nest predation, a phenomenon that may be elevated in habitat remnants, particularly those that are small or characterised by a large proportion of edge habitat where generalist predators may invade from the surrounding habitat matrix. Finally, Speckled Warblers form intraspecific flocks in winter, behaviour that is likely to increase survival in harsh years. Disruption of the structure and composition of flocks may have potential to trigger the Allee effect, which is a slowing in population growth at low density or small population size.*

Introduction

Habitat fragmentation alters the amount, configuration in the landscape, and quality of suitable habitat available for species, and can have profound effects on the dynamics of natural populations (Sih *et al.* 2000). For example, it can subject populations to a loss of critical resources for breeding and survival (*e.g.* food and shelter), change the intensity of ecological processes such as predation and competition, and reduce gene flow (Andren 1994, Fahrig and Merriam 1994). The impact of fragmentation on the Australian avifauna has been ubiquitous with local extinctions occurring across most guilds of birds and in most habitat types (Recher and Lim 1990, Garnett 1992, Lunney *et al.* 1997, Recher 1999). Considerable research has focused on identifying patterns of declines, and it is clear that species richness and abundance decline with a reduction in remnant size and habitat quality and an increase in habitat isolation (Loyn 1987, Saunders 1991, Barrett et al. 1994, Reid 1999, Mac Nally et al. 2000, Major et al. 2001, Lindenmayer et al. 2002). The Speckled

Warbler *Chthonicola sagittata* is one of a number of species declining from the highly fragmented temperate woodlands of eastern Australia (Garnett and Crowley 2000). The species has recently been upgraded nationally to "Near Threatened" (Garnett and Crowley 2000), and in NSW and Victoria to "Vulnerable", in recognition of its decline (Robinson and Traill 1996, Reid 1999; Traill and Duncan 2000). Since European settlement up to 80% of the natural habitat of the temperate woodlands has been cleared to make way for agriculture and grazing, with most remaining habitat modified in some way (Ford *et al.* 2001). This has had considerable impact on the status of species within the region. Speckled Warblers have declined across a large part of their range, and in districts where no habitat fragments larger than 100 ha remain, they appear to be locally extinct (Barrett *et al.* 1994, Robinson and Traill 1996, Traill and Duncan 2000). Specific causes of decline are unknown but thought to be related to processes resulting from fragmentation and degradation of the habitat, rather than a result of habitat loss alone, because populations continue to decline in districts where land clearing has stopped (Reid 1999). Here we summarise results from a three-year study of the demography of an apparently healthy population of Speckled Warblers in the ACT, reporting on aspects of the species' biology that might be linked to the causes of decline in habitat remnants.

Study species and field techniques

The Speckled Warbler is a small (11- 15 g) insectivorous passerine and a sedentary resident of the temperate woodlands of eastern Australia (Blakers et al. 1984). It is primarily ground-dwelling, nesting and foraging directly on the ground. Males are slightly larger than females and can be distinguished on the basis of a black rather than rufous lateral crown stripe.

The study was conducted on the lower slopes of Mt Ainslie in the Canberra Nature Park, Australian Capital Territory (149° 9' E, 35° 16' S), between 1997 and 2000 in open eucalypt woodland dominated by *Eucalyptus rossii*, *E. melliodora*, *E. mannifera* and *E. macrorhyncha*. The study population consisted of all individuals living within a 300 ha area within the larger ca. 1500 ha reserve, and was monitored throughout the year. Adults were captured in mist-nets, and each was colour-banded to allow individual recognition; at least 90% of the resident adult population was banded in each year. We attempted to monitor all nesting attempts by resident females and juveniles were colour-banded in the nest. Repeatedly locating banded birds and catching and banding unmarked individuals as they settled on the study site allowed us to document the social structure of the population, reproductive success, mortality and dispersal.

Summary and discussion

Population density and territory size

The population density of Speckled Warblers on Mt Ainslie was low with a mean 1.8 birds per 10 ha (range 1.7-1.9 over three years) (Gardner *et al.* 2003). Breeding groups defended large, usually contiguous territories whose boundaries changed little from year to year (Gardner 2002). The mean size of breeding territories was 9 ha (range 6-12 ha), which is considerably larger than for closely related and ecologically similar species with which Speckled Warblers coexist (Gardner et al. 2003).

The causes of low density on Mt Ainslie are unknown but similar figures (0.18- 0.54 birds/ha) are reported from several sites across the species' range (Higgins and Peter 2002), suggesting a broad-scale, rather than site-specific cause. One possibility relates to the

species' narrow foraging niche. Speckled Warblers forage almost exclusively on the ground year-round; they do not use multiple substrates or change their foraging niche seasonally as do other related Acanthizid species with which they share habitat (Ford et al. 1986, Bell and Ford 1990, Tzaros 1996). In addition, they do not dig for prey or sift leaf litter like White-browed Scrubwrens *Sericornis frontalis* but move across the ground gleaning prey off the surface (Tzaros 1996, Higgins and Peter 2002). Such a specialised foraging niche may act to limit overall numbers.

Regardless of the causes of low density, populations that are small are particularly vulnerable to stochastic demographic and environmental events and therefore at increased risk of extinction compared with large populations. In small habitat remnants, populations will inevitably be at greater risk of extinction because of their low numbers, given their occurrence at low densities. In addition, where local extinctions have occurred recolonisation will be difficult if remnants are isolated from source populations.

Breeding biology

Most aspects of the breeding biology of the Speckled Warbler are similar to those of other closely related members of the family whose populations are not in decline. Females produce multiple broods over a long breeding season, with the potential to fledge three broods (each of three chicks) per season, given suitable conditions (Gardner 2002). Speckled Warblers apparently have the breeding potential to recover from short-term fluctuations in population levels, and it is probable that many aspects of breeding biology are not linked to underlying causes of population decline.

Nevertheless, one aspect of breeding biology that may have consequences for populations nesting in fragmented landscapes, and be a contributing factor in population decline, is the species' inflexible nesting behaviour. Unlike other Acanthizid species, all nests are built on the ground in a shallow depression which the birds appear to excavate so that the base of the entrance is almost flush with the surface of the ground (Tzaros 1996, Gardner 2002). As a result, nests are vulnerable to a wide range of predators and other forms of mishap. A consequence of this nesting behaviour is that breeding females suffer considerably higher mortality during the breeding season compared with males (Gardner *et al.* 2003). Only females incubate the clutch and brood the nestlings and they appear to be vulnerable to predation at this time (Gardner 2002). Predators can probably approach the nest without being observed because the dome structure and location of the nest obscure the view of the sitting female. Males neither incubate nor brood the offspring and accordingly suffer lower mortality during breeding; in the non-breeding season mortality rates of males and females are similar (Gardner *et al.* 2003).

Habitat quality, in particular the structure and complexity of ground and understorey vegetation, is likely to be an important factor in the persistence of Speckled Warbler populations. Where understorey habitat is sparse, nests and attendant females may be more exposed to predation, especially by visually hunting predators that use parental activity as clues to locate nests (Martin *et al.* 2000). Most nest failure in the ACT population was due to avian predators that probably cue on parental activity, and differences in hatching success of nests were correlated with differences in habitat structure (Gardner 2007).

In addition to habitat quality, individuals nesting in habitat remnants that are small or irregular in shape are likely to suffer higher rates of nest predation than those nesting in large tracts of habitat because of changes to predator communities or differences in

patterns of predation due to edge effects (Paton 1994, Gardner 1998). Two factors are involved. First, local extinctions of large carnivores will occur if remnants become smaller than the areas they require for survival. Large carnivores play an important role in regulating populations and following their loss the numbers of small omnivores residing within remnants increase. Second, an increase in the ratio of edge to interior habitat that is typical of small or irregularly shaped remnants exposes the remnant to increased predation from adjacent habitats. This predation along the edges of remnants is probably due to a suite of medium-sized omnivores that thrive in disturbed habitats. This is of particular concern because females in the apparently healthy Mt Ainslie population had low reproductive success, each fledging about one chick per year, which is at the lower end of the range for the family (Green and Cockburn 1999). Predation by generalist bird species was the primary cause of low reproductive success at Mt Ainslie, and any increase in predation rates in sub-optimal habitat could destabilise populations.

Winter flocking

During winter, Speckled Warblers formed intraspecific flocks via amalgamation of residents from several adjacent breeding territories, as well as by the arrival of immigrants that had dispersed after the previous breeding season. The timing and mode of flock formation suggested that flocking probably increases survival in harsh conditions and appears to be particularly important to Speckled Warblers in drought conditions (Gardner 2004).

The aggregation of individuals into foraging flocks is thought to facilitate increased foraging efficiency and predator detection and therefore acts to increase survival in harsh conditions (Lima and Dill 1990). The benefits of grouping increase with group size, up to a point, and group size is varied in response to the severity of conditions (Elgar 1989). A reduction in population size that depletes the number of individuals available for grouping may therefore lead to a reduction in survival if groups become so small that foraging and anti-predator strategies become inefficient. Social disruption of this sort can trigger the Allee effect which describes a slowing in population growth at low density or small population size which can greatly increase the risk of extinction (Reed 1999, Stephens and Sutherland 1999)

The areas used by Speckled Warbler flocks ranged from 6 to 30 ha with potential for single flocks to use areas as large as 36 ha. Habitat remnants smaller than about 40 ha may therefore be unsuitable habitat if there are too few birds available to form flocks of an adequate size when conditions are most extreme, leading to increased mortality.

Conclusions and future directions

We have identified several aspects of demography that have the potential to cause population decline in fragmented landscapes, particularly in small habitat remnants. An obvious focus for future work is to explore the effects of these phenomena on the viability of populations living in habitat remnants of different size and with different habitat characteristics, using the established procedures of Population Viability Analysis (Reed *et al.* 2002). PVA allows simulation of the stochastic and deterministic forces affecting populations and is primarily used to model the probability of extinction of small populations and the effects of different treatments and perturbations on population persistence. The effects of fragmentation on Speckled Warblers appear to be multiple and potentially synergistic. For example, population size could be reduced in some remnants as a result of increased rates of nest predation, which will affect the numbers of birds available for flocking which in turn could trigger the Allee effect. Modelling has the potential to dissociate such effects and

identify threshold values at which such changes in population dynamics occur, something very difficult to achieve on the basis of field studies alone. In recent years, advances in modelling techniques have allowed the consequences of Allee effects to be incorporated in models of population dynamics, so the tools are available to investigate these sorts of complex interactions (Courchamp *et al.* 1999, Stephens and Sutherland 1999).

Ultimately, the accuracy of predictions derived from such modelling depends on the quality of baseline demographic data on which the model is built. Given the breadth of demographic data collected during this study, the variability recorded among years and the focus on individuals, which allows assessment of the variability recorded, PVA modelling would be valuable and would have the potential to make sense of distribution patterns in remnants, providing a basis for management of such metapopulations.

References

Andren, H. (1994) Effects of habitat fragmentation on birds and mammals in landscapes with different proportions of suitable habitat: a review. *Oikos* 71: 355- 366.

Barrett G.W., Ford, H.A. and Recher, H.F. (1994) Conservation of woodland birds in fragmented rural landscape. *Pacific Conservation Biology* I: 245-256.

Bell, H.L. and Ford, H.A. (1990). The influence of food shortage on interspecific niche overlap and foraging behavior of three species of Australian warbler. *Studies In Avian Biology* 13: 381-388.

Blakers, M., Davies, S.J.J.F. and Reilly, P.N. (1984) *The Atlas of Australian Birds*. Melbourne University Press, Melbourne.

Courchamp, F., Clutton-Brock, T. and Grenfell, B. (1999) Inverse density dependence and the Allee effect. *Trends in Ecology & Evolution* 14: 405-410.

Elgar, M.A. (1989) Predator vigilance and group size in mammals and birds: a critical review of the empirical evidence. *Biological Reviews* 64: 13-33.

Fahrig, L. and Merriam, G. (1994) Conservation of fragmented populations. *Conservation Biology* 8: 50-59.

Ford, H.A., Noske, S. and Bridges, L. (1986) Foraging of birds in eucalypt woodland in north-eastern New South Wales. *Emu* 86: 168-179.

Ford, H.A., Barrett, G.W., Saunders, D.A. and Recher, H.F. (2001) Why have birds in the woodlands of Southern Australia declined*? Biological Conservation* 97: 71-88.

Gardner, J.L. (1998) Experimental evidence for edge-related predation in a fragmented agricultural landscape. *Australian Journal of Ecology* 23: 311- 321.

Gardner, J.L. (2002) Breeding biology of the speckled warbler, *Chthonicola sagittata*. *Australian Journal of Zoology* 50: 169-181.

Gardner J.L (2004) Winter flocking behaviour of speckled warblers and the Allee effect. *Biological Conservation* 118: 195-204.

Gardner, J.L. (2007) Predation risk is unlikely to account for the failure of subordinate speckled warblers to help at the nest. *Journal of Avian Biology* 38: 443-449.

Gardner, J.L., Magrath, R.D. and Kokko, H. (2003) Stepping stones of life: natal dispersal in the group-living but noncooperative speckled warbler. *Animal Behaviour* 66: 521-530.

Gardner, J.L., Magrath, R.D. and Olsen, P.D. (2004) Speckled warblers break cooperative rules: absence of helping in a group-living member of the Pardalotidae. *Animal Behaviour* 67: 719-728.

Garnett, S.T. (1992) *Threatened and Extinct Birds of Australia*. RAOU Report No 82, Melbourne.

Garnett, S.T. and Crowley, G.M. (2000) *The Action Plan for Australian Birds*. Birds Australia, Melbourne.

Green, D.J. and Cockburn, A. (1999) Life history and demography of an uncooperative Australian passerine, the brown thornbill. *Australian Journal of Zoology* 47: 633-649.

Higgins, P.J. and Peter, J.M. (2002) *Handbook of Australian, New Zealand and Antarctic birds*. Volume 6: *Pardalotes to Shrikethrushes*. Oxford University Press, Melbourne.

Lindenmayer, D.B., Cunningham, R.B., Donnelly, C.F., Nix, H. and Lindenmayer, B.D. (2002) Effects of forest fragmentation on bird assemblages in a novel landscape context. *Ecological Monographs* 72: 1-18.

Lima, S.L. and Dill, L.M. (1990) Behavioral decisions made under the risk of predation - a review and prospectus. *Canadian Journal of Zoology* 68: 619- 640.

Loyn, R.H. (1987) Effects of patch area and habitat on bird abundances, species numbers and tree health in fragmented Victorian forests. in: Saunders DA, Arnold GW, Burbidge AA, and Hopkins AJM (Eds), *Nature Conservation: The role of remnants of native vegetation*. Surrey Beatty and Sons, Chipping Norton, NSW: p 65-77.

Lunney, D., Curtin, A.L., Fisher, D., Ayers, D. and Dickman, C.R. (1997) Ecological attributes of the threatened fauna of New South Wales. *Pacific Conservation Biology* 3: 13-26.

Mac Nally, R., Bennett, A.F. and Horrocks, G. (2000) Forecasting the impacts of habitat fragmentation. Evaluation of species-specific predictions of the impact of habitat fragmentation on birds in the box ironbark forests of central Victoria, Australia. *Biological Conservation* 95: 7- 29.

Major, R.E., Christie, F.J. and Gowing, G. (2001) Influence of remnant and landscape attributes on Australian woodland bird communities. *Biological Conservation* 102: 47-66.

Martin, T.E., Martin, P.R., Olson, C.R., Heidinger, B.J. and Fontaine, J.J. (2000) Parental care and clutch sizes in North and South American birds. *Science* 287: 1482-1485.

Paton, P.W.C. (1994) The effect of edge on avian nest success: how strong is the evidence? *Conservation Biology* 8: 17- 26.

Recher, H.F. (1999) The state of Australia's avifauna: a personal opinion and prediction for the new millennium. *Australian Zoologist* 31: 11-27.

Recher, H.F. and Lim, L. (1990) A review of current ideas on the extinction, conservation and management of Australia's terrestrial vertebrate fauna. *Proceedings of the Ecological Society of Australia* 16: 287-301.

Reed, J.M. (1999) The role of behavior in recent avian extinctions and endangerments. *Conservation Biology* 13: 232-241.

Reed, J.M., Mills, L.S. Dunning, J.B., Menges, E.S., McKelvey, K.S., Frye, R., Beissinger, S.R., Anstett, M.C. and Miller, P. (2002) Emerging issues in population viability analysis. *Conservation Biology* 16: 7-19.

Reid, J. (1999) *Threatened and declining birds in the New South Wales Sheep-wheat belt: diagnosis, characteristics and management*. Final Report to NSW National Parks & Wildlife Service, Canberra.

Robinson, D. and Traill, B.J. (1996) *Conserving woodland birds in the wheat and sheep belts of southern Australia*. RAOU Conservation Statement No 10, Melbourne.

Saunders, D.A., Hobbs, R.J. and Margules, C.R. (1991) Biological consequences of ecosystem fragmentation - a review. *Conservation Biology* 5: 18-32.

Sih, A., Jonsson, B.G. and Luikart, G. (2000) Habitat loss: ecological, evolutionary and genetic consequences. *Trends in Ecology and Evolution* 115: 132-134.

Stephens, P.A. and Sutherland, W.J. (1999). Consequences of the Allee effect for behaviour, ecology and conservation. *Trends in Ecology & Evolution* 14: 401- 405.

Traill, B. and Duncan, S. (2000) *Status of birds in the New South Wales temperate woodlands region*. Australian Woodlands Conservancy, Chiltern, Victoria. 13

Canberra Bird Notes 39(2) (2014): 147-151

OBSERVATIONS OF EASTERN KOEL FLEDGLINGS IN CHAPMAN/RIVETT DURING THE SUMMER OF 2014

JACK HOLLAND

8 Chauvel Circle, Chapman, ACT 2611

On the morning of 23 January 2014 Andrea rang me at work with great excitement as she thought she saw a female, or more likely, a fledgling Eastern Koel (*Eudynamys orientalis*) in our garden in Chapman.

We couldn't locate it when I got home but interestingly adult Koel activity was much more noticeable, with two males seen and heard in a large blue gum in our GBS site (on the edge of our block) just after 7 pm. What we later recognised as the fledgling was heard after this about 150 m away, in a garden at the corner of Darwinia Terrace and Rafferty Street, Chapman.

However, the following morning the bird was easy to locate in the very bushy garden of our near neighbours at 60 Darwinia Terrace, and I was able to get good looks a number of times over a period of 3 hours or so. Even though it sported a very nice striped tail, it was clearly a fledgling, as it didn't fly very securely and most importantly it gave a constant, one-note repeated begging call. The pictures in *HANZAB* (Higgins, 1999) also supported this, in particular the lighter head colouring.

While Red Wattlebirds (*Anthochaera carunculata*) were around when I first located the bird, there was no evidence of any feeding, in fact when close the wattlebird gave a growling type alarm call (which is why I first thought it might have been a female). However, with a bit more patience I was able to see a single Red Wattlebird feed it twice at around 5-minute intervals.

Interestingly, I had also seen a new pair of Red Wattlebird fledglings (with quite short tails) in my GBS site the night before. This added to the much more mature fledglings that were still around after first being seen at the beginning of December. This made it three separate Red Wattlebird breeding "events" this summer, though I couldn't be sure any actually occurred within my GBS site as all records are of dependent young.

Also this was the first Koel breeding observation in my local area that I had recorded, despite them having been relatively common over the past seasons. Interestingly it came after a summer of apparently reduced Koel activity compared with the past few years. While they had been calling in the distance (close to or >1 km) intermittently from the beginning of November and occasionally closer (but not within 400 metres), since Christmas I had only a single record of one calling within 0.5 km of our garden about a fortnight earlier.

By the end of the long weekend the fledgling was becoming increasingly conspicuous by its constant calling and was also relatively easy to approach and observe, often in the Chinese elm in the garden of my adjacent neighbour at 58 Darwinia Terrace, within 20 m of our house, and with both the owner of 60 Darwinia Terrace and me having seen more feeding by Red Wattlebirds, though sometimes the interval between presenting food was > 10 minutes. This included being fed in the gums on the wide street verge in Rivett across Darwinia Terrace. On one occasion, while I was trying to confirm the host, a Red Wattlebird was in the same tree for several minutes before flying off without offering food.

On my arrival home on Tuesday 28 January, I could hear two begging calls and see the above fledgling calling in my neighbour's Chinese elm, and trace the second to a seemingly smaller and sleeker (but still highly coloured) fledgling in the front garden of 47 Darwinia Terrace, close to the corner of Angophora Street, Rivett, less than 200 m away. It too was subsequently seen being fed by its Red Wattlebird host, on one occasion pursuing it down onto the ground.

Eastern Koel fledgling with its Red Wattlebird host (*Geoffrey Dabb*)

Interestingly, while I first thought they were calling to each other, these birds were never seen together (though <100 m apart on a number of occasions), and from my observations never crossed into each other's "territories", with the second bird only seen in a rough triangle between a large gum tree at 4 Pavonia Street and the wide street verges of 39 Darwinia and just into 51 Darwinia Terrace, Rivett, the latter being on the edge of my GBS site (see triangle on Map 1). The closest the two probably actually came to each other was on the afternoon of 29 January, when it was at the latter spot and the one time the first bird crossed the bike/walking path on the northwestern side of our house and was first seen in

parkland on the other side of 50 Darwinia Terrace and then heard calling in the large red box of 52 Darwinia Terrace (a battleaxe block – see X on Map 1).

The second fledgling seemed to be a much better flier and was seen doing the asymmetric triangular circuit a number of times (the longest leg being >100 m). It was last seen doing this circuit at 6 am on Saturday morning 1 February, after which I didn't see/hear it again. However, PhD researcher Virginia Abernathy (personal communication) was able to locate it in Angophora Street, Rivett, on the morning of 3 February 2014 and record/photograph it for over an hour before it flew further down into Rivett. During this time she never saw it fed, so we assume that it had become independent.

By this time the other fledgling had become quite advanced and mobile and seemed to come in and out of my area during the day (unless it was silent for periods). When present it was quite bold and easy to locate when begging, and my neighbour at 60 Darwinia Terrace, in whose garden it had spent most time, was thoroughly sick and tired of its constant begging and was seen trying to shoo it away a number of times.

Over the next week it got increasingly harder to find and was only heard before 7 am and about 8 pm, and also further away though I did manage to locate it on several occasions in Monkman Street, Chapman. Apart from that described above, during these 3 weeks my observations of this bird were confined to a rough rectangle (see Map 1) bounded by Darwinia Terrace (either side), Rafferty and Monkman Streets and the bike/walking path which runs along the NW side of our house through an underpass and alongside 55 Darwinia Terrace into Rivett.

By the weekend I thought the bird had left, so it was a surprise to suddenly hear it still begging loudly in a large planted ironbark on the verge of 55 Darwinia Terrace (diagonally opposite No 60) around 6:30 am on Sunday 9 February. It flew reasonably well to 62 Darwinia Terrace, and shortly after an adult Koel could be heard calling very loudly close by, and it was traced to the above gum tree at 4 Pavonia Street, where it was harassed by Magpie-larks (*Grallina cyanoleuca*) before flying towards Darwinia Terrace.

Unfortunately I was unable to follow it. However, around 7 am on Monday 10 February an adult was heard calling loudly in the blue gum just in front of our house, and then a male was seen flying into the gum outside our bedroom seemingly pursued by a couple of other Koels, one of which made a very different call from that which I associate with adults and by now had become familiar with for the fledglings. I suspected females, but the one I was able to briefly get my binoculars on was a barred bird typical of a juvenile rather than the more spotted adult female.

I thought this would be the last time I saw a fledgling/juvenile in my GBS, though I did hear the same call during the week when a male again called close to our house. So it was again a surprise to first hear and then find a begging Koel fledgling close to the underpass on Bangalay Street, Rivett (diagonally opposite the Rivett shops, see circle on Map 1) at 7:15 am on Saturday morning 15 February. This is about 0.5 km from our GBS site and I suspected this was a third one as it was constantly begging and flew only short distances pretty clumsily (compared with ours at the end).

Again Red Wattlebirds were around and while I didn't actually see it being fed, judging by the sounds it made it was possibly fed once. It looked more like the scruffier and larger 60 Darwinia Terrace bird than the one centred on Angophora Street, which was quite sleek and well groomed by comparison. Again, soon after adult Koels were calling close by, adding further evidence to the suggestions of interactions between adult and fledgling/juvenile birds. I was able to find it easily again at about 6 pm the next evening. After watching it sitting and calling quietly for about 5 minutes, a Red Wattlebird came to feed it, thus confirming the host.

Despite a number of visits I wasn't able to find it again, though Virginia Abernathy (personal communication) found it begging a few houses down from the underpass at 5:30 pm on Monday 17 February. She then followed it as it slowly made its way towards the underpass and got a pretty good video of it being fed several times. She thought both wattlebird parents were there. It looked big to her, but the tail wasn't fully grown yet so she agreed it probably was different from the one she saw at Angophora Street because that one was pretty well grown several weeks ago, and as noted above it was never fed while she was there.

An even bigger surprise was that on same Saturday evening, 15 February, before 7 pm while following up some Satin Bowerbirds (*Ptilonorhynchus violaceus*), which at the time had dependent young in my GBS site, I found a fully independent juvenile Koel sitting quietly in a fig tree in the backyard of 4 Chauvel Circle, with which our battleaxe block shares a corner. On the following Sunday night, within the hour of seeing the new fledgling, I found it again sitting motionless in the same fig tree as the night before, confirming that these were different birds. I also found it there on the Monday evening sitting quietly eating a fig, but not again. despite many visits and the ripe figs attracting many birds, particularly Red Wattlebirds, Pied Currawongs (*Strepera graculina*), Silvereyes (*Zosterops lateralis*) and Common Mynas (*Sturnus tristis*).

There was no adult Koel calling near my place during the time I saw this independent juvenile, so, based on my observations, the purpose and extent of their interaction with fledglings/juveniles remains unclear. It is certainly not constant, and as far as I could tell no adult was present when I suspect the independent fledgling departed. In fact I only heard a few distant calls until the end of February, and none in March, suggesting the adults left a little earlier than in previous years.

Map 1. Locations of Eastern Koel Fledglings (see text for details).

So despite the seemingly low Koel activity in my local area this season, at least three fledged locally. Now that I know the call, I suspect there was one last year as well in the same shrubbery off the lane, but it remained hidden from view (perhaps a younger bird?). However, I can't rule out this having been a fledgling Red Wattlebird. On many occasions in 2014 I heard a call somewhat similar to that of the begging Koel fledgling (which I best describe as similar to that of a Little Friarbird *Philemon citreogularis*), only to discover that it was being made by the large almost independent Red Wattlebird fledgling.

References

Higgins, P.J. (Senior Ed.) 1999 *Handbook of Australian, New Zealand and Antarctic Birds.* Vol. 4, Oxford University Press, Melbourne.

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Young Eastern Koel in nest of Red Wattlebird (*Geoffrey Dabb)*)

Further reading on the Theme *Reporting on the Status of Birds in the Canberra Region* in *Canberra Bird Notes:*

All species and selected species:

All species

Annual Bird Reports (ABR): In early years general statements based on records just handed to editor or noted in the records book at meetings, mostly with a focus on rarities, to the full reports of later years, covering all species.

Clark, Grahame, H. A. Nix and S. J. Wilson. (1972) The Status of Birds in Canberra and District. Part 2. *CBN* 2(3) 8-12.

Clark, Grahame, H. A. Nix and S. J. Wilson (1972) The Status of Birds in Canberra and District. Part 3. *CBN* 2(4) 11-16.

Clark, Grahame, H. A. Nix and S. J. Wilson (1973) The Status of Birds in Canberra and District. Part 4. *CBN* 2(7) 10-21.

Clark, Grahame, H. A. Nix and S. J. Wilson. (1974) The Status of Birds in Canberra and District. Part 5. *CBN* 2(12) 1-24.

Clark, Grahame, H. A. Nix and S. J. Wilson. (1975) The Status of Birds in Canberra and District. Part 6. *CBN* 3(2) 14-16.

Clark, Grahame, H. A. Nix and S. J. Wilson. (1975) The Status of Birds in Canberra and District. Part 7. *CBN* 3(3) 13-19.

Clark, Grahame, H. A. Nix and S. J. Wilson. (1975) The Status of Birds in Canberra and District. Part 8. *CBN* 3(6) 6-15.

Clark, Grahame, H. A. Nix and S. J. Wilson (1975) The Status of Birds in Canberra and District. Part 9. CBN 3(7) 7-10.

Clark, Grahame, H. A. Nix and S. J. Wilson (1979) The Status of Birds in Canberra and District. Part 10. *CBN* 4(7) 18-22.

Clark, Grahame (1976) Bird Report, 1 July 1975 to 20 June 1976. *CBN* 3 (8) 2-15.

Clark, Graham (*sic*). (1977) Bird report, 1 July 1976 to 30 June 1977. *CBN* 3 (12) 2-10.

Clark, G.S. and M. Lenz. (1978) Bird report, 1 July 1977 to 30 June 1978. *CBN* 4(4) 2-13.

Lenz, Michael (1980) Bird report, 1 July 1978 to 30 June 1979. *CBN* 5(1) 2-23

Selected species

Boekel, C. (2010) Status of the Banded Lapwing *Vanellus tricolor* in the Australian Capital Territory. *CBN* 35(3) 192-196.

Bounds, J. (2001) Occurrence of the Brush Bronzewing in the ACT. *CBN* 26(1) 9-13.

Butterfield, M. (2014) Plumed Whistling Ducks in the COG Area of Interest. *CBN* 39(3) 173-184.

Butterfield, M. (2018) Status of the Azure Kingfisher in the COG AoI. *CBN* 43(3) 226-235.

Butterfield, M. (2022) Assessing the number of rare birds in an area. *CBN* 47(1) 29-33.

Davey, C. and Gould, L. (2017) Surveying Latham's Snipe in the ACT and surrounding areas August 2016 - Mar 2017. *CBN* 42(3) 229-238.

Davey, C. (1990) Numbers and distribution of the Common Myna in Canberra in July 1990. *CBN* 16(3) 41-50.

Davey, C. (2018) A review of the Australian Darter and various cormorant species breeding on Molonglo Reach, Lake Burley Griffin, ACT. *CBN* 43(2) 149-160.

Farley, K. (2022) White-bellied Ccuckooshrikes in the ACT – August – October 2021. *CBN* 47(1) 54-57.

Farley, K. (2022) Pilotbirds (*Pycnoptilus floccosus*) in the ACT and COG's AoI. Rare? Yes. Hard to find? Not so much. *CBN* 47(2) 101-115.

Farley, K. (2023) Pied Butcherbird (*Cracticus nigrogularis*) in the ACT - once a rare vagrant, now a breeding resident. *CBN* 48(1) 12-17.

Fennell, P. (2011) Status of the Little Corella in the Canberra Region since 1995. *CBN* 36(3) 133-140.

Gregory-Smith, R. (1985) Introduction and Spread of the Common Myna in Canberra. *CBN* 19(3) 97-104.

Holland, J. (1999) Observations on the increase in records of the Satin Bowerbird in the Chapman area. *CBN* 24(1) 7-17.

Holland, J. and Veerman, P. (2000) Observations on the spread of the Satin Bowerbird into Canberra suburbs. *CBN* 25(2) 59-71.

Holland, J. (2021) The rise and rise of the Eastern Koel in the ACT. *CBN* 46(2) 105-118.

Holland, J. (2000) Further observations of Satin Bowerbirds in Chapman, 1999-2000. *CBN* 25(3) 98-112.

Holliday, S. (2004) The Glossy Black Cockatoo in the Australian Capital Territory. *CBN* 29(4) 125-130.

Lenz, M. (2016) Effects of widespread rainfall in 2016 on birds in the Canberra region – some observations and comments. *CBN* 41(3) 241-252

Lenz, M. (2020) The status of the Horsfield's Bushlark (*Mirafra javanica*) in the Canberra region. *CBN* 45(3) 242-255

Lenz, M. (2022) The status of the Banded Lapwing (*Vanellus tricolor*) in the Canberra region. *CBN* 47(1) 88-100.

Lepschi, B. (1987) Status of the Singing Bushlark in the Canberra District. *CBN* 12(3) 95-98.

Luff, N. (2016) A change in attitude: Where did the Indian Myna go wrong? *CBN* 41(2) 118-123.

McDonald, D. (2016) The Australian Brush Turkey in the Canberra Region. *CBN* 41(3) 233-240.

Taylor, I. (1984) The history of the Emu in the Canberra Area. *CBN* 9(4) 150-155.

Taylor, I.M. (1985) The status of the Yellow-tufted Honeyeater in the Canberra district. *CBN* 10(3) 105-109.

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3. Theme: *Monitoring our birds*

MICHAEL LENZ (*michael.lenz.birds@gmail.com*)

Populations of birds tend to experience fluctuations over time. The reasons behind such changes in numbers can be complex. Changes may be short-term, for example when a wet or dry season affects food supply, resulting in varying survival and breeding success. In the long term, however, a population may decline, increase or remain stable, although it may experience some year-to-year fluctuations contrary to the overall trend. Factors that shape these dynamics may include climate variability, exacerbated by climate change and other forms of increasing human impact on our ecosystems, such as land clearing, habitat fragmentation, intensive agricultural practices, pollution, weeds and pest animals, and urban expansion.

The response of our birds to such variable conditions can only be understood if we monitor their numbers and distribution. First, we have to establish a baseline and work out, in a chosen habitat, what suite of species is present and in what numbers and how numbers change with the seasons, and develop an understanding of other environmental factors that may impact birds, such as rainfall and changes in vegetation (*e.g.* increasing weediness of sites after good rainfall). Such 'snapshot' studies then need to be followed by monitoring with set protocols over longer periods to reveal patterns, delayed responses to environmental variables *etc.* Such information is critical if conservation measures are to be instigated.

These days more than in the past, funding restricts the ability of institutions to commit to survey programs over extended periods. That is where the amateur, these days referred to as 'citizen scientist', steps in to collect data over many years. Over time we have seen an evolution of survey methodologies. Early Canberra Birds surveys focussed on documenting the presence of bird species at locations or habitats, at points in time. This was important to establish a baseline on the distribution of species (especially for those of conservation interest), and from which future changes might be measured. The Murrumbidgee River Corridor survey informed the future conservation status of this major river corridor (Taylor 1987). *Birds of the Australian Capital Territory – An Atlas* (Taylor and COG 1992) is another example of these early approaches.

Canberra Birds/COG has an outstanding history of running long-term studies involving its members. In 1980, the Garden Bird Survey (GBS), now in its 46th year, was developed to collect systematic data on Canberra's suburban birds. This has proven to be a highly useful dataset and has been summarised in reports (Veerman 2003) and utilised in academic studies (Hermes and Veerman, 2014). The Waterbird Survey [WBS] at Lake Bathurst has been conducted for almost as long (45 years, with a 1-year break) (Lenz 2014; Lenz 2025).

By the 1990s, the need for more structured survey methods was realised to determine long-term changes in abundance more accurately. The Woodland Survey methodology was developed for quarterly surveys at defined sites, first at Mulligans Flat in 1995 (a baseline survey over five years initially proposed), and in 1998 this methodology was applied to additional woodland locations (now 15 locations with 142 sites). Together with the Waterbird Survey, these surveys recognised the importance of collecting data over longer periods. Such data sets together with contemporary statistical methods are now critical to inform the conservation needs of bird species and their habitats.

CBN has also published a number of detailed 'snapshot' surveys, some covering only a few years, with a focus on a habitat (riverine, farmland, revegetation sites or the new Canberra landscape of stormwater management ponds with surrounding grassland and tree and shrub plantings). Some of those studies, rather rare for Australia, focussed on establishing the size of breeding bird communities (*e.g*. Lenz 2021). This can be achieved in Canberra, which has four distinct seasons and a well-defined breeding season, unlike our warmer coastal, inland and northern regions (Nix 1976).

Other 'snapshot' surveys capture the situation in late spring (Blitz over the past 20 years; see Allan 2014, 2019) or have focussed on single species such as the Superb Parrot (see Theme 4: Conservation), raptors and Latham's Snipe (see Theme 2). Documentation of the spread of the Common Myna (Gregory-Smith 1985; Davey 1991) and the build-up of the Pacific Koel population in Canberra (Holland 2021) are examples of monitoring efforts from suburbia.
Data from these diverse surveys, together with external bird datasets, such as eBird and Birdlife Australia's Bird-data, have formed a substantial part of the material in the Annual Bird Reports and significantly shaped our understanding of the status and biology of the birds in our region.

References

Allan, B. (2014) COG's Bird Blitz. *Canberra Bird Notes* 39, Anniversary Issue:125-128.

Allan, B. (2019) The Canberra Bird Blitz 2019. *Canberra Bird Notes* 45: 167-182.

Davey, C. (1991) Numbers and distribution of the Common Myna in Canberra in July 1990. *Canberra Bird Notes* 16: 41-48.

Gregory-Smith, R. (1985) Introduction and spread of the Common Myna in Canberra. *Canberra Bird Notes* 10: 97-103.

Hermes, N. and Veerman, P. (2014) Brief history and evolution of the Garden Bird Survey. *Canberra Bird Notes* COG 50th Anniversary issue: 45: 167-182 116-121.

Holland, J. (2021) The rise and rise of the Eastern Koel in the ACT. *Canberra Bird Notes* 46: 105-118.

Lenz, M. (2014) The history of COG's waterbird surveys – Lake George and Lake Bathurst. *Canberra Bird Notes* COG 50th Anniversary issue: 104-115.

Lenz, M. (2021) The bird community of the Gungaderra Creek wildlife corridor in suburban Franklin, ACT, during the 2020/2021 breeding season. *Canberra Bird Notes* 46: 171-198.

Lenz, M. (2025) Observations of migratory waders from Lake Bathurst, New South Wales, 1980-2022. *Canberra Bird Notes* 50: 45-71.

Nix, H.A. (1976) Environmental control of breeding, post-breeding dispersal and migration of birds in the Australian region. *Proceedings of the International Congress of Ornithology* 16: 272-305.

Taylor, I.M. (1987) Murrumbidgee River Corridor bird survey. Summary of results. *Canberra Bird Notes* 12: 110-132.

Taylor, M. and Canberra Ornithologists Group (1992) *Birds of the Australian Capital Territory – An Atlas*. Canberra Ornithologists Group and National Capital Planning Authority, Canberra.

Veerman, P. (2003) *Canberra Birds: A report on the first 21 years of the Garden Bird Survey.* Author, Canberra.

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LONG-TERM TRENDS IN ACT WOODLAND BIRDS

1998 – 2019

A SUMMARY

JENNY BOUNDS[1], CHRIS DAVEY[2], NICKI TAWS[3] AND LAURA RAYNER[4]

1. PO Box 3933, Weston Creek, ACT 2611
2. 24 Bardsley Place, Holt, ACT, 2615
3. PO Box 348 Jamison Centre, ACT, 2614
4. Environment, Planning and Sustainable Development Directorate, ACT Government

Correspondence to: cogoffice@canberrabirds.org.au

1. Introduction

In the ACT the vegetation community defined as Yellow Box/Red Gum grassy woodland is classified as Endangered (*Nature Conservation Act*, 1980). The ACT holds some of the largest intact woodlands so there is a special responsibility to ensure the community is adequately protected and managed. A major aim of the Canberra Ornithologists Group is to promote the conservation of birds and their habitat, so in 1998 COG initiated a project to aid management through bird surveys aimed to record changes in the distribution and abundance of birds within the woodland community.

We summarise the results of the surveys from a report titled 'Long-term trends in ACT Woodland Birds 1998-2019' (Bounds *et al.* 2021), which details the results of observations from 15 woodland locations. The full report can be found at COG Woodland Bird Monitoring Project - Canberra Birds

2. Background

2.1. The Woodland Bird Monitoring Project

The primary aim of the Woodland Bird Monitoring Project was to develop a statistically robust monitoring program to measure the abundance of birds through time at grassy woodland locations in the ACT (see Cunningham 2003 and Bounds *et al.* 2010). A priority feature of the sampling design was to establish survey sites on-reserve and off-reserve to assess the effectiveness of the ACT reserve network for conserving woodland birds (see Rayner *et al.* 2014).

A core purpose of the Woodland Bird Monitoring Project is to provide recommendations for land management based on monitoring results. Survey data from the Woodland Bird Monitoring Project have been analysed on several occasions previously, examining trends in reporting rate for a range of bird species. Previous reports published on the COG website, including Bounds *et al.* 2010 and Taws *et al.* 2012, provide additional background

information and site details. A Ten-year Analysis of bird survey data (1998 to 2008) was undertaken in 2009 (Bounds *et al.* 2010) and multiple project reports have been published in COG's journal *Canberra Bird Notes*, available on the COG website.

This report presents major results from the analysis of survey data collected over the period March 1998 to September 2019, a period of twenty-one years and six months. The intention was to undertake an analysis once the majority of survey locations had at least 20 years of monitoring data.

2.2. Scope of the Analysis

Questions for the analysis focussed on long-term trends in woodland bird detections. This investigated:

- **changes in species richness** to broadly assess community condition
- **individual species trends** to assess the conservation status of woodland birds, and
- **composite trends for bird groups of special interest** to inform targeted conservation work.

3. Methods

3.1. Bird Surveys

Bird survey data are collected on sites of 50-metre radius (*c* 0.8 hectares) within grassy woodlands. Ten of the 15 survey locations have 9 sites each, one has 8 sites, and 3 locations have 6 to 7 sites. All survey locations are categorised into low, medium, and high habitat structure (*sensu* Bounds *et al.* 2010) to allow for an overall representation of the location. Mulligans Flat Nature Reserve surveys commenced in 1995 with 24 sites; these sites were selected to represent three habitat types: grassy woodland on flats, dry forest on low ridges, and areas at the ecotone of these communities. See Appendix A for site locations.

3.2. Survey Sites

Survey locations and their management histories are described in detail in the Ten-year Analysis Report (Bounds *et al.* 2010), whilst the number of sites and survey period for the report are described in Bounds *et al*. 2021.

3.3. Bird Groups

Twelve bird groups of conservation interest were analysed for long-term change. The groups included 125 species, and their allocation (including method used for allocation) is shown in Bounds *et al.* 2021, 2.3 and Appendix C. All bird species are allocated to at least one bird group, and bird species can be allocated to more than one bird group.

- ACT woodland-dependent species: 48 species
- South-east woodland-dependent species: 49 species
- Degraded woodland community: 10 species
- ACT threatened species: 11 species

- Species of conservation concern: 14 species
- Canopy feeding species: 24 species
- Mid-storey feeding species: 3 species
- Ground feeding species: 17 species
- Woody-weed frequenting species: 16 species
- Small woody-weed frequenting species: 10 species
- Small-bodied species (<70 g): 74 species, and
- Large-bodied species (>70 g): 52 species.

3.4. Data Analysis

For the analysis, trends in *Species Richness* are derived from the number of species detected at each bird survey, whilst trends in *Individual Species Reporting Rate* (hereafter *Individual Species*) are derived from the detection (presence/absence) of an individual species at each bird survey, thereby adjusting for any differences in survey effort between years. The reporting rate is the number of surveys in which a species was recorded out of the total number of surveys for that season. The effect on *Species Richness* and *Individual Species* of the following factors was modelled:

- **Time** – the effect of each year spanning 1998 to 2019 (21 years)
- **Location** – representing the 15 locations at which bird surveys took place, and
- **Site** – representing the 142 survey sites, nested within *Location*.

3.4.1. Individual Species Trends

Detections for individual species were used to model the trends of birds through time. Both generalised additive models (GAM), and generalised additive mixed models (GAMM), were fitted to individual species detections data, providing a smoothed (non-linear) trend line. To test whether there was an overall increase or decrease in detections of individual species from 1998 to 2019, generalised linear models (GLM), and generalised linear mixed models (GLMM), were fitted to individual species detections, providing a straight (linear) trend line. For further details see Bounds *et al.* 2021.

3.4.2. Composite Trends for Bird Groups

To test whether birds of a particular grouping (n = 12, described above) showed common linear trends from 1998 to 2019, a guilds analysis was conducted on linear trend results from the individual species analysis described above. To do this, a new variable representing the time-effect *(i.e.* trend) for each species was fitted against the two-level factor (included or not) for each bird group.

4. Results and Discussion

The analysis incorporated 10,728 surveys undertaken at 142 sites between 1998 and 2019. The number of bird surveys completed per site ranged from 52 to 92 over the observation

period. Bird data for 129 land-based woodland bird species (water-based birds excluded) were analysed.

4.1. Species Richness

The analysis showed no significant change in species richness from 1998 to 2019 across woodland bird monitoring sites. There were significant (but small: average 1-2 species) decreases in species richness from 1999 to 2001 and from 2015 to 2019, possibly reflecting significantly drier than average years.

4.2. Individual Species

Long-term trends in reporting rate were calculated for 129 land-based woodland species, of which 73 species showed no significant trend pattern, and are not individually discussed. In some cases, non-significant trend results may be due to limitations of the project sampling design. For example, no raptors showed statistically significant trends, likely because the within-site (50 m) survey methodology is not effective for measuring the abundance of raptors (a more targeted sampling design is needed).

Significant trends – either an increase or decrease – were observed for 56 species (for individual species' trend plots see Appendix E in Bounds *et al.* 2021). Table 1 provides an overview of significant trend patterns.

4.2.1. Decreasers

Thirty-two species showed a statistically significant decrease in reporting rate over the analysis period. Twenty-eight are native species, and include seasonal migrants,[3] residents, and a range of sizes of birds (21 small-bodied: < 70 g, and 7 large-bodied: > 70 g). Some of these birds are thought by observers to have declined at some woodland sites or occur in very low numbers at sites (*e.g.* **White-plumed Honeyeater**, **Southern Whiteface**, **Crested Shrike-tit**). However, the long-term decline of some species was unexpected, including the following 16 species generally regarded as common:

- Tree Martin
- Fuscous Honeyeater
- Pallid Cuckoo
- Dollarbird
- Superb Fairy-wren
- Mistletoebird
- Striated Thornbill
- Weebill
- Yellow-rumped Thornbill
- Rufous Whistler
- Willie Wagtail
- Western Gerygone
- Striated Pardalote
- Leaden Flycatcher
- Buff-rumped Thornbill
- Grey Fantail.

[3] *Seasonal migrant* refers to a species that has constant and regular movements, moves into the ACT over the spring and summer months (for breeding), and moves out of the ACT for the cooler months to other locations, *e.g.* north, coastal. This is distinct from an *altitudinal migrant*, which moves within the local area, breeds in upland forests, and moves to lower and milder altitudes in autumn/winter (including to lowland woodlands).

4.2.2. Increasers

Of the 24 species that showed increasing trends most are common, large-bodied birds, adapted to urban environments (*i.e.* habitat generalists). However, the list of increasers does include 5 small-bodied birds that occur in ACT lowland and mountain forests, as well as woodland habitats (*i.e.* not strictly woodland-dependent), for example **Golden Whistler**, **White-eared Honeyeater** and **Brown Thornbill**.

4.2.3. Consistent linear changes

Species that showed steady, consistent decreases over every year in the analysis period were:

- Hooded Robin
- Tree Martin
- Restless Flycatcher
- Pallid Cuckoo
- Dollarbird
- Rufous Whistler
- Grey Currawong
- Western Gerygone.

Species that showed steady, consistent increases over every year in the analysis period were:

- Rainbow Lorikeet
- Satin Bowerbird
- Little Corella
- Gang-gang Cockatoo
- Australian King-Parrot
- Australian Raven.
- White-winged Chough
- Crimson Rosella

Table 1. Trend summary for individual species that showed significant change over the analysis period (1998-2019). Species marked with an asterisk (*) show consistent significant inter-annual trend effects, *i.e.* significant annual decrease or increase in every year of the analysis period. Mean site-level reporting rate (RR) is presented for the first year (1998) and last year (2019) of the analysis to provide an indication of linear change through time.

Species name	No. records	1998 RR (%)	2019 RR (%)	P value	Trend description
DECREASERS *Greatest to least*					
Little Friarbird	7	0.25	0.00	0.008	Seasonal. Very low RR, most years with no records. Significant decline over the analysis period.
House Sparrow	89	0.23	0.01	< 0.001	Low RR. Significant decline over the analysis period, few records in the last 10 years.

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Species name	No. records	1998 RR (%)	2019 RR (%)	P value		Trend description
Hooded Robin*	74	0.62		0.02	< 0.001	Low RR declining to very low. Significant steady decline 1998-2014 after which there were no records.
Crested Shrike-tit	44	0.66		0.02	< 0.001	Low RR. Slight peak in 2006, then significant decline 2007-2013 after which there were no records.
Tree Martin*	1,439	2.8		0.20	< 0.001	Seasonal. Medium RR declining to low. Significant decline 1998-2011. Still declining after this but at a less significant rate.
Common Myna	1,171	3.10		0.24	< 0.001	Medium RR declining to low. Significant decline 1999-2002, then increase to a slight peak in 2006, followed by significant decline to 2012. Small increase 2014-2016, then another decline from 2018. Overall downward trend.
Restless Flycatcher*	17	0.36		0.03	0.016	Low RR, more than half the years with no records. Significant decline over the analysis period.
Fuscous Honeyeater	265	1.12		0.11	< 0.001	Seasonal. Low RR. Significant decline 1999-2002. Small increase 2004-2006 followed by significant decline 2009-2010 and ongoing slow decline since.
DECREASERS *Greatest to least*						
White-plumed Honeyeater	1,723	5.48		0.71	< 0.001	Medium RR declining to low. Significant decline 1998-2002 then slight increase from 2003-2005. Further significant declines 2007-2009 and 2012-2015. Still declining after this but at a less significant rate.
Pallid Cuckoo*	77	1.44		0.19	< 0.001	Seasonal. Low RR. Significant steady decline over the analysis period.
Brown Treecreeper	222	0.36		0.05	< 0.001	Low RR declining to very low. Significant decline from 2011 onwards.
European Goldfinch	59	0.29		0.05	0.048	Sparse observations. Slow, marginally significant decrease over the analysis period.

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Species name	No. records	1998 RR (%)	2019 RR (%)	P value		Trend description
DECREASERS *Greatest to least*						
Dollarbird*	127	1.20		0.25	< 0.001	Seasonal. Low RR declining to very low. Significant steady decline over the analysis period.
Southern Whiteface	178	0.46		0.10	0.003	Low RR. Significant decline from 2009-2014.
White-winged Triller	241	2.44		0.56	< 0.001	Seasonal. Medium-low RR. Significant decline 1998-2000. Small but significant increase in 2010-2011 followed by decline in 2013-2014.
Grey Currawong*	201	1.12		0.37	< 0.001	Low RR declining to very low. Significant steady decline over the analysis period.
Superb Fairy-wren	6,535	14.28		5.57	< 0.001	Medium RR. Significant decline 2000-2006, significant increase from 2008-2011 followed by significant decline 2013-2019 to give an overall declining trend.
Common Starling	9,547	12.15		4.91	< 0.001	Medium RR. Two periods of significant declines; 1999-2002 and 2010-2012, each followed by 2 years of significant increase; 2003-2005 and 2013-2015. Overall downward trend.
Mistletoebird	900	6.53		2.81	< 0.001	Seasonal. Medium RR. Significant declines in 2000-2001 and 2014-2019 give an overall declining trend.
Striated Thornbill	3,519	6.24		3.00	< 0.001	Medium RR declining to low. Significant decline in 2005-2008 followed by a small but significant increase 2010-2012 then another decline 2014-2017.
Weebill	8,949	40.58		24.49	< 0.001	High RR with large fluctuations. A significant increase in 2002-2005 followed by two periods of significant decline 2006-2009 and 2012-2016, then a significant increase 2017-2019. Overall declining trend.

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Species name	No. records	1998 RR (%)	2019 RR (%)	P value	Trend description
DECREASERS *Greatest to least*					
Noisy Friarbird	1,786	11.70	6.03	< 0.001	Seasonal. Medium RR. Significant decline 1998-2002, followed by significant increase 2004-2006, then ongoing declines, significant in 2009-2011 and 2016-2019.
Yellow-rumped Thornbill	3,941	10.23	5.94	< 0.001	Medium RR. Significant increase 2006-2008 followed by significant declines 2010-2012 and 2016-2019, with an overall declining trend.
Rufous Whistler*	1,631	10.14	5.91	< 0.001	Seasonal. Medium RR. Significant steady decline over the analysis period.
Willie Wagtail	730	3.66	2.15	0.003	Medium to low RR. Significant decline 1998-2002. Non-significant downward trend since.
Western Gerygone*	440	2.33	1.39	0.009	Seasonal. Low RR. Significant steady decline over analysis period.
Striated Pardalote	8,866	42.15	30.45	< 0.001	High RR. A significant increase 1998-2000, followed by a short but significant decline 2001-2002. Another increase 2003-2005 then a significant decline 2010-2013. Overall declining trend.
Leaden Flycatcher	386	2.34	1.52	0.048	Seasonal. Low RR. Significant decline 1998-2002.
Red-rumped Parrot	2,143	1.74	1.13	0.019	Low RR. Significant decline 1998-2006.
Black-faced Cuckoo-shrike	1,657	12.42	8.66	< 0.001	Seasonal. Medium RR. Two periods of significant decline; 1998-2002 and 2015-2019.
Buff-rumped Thornbill	7,199	12.14	8.64	< 0.001	Medium RR. Two periods of significant decline; 2000-2002 and 2014-2019.
Grey Fantail	5,088	26.35	20.11	< 0.001	Seasonal. High RR. Significant decline 1998-2000, significant increase 2009-2012, followed by another decline 2013-2016.
INCREASERS *Greatest to least*					
Rainbow Lorikeet*	285	0.00	0.64	< 0.001	Low RR. First records not until 2008 but significant increase since then.
Tawny Frogmouth	7	0.00	0.24	0.034	Very low RR. First records in 2013. Significant increase since then.
Superb Parrot	168	0.02	0.30	< 0.001	Seasonal. Low RR. First records in 2005 and a significant increase from then until 2012.

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Species name	No. records	1998 RR (%)	2019 RR (%)	P value	Trend description
Satin Bowerbird*	44	0.01	0.14	0.001	Low RR. First records in 2000 then sporadic until 2011. Significant increase over the period 2000-2019.
INCREASERS *Greatest to least*					
Little Corella*	376	0.12	1.24	< 0.001	Low RR. Significant steady increase from first records in 1999 to 2019.
Noisy Miner	7,985	2.97	24.49	< 0.001	Low RR increasing to high. Two periods of significant increase 2002-2008 and 2012-2016 giving a strong upward trend.
Masked Lapwing	250	0.00	0.02	0.001	Very low RR. Significant increase 2007-2010.
Gang-gang Cockatoo*	342	0.07	0.30	< 0.001	Low RR. Slight but significant increase in RR over the analysis period.
Grey Butcherbird	443	1.07	4.51	< 0.001	Low RR increasing to medium. Significant steady increase from 2004-2019.
	1,036	0.39	1.60	< 0.001	Low RR. Significant steady increase over the analysis period.
Australian Raven*	2,528	6.12	16.26	< 0.001	Medium RR. Significant steep increase over the analysis period.
Australian King-Parrot*	4,576	7.08	18.39	< 0.001	Medium RR. Significant steady increase 1998-2013. Still increasing to 2019 but non-significant.
Crested Pigeon	1,259	1.93	5.20	< 0.001	Low RR increasing to medium. Significant increases 2002-2005 and 2006-2009 to a peak, then significant decrease 2010-2013 before another significant increase 2014-2018.
Welcome Swallow	569	0.56	1.30	0.004	Low RR. Significant increase 2009-2013 then significant decline 2015-2019. Overall subtle, significant increase over the analysis period, most likely due to rainfall response.
White-winged Chough*	3,613	2.26	5.01	< 0.001	Low RR increasing to medium. Significant steady increase over the analysis period.
Brown Thornbill	760	1.58	3.52	< 0.001	Low RR. Steady until small but significant increase 2008-2012.
Pied Currawong	2,319	4.74	9.48	< 0.001	Low to medium RR. Steady until a small but significant increase 2012-2015, then small but significant decrease 2017-2018.
Australian Magpie	6,884	23.96	36.79	< 0.001	Medium RR increasing to high. Steady then. significant increases in 2006-2010 and 2014 followed by significant decline 2016-2019. Overall significant linear increase over the analysis period

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Species name	No. records	1998 RR (%)	2019 RR (%)	P value	Trend description
INCREASERS *Greatest to least*					
White-eared Honeyeater	429	1.81	2.96	0.010	Mostly seasonal. Low to medium RR. Small but significant increase 2006-2009, small but significant decrease 2014-2017. Overall slightly increasing trend.
Brown-headed Honeyeater	1,251	1.49	2.38	0.013	Low RR. Slight increase, (significant only in 2012) through to a peak in 2014, significant decrease from 2016-2019. Overall subtle, significant linear increase over the analysis period.
Golden Whistler	484	2.43	3.68	0.024	Mostly seasonal. Low to medium RR with two peaks, 2003 and 2013. Significant changes before and after these peaks, but an overall increasing trend.
Galah	6,453	17.16	23.90	< 0.001	Medium RR increasing to high. An initial significant decline in 1998-2000, followed by significant increases 2002-2008 and an ongoing upward trend.
Magpie-lark	1,411	3.39	4.98	0.008	Low RR increasing to medium. Slightly increasing trend overall with two peaks in 2008 and 2016 with significant changes before and after these peaks.
Crimson Rosella*	14,130	43.16	51.62	< 0.001	High RR. Significant steady increase over the analysis period.

4.2.4. Increasers of interest

Increases in these species are of ecological relevance: a substantial increase in the resident **Noisy Miner**, and colonisation in recent decades by **Rainbow Lorikeet** and **Little Corella**.

4.2.4.1. Noisy Miner

Noisy Miners showed a significant six-fold increase in reporting rate over the analysis period. This species is an aggressive, medium-sized, colonial honeyeater known to exclude or suppress small birds. There is widespread concern about these impacts, with culling programs implemented across many areas of the Australian temperate zone. Further research is needed to inform **Noisy Miner** management programs in the ACT.

4.2.4.2. Rainbow Lorikeet

Rainbow Lorikeets showed a significant increase in the analysis. This is a nectar-feeding parrot typically associated with coastal habitats, and first observed in the ACT around 1986 (Canberra Ornithologists Group). In many parts of Australia, **Rainbow Lorikeets** are considered an invasive species and, while their reporting rate is low in the ACT, its increase is consistent and statistically reliable.

4.2.4.3. Little Corella

Little Corellas showed a slight but steady and significant increase in reporting rate over the analysis period. This is a ground-feeding, flock species of cockatoo that is very common in open, inland habitats, and has been increasing in the ACT since around 1990 (Canberra Ornithologists Group).

4.2.5. Decreasers of interest

Two small, canopy-feeding honeyeaters which have a wide distribution/range outside the ACT are highlighted. The **White-plumed Honeyeater** is a resident breeder in ACT lowland woodland, and the **Fuscous Honeyeater** a breeder in mid-altitude woodland.

4.2.5.1. White-plumed Honeyeater

The **White-plumed Honeyeater** showed an overall decrease of concern. Before 2002, there is a strong decline, and a more gradual decline in the trend since then, to a low level of abundance. This is a widely distributed honeyeater, common along inland river systems. In the ACT, they have been considered a fairly common species, largely sedentary, resident in woodlands as well as parklands with mature eucalypts. The species has been thought by observers to have reduced in numbers or disappeared from some woodland sites, and the analysis result confirms this.

4.2.5.2. Fuscous Honeyeater

The **Fuscous Honeyeater** showed an overall decrease, with a very low reporting rate since 2011. The decline is of concern, particularly as the species' core ACT habitat is in the southern half of the ACT, where it breeds, at mid-altitude in open woodlands in valleys and on foot-slopes. This area was impacted by bushfires in 2003 and 2020. Some seasonal movement is known in cooler months to peri-urban ACT woodlands, where there are nectar sources.

For further examples of species with significant decreases see Bounds *et al.* 2021, Table 4.

4.3. Seasonal migrants

The only seasonal (or partial) migrants that showed a significant increase are the **Welcome Swallow** and **Superb Parrot**. Twelve seasonal migrants (see below) showed decreases; of those, 11 are common species that breed in ACT woodlands (excludes Little Friarbird). Trends in seasonal migrants are variable and not clearly explained by local weather.

- Rufous Whistler
- Leaden Flycatcher
- Dollarbird
- Mistletoebird
- Tree Martin
- Pallid Cuckoo
- Noisy Friarbird
- Little Friarbird
- Black-faced Cuckoo-shrike
- White-winged Triller
- Western Gerygone
- Grey Fantail.

4.4. Resident species

Of the 22 resident species that showed a significant increase, 18 are large-bodied species. Of the small-bodied species, two are altitudinal migrants in the ACT (**Golden Whistler**, **White-eared Honeyeater**). The **Weebill** and **Buff-rumped Thornbill** are examples of small, resident species that showed a significant variation, but an overall decrease, in their reporting rates. Significant drops in the reporting rate of **Buff-rumped Thornbill** appeared to coincide with drier than average periods (e.g. 2000-2003 and 2014-2019), whereas changes in the reporting rate for **Weebill** do not appear weather-related. The large-bodied **Grey Currawong** showed a decreasing trend. This species is resident in woodlands. They are at some woodland sites in fairly low numbers, as breeding pairs.

4.5. Non-native species

No non-native species were found to have increasing trends. Of the seven non-native species, four showed significant decreases: **House Sparrow**, **Common Myna**, **European Goldfinch** and **Common Starling**. The remaining 3 are marginal woodland species. Although records are few, the **Common Blackbird** showed a decline but a positive response to the breaking of the Millennium Drought.

4.6. Bird Groups

Seven bird groups showed significant trends over the analysis period (Figure 1). These included:
an increase in large-bodied birds and birds associated with degraded woodland communities, and a decrease in small-bodied birds, canopy feeders, south-east Australian woodland birds, ACT woodland-dependent birds and ACT species of conservation concern.

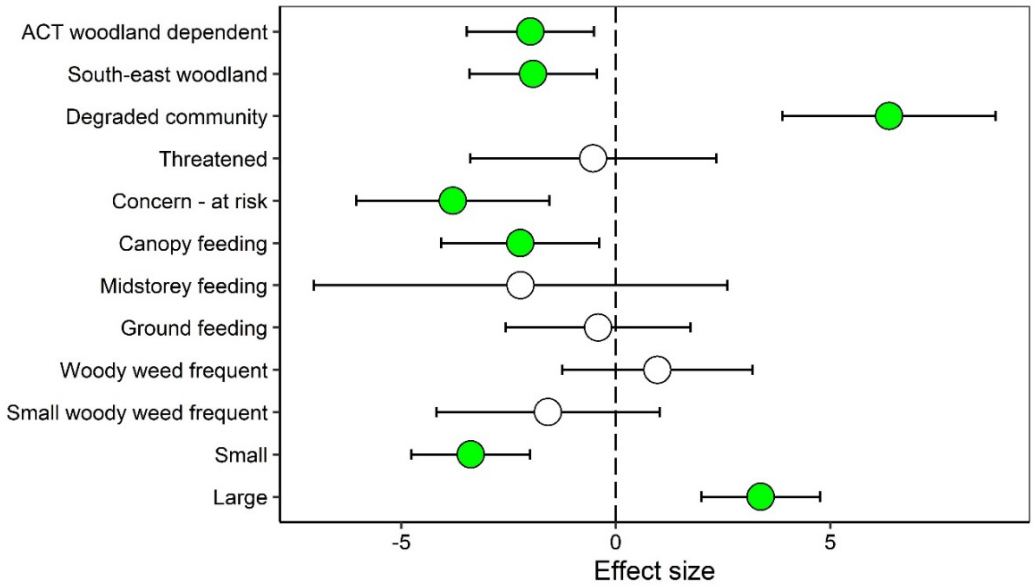

Figure 1. *Effect size plot* for bird groups of interest. Points to the right of the zero line indicate that species in that group have collectively increased over time (1998 to 2019), and points to the left of the zero line indicate that species in that group have collectively decreased over the time. Bird group trends that are statistically significant are shaded.

There was no collective trend in threatened species, ground feeders, or birds associated with woody weeds (all species or small-bodied species). Models did not converge for mid-storey feeders due to sparse data. Additional information showing the magnitude of (significant) change for individual species in a bird group is provided in Bounds *et al*. 2021, Appendix G.

4.7. Conservation Priority Species

The Project Team has compiled a list of Conservation Priority Species in ACT woodlands and assigned a management **priority ranking** (high or low) to each, based on an assessment of significant statistical results collectively. The purpose of this list is to support land managers in conservation and restoration planning for woodland birds. To be considered a Conservation Priority Species, a species had to meet ALL THREE (3) of the following criteria:

- a significant decliner, and
- an ACT woodland-dependent bird species, and
- **(i)** a consistent, every-year decliner, **(ii)** a canopy feeder, and/or **(iii)** a small-bodied bird.

The **priority ranking** takes account of these criteria and the local knowledge and expertise of the Project Team, and relates to the ACT region only.

Table 2. Species prioritised for conservation attention in the ACT due to concerning long-term status and trait-based vulnerability (*i.e.* small-bodied and/or canopy feeder). *Reminder: Canopy feeders feed primarily, but not exclusively, in the canopy.*

Species	RR trend	Consistent decline	Canopy feeder	Small-bodied	Priority ranking	Notes on ecology and trend pattern
Brown Treecreeper	Low-very low			√	High	Mainly ground feeder of insects, also taken from crevices/bark in trees. Reliant on dead and fallen timber. Hollow nester. Requires well connected habitats/patches. No longer resident breeding groups at woodland sites. Rare/uncommon in rural areas.
Buff-rumped Thornbill	Medium			√	Low	Abundant flock species in good quality woodland structures/habitats. Insect feeder, utilises lower/mid-storey and ground, including eucalypt re-growth.
Dollarbird	Low-very low	√			High	Seasonal, long-distance migrant from areas in Asia and PNG. Canopy and aerial feeder/hawker of insects. Nests in tree hollows, often dead trees.

Table 2 continued on next page

Table 2 continued from previous page

Species	RR trend	Consistent decline	Canopy feeder	Small-bodied	Priority ranking	Notes on ecology and trend pattern
Fuscous Honeyeater	Low		√	√	High	Moves seasonally between mid-altitude and lowland woodlands in ACT. Widely distributed in SE Aust. woodlands. Nectar feeder in eucalypts, shrubs. Takes insects in absence of nectar. Core ACT habitat impacted by bushfires 2003 and 2020.
Grey Currawong	Low-very low	√			High	Widespread species. In ACT occurs in low numbers/pairs, in woodlands. Takes insects, fruits/berries, probes bark/litter. Records in COG Area of Interest (AOI) show slow decline from 1991 (Canberra Ornithologists Group).
Grey Fantail	High		√	√	Low	Mostly migratory/seasonal. Occurs in habitats of varying structures/quality. Insect feeder, taken in flight.
Hooded Robin	Low-very low	√		√	High	Mainly ground feeder of insects. Requires large, undisturbed, well connected patches/habitats. No longer resident breeding groups at woodland sites. Rare/uncommon in rural areas.
Leaden Flycatcher	Low		√	√	Low	Seasonal species. Occurs in good quality woodland habitats with large eucalypts, open forest. Insect feeder, in trees and in flight amongst treetops.
Little Friarbird	Very low		√		Low	Very sparse data, marginal ACT species, core range outside ACT.
Mistletoebird	Medium		√	√	Low	Seasonal species, some overwinter. Feeds largely on mistletoe fruits, and insects. Tree health decline is possible factor (loss of/reduced mistletoes, herbivores/possums).
Noisy Friarbird	Medium		√		Low	Seasonal, migratory species. Insects and nectar feeder.
Restless Flycatcher	Low	√		√	High	Widely distributed species. Mainly hawks insects on or from the ground. Tolerates open treed habitats, farmlands and riverine.

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Species	RR trend	Consistent decline	Canopy feeder	Small-bodied	Priority ranking	Notes on ecology and trend pattern
Rufous Whistler	Medium	√	√	√	Low	Seasonal migratory species. Occurs in good quality woodland habitats with large eucalypts. Insect feeder in trees and shrubs layer.
Southern Whiteface	Low			√	Low	Ground feeder, on insects and seeds. Some disturbance tolerance, occurs in modified habitats and farmlands. Prefers areas of short grass, patchy ground layer.
Striated Pardalote	High		√	√	Low	Widely distributed species. Feeds on tree-frequenting insects, including lerps. Disturbance tolerant, occurs in degraded, treed habitats, and fragmented patches.
Tree Martin	Medium- low	√		√	High	Seasonal migrant, some overwinter. Hawks insects from or between trees and aerial. Tolerates open treed habitats. Nests in small hollows in eucalypts.
Weebill	High		√	√	Low	Lerp and insect feeder, mostly taken from outer foliage of eucalypts. Abundant at woodland sites of varying quality/structure. Utilises eucalypt re-growth.
Western Gerygone	Low	√	√	√	Low	Seasonal migratory species. Small insect feeder, usually in outer foliage. Occurs in better-quality woodland habitats. Widespread species, more common further inland.
White-plumed Honeyeater	Medium- low		√	√	Low	Widely distributed species in woodland structures and riverine habitats. In ACT, occurs in woodlands, in treed urban/reserve edge green strips, and parklands with mature eucalypts. Insects and nectar feeder.
White-winged Triller	Medium- low		√	√	Low	Widespread, mobile, irruptive species, numbers vary seasonally. Insect feeder, including on or close to the ground.

Notes on some declining species in Table 1 list, not included as Conservation Priority Species in Table 2:

Crested Shrike-tit (RR low, never a common woodland species, uncommon/rare in ACT forest habitats).

Striated Thornbill (RR medium declining to low, flock and canopy feeding species, not woodland-dependent, also forest species).

Pallid Cuckoo (RR low, a consistent decliner, not woodland-dependent, a widespread species more common inland in open habitats).

5. Conclusions and Recommendations

This report provides a timely update on the conservation status of ACT woodland birds. Here, long-term woodland bird population trends have been elicited from the Woodland Bird Monitoring Project database and interpreted with expert knowledge, to provide an overview of desirable and undesirable changes to woodland avifauna. Further, this report serves as a support tool for conservation land managers through the identification of Conservation Priority Species that arguably require immediate protection and conservation attention. In some cases, strategic restoration planning to improve woodland condition and arrest current rates of decline may be necessary to avoid future local extirpation events. Below, the authors call attention to some key conclusions from the analysis.

The increase in large-bodied bird species and the strong, unabated increase in aggressive species like **Noisy Miner** and **Rainbow Lorikeet** are important considerations for the management of woodland-dependent birds. This is particularly relevant in the consideration and planning of conservation buffers – including their size and nature – at the interface of new urban and greenfield developments. It is likely that high-functioning conservation buffers will be needed to minimise the intrusion and dominance of large and/or aggressive, urban-tolerant bird species in nature reserves and rural woodland habitats.

There were three important new findings from the analysis:

1. Observed declines were expected for some species (*e.g.* **White-plumed Honeyeater**, **Southern Whiteface**, **Crested Shrike-tit**), but there were a number of additional species showing declines that were unexpected by the Project Team (*e.g*. **Fuscous Honeyeater**, **Mistletoebird**). Similarly, some species regarded as fairly common or abundant showed long-term downward trends *(e.*g. **Rufous Whistler**, **Weebill**, **Yellow-rumped Thornbill**, **Superb Fairy-wren**), albeit only small declines in some cases (*e.g*. **Leaden Flycatcher**, **Red-rumped Parrot**). Declining groups were not restricted to native species: 4 of the 7 introduced species showed a decrease (the other 3 showed no trend).

2. A significant collective decline in canopy feeders was unexpected and warrants further investigation. Possible drivers of decline in this bird group include eucalypt dieback and crown condition, climate-related habitat effects (*e.g.* nectar availability), and over-abundant canopy browsers such as possums.

3. Before the analysis, it was thought by the Project Team that ground feeders might be the group of most concern, given previous analyses and factors such as increasing periods of drought, variable rainfall, overgrazing by native herbivores, deterioration of ground-layer habitat condition and plant diversity, and invasive weeds. However, the ground-feeding group did not show a collective trend.

Drought and rainfall are generally considered important determinants of bird distribution and abundance, especially for small passerines. From this analysis, it appears some species (*e.g.* **Scarlet Robin**) responded positively to increased rainfall, while others (*e.g.* **Hooded Robin**) showed no response at all. Without a more tailored analysis, it is unclear if (or how) weather affects woodland bird reporting rates. It is plausible, however, that species occurring only at low densities, or in fragmented populations, lack the means to exploit favourable weather to recover their numbers.

The analysis confirms that a focus on small birds as a conservation priority is valid. There may be a need to consider the nomination of some species as *Threatened* (Vulnerable status) under the ACT *Nature Conservation Act 2014*, such as those considered 'High' priority in Table 2 (*e.g.* **Tree Martin**, **Fuscous Honeyeater**), or the upgrading of some species already listed as *Threatened* (*e.g.* **Hooded Robin**). Additional supporting data, or further analysis, may be needed to underpin a strong case for new threatened species nominations. In the interim, all species named as 'Conservation Priority Species' (Table 2) should form part of a formalised 'Watching Brief' that implies ongoing species assessment in terms of their population status and their habitat extent and condition.

5.1. Future work

Further exploration of results presented here could be undertaken, as well as new projects, with questions arising from, or based on, this report. Future work using COG's Woodland Bird Monitoring Project database, dependent on available funding, resources and priorities, could include:

- Targeted analysis of species of interest, including species of concern, which may warrant nomination for listing as *Threatened*. This should be driven by clear questions (*e.g. What do we need to know about species X?*). Action Plans produced by the ACT Government may provide some guidance.
- Analysis of landscape-scale woodland change and associated bird responses. This could include:
    - Assessing whether habitats critical to the maintenance of woodland bird diversity are being maintained.
    - Analysing how woodland birds are responding to ongoing urbanisation and reservation (an update of Rayner *et al.* 2014).
    - Investigating the relationship between dieback and woodland bird abundance, density and distribution.
- Examination of the impacts of dominant avian competitors on vulnerable woodland birds that would include a description of **Noisy Miner** colonisation dynamics across the ACT.
- An analysis of site-based species occurrence and community composition, which may be influenced by site-related attributes such as patch size, patch connectivity, habitat structure, land tenure, grazing regimes, the urban context, or other geographical factors.

- A case study of Mulligans Flat and Goorooyarroo Nature Reserves, where survey data are available from 1995, before/after and within/outside the predator-proof Sanctuary.
- Identification of climate-sensitive species, based on research on how woodland birds are responding to weather variability and broad-scale climate signals.

Readers are encouraged to explore reports from other woodland bird monitoring projects in the region to position the results of this project in the broader context of temperate woodland bird conservation. For example, the Cowra Woodland Birds Program (CWBP) conducts regular bird surveys in woodlands in the Cowra area north of Canberra, and 17 years of data have recently been analysed (Reid & Nicholls 2020).

Finally, this report has been prepared to enable COG to publish key results, and for consideration as an article in a peer-reviewed journal.

5.2. Actions Recommended

1. Continue the survey program and consider a future trend analysis.
    - Most suitable at the 30-year milestone (1998 to 2028).
    - With an emerging pattern of drier years since 2015, there is great interest and, in some cases, concern for what trends will emerge in the next decade and whether some unexpected decliners might recover. Monitoring should continue to determine when/if populations will plateau and how this influences the conservation status of species.
2. Consider publishing results presented in this report in a peer-reviewed journal to enhance the dissemination of key findings and reach a wider scientific audience.
3. Seek funding/resources to undertake further analysis or research projects with a focus on Conservation Priority Species and their primary threatening processes.

Acknowledgement

Over many years of this Program there have been many COG members who have undertaken the bird surveys contributing to the long-term dataset. COG thanks all who have undertaken a bird survey in the Program. Some people have made a substantial contribution to surveys/data collection over many years and some of the current site coordinators have undertaken surveys since their sites were originally established. The list does not include the names of those who may have done occasional surveys.

Current site/location coordinators:

Lia Battisson (Tuggeranong Hill NR)
Jenny Bounds (Mulligans Flat NR, Jerrabomberra West NR)
Chris Davey (Kama NR)
Steve Holliday (Goorooyarroo NR south)
Paul Fennell (Majura Field Range)
Sandra Henderson (Symonston - Callum Brae NR, Isaacs Ridge NR)
Sue Lashko (Newline Quarry)

Michael Lenz (Campbell Park)
David McDonald (Castle Hill)
Julie McGuiness (Naas)
Harvey Perkins (Red Hill NR)
Alison Rowell (Hall/Gold Creek)
Nicki Taws (Goorooyarroo NR north)
Kathy Walter & John Goldie (Mt Majura NR)

Significant survey contributors:

Martyn Moffat (Mulligans Flat 1995 to date); Jack Holland (Mulligans Flat 1997 to date); Bruce Lindenmayer (Mulligans Flat 1995-2015); Stuart Harris (Red Hill); Jenny Bounds (multiple sites/locations since 1995).

Other survey contributors: (past site coordinators and/or survey helpers at one or more sites/locations – in alphabetical order; most of the list at Mulligans Flat):

Barbara Allan, John Avery, Shaun Bagley, Alistair Bestow, Con Boekel, Suzi Bond, John Brannan, David & Kathy Cook, Muriel Brookfield, Prue Buckley, Mark Clayton, Geoffrey Dabb, Alan Ford, Malcolm Fyfe, Bill Graham, Bill Handke, Kay & Horst Hahne, Steve Holliday, Robin Hide, Sue Lashko, Tony Lawson, Isobel Crawford, Noel Luff, Joan & Trevor Lipscombe, Jonette McDonnell, Duncan McCaskill, Julie McGuiness, Carol Neumann, Gail Neumann/Daryl Beaumont, Anthony Overs, Peter Roberts, Alison Russell-French, Nicki Taws.

The analysis was undertaken in a collaboration between COG and the ACT Parks and Conservation Service, (funding of the statistical analysis), using statistical analysis services provided by Maldwyn John Evans from the Australian National University.

The authors thank all the individuals who undertake the woodland surveys, and the landholders/land managers who allow access to sites.

The authors thank Thea O'Loughlin (Ecologist, Offsets Team, ACT Parks & Conservation Service) who reviewed the document.

References

Bounds, J., Taws, N., and Cunningham, R. (2010) *A Statistical Analysis of Trends in Occupancy Rates of Woodland Birds in the ACT, 1998 to 2008: The Ten-Year Data Analysis*. [This report was published by COG in *Canberra Bird Notes*, Volume 35 (3), December 2010 (pages 158-191].

Bounds, J., Davey, C., Taws, N., Evans, M.J. and Rayner, L. (2021) *Long-term trends in ACT woodland birds 1998-2019*. Canberra Ornithologists Group, Canberra

Cunningham, R. (2003) *A statistical assessment of the status and trends of woodland birds in the ACT: a report to Canberra Ornithologists Group (COG),* September 2003.

Rayner, L., Lindenmayer, D. B., Wood, J.T., Gibbons, P., and Manning, A.D. (2014) Are protected areas maintaining bird diversity? *Ecography*, 37: 43-53.

Reid, J.W. and Nicholls, A.O. (2020*). Long-Term Trends of Birds in the Cowra Region NSW - Statistical Models of Species, Indices and Communities over 17 years of Cowra*

Woodland Birds Program Surveys, November 2020. BirdLife Australia, Southern NSW and ACT Region.

Rowell, A. (2004) *Canberra Ornithologists Group Woodland Bird: Survey Progress Report, 2000-2003.* Canberra Ornithologists Group. [This report was published by COG in *Canberra Bird Notes*, Volume 29 (2), June 2004 (pages 49-67)].

Taws, N., Bounds, J., Rowell, A., and Cunningham, R. (2012) *An Analysis of Bird Occupancy and Habitat Changes at six woodland locations – 2003 and 2010*. [This report was published by COG in *Canberra Bird Notes*, Volume 37 (2), June 2012 (pages 100-129)].

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HOW DOES THE GARDEN BIRD SURVEY REPRESENT RESIDENTIAL CANBERRA?

KAREN IKIN [A,B,C], LAURA RAYNER [A] and R. MATTHEW BEATY [B]

[A] *Fenner School of Environment and Society, The Australian National University, Canberra ACT 0200*

[B] *CSIRO Ecosystem Sciences, Clunies Ross Street, Acton ACT 2601*

[C] *To whom correspondence should be addressed: Karen.Ikin@anu.edu.au*

1. Introduction

The Garden Bird Survey (GBS) has monitored birds throughout urban Canberra for over 30 years. Since its inception in July 1981, members of the Canberra Ornithologists Group (COG) and interested citizens have contributed over 2,300 annual surveys of birds observed near their home or place of work. To date, these surveys comprise almost 83,000 monitoring weeks at 399 sites spread across 85 Canberra suburbs. This massive volunteer effort cements the GBS as one of the strongest urban biodiversity monitoring programs in Australia. Consequently, an increasing number of institutions are turning to COG and the GBS to explore important questions related to the ecology and conservation of birds in urban areas (COG 2013). Already, data from the GBS has supported at least 20 submissions to *Canberra Bird Notes*, and two in-depth summaries by Veerman (2002, 2006). We are also aware of at least 14 peer-reviewed journal articles that have used GBS data, some of which attract large international readerships.

Given the growing interest of citizens, conservation practitioners and scientists in the GBS database, we thought it a valuable and timely venture to explore the spatial, temporal and biophysical coverage of GBS survey sites. Doing so will provide managers and participants of the GBS with an overview of the program's current strengths and weaknesses. Likewise, our assessment may assist practitioners and scientists in their use and interpretation of GBS data, which they may not be personally familiar with.

Simply put, in this report we investigate how the GBS represents Canberra. We examine where GBS sites have been located, what features of the urban landscape are captured by those locations and how these relationships have changed over time.

2. Methods

We restricted our investigation to GBS sites located in residential suburbs of Canberra (*i.e.* suburbs that were >10% residential; this excluded industrial suburbs such as Fyshwick, Mitchell and Hume, and broad-acre suburbs such as Pialligo). This gave us 343 sites spread across 78 suburbs that had submitted at least one GBS data sheet since 1981.

We investigated the spatial coverage of the GBS by looking at districts where sites were located. We then looked at the biophysical features of the sites, including: (i) the percent cover of public greenspace (*e.g.* parks, laneways, and street verges), (ii) the percent cover of trees, (iii) the proximity to nature reserves, and (iv) the average landscape position (*e.g.* ridge,

slope, and flat). Because the shape of each site was undefined, we measured biophysical features within a standard 100 m radius of each site address (area = 3.1 ha).

To see how the GBS coverage has changed over time, we broke the dataset up into five-year time periods (starting in 1981), and compared the spatial distribution and biophysical features of sites across these periods. To determine how representative the GBS is of Canberra, we compared the 343 GBS sites with 343 randomly-selected sites (restricted to residential suburbs) generated using geographic information system software (ArcGIS). We have used statistical analyses (Chi-square tests, ANOVA) to determine the significance of these comparisons. Our analyses are not described in detail here. However, we encourage readers who would like further information about any of the methods to contact the authors directly.

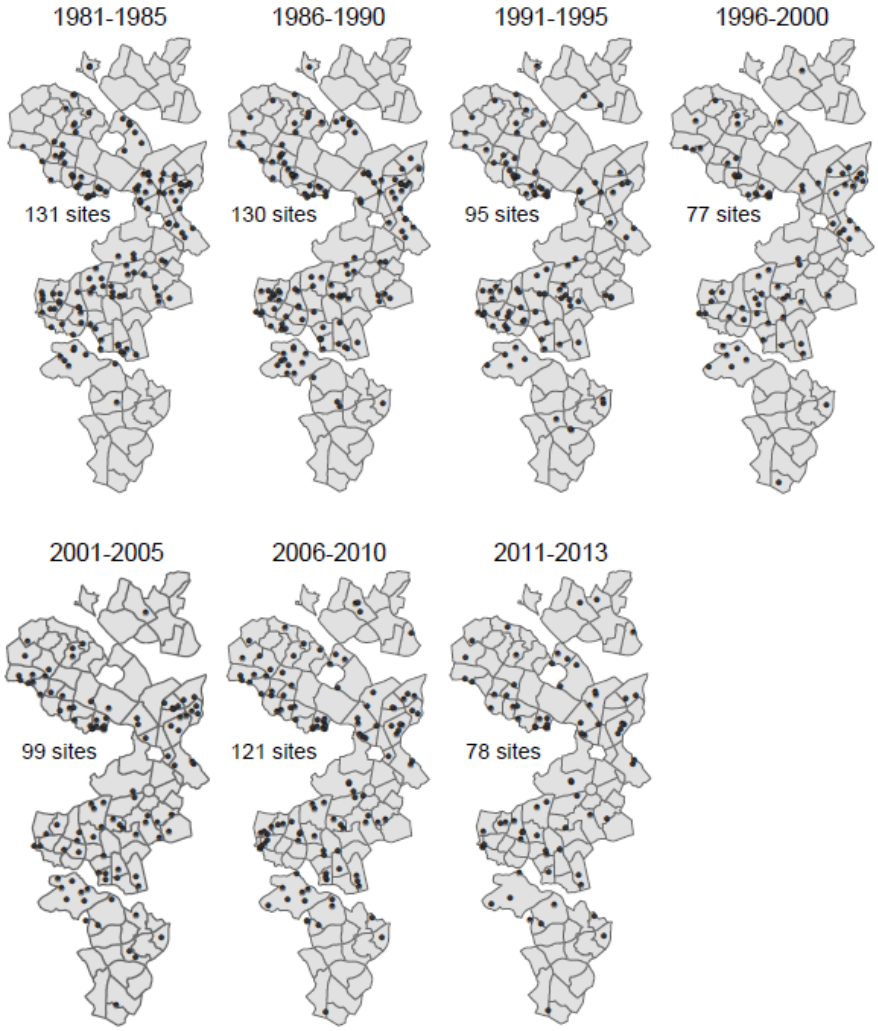

Figure 1. Location of residential GBS sites in each five-year time period since the commencement of the program in 1981. Grey areas illustrate urban Canberra, suburbs are outlined and GBS sites are presented as black points.

3. Results

3.1. How does the GBS change over time?

Looking at the GBS in five-year time periods, we saw that the number of sites declined from 1981-1985 to 1996-2000, but started increasing again from 2001 (Fig. 1). The period 2011-2013 had 78 sites, down from the 121 sites in 2006-2010, but this may be because this period only contains two years so far.

When investigating change in the GBS site locations over time, we found that Belconnen was the most intensively surveyed district for any given five-year time period of the GBS program (Fig. 2). The older, more central districts contributed the largest number of sites in the early years of the program (1981-1990), while the number of sites in Gungahlin and Tuggeranong is increasing. Over the duration of the GBS, we found no significant change in the proportion of sites located in each district through time.

Further, when we compared the groups of sites between in each five-year period, we found that they were similar in their representation of current greenspace cover, tree cover, proximity to reserves and average landscape position.

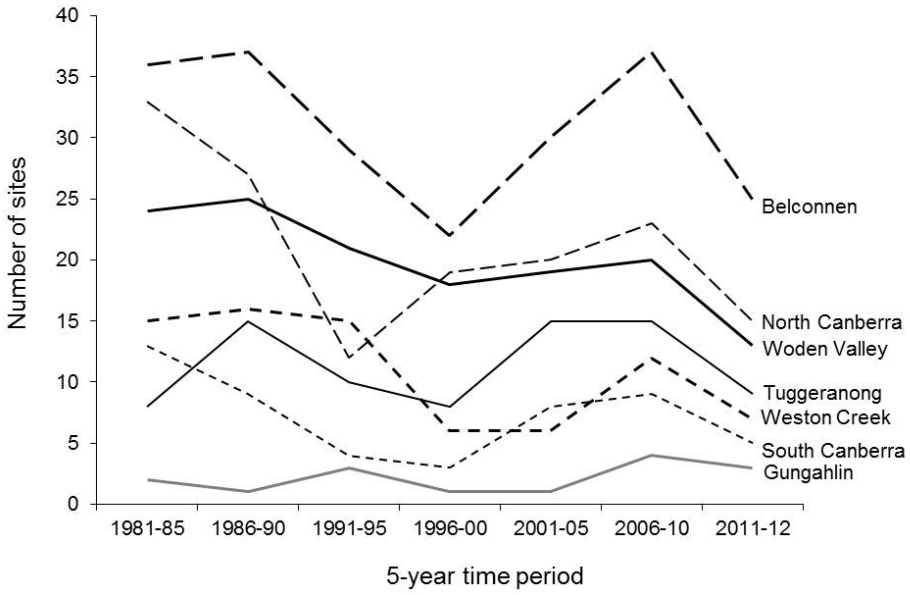

Figure 2. Number of sites across five-year time periods for each Canberra district.

3.2. How does the GBS represent Canberra?

Comparing the GBS sites with randomly-located sites across Canberra (Fig. 3), we found that the GBS is mainly distributed across Belconnen, North and South Canberra, Weston Creek and Woden Valley, with fewer sites in Gungahlin and Tuggeranong. When we looked at the number of suburbs surveyed in the GBS between districts, we found that there was little difference between the GBS sites and locations selected at random (Fig. 4, left panel). Therefore, statistically, the spread of the GBS sites is representative of Canberra suburbs.

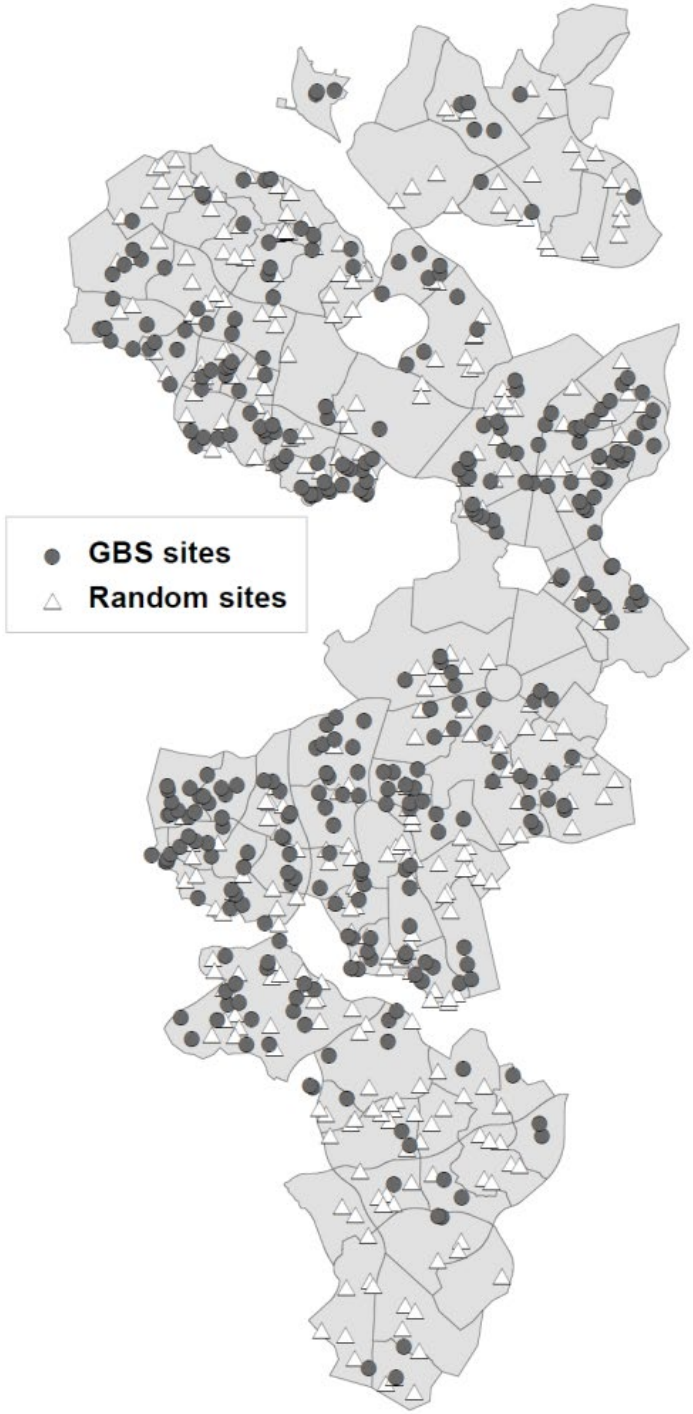

Figure 3. Location of residential GBS sites (circles) and randomly-located sites (triangles).

However, looking at the total number of GBS sites within each district tells a different story. Whilst Belconnen, South Canberra and Woden Valley have similar numbers of GBS sites as expected (based on randomly-located sites), there are more sites than expected in North Canberra and Weston Creek and less sites than expected in Gungahlin and Tuggeranong (Fig. 4, right panel). Thus, the survey effort of the GBS is not spatially balanced across Canberra districts.

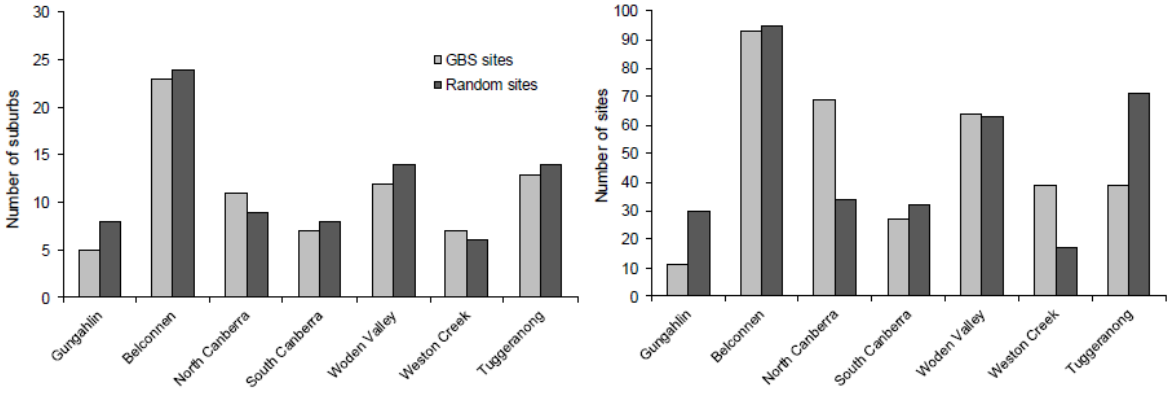

Figure 4. Comparison of GBS sites with randomly-located sites between districts. Left panel: the number of suburbs containing GBS sites vs. random sites calculated for each district. Right panel: the number of GBS sites vs. random sites in each district.

We also found that the GBS under-represents greenspace cover across Canberra (Fig. 5). Compared with random sites, GBS sites had ~20% less greenspace cover and this difference was statistically significant. In contrast, we found that GBS sites had ~20% more tree cover than random sites (Fig. 5; again this difference was statistically significant). Thus, it appears that GBS sites are located in greener suburbs with more private gardens, but with less public greenspace areas (*e.g.* parks). Our estimate of how the GBS represents greenspace, however, may be conservative due to the uncertainty about the actual shape of each survey area. In comparison, we found no difference between the GBS sites and random sites in terms of proximity to reserves and landscape position (*e.g.* ridges, slopes).

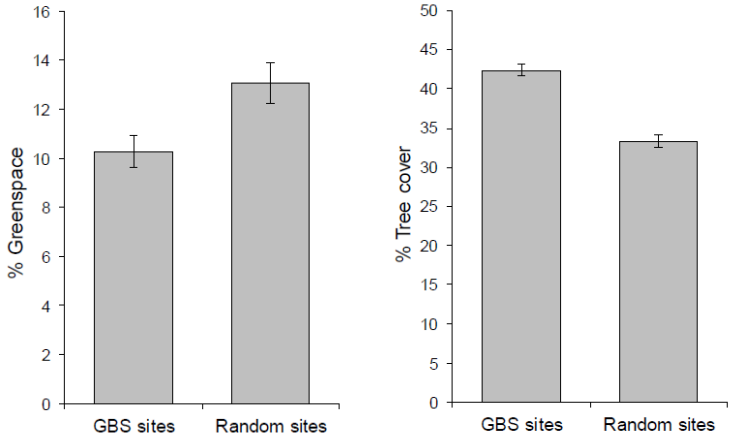

Figure 5. Mean greenspace cover (left) and tree cover (right) in GBS sites compared with random sites (± standard error)

4. Conclusions

In summary, we found that the spatial and biophysical coverage of the GBS has not changed significantly over the duration of the program (33 years). Compared with randomly-located sites spread across Canberra, we found that suburbs and districts are well represented. However, survey effort is higher than expected in North Canberra and Weston Creek and lower than expected in Gungahlin and Tuggeranong. We also found that the GBS sampled less public greenspace, and more urban tree cover, than expected. Variations in topography (measured as landscape position) and reserve proximity have been adequately sampled by the GBS.

Overall, we can conclude that the GBS has been quite comprehensive in sampling a number of geographic features that are useful for investigating the distribution of birds in the city. Importantly, these features have also been surveyed with similar effort over time, providing the rare opportunity to develop robust estimates of species population trends. Nevertheless, the GBS program can be improved. Two keys areas of the dataset that would benefit from further effort are the representation of (1) districts and (2) greenspace.

Recommendation 1: Balancing survey effort across districts.

> The lower number of sites located in Tuggeranong and Gungahlin means that, at present, the latitudinal extremes of the urban footprint are under-sampled. While this is likely due to recent development and the limited time-frame for establishing new sites (especially in Gungahlin), a concerted effort to remedy this bias would be most worthwhile. Firstly, because sampling new developments improves our understanding of how birds respond to changing urban form. And secondly, because sampling the latitudinal extremes (including suburbs on the urban fringe) will provide important information about movement pathways, connectivity and the impact of adjacent land-uses.

Recommendation 2: Increasing survey effort in greenspace.

> We now know that urban greenspace contributes significantly to the diversity and abundance of birds detected within Canberra (Ikin et al. 2013). A concerted effort by a few keen COG members to establish sites that include urban greenspace would provide valuable insights into characteristics of available greenspace and how birds are responding to new and changing greenspace over time. Households located near parks and street verges are ideally located to make a valuable contribution to the GBS.

The spatio-temporal strength of the GBS dataset, as demonstrated here, is an achievement that COG and its contributing members should be extremely proud of. Our understanding of urban bird ecology has, and will continue to be, greatly enhanced by the GBS. We encourage all readers to be as actively involved as possible to ensure that the quantitative strength of the GBS is maintained, and can be used to keep the our beautiful bird life safe in the Bush Capital.

Acknowledgements

We thank all COG members who have been actively involved in the Garden Bird Survey. We also thank the coordinators for their vital commitment to maintaining the GBS over the last 30 years, including McComas Taylor, Grahame Elliott, Ian Baird, Philip Veerman and Graeme Deaker. We especially thank Martin Butterfield and Duncan McCaskill for providing access to the GBS database for use in this study. A.O. Nicholls provided helpful comments on the manuscript.

References

[COG] Canberra Ornithologists Group. (2013) Annual Bird Report: 1 July 2011 to 30 June 2012. *Canberra Bird Notes* 38: 1-101.

Ikin, K., Beaty, R.M., Lindenmayer, D., Knight, E., Fischer, J. & Manning, A. (2013) Pocket parks in a compact city: how do birds respond to increasing residential density? *Landscape Ecology* 28: 45-56.

Veerman, P. A. 2002 *Canberra Birds: A report on the first 18 years of the Garden Bird Survey*. Author, Canberra.

Veerman, P. A. 2006 *Canberra Birds: A report on the first 21 years of the Garden Bird Survey*. Author, Canberra.

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THE HISTORY OF COG's WATERBIRD SURVEYS – LAKE GEORGE AND LAKE BATHURST

MICHAEL LENZ[4]

117/50 Ellenborough Street, Lyneham, ACT 2602

1. Introduction

Two natural lakes are located in the north-eastern part of COG's Area of Interest (AOI): Lake George and Lake Bathurst (Fig. 1). They represent wetlands of significance for diverse waterbirds well beyond the local area and will often attract many thousands of birds.

The Waterbird Survey of the lakes organised since 1979 by the author (Lenz), with participation from many others whose names are acknowledged at the end of this paper, is the longest running continuous survey undertaken by COG covering 35 of COG's 50-year history. Data is entered into COG's database and recorded in summary species statements in each Annual Bird Report and provides a vital source of long-term information on waterbirds in our region. This paper gives an overview and history of the survey and some general results only.

The first European to see Lake Bathurst was the surveyor, explorer and settler James Meehan in April 1818 (Abell 1995). Lake George was 'discovered' by the convict Joseph Wild in August 1820, although Aboriginal people lived around it for more than 20,000 years (Barrow 2012).

For both lakes, early European visitors attested to the abundance of waterbirds, most famously Governor Macquarie, who, when visiting Lake George in late 1820, noted in his diary: *"…when we came to the South end of the lake it was covered with innumerable flocks of black swans, ducks and sea gulls…."* (Barrow 2012). There are similar subsequent accounts for Lake George and of the easy hunting of waterfowl (Barrow 2012). Ramsay (1866) describes the plants and birdlife of Lake Bathurst in some detail and Cambage (1921 in Abell 1995) wrote, *"…The quantity of ducks and other wild water fowl on the lake and marshes are beyond description."*

However, it seems that apart from earlier general descriptions of an abundance of waterbirds on the lakes, it is only in recent times that the waterbirds were studied in more detail. Various aspects of the biology of some waterbirds in south-eastern Australia, including at the two lakes, were investigated by staff of the then CSIRO Division of Wildlife Research: several species of ducks (Frith 1959), Grey Teal (Frith 1962), Australian Shelduck (McKean and Braithwaite 1976), Black Swan (Braithwaite 1982), Australian Pelican (Vestjens 1977) and Silver Gull (Murray and Carrick 1964).

[4] Unless stated otherwise, all photos in this article are by the author.

2. The first waterbird survey at Lake George by Donald W. Lamm and Steve Wilson and his sons

Actual counts of all waterbirds on a significant readily accessible part of Lake George were carried out by Donald W. Lamm (1964), a visitor to Canberra, with the assistance of Steve Wilson and his sons over a three-year period (1961 to 1963). They counted the birds on the NW part of the lake from Geary's Gap to the northern end (Fig. 2). They drove along the Federal Highway and stopped at many points along the way and walked around the northern tip of the lake. Key findings were that conditions locally (water level) and further inland (availability of water) influenced the numbers of ducks and waders at Lake George. Most species appeared to be nomadic and only *"relatively few species showed a completely seasonal pattern of movement"* (Lamm 1964).

Figure 1. *Google Earth* view of Lake George (left) and Lake Bathurst (top right) in 2013. Both lakes are only partially filled.

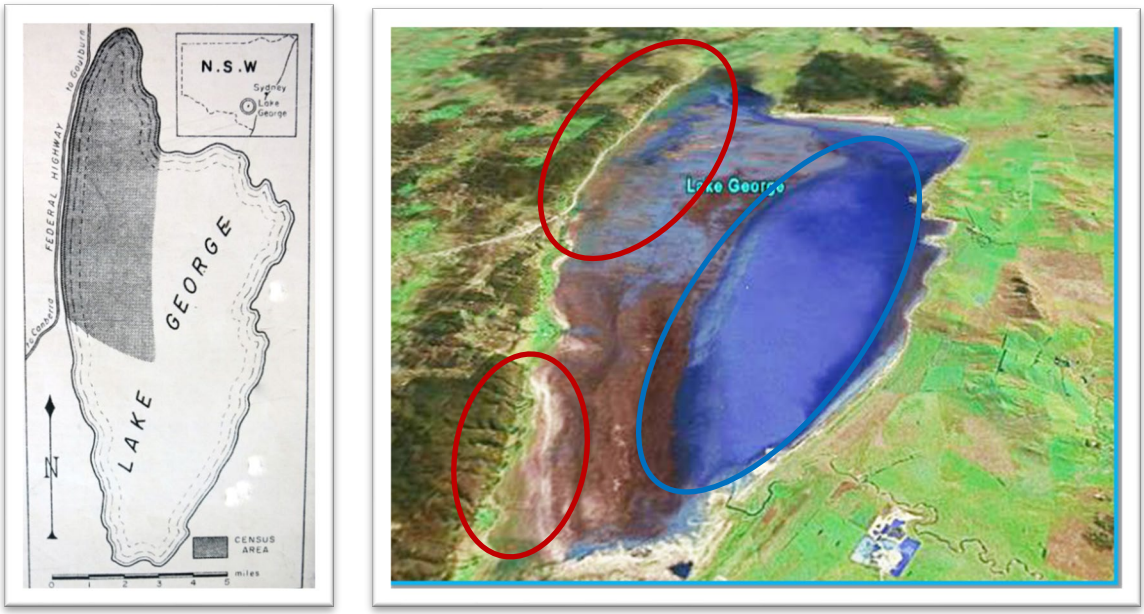
3. The beginning and timing of COG's waterbird surveys

I arrived in Canberra in 1977. At that time the water level at Lake George was high and many birds could easily be seen from the Federal Highway. The study by Lamm (1964) provided a good model for starting regular surveys. A proposal to COG to resume surveys of the waterbirds on Lake George was accepted.

In June 1979 the surveys at Lake George, covering both the NW and SW sections of the lake (Fig. 3), commenced. Henry Nix of COG suggested including "*the most interesting*" Lake Bathurst in regular surveys as well. These surveys started in September 1980. I have organised the surveys on both lakes on behalf of COG ever since. Many COG members have been involved in these surveys (see below).

Over time, Lake George was visited on a monthly basis (bi-monthly only for a short initial period) from June 1979 to June 1981, November 1984 to March 1986 and March 1989 to June 2001. In the intervening periods the lake had either dried up completely or the water had receded too far to the eastern shore that the remaining area under water could no longer be surveyed from the West.

After 2001 surveys were interrupted for two main reasons. The upgrade to the Federal Highway meant it was no longer possible to stop on the side of the road to scan the lake. Likewise, access to the northern tip was now impeded. The lake also dried up for a number of the following years, although a partial refill in 2005, with water more restricted to the eastern half of the lake (see Fig. 3), was missed. In early 2010 Nicki Taws, records officer of COG, received a message from a member of the Taylors Creek community on the eastern side of the lake: "*Water is back, birds are back*". The members of that community provided access to large parts of the eastern shore, commencing in April 2010.



Figures 2 (left) and 3 (right). The area of Lake George covered in Lamm's surveys (left) and the areas covered in COG's surveys (right) on the western side (the two smaller red rings on left) and along the eastern part of the lake (larger blue ring on right). The latter area became accessible only in 2010. Fig. 2 is taken from Lamm (1964) *Emu 64*, *p. 114*; Fig. 3 (showing the lake in 2005) from P. De Decker and E. Truswell (ANU): Lake George – Weereewa. The Ancient Story. *Talk at Geoscience Australia, June 2011*.

Lake Bathurst has been visited regularly since September 1980 up to now (bimonthly to April 1982, monthly ever since). The main lake may be dry for periods, but often the Southern Morass will hold water for longer. In dry periods the visits were less regular, and a greater emphasis was then placed on the birds of the land surrounding the lake, notably snow gum remnants and the former gravel pits near Tarago.

4. Main characteristics of both lakes

4.1 Lake George

Lake George is the largest inland lake in NSW, with a length of 24 km and a maximum width of 10 km, covering about 15,000 ha when full, and a maximum depth of 4 m (Braithwaite 1982; Barrow 2012). The water has a fairly high salt content (1,600 to 4,600 mg/L; Braithwaite 1982). The soils of Lake George are mainly clays and silts. The lake is very exposed to wind. As a result of these physiographic factors the water is turbid. This in turn affects the aquatic vegetation.

Algae, *Spirogyra* spp., are an important element of the aquatic flora. Blooms can result in the formation of large floating mats, on which waterbirds feed. Diverse marsh vegetation dominates at the northern and southern end of the lake (Lamm 1964) and at all creeks that run into the lake (six in total). Southern Cane Grass (*Eragrostis australasica*) is the main element at the northern swamp. It is one of the most easterly occurrences of this plant in Australia. Areas of the lake bed that become exposed are soon covered by the naturalised weed *Atriplex prostrata.* The seeds are an important food source especially for Grey Teal (*Anas gracilis*), and become available in large volumes to the birds with re-flooding of the lake bed. Another important food plant, growing on exposed mud and in very shallow water is the Round-leafed Wilsonia (*Wilsonia rotundifolia*); its small leaves (see Fig. 8) are stripped off by Black Swans (*Cygnus atratus*) and Grey Teal, often leaving the leaves at the growing tip intact.

The large size of the lake and difficulties of access impose many limitations on the ability to effectively survey the waterbirds. However, when the lake is well filled waterbirds tend to concentrate along the shore line and especially at the northern and southern end of the lake. Generally, not too many birds are present on the open water. Hence, despite the above mentioned restrictions, a significant portion of the waterbirds can often be surveyed. For many years now water at Lake George, if present at all, has covered only the eastern half (Fig. 3), the deepest part of the lake. Under these conditions, as shown in *e.g.* Figs. 3 and 4, since 2010, with access to the eastern shore, it has been possible for the first time to count all waterfowl, with the exception of small waders.

Figure 4. View of Lake George - completely dry, seen from the West (left) and partially filled, seen from the East (right).

4.2 Lake Bathurst

When full, Lake Bathurst covers an area of 1,350 ha, *i.e.* about a tenth of the area of Lake George. Its depth can extend to 7 m. Over the survey period the lake was full mainly in the early years. Mostly water is restricted to a major "East Basin", a smaller "West Basin" and a couple of smaller pools with varying tracts of dry land in between (Fig. 5). Water is retained for longest in the East Basin. Adjacent to the lake are two smaller wetlands, the Southern and Northern Morass (Fig. 5). After heavy rains the Southern Morass overflows into the Northern Morass, and in turn its overflow runs into Lake Bathurst, although this is a rare event and occurred only a couple of times over the survey period.

Due to the smaller size of Lake Bathurst and the Morass, all waterbirds can be counted on a single survey. While birds are recorded separately for the main sections of the wetland system, they are treated as a single population. Birds move freely between the various areas.

Figure 5. *Google Earth* view of Lake Bathurst at low water level (East and West Basins) and the Morass (Northern and Southern parts).

Figure 6. The East Basin of Lake Bathurst viewed from the North (left) and the Southern Morass viewed from the East (right).

The Morass contains freshwater while that in Lake Bathurst is brackish, albeit with a lower salt concentration than in Lake George, at 700-2,900 mg/L (Braithwaite 1982; Abell 1995). The lake bed is composed of sand and gravel. Hills surrounding the lake ensure that the lake is less exposed to wind than Lake George. The water is clear and as a result the aquatic vegetation is very different from that of Lake George.

Milfoil (*Myriophyllum propinquum*) forms dense stands at higher water levels. As water levels recede and salinity increases widgeon grass, *Ruppia* sp., (Figs. 7 and 9) will dominate the underwater vegetation. Extensive algal mats develop especially when the water becomes shallower (Fig. 7). Adding to the food supply for ducks and swans are the small leaves of the Round-leafed Wilsonia, an abundant plant growing under ephemeral conditions at both lakes (Fig. 8).

The water vegetation is a key element in the ecology of this lake and of great importance to waterbirds (as the basis for a complex food chain in the lake, for grazing and nest material; see Figs. 7 to 9). Wave and wind action result in the accumulation of large volumes of these water plants, notably along the eastern shore (see also Ramsay 1866). The decaying plant material provides important feeding sites for various birds, notably for waders and White-fronted Chats (*Ephianura albifrons*), and contributes to a rise in the shoreline. In the end, sheets of this dry plant material are rolled up by the wind, torn and blown over a wider area, thus contributing nutrients to surrounding ground (see Figs. 10 and 11).

Figures 7 (left) and 8 (right): *Ruppia* grass and dense algal matts (left) and the small leaves of Round-leafed Wilsonia (*Wilsonia rotundifolia*) growing on wet ground and in shallow water (right) are main sources of food for Black Swans, Grey Teal and other ducks.

Figure 9. Abandoned (due to falling water level) Black Swan nest at Lake Bathurst, illustrating the size of the circular area (radius 5 to 6 m) surrounding it that the birds have stripped of *Ruppia* grass for the construction of the nest.

Figures 10 (left) and 11 (right). When the water level of Lake Bathurst falls and the underwater vegetation becomes exposed and dries up, the predominantly westerly winds roll up this vegetation layer on the eastern shore and distribute the fragments across surrounding ground.

5. Overview of the waterbirds recorded from the two lakes

The waterbird fauna is very similar at both lakes (Table 1). The higher number of species at Lake Bathurst is mainly due to more wader species being recorded there. At Lake George, the key areas for waders, most notably the northern part of the lake, are simply not visited often enough or are no longer accessible. The difference is relative rather than fundamental. The cane grass swamp in the North used to be home to the Australasian Bittern (*Botaurus piciloptilus*); no suitable habitat for this species is available at Lake Bathurst. Breeding of the bittern was likely but could not be confirmed. Longer periods of drought and cattle grazing have heavily impacted this most interesting cane grass swamp. It was also a key area for crakes and rails.

Table 1. Number of waterbird species recorded at Lake George and Lake Bathurst during the waterbird surveys.

Group	No. species (*breeding*)	
	Lake George	Lake Bathurst
Ducks, Swans	12 (*4*)	12 (*8*)
Grebes	3 (*1*)	3 (*1*)
Cormorants	5 (*1*)	5
Pelicans	1 (*1*)	1
Herons, Egrets, Bittern	8 (*1?*)	7
Ibises	3	3
Spoonbills	2	2
Crakes, Rails	5	5
Waders	22 (*3*)	32 (*4*)
Gulls, Terns	3	5 (*1*)
Total	**64 (*10*)**	**75 (*14*)**

A few more species breed at Lake Bathurst than at Lake George. This is due to the fact that Lake Bathurst, when at high water levels, contains many islands which provide nesting sites safe from fox predation. Only a few species breed at times in larger numbers [Black Swan on both lakes; Silver Gull (*Chroicocephalus novaehollandiae*) and Hoary-headed Grebe (*Poliocephalus poliocephalus*) at Lake Bathurst]. For most other species breeding is restricted to a few pairs at any given time.

Tables 2 and 3 give examples of maximum numbers of birds recorded for selected species. In many cases similar maxima may also have been reached at other times, but only one example is given. However, the figures clearly indicate the significance that both lakes can have for waterbirds.

Table 2: Maximum numbers of selected species of waterbirds recorded at Lake George during COG's surveys.

Species	Max. no.	Date	Species	Max. no.	Date
Freckled Duck	1 330	Dec 12	Australasian Bittern	5	Jan 90
Black Swan	2 500	Oct 92	Straw-necked Ibis	350	Jan 81
Australian Shelduck	2 000	Dec 95	Royal Spoonbill	84	Apr 90
Pink-eared Duck	18 000	Dec 14	Yellow-billed Spoonbill	40	Jan 90
Australasian Shoveler	1 670	Apr 89	Eurasian Coot	20 000	Jan 13
Grey Teal	12 000	Apr 13	Red-necked Avocet	1 180	Jul 13
Chestnut Teal	2 000	Jun 11	Double-banded Plover	89	May 89
Hardhead	3 000	Sep 12	Red-capped Plover	400	Apr 91
Great Crested Grebe	67	Aug 79	Red-kneed Dotterel	130	Apr 89
Australian Pelican	1 150	May 80	Latham's Snipe	64	Sep 97
White-faced Heron	266	Feb. 91	Silver Gull	1 800	Apr 89

Table 3. Maximum numbers of selected species of waterbirds recorded at Lake Bathurst during COG's surveys.

Species	Max. no.	Date	Species	Max. no.	Date
Musk Duck	220	Oct 91	Black-winged Stilt	1 374	Oct 14
Freckled Duck	470	Apr 86	Pacific Golden Plover	57	Mar 99
Black Swan	5 850	Oct 94	Red-capped Plover	605	Aug 82
Australian Shelduck	1 455	Dec 95	Double-banded Plover	182	Jul 87
Pink-eared Duck	4 500	Jul 13	Red-kneed Dotterel	130	Apr 89
Australasian Shoveler	5 620	Feb 96	Banded Lapwing	158	Jan 07
Grey Teal	6 500	Apr 13	Masked Lapwing	550	Apr 82
Chestnut Teal	1 165	Jun 11	Marsh Sandpiper	41	Feb 89
Blue-billed Duck	310	Aug 85	Red-necked Stint	935	Jan 96
Great Crested Grebe	65	Dec 90	Sharp-tailed Sandpiper	4 480	Dec 95
Hoary-headed Grebe	3 420	Mar 92	Curlew Sandpiper	200	Oct 96
Eurasian Coot	16 000	Dec 12	Whiskered Tern	490	Oct 13

As a rule it is impossible to predict when a given species is present or maximum numbers are going to be reached. The presence or absence of species at the lakes is the result of a complex interaction between (1) *conditions at both local lakes* (water level, time since filling, food availability etc.) and (2) *conditions in wetlands many hundreds of kilometres away in inland Australia* (with water and suitable conditions for breeding, or falling dry).

The coming and going of wetlands is the main driver for movement of waterbirds in Australia. Lake George and Lake Bathurst are critical rest and refuge sites for waterbirds. The lakes are at their most significant when they hold water but inland wetlands are dry (see also Lamm 1964).

6. Lack of any conservation status for Lake George and Lake Bathurst

Both lakes are considered to be areas of important environmental, scenic and heritage value and acknowledged as refuge areas for waterbirds during inland droughts (NSW CALM 1994; Environment Australia 2001). However, neither lake has been given any specific protection status - but not for lack of trying.

In 1994 the NSW Department of Conservation and Land Management (CALM) proposed to establish a reserve trust to manage the crown lands at Lake George and to establish reserves especially for the northern and southern ends of the lake. Unfortunately, the project did not go beyond the proposal stage.

In 1995 Chris Davey and Peter Fullagar prepared, on behalf of COG, a submission to National Parks and Wildlife Service NSW to nominate both lakes as Wetlands of International Importance under the RAMSAR Convention. The submission was not even acknowledged.

In 2006 Chris Davey, on behalf of COG, proposed to Birdlife Australia to nominate Lake Bathurst as Important Bird Area (IBA). This application was successful, but it conveys no

protection status to the lake. The Lake Bathurst IBA "*regularly supports significant numbers of near threatened Blue-billed Ducks and over 1% of the world population of Australasian Shovelers. It is an important drought refuge, sometimes supporting over 1% of the world populations of Freckled Ducks* [see Fig. 12]*, Black Swans, Chestnut Teals and Sharp-tailed Sandpipers*" (Wikipedia 2014). It also represents a key inland resting area for the New Zealand Double-banded Plover (*Charadrius bicinctus*).

Figure 12. An example of the significance of the lakes as refuge sites: In late 2012 around 1,500 (combined across both lakes) Freckled Ducks (*Strictonetta naevosa*) were present. This was a nationally significant concentration. Inland wetlands that are favoured by this species must have dried up. Although the species appeared at the time at many other sites in eastern Australia, including the ACT, nowhere were numbers that high. The species is threatened in Victoria and vulnerable in New South Wales (Davey and Fullagar 1995; Lenz and Kamprad 2013).

In 2008 the Wetlands Management Program of the Hawkesbury Nepean Catchment Management Authority identified Lake Bathurst as "*Wetland of National Importance*" and was to provide funding for weed control. The South American weed Serrated Tussock (*Nassella trichotoma*) took hold on several properties around the lake during prolonged years of local drought. Only in a few cases was the weed managed by landholders; elsewhere it got out of hand and is now forming dense stands (Fig. 13). This has significantly reduced the habitat of open, sparsely vegetated ground that is preferred by Banded Lapwings (*Vanellus tricolor*), Pacific Golden Plovers (*Pluvialis fulva*), White-fronted Chats and Australasian Pipits (*Anthus novaeseelandiae*). However, up to now, only very limited funding has been made available for Serrated Tussock control. Wetter seasons in recent years had a patchy impact on the weed where rain filled some low-lying flat areas. But as these areas dry up the weed will re-sprout. There is now a massive seed bank of this grass around Lake Bathurst. Wetter conditions over the last few years have also seen the emergence of thistles.

Figure 13. The weed Serrated Tussock (close-up on left) now covers large tracts of the Lake Bathurst basin (right).

7. Conclusion

Despite the lack of progress in achieving some conservation status for these Lakes, I believe the continuous monitoring and collection of survey data at these lakes of national significance is vital. As some members reach an age where such dedicated long-term commitments are less achievable, it is to be hoped that younger members will be able to continue surveying these lakes well into the future.

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Most sites around Lake George and Lake Bathurst are only accessible through private property. Permission to enter sites is confirmed with the owners and managers each time that we go out. We greatly appreciate their support. Access to these lands is a key prerequisite enabling these surveys.

References

Abell, R.S. 1995 *Geology, Geomorphology and Hydrology of the Lake Bathurst Drainage Basin New South Wales.* Australian Geological Survey Organisation, Record 1995/23, Commonwealth of Australia, Canberra.

Barrow, G. 2012 *'Magnificent' Lake George: The Biography*. Dagraja Press, Canberra.

Braithwaite, L.W. (1982) Ecological studies of the black swan. IV. The timing and success of breeding on two nearby lakes on the Southern Tablelands of New South Wales. *Australian Wildlife Research* 9: 261-275.

Department of Conservation and Land Management (CALM) 1994 *Lake George Crown Land Assessment.* Sydney.

Davey, C. and Fullagar, P. (1995) Observation of a large flock of Freckled Duck on Lake George, NSW – Should Lake George be considered a wetland of international importance? *Canberra Bird Notes* 20: 58-63

Department of the Environment, Government of Australia 1991 *Directory of Important Wetlands in Australia.* Canberra.

Frith, H.J. (1959) The ecology of wild ducks in inland New South Wales: I, II, II and IV. *CSIRO Wildlife Research* 4: 97-107; 108-130; 131-155; 156-181.

Frith, H.J. (1962) Movements of the Grey Teal, *Anas gibberifrons* Müller (Anatidae). *CSIRO Wildlife Research* 7: 50-70.

Lamm, D.W. (1964) Seasonal counts of birds at Lake George, New South Wales. *Emu* 64: 114-128.

Lenz, M. and Kamprad, J. (2013) Record numbers of Freckled Ducks in COG's Area of Interest (AOI) in 2012/13. *Canberra Bird Notes* 38: 172-174

McKean, J.L. and Braithwaite, L.W. (1976) Moult, movements, age and sex composition of mountain duck, *Tadorna tadornoides,* banded at Lake George, N.S.W. *Australian Wildlife Research* 3: 173-179

Murray, D.M. and Carrick, R. (1964) Seasonal movement and habitats of the silver gull, *Larus novaehollandiae* Stephens. *CSIRO Wildlife Research* 9: 160-188.

Ramsay, E. (1866) Ein Ausflug nach dem Bathurst-See. *Bericht über die Tätigkeit der St. Gallischen Naturwissenschaftlichen Gesellschaft*: 221-226.

Vestjens, W.J.M. (1977) Breeding behaviour and ecology of the Australian Pelican, *Pelecanus conspicillatus*, in New South Wales. *Australian Wildlife Research* 4: 37-58.

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Further reading on *Monitoring our birds* in *Canberra Bird Notes:*

***Co-ordinated surveys* [Canberra Birds/COG]**

Woodland survey

Bounds, J. (2014) Woodland bird monitoring survey. *CBN* 39 COG 50th Anniversary Issue, 122-124.

Bounds, J., Taws, N. and Cunningham, R. (2007) A statistical analysis of trends in occupancy rates of woodland birds in the ACT December 1998 to December 2005. *CBN* 32(2) 73-98.

Bounds, J., Taws, N. and Cunningham, R. (2010) A statistical analysis of trends in occupancy rates of woodland birds in the ACT, December 1998 to December 2008: the ten-year data analysis. *CBN* 35(3) 158-191.

Cunningham, R. and Rowell, A. (2006) A statistical analysis of trends in detection rates of woodland birds in the ACT, 1998 to 2004. *CBN* 31(2) 73-110.

Rowell, A. (2004) Canberra Ornithologists Group woodland bird survey: progress report, 2000-2003. *CBN* 29(2) 49-68.

Taws, N., Bounds, J., Rowell, A. and Cunningham, R. (2011) An analysis of bird occupancy and habitat changes at six woodland locations - 2003 and 2010. Report prepared for the Canberra Ornithologists Group (COG). *CBN* 37(2) 100-129.

Garden Bird Survey (GBS)

Brooker, M. and Brooker, B. (1998) A tale of two cities – garden birds in Canberra and Perth. *CBN* 23(2) 20-30.

Butterfield, M. (2012) Noisy Miners in the COG Garden Bird Survey. *CBN* 37(2) 130-136.

Butterfield, M. (2004) Reporting of breeding activity in the Bird Survey. *CBN* 29(3) 99-106.

Butterfield, M. (2008) Some impacts of spatial distribution of Garden Bird Survey sites across Canberra. *CBN* 33(3) 142-148.

Davey, C. and Nicholls, N. (AO). (2009) Preliminary analysis of the relationship between GBS site species richness and google earth derived environmental data. *CBN* 34(3) 149-157.

Hermes, N. and Veerman, P. (2014) Brief history and evolution of the Garden Bird Survey. *CBN* 39 COG 50th Anniversary Issue, 116-121.

Taylor, I. M. (1985) The arrival of Canberra's summer migrants - a re-examination. *CBN* 10(3) 105-109.

Taylor, I. (1987) Breding data from suburban gardens, Canberra, 1981 to 1984. *CBN* 12(1) 8-13.

Canberra Bird Blitz – Annual reports from 2005-2016 by Barbara Allan (first and last cited)

Allan, B. (2005) The Canberra Bird Blitz 2005. *CBN* 30(4) 148-158.

Allan, B. (2017) The Canberra Bird Blitz 2016. *CBN* 42(2) 195-213.

Allan, B. (2014) COG's Bird Blitz. *CBN* 39 COG 50th Anniversary Issue, 125-128.

Waterbird Survey

Lenz, M. (2025) Observations of migratory waders from Lake Bathurst, 1980-2022. *CBN* 50(1) 45-71.

Various

Butterfield, M. (2020) The impact of the January 2020 Mallacoota bushfire on birds – first impressions. *CBN* 45(3) 273-288.

Davey, C. (2002) The birds of Mulligans Flat Nature Reserve. *CBN* 27(3) 97-125.

Lindenmayer, Bruce. (1992) Report on the campaign and submission to preserve Mulligan's Flat, Gungahlin, ACT. *CBN* 17(4) 100-102.

Taws, N. (2000) The Greening Australia birdwatch project. *CBN* 25(3) 89-94.

Taylor, I.M. (1987) Murrumbidgee River Corridor bird survey. *CBN* 12(4) 110-131.

Individual observer surveys

Bond, S. and Taws, N. (2006) Bringing breeding birds back: woodland birds breeding in revegetation patches. *CBN* 31(3) 136-141.

Graham, B. (20121) Birds of Mulanggari Grasslands Nature Reserve January 2012 – November 2020. *CBN* 46(2) 199-207.

Holland, J. (1985) Birds of the proposed Lake Tuggeranong area. *CBN* 10(4) 114-131.

Hone, T. (2020) Observations of birds in eastern Namadgi National Park. *CBN* 45(3) 256-266.

Lenz, M. and Kamprad, J. (2019) Composition and estimate of the size of the breeding grassland bird community on farmland at Lake George (NSW). *CBN* 44(3) 271-285.

Lenz, M. (2021) The bird community of the Gungaderra Creek wildlife corridor in suburban Franklin, ACT, during the 2020/2021 breeding season. *CBN* 46(2) 171-198.

McDonald, D (2001) The Australian bird count surveys at Castle Hill, ACT, 1989-1995. *CBN* 26(3) 65-76.

Marchant, S. (1973), Birds in the Caswell Drive Area, *CBN* 2(5), 2-16.

Muller, Z. and Downey, L. (2024) Observations of White-throated Nightjars in the ACT February-April 2024. *CBN* 49(2) 85-90.

Overs, A. (2021) My bird-magnet yard: a summary of observations from my home near the urban-rural fringe in North Canberra. *CBN* 46(2) 158-170.

Canberra Bird Notes 50(2) (2025): 202-217

4. Theme: Conservation

4.1. General Introduction

JENNY BOUNDS (cogoffice@canberrabirds.org.au), Conservation Officer, Canberra Birds

This introduction updates the report in the *CBN* 50th Anniversary edition (*CBN* 39, December 2014), with a contemporary focus against a background of a growing Canberra city spreading further into greenfield areas over recent decades, particularly impacting woodland habitats and mature eucalypts. The three 'iconic' bird species featured illustrate some of the pressures on natural habitats. Research and monitoring of these species have largely been undertaken by private individuals, academic researchers, and ACT Government ecologists.

Little Eagle

The nomination by Canberra Birds of the Little Eagle to the ACT Government for listing as a threatened species (*CBN* 33(2), 2008) complemented the early research and articles in *CBN* about the collapse of their breeding numbers, and the loss of rural habitats in Ginninderry (NW Belconnen) and potentially in the Molonglo Valley (*CBN* 30(4), 2005; 31(4), 2006; 33(2), 2008). This led to more funding for research and tracking of Little Eagles, providing important new information about their long-distance movements and conservation needs.

Superb Parrot

Observations and reports by Canberra Birds members (*CBN* 31(3), 2006) after a noticeable influx of these birds to the Canberra area in the early 2000s, led to local research on this species, already listed as threatened ('vulnerable') under Commonwealth and ACT legislation. Prior to the influx (believed to be climate-related), Superb Parrots were regarded as a marginal ACT species, reported occasionally around the northern borders of the ACT (*CBN* 22(1), 1997). Research by ACT Government ecologists, with support from Canberra Birds members, has been important to inform land planning, especially in Gungahlin and the Molonglo Valley.

Gang-gang Cockatoo

The Gang-gang Cockatoo's forest habitat in Namadgi National Park and other forest areas in SE Australia has been impacted by bushfires in the last twenty-five years, particularly in the widespread, severe 2019 and 2020 bushfires. The 2014-15 Gang-gang Bird of the Year project by Canberra Birds (*CBN* 39, 50th Anniversary Issue 2014) is a good example of a citizen-science survey, with a community-engagement and conservation focus. After the 2020 bushfires, the Commonwealth and ACT listed the Gang-gang as an 'endangered' species. Regional projects were funded, enabling more surveys and studies into the breeding of this hollow-nesting bird (*e.g. CBN* 44(3), 45(3), 46(2), 50(1)), with greater conservation efforts to protect known and potential nesting trees around urban Canberra.

Woodlands & Mature Eucalypts

A major focus of Canberra Birds citizen-science and conservation advocacy in the last three decades has been to better protect woodlands, an 'endangered' ecological community (Commonwealth and ACT), and mature eucalypts which are lost to development, including infrastructure such as widening arterial roads. Canberra Birds contributed to the ACT Conservation Council's 2016 nomination and subsequent ACT listing of the loss of mature

native trees (including hollow-bearing eucalypts) as a threatening ecological process. An Action Plan has improved some land-planning processes to minimise native tree losses.

Canberra Birds has documented the decline in flagship woodland bird species, the Hooded Robin and Brown Treecreeper, among the first woodland-dependent birds to disappear with habitat clearing and fragmentation (*CBN* 31(4), December 2006; *CBN* 44(2), July 2019). Further, its long-term woodland monitoring surveys have provided evidence-based trends of declines in various woodland species, including recent analyses showing unexpected declines of some common and migratory birds, and small birds as a group (*CBN* 47(1), May 2022).

Future Conservation Focus

Landscape-scale conservation is becoming increasingly important to protect the remaining natural habitats and connectivity corridors, as individual developments have been rolled out piecemeal in Canberra, without taking proper account of the cumulative impacts of the loss of habitats. There is an emerging recognition that the ACT's nature conservation strategies need to be at a landscape-scale on both public land (includes reserves, urban open space) and non-Government land (rural leaseholds). Focus areas for the future include working with the ACT Conservation Council to save the western edge lands beyond Mt Stromlo from urban spread and protect the Murrumbidgee River corridor, and influencing the setting of a 'sustainable' urban boundary.

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BROWN TREECREEPER (*CLIMACTERIS PICUMNUS*), ITS OCCURRENCE AND STATUS IN THE ACT, AND DEPENDENCE ON MATURE, HOLLOW-BEARING EUCALYPTS[5]

(Additional material to support nomination of loss of hollow-bearing eucalypts as a threatening process, for ACT Scientific Committee[6] – 24 August 2017)

JENNY BOUNDS

PO Box 3933, Weston Creek, ACT 2611
cogoffice@canberrabirds.org.au

Abstract. *This paper was submitted to the ACT Scientific Committee, as part of documentation to support a nomination to the Committee (and ACT Government) of the threatening process, 'Loss of Hollow-bearing Trees'. The nomination was lodged in 2016 by several community*

[5] This document is a slightly modified version of the original report.

[6] Note: The ACT Scientific Committee is a statutory, expert body appointed by the Minister for the Environment under the *Nature Conservation Act 2014*, and has a significant role in advising the ACT Minister for the Environment and the Conservator of Flora and Fauna in relation to nature conservation, including making recommendations to the Minister on the listing of threatened species and providing advice to the Conservator during development of draft action plans.

groups, (including COG), led by the Conservation Council ACT Region. The Scientific Committee considered the nomination and supplementary information provided by the nominators, including studies on Superb Parrot breeding in the ACT from COG, and other research on large, mature native trees within the ACT and region, and assessed this against its eligibility criteria. The Committee agreed to broaden the threatening process from the loss of hollow-bearing trees to the key threatening process of 'Loss of mature native trees (including hollow-bearing trees) and a lack of recruitment'. The nomination was successful and a declaration made in an instrument under the ACT's Nature Conservation Act 2014, taking effect on 27 September 2019. An Action Plan will be required. It is not known at this time, how this will be implemented and operate in practice. Due to limited time available, only readily available bird data and bird survey records (principally from COG databases) and other relevant references were sourced for the paper.

Key points

The Brown Treecreeper (*Climacteris picumnus*) [hereafter BT], is dependent on mature, native hollow-bearing eucalypts and their products (such as fallen limbs, coarse woody debris) for a range of ecological needs, nesting, roosting, feeding and for refuge from predators.

BTs utilise paddock trees to disperse to other territories; without such connectivity, recruitment of juvenile birds, females in particular, is disrupted. Studies indicate that they survive in fragmented landscapes, provided there are sufficient patches of large eucalypts, paddock trees and uncleared dead and fallen timber.

Expansion of urban development in and around BT habitat in the ACT, including Molonglo (Kama NR) and Gungahlin (Mulligans Flat NR/Goorooyarroo NR), puts further pressure on those areas that contain mature tree habitat for the species. BTs have been lost from many areas/sites on the lowlands; they are largely gone from peri-urban Canberra, and have disappeared from the large woodland reserves (Mulligans Flat/Goorooyarroo). They are being pushed out further and further as habitat and mature tree loss continues.

There has, in recent years, been a loss of four breeding groups of BTs in and around the Kama NR in Central Molonglo. This is near what is now the expanding suburbs of Molonglo, which could eventually extend west to Uriarra Crossing on the Murrumbidgee River.

Lands protected in the ACT reserve system have lost their BT populations, except in Namadgi NP and Googong, distant from urban Canberra. Although BTs are apparently gone from ACT urban reserves and much of peri-urban ACT (rural lands and reserves on the urban boundary), populations are believed to still exist to the south and west of Canberra, around and to the south of Tharwa, in Namadgi NP and on the Monaro, and the Murrumbidgee River corridor.

As canvassed in the nomination, mature hollow-bearing eucalypts have been and continue to be systematically removed from the landscape in the ACT (largely for urban or infrastructure development), not only from peri-urban Canberra, but also from rural areas distant from existing suburbs. The removal of trees for the solar farm at Williamsdale is close to the Murrumbidgee River corridor south of Canberra, in the general vicinity where populations/groups of BTs are believed to still persist. For example, there are recent records

(2016) of BTs at a popular, roadside birding site off the Monaro Highway (along Kelly Road) only a few kilometres south of Williamsdale.

The ACT Government, through the Land Development Agency, has purchased as a future land bank a number of rural properties across a large area west of Mt Stromlo/west of the current Molonglo urban development as far as Uriarra Crossing on the Murrumbidgee River, as well as some properties west of the Murrumbidgee River adjacent to Point Hut Crossing in Tuggeranong. Like much of the rural land remaining around the ACT, this consists of scattered paddock trees and some remnant patches, which may not have formal protection. If these areas are developed and more mature trees lost, this is likely to push out any BT groups which may be holding on in some places.

It is uncertain if BTs might re-colonise some sites within and around Canberra where they once occurred, although there are many reserved areas (mostly of forest vegetation type). There are a number of ACT Government habitat restoration programs already undertaken (Belconnen Hills, Greater Goorooyarroo) or in train (*e.g.* ACT Government Natural Resource Management (NRM) bird hotspots program focussed on Molonglo, Tharwa/Naas and Googong), which may include plantings of native trees and shrubs and the introduction of coarse woody debris. Over time, this may improve the habitat complexity and productivity of some sites and assist as movement corridors, but is unlikely to replace original habitats. The continuing removal of significant numbers of mature hollow-bearing eucalypts across the ACT, not only from the peri-urban but also from rural areas, potentially places limits or constraints on the possibility of BT groups surviving or of birds moving around the landscape and re-establishing populations where they once occurred.

The following provides more details.

Background and overview

The BT is listed as vulnerable in NSW as well as the ACT. The Canberra Ornithologists Group (COG) submitted the nomination to have this species declared vulnerable in the ACT, and this was declared by the ACT Government in 1997. That nomination provided information about the species' decline in abundance and disappearance from local sites.

In the ACT, BTs have declined over the years of COG's records, primarily due to continuing loss and fragmentation of habitat, woodlands and open forest. Their preferred habitat is not well represented in reserves such as Canberra Nature Park, and the rich grassy woodlands on the fertile soils of Canberra's limestone plains (primarily Yellow Box/Blakely's Red Gum woodlands – an endangered ecological community) have largely been cleared for housing and urban infrastructure.

The area of interest over which the Canberra Ornithologists Group has observed and recorded birds for over 70 years extends well beyond the ACT, to Yass and Goulburn to the north, and to Adaminaby and the Deua area to the south.

Historically in the Canberra region, BTs were regarded as widespread in suitable habitat of open forests, woodlands, and partly cleared country, with small parties sighted regularly in some areas over periods of years. For example, they were recorded regularly on the wooded

eastern slopes of Mts Ainslie/Majura and the Campbell Park area, and were common until the 1960s in the Caswell Drive area on the western slopes of Black Mountain – groups of BTs no longer occur at those sites.

In a survey by Lamm and Calaby (1950), of part of the Murrumbidgee River corridor in the late 1940s, Brown Treecreepers were recorded on 94% of their visits. Forty years later in the early 1980s, COG ran a survey of the whole river corridor in the ACT and classified the BT as a 'rare visitor', with only two records during the survey period.

The 1966 publication, *A Field List of the Birds of Canberra and District*, published by ACT Branch RAOU, (later called Canberra Ornithologists Group) described the species as 'regular in small numbers' in 'savanna woodland'. The third edition of the *Field List* in 1985, published by the Canberra Ornithologists Group, described the Brown Treecreeper as 'uncommon'.

The latest list of 'Birds of the Capital Region', published on COG's website, lists the species' in the COG area of interest as an 'uncommon breeding species in dry woodlands. On the tablelands it is being pushed out further by development'.

A three-year study and collection of data, *Birds of the Australian Capital Territory – an Atlas*, by the Canberra Ornithologists Group over 1986-1989, concluded that the BT was a 'common breeding resident' (M. Taylor and Canberra Ornithologists Group 1992). This publication indicated:

- the species was found in 'relatively undisturbed areas of woodland and dry open forest below 1000 metres …'
- 'They are most common in the Clear Range and along the Lower Naas River, but other permanent populations exist at Mulligans Flat, Burbong and Campbell Park. This last population is of particular interest as it is located in an isolated remnant of Yellow Box and Blakely's Red Gum woodland, once a common and widespread habitat in the ACT. These birds, less than 4km from the centre of Canberra, are possibly the survivors of a much greater population.'
- 'Brown Treecreepers are threatened at Campbell Park and elsewhere by the removal of dead timber for use as firewood. Not only is fallen timber an important substrate, but Brown Treecreepers nest in hollows and spouts of dead trees and stumps.'

Shortly after the BT was declared a 'vulnerable' species in the ACT, Wilson (1999) recorded:

- 'The Brown Treecreeper has disappeared from some places where it was previously found. The spread of housing has also involved destruction of habitat, and this bird is not generally found in populated areas.'
- 'Uncommon breeding species in dry woodlands. On the tablelands it is being pushed further out by development.'

COG conducts a long-term monitoring survey of birds (142 monitoring points over 15 locations) in grassy woodlands in peri-urban ACT in reserves and some rural leasehold sites. A statistical analysis of data collected to 2005 (Bounds *et al*. 2007), gave a summary trend for the BT as, 'low variable occupancy rate, highest in 1999, steep decrease the following year,

increasing to peak at end 2002. Overall, fairly steady since 2001, but long-term trend unclear due to very low numbers.' Subsequent analyses of the woodland survey data have been unable to determine a statistical trend for the BT, due to the low occupancy rate (insufficient records for analysis).

In peri-urban Canberra, BTs are now regarded as very rare. The population at Campbell Park, once the local hotspot for this species, is gone. Groups of BTs became locally extinct at the large reserves of Mulligans Flat and Goorooyarroo in northern Canberra in 2000 and 2005 respectively. These last two sites represent the largest remnant of lowland grassy woodland in the ACT reserve system.

In the Jerrabomberra Valley in central Canberra, a small group of BTs remaining in woodland on leaseholds in and around the 'Woden' property off the Monaro Highway was last recorded by COG in 2006. COG has not recorded the species at the nearby Callum Brae NR (a grassy woodland site), since regular bird surveys by COG commenced there in 1998 when the land was under leasehold. The Jerrabomberra Valley has industrial development (commercial offices, light industries, airport, ACT Corrections Centre, other broad-acre facilities) as well as some rural leasehold land.

In the last decade, breeding groups of BTs in peri-urban Canberra have been reported at the Newline quarry woodland south of the Canberra airport, and the Kama NR in the Molonglo Valley. However, there have been no sightings in recent years at those two sites (See under headings below for more details regarding those sites.)

COG Annual Bird Report and Annual Blitz 2015/16

The Canberra Ornithologists Group publishes an annual report of the status of birds in the ACT region. To assess changes in abundance, a sound approach is to compare data on reporting rates from the present with comparable historical reporting rates. Fig. 1 shows the reporting rates for the BT since 1993.

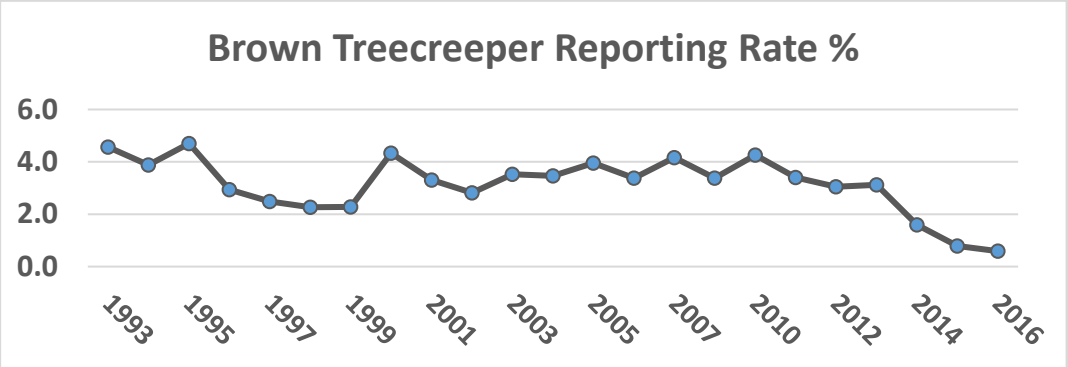

Figure 1. The reporting rates for the Brown Treecreeper since 1993.

The COG report for the year 2015/16 indicates that the BT is a 'rare breeding resident'. The reporting rate and abundance for the species in that report are the lowest figures since the data series commenced in 1987. There are only 69 records for that year, well below the 2012

peak of 137, the ten-year average (94) and the thirty-year average (81). Sites noted in that report are well to the north and south of the settled/urban Canberra area, the Nelanglo Travelling Stock Reserve (TSR) near Gundaroo in NSW and Old Boboyan Road in Namadgi National Park.

An annual survey/inventory of birds in the ACT (within the ACT's borders), the COG Annual Blitz, has been conducted for twelve years in late October over a weekend. The latest Blitz report (Allan 2017) has only two records of BTs in the south of the Territory, with a maximum of 4 birds at one location. The reporting rate for this species was the lowest ever in a Blitz survey.

Current occurrence of Brown Treecreeper

It is known from various bird surveys and other reports to COG and E-Bird, that there are remaining populations of BTs to the south of Canberra urban area, for example, in the wooded foot slopes of Namadgi NP, in the Naas Valley, along the Murrumbidgee River corridor south and into the Monaro area of NSW from Williamsdale to Bredbo environs (private properties, TSRs, Scottsdale Reserve), and possibly still around the Tharwa environs (private properties, Gigerline NR on the Murrumbidgee River), with some records over the last decade.

There are believed to be populations of BTs to the west of the Murrumbidgee River in some remnants on Mountain Creek Road in NSW, and in the Wee Jasper Valley. East of Canberra there are recent records in the Wamboin area and Cuumbeun NR near Queanbeyan. There are recent records in Googong Reserve, London Bridge area, south of Queanbeyan.

To the north of urban Canberra in NSW, much of the landscape has been cleared and fragmented and mature eucalypts lost. The only known population of BTs occurs at Nelanglo TSR, a reasonably sized wooded block surrounded by mostly cleared grazing land north of Gundaroo. Some small groups of BTs north of the ACT are known to have disappeared (*e.g.* Namina TSR near Murrumbateman, NSW). There have been occasional reports in the last decade of a single BT at the Hall TSR, just outside northern urban Canberra.

Threats in the ACT Region

In the first Action Plan, Number 18, produced for the BT by the ACT Government, following its declaration as a threatened species in 1997, the threats to the species were described as:

> Since European settlement in the ACT region several major environmental changes have occurred that are likely to have seriously disadvantaged *C. picumnus.* These are:
>
> - clearing of once widespread native open forest and woodland, particularly box woodlands;
> - urban development – rapid spread of urban areas puts increasing pressure on remnant woodland patches; and
> - fragmentation, separation and degradation of remaining viable habitat patches.

That Action Plan listed a number of other threats to the species' woodland habitats including clearing of both living and dead trees, removal of fallen timber and litter for fire-fuel hazard reduction, inappropriate fire regimes, predation by feral animals or uncontrolled domestic animals, invasive pasture grasses/weeds and competition for hollows from introduced species such as Common Starlings (*Sturnus vulgaris*). [Evidence was cited of Common Starlings evicting Brown Treecreepers from nesting hollows.].

Nearly twenty years after the publication of that Action Plan, those threats continue, particularly with rapid urban spread into Gungahlin and Molonglo. It is known, for example, that timber has been regularly taken (illegally) from Campbell Park woodlands, which used to be the local hotspot for the species.

Habitat and ecological requirements

The BT is dependent on suitable hollows in eucalypts, particularly in mature trees, but also in standing dead trees, and the products of mature eucalypts, particularly fallen (hollow) limbs, woody debris and stumps. The BT requires these for:

- nesting (in hollows)
- foraging (on trunks and branches)
- roosting at night (in hollows, crevices)
- refuge for resting during the day and to escape and find safety from predators (in hollows, crevices).

Higgins *et al.* (2001) in HANZAB have provided comprehensive information about the Brown Treecreeper, including from studies on the south-west slopes of NSW of the species' movements, by Drs Veronica and Erik Doerr (CSIRO, Canberra). The following summary is taken from that publication's sections on habitat, movements, food, social organisation and social behaviour, and is based on contributions written by those researchers.

Brown Treecreepers:

- Are mostly found in woodlands dominated by eucalypts … with open grassy understorey
- Are also found in semi-cleared pasture, in grasslands with scattered trees, in shelter belts fringing cleared lands
- Have a preference for rough-barked trees, such as boxes and stringybarks
- Are territorial year round, some birds disperse locally after breeding; adults may also move locally after divorce or loss of mate
- Vagrants may occur up to 100km from normal range
- Most young females and possibly some males start to disperse from the natal territory by the next breeding season to search for breeding positions in other groups of Brown Treecreepers
- Both sexes of young birds make forays out of the natal territory, but females make longer and more frequent forays out of the natal territory to search for breeding

vacancies; males tend to fill breeding vacancies 1-2 territories away, while females tend to settle anywhere from 1-10 territories away, rarely up to 35-40 territories away

- Are almost entirely insectivorous, mainly ants and beetles, occasionally nectar
- Are both terrestrial and arboreal for foraging, in about equal proportions; forage mainly by gleaning but also by probing
- Forage in pairs or small social groups (3-8 birds), on bare or sparsely vegetated ground, in leaf litter, in crevices and holes on trunks and larger limbs of trees (dead and live), amongst coils of loose bark, on and around fallen logs and under bark of logs.

A main response by BTs to the threat of predation is to flee to a nearby hollow, such as a hollow fallen log. Birds being observed in the field will suddenly disappear, for example, when other birds' alarm calls are made. Fleeing to hollows in trees or logs was observed in the reintroduction study of this species at Mulligans Flat/Goorooyarroo Nature Reserves.

BTs require vegetation structures for connectivity between patches, for example, to disperse to other territories; paddock trees will be used where there is no shrub/mid canopy structure for cover.

Habitat fragmentation is a major contributor to the decline of BTs. Fragmentation of habitat can disrupt the recruitment of juvenile females, resulting in some (isolated) groups in habitat fragments lacking a breeding female. The last bird remaining in an isolated territory is often a male; this was observed locally at Goorooyarroo NR. A second problem is reduced genetic flow between (isolated) populations.

BTs have been shown in various studies known to the author *(e.g.* Fenner School, ANU) to survive in fragmented farming landscapes, provided there are sufficient patches of large eucalypts, connectivity corridors *(e.g.* paddock trees or other vegetation structure), and dead and fallen timber is not cleared away.

Experimental reintroduction at Mulligans Flat/Goorooyarroo Reserves

BTs became locally extinct in 2000 at Mulligans Flat and 2005 at Goorooyarroo. An experimental reintroduction of BTs in spring 2009 at these large grassy woodland reserves failed. While that study concluded that a number of factors probably influenced the failure, it noted there was high mortality from predators in the first months. The study noted that the birds were hard released [7] and may have been more vulnerable as they did not have knowledge of the territory or, importantly, of suitable refuges/bolt holes/hiding places. Natural hollows at those reserves were not considered abundant/sufficient, so a large number of nesting boxes and refuge tubes were installed next to logs as part of the experiment to substitute for natural hollows, but the artificial structures were not known to be used by the birds.

[7] Hard release: Birds are brought from capture area, in this case the SW slopes of NSW, and immediately released, without a settling-in period.

Newline Quarry Woodland

The woodland patch of Yellow Box/Red Gum known as Newline is just south of the Canberra Airport on Pialligo Avenue towards Queanbeyan. This site consists of a number of fenced paddocks of varying eucalypt tree density and varying understorey quality, with invasive weeds over much of the site. The front paddocks abutting Pialligo Avenue have a high density of very old eucalypts and are known to ACT birdwatchers as a very good patch for woodland birds, especially in the spring.

This woodland is noted in the ACT's Lowland Woodland Strategy (Action Plan 27) as an important bird habitat, particularly for the threatened BT. The woodland is also noted in Action Plan 27 as an important corridor link between the Majura Valley and the Jerrabomberra Valley, although this is not necessarily a functional/ecological link for some bird species.

COG established nine bird-monitoring sites at Newline in 2000, as part of its long-term woodland bird-monitoring survey; these sites are across all the paddocks, down to the southern end near the quarry. There is an extensive bird list and the migratory Swift Parrot (vulnerable in the ACT; endangered under Commonwealth and NSW legislation) has been recorded there.

Over the years, a small group of BTs has been a feature species at this site, generally found in the front paddocks on most surveys/visits. This has been one of the very few remaining, breeding groups of BTs close to the urban area, but COG has not recorded them in its surveys since 2012.

The majority of the woodland site (the northern part) is within an area owned by the Commonwealth under the jurisdiction of the Department of Defence. A smaller portion of land at the southern end of the woodland is understood to be under the control of the ACT Government. Some years ago, COG became aware that the Commonwealth Department of Defence may dispose of the site, therefore raising concerns about the long-term future of this important site to the birds of the ACT. Discussions have occurred with both the ACT Government and Defence with the aim of having this habitat and corridor link under conservation management and better protection, but this has not happened to date.

In 2004, the ACT Government made an election policy commitment, as part of a package of initiatives to protect grassy ecosystems; this is documented in the Australian Labor Party's ACT Campaign 2004 documents as:

> The Newline Quarry Woodland, situated just south of Canberra Airport is an area of around 50 ha that is recognised for its important bird habitat. Although parts of the land are of variable environmental value, endangered species such as the White-winged Triller are often spotted in the vicinity. The area provides connectivity between the Majura Valley and Callum Brae Woodlands. The Commonwealth owns part of the land, while other parts are owned by the ACT. Given that the area is of variable quality and that there are multiple landowners involved, the Labor Party will undertake a detailed study of the area, with a view to protecting the important habitat and connectivity values.

The Newline site, which also has some ongoing industrial uses and a builders' waste dump on one edge, should be managed under conservation management principles to ensure that its large eucalypts are protected. It remains a viable habitat for threatened species and is enhanced to improve its connectivity/wildlife corridor values. Although it seems that the group of BTs may not currently occupy the Newline site, it is possible that birds might move from/through the Majura Field Firing Range site (further north) where they have been recorded by COG in the past. This area is part of a wooded corridor (outlined in Action Plan 27) which extends to Mulligans Flat/Goorooyarroo and west around the ACT's northern border. Critically, the Newline woodland with its old hollow eucalypts is not currently being actively managed for woodland bird conservation and is also not protected in perpetuity.

Kama NR and the Molonglo Valley

The Kama NR is in the central Molonglo Valley, a site with high-quality Yellow Box-Red Gum woodland and many large mature eucalypts. The site is on a south-facing slope with deep soils, adjacent to the Molonglo River and surrounded to the north by rural leaseholds and the suburbs of Belconnen further north. Kama itself is a narrow plot, around 800-900 metres in width. The site had lost much of its shrub layer (due to grazing activities), but restoration plantings have been done there in recent years. Prior to becoming a nature reserve in early 2009 (part of Molonglo development offsets conditions), the block was known as agistment block 1419, owned by the ACT Government.

In 2005, COG set up bird-monitoring sites in what was then the agistment block; these sites have been surveyed quarterly since then, as part of a long-term COG bird-monitoring project in the ACT's grassy woodlands. COG has records of BTs at the site going back to 1989, when COG undertook a three-year Atlas survey, a census of birds. However, no records of observations on the population are known over the sixteen-year period between December 1989 and September 2005.

In 2006, Mr Chris Davey, a member of COG and former CSIRO researcher, set up a research study of the BT population at Kama (see Davey 2019, this issue); this species was chosen because it is a listed threatened species in the ACT and because it is regarded as a model species that can be used to examine the threatening processes responsible for the demise of other ground-feeding woodland bird species. As many birds as possible were banded so they could be individually identified in the field, as part of this study over the period 2006 to 2010, approved by the ACT Government and the Australian Bird and Bat Banding Scheme. Eighteen birds were banded over the study period. At that time, this was believed to be the largest known BT population within the ACT.

Initially, Mr Davey found a total of ten birds in four distinct groups of Brown Treecreepers, three within Kama and one adjacent to the western boundary, with each group consisting of a pair and a male helper. There was an interchange of female young between one of the inside groups and the outside group. Birds were observed throughout the Kama block and also using areas outside both the eastern and western boundaries, each group being confined to a specific area, with different areas used each winter. BTs were also discovered by Mr Davey at a property on the western side of the Molonglo River off the Uriarra Road (Piney

Creek), but this site was not part of the Kama study. It is noted that COG has records of BTs at another property off the nearby Cotter Road west of Mt Stromlo, up to 2015.
At Kama, there were successful breeding seasons in 2005-06 and 2006-07. The population started to decline from June 2007. There was a poor breeding season in 2008-09 with no new birds produced, and by April 2009 only four adult birds remained, and an unbanded bird which moved in temporarily from outside the study area. Grazing stock, which had been intermittently present, were eventually permanently removed from the block in September 2008. Since that time, grass biomass has thickened and may not be optimal for BTs foraging on the ground.

Mr Davey concluded that the BTs at Kama were not a closed population, with four new birds appearing at various times and all female, one of which was known to have successfully bred. These immigrant females were all first seen in the two most north-western territories at Kama, most likely having come from territories discovered at sites to the north-west of Kama.

Mr Davey also noted that the area surrounding the Kama agistment block (mainly grazing leaseholds with scattered or groups of trees, known generally as the Central Molonglo) is a critical element of the endangered woodland community due to the presence of breeding hollows and the amount of fallen timber. That area was also used for breeding by one group of BTs and for feeding by two other groups. BTs were observed using areas up to 380 metres from the Kama boundary fence. The group breeding outside Kama was an integral part of the population and acted as a source of individuals for the breeding groups within Kama. However, little was known about the actual dispersal of female BTs.

Mr Davey suggested that, on the information at the time of his study, there was the possibility of other locations in the Molonglo Valley supporting isolated, possibly breeding pairs of BTs. The latest COG surveys indicate that the BT population no longer persists in Kama NR.

It should be noted that works for urban development and the (Molonglo) River Park commenced in the Molonglo Valley (known as Molonglo East) from the northern boundary of Weston Creek from around 2011, with the first suburbs of Coombs and Wright, and new suburbs are now moving further west and north with additional stages of development. This has meant the clearance of a large area of rural land, including the loss of many mature eucalypts across the development area, possibly compromising movement corridors.

Eventually, houses will abut the southern boundary of Kama Nature Reserve. An urban buffer zone from the Kama boundary was recommended by environmental experts for fire management and to protect the site from urban-edge effects. This buffer is important because Kama is a narrow reserve with little core resilience and will be impacted significantly by urban-edge effects. A buffer area, required under the Commonwealth's EPBC Act approval of the Molonglo development, has not been determined, notwithstanding the lapse of several years (this buffer would also protect some mature eucalypt trees outside Kama), and a management plan for the Molonglo river corridor reserve and offset sites has not been made public. It is understood that a recent application has been made for an EIS exemption for the Molonglo Valley Stage 3 urban development, the documents for which, apparently, do not provide for a buffer for Kama and also expand the development boundaries.

In a report, consultants O'Sullivan and Beitzel (2006) concluded that the current development model for East and Central Molonglo would in all probability result in the local extinction of the BT.

The central Molonglo area north of Kama NR has no formal legislative protection, although the ACT Government announced that this would be conserved, not developed. That area also has an important breeding site for Superb Parrots.

Figure 2. Brown Treecreeper breeding site at Kama NR, Yellow Box (*Eucalyptus melliodora*) nearest tree on left. This kind of landscape, with scattered, mature eucalypt trees is typical in the Molonglo Valley. Much of this habitat has already been cleared for housing.

PhD study on landscape use by birds in future urban and peri-urban Canberra

A PhD study by Karen Ikin from 2008-2010, focussed on patterns of landscape use by birds in urban and future urban Canberra, with a view to providing sound whole-of-landscape scientific evidence on which to base planning, management and conservation priorities. This study examined (as one component of the research) bird-habitat relationships in the Molonglo Valley (the area planned for future urban development), and as another component, bird-community dynamics on urban edges. The BT was recorded in the study in urban fringe and future urban areas.

Dr Ikin's study concluded that:

- Large eucalypts had a consistently positive relationship with bird diversity
- Woodland sites with the highest tree cover supported the largest number of bird species overall
- In suburban pocket parks, large trees were acting as keystone structures (shelter, resources, or goods and services for other species), and

- The overall findings provided critical support for the protection of scattered trees in any modified landscapes where they occur, *e.g.* urban, peri-urban and rural.

The study also concluded, 'the presence of structural features such as logs, shrubs, hollows, eucalypt regeneration, and leaf litter in the Molonglo Valley had a positive effect on the probability of recording eight of the ten declining ACT woodland species investigated.'

Dr Ikin's research made three main recommendations relating to trees in the urban and peri-urban/reserve environment:

(1) Retain eucalypt woodlands

(2) Preserve large, scattered trees, and

(3) Encourage replacement of trees through regeneration.

Acknowledgement

This material has been prepared by Ms Jenny Bounds, Conservation Officer, Canberra Ornithologists Group. The information is largely based on COG's records of birds observed in the ACT and recorded in its databases, the Annual Bird Reports published by COG in its journal *Canberra Bird Notes*, information from the COG long-term woodland bird-monitoring project in grassy woodlands in fifteen locations, and other relevant sources.

Ms Bounds has a special interest in woodland birds and experience over many years in bird survey projects in ACT and NSW. Ms Bounds has been a member of the COG Committee for some years, is a member of the Board of the Conservation Council and Chair of their Biodiversity Working Group, and is on the Management Committee of the Woodlands and Wetlands Trust. She has drafted several nominations of bird species now listed as threatened in the ACT, including Little Eagle, Glossy Black-Cockatoo and Scarlet Robin.

References

ACT Government (1999) Action Plan No. 18, Brown Treecreeper, *Climacteris picumnus*, A vulnerable species, Environment ACT.

ACT Government (2004) Woodlands for Wildlife: ACT Lowland Woodland Conservation Strategy, Action Plan No 27, Environment ACT.

Allan, B. (2017) The Canberra Bird Blitz 2016. *Canberra Bird Notes* 42: p. 202.

Australian Labor Party, Australian Capital Territory Branch (2004) Our Environment – ACT Election Campaign 2004 (28 September 2004).

Bennett, V.A., Doerr, V.A.J., Doerr, E.D., Manning, A.D. and Lindenmayer, D.B. (2012), The anatomy of a failed reintroduction: a case study with the Brown Treecreeper. *Emu* 112: 298-312.

Bounds, J., Taws, N. and Cunningham, R. (2007) A statistical analysis of trends in occupancy rates of woodland birds in the ACT December 1998 to December 2005. *Canberra Bird Notes* 32: p. 86.

Canberra Ornithologists Group (1985) *A Field List of the Birds of Canberra and District*, 3rd edition.

Canberra Ornithologists Group. Brown Treecreeper – Nomination of a Vulnerable Species to the ACT Flora and Fauna Committee (date not recorded, *c.* 1996/97)

Canberra Ornithologists Group (2017) (Ed. Paul Fennell) Annual Bird Report: 1 July 2015 to 30 June 2016. *Canberra Bird Notes* 42: pp. 6 and 53.

Canberra Ornithologists Group records and databases of bird observations, including information published on the COG website: www.canberrabirds.org.au

Davey, C. (2010) Update to project LT 2006203 An assessment of factors influencing the breeding success of the Brown Treecreeper (*Climacteris picumnus*) in the Molonglo Valley, ACT (unpublished paper).

Frith, H.J. (Ed.) (1969) *Birds in the Australian High Country*. Reed Publishers, Sydney.

Frith, H.J. (Ed.) (1984) *Birds in the Australian High Country*. Angus and Robertson Publishers, Melbourne.

Higgins, P.J., Peter, J.M., Steele, W.K. (2001) *Handbook of Australian, New Zealand and Antarctic Birds* [HANZAB]. Vol. 5. *Tyrant-flycatchers to Chats*. pp. 228 to 235. Oxford University Press, Melbourne.

Ikin, K. (2012) Conservation, planning and management of habitat for a diverse bird community in urban and future urban areas, PhD Thesis, Fenner School, ANU (Chapter 8 - Conclusion).

Lamm, D.W. and Calaby, J.H. (1950) Seasonal variation of bird populations along the Murrumbidgee in the Australian Capital Territory. *Emu* 50: 114-122.

O'Sullivan, T. and Beitzel, M. (2006). Final Molonglo Valley Ecological Impact Review. Project No. 4427. Biosis Research, Queanbeyan.

Royal Australasian Ornithologists Union (RAOU), ACT Branch (1966). *A Field List of the Birds of Canberra and District.*

Taylor, I. M., (1987), Murrumbidgee River Corridor Survey – Summary Results. *Canberra Bird Notes* 12: 110-131.

Taylor, M. and Canberra Ornithologists Group (1992) *Birds of the Australian Capital Territory - an Atlas*. Canberra Ornithologists Group and the National Capital Planning Authority, p. 147.

Wilson, S. (1999) *Birds of the ACT – Two Centuries of Change*, Canberra Ornithologists Group, Canberra.

Accepted 20 February 2019

Further reading on *Conservation* in *Canberra Bird Notes:*

Boekel, C. (2920) A fake bush capital? Bird species local extinctions in Black Mountain Nature Reserve and associated natural and semi-natural fragments. CBN 46(1) 1-17.

Bounds, J. (2006) The status of Hooded Robins in the Hall to Newline woodland corridor. CBN 31(4) 169-77.

Bounds, J. (2011) Glossy Black-cockatoo *Calyptorhynchus lathami* declared a Threatened (Vulnerable) species in the ACT. CBN 35(2) 100-120.

Bounds, J. (2015) Nomination of a Vulnerable Species to the ACT Flora and Fauna Committee – Scarlet Robin. CBN 40(2) 173-192.

Bourne, D. (2002) 'Birds of the Upper Molonglo Floodplain NSW: The importance of remnant grassland and wetlands.' CBN 27(2) 60-65.

Dabb, G. (2018) A Discussion paper: When is a bird species regionally threatened? a discussion of the not-so-simple concept of 'regional extinction' in relation to the Australian Capital Territory. CBN 43(2) 114-119.

Dabb, G. (2020) A short discussion about casuarinas and birds, in particular the Glossy Black-Cockatoo *Calyptorhynchus lathami.* CBN 45(2) 182-192.

Davey, C. (2019) Demise of Brown Treecreepers in the Central Molonglo Valley, ACT. CBN 44(2) 122-135.

Lindenmayer, Bruce. (1992) 'A report on the campaign and submission to preserve Mulligan's Flat, Gungahlin, A.C.T.', CBN 17(4), 100-102.

Mulvaney, M (1986) Birds, berries and bad bushes. CBN 11(3) 94-98.

Reid, J (2001) Finding solutions to the biodiversity crisis in our temperate agricultural landscapes. CBN 26(2) 46-48.

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4.2. Conservation: Iconic threatened species

4.2.1. Little Eagle (*Hieraaetus morphnoides*)

STEPHEN DEBUS (sdebus@une.edu.au), University of New England

Over the past decade or so the Little Eagle has been recognised as threatened and officially listed as vulnerable under relevant legislation in New South Wales, the ACT, Victoria and South Australia. The late Jerry Olsen first drew attention to its decline in the ACT, on the basis that with his small band of volunteers he was able to find only a small and declining number of successfully breeding pairs annually in the 2000s and 2010s, compared with his research in the 1990s. In particular, Jerry published in *CBN* about the likely adverse effects of urban sprawl on known ACT Little Eagle territories, notably the one in West Belconnen known as the "Strathnairn" nest. Jerry advocated radio- or satellite-tracking studies of ACT Little Eagles to ascertain their home range and habitat use, and he conducted one that identified critical resources used by the Strathnairn fledgling in one breeding season. Given the prospect of planned development displacing the Strathnairn pair, and Jerry's opinion that a 200-m buffer (exclusion zone) around the nest would be inadequate if the eagles lost substantial foraging habitat, the developer of the Ginninderry Project funded a satellite-tracking and dietary study by Dr Stuart Rae and his team of professionals. Meanwhile, Jerry had also published multiple dietary studies of the ACT Little Eagles and comparisons with Wedge-tailed Eagle diets.

With his colleagues, Dr Rae's annual summaries in *CBN* have provided regular updates of critical findings on the ecology and movements of the ACT Little Eagles. An early and crucial finding from the satellite tracking is confirmation that some breeding Little Eagles migrate for the winter to the tropics of the Top End of the Northern Territory, the Gulf of Carpentaria/base of Cape York Peninsula, or coastal Queensland before returning to their breeding territories. Others wander more locally or regionally. Some independent juveniles also perform similar dispersals, including to the tropics, in some cases staying away for an extra year before returning to their general natal region. Predictably, though, the tagged Strathnairn male returned to find his nesting territory developed for urbanisation, and he then disappeared. The neighbouring "Lands End" pair visited the now vacant nest, but then returned to their expanded territory, nesting a little closer to Strathnairn than before. Dr Rae's study has also produced critical findings on home-range size, breeding success, territory fidelity, and the tolerance of Little Eagles to various human features in the landscape, as well as presenting annual dietary data in relation to seasonal conditions. In addition to prey remains found at nests, annual pellet collections, still to be analysed, will contribute to a more comprehensive dietary profile of the ACT Little Eagles.

One lesson from the study by Dr Rae and his team of paid professionals is that greater survey effort produces more Little Eagle nests than was possible by Jerry's small team of volunteers in their spare time. Nevertheless, although Dr Rae's study initially documented more nests in the ACT than found by Jerry and team, the number of successful nests within the ACT appears to be declining in recent years, and Dr Rae's study is increasingly relying on finding more nests in neighbouring NSW to maintain the annual sample size of successful nests in and around the ACT. Thus, there may be a parallel trend with Jerry's findings for the ACT, albeit from a higher starting point.

Overall, ACT-based research on the Little Eagle has most definitely contributed to better understanding of the biology of this species, which will be critical in implementing appropriate

conservation and management strategies. Both Jerry and Dr Rae have also published on the ACT Little Eagles in other journals, notably *Australian Field Ornithology* (open access via the BirdLife Australia website) and *Emu* (Rae). The paper in *Emu* demonstrated the impact of the Black Summer bushfire smoke on Little Eagle flight time, and serves to warn of the seriousness of increasingly frequent and intense wildfires under human-caused global warming.

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TELEMETRY AND COLOUR-BANDING CONFIRM PREDICTIONS ABOUT LITTLE EAGLE MIGRATION AND TERRITORY DESERTION

JERRY OLSEN

Institute for Applied Ecology, University of Canberra, ACT 2601

Email: Jerry.Olsen@canberra.edu.au

Abstract. *The Little Eagle (*Hieraaetus morphnoides*) is listed as vulnerable in New South Wales and in the Australian Capital Territory. The work of Nix (1974), Baker-Gabb and Fitzherbert (1989) and Griffioen and Clarke (2002) predicted that Little Eagles would migrate north to tropical areas from southeast Australia. Here I detail these predictions and others about territory desertion, and comment on the fate of the first satellite-tagged Little Eagle.*

Background

Olsen and Fuentes (2004, 2005) first signalled a decline in breeding Little Eagles in the Australian Capital Territory (ACT). Subsequently, the Little Eagle was declared Vulnerable in the ACT then in New South Wales (Olsen 2014; Debus 2017) and is being assessed for Vulnerable status in South Australia (Ian Falkenberg pers. comm.).

Figure 1. (left) Satellite-tagged adult male Little Eagle "OB" at Strathnairn with tubular satin rouleau harness, and (right) Radio-tagged juvenile Little Eagle "OA" at Strathnairn.

Olsen *et al.* (2008, 2009) proposed radio-tagging Little Eagles in the ACT because home ranges recognised by planners and government agencies were much too small, and habitat destruction from suburban sprawl might cause the desertion of Little Eagle breeding territories in the ACT. The first Little Eagle (Fig. 1, right) was radio-tagged on 22 Nov 2014, a nestling male (VHF transmitter). His Strathnairn nest was in the path of the proposed Ginninderry housing development (Olsen *et al.* 2015, 2017a). The second Little Eagle (Fig. 1, left), the adult male from this same nest, was banded and radio-tagged on 28 Oct 2015 and migrated to Daly Waters in the Northern Territory and back to the Strathnairn nest site (Drynan 2017; Olsen *et al.* 2017b; Olsen and Trost 2017a; ABC News 21 April 2017; Anon. 2017; Brawata *et al.* 2019).

Olsen *et al.* (2015, 2017a, b) and Olsen and Trost (2017a, b) said this Little Eagle nest site could be abandoned because of an inadequate buffer radius around the nest tree and increased habitat destruction from property development. After this adult male returned from Daly Waters to his spring-summer home range in 2017, he (identified by colour-band) and a female were seen in the Strathnairn nest area by Susan Trost on 13 Aug 2017, but both disappeared. A different male and female from nearby Land's End appeared after the Strathnairn pair abandoned their nest, and they attended the nest for a short time, but they too left and the Strathnairn nest site was deserted. The Land's End pair and Strathnairn pair were identifiable by plumage differences – the Land's End male was dark morph (Fig. 2), the Strathnairn male was light morph and colour-banded (Fig. 3); the Land's End female was wary, flew when approached, and showed a twisted primary in flight (Fig. 4, left); the Strathnairn female was confiding and remained perched when approached, and had no twisted primary in flight (Fig. 4). Several photographers took images of the Strathnairn female from the ground.

Remote-controlled cameras placed in the tree next to the Strathnairn nest in 2017 appeared to disturb the original Strathnairn pair and they were not seen attending the nest again. These two pairs in West Belconnen in 2016 (Strathnairn and Land's End) were reduced to one failed pair at Land's End in 2017 (see Olsen and Trost 2018; Olsen 2018).

Figure 2. Land's End male Little Eagle.

Figure 3. Adult male Little Eagle "OB" photographed on 1 Jan 2017 near Canberra (*Geoffrey Dabb*).

Figure 4. Land's End female (left), showing distinctive twisted primary, and Strathnairn female (right) Little Eagles.

Comments on Little Eagle migration

The recent paper by Brawata *et al*. (2019) on the migration of the above-mentioned adult male Little Eagle makes a number of statements which require comment.

First, two technical points:

(1) The total weight of the backpack including the PTT-100 transmitter was 22 g. This represents less than 3% of the bird's body weight, with the typical weight span for a male Little Eagle being 600–800 g.

We would not use a 22 g transmitter on a 600 g raptor; 22 g is 3.7% of 600 g. This male Little Eagle weighed 740 g, and the transmitter was 3% of his weight.

(2) The PTT-100, encased in a backpack, was attached to the bird using a Teflon ribbon harness.

On this Eagle we used tubular satin rouleau.

We had previously used Teflon ribbon to attach a satellite transmitter to a Wedge-tailed Eagle (see Hatton *et al*. 2015) and we had 6 mm Teflon ribbon available, but had concerns about the effect of Teflon harnesses on smaller, agile male raptors such as male Little Eagles because we found it abrasive compared to other materials (see also Peniche *et al.* 2011 and Dixon *et al.* 2016). We did not use Teflon ribbon on either of the radio-tagged male Little Eagles at Strathnairn, including the one referred to in the Brawata article (see Olsen and Trost 2017b and Fig. 4).

Other statements in the Brawata *et al*. paper relate to previous research on Little Eagle migration:

(3) In Victoria, it is thought that some Little Eagles move seasonally between different breeding and wintering areas (Baker-Gabb and Fitzherbert 1989) and this apparently includes migration.

Baker-Gabb and Fitzherbert did not say this. They were discussing continental migration, not just Victorian movements, and said that Little Eagles migrate north from southeast Australia, some to far northern Australia. They used RAOU Atlas data (Blakers *et al.* 1984) to determine within year and not year-to-year variation in raptor movements. They also used the paper by Nix (1974) who developed a model of bird migration in Australia based on the premise that the relative degree of change in the environment, whatever the cause, should provide the best index of the need for seasonal movement (p. 160).

Further,

Analysis of seasonal growth indices suggests that movements of bird populations in the Australian region should occur very largely within four discrete sets. One of these sets was: Eastern Australia, including Tasmania and extending to New Guinea and associated islands for some species. The important seasonal change here is the low winter temperatures in the south-east. (p. 161).

Baker-Gabb and Fitzherbert concluded that seasonal movements of raptors in Australia appear to reflect well the patterns predicted by Nix (1974)' (p. 162).

They argued that:

> The widespread and temperate zone species which migrate [by definition, make return journeys] south-north over long distances include the Square-tailed Kite *Lophoictinia isura*, Whistling Kite *Haliastur sphenurus*, Brown Goshawk *Accipiter fasciatus*, Collared Sparrowhawk *A. cirrhocephalus*, Little Eagle *Hieraeetus morphnoides*, Black Kite, Australian Hobby *Falco longipen*nis, Australian Kestrel *F. cenchroides*, Swamp Harrier and, probably, the Southern Boobook.

They further state. 'The … migratory species [*i.e*. including Little Eagles] travel north, some as far as northern Australia ' (p. 162).

This north-south movement is also clear in the reporting rates for Little Eagles in atlas studies such as Barrett *et al*. (2003). Their summer map shows more sightings in the southeast; their winter map shows more sightings in the north. Cooper *et al*. (2014) also showed reduced reporting rates from April to July for Little Eagles in NSW and the ACT.

Figure 5. Predicted Little Eagle migration route (based on Figure 16 in Griffioen and Clarke (2002)), matching the route taken by Little Eagle "OB" (see map in Brawata *et. al.* 2019).

(4) Bird movements in general in Australia are all but unknown despite the importance of such knowledge (Griffioen and Clarke 2002).

Griffioen and Clarke did not conclude this. In fact, using atlas data, as did Baker-Gabb and Fitzherbert, they provide a map (their Figure 16) showing that various species, including Little Eagles (Fig. 5), should move, during winter, from southeast Australia in a northwest direction to northern Australia, thus making a return journey between breeding and wintering grounds, the same pattern found in the satellite-tagged Strathnairn male. Like Baker-Gabb and Fitzherbert, they concluded that, 'The large-scale movement patterns detected agree well with Nix (1976)' (p. 122).

In summary, Baker-Gabb and Fitzherbert (1989) and Griffioen and Clarke (2002), using the earlier work of Nix (1974), predicted the migration route used by the adult male Little Eagle from Strathnairn.

Issues of Little Eagle conservation

Other questions about Little Eagle conservation deserve comment. There are no known threatening processes linked to migration, but there were threatening processes linked to disturbance of breeding habitat. Researchers had accurately predicted the desertion of ACT Little Eagle nest sites before these nest sites were abandoned, including the Strathnairn nest site. The predicted desertions were linked to suburban development and Wedge-tailed Eagles *Aquila audax* (Olsen *et al*. 2015; Olsen 2018). Dabb (2018) said about the Strathnairn nest site in 2017, 'That nest was abandoned before egg-laying.'

Why was the Strathnairn nest site, where Little Eagles were first radio-tagged and colour-banded, deserted? Rae (2018) postulated that the Strathnairn nest may have been abandoned because of beetle infestation but provided no evidence as to where this pair went, which beetle species was involved, and whether these same insects are found in successful raptor nests. Insect infestations are common in successful raptor nests in the ACT, so, when collecting pellets and prey remains, it is our protocol to freeze these remains before sending them to museums for analysis so museum collections are not affected (J. Olsen and S. Trost unpublished data).

Figure 6 (left). Little Eagle roost tree near Strathnairn in 2016. Figure 7 (right). Same roost area previously used by fledglings and adults for foraging and roosting (photographed in 2019).

The area close to this nest experienced disturbance from land clearing for suburban housing (Figs. 6 and 7). Parallel cases exist in NSW where pairs attempted or completed a breeding cycle while major earthworks gradually approached the nest and removed foraging habitat, but abandoned the nest site in the following year apparently because the disturbance had been too great (Debus 2011; Larkin *et al.* unpublished data).

Finn and Stephens (2017) state: 'Despite evidence of the harm that land clearing causes to individual animals, such harm is either ignored or considered only indirectly in environmental decision-making … land clearing causes physical injuries, other pathological conditions, pain and psychological distress over a prolonged period as animals attempt to survive in the cleared environment or in the environments they are displaced to…' (p. 377).

Because many eagle species need large home ranges to breed in, they can be used as 'surrogates', in this case, as 'umbrella species' that provide large areas that contain more biodiversity (species richness) than do smaller areas (Ray *et al*. 2005). However, the 'Little Eagle Protection Zone' in place to protect this nesting pair, a 200m radius around the nest, was apparently too small and failed (Olsen 2018), so the original pair could not serve this function.

When breeding habitat is to be destroyed, industries often use strategies that create the illusion of species conservation, including 'buffers' and 'corridors' too small to save nesting pairs, and inadequate 'trade-offs' (Olsen 2014). Ecologists are sometimes hired to find more individuals of a threatened species, apparently to diminish the perceived harm caused by the destruction of breeding habitat (see, as an example for Leadbeater's Possum *Gymnobelideus leadbeateri*, 060519-media-release-ground-breaking-research-find-new-leadbeaterspossum-areas-wfeedlcpkcqo).

Olsen and Debus (2018) argued that independent research, not linked to industry funding, should be considered alongside industry-funded research. When future ACT Little Eagle nests are abandoned, at least four potential hypotheses could be investigated and tested by researchers to find causal factors – Wedge-tailed Eagles, prey availability, property development, and beetle infestation.

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References

ABC News 21 April (2017) Little Eagle's big journey from Canberra to a Northern Territory town.

Anon. (2017) Recovery Roundup. Corella 41: 104-107.

Baker-Gabb, D.J., Fitzherbert, K. (1989) An overview of raptor movements and wintering places in Australia and New Zealand. In *Raptors in the Modern World*. (Eds. Meyburg, B.-U. and Chancellor, R.D.), pp.159-166. World Working Group on Birds of Prey and Owls: Berlin, Germany.

Barrett, G., Silcocks, A., Barry, S., Cunningham, R., and Coulter, R. (2003) *The New Atlas of Australian Birds*. Royal Australasian Ornithologists Union, Hawthorn East Victoria.

Blakers, M., Davies, S.J.J.F., and Reilly, P.N. (1984) *The Atlas of Australian Birds*. Melbourne University Press, Melbourne.

Brawata, R., Rae, S., Gruber, B., Reid, S., and Roberts, D. (2019) Confirmation of little eagle (*Hieraaetus morphnoides*) migration by satellite telemetry. *Australian Journal of Zoology* 66: 247-250.

Cooper, R.M., McAllan, I.A.W. and Curtis, B.R. (2014) *An Atlas of the Birds of New South Wales and the Australian Capital Territory*, Vol. 1: Emu to Plains-wanderer. NSW Bird Atlassers Inc., Sydney.

Dabb, G. (2018) An inconvenient eagle. *Canberra Bird Notes* 43: 132-137.

Debus, S.J.S. (2011) Parental time-budgets and breeding behaviour of the little eagle *Hieraaetus morphnoides* in northern New South Wales. *Corella* 35: 65-72.

Debus, S. (2017) *Australasian Eagles and Eagle-like Birds*. CSIRO Publishing, Melbourne.

Dixon, A., Ragyov, D., Purev-Ochir, G., Rahman, M. L., Nyambayar, B., Bruford, M.W., and Zhan, X. (2016) Evidence for deleterious effects of harness-mounted satellite transmitters on Saker Falcons *Falco cherrug*. Bird Study 1: 11; http://dx.doi.org/10.1080/0006365 7.2015.1135104

Drynan, D. (2017) Bill board. *Flightlines* 32: 5. Australian Bird and Bat Banding Scheme.

Finn, H.C., and Stephens, N.S. (2017) The invisible harm: land clearing is an issue of animal welfare. *Wildlife Research* 44: 377–391.

Griffioen, P. A. and Clarke, M. F. (2002) Large-scale bird-movement patterns evident in eastern Australian atlas data. *Emu* 102: 99–125.

Hatton, F., Olsen, J., and Gruber, B. (2015) Post-fledging spatial use by a juvenile wedge-tailed eagle *Aquila audax* using satellite telemetry. *Corella* 39: 53-60.

Nix, H. A. (1974) Environmental control of breeding, post-breeding dispersal and migration of birds in the Australian region. In: Proceedings of the 16th International Ornithological Congress. (Eds. Frith, H.J. and Calaby, J.H.), pp. 272-305. Australian Academy of Science, ACT.

Olsen, J. (2018) Eleven historic breeding territories of ACT Little Eagles is an underestimate – A reply to Olsen and Rae (2017). *Canberra Bird Notes* 43: 120-131.

Olsen, J. (2014) *Australian High Country Raptors*. CSIRO Publishing, Melbourne.

Olsen, J. and Debus, S. (2018) Funding bias and independent research. *Boobook* 36: 12.

Olsen, J., and Fuentes, E. (2004) *Preliminary report on the effect of the development of the Molonglo Valley on the community of Birds of Prey*. [36 page report ACT. Planning & Land Authority].

Olsen, J. and Fuentes, E. (2005) Collapse in numbers of breeding Little Eagles in the Australian Capital Territory. *Canberra Bird Notes* 30: 141-145.

Olsen, J., and Trost, S. (2017a) Little Eagles in the Australian Capital Territory during two breeding seasons: 2015 and 2016, and the myth of 'buffers' and 'corridors'. *Boobook* 35: 4-5.

Olsen, J., and Trost, S. (2017b) ACT Little Eagle migrates to Daly Waters. *Boobook* 35: 20.

Olsen, J., and Trost, S. (2018) Little Eagle returns from Daly Waters to Canberra. *Boobook* 36 (1), 7.

Olsen, J., Long, T., and Trost, S. (2015) A radio-tagged Little Eagle. *Canberra Bird Notes* 40, 276-277.

Olsen, J., Trost, S., and Dabb, G. (2017b) Little Eagles in the Australian Capital Territory during two breeding seasons: 2015 and 2016. *Canberra Bird Notes* 42: 134-139

Olsen, J., Osgood, M., Maconachie, M., and Dabb, G. (2008) Numbers of breeding Little Eagles *Hieraaetus morphnoides* in the Australian Capital Territory in 2007. *Canberra Bird Notes* 33: 77-80.

Olsen, J., Osgood, M., Maconachie,M., Dabb, G. and Butterfield, M. (2009) Numbers of breeding Little Eagles *Hieraaetus morphnoides* in the Australian Capital Territory in 2008. *Canberra Bird Notes* 34: 81- 85.

Olsen, J., Trost, S., Gruber, B., and Long, T. (2017a) Home-range and behaviour of a fledgling Little Eagle *Hieraaetus morphnoides* in the Australian Capital Territory. *Corella* 41: 88 – 98.

Peniche, G., Vaughan-Higgins, R., Carter, I., Pocknell, A., Simpson, D., and Sainsbury, A. (2011) Long-term health effects of harness-mounted radio transmitters in red kites (*Milvus milvus*) in England. *Veterinary Record* 169: 311–317.

Rae, S. (2018) Little Eagles in the ACT and nearby NSW in 2017/18. *Gang-gang*. April, 6.

Ray, J.C., Redford, K.H., Steneck, R.S., and Berger, J. (Eds) (2005) *Large Carnivores and the Conservation of Biodiversity*. Island Press, Washington DC.

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THE BREEDING SUCCESS AND DIET OF LITTLE EAGLES IN THE ACT AND NEARBY NSW IN A DRY YEAR, 2019

STUART RAE[1], MICHAEL MULVANEY[2], DON FLETCHER[3], CLAIRE WIMPENNY[2], RENEE BRAWATA[2], RHIANNON KIGGINS[2], JACQUI STOL[4], MICAH DAVIES[4], DAVID ROBERTS[5] AND PENNY OLSEN[1].

1. Division of Ecology and Evolution, Research School of Biology, The Australian National University. Australia
2. Environment, Planning and Sustainable Development Directorate, ACT Government
3. 15 Wandoo St, O'Connor ACT, Australia
4. CSIRO Land and Water, Black Mountain, Australia

5. Environmental Scientist, Ginninderry Joint Venture, Australia.

Correspondence to: *stuart.rae@anu.edu.au*

Abstract. *Fourteen Little Eagle* (Hieraaetus morphnoides*) territories have been identified in the ACT in three years of study, although not all have been occupied in all years. In the ACT in 2019, spring rainfall was well below average and maximum temperatures above average. A minimum of ten pairs of Little Eagles were located in the ACT during the 2019–2020 breeding season. Nine pairs had nests and at least six laid eggs. A minimum of three pairs successfully fledged a chick each. Of four pairs that were monitored in nearby NSW, single chicks were successfully reared by three pairs and one nesting attempt was disrupted during incubation by a pair of Wedge-tailed Eagles* (Aquila audax). *Overall breeding success was lower than for 2018 but similar to 2017. The main prey types were: mammals (50%) of which rabbit was the main species, small/medium-sized birds (43%), and reptiles (7%). Similar proportions of mammals, birds and reptiles were eaten in 2019 and 2018, and a higher proportion of mammals than in 2017.*

Introduction

This is the third consecutive annual report by the Little Eagle Research Group, whose aim is to describe the population ecology of the Little Eagle (*Hieraaetus morphnoides*), a species listed as vulnerable in the Australian Capital Territory (ACT) and New South Wales (NSW).

In spring and summer 2019–2020 (hereafter referred to as 2019), the Little Eagle breeding season, environmental conditions in the ACT and surrounding area were extreme, with the highest average daytime temperatures on record, low rainfall, and long dry periods (Bureau of Meteorology (BOM) 2020). Also, air pollution was high with raised dust carried by winds on numerous occasions, and extensive smoke haze from bushfires in surrounding areas of NSW severely degrading air quality in late November and December (BOM 2020a), continuing into January (BOM 2020b). The very warm and dry conditions affected general bird activity (Holland 2019a), numbers were low and fewer birds were breeding (Holland 2019b).

This preliminary report summarises the breeding status and diet of a sample of Little Eagles in the ACT and surrounding area of NSW under the extreme conditions of 2019 and compares them with those of the previous two years of study (Rae *et al*. 2018, 2019). Details of movements during this period of birds fitted with satellite trackers will be reported separately.

Methods

All Little Eagle nests and territories known from previous surveys in 2017 and 2018, and localities around them, were checked for occupancy in the 2019 breeding season. The survey was done by the same methods as in previous years (Rae *et al*. 2018, 2019) following the methods of Hardey *et al*. (2013). Observations of the birds' behaviour were mostly done by watching for eagles from vantage points from late July 2019 to February 2020 and following up any sightings of eagles for possible nests.

Field observations were supported by following the movements of a sample of birds that were fitted with GPS-satellite transmitters (Rae *et al*. 2019). Four males and three females in seven territories carried transmitters, confirming their movements and breeding status. Further information on the behaviour of eagles was obtained with the deployment of cameras at two nests prior to the breeding season. Still images of activity at the nests were recorded with time-lapse settings and motion sensor.

Prey remains were collected from below nests and perches used by eagles between August 2019 and March 2020, in batches each site visit. The minimum number of each prey species per batch was calculated from distinguishable parts (Watson *et al.* 1987, Rae *et al*. 2018 & 2019). The composition of the prey remains in 2019 was summarised and compared with those of 2017 and 2018 as reported in Rae *et al*. (2018, 2019). Cast pellets of undigested food were collected and stored for later analysis as per Watson *et al.* (1993) and Rae *et al*. (2018, 2019).

Results

Number of Little Eagle pairs and breeding success

A minimum of nine pairs of Little Eagles were confirmed with nests in the ACT in 2019, and a tenth pair occupied another territory, but no association with a nest was confirmed. There were single birds in two further territories. Four pairs with nests were confirmed in nearby NSW (within 30 km of the ACT border). One other successful breeding event in the NSW area was reported to the study (Michael Lenz, *pers. comm*.). Not all the ACT or the nearby NSW area was surveyed.

Most territories occupied by Little Eagles in the ACT in 2019 were occupied in previous years. Seven of these were occupied in both 2017 and 2018, one pair were in a territory first known in 2018, and two pairs were in new-found territories. One of the single birds was in a territory occupied by a pair in 2018, and the other was in an area where nesting birds have been reported prior to this study. Two territories occupied in 2017 were not occupied in 2019. The new-found occupied territories were in areas where birds had been previously observed and were not adjacent to any of the unoccupied territories; therefore it is considered that a minimum of 14 distinct breeding territories have likely been identified over the three years of study.

The four territories monitored in nearby NSW in 2019 were the same as in 2018. Two of these were also monitored in 2017.

Six of the known pairs of Little Eagles in the ACT laid eggs. No eggs hatched at two of these nests after prolonged incubation (minima of 66 and 78 days; average successful incubation period about 37 days). Chicks hatched in the other four nests, and one died when only a few days old during a period of hot windy weather. Three chicks were reared, one from each successful nest. In nearby NSW, three chicks were reared from three nests, and another nesting attempt failed after disturbance by a pair of Wedge-tailed Eagles (*Aquila audax*) during incubation (details below). Therefore, breeding success was 0.30 chicks fledged per pair with a nest in the ACT, 0.75 in NSW and 0.46 overall. Or alternatively, 0.50 chicks were reared per pair that laid eggs in the ACT, 0.75 in NSW and 0.60 overall. Fewer chicks fledged per pair with a nest in the ACT than in 2017 and 2018 (0.44 and 0.55, respectively) and fewer overall than in 2018 (0.61), but similar to that in 2017 (0.45).

A pair of Little Eagles successfully reared a chick at one of the nests monitored with a camera. At the second nest with a camera, a pair of Wedge-tailed Eagles were recorded at the Little Eagle nest during the incubation period. The Little Eagles laid their first egg on 9 Sep and began incubating from then (Fig. 1). Photographs from 15 Sep showed a second egg (Fig. 2). One of the birds was incubating the eggs on 19 Sep when a pair of Wedge-tailed Eagles approached the nest, displaced the incubating Little Eagle, and one of the eggs was broken when a Wedge-tailed Eagle stepped on it (but did not eat it; Fig.3). The Little Eagles had returned to continue incubating the surviving egg by 20 Sep (Fig. 4). On 22 Sep the incubating female Little Eagle left the nest at 16:16 hrs (Fig. 5) presumably to avoid the approaching pair of Wedge-tailed Eagles which were again at the nest by 16:18, their second visit to the nest (Fig. 6). One of the Wedge-tailed Eagles then stayed on the nest till after 18:00 (Fig. 7). A single Wedge-tailed Eagle made a third visit to the nest on 24 Sep (Fig. 8) and there was a

fourth and last visit on 25 Sep. No egg was visible on 24 Sep, and the Little Eagles abandoned their breeding attempt. The pair were subsequently seen within 1 km of the nest on 15 Nov, flying over an area where they had been observed previously.

Figure 1 (left) and Figure 2 (right): See text above for explanations.

Figure 3 (top), Figure 4 (middle) and Figure 5 (bottom): See text above for explanations.

Figure 6 (top), Figure 7 (middle) and Figure 8 (bottom): See text above for explanations.

Diet

The remains of 96 individual prey items were collected and all were identified to species except for two small passerines. In addition, 264 pellets were collected for future analysis. Analysis of the prey remains revealed the proportions contributed by number were mammals (50%), birds (42.7%) and reptiles (7.3%). The mammals were mostly young European Rabbits

(*Oryctolagus cuniculus*) (45.8%) and single items of Ring-tailed Possum (*Pseudocheirus peregrinus*), Brown Hare (*Lepus europaeus*) leveret, Red Fox (*Vulpes vulpes*) cub and an adult Eastern Grey Kangaroo (*Macropus giganteus*) paw (the last would have been collected as carrion, as a Little Eagle could not kill a full-grown kangaroo). The main bird species eaten were Crimson Rosella (*Platycercus elegans*) (n = 12), Starling (*Sturnus vulgaris)* (n = 5) and Eastern Rosella (*P. eximius*) (n = 4). The unidentified passerines were possibly a thornbill species and an Australasian Pipit (*Anthus novaeseelandiae*) or Eurasian Skylark (*Alauda arvensis*). Two reptile species were eaten: Eastern Blue-tongue Skink (*Tiliqua scincoides*) (n = 4) and Cunningham's Skink (*Egernia cunninghami*) (n = 3).

Over all three years of study, 2017, 2018 and 2019, mammals (42.6%) and birds (47.3%) were the most common prey items (n = 336) (Figure 9). Most of the mammals eaten were rabbits (88.8%, n = 143). There were significantly fewer mammals and reptiles, and more birds eaten in 2019 than in 2017 (Fisher exact test, n.s. $\chi^2 = 12.14$, df = 2, P = 0.002), but no difference between 2019 and 2018 (Fisher exact test, n.s. $\chi^2 = 0.02$, df = 2, P = 0.99).

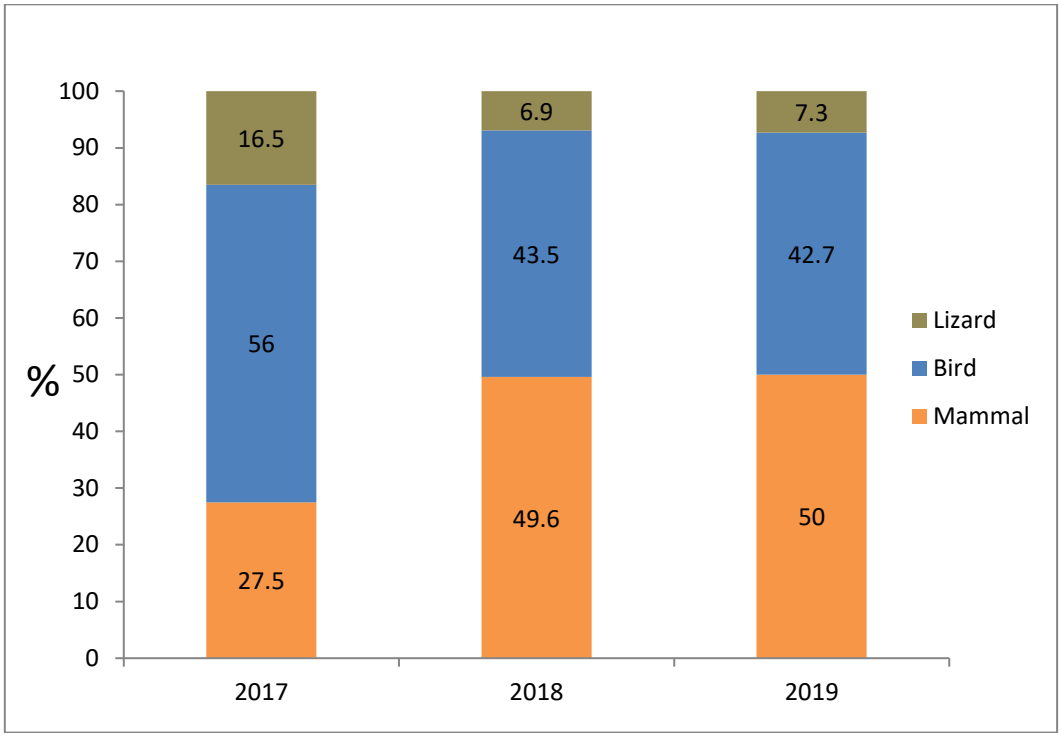

Figure 9. Proportions of food types in the remains of Little Eagle prey collected during the breeding season in the ACT and nearby NSW in 2017 (n = 109), 2018 (n = 131) and 2019 (n = 96).

Discussion

The number of Little Eagles found with nests in the ACT and nearby NSW in 2019 (9 and 4, respectively for each state) was similar to those in 2017 (9 and 2) and 2018 (9 and 4) (Rae *et al.* 2018, 2019). One territory that was occupied in the ACT in 2017 was vacant in 2018 and 2019 and another territory that was occupied in the ACT in 2017 and 2018 was vacant in 2019. However, the total numbers were balanced by new-found nesting birds in areas not previously surveyed and those territories could have been occupied in 2017 and 2018.

The failure of one breeding attempt due to disruption by a pair of Wedge-tailed Eagles confirms that Wedge-tailed Eagles can displace Little Eagles from their nests, as suggested by Olsen *et al.* (2006). Over the three years of the study, there have been nine other cases where breeding has failed post egg-laying: unhatched eggs (n = 3), eggs eaten by predator (n = 2), nest blown out (n = 1) and unknown causes (n = 3). As the larger eagles did not kill either of the Little Eagles and visited the nest four times, twice when no Little Eagles were present, it would seem that the purpose of their visits was more inclined towards occupying the nest site or ousting the adults rather that depredating the Little Eagles or their eggs. Interspecific competition for territories, sometimes called interference competition, is not unusual among raptors (for example, Kostrzewa 1990, Kruger 2004).

Little Eagle breeding success (young fledged per nest where eggs were laid) was lower in 2019 (0.6) than in the previous two years and lower in all three years of this study (Rae *et al.* 2018, 2019) than around Armidale, NSW, in 2017 (0.83) and 2018 (1.00) (Larkin *et a*l. 2020). Raptor breeding success varies in association with food supply (Newton 1979) and Larkin *et al*. discussed the possibility of the high breeding success in 2017 being related to a high abundance of rabbits in their study area. Ridpath and Brooker (1986) related lower breeding success of Wedge-tailed Eagles during drought to lower prey abundance under poor habitat conditions.

There was a considerable difference in annual rainfall between the two Little Eagle study areas. In Canberra it was 486 and 472 mm for the years 2017 and 2018, respectively, and higher at Armidale (817 and 638 mm; BOM Climate data online, for the respective airports). In Canberra, annual rainfall has been lower than usual every year of the study (BOM 2018, 2019). In 2019, Canberra received just 358.6 mm, 60% of the long-term mean, and temperatures were higher than usual (BOM 2020 a, b). During drought, numbers of woodland birds in the ACT area have been found to decline due to habitat degradation (Taws *et al.* 2011). Low rainfall is also poor for breeding rabbits, the main other food eaten by Little Eagles, as less green feed is available (King *et a*l. 1983). As well as resource availability, drought probably also affects bird populations by increasing physiological pressures (Selwood *et al*. 2015) and the Little Eagle and their prey species could have been distressed.

It appears that the Little Eagle population and breeding success in the ACT area has been in a trough during the past three years, which will potentially change if conditions improve. Long-term study is necessary to fully assess differences in breeding population and productivity under annual variabilities in weather and food availability, as has been done for other long-lived raptors such as the Wedge-tailed Eagle (Robertson 1987), Black Eagle (Gargett *et al*. 1995) and Golden Eagle (Watson and Rae 2019). Therefore, study and analysis of the breeding ecology of Little Eagles by the research group is ongoing.

Acknowledgements

The aim of the Little Eagle Research Group is to describe the population ecology of the Little Eagle. This is a collaborative study group, combining the members' knowledge, expertise and resources and we thank all other members for their teamwork on the study, namely Melissa Snape, Melissa Piper and Zohara Lucas. Rob Magrath and Simon Cherriman gave comments and helpful discussion on the draft. We are grateful for information supplied by the public as to the whereabouts of Little Eagles and to landowners and managers for allowing access to

nest sites. All nest sites are georeferenced and archived but this information is not made available to the public at the request of some of the landowners and managers and for the protection of the eagles and the integrity of the research.

References

Bureau of Meteorology. Climate data online. Bureau of Meteorology, Canberra. http://www.bom.gov.au/climate/data/" http://www.bom.gov.au/climate/data/

Bureau of Meteorology (2018). Australian Capital Territory in 2017: warm days, chilly winter nights, and drier than average. *Australian Government*. http://www.bom.gov.au/climate/current/annual/act/archive/2017.summary.shtml

Bureau of Meteorology (2019). Australian Capital Territory in 2018: dry with record warm days. *Australian Government.*

http://www.bom.gov.au/climate/current/annual/act/summary.shtml

Bureau of Meteorology (2020a). Australian Capital Territory in 2019: dry with the highest average daytime temperatures on record. *Australian Government*. http://www.bom.gov.au/climate/current/annual/act/summary.shtml

Bureau of Meteorology (2020b). Australian Capital Territory in January 2020: hot with below average rainfall. http://www.bom.gov.au/climate/current/month/act/archive/202001.summary.shtml

Commonwealth of Australia (2019). *Special Climate Statement 70—drought conditions in Australia and impact on water resources in the Murray–Darling Basin*. Bureau of Meteorology.

Gargett, V., Gargett, E. and Damania, D. (1995). The influence of rainfall on Black Eagle breeding over 31 years in the Matobo Hills, Zimbabwe. *Ostrich* 66: 114-121.

Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013). *Raptors: A Field Guide to Survey and Monitoring*. The Stationery Office, Edinburgh.

Holland, J. (2019a). Summary/analysis of the past month and what to watch out for this month. *Gang-gang*, November 2019: 1-6.

Holland, J. (2019b). Sunday 10 November – Campbell Park nest workshop. *Gang-gang*, November 2019: 7-9.

King, D. R., Wheeler, S.H. and Schmidt, G.L. (1983). Population fluctuations and reproduction of rabbits in a pastoral area on the coast north of Carnarvon, W.A. *Australian Wildlife Research* 10: 97-104.

Kostrzewa, A. (1990). Interspecific interference in three European raptor species. *Ethology Ecology and Evolution* 3: 127-143.

Kruger, O. (2004). The importance of competition, food, habitat, weather and phenotype for the reproduction of Buzzard *Buteo buteo*. *Bird Study* 51: 125-132.

Larkin, C., Jenkins, R., McDonald, P.G. and Debus, S.J. (2020). Breeding habitat, nest-site characteristics and productivity of the Little Eagle (*Hieraaetus morphnoides*) near Armidale, New South Wales. *Pacific Conservation Biology*. Published online 12 March 2020.

Newton, I. (1979). *Population Ecology of Raptors*. Poyser, Berkhamsted.

Olsen, J., Fuentes E., Rose, A.B., and Trost S. (2006). Food and hunting of eight breeding raptors near Canberra, 1990–94. *Australian Field Ornithology* 23: 77-95.

Rae, S., Fletcher, D., Mulvaney, M., Davies, M., Roberts, D., and Olsen, P. (2018). Notes on the breeding ecology of Little Eagles in the ACT in 2017/2018. *Canberra Bird Notes* 43: 186-193.

Rae, S., Wimpenny, C., Mulvaney, M., Davies, M., Fletcher, D., Roberts, D., and Olsen, P. (2019). Preliminary results from study of little eagles in the ACT and nearby NSW in 2018-2019. *Canberra Bird Notes* 44: 145-151.

Ridpath, M.G. and Brooker, M.G. (1986). The breeding of the Wedge-tailed Eagle *Aquila audax* in relation to its food supply in arid Western Australia. *Ibis* 128: 177-194.

Robertson, G. (1987). Effect of drought on a breeding population of Wedge-tailed Eagles *Aquila audax*. *Emu* 87: 220-223.

Selwood, K.E., Clarke, R.H., Cunningham, S.C., Lada, H., McGeoch, M.A. and MacNally, R. (2015). A bust but no boom: responses of floodplain bird assemblages during and after prolonged drought. *Journal of Animal Ecology* 84: 1700-1710.

Taws, N., Bounds, J., Rowell, A. and Cunningham, R. (2011). *An analysis of bird occupancy and habitat changes at six woodland locations-2003 and 2010*. Canberra Ornithologist Group, Canberra.

Watson, J., Langslow, D.R. and Rae, S.R. **(**1987). *The Impact of Land-Use Changes on Golden Eagles in the Scottish Highlands*. CSD Report no. 720. Nature Conservancy Council, Peterborough.

Watson, A. and Rae, S. (2019). *Observations on Golden Eagles in Scotland*. Hancock House, Surrey, Canada.

Further reading on Little Eagles in *Canberra Bird Notes*

Bounds, J. (2008) Nomination of a vulnerable species to the ACT Flora and Fauna Committee - Little Eagle. *CBN* 33(2) 84-95.

Dabb, G. (2018) An inconvenient eagle. *CBN* 43(2) 132-137.

Debus, S. (2008) Raptors and the proposed Central Molonglo development. *CBN* 33(2) 81-83.

Debus, S. (2018) Little Eagles in the ACT: a reply to Olsen & Rae (2017). *CBN* 43(2) 138-139.

Olsen, J. and Osgood, M. (2006) Numbers of breeding Little Eagles in the Australian Capital Territory in 2006. *CBN* 31(4) 178-182.

Olsen, J, Osgood, M., Maconachie, M. and Dabb, G. (2008) Numbers of breeding Little Eagles *Hieraaetus morphnoides* in the Australian Capital Territory in 2007. *CBN* 33(2) 77-80.

Olsen, J., Osgood, M., Maconachie, M., Dabb, G. and Butterfield, M. (2009) Numbers of breeding Little Eagles *Hieraaetus morphnoides* in the Australian Capital Territory in 2008. *CBN* 34(2) 81-85.

Olsen, J., Osgood, M., Maconachie, M., Dabb, G. and Butterfield, M. (2010) Little Eagles, Whistling Kites and Swamp Harriers in the Australian Capital Territory 2009. *CBN* 35(2) 81-84.

Olsen, J., Osgood, M. and Dabb, G. (2015) Little Eagles in the Australian Capital Territory in 2014. *CBN* 40(3) 207-209.

Olsen, J., Trost, S. and Dabb, G. (2017) Little Eagles in the Australian Capital Territory during two breeding seasons: 2015 and 2016. *CBN* 42(2) 134-139.

Olsen, P. and Rae, S. (2017) Invalid evidence for purported 'collapse' in the number of breeding Little Eagles in the Australian Capital Territory. *CBN* 42(3) 245-249.

Olsen, J. (2018) Eleven historic breeding territories of ACT Little Eagles is an underestimate - a reply to Olsen and Rae. *CBN* 43(2) 120-131.

Rae, S., Fletcher, D., Mulvaney, M., Davies, M., Roberts, D., and Olsen, P. (2018). Notes on the breeding ecology of Little Eagles in the ACT in 2017/2018. *CBN* 43(2) 186-193.

Rae, S., Wimpenny, C., Mulvaney, M., Davies, M., Fletcher, D., Roberts, D., and Olsen, P. (2019). Preliminary results from study of Little Eagles in the ACT and nearby NSW in 2018-2019. *CBN* 44(2) 145-151.

Rae, S., Mulvaney, M., Wimpenny, C., Brawata, R., Stol, J., Roberts, D., Davies, M., and Olsen, P. (2021). Breeding success and diet of Little Eagles in the ACT and nearby NSW in 2020. *CBN* 46(1) 57-63.

Rae, S., Story, G., Davies, M., Mulvaney, M., Fletcher, D., Kiggins, R., Stol, J., Roberts, D., and Olsen, P. (2021). Prey items identified from Little Eagle pellets collected in and around the Australian Capital Territory. *CBN* 46(1) 64-69.

Rae, S., Brawata, R., Wimpenny, C., Stol, J., Roberts, D., Mulvaney, M., Davies, M., and Olsen, P. (2022). Breeding success and diet of Little Eagles in the ACT and nearby NSW in a wet year, 2021. *CBN* 47(2) 81-87.

Rae, S., Brawata, R., Wimpenny, C., Davies, M., Stol, J., Mulvaney, M., & Olsen, P. (2023). The breeding success and diet of Little Eagles in the ACT and nearby NSW in a third consecutive wet year, 2022. *CBN* 48(1) 6-11.

Rae, S., Hopkins, J., Brawata, R., Wimpenny, C., Davies, M., Stol, J., & Olsen, P. (2024). The breeding success and diet of Little Eagles in the ACT and nearby NSW in a 2023. *CBN* 49(1) 41-50.

Rae, S., Hopkins, J., Malam, C., Wimpenny, C., Davies, M., Stol, J. and Olsen, P. (2025) The breeding success and diet of Little Eagles in the ACT and nearby NSW in 2024. *CBN* 50(1) 72-76.

Canberra Bird Notes 50(2) (2025): 238-243

4.2. Conservation: Iconic threatened species

4.2.2. Gang-gang Cockatoo (*Callocephalon fimbriatum*)

MICHAEL MULVANEY (mulvaney@netspeed.com.au)

The Gang-gang Cockatoo is a well-loved locally iconic species. It is the logo of the Parks and Conservation Service, the figurehead of the Canberra Ornithologist Group (COG) and ACT's unofficial bird. It is not an agricultural pest and until very recently was not considered threatened, so despite its popularity, the Gang-gang has been little researched. What was known was largely derived from aviary studies or by egg collectors of the 1920s and 1930s. What we now know about Gang-gang nesting ecology and diet, has been recently determined by citizen scientists, mostly COG members. Professional scientists are a relatively new occurrence; Charles Darwin and Isaac Newtown were both citizen scientists. Citizens can obtain valuable knowledge and do great science and the articles of *Canberra Bird Notes* are brimming with it.

Leonard (2010, 2011, 2012 and 2013) organised COG members to undertake census surveys of Canberra's Gang-gang population. The studies identified the inner north and inner south as Gang-gang hotspots, but that they had a wider distribution and whilst conspicuous with high local concentrations the overall Canberra population was low, estimated at around 150. This figure holds up against the low number of nest trees recently located within the Canberra region (Davey *et al.* 2025), and 2023 transect Gang-gang count surveys across the ACT, conducted by the ACT Government.

In 2014 the Canberra Ornithologists Group celebrated 50 years of birding in the ACT and surrounding region by declaring the Gang-gang the bird of the year and asking members to submit Gang-gang observations across COG's area of interest. Observers were asked to record details on the location of birds, group size and sex ratios, behaviour and interaction with other species and food preferences. 13,329 observations were submitted. This work helped to further define Gang-gang distribution and behaviour across the Canberra Region (Davey and Eyles 2014 and 2016).

In summer 2017 the Red Hill Regenerators recorded a nest tree and in conjunction with COG began a project to find and observe further nesting hollows. People were asked to lodge sightings on the Canberra Nature Map platform wherever they saw Gang-gangs in or near tree hollows. Over 700 such images were submitted and combined with the relevant observations from the 2014 study. Volunteers then went out and checked reported hollows during the breeding season. For every 10 hollows checked a nest tree was located, with 85 nests found across inner Canberra. Through observing nests, information is now known on Gang-gang nest-hollow dimensions, nest-tree type, nest selection, nesting behaviour, nest survival rates, chick sex ratio, key hollow competitors, predators and predation rates, and how breeding is impacted by climate and altitude. The project now has a national focus. The 2014 food preference observations, together with 2,700 images of feeding Gang-gangs that people submitted across its range, have also been the basis for the definitive study of Gang-gang diet (Mulvaney and Booksmythe 2023). Over 300 different food items are known, of which 26% are exotic plants. Gang-gangs vary in what they eat across their range and focus on what is locally abundant. The diet and nesting ecology information is the basis for current Gang-gang management and conservation.

We still know little about Gang-gang movement, the total population size, regional genetic differences or how to tell individual Gang-gangs apart. The Australian National University is currently working on these issues, relying heavily on the previous citizen science work.

References

Davey, C. and Eyles, K. (2014) The bird of the year project: Citizen Science survey of the Gang-gang Cockatoo. *Canberra Bird Notes* 39, 50th Anniversary Issue: 32-35.

Davey, C. and Eyles, K. (2016). *Gang-gang Cockatoo Citizen Science Survey*. March 2014 – February 2015. Canberra Ornithologists Group, Canberra, ACT

Davey, C., Mulvaney, M., Fogerty, J., Tyrrell, T. and Tyrrell, J. (2019) Breeding of Gang-gang Cockatoos in suburban Canberra. *Canberra Bird Notes* 44: 210-220.

Davey, C. and Mulvaney, M. (2020) Report on a survey of breeding activity of the Gang-gang Cockatoo within urban Canberra 2019-2020. *Canberra Bird Notes* 45: 224-234.

Davey, C., Mulvaney, M., Tyrrell, T. and Rayner, L. (2021) Gang-gang observations during the 2020-21 breeding season, Canberra, ACT. *Canberra Bird Notes* 46: 145-157.

Davey, C., Mulvaney, M., Tyrrell, T. and Rayner, L. (2025) Breeding success of the Gang-gang Cockatoo in periurban Canberra for three breeding seasons: 2021 to 2023. *Canberra Bird Notes* 50: 31-44.

Leonard, J. (2010) Central Canberra Gang-gang census; 1st August 2010. *Canberra Bird Notes* 35: 202-204.

Leonard, J. (2011) Central Canberra Gang-gang census; 5th June 2011. *Canberra Bird Notes* 36: 97- 99.

Leonard, J. (2012) Gang-gang survey, Canberra June 2012. *Canberra Bird Notes* 37: 95-99.

Leonard, J. (2013) Canberra Gang-gang survey. *Canberra Bird Notes* 38: 205-207.

Mulvaney, M and Booksmythe, I. (2023) Gang-gang Cockatoo diet as assessed by camera images and written records. *Corella* 47:8-15

Tyrrell, T. (2020) A Gang-gang story for several hollows in Red Hill Nature Reserve and surrounds. Hughes and Deakin, 2019/20 season. *Canberra Bird Notes* 45: 235-241.

Note: The above reference list gives all articles on the Gang-gang Cockatoo published in *Canberra Bird Notes.*

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THE BIRD OF THE YEAR PROJECT: CITIZEN SCIENCE SURVEY OF THE GANG-GANG COCKATOO

CHRIS DAVEY[A] AND KATHY EYLES[B]

[A]24 Bardsley Place, Holt, ACT 2615
[B]kathy.eyles@anu.edu.au

One of the projects undertaken by COG to celebrate the 50th Anniversary was a Bird of the Year project on the Gang-gang Cockatoo (*Callocephalon fimbriatum*). Members of the public were asked to become involved in the project by recording any sightings of Gang-gangs from the COG area of Interest, an area between Yass and Goulburn in the north to Bredbo in the south.

The Gang-gang holds a special significance to the ACT as the faunal emblem of the Territory and proudly appears as the logo of both COG and the ACT Parks and Conservation Service. It is also a species that local and visiting birders like to see. However, despite this, little is known about the bird's abundance or seasonal movements within the area, what food it eats at different times of the year, what nest sites it uses, or its breeding success.

The aims of the project were to

Expand our knowledge of the Gang-gang in the COG area of interest

Involve the membership and general public in a citizen-science based project on birds

Promote the activities of COG

The Gang-gang survey was launched on 13 March 2014 at Corroboree Park, Ainslie, by the Canberra naturalist Ian Fraser and will run for 12-18 months depending on participation rate. At the time of writing (16 December) records have been received for over 10 months with more than 4000 observations from over 330 observers.

Gang-gang Cockatoo emerging from its nesting hollow (*Chris Davey*)

From the start of the project it was realised that to get the public involved good communications were essential, so in late February, Kathy Eyles was appointed to act as Communications Officer for the project. In addition to the project benefiting from Kathy's communication expertise, she will be able to use experience gained from the citizen-science project towards her Ph.D., exploring how urban people value nature. With the help of Stuart

Rae a leaflet was produced titled 'Have you seen this Bird - Gang-gang Cockatoo', which was then widely distributed. The leaflet outlined the aims of the project, how to contribute and how to submit observations. In mid-May Kathy submitted a successful ACT Environment Grant application for $6,035 to assist with the data recording, analysis and reporting on the results of the survey.

The survey was in two parts. First, general *ad hoc* observations on the location and behaviour of Gang-gangs throughout the period could be provided on a specifically designed form. Second, four periods, each of seven days, were set aside to gather more detailed daily activities. This part known as the '*Muster*' count was based on the COG Garden Bird Survey protocol and designed to obtain records of days when birds were not observed. For each of the designated seven days, observers were required to record the largest number of Gang-gangs observed each day within a 100m radius of a site of the observers choosing, usually a garden or work place. The four periods were 19-25 February, 21-27 May, 21-27 August and 20-26 November.

Before the start of the project Chris Davey approached The Atlas of Living Australia (ALA) to produce an on-line record-input portal so that members of the public could input their *ad hoc* observations directly via the portal to the ALA database. The entry page to the portal could be accessed directly or through the COG website. The portal was provided free of charge and proved to be very popular, with over 85% of all observations entered on-line. In addition to the portal, observations could be provided on a paper form which was made available for printing from the COG website, in the COG newsletter or available at monthly COG meetings.

The Muster forms were available one month before the due Muster period and were available from the COG website, the newsletter or at monthly meetings. In addition, thanks to Julian Robinson, a form was made available on-line via the COG website.

To ensure that the COG Discussion List (chat-line) was not inundated with queries and observations from the general public about Gang-gangs, a specific email address, known as '*ggquery*' was set up, to which survey queries could be addressed.

The data verification process, checking and determining geo-coordinates for survey observations, created a significant workload. Although it was possible to provide coordinates by clicking on a map provided with the ALA portal, virtually all other coordinates needed to be determined from site descriptions, usually through Google Maps. Data verification has been possible with the help of Steve Wallace, Anne Carrick and Michael Robbins. A report on the findings of the survey will be produced at the end of the survey.

In addition to monthly progress reports in the COG newsletter and on the web, a progress report was provided to the BIGNET meeting of bird clubs held in Canberra over the weekend 12-13 April. Presentations about the survey were given to the ACT Park Care and Landcare Coordinators on 3 June, at the K2C Landholders Connectivity Forum on 20 June, at the 'Landscapes for Birds- conserving and enhancing their habitats' Forum held at the ACT Legislative Assembly on 5 July and at the CSIRO's Inspiring Australia stand at Floriade on 30 September. The project team also engaged the ACT Rangers working in the Murrumbidgee corridor, at Tidbinbilla Nature Reserve and Namadgi National Park, and interested schools and scout groups.

A most successful public engagement was the 'imagining Gang-gangs' Student Art Competition and Exhibition with 80 student artworks on show between 26-30 November at

the M16 Artspace, Griffith. Students were invited to use the art medium of choice and produced ceramic 3D works, drawings, paintings, collage and sculptures about the Gang-gang Cockatoo. A prize of $250 was donated by bankmecu to each of the winners of the junior and senior section, as voted by visitors to the exhibition. A selection of student artworks will be displayed at the Civic Library over the summer school holidays in January 2015.

Throughout the year of the survey there has been significant media coverage with newspaper articles and features, radio interviews and stories on ABC 666, and a feature on ABC TV news and the 7.30 report. This coverage has greatly assisted with community awareness and interest in the survey, as well as keeping the public up-to-date with survey progress and timing of the Muster count events.

Lara Hedley from Campbell High School with her winning senior artwork from *Imagining Gang-gangs*

The winning junior entry from Dan Leivesley from North Ainslie Primary School.

Imagining Gang-gangs - Prize ceremony at bankmecu in Civic:
(l. to r.) Kathy Eyles, Dan Leivesley, Lara Hedley, Jo O'Sullivan (bankmecu).

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4.2. Conservation: Iconic threatened species

4.2.3. Celebrating the Superb Parrot (*Polytelis swainsonii*)

LAURA RAYNER (Laura.Rayner@act.gov.au), *Senior Ecologist, ACT Government*

The Superb Parrot is more than just a striking splash of green in treetops of the ACT; it's a species that has come to embody the spirit of Canberra's conservation community. Loved by locals and admired by birders across Australia, the Superb Parrot is a threatened species whose survival depends on our ability to understand, protect, and restore the habitats it relies on. Over the past decade, research based in the ACT has played a vital role in revealing the ecological intricacies of this charismatic bird, and in guiding national conservation efforts to secure its future.

Since 2015, ACT-based research has focused on three key areas: habitat requirements, movement ecology, and breeding success. One of the most important discoveries has been just how selective Superb Parrots are when it comes to nesting habitat. These birds rely on mature eucalypt trees with deep hollows, wide floors, and snug entrances - features that are surprisingly rare. After hundreds of in-tree hollow inspections, we found that only 0.5% of available hollows meet the species' nesting criteria. This rarity of suitable hollows likely limits their population growth, a finding that underscores the importance of protecting mature native trees and managing breeding habitat with precision.

Understanding where Superb Parrots go, and how they move through the landscape, has been another major focus. Using lightweight transmitters, we have tracked both local and migratory movements. These studies have helped identify important foraging areas, movement corridors, and seasonal habitat use, providing essential data for landscape-scale conservation planning.

Long-term monitoring has also revealed that Superb Parrot reproductive output in the ACT varies significantly from year to year. Clutch size, brood condition, and nestling health fluctuate with seasonal changes, suggesting that environmental factors may constrain breeding success, with significant implications for supporting this species under climate change. Perhaps most striking has been the discovery of reproductive skew: in the ACT, a small number of adult breeding pairs produce the majority of Superb Parrot offspring. Between 2015 and 2019, just 13 pairs accounted for 60% of nestlings, with five pairs alone producing 28%. These dominant breeders monopolise the best nesting hollows, and their repeated success raises important questions about long-term population resilience.

Looking ahead, the next frontier of Superb Parrot research lies in understanding the factors that influence nestling survival and juvenile recruitment. As pressures on breeding habitats intensify nationally, there is an urgent need to investigate how nest competitor and predator densities shape reproductive outcomes for the Superb Parrot across critical landscapes.

None of this work would have been possible without the support of the Canberra community, and Canberra Birds (COG) has been central to this effort. Special thanks go to COG members Chris Davey and Stuart Harris for their extraordinary field efforts. COG members Sue Lashko, Anthony Overs, Jenny Bounds and Nicki Taws have also contributed valuable observations, advice and passion over the years. The ACT Government and the Difficult Bird Research Group (ANU), especially Dejan Stojanovic and McLean Cobden, have been tireless collaborators. We also acknowledge the landholders who generously allow access to breeding sites and tolerate our trucks, text messages and field equipment.

This Special Issue chapter of *Canberra Bird Notes* is a celebration of the Superb Parrot and the collective effort to understand and protect it. For more than 50 years, this publication has captured the observations, insights and investigations of Canberra's birding community. Today, it continues to showcase the power of citizen science and place-based research. The Superb Parrot's story is still unfolding, but thanks to the dedication of many, it is a story of hope.

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OBSERVATIONS ON THE SUPERB PARROT WITHIN THE CANBERRA DISTRICT

CHRIS DAVEY

24 Bardsley Place, Holt, ACT 2615

Introduction

The Superb Parrot *Polytelis swainsonii* has a restricted distribution within the ACT. It is recorded once or twice a year and is typically restricted to Hall, Gungahlin and the northern suburbs of Belconnen (Taylor and Canberra Ornithologists Group 1992). Most observations elsewhere in the ACT appear to be of aviary escapees. During the `ACT Avifauna Database Project' which was undertaken by the Canberra Ornithologists Group (COG) from September 1986 through to August 1989, the Superb Parrot was recorded only on four occasions (Taylor and Canberra Ornithologists Group 1992).

Within New South Wales, records from The Atlas of Australian Birds (Blakers *et al*. 1984) indicate that the area south-east of Yass is at the eastern edge of the breeding range of the Superb Parrot. A survey conducted from 1985 to 1987 by Rick Webster confirmed this breeding distribution and reported only two breeding records between Yass and Canberra (Webster 1988, Webster and Ahern 1992).

In January 1990 COG extended the grid which was used in the 'ACT Avifauna Database Project' from the boundaries of the ACT so that it fully encompassed COG's area of concern (Canberra Ornithologists Group 1993). Thus the grid system was extended north to include the area from Yass and the Hume Highway through to Goulburn (Figure 1).

In 1993 I decided to survey the new northern grid cells and also some within the ACT to determine whether Superb Parrots still bred within the area between the Murrumbidgee River, Hume Highway and Federal Highway (see Figure 1). In the process it was hoped to obtain as much information as possible on their abundance, distribution and habitat requirements.

To protect the Superb Parrots from possible harm, details of specific nesting locations are not provided in this paper. These have been entered onto the COG database but can be extracted only with my permission.

The Superb Parrot is listed as vulnerable (New South Wales Threatened Species Conservation Act (1995)) and its distribution covers some of the most productive agricultural land in Australia, virtually all of which is privately owned. Many landowners express concern about

disclosing the presence of vulnerable and endangered species on their land. It is therefore likely that there are undisclosed colonies of Superb Parrots within the local area.

Prior to 1993

There are few historical records of the abundance, distribution and breeding of the Superb Parrot in the Canberra district. Gillespie (1992) notes that in the Ginninderra district 'the Greenleek or Superb Parrot, which nests in the hollows of tall trees, has apparently moved to more suitable places'. His observations concerned the late 1930s and were his own personal recollections (L. Gillespie pers. comm.). N. Simms (pers. comm.) recalls that during the late 1950s the parrots were a common sight in the Hall area.

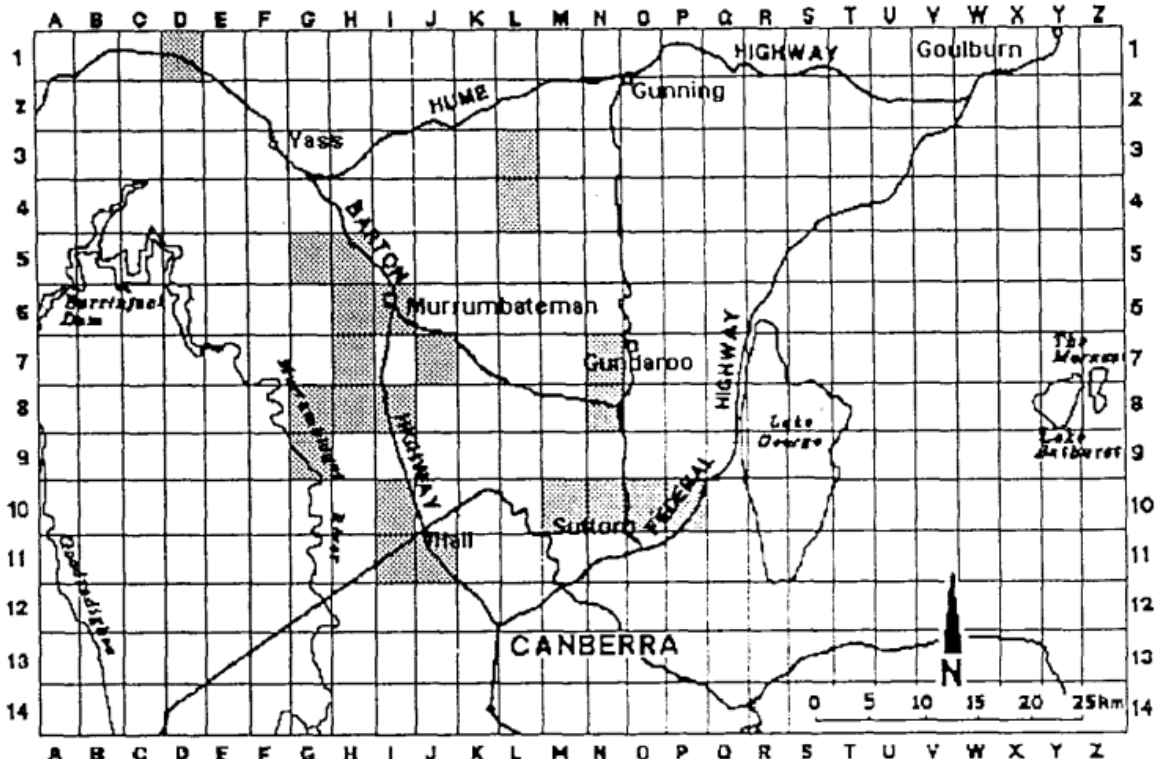

Figure 1. Location of the northern grid cells. The shaded cells are those from which sightings have been reported since 1985 (excluding possible escapees in the suburbs of Canberra).

M. Southwell, who owns a property along the Spring Range Road (grid cell J10), noted in correspondence that from the 1920s to the 1950s Superb Parrots visited his property 'in quite some numbers and still do, but in very depleted numbers. However, up to 1994 one couple nested near our home in a large yellow box tree (dead). Last year although we heard them about as usual, but did not nest (sic)'.

In the 1940s the Superb Parrot was common and bred around the manager's cottage on `Cranleigh' in the ACT (T. Shepherd pers. comm.). The cottage was situated in I12 in what is now the north-west corner of Scullin near Levien Street (Coulthard-Clark 1987). Superb Parrots no longer occur in this area. On the CSIRO experimental station at Ginninderra (K11) two pairs have been seen each year and during the spring of 1993 a female was observed leaving a tree hollow with a male guarding the site. No breeding has been seen since (T. Shepherd pers. comm.).

Forshaw (1969) writes that Superb Parrots had been found breeding at Ginninderra and Gundaroo but no dates or references are provided. In the late 1960s they were breeding in an area now covered by the suburbs of Fraser and Spence (M. Clayton pers. comm.) and in November 1959 a pair was seen leaving a nest hollow at Gungahlin Hill (K12) (R. Schodde pers. comm.).

From January 1983 to June 1991 almost daily records on the presence or absence of Superb Parrots were kept for an area near Sutton, NSW (N10) (J. Wombey pers. comm.). The birds usually appeared during September, departed by February and reached a maximum during December (Table 1).

Table 1. The maximum number of Superb Parrots seen each month from January 1983 to January 1991 in an area near Sutton. No birds were observed from February to August.

	Sep	Oct	Nov	Dec	Jan
1982-83	-	-	-	-	0
1983-84	0	4	9	25	0
1984-85	11	0	2	8	0
1985-86	-	2	13	10	2
1986-87	0	0	4	6	8
1987-88	2	5	>12	>30	10
1988-89	0	3	>10	>10	0
1989-90	0	0	0	>15	present
1990-91	1	0	6	>10	0

There are also the following unpublished observations of Superb Parrots from the vicinity of Sutton: although not recently reported they were regularly observed in O10 in 1988-89 (M. Clayton pers. comm.); sometime during the mid to late 1980s a pair were found nesting in a dead tree in M10 (J. Kershaw pers. comm.); and on 24 December 1990 approximately 14 were observed flying from one tree to another in P10 (J. Bradshaw, COG records and pers. comm.). The Annual Bird Reports of COG contain three records of Superb Parrots from the Sutton area: three were seen just north of Sutton on 1 December 1977 (Clark and Lenz 1978); one was seen near Sutton in the second week of October 1982 (Taylor 1983); and four were seen at Sutton on 30 and 31 October 1982 (Taylor 1984).

A complete list of the records contained in the Annual Bird Reports of COG is given in the Appendix. Other than those from the Sutton area, most are from the Murrumbateman and Hall areas, or suburbs of Canberra. It is possible that many of those from the suburbs are aviary escapees. The date of the record from L4, 11 May 1991, suggests it was a misidentification or an aviary escapee. The only breeding record was of flying young making begging calls and being fed by adults in December 1988 at the Fraser oval. In October 1992 a female Superb Parrot was seen looking into a nest box in Melba but no further interest was shown in the box by the bird (Ormay 1994).

Other COG records of Superb Parrots are unpublished sightings in I11, I10 and J11 in November 1991, and September, October and December 1992; and seven in H6 in December 1992. There are also sightings from J11 in October 1971 and October 1973, and J12 and G8 in November 1972, included in Dow (1988) which had not been published in Annual Bird Reports.

Methods used for the 1993-96 survey

The methods used to undertake the survey consisted of the preparation and distribution of a form seeking information on the presence of Superb Parrots, and road surveys conducted by myself and by COG members.

In September 1993, with the help of Greening Australia, a survey form was prepared on which people could enter details of their sightings of Superb Parrots. Copies of this form were placed in the village stores at Sutton, Hall, Murrumbateman, Gunning and Gundaroo, also at Hall Primary School.

From 23 September through to 26 November 1993 I surveyed the grid cells in an area from the Sutton to Gunning road, west to the Murrumbidgee River. Starting just before sunrise I drove along roads in the area with both front windows open listening and looking for Superb Parrots. Whenever they were sighted, I stopped and observed them for as long as necessary to obtain details of numbers, sex, behaviour and age. Inevitably these observations were restricted to the roadside and therefore do not necessarily reflect the total number of birds in any one cell. Whenever time allowed, up until the end of January 1994, I again visited the cells in which I had seen Superb Parrots.

During the weekend 20-21 November as many roads as possible were travelled in 38 grid cells by eight COG members in four cars. Each vehicle carried a minimum of two people. Observers in three cars searched different cells from Saturday mid-day to late evening and, after camping for the night in L4, observers in four cars covered the area from early Sunday morning to mid-day.

Definitions of breeding followed Webster (1988) and a tree hollow was assumed to be a Superb Parrot nesting site if one of the following was recorded:

- a pair of Superb Parrots was seen entering the hollow;
- a male was seen to enter the hollow on his own;
- a male or female was observed entering the hollow on a number of occasions;
- a male was observed feeding a female at the hollow entrance or nearby;
- young birds were observed at the hollow entrance; or
- a Superb Parrot was flushed from the hollow.

Results

1993-94 observations

a) general

The only information received from the survey forms distributed in September 1993 came from observers within a triangular area between the ACT in the south, the Murrumbidgee River to the west and the Barton Highway to the east and north to Long Rail Gully Road. All the observers were contacted and asked to continue with their observations. I confirmed their initial observations and when time permitted continued to follow up as many of the sightings as possible as well as covering the area for additional observations.

I was frequently in the area immediately north-west of Canberra covered by cells H9, G10, H10, I10, H11, I11, J11, G12, H12 and therefore it was particularly well covered. In addition, many other cells in the vicinity were visited but no Superb Parrot sightings were recorded.

The maximum number of Superb Parrots seen each week from the end of August to the end of January in grid cells in which Superb Parrots were reported is shown in Table 2. At no time was a grid cell considered to have been adequately surveyed for Superb Parrots; the number reported merely represented the maximum number seen during the week an observation was made.

Table 2. The maximum number of Superb Parrots seen for each week from the end of August 1993 to the end of January 1994.

	G5	G8	G9	H5	H6	H7	H8	H9	I5	I6	17	I8	I9	I10	J10	Jll	L3
30 Aug										24		yes		yes			
6 Sep										14							
13 Sep																	
20 Sep	11			2	0	0	0	0	0	14	0	0	0	1			
27 Sep										24							
4 Oct																	
11 Oct	10			0					0	13	0	0	0		0	0	
18 Oct														1			
25 Oct										20	0	0	0		0	0	
1 Nov				3					0	18	0	0	0	2	0	0	
8 Nov		3								10				13			
15 Nov	0			0	6			0	0	17		6	0	27	0	0	2
22 Nov				2	5				0	12	0	5	0		0	0	
29 Nov		50	29							10		3		15			
6 Dec												22		14			
13 Dec														13		.	
20 Dec														20			
27 Dec																	
3 Jan																	
10 Jan	0			0	0	0	0	0	0	0	0	0	0		0	0	
17 Jan												3		15			
24 Jan														0			

Superb Parrots were first seen in the area during the last week in August from Murrumbateman (I6), Wallaroo Road (I10) and Jeir Creek (I8). The birds appeared to have left the area by the end of January 1994 (Table 2).

Flocks of more than 10 birds were recorded in G5, G8, G9, I6, I8, I10; interestingly three of the cells were where birds were first reported in late August (Table 2).

Although 38 grid cells were visited during the weekend survey on 20-21 November (see Methods), Superb Parrots were reported only from cells H6 and L3.

b) breeding observations

The female incubates the eggs and remains on the nest for about two weeks after the eggs hatch, therefore at this time more males than females are seen. The first indication that the birds were breeding locally was in mid-October. There were many more males than females observed in I6 and G5 and males were seen alone perched next to tree hollows and reluctant to move.

11 November I received a reliable report of a female Superb Parrot seen leaving a hollow in a live Blakely's Red Gum *Eucalyptus blakelyi* in G8. On 14 November chicks were confirmed to be in the nest and photographs were taken.

17 November I observed a pair fly to a dead eucalypt in L8. Within the same tree two pairs of Common Starlings *Sturnus vulgaris*, one pair of Galahs *Cacatua roseicapilla* and one pair of Red-rumped Parrots *Psephotus haematonotus* were nesting. The pair of Superb Parrots was seen feeding young although they were disturbed by the pair of breeding Galahs.

20-21 November During the weekend survey breeding was again confirmed when a male was seen to enter a hollow in a live Blakely's Red Gum in H6 and the begging call of chicks was heard. A pair of Common Starlings was also nesting in the tree. On a visit to the nest site six days later there was no sign of activity from the hollow and I presume the pair had vacated the nest.

9 December A male was seen feeding a female, then both entered a nearby hollow in a live Blakely's Red Gum in I10. When I left the- area one hour later the female was still inside the hollow.

14 December A flock of 14 birds, which included a few young, was reported feeding on the seeds of Cootamundra Wattle *Acacia baileyana* in I10. The young were identified by their shorter wing and tail feathers.

During early January 1994 I contacted as many observers as possible and all confirmed my observations that the Superb Parrots, though still in the general area, had dispersed and were seen less frequently.

1994-95 observations

a) general

Information collected during the 1993-94 breeding season confirmed that within the area bounded by the Murrumbidgee River, Hume Highway and the Federal Highway the most likely area to observe Superb Parrots was an area east of the Murrumbidgee River, west of the Barton Highway and as far north as the Long Rail Gully Road south of Yass. For the 1994-95 breeding season I restricted my observations to this area to obtain further information on the breeding of the Superb Parrot. At the beginning of August 1994, I also contacted those who submitted observations the previous season asking them to provide further details.

On nine occasions at approximately fortnightly intervals, I searched the roads that passed through 14 grid cells. The same route was travelled each time and covered approximately 110 km.

In addition, further details were obtained from *ad hoc* visits to certain areas and from data supplied to me by other observers.

The first report I received of Superb Parrots was on 25 August 1994 from an area 20 km south-east of Boorowa, NSW. Apparently, they have always appeared at this locality within a week after 20 August (B. Brown pers. comm.).

The first report of birds from within the Canberra district was of three on 7 September in I6. Two days later this number had increased to 15 with a similar number of males and females (Table 3). During the same week three pairs were reported from I8. It is interesting that a pair

of aviary escapees that had been living around Hughes since January 1994 moved away from the area in early September as wild birds were returning (Anderson 1994).

Flocks of more than 10 birds were recorded in grid cells G5, H5, H7, I6, I8, I10, J7.

Superb Parrots appeared to have left the area by the middle of January 1995.

Table 3. The maximum number of Superb Parrots recorded for each week from the start of August 1994 to the end of January 1995.

	G5	G8	H5	H6	H7	H8	H9	I5	I6	I7	I8	I9	I10	J7	J10	J11
8 Aug													0		0	0
15 Aug																
22 Aug													0		0	0
29 Aug													0		0	0
5 Sep									15		6					
12 Sep	5		5	2	0	0	0	0	14	0	6	0	0		0	0
19 Sep	0		0	0	0	0	0	0	14	0	0	0	0		0	0
26 Sep																
3 Oct	6		8	0	0	0	0	0	30	0	0	0	0		0	0
10 Oct	6		16	0	0	0	0	0	0	0	1	0	6		0	0
17 Oct		yes											3			
24 Oct									15				7			
31 Oct	9		23	1	0	0	0	0	0	0	10	0	3		0	
7 Nov	8		26	0	0	0	0	0	0	0	21		7		0	0
14 Nov						2	0					0	30			
21 Nov													16			0
28 Nov	11		18	3	5	3	0	0	0	0	25	0	35		0	0
5 Dec													25	25		
12 Dec	8	6	22	5	13	0	0	0	0	0	7	0	0		0	0
19 Dec													13			
26 Dec													0			
2 Jan	0		0	0	0	0	0	0	0	0	0	0	20		0	0
9 Jan													0			

b) breeding observations

18 September Interest in tree hollows must start soon after the birds return because lone males and females were seen emerging from hollows in H5. Most appeared paired and all hollows inspected were in Blakely's Red Gum.

3 October A female was seen examining a tree hollow in G5 with a male nearby whilst in a second tree a lone male was seen perching quietly near a hollow. Both hollows were in Blakely's Red Gum.

9 October Thirty birds observed in I6 were of equal sex ratio so it was unlikely that nesting had started.

12 October Single males were seen sitting quietly next to hollows in Blakely's Red Gums in G5 and H5.

18 October A male was observed feeding a female after she had inspected a hollow in a dead Blakely's Red Gum in I10. A female visited the same hollow in a Blakely's Red Gum in G8 that had been used as a nesting site the previous year.

30 October The number of birds seen on 9 October in I6 was reduced by half and virtually all were males, thus indicating that most of the females were no longer nest-searching and that nesting had begun.

31 October Two females observed emerging from hollows in Blakely's Red Gums in G5 and twice as many males to females were seen. Females were seen entering and emerging from hollows in the same Blakely's Red Gum in H5 reported by Rick Webster nine years earlier (Nests 740 and 741 in Webster and Ahern 1992). Of the 23 birds seen in this grid none appeared to be young birds.

15 November Thirty Superb Parrots were reported in I10. Of these only eight were males, possibly indicating that many were young birds.

18 November I visited the same tree in G8 that had been used as a nest site the previous year and in which I had seen a female on 18 October. A female was seen leaving the hollow and returning approximately 30 minutes later; chicks could be heard calling on her arrival.

22 November At two hollows in Blakely's Red Gums in I10 females emerged and then immediately re-entered but at neither site could chicks be heard calling.

30 November Indications of breeding were observed in seven cells. In I10, G8, H5, G5 and I8 recently fledged young were seen with adults, whilst in I8, H7, H6 and G5 females were seen emerging from or entering hollows, some with tatty tails probably caused by nesting in small hollows.

6 December A pair was still nesting in a Blakely's Red Gum in I10 with a male nearby and the female seen leaving and then returning to the nest hollow.

16 December There was much less activity and the only sign of breeding was in H7 where a female was seen sitting at the entrance to a hollow. Birds were not observed in the usual spots and were seen in groups rather than pairs.

3 January During a final road survey I did not see or hear any parrots in the usual areas although a day later I was informed there was a flock of approximately 20 birds in I10.

1995-96 observations

No road surveys were undertaken during the 1995-96 breeding season but I was informed that the parrots returned at the usual time with 14 seen in I6 on 26 August, an unrecorded number in J7 on 31 August, 12 in I10 on 2 September and about 20 in H8 on 5 September.

Within J7 about 40 Superb Parrots were observed on 10 September, with a similar number of males and females. The number then greatly decreased until around mid-December when it again increased to about 60 individuals. In the meantime, a female was seen leaving a hollow further south near Gooda Creek. The flock reported in mid-December contained very young birds only just able to fly. Interestingly the adult pairs with young just capable of flight left the young in the trees whilst they went out to obtain food and then return to the young. As the calling adults returned, the young, obviously able to recognise the parents call, would then leave the refuge of the trees to follow the parents with a begging call. Eventually the parents would land and regurgitate food to the begging young. Adult birds with older young would fly

out from the shelter of the trees with the begging young following them. On their return to the trees the young would then be fed by the adults. This behaviour is very similar to the creching behaviour of the Galah described by Rowley (1990).

Two sightings, one on 8 November and another on 22 November, of up to eight birds in N7 and N8, were of interest. These sightings and those from Sutton in 1983 to 1991 suggest that the Superb Parrot may still be unreported from the area bordered by the Murrumbateman to Gundaroo road to the north, the Barton Highway to the west and the Gundaroo to Sutton Road to the east. Superb Parrots left the area around Hall at the beginning of January and around Murrumbateman some three weeks later.

Discussion

Information derived from the survey forms, reports from COG members and other people, historical records, and my own observations indicate that in the Canberra district the Superb Parrot is mainly confined to an area bounded by the Murrumbidgee River to the west and the Barton Highway to the east. However, they may still be present in the area bordered by the Murrumbateman to Gundaroo road to the north, the Barton Highway to the west and the Gundaroo to Sutton Road to the east.

Within the Canberra district the Superb Parrot was first reported during the last week of August in 1993, 1994 and 1995. At this time reports were received from south of Boorowa, Murrumbateman and south to Jeir Creek and Wallaroo Road. Further south near Sutton between 1983 and 1990 the earliest that the birds were reported was in mid-September. In all areas the birds did not arrive at the same time but rather numbers slowly increased and nest-searching started soon after their arrival. There appeared to be a similar number of males to females. A few of the young males, born the previous year, were still moulting into the adult plumage.

Clear plumage differences between the sexes allow easy identification of males from females in the field. Descriptions from the literature indicate that young can be easily differentiated from adult females. This may be true of birds in the hand but is not so in the field. It is extremely difficult to identify young by plumage or eye colour. Obvious differences are the begging behaviour, though it must be remembered that adult females will beg from adult males. Erratic uncoordinated flight and short wings and tail feathers of young only persist for a very short time after the young emerge from the nest. In aviary birds these differences are not obvious beyond 7 to 10 days. It is therefore difficult to determine the number of young of the year, the success of breeding, and the termination of the breeding season.

Following an incubation period of 20 days, which is undertaken only by the female, the young emerge from the nest 40 days after hatching (Forshaw 1981). Thus, approximately two months should elapse between the time when females disappear from the visible population, with a concomitant increase in the ratio of males to females, and the time when young enter the population, with an increase in the ratio of females/young to males. This appears to be the case between mid- to late October and mid- to late December.

Table 4. A summary of breeding activity within the Canberra—Yass area. Nesting sites followed definition of Webster (1988).

Grid cell	Nest searching seen	No. of nesting sites	Young seen
G5	Yes		Yes
G8	Yes	2	Yes
H5	Yes		Yes
H6	Yes	2	
H7	Yes		
18	Yes	1	Yes
I10	Yes	3	Yes
J7	Yes		Yes

It is much easier to obtain records of birds first seen on arrival than it is to obtain reports on when they leave. Until about mid-December the birds can usually be seen in their breeding areas, especially during the early morning and evening. After this time the birds are likely to be seen elsewhere.

This suggests that the birds disperse from the nesting areas after the young leave the nest though they do still return occasionally to the nesting areas. Thus, birds are seen with decreasing frequency until last observed about early to mid-January, but there are unconfirmed reports of birds still present around Murrumbateman until the first week in February. These observations confirm those of Webster who noted that there was a dispersal away from the southwest slopes from late December 1986 through to January 1987 beginning from the east of Boorowa and Cowra (Webster 1988).

Over the three years of this study the Superb Parrot was reported nest-searching in hollows of Blakely's Red Gum only from eight grid cells; flying young not long out of the nest were reported from six of these eight cells (Table 4). In eight hollows I observed one or more indications of breeding as defined by Webster (1988).

The survey by Webster conducted between 1985 and 1987 reports only two breeding records from the Canberra district, both from grid cell H5, yet the observations reported here indicate breeding (nesting sites) from four cells (Table 4). In both cases the same criteria for nesting were used. This does not imply that the Superb Parrot has extended its local breeding range but rather it is a result of the fact that Webster spent little time gathering detailed information on the distribution and activity patterns of the Superb Parrot in the Canberra district (R. Webster pers. comm.)

There are no obvious reasons why the birds are restricted to certain areas because there are many other similar areas without Superb Parrots. All areas in which Superb Parrots were found in 1993 also supported parrots the following year. In H5 parrots were seen nest-searching in the same tree that had been used nine years previously.

These observations suggest that birds return to the same sites each year even though other apparently suitable sites are available. Without banding it is not possible to know whether individuals return to the same site, but this is most likely. Further, these observations suggest that from the time of the birds' arrival until the young leave the nest the birds remain very close to the nest sites. For example, a major road that I travelled along many times each week at all times of the day, passed within 1 km of a site containing up to 35 birds. They were present throughout the season, yet I saw them along the road only twice and then towards

the end of December. These observations highlight the importance of identifying and safeguarding these remaining breeding sites. They suggest that the breeding areas contain traditional nesting sites and are used each year, probably by the same group of birds. These observations also suggest that individual breeding areas can be small and therefore difficult to find, especially on private land.

Webster (1988) indicates that within the Riverina District of New South Wales the Superb Parrot breeds along river courses, mainly in Red River Gum *E. camaldulensis*, and fly up to 10 km to feed in areas away from the river. My observations do not suggest this happens within the local district — they indicate the birds stay close to the nesting area and hence the difficulty of knowing they are present. This suggests that the birds breed and feed within the same small area.

Webster and Ahern (1992) recommend that no commercial harvesting or silviculture treatments should be authorised within 100 m of any Superb Parrot nest trees, whether containing presently active nests or not. Within the Canberra district where feeding appears to occur close to the nest site it would be necessary to recommend a greater distance. Every sign of nesting that I have seen or have had reported to me was invariably in a hollow of dead, dying or live Blakely's Red Gum. Other eucalypts are present, usually Yellow Box *E. mellio*dora and much less frequently Apple Box *E. bridgesiana* and Red Stringybark *E. macrorhyncha*, but these species do not appear to commonly provide the hollows required for nesting by the Superb Parrot.

The Superb Parrot appears to be associated commonly with Yellow Box (Webster 1988, Webster and Ahern 1992) and my observations support this conclusion. Yet I have never observed the parrots either feeding or nesting in this tree. Within the local district the birds are always feeding on the ground but will readily fly up to the nearest tree where they are usually found perching. The exception to this is when the birds are feeding on the still attached seed pods of Acacia species, usually Cootamundra Wattle, and other trees that produce large seeds. I have only one observation of them feeding in eucalypts and that was in a flowering Blakely's Red Gum. I believe that within the Canberra district the Cootamundra Wattle is favoured above all other wattles because the seed pods form quicker and are therefore available much earlier. The birds appear to cease feeding on this plant once the seeds harden and fall to the ground.

The association with Yellow Box therefore appears to be indirect and it is the grasses and other plants that grow in association with the tree that are favoured. In addition, the Blakely's Red Gum — Yellow Box woodland that is locally common provides both nesting and feeding resources at the same location.
Grid cell I10 is the most southerly to contain breeding birds. This is a neighbour to the cells within the ACT where Superb Parrots are most commonly seen and is, no doubt, the area from which the ACT birds originate.

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References

Anderson, B. (1994). Superb Parrots in Hughes. *Canberra Bird Notes* 19: 21-22.

Blakers, M., Davies, S.J.J.F. and Reilly, P.N. (1984). *The Atlas of Australian Birds*. Melbourne University Press: Melbourne.

Canberra Ornithologists Group (1990). Annual Bird Report: 1 July 1988 to 30 June 1989. *Canberra Bird Notes* 15: 69- 122.

Canberra Ornithologists Group (1992). Annual Bird Report: 1 July 1989 to 30 June 1990. *Canberra Bird Notes* 17: 17- 71.

Canberra Ornithologists Group (1993). Annual Bird Report: 1 July 1990 to 30 June 1991. *Canberra Bird Notes* 18: 53- 108.

Canberra Ornithologists Group (1996). Annual Bird Report: 1 July 1991 to 30 June 1992. *Canberra Bird Notes* 21: 69- 124.

Clark, G. (1975). Bird Report 1.7.74 to 30.6.75. *Canberra Bird Notes* 3(3): 2-10.

Clark, G. (1976). Bird Report, 1 July 1975 to 30 June 1976. *Canberra Bird Notes* 3(8): 2-15.

Clark, G. (1977). Bird Report, 1 July 1976 to 30 June 1977. *Canberra Bird Notes* 3(12): 2-10.

Clark, G. and Lenz, M. (1978). Bird Report, 1 July 1977 to 30 June 1978. *Canberra Bird Notes* 4(4): 2-13.

Coulthard-Clark, C. (1987). General Legge at Weetangera. *Canberra Historical Journal* (new series) no. 19: 9-13.

Dow, C. (1988). Regional rarities records review 1964-1974. *Canberra Bird Notes* 13: 2-21.

Forshaw, J.M. (1969). Superb Parrot. In: *Birds in the Australian High Country* (editor H.J. Frith) pp. 229-230. A.H & A.W. Reed: Sydney

Forshaw, J.M. (1981). *Australian Parrots* (second (revised) trade edition). Lansdowne: Melbourne.

Gillespie, L.L. (1992). Ginninderra Forerunner to Canberra. Privately published: Canberra.

Lenz, M. (1981). Bird Report 1 July 1979 to 30 June 1980. *Canberra Bird Notes* 6: 3-42.

Lenz, M. (1982). Bird Report 1 July 1980 to 30 June 1981. *Canberra Bird Notes* 7: 2-33.

Ormay, M. (1994). Superb Parrot sighting in Melba. *Canberra Bird Notes* 19: 3.

Rowley, I. (1990). *Behavioural Ecology of the Galah* Eolophus roseicapillus *in the Wheatbelt of Western Australia*. Surrey Beatty & Sons: Sydney.

Taylor, I. (1983). Annual Bird Report: 1 July 1981 to 30 June 1982. *Canberra Bird Notes* 8: 5-52.

Taylor, I. (1984). Annual Bird Report: 1 July 1982 to 30 June 1983. *Canberra Bird Notes* 9: 50-139.

Taylor, I. and Davey, C. (1985). Annual Bird Report: 1 July 1983 to 30 June 1984. *Canberra Bird Notes* 10: 26-85.

Taylor, I., Davey, C. and Gibson, J. (1986). Annual Bird Report: 1 July 1984 to 30 June 1985. *Canberra Bird Notes* 11: 26-88.

Taylor, I., Lenz, M. and Lepschi, B.J. (1987). Annual Bird Report: 1 July 1985 to 30 June 1986. *Canberra Bird Notes* 12: 30-83.

Taylor, M. and Canberra Ornithologists Group (1992). *Birds of the Australian Capital Territory - an Atlas.* Canberra Ornithologists Group and National Capital Planning Authority: Canberra.

Veerman, P.A., Elliott, G., Davey, C. and Lepschi, B.J. (1988) Annual Bird Report: 1 July 1986 to 30 June 1987. *Canberra Bird Notes* 13: 54-102.

Veerman, P.A., Baird, I.A., Lenz, M. and Lepschi, B.J. (1989) Annual Bird Report: 1 July 1987 to 30 June 1988. *Canberra Bird Notes* 14: 37-88.

Webster, R. (1988). *The Superb Parrot. A survey of the breeding distribution and habitat requirement*s. Report Series No. 12. Australian National Parks and Wildlife Service: Canberra.

Webster, R. and Ahern, L. (1992). *Management for Conservation of the Superb Parrot Polytelis swainsonii in New South Wales and Victoria*. New South Wales National Parks and Wildlife Service: Sydney, and Victorian Department of Conservation and Natural Resources: Melbourne.

Wilson, S.J. (1968). Systematic Notes 1st July, 1966 to 30th June, 1967. In: Third Annual Bird Report — 1966/67. S. Marchant (editor). Royal Australasian Ornithologists Union (ACT Branch): Canberra. (Roneoed).

Wilson, S.J. (1970). A.C.T. Bird Report, Systematic Notes — July 1, 1968 to June 30, 1969. *Canberra Bird Notes* 1(7): 2-18.

Chris Davey is a biologist with the CSIRO Division of Wildlife and Ecology. His work with CSIRO has mainly involved research on rabbits and ducks. In his spare time Chris has undertaken a variety of bird studies and is a frequent contributor to Canberra Bird Notes. He has been a member of COG since 1969 and has represented the Group in many ways on the committee and subcommittee.

APPENDIX. List of all records of Superb Parrots contained in the Annual Bird Reports published by the Canberra Ornithologists Group.

The individual records are presented in the order: number seen; date(s); place.

1966/67 (Wilson 1968) 1; 24 September; Bungendore. `Single birds'; 5 November, 10, 11 December; Hall.

1968/69 (Wilson 1970) 2; 19 September; Lyneham. 4; 28 September; Lyneham. 3; 1 November; Ginninderra.

1974/75 (Clark 1975) 1 male `escapee?'; 1 July 1974; Waramanga.

1975/76 (Clark 1976) 2; 8 November; near Hall.

1976/77 (Clark 1977) 15; 26 December; Murrumbateman. 1 'escapee'; July; Chapma

1977/78 (Clark and Lenz 1978) 3; 1 December; just north of Sutton. 5; 12 December; Bywong. `numerous'; December—January; around Murrumbateman.

1979/80 (Lenz 1981) 6; 17, 21 December; Murrumbateman.

1980/81 (Lenz 1982) 1 `escapee?'; 14 July; Fisher.

1981/82 (Taylor 1983) 1; 2nd week October; near Sutton. 1; 1, 25 November; Dog Trap Road, near Murrumbateman. 1; 4th week November; near Hall

1982/83 (Taylor 1984) 1; 2nd week September; Torrens. 4; 30, 31 October; Sutton. 4; 4th week November; Melba. 1; 4 December; Kambah. 1; 19 May; Sutton.

1983/84 (Taylor and Davey 1985, and Taylor et al. 1986) 1 male; 4th week October; Fraser. 5; 4th week November; Fraser. 1; 2nd week December; Fraser. 4; 8 March; between Lyneham and `Gungahlin'. 1; 5th week April; Scullin.

1984/85 (Taylor et al. 1986) 2; 23 September; Sutton. 1 male 'escapee?'; 22 October; Ainslie. `regular' maximum 8; October to January: Murrumbateman. 6; 10 December; Gundaroo. four records of single birds; 1st week December to 3rd week February; Aranda. 1 'escapee'; 6 January, ANU. 1 male; 27 February; Ainslie. 1 female; 13 April; Cook.

1985/86 (Taylor et al. 1987) `regular' maximum 30; no date; Murrumbateman. 3; 10 November; 1 km S. Murrumbateman. 8 male & 12 female; 24 December; Hall. 1 male; 1 April; Fadden. 1 female; 13 April; Cook.

1986/87 (Veerman et al. 1988) 8; 1st week January; Calogoma Homestead near Gundaroo. 28; 1st to 2nd week September, Wallaroo Road, Hall. 6; 8 October; Wallaroo Road, Hall. 3; 28 October; Murrumbateman.

1987/88 (Veerman *et al*. 1989) `regular in small numbers'; no date; Murrumbateman.

1988/89 (Canberra Ornithologists Group 1990) 'regular in small numbers'; spring/summer; Murrumbateman. no number; 25 September; O'Connor Ridge. 'probably an escapee'; 11 October; Kambah. 1; 12 November; Murrumbateman. no number; 27 November and 17 December; Hall cemetery and showground. 'dependent young'; 23 December, Fraser. no number; 22 January; field firing and artillery range in N13.

1989/90 (Canberra Ornithologists Group 1992) 4; 24 October; Murrumbateman. 30; 1st week January; Evatt.

1990/91 (Canberra Ornithologists Group 1993) 2; 8 October; Murrumbateman. 2; 11 May; roadside reserve in L4.

1991/92 (Canberra Ornithologists Group 1996) 15; 7 October; Murrumbateman. 20; 13 December; Bowning. 30; 5 to 8 January; Evatt.

Further reading on the Superb Parrot in *Canberra Bird Notes*

Dacey, C. (2010) The distribution, abundance and breeding status of the Superb Parrot *Polytelis swainsonii* during the 2009-10 breeding season, Gungahlin, ACT. *CBN* 35 (3) 205-221.

Davey, C. (2011) Distribution, abundance and breeding status of the Superb Parrot during the 2010-11 breeding season, Gungahlin, ACT. *CBN* 36 (3) 141-154.

Davey, C. (2013) Distribution, abundance and breeding status of the Superb Parrot (*Polytelis swainsonii*) during the 2011-12 breeding season, Central and Lower Molonglo Valley, ACT. *CBN* 38 (2) 134-154.

Davey, C. (2013) Distribution, abundance and breeding status of the Superb Parrot (*Polytelis swainsonii*) during the 2012-13 breeding season, Throsby Neck, Throsby Ridge and East Throsby, ACT. *CBN* 38(3) 208-228.

Lashko, S. (2006) A superb summer: an influx of Superb Parrots into Belconnen in 2005-06. *CBN* 31 (3) 142-146.

Overs, A. and Overs, E. (2022) An examination of a Superb Parrot (*Polytelis swainsonii*) flight path between a woodland breeding area and suburban foraging areas in the Australian Capital Territory. *CBN* 47(2) 116-151.

Canberra Bird Notes 50(2) (2025): 259-289

5. Theme: *Bird Movements in the ACT*

CHRIS DAVEY (daveychris12@gmail.com)

Unfamiliar calls can be heard after a light frost on a sunny autumn morning. With a hard frost in the Brindabella Ranges the birds, predominantly honeyeaters, are on the move. Flying overhead are birds in groups of 10-20 passing continually in a north-east direction until after mid-morning, when the movement appears to cease. The birds are in a hurry, stopping briefly to rest in the treetops before continuing their passage. The autumn change in the ACT bird community is happening as some species move in and some move out whilst others are just passing through.

The annual change in the composition of bird communities in Australia occurs again over the spring months and is driven by the cyclic variation in resources, in particular food. Generally, movements are in a northerly direction in the autumn and south in the spring but there are exceptions such as the White-fronted Tern and Double-banded Plover which move in an east-west direction.

Birds have developed many strategies to allow them to migrate, not only the still mystifying ability to navigate, in the case of young birds often without parental guidance, but also the ability to store fat to enable them to fly long distances without refuelling and in the case of many trans-equatorial migrants to reduce the size of some internal organs.

In the ACT the composition and numbers are constantly changing, most birds are present throughout the year but others come and go depending on the seasons. Many are trans-equatorial migrants arriving in the spring, after breeding in the northern hemisphere, only to leave our area in the autumn. These include the shorebirds and two species of swift.

The most common are the continental migrants that move between northern and southern Australia. Many are total migrants whilst others are partial migrants. The partial migrants are those where only some individuals move away, with numbers varying from year to year.

An example of continental movements is shown by the spring arrival and autumn departure of many of the local honeyeaters. Due to observations from the ACT birding community much is now known about the movement patterns. Lamm and Calaby (1950) described the autumn movement of honeyeaters along the Murrumbidgee corridor. Davey, Prendergast and Taylor (1984) and Davey (1986) reported on a survey to determine movement routes across the ACT, whilst Taws (1999) reported on the number of honeyeaters passing through at various strategic points along the Murrumbidgee River.

Many of the waterfowl undertake nomadic movements that generate considerable changes in numbers, with movements governed by local, regional and continental conditions, and no strict seasonal pattern is followed. Good examples include the Pink-eared Duck, Grey Teal and the Eurasian Coot.

Local movements within the ACT occur with a few species where altitudinal movements from the high country to the warmer lowlands happen in the autumn.

Taylor and Day (2013) estimate that of the 213 listed species, 211 can be found in the ACT during the spring, 212 during the summer, 205 in the autumn and 168 during the winter months. For a more detailed explanation of bird movements within the local region see Frith and Watts (1984).

Despite the surveys and *ad hoc* observations from the local birding community there is still much that is unknown. There appears to be an annual variation in numbers migrating. The time of migration can vary. Does the urban environment help or hinder the migration? And it is unknown where the migrating birds come from or go to.

The movement of birds and the subsequent changes in seasonal occurrence appear to occur throughout south-eastern Australia. The location of the ACT provides a small window through which we are fortunate to be able to observe and record one of the most important events that allow for such a varied and diverse avifauna in the ACT.

References

Davey, C., Prendergast, H. and Taylor, I. (1984) Honeyeater migration through the Canberra region- a project proposal. *Canberra Bird Notes* 9: 142-146.

Davey, C. (1986) Honeyeater migration pattern through the Canberra region, Autumn 1985, *Canberra Bird Notes* 11: 2-14.

Frith, H.J. and Watts, B.T. (1984) *Birds in the Australian High Country*. Angus and Robertson.

Lamm, D.W. and Calaby, J.W. (1950) Seasonal variation of bird populations along the Murrumbidgee in the Australian Capital Territory. *Emu* 50: 114-122.

Taws, N. (1999) Murrumbidgee River corridor honeyeater survey 1997. *Canberra Bird Notes* 24: 145-166.

Taylor, M. and Day, N. (2013) *Field Guide to the Birds of the ACT*. National Parks Association of the ACT.

Reprinted feature articles (3) originally published in:

Canberra Bird Notes 3(10) (1977): 14-17

THE OLDEST INHABITANTS OF NEW CHUMS ROAD

STEVE WILSON

It is probably not generally realised that the work at New Chums Road can be regarded as unique in the annals of ornithology in several respects.

In overseas places, for example the bird observatories in the British Isles, work has continued with banding as a chief technique for much longer than our work in the Ranges.

However, the New Chums Road work is really notable. It can be claimed that this is the longest continuing mist-netting survey of an area of natural mountain forest carried out on a regular basis by an amateur group. As a consequence longevity records should be excellent, and they are.

Certainly when the work started with nets in April 1961 it was not realised that individuals among our small passerines could live for such incredible life spans. As time goes on it is hoped to produce comparative figures for European and North American species but at this stage it may be of general interest merely to record the oldest birds among the populations of some of our regular species.

Species	Date banded	Date retrapped	No. of Times netted	Known Life Span (y-m-d)	
				NCR	All Aust.
Brown-headed Honeyeater 020-27396	8.10.61	9.5.65	3	3-7-1	7-5-23
Brown Thornbill 010-60051	10.2.63	18.9.76	8	13-7-7	13-7-7
Crescent Honeyeater 030-12094	23.11.65	23.2.72	5	6-4-0	6-4-0
Eastern Spinebill 010-38358	2.12.61	18.2.67	5	5-2-16	11-5-11
Eastern Yellow Robin 020-27423	28.10.61	8.3.70	3	8-4-11	11-8-9
Eastern Whipbird 050-25207	28.10.61	9.3.68	4	6-4-12	10-9-30
Fantailed Cuckoo 040-31949	5.10.69	27.9.75	2	5-11-23	5-11-23
Flame Robin 012-44194	24.1.71	18.9.76	3	5-8-6	7-2-15
Golden Whistler 030-29409	15.10.61	17.10.69	5	8-02	
Grey Fantail 010-94515	18.1.65	2.11.68	2	3-9-14	5-4-0
Grey Shrike Thrush 060-25260	15.1.68	3.1.76	2	7-11-18	8-11-0
Olive Whistler 040-31947	30.8.69	19.1.75	2	5-4-11	5-4-11
Pink Robin 010-22703	27.6.62	5.7.64	3	1-11-23	2-2-16
Red-browed Treecreeper 030-65706	29.6.68	18.9.76	2	8-2-19	8-2-19
Rose Robin 010-46167	1.4.62	10.12.66	3	4-8-9	4-8-9
Rufous Fantail 010-60050	10.2.63	11.1.69	2	5-11-0	9-1-4
Rufous Whistler 030-65398	14.11.65	4.10.70	3	4-10-10	11-10-5

Table continued on next page

Table continued from previous page

Species	Date banded	Date retrapped	No. of Times netted	Known Life Span (y-m-d)	
				NCR	All Aust.
*Scaly Thrush 060-49404	4.10.70	21.3.76	2	5-5-17	(7)5-5-17
Silvereye 010-71898	17.11.63	5.4.69	2	5-4-12	9-11-20
Striated Thornbill 010-93796 & 93797	12.3.66	1.6.74	5&6	8-2-22	11-7-24
*White-browed Scrubwren 020-27422	29.10.61	23.3.76	18	14-4-6	14-4-6
White-eared Honeyeater 030-65531	18.2.67	14.2.71	3	1-11-26	4-1-24
White-naped Honeyeater 020-56060	19.10.63	31.1.72	6	8-3-12	10-11-17
White-throated Treecreeper 030-65595	3.12.67	3.1.76	5	8-1-0	8-60
Yellow-faced Honeyeater 020-27392	8-10.61	25.1.69	6	7-3-17	12-10-1

* = Probable species longevity record (from Banding Office and Bird Bander)

These figures indicate that there are ten species longevity records current from New Chums Road, and it is obvious that while some of the known life spans are very long already, most of these known life spans will increase progressively as the work proceeds.

S.J. Wilson, 2 Scott Street, Narrabundah, A.C.T. 2604.

This article, originally published in Newsletter No. 7 of the Brindabella Banding Group, is republished by courtesy of the Editor of that publication, Mr A. Stokes - many thanks.

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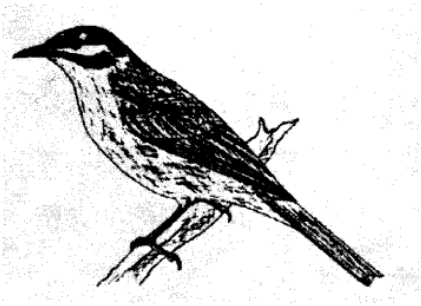
MURRUMBIDGEE RIVER CORRIDOR HONEYEATER SURVEY 1997

NICKI TAWS

PO Box 348, JAMISON, ACT 2614



Yellow-faced Honeyeater
Lichenostomus chrysops

The autumnal exodus of large numbers of honeyeaters from the Canberra region is a seasonal phenomenon which was first documented in the early 1950s. Several surveys conducted over the years since then, by COG or its members, have greatly increased our knowledge of this spectacular event. Many questions still remain, however. This latest survey, conducted by Nicki Taws and COG, attempts to glean further information on some of these questions, as well as addressing the question of whether the migration event can be useful as a bioindicator of the health of the Murrumbidgee River Corridor and its immediate environment. Because of these objectives, Environment ACT generously provided funds for the undertaking of the project and production of a report of the findings. This report, the Murrumbidgee River Corridor Honeyeater Survey 1997. was prepared by COG member Nicki Taws and submitted to Environment ACT. So that COG members may readily avail themselves of these results, and so that the information is available in a public forum, we are now publishing the Report in Canberra Bird Notes. We have made several small editorial changes, and have omitted the recommendations at the request of Environment ACT, but the Report is otherwise essentially unchanged.

Summary

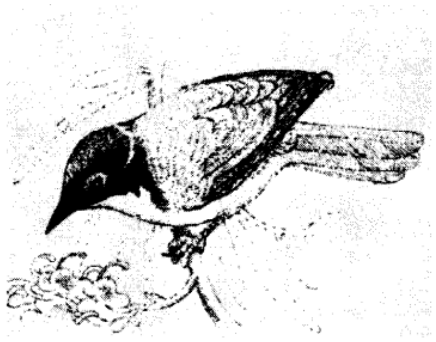
Surveys of migrating honeyeaters in the Murrumbidgee River Corridor (MRC) were conducted on three consecutive Sundays in April 1997. Teams of three people were stationed at seven sites along the river and two sites on the Monaro Highway. Observers counted and, where possible, identified all migrating honeyeaters passing through the site in 15-minute intervals between 8:00 h and 13:00 h. A total of fifty volunteers from the Canberra Ornithologists Group (COG) were involved in the survey. The first survey day, 13 April, was sunny and calm, and a total of 39,423 honeyeaters were recorded. The second survey day, 20 April, was fine but overcast and 9,088 honeyeaters were recorded. The third survey day, 27 April, was again sunny and calm, and numbers totalled 21,880. The Yellow-faced Honeyeater *Lichenostomus*

*chrysop*s was the most common migrating species (comprising approximately 95% of birds on the first survey, decreasing to 50% by the third survey) with White-naped Honeyeaters *Melithreptus lunatus* making up most of the remainder of the flocks. Red Wattlebirds *Anthochaera carunculata* made up between 5-10% of migrating birds on the second and third survey days.

Direction of movement across the Canberra region was generally easterly, with the birds often following well-defined routes, apparently determined by topographical features and availability of trees and shrubs. The migration route and the number of birds using it varied from day to day, possibly due to the weather. The greatest movement occurred on calm clear sunny days. Significant numbers of honeyeaters crossed the Murrumbidgee River Corridor in the Tharwa to Williamsdale area. The lack of suitable cover at sites such as Point Hut Crossing and Angle Crossing may cause additional stress to the birds during migration as they are forced to fly longer distances between trees and are more prone to predation by raptors.

Introduction

The autumn movement of honeyeaters through the Canberra region is a well-known phenomenon, with much of our current knowledge provided by surveys undertaken in 1985-86 (Davey 1986, Taylor 1987).



White-naped Honeyeater *Melithreptus lunatus*

The two most common migrating species are the Yellow-faced Honeyeater and the White-naped Honeyeater. It is assumed that the migrating birds are those which breed in the Brindabella Ranges, where the Yellow-faced Honeyeater is particularly numerous over spring and summer. Movement away from the mountains begins at the end of March, triggered apparently by the first cold weather, and is largely finished by mid-May.

Despite intensive banding efforts during autumn migrations in the 1960s and 1970s, too few birds were ever retrapped to provide conclusive evidence about the origins and destinations of the migrating honeyeaters (Purchase 1985). The general consensus is that the birds are moving to forests east of the Great Dividing Range. One migration route has been traced from Canberra north-east towards Geary's Gap, along the escarpment on the western side of Lake George, then towards Goulburn (R. Allen pers. comm., COG 1986). In coastal and escarpment areas of NSW, autumn movements of Yellow-faced Honeyeaters have been reported, for example, at Moruya on the south coast from late April into early winter (Horey 1979), in the Clyde Range close to the coast (Lamm and Calaby 1950), at Mittagong close to the escarpment on 20 April 1997 (R. Allen pers. comm.), and at Saddleback Mountain on the edge of the escarpment near Kiama on 27 April 1997 (M. Braby pers. comm.). Yellow-faced Honeyeaters also become more common during the winter months on the western slopes of the Divide, and movement away from the higher areas of the tablelands has been noted in many areas of NSW.

The movement away from the mountains appears to be a post-breeding dispersal in search of better food sources, and the honeyeaters will stop moving when they find adequate food. The increase in native plantings in Canberra suburbs over the last 20 years seems to have encouraged the overwintering of Yellow-faced and White-naped Honeyeaters in greater

numbers than occurred previously (S. Wilson pers. comm.). The Murrumbidgee River through the ACT is described as 'a major trunk route' for the autumn migration, with nearly all parts of the river corridor being used (Taylor 1987). The Murrumbidgee River Corridor Draft Management Plan (ACT Parks and Conservation Service 1995) recognises the importance of the River to honeyeater migration, 'especially at Angle Crossing, Tharwa, and from the Cotter north to Uriarra, east to Stromlo and south-east along the River to Point Hut'. In the Draft Management Plan, the list of specific management practices includes one related to the honeyeater migration:

> ***Habitat for honeyeater migration***
>
> *The Service will monitor honeyeater migration patterns, particularly the effects of development in southern Tuggeranong.*

The Canberra Ornithologists Group has previously provided assistance to managers of the Murrumbidgee River Corridor (MRC) in surveying birds (Canberra Ornithologists Group 1986). In 1997 COG agreed to assist the ACT Parks and Conservation Service in undertaking its objective to monitor honeyeater migration patterns. The survey in the first year was designed as a trial to:

> determine suitable methods for monitoring honeyeater movements, identify suitable survey sites where migration concentrations occur, assess whether the monitoring of honeyeater movement would, as the only source of data, provide sufficient information to achieve successful management of the Corridor, and if not, what additional surveys would be appropriate.

The results from this trial would be used to improve survey techniques and locations in subsequent years.

Survey method

In the 1985 survey of honeyeater migration (Davey 1986) daily records were kept of honeyeater movements across the ACT, and one 'blitz' day was organised involving small teams counting honeyeaters in specified time periods, passing through 18 sites.

This survey method was modified for the 1997 survey. Three days in April (13th, 20th and 27th) were selected as 'blitz' days. It was felt that three days were necessary to ensure at least one day of good weather for migration. As the principal aim of the survey was to monitor honeyeater movement along the Murrumbidgee River Corridor, seven sites along the river were selected. Three sites along the Monaro Highway (later reduced to two) east of the river were also chosen in an attempt to track the movement across the ACT. Sites were selected on the basis of ease of access, ease of viewing, and the likelihood of seeing honeyeaters at that location according to prior experience, local knowledge and the results from the 1985 survey.

Preliminary site visits were made prior to the first survey day to determine the exact location for observers to be stationed. The sites selected are listed below and shown in Map 1.

Uriarra Crossing - 300 m north of the crossing on the east bank.
Casuarina Sands - near the weir 300 m north of the northern carpark.
Kambah Pool - southern carpark, overlooking gully running in from the east.
Pine Island - 200 m south of the southernmost carpark.
Point Hut Crossing - 200 m north of the picnic area.

Gigerline A - site beside the Murrumbidgee River below Smiths Road, 500 m east of the Gudgenby River bridge.
Gigerline B - on Smiths Road 500 m east of Gudgenby River bridge, overlooking the Gudgenby River.
Angle Crossing A - 100 m north of the Crossing, west side of the river. (Only used on the first survey day.)
Angle Crossing B - Angle Crossing Road 1 km before the Crossing. (Used for the second and third survey days.)
Williamsdale - Angle Crossing Road, 800 m from Monaro Highway.
Tuggeranong Hill - Information Bay on Monaro Highway.
Tralee - corner of Mugga Lane and Monaro Highway, also Tralee St in Hume.

The survey teams consisted of three or more people when volunteer numbers were sufficient. If fewer people were available the sites expected to have lower honeyeater numbers were allocated only one or two observers. Each team had at least one leader who was experienced in identifying honeyeaters by sight and call. Other team members assisted with identification, counting and recording. Fifty volunteers from COG took part on at least one day, with about 30 people available on each survey date.

The survey period ran from 8:00 h to 13:00 h to cover the expected time of peak movement between 9:00 h and 11:00 h. All honeyeaters migrating through the sites were counted as accurately as possible in 15-minute periods. The different honeyeater species were identified either visually or by call, but identification was not always possible when the birds were too far away. The main species which migrate are the Yellow-faced Honeyeater and White-naped Honeyeater, with lower numbers of Red Wattlebird, and occasional White-eared Honeyeaters *Lichenostomus leucotis*, Fuscous Honeyeater *Lichenostomus fuscus* and Eastern Spinebill *Acanthorhynchus tenuirostris*. Some birds not normally considered to be migratory species, such as White-plumed Honeyeater *Lichenostomus penicillatus* and Brownheaded Honeyeater *Melithreptus brevirostris*, get caught up in the mass migration. Observers also recorded the numbers of other bird species seen or heard while at the site, however this activity took second priority to the counting of migrating honeyeaters.

Weather information was collected from the local newspaper for the three weeks from 7 to 27 April.

Results

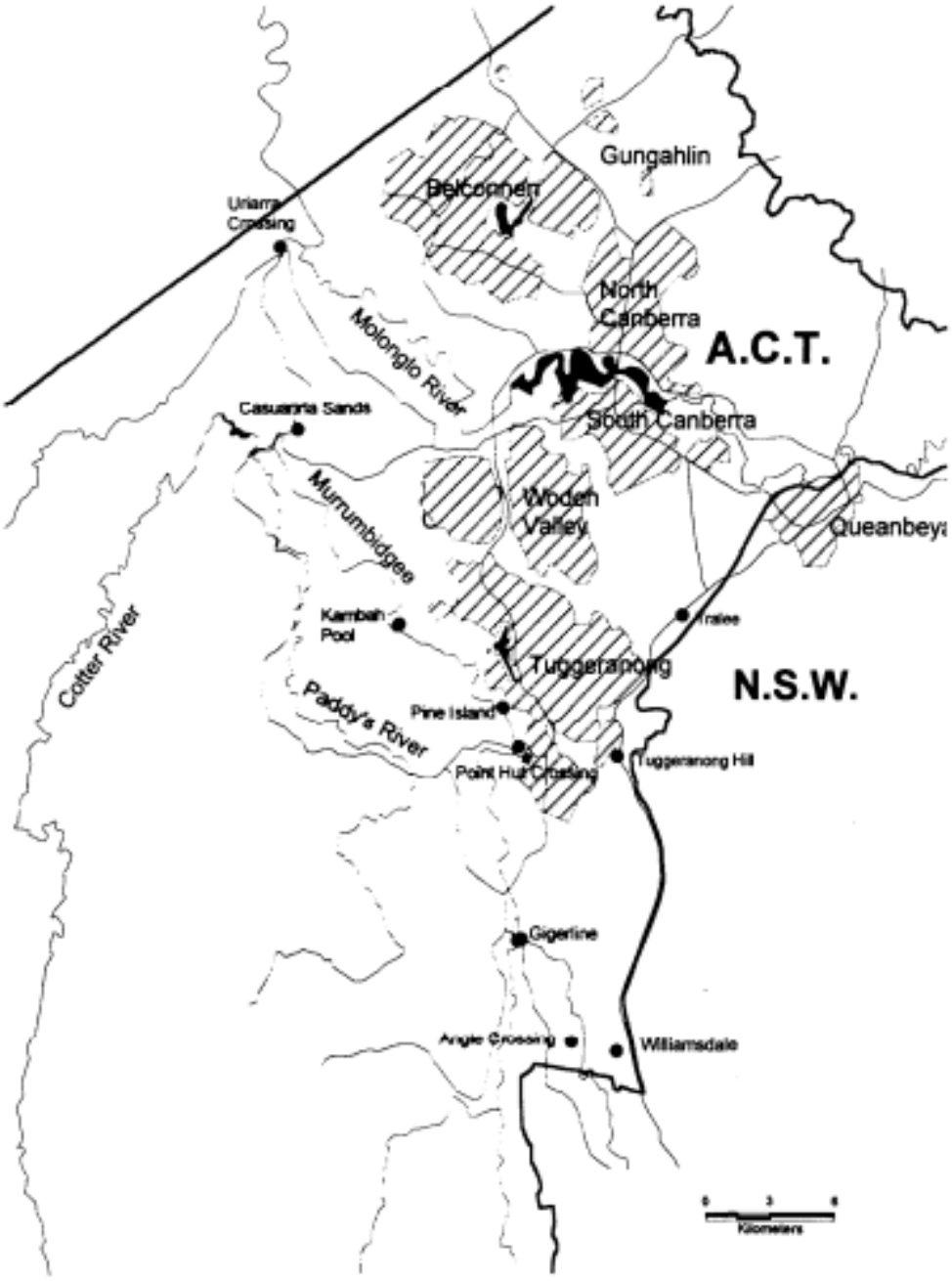
The weather

The weather throughout the survey period was remarkably stable, forming one of the driest spells of Autumn weather on record for the ACT. On 2 April, 0.6 mm of rain was recorded and it did not rain again during the month. Daily maximum temperatures were above average and minima were below average. The only significant cold front to affect the ACT during the period 7-27 April passed through on 7 April. Other weak fronts passed through on 15 April, 19 April and 22 April bringing only high cloud and slightly cooler temperatures. The typical April day was fine and sunny with a maximum of 22 C after a minimum of 5 C, conditions which appear to be ideal for honeyeater migration (Davey 1986).

Weather on the individual survey days was as follows:

13 April Some fog and low cloud in the morning, minimum of 7 C, clearing to a fine sunny day with light winds, maximum of 25C.

Map 1. Honeyeater Survey Sites 1997



20 April Cool at first with local fog patches, minimum of 3 C. The day was fine but high cloud kept temperatures lower than expected, maximum of 21 C.

27 April Fine and sunny with light north-west winds, maximum of 23 C.

Honeyeater numbers

Pre-survey

Several trips were made to the sites prior to the survey days to determine the best locations for honeyeater viewing. These trips occurred on the morning of 28 March (to Kambah Pool, Pine Island, Point Hut Crossing, Gigerline, Angle Crossing, Williamsdale, Tuggeranong Hill and Tralee), 8 April (to Kambah Pool, Pine Island, Point Hut, Williamsdale, Tuggeranong Hill and Tralee) and 9 April (to Uriarra Crossing and Casuarina Sands). Each of these days was fine and sunny with temperatures around 23 C, and on each trip large numbers of honeyeaters were observed moving, particularly at Gigerline and Casuarina Sands.

[On a visit to the Angle Crossing area on 18 April, during the week between the first and second survey days, approximately 3000 honeyeaters were observed in 30 minutes at the Angle Crossing B site, and it was decided to use this location, rather than the Angle Crossing A site for the remainder of the survey.]

13 April

The largest number of honeyeaters was recorded on the first survey day, 13 April, when a total of 39,423 honeyeaters were counted at the 10 sites (see Table 1). Particularly high counts were recorded at the southern sites, Gigerline (18,022 honeyeaters at A and B sites combined) and Williamsdale (6,980), and also at Casuarina Sands (6,828) in the north. The lowest count was recorded at Tuggeranong Hill, where only 10 honeyeaters were seen. Tralee was also a quiet site with only 182 honeyeaters counted, all in the last hour of the survey. The total number of migrating honeyeaters counted at each site is given in Table 1.

Table 1. Number of migrating honeyeaters at each site on 13 April 1997.honeyeaters

Site	Total	Y-f	W-n	R W	Unid.	Other	% of identified h'eaters		
							Y-f	W-n	RW
Gigerline A	13,485	8.084	1.258	0	4,135	8	87	13	0
Williamsdale	6.980	180	0	5	6.795	0	97	0	3
Casuarina Sands	6.828	5.914	914	0	0	0	87	13	0
Gigerline B	4.537	4.112	425	0	0	0	91	9	0
Point Hut Crossing	2.441	2.425	16	0	0	0	99	1	0
Pine Island	1.984	1.604	380	0	0	0	81	19	0
Angle Crossing	1,357	1.031	208	0	118	0	83	17	0
Kambah Pool	1.128	1.103	25	0	0	0	98	2	0
Uriarra Crossing	491	486	5	0	0	0	99	1	0
Tralee	182	182	0	0	0	0	100	0	0
Tuggeranong Hill	10	10	0	0	0	0	100	0	0
Total	**39,423**	**25,131**	**3,231**	**5**	**11,048**	**8**			

Across all sites on this day, 90-95% of identified migrating birds were Yellow-faced Honeyeaters.

The time of honeyeater movement across all sites is shown in Figure 1. Movement was delayed in the morning by fog and low cloud along the river corridor, until it lifted around 9:00 h. Peak movement occurred at different times at each site, but overall the highest numbers occurred between 9:30 h and 9:45 h, with another peak between 11:15 h and 11:30 h.

20 April

The second survey day, 20 April, provided an interesting contrast to the previous week. The day was fine and calm, the only apparent difference from the preceding good migration days being a layer of high cloud associated with a weak cold front. However, this appeared to be enough to affect honeyeater movement, and the total count of 9,088 was well down on the previous week. The highest numbers were again recorded at the southern sites, Angle Crossing B (3,601) and Williamsdale (2,827). Other sites along the river all recorded less than 1000 birds (see Table 2).

The proportion of Yellow-faced Honeyeaters to White-naped Honeyeaters varied across the sites. Most sites recorded a high proportion of Yellow-faced Honeyeaters (85-95%), with a lower proportion recorded at Kambah Pool (53%) and Gigerline A (60%). Several flocks of Red Wattlebirds were recorded at the southern sites, and they totalled 9% of the final honeyeater numbers across all sites.

Time of movement was less defined this day with small peaks at various times of the morning (Figure 2). The sun emerged from behind the high cloud towards the end of the morning, which may account for the greater numbers of honeyeaters counted after 11:00 h.

Table 2. Number of migrating honeyeaters at each site on 20 April 1997.

Site	Total	Y-f	W-n	R W	Unid.	Other	% of identified h'eaters		
							Y-f	W-n	RW
Angle Crossing	3,601	1,432	1,780	332	50	7	40	50	9
Williamsdale	2.827	1,448	470	418	491	0	62	20	18
Gigerline A	961	563	366	10	0	22	60	39	1
Casuarina Sands	590	498	92	0	0	0	84	16	0
Gigerline B	384	311	8	65	0	0	81	2	17
Pine Island	259	249	10	0	0	0	96	4	0
Point Hut Crossing	217	189	28	0	0	0	87	13	0
Kambah Pool	173	92	81	0	0	0	53	47	0
Uriarra Crossing	55	55	0	0	0	0	100	0	0
Tralee	21	21	0	0	0	0	100	0	0
Total	**9,088**	**4,858**	**2,835**	**825**	**541**	**29**			

27 April

Ideal autumn weather conditions continued during the week up to the third survey day, 27 April. The total count of 21,880 was only just over half the total of the first survey day, but well up on the preceding week. The southern sites at Angle Crossing B (5,107) and Williamsdale (6,881) again led the count, with a high number of honeyeaters also recorded at Kambah Pool (3,904). Figures for all sites are given in Table 3.

Table 3. Number of migrating honeyeaters at each site on 27 April 1997.

Site	Total	Y-f	W-n	R W	Unid.	Other	% of identified h'eaters		
							Y-f	W-n	RW
Williamsdale	6,881	2.680	2.603	624	974	0	45	44	11
Angle Crossing	5,107	1,333	2.800	464	510	0	29	61	10
Kambah Pool	3,904	1.310	2.579	0	15	0	34	66	0
Gigerline A	[illegible]	611	259	0	810	0	70	30	0
Pine Island	1,478	521	893	60	4	0	35	61	4
Casuarina Sands	1,293	687	574	30	0	2	53	44	2
Point Hut Crossing	993	387	263	130	213	0	50	34	17
Gigerline B	445	328	111	0	0	6	75	25	0
Tralee	83	55	28	0	0	0	66	34	0
Uriarra Crossing	16	10	1	0	0	5	91	9	0
Total	**21,880**	**7,922**	**10,111**	**1308**	**2526**	**13**			

At all sites the proportion of Yellow-faced Honeyeaters to White-naped Honeyeaters was roughly equal. Of interest was the large number of Red Wattlebirds migrating, with flocks totalling up to 500 moving through Angle Crossing and Williamsdale, and over 100 counted at Point Hut Crossing.

Time of movement conformed to the expected pattern this day, with the largest numbers of honeyeaters counted between 8:45 h and 10:45 h (Figure 3).

Post survey

During the week following the last survey day (28 April - 4 May) the weather remained very similar to the preceding four weeks. During a brief visit to the Casuarina Sands site on 4 May, a fine sunny day, only 20 honeyeaters were counted between 9.30 h and 10.30 h.

Honeyeater movements

On good migration days when large flocks were moving, the honeyeaters were observed to follow defined routes. They moved in 'rolling' flocks, with some birds joining the flock as it passed and others dropping out to rest or feed and wait for the next flock. Towards the end of the morning when fewer birds were moving, direction was less defined, and some small flocks were even seen heading in the opposite direction to the main migration route. Similarly on the second survey day when conditions were less than ideal and few honeyeaters migrated, direction was less defined. Birds moved in smaller flocks, seemingly with less urgency, spending more time flying back and forth in the one area. Similar confused movement on a cold windy day was reported in COG (1986).

At some sites the honeyeaters passed through on a wide front or along two routes, and the observers in a team had to watch in different directions or sit in different parts of the site to be able to count as many of them as possible.

The direction of honeyeater movement at each site is described below and is illustrated in Map 2.

Figure 1.
Time of honeyeater movement across all sites 13 April 1997

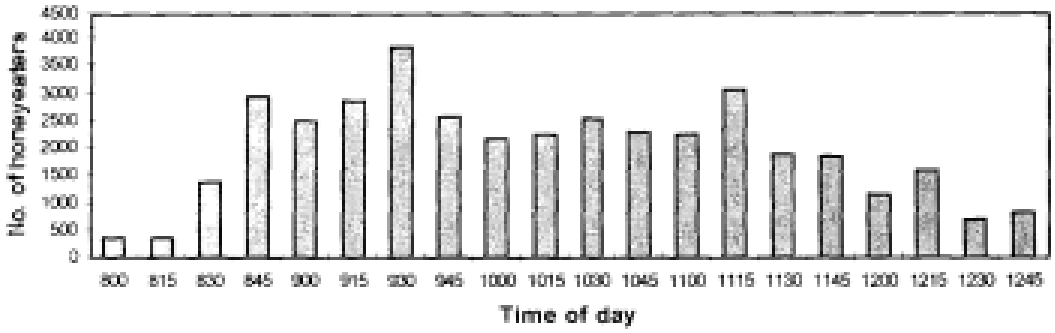


Figure 2.
Time of honeyeater movement across all sites 20 April 1997

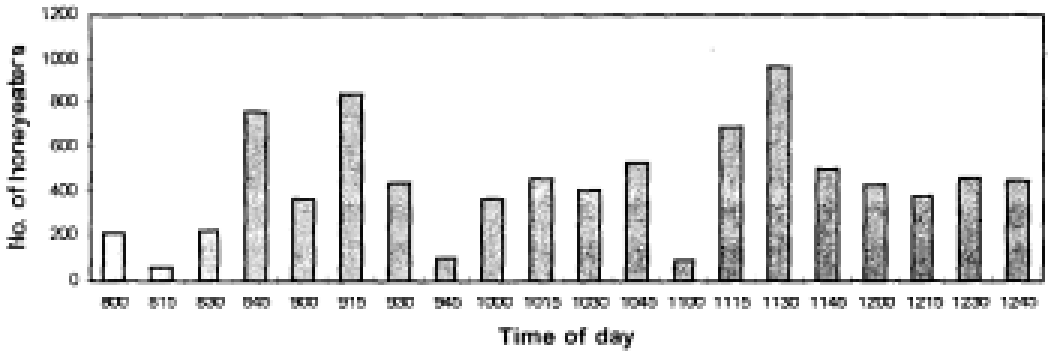
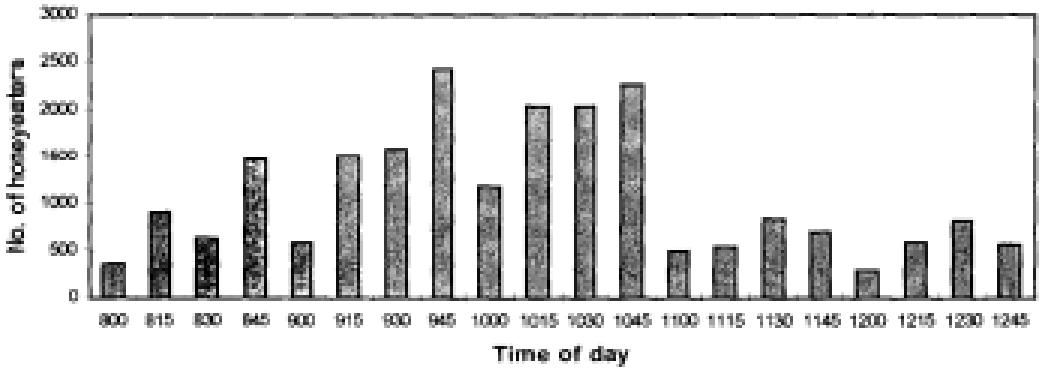
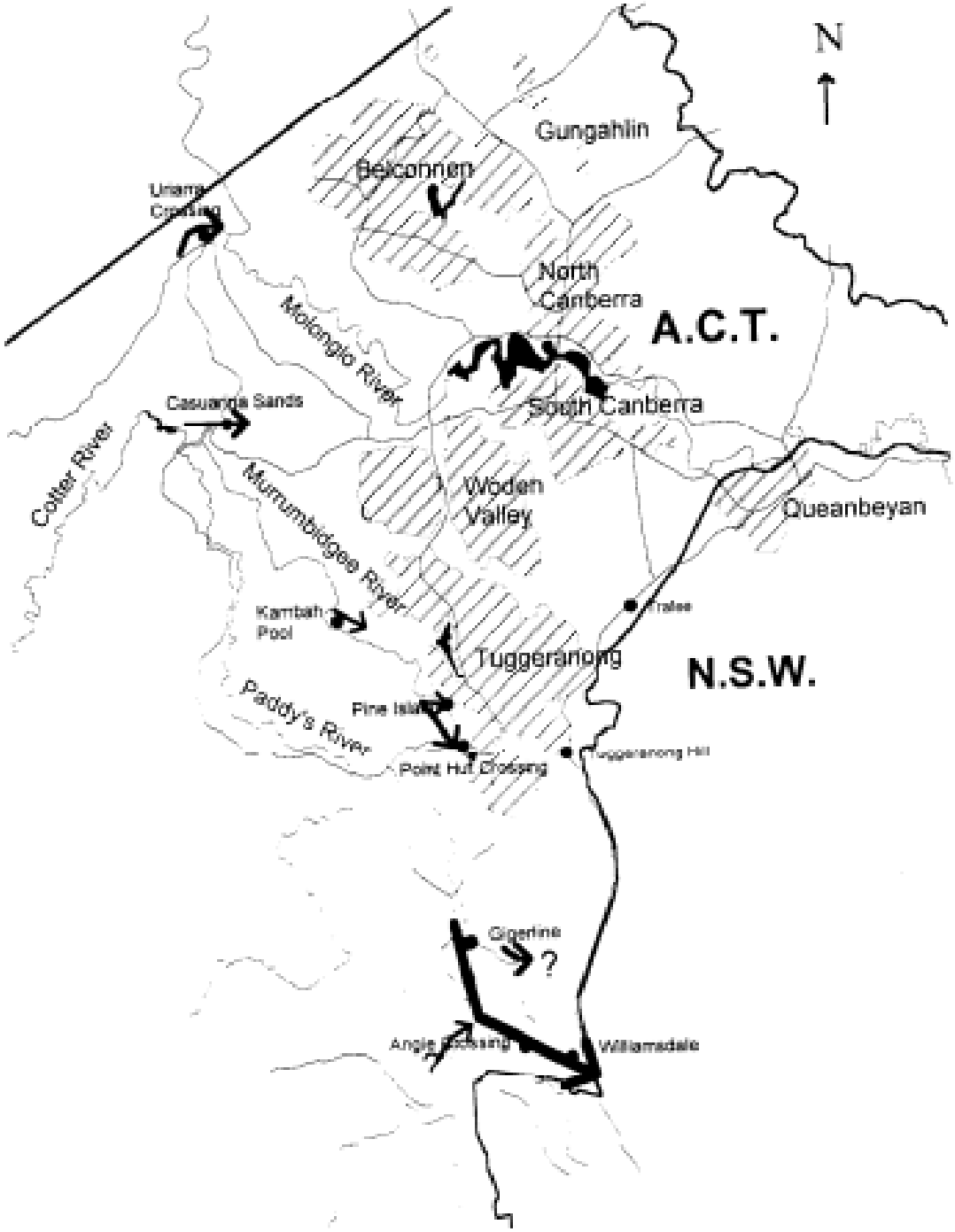


Figure 3.
Time of honeyeater movement across all sites 27 April 1997



Map 2. Honeyeater Movements April 1997



Uriarra Crossing

Movement was mostly in a northerly direction following the river downstream, with some flocks flying easterly up the hill.

Casuarina Sands

The greatest movement was in an easterly direction across the river and up the small gully. Smaller flocks sometimes headed south along the river, or southeast up the steep hill beside the river.

Kambah Pool

Movement was predominantly southeasterly, following the river upstream. From the site at the carpark well above the river, only the honeyeaters flying overhead could be recorded, however, it was noted that many honeyeaters were also moving along the riverbanks, and could be counted only by moving to a new site closer to the river.

Pine Island

Movement was predominantly south-easterly, following the river upstream. However, on the final survey day it was noticed that a significant number of honeyeaters were following the line of young trees from the southern carpark up the hill behind Bonython, and from there probably across towards Tuggeranong Hill.

Point Hut Crossing

Honeyeaters either flew south-southeasterly up over Point Hut Hill, or south along the river into the large deciduous trees at the Point Hut picnic area. From there they moved south-easterly up Point Hut Creek but were not observed beyond that point.

Gigerline A

Honeyeater flocks arrived from the Tharwa area to the north and appeared to split into several routes at the junction of the Gudgenby and Murrumbidgee Rivers. At Gigerline A honeyeaters were observed to follow the Murrumbidgee River upstream in an south-easterly direction, either along the banks or in large flocks along the ridge on the northeast side of the river.

Gigerline B

The flocks of honeyeaters from Tharwa split at the confluence of the Gudgenby and Murrumbidgee Rivers, some following the Gudgenby for a short distance. South of Smiths Road the Gudgenby turns from a south-easterly direction to the south, then sharply to the west. The honeyeaters were observed to leave the river as it turned south, move up onto the Smiths Road ridge, and fly south-east through the Ingledene pine plantation before passing the Angle Crossing site.

Angle Crossing A

On the first survey day the site was located at the Crossing, but relatively few birds were counted was although it appeared to be a good migration day.

Further investigation during the week between the first and second surveys revealed that the large numbers of honeyeaters moving through Ingledene pines were crossing the river approximately 1 km north of the Crossing. Observers for the second and third survey days were stationed at this site (Angle Crossing B) on the Angle Crossing Road approximately 500 metres from the edge of the pines.

Angle Crossing B

The honeyeaters amassed at the edge of the pine plantation before venturing across the largely treeless western slopes above the river. From the pines they followed a very well defined route along a narrow line of eucalypts east towards the river. Across the river they followed a gully up the other side towards Williamsdale, but dispersed across a wider front through the scattered trees.

Williamsdale

Movement was south-easterly. The birds passed over this site on a wide front. Observers were stationed on the road to count honeyeaters to the north, and on mullock heaps south of the road to count honeyeaters flying south of the site below the crest of the hill.

Tuggeranong Hill

The Tuggeranong Hill site was abandoned after the first survey day. Only ten honeyeaters were recorded on a morning when big movements were recorded at other sites. On several pre-survey trips this site was visited again when many honeyeaters were moving at other sites, and no migrating honeyeaters were seen.

Tralee

Movement was easterly. On the first survey day only 182 honeyeaters were recorded, and all in the last hour. On pre-survey trips this site was revisited when many honeyeaters were moving at other sites, and no migrating honeyeaters were seen. For the second and third survey days, the site was moved off the Monaro Highway to a quieter location in Tralee Street. Volunteers were not stationed here for the whole morning. Instead the site was visited for the last hour. The honeyeater survey in 1985 recorded over 10,000 birds at Tralee, but it appears that this site may have been at a different location, further to the north.

Other species

During the survey a total of 93 bird species were observed at the sites along the Murrumbidgee River. These are listed, with their frequency of occurrence across the three days, as an Appendix. Eight of these species were not recorded during the Murrumbidgee River bird survey undertaken by COG in 1985-6 (Taylor 1987). These species are Straw-necked Ibis *Threskiornis spinicollis*, Peaceful Dove *Geopelia striata*, Little Corella *Cacatua sanguinea*, Australian Owlet-nightjar *Aegotheles cristatus*, Spotted Quail-thrush *Cinclosoma punctatum,* Crested Shriketit *Falcunculus frontatus* as well as the introduced Common Myna *Acridotheres tristis* seen at Gigerline and Point Hut Crossing, and a domestic goose. The Common Myna is an aggressive species whose numbers in Canberra have increased rapidly in recent years (Pell and Tidemann 1994).

Discussion

The results of the 1997 honeyeater migration survey confirm much of the information reported in the literature.

• The most common migrating species is the Yellow-faced Honeyeater.

• White-naped Honeyeaters migrate in lesser numbers and about two weeks later than the Yellow-faced Honeyeaters.

• The two species migrate in mixed flocks which may include small numbers of other honeyeaters.

• Direction of movement across the Canberra region is generally easterly, varying from north-east to south-east.

• Greatest movement occurs on calm clear sunny days.

• The birds often follow well-defined routes, apparently determined by topographical features and availability of trees and shrubs.

• Significant numbers of honeyeaters cross the Murrumbidgee River in the Tharwa to Williamsdale area.

• The migration route and the number of birds using it vary from day to day, possibly due to the weather.

Also revealed by the survey was the significant number of Red Wattlebirds migrating (16% of the total honeyeaters on the third survey day). The wattlebirds moved at about the same time as the majority of White-naped Honeyeaters, and often in single-species flocks.

Honeyeater numbers

The variation in numbers between the three survey days is most likely a result of the weather, which is considered to be a strong determinant in the movement of the honeyeaters (Wilson 1963b, Davey 1986). Autumn 1997 was unusually warm and dry with the majority of days seemingly suitable for migration. The survey results suggest that many of the honeyeaters left early in the migration period (late March to mid April), with the highest numbers recorded on the first survey day (13 April), and the large movements noticed during pre-survey trips.

The second survey day (20 April) happened to be the first day of less than ideal conditions for about 12 days, and the presence of high cloud seemed to be enough to keep honeyeater numbers to one-fifth of the previous week. The third survey on 27 April was carried out under apparently good migration conditions, but numbers were still only half those of the first survey day. Anecdotal evidence from the observations of COG members during April in suburban gardens suggests that honeyeater numbers peaked in the first half of April, a week or two earlier than usual. The succession of fine sunny days early in the migration period may have allowed greater than usual movement during this time, or the dry conditions in the mountains may have limited food availability and stimulated the honeyeaters to move. Alternatively, the continuing warm conditions may have meant that many honeyeaters had still not left the mountains by the end of April, although post-survey observation indicate that this is less likely.

Having three survey days was necessary to allow for the possibility of one or more days of poor migration weather. The scheduling of the survey days from mid to late April was timed to cover the expected peak migration period. However, the dry and sunny conditions this year may have meant that migration peaked in early to mid April. It may be that future surveys need to have some flexibility to take account of the daily weather and seasonal conditions.

To provide a comparison with similar previous surveys, the results of the 1997, 1986 and 1985 migration surveys have been compiled in Table 4 for comparable sites along the Murrumbidgee River. Of interest in comparing figures from different years is the variation in numbers between days and years and between sites. It is difficult to see any overall pattern other than the variation in total numbers associated with the weather. As an example,

numbers at Uriarra Crossing were relatively low in 1985 on a day of good migration weather, high on two days in 1986, even though weather on 20 April 1986 was not considered good for migration, and low on three days in 1997 when ideal migration conditions prevailed on two of the days

Table 4. Number of migrating honeyeaters at the Murrumbidgee River sites surveyed during 1985, 1986 and 1997.

Site	Date						
	1985 28 April (Davey	**1986** 6 April (COG	**1986** 20 April (COG	**1986** 4 May (COG	**1997** 13 April	**1997** 20 April	**1997** 27 April
Weather	Fine	Cool, fine	Cool, windy	Sunny. calm	Warm, sunny, calm	Mild, calm, overcast	Warm, sunny, calm
Northern and central sites							
Uriarra Crossing	953	14	4,540	2,500	491	55	16
Casuarina Sands	668	973	1,000	-	6,828	590	1,293
Kambah Pool	4,326	-	616	1.385	1,128	173	3,904
Pine Island	2,102	938	180	-	1,984	259	1,478
Point Hut	3,360	-	260	100	2,441	217	993
Total	**11,409**	**1,925**	**6,596**	**3,985**	**12,872**	**1,294**	**7,684**
Southern sites							
Gigerline A	-	995	43	65	13,485	961	1,680
Gigerline B	-	-	-	-	4,537	384	445
Angle Crossing A	-	-	-	-	1,357	-	-
Angle Crossing B	-	7,445	780	3,375	-	3,601	5,107
Total		**8,440**	**823**	**3,440**	**19,379**	**4,946**	**7,232**

The earliest reports on the honeyeater migration in the 1950s and 1960s provide some interesting figures on honeyeater numbers when compared with more recent records for the same sites. Records for Pine Island have been compiled in Table 5 and for Point Hut in Table 6.

Murn (1963) at Pine Island estimated 10,000-12,000 honeyeaters passed during a four-hour period. Wilson (1963b), also at Pine Island, estimated 10,000 birds passed in two hours. Lamm and Calaby (1950) reported 4,000 birds per hour moving northward between Casuarina Sands and Uriarra Crossing. Two weeks later they reported the honeyeaters were moving west to east across the valley at a rate of 10,000 birds per hour.

Figures in Table 4 for the sites at Casuarina Sands and Uriarra Crossing and in Table 5 for Pine Island are well below those reported in the 1960s, with no more than a few thousand birds recorded at these sites on each morning. The highest recent count was at Casuarina Sands on 13 April 1997 when about 7,000 honeyeaters passed through. Apart from this, nearly all other counts were below 2,000.

5. Number of migrating honeyeaters recorded at Pine Island.

Date	Source	Weather	Time	No.
1963, 6 April	Murn, 1963	-	7.30-11.30	10,000
1963, 13 April	Wilson, 1963b	Sunny, calm	6.00-11.00	10,000
1963, 14 April	Wilson, 1963b	Cool, overcast	7.00-11.00	0
1985, 28 April	Davey, 1986	Fine	8.00-13.00	2,102
1986, 6 April	COG, 1987	Cool, clear	8.00-12.00	938
1986, 20 April	COG, 1987	Cool, windy	8.00-12.00	180
1997, 13 April		Warm, sunny, calm	8.00-13.00	1,984
1997, 20 April		Mild, calm, overcast	8.00-13.00	259
1997, 27 April		Warm, sunny, calm	8.00-13.00	1,478

Table 6. Number of honeyeaters recorded at Point Hut Crossing.

Date	Source	Weather	Time	No.	Comments
1984 26 April	Taylor & Davey, 1985	-	9.00-14.00	9,400	Yellow-faced
1985 28 April	Davey, 1986	Fine	8.00-13.00	3,360	50% Y-f, 50% W-n
1986 20 April	COG, 1987	Cool, windy	8.00-12.00	260	
1986 4 May	COG, 1987	Cool, calm, fine	8.00-12.00	100	
1990 April	Davey, 1991	-	3 hrs in AM	1,300	
1991 20 April	Davey, 1991	'perfect'	8.48-12.00	8,200	mostly W-n, although Y-f were more vocal
1992 12 April	Holland, 1992	clear and still	AM.		flocks of several hundred, mostly Y-f, some W-n.
1993 10 April	Davey, 1993	cool, overcast	8.00-11.00	0	
1993 17 April	Davey, 1993	Cool start to a warm still clear day	8.00-11.15	1500	down on previous years, majority Y-f, very few W-n, W-e, W-p
1995 22 April	Davey, 1995	Clear and sunny after a cool night	8.30-12.15	2200	similar to 1993, more than 1994, 70% Y-f, 30% W-n.

Records from Point Hut Crossing have been kept more regularly than other sites since the early 1980s, as this has been the location of the annual COG excursion to view the honeyeater migration. The figures from Point Hut can be considered a reflection of the numbers of honeyeaters at Pine Island, as it is assumed that these two locations are on the same migration pathway, and are only 2 km apart. The highest honeyeater count reported from Point Hut is 9,200 made in 1984. The only other figure close to this is 8,400 made in 1991.

Suggestions have been made that the general migration pattern has moved to the south of Canberra (S. Wilson pers. comm). However, apart from the reports in the 1960s, few pre-1980 records are available for the numbers of honeyeaters migrating through particular sites. Unfortunately, most of the banding efforts in the 1960s and 1970s were not coupled with a visual census of the number of migrating honeyeaters (Purchase 1985).

The available records suggest that current migration numbers in both the Pine Island - Point Hut and Casuarina Sands - Uriarra Crossing areas rarely reach the levels reported in the 1960s. However it is not possible to determine whether this is a result of daily fluctuations, seasonal fluctuations, a general decline in honeyeater numbers or a shift in migration patterns. The significance of the Tharwa - Angle Crossing area to honeyeater migration was not revealed until the 1986 Murrumbidgee River survey (COG 1986), so it cannot be determined whether the large number of birds now recorded in this area has changed over the last few decades.

Seasonal fluctuations may be an important factor in the variation in migration numbers. In 1982-83 the number of honeyeaters reported in the COG Garden Bird Survey was 75% lower than the previous year. The failure of the autumn migration in this year was considered to be a sign of poor breeding success possibly due to drought or bushfires (Taylor 1984). The following year, however, numbers had returned to previous levels and included the figure of 9,200 reported from Point Hut (Taylor and Davey 1985).

Honeyeater movements

The Murrumbidgee River provides a corridor for movement of honeyeaters for a part of their journey, for those flying south-east from Kambah Pool to Point Hut Crossing, and those flying from Tharwa-Gigerline towards Angle Crossing and Williamsdale. Not all honeyeaters use these routes for the full length; flocks were observed leaving the river corridor from Kambah Pool area and heading more easterly over Gleneagles (also reported in COG 1986), and at Pine Island flocks veered away from the corridor where the river turns to the south, heading along a line of young trees in a south-easterly direction, behind the suburb of Bonython.

It also appears that the migration routes and the number of birds using them change from day to day, possibly depending on the weather. In the report on the 1985-6 Murrumbidgee River survey, two migration routes were proposed for the Tharwa - Angle Crossing area. Observations during the 1997 survey suggest that these two routes are not as separate as drawn, but sometimes cross over.

On 13 April a stream of honeyeaters from the Tharwa area was observed at Gigerline A to fly east following the ridgeline north of the Murrumbidgee River. It is thought these birds follow the river upstream and leave it probably somewhere in the Guises Creek area, as illustrated in Map 2. On the same day large flocks of birds counted at Gigerline B (overlooking the Gudgenby River) were followed by observers up the ridge along Smiths Road and through Ingledene Pines to Angle Crossing and across to Williamsdale. Unfortunately the Angle Crossing observers were not stationed at the best location on this day to count all these birds,

but this was rectified the following week. The birds passing Gigerline B were coming from the north, presumably also from the Tharwa area, so the Tharwa migration route seems to split in two at Gigerline (Map 2). It appears, however, that Angle Crossing also receives birds from another source. On the following two survey days, only small numbers were recorded at the Gigerline sites but ten times as many were counted at Angle Crossing. This would support the idea of the southern route (COG 1986) in which honeyeaters move from the Naas - Gudgenby catchment through Ingledene pines to Angle Crossing.

Holland (1992), watching the migration at Point Hut, noted that a number of honeyeaters were moving downstream from the direction of Lambrigg. This is different from the usual upstream movement from Pine Island, and remains the only report of honeyeaters arriving at Point Hut from a different direction.

The availability of tree cover may be a major determinant of the honeyeater migration routes. Honeyeaters generally prefer to migrate making short-distance flights between trees and will only cross extensive open areas when forced to do so (Wilson 1963a). Trees provide a resting place and shelter from birds of prey. Shrubs also provide important shelter and feeding opportunities. Wilson (1963a) noted that during bad weather and in the first hour of light on a fine day the movement of honeyeaters in loose flocks through the tree tops was abandoned in favour of individual movement through the shrubs.

The presence of raptors causes considerable concern amongst the migrating honeyeaters (Clayton 1979). At a location such as Angle Crossing the absence of tree and shrub cover and the use of a well-defined route makes the honeyeaters particularly susceptible to predators. At this site several raptors, including Peregrine Falcon *Falco peregrinus*, Australian Hobby *Falco longipennis* and Brown Goshawk *Accipiter fasciatus*, were present during the surveys causing the honeyeaters to remain quiet and still whenever they flew over. On one morning a Peregrine Falcon was observed eating a White-naped Honeyeater. At the Williamsdale site, an Australian Hobby and Brown Goshawks were observed, and the Hobby was seen to attack a honeyeater flock, taking one of the birds in flight.

Where adequate cover exists, it appears that the honeyeaters migrate across the MRC in an easterly direction, as at Uriarra Crossing and Casuarina Sands. Where there is a lot of treeless space either side of the river they use the available cover in the corridor until a suitable exit route is available. Judiciously placed plantings are likely to assist migration, particularly in treeless areas such as Angle Crossing, or where suburbs are closest to the river corridor, such as Point Hut. Holland (1992) noted the effect of plantings on honeyeater movement at Point Hut. 'While many [honeyeaters] made several abortive sorties as in the past, the recent planting / regeneration on the nearby hill now appears to allow the slightly different option of diving into and resting in these before continuing.' During the 1997 survey at Pine Island, a stream of honeyeaters was observed to follow the line of young trees heading south-east away from the river, behind the suburb of Bonython. Presumably from here they use the few remaining mature trees to cross the suburb of Gordon to Tuggeranong Hill.

Plantings which lead to a dead end and don't create a corridor could cause confusion. Although further observations are required, from Point Hut Crossing it was noted that some honeyeaters followed the line of trees up the creek to Point Hut Dam, then rather than fly over the expanse of water, they followed the new plantings circling back around Point Hut Hill towards the river. Their movement was not followed from here but it is assumed that somehow they do continue eastwards over or around the suburbs.

Whether or not there is suitable cover, the birds will eventually migrate. It can be assumed that an easier migration path would benefit the birds, and the fewer 'stress points' such as at Point Hut, the better. Therefore judicious plantings to create as many 'escape corridors' through the suburbs from Point Hut northwards could facilitate migration.

The migration of the honeyeaters is an interesting study. The 1997 survey of migrating honeyeaters has confirmed the importance of certain sites, such as Angle Crossing, as part of the route used during migration. However, there remain many unanswered questions about the destinations of the birds, about the movement patterns themselves, and about the status of a group of birds which is certainly not endangered but whose numbers may have declined significantly over the last two decades.

However, it may be postulated that while the honeyeaters have to traverse the MRC in a general west to east direction, the nature of the vegetation in the MRC has little bearing on the success or otherwise of the migration. What is more significant is the lack of tree or shrub cover on either side of the river, particularly in the stretches north of Point Hut and Angle Crossing, which channels the honeyeaters along the river. Therefore in management terms, the advice is to plant trees and shrubs at those points where they will most assist an exit from the corridor. Further work is required to identify these points.

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References

Canberra Ornithologists Group (1986). *Murrumbidgee River Corridor bird survey*: Final Report December 1986. NCDC (unpublished)

Clayton, M. (1979). COG Excursions. *Canberra Bird Notes* 4(7): 27.

Davey, C. (1986). Honeyeater movement patterns through the Canberra region, Autumn 1985. *Canberra Bird Notes* 11 (1): 2-14.

Davey, C. (1991). Outing report: 20 April, Point Hut Crossing. *Gang-gang*, Newsletter of the Canberra Ornithologists Group, June 1991.

Davey, C. (1993). Outing report: Saturday 10 April and Sunday 18 April 1993 - Point Hut Crossing. Gang-gang, Newsletter of the Canberra Ornithologists Group, June 1993.

Davey, C. (1995). Field Trip Reports: Point Hut Honeyeater migration - 22 April 1995. *Gang-gang*, Newsletter of the Canberra Ornithologists Group, June 1995.

Holland, J. (1992). Outing report: Sunday 12 April – Point Hut (Honeyeater Migration). *Gang-gang*, Newsletter of the Canberra Ornithologists Group, May 1992.

Horey, G. (1979). The autumn-winter movement of the Yellow-faced Honeyeater. *Canberra Bird Notes* 4(16): 13-14.

Lamm, D.W. and Calaby, J.W. (1950). Seasonal variation of bird populations along the Murrumbidgee in the Australian Capital Territory. *Emu* 50: 114-122.

Murn, M. (1963). Autumn banding of migrating Yellow-faced Honeyeaters. *The Bird Bander* 1(6): 123-5.

Pell, A.S. and Tidemann, C.R. (1994). Population densities of Common Mynas, Common Starlings, Crimson Rosellas and Eastern Rosellas in Oakey Hill Nature Park and adjacent suburbs. *Canberra Bird Notes* 19(4): 58-66.

Purchase, D. (1985). Bird-banding and the migration of Yellow-faced and White-naped Honeyeaters through the Australian Capital Territory. *Corella* 9(2): 59-62.

Taylor, I. (1984). Annual Bird Report 1 July 1982 to 30 June 1983. *Canberra Bird Notes* 9(3).

Taylor, I.M. (1987) Murrumbidgee River Corridor Bird Survey Summary of Results. *Canberra Bird Notes* 12(4): 110-131.

Taylor, I. and Davey, C. (1985). Annual Bird Report 1 July 1983 to 30 June 1984. *Canberra Bird Notes* 10(2).

Wilson, S.J. (1963a). Mist-netting migrating Yellow-faced Honeyeaters. *The Bird Bander* 1(4): 53-59.

Wilson, S.J. (1963b). Further notes on autumn migration of honeyeaters. *The Bird Bander* 1(6): 123-125.

APPENDIX: List of bird species recorded at honeyeater survey sites along the Murrumbidgee River Corridor, April 1997.

Records were kept at eight sites on three days. Occurrence (Occ) is the number of sites and days a species was seen: maximum of 24 (8 sites x 3 days).

Species	Occ	%Occ	Species	Occ	%Occ
domestic goose	1	4%	White-eared Honeyeater	23	96%
Australian Wood Duck	1	4%	Fuscous Honeyeater	8	33%
Pacific Black Duck	10	42%	White-plumed Honeyeater	6	25%
Little Pied Cormorant	10	42%	Brown-headed Honeyeater	1	4%
Little Black Cormorant	1	4%	White-naped Honeyeater	23	96%
Great Cormorant	3	13%	Crescent Honeyeater	4	17%
White-faced Heron	15	63%	New Holland Honeyeater	6	25%
Great Egret	1	4%	Eastern Spinebill	19	79%
Straw-necked Ibis	1	4%	Scarlet Robin	17	71%
Whistling Kite	1	4%	Flame Robin	1	4%
White-bellied Sea-Eagle	1	4%	Eastern Yellow Robin	15	63%
Brown Goshawk	5	21%	Spotted Quail-thrush	1	4%
Wedge-tailed Eagle	12	50%	Varied Sittella	2	8%
Brown Falcon	6	25%	Crested Shrike-tit	1	4%
Australian Hobby	1	4%	Golden Whistler	9	38%
Peregrine Falcon	3	13%	Rufous Whistler	3	13%
Nankeen Kestrel	7	29%	Grey Shrike-thrush	17	71%
Black-fronted Dotterel	2	8%	Restless Flycatcher	5	21%
Masked Lapwing	4	17%	Magpie-lark	10	42%
Crested Pigeon	2	8%	Grey Fantail	8	33%
Peaceful Dove	2	8%	Willie Wagtail	10	42%
Yelowl-tailed Black Cockatoo	3	13%	Black-faced Cuckoo-shrike	6	25%
Gang-gang Cockatoo	5	21%	Dusky Woodswallow	17	71%
Galah	20	83%	Grey Butcherbird	11	46%
Little Corella	1	4%	Australian Magpie	20	83%
Sulphur-crested Cockatoo	12	50%	Pied Currawong	17	71%
Australian King-Parrot	6	25%	Australian Raven	23	96%
Crimson Rosella	23	96%	Little Raven	2	8%
Eastern Rosella	9	38%	White-winged Chough	1	4%
Red-rumped Parrot	1	4%	Satin Bowerbird	1	4%
Australian Owlet-nightjar	7	29%	Skylark	3	13%
Laughing Kookaburra	7	29%	Richard's Pipit	1	4%
White-throated Treecreeper	15	63%	House Sparrow	2	8%
Brown Treecreeper	3	13%	Double-barred Finch	2	8%
Superb Fairy-wren	19	79%	Red-browed Finch	17	71%
Spotted Pardalote	15	63%	Diamond Firetail	2	8%
Striated Pardalote	10	42%	European Goldfinch	15	63%
White-browed Scrubwren	15	63%	Mistletoebird	4	17%
Weebill	6	25%	Welcome Swallow	19	79%
Brown Thornbill	20	83%	Tree Martin	2	8%
Buff-rumped Thornbill	13	54%	Fairy Martin	2	8%
Yellow-rumped Thornbill	16	67%	Golden-headed Cisticola	1	4%
Striated Thornbill	4	17%	Silvereye	16	67%
Red Wattlebird	14	58%	Common Blackbird	20	83%
Noisy Friarbird	3	13%	Common Starling	7	29%
Noisy Miner	1	4%	Common Myna	2	8%
Yellow-faced Honeyeater	24	100%	Total species	93	

Canberra Bird Notes 24(1) (1999): 1-6

SOME OBSERVATIONS ON THE ALTITUDINAL MIGRATION OF GOLDEN WHISTLERS IN THE ACT

DAVID PURCHASE [1] AND STEVE WILSON[2]

[1]5 Orchard Place, Melba, ACT 2615

[2]56 Harrington Cct, Kambah, ACT 2902

The Golden Whistler *Pachycephala pectoralis* is known to be an altitudinal migrant in the Australian Capital Territory (Wilson 1984). In higher altitudes (*e.g*. the Brindabella Range c. 25 km to the west of Canberra) numbers increase in summer and decrease in winter. In lower altitudes (*e.g*. the suburbs of Canberra) the reverse occurs. Some information on the extent of the seasonal change in distribution between the higher and lower altitudes was gained from data collected during the 1986 to 1989 ACT Avifauna Database Project (bird atlas) and is illustrated in two maps (September-April and May-August) in Taylor and COG (1992).

In this paper we present more information on this phenomenon. The information is obtained from two sources: a 26-year study of the birds of a suburban garden and its environs in Melba, and a 21-year bird-banding study of the birds at two sites in the Brindabella Range. The two study periods are not entirely contemporaneous, but do overlap by nine years.

Study Sites

Melba

The first houses in the suburb of Melba, at an altitude of 580 m, were occupied in 1972. One of us (DP) moved into a house there in April 1973. At the time the area was largely exposed grassland with few trees. However, a great deal of construction activity was in progress as the area was rapidly being transformed from grassland to a suburban landscape.

Details of the birds occurring in the garden and surrounding area have been recorded since April 1973, but were not collected in a systematic way until February 1976. From that time every species seen or heard each day, in or from the garden, was recorded. A note was made as to whether the species was seen in or out of the garden. The largest number of individuals of each species observed at any one time during the day was also recorded. For days when no observations were made because of holidays etc., an average figure was calculated based on the totals for the relevant month, so that comparisons made would not be unduly perturbed by missing data. This was done for 361 (4.3%) of the 8412 days of the study (up to 28 February 1999). Most absences were less than 4 days in duration in any one month, the longest being 15 days.

Melba is now a well-vegetated suburb with a mixture of native and exotic trees and shrubs. The study site and its environs have become relatively sheltered and some of the eucalypts planted in 1973 are now c. 25 m in height. Originally on the outer edge of Canberra and largely surrounded by grassland, Melba has, over the years, gradually become an inner suburb as further development has taken place and is now c. 2 km from the suburban fringe at its closest point. T

The first Golden Whistler was recorded at this site in March 1974 when an adult female hit a window of the house.

Brindabella Range

Since March 1961 mist nets have been used by the second author (SW) and others to capture birds for banding at eight sites in the Brindabella Range (details of the sites are contained in Wilson (1995)). Only data from two sites, New Chums Road and Lees Creek Road, at which the majority of birds were banded, will be considered in this paper.

a) New Chums Road

New Chums Road (35° 24'S., 148° 50'E.) runs along the eastern side of the Brindabella Range, extending for about 3 km and roughly following the 1,050 m contour line through mainly wet sclerophyll forest, although it passes through dry sclerophyll forest on the exposed ridges (Tidemann *et al*. 1988). Nets were set along a stretch of about 2 km of the road. From April 1961 through to June 1982, 292 visits were made to this site.

b) Lees Creek Road

The banding site on Lees Creek Road (35° 22'S., 148° 50'E.) is c. 3 km NE of New Chums Road in wet sclerophyll[8] forest at an altitude of 840 m. The nets were set along about 0.5 km of the road and also along an old logging track beside Lees Creek itself which at this point runs close to the road. This is a more sheltered site than the New Chums Road site. From March 1961 through to May 1982, 126 visits were made to this site.

Results

Melba

The totals (by calendar month) of the number of days that Golden Whistlers were recorded over the 23-year period of daily observations at the Melba site are shown in Figure 1. The figure shows occurrence only and takes no account of the number of individuals seen at any one time. Golden Whistlers were recorded on a total of 742 days (8.8% of all observation-days). Of these, the number of individuals seen at the one time was recorded on 665 days, comprising: one of four birds (16 May 1982); two of three birds (2 April 1990 and 15 September 1994); 29 of two birds (nine in April, six in May. five in June, two in July, six in September, and one in October); and 633 of one bird. The remaining 77 observation-days, for which no number was recorded, were either of birds heard calling but not seen (59 records) or the result of averaging to correct for days when no observations were made (18 'records').

Brindabella Range

The total number of visits to the two sites in each calendar month over the 21-year study period is shown in Table 1. The number of nets used (c. 20) and the time spent (c. 6 hrs) at each site remained fairly constant throughout the study. However, as can be seen from Table 1, the number of visits to the sites each month was established. These varied from month to month. Therefore, were used to prepare Figure 2, which an average figure for the number of

[8] On early maps the name Lees Creek Road was given to the road which runs from Brindabella Road to the southern end of Blundells Creek Road. At this point it became Warks Road which continued through to Mount Franklin Road (crossing Bendora Road). On recent maps what was Lees Creek Road is shown as being a continuation of Warks Road. The name is retained here as it has been used to describe this site in previous papers.

shows, for each month, the average Golden Whistlers caught (bandings and number of Golden Whistlers caught on recaptures) at each site, on each visit, in each visit.

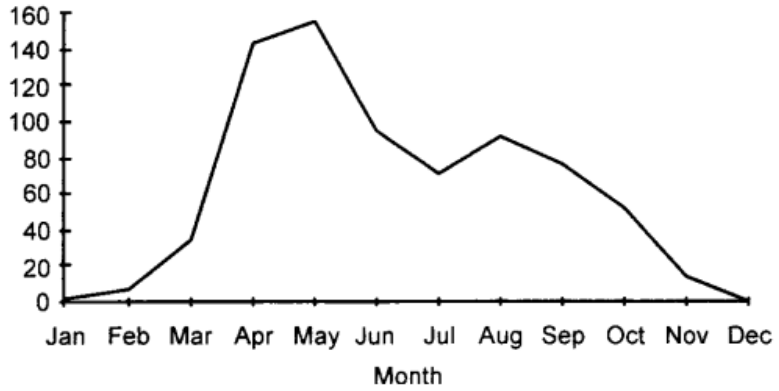

Figure 1. Total Number of days, by calendar month, on which Golden Whistlers were recorded in or from the garden of 5 Orchard Place, Melba, over the 26-year study period.

Table 1. Total number of visits (by calendar month) to New Chums Road and Lees Creek Road sites over the 21-year study period.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
New Chums Road	24	27	25	25	21	23	21	19	26	31	22	28	292
Lees Creek Road	15	11	13	14	9	8	4	6	6	16	14	10	126

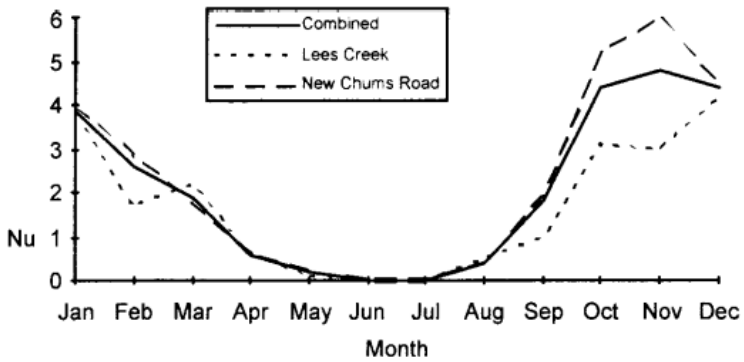

Figure 2. Averages (by calendar month) of the total number of Golden Whistlers caught at the Lees Creek and New Chums Road sites in the Brindabella Range. The combined monthly averages are also shown.

Discussion

Bearing in mind that only three sites are involved, a comparison of Figures 1 and 2 shows the numbers of Golden Whistlers in higher altitudes increase in summer and decrease in winter with the reverse occurring at a lower altitude. Golden Whistlers are not completely absent from higher altitudes during winter as a few (mostly adult males) were seen during visual censuses at New Chums Road during the winter (Lamm and Wilson 1966). However, none has been caught there between 29 May and 2 August.

The distribution of sightings in Melba is similar to the distribution of abundance figures derived from data collected from the Garden Bird Survey, e.g. COG (1996, 1997), and as such is representative of Canberra generally. Although largely absent from Melba during the summer months, small numbers of Golden Whistlers are found throughout the year in Canberra.

It must be remembered that figures showing the days on which the species was recorded at the Melba site provide, at best, a poor indicator of the total number of Golden Whistlers which frequent the area. It is possible the same individual was being seen on successive days or, on the other hand, many individuals were passing through the site.

Although the exact requirements are unknown, it seems likely that the continuing development of Canberra will provide an ever-increasing amount of habitat suitable to sustain Golden Whistlers during the winter. Although the origin of the Golden Whistlers which visit Canberra is unknown (none of the Golden Whistlers banded in the Brindabella Range has been recovered away from the Range) it seems fairly safe to assume that many of them are from the Brindabella Range. If this is so, it is a matter of speculation as to where birds from the Brindabella Range wintered prior to the development of Canberra - did they travel further afield or did they simply spread themselves thinly over the area now occupied by Canberra? What effect, if any, has this relatively new and abundant source of winter food so close to the Brindabella Range had on the dynamics of the population of Golden Whistlers, and indeed other species which breed in the range?

The number of days on which Golden Whistlers were seen at the Melba study site reached a peak in 1990 (Figure 3). The increase in numbers up to 1990 may reflect an increase in suitable habitat as vegetation in the study site and surrounding area matured. The decline after 1990 is not so easily explained. Has the site become less attractive to Golden Whistlers? Do Golden Whistlers prefer to winter in those suburbs which have attained suitable habitat along the edge of Canberra (with the development of more suburbs, Melba is getting further away from the edge of the suburban area - particularly the western edge which is closer to the Brindabella Range)? As the size of Canberra increases, is the wintering population of Golden Whistlers being spread more thinly over the available habitat and thus their occurrence in Melba has become less frequent? Has there been a reduction in the size of the breeding population of Golden Whistlers?

Golden Whistlers in adult male plumage are rarely observed at the Melba study site. Of the 701 visual records of Golden Whistlers (from 665 observation-days), male-plumaged birds were seen only 17 times (2.4% of records). The majority of the sightings of male-plumaged birds was in late winter and early spring. It is possible, therefore, that some or all of these had recently moulted from immature to adult male plumage. Indeed, one sighting on 17 September 1993 was of an 'immature male' which may have been a moulting bird. The monthly distribution of the sighting of male-plumaged birds is: April 2; June 2; July 1; August 2; September 8; October 2. Three of the sightings recorded the male as being in company with an adult female, and three in company with a brown-plumaged bird (i.e. it was not known if it was an immature bird or an adult female). Two of the sightings of males in company with another bird were in April and four in September. Were these pairs travelling together?

There have been several comments in *Canberra Bird Notes* on the small number of Golden Whistlers in male plumage seen in Canberra during the non-breeding season compared with a greater number in brown female plumage (e.g. Marchant 1973, Lenz 1982, Taylor 1984).

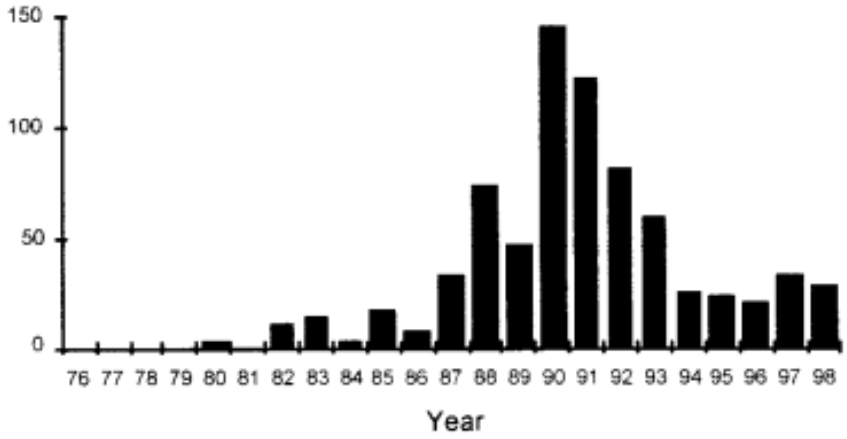

Figure 3. Number of days each year on which Golden Whistlers were recorded in, or from the garden of 5 Orchard Place, Melba.

Male Golden Whistlers do not attain the distinctive adult plumage until at least their second, but mostly third years (S. Wilson's bird-banding records, Schodde and Tidemann 1986). They may also breed before attaining adult plumage (Schodde and Tidemann 1986). The delay in males achieving adult plumage would reduce the number of birds in this plumage in the population compared with the other plumage types. However, it is unlikely to be sufficient to explain the low number of male-plumaged birds seen in Canberra. We can also find no evidence from bird-banding records, or elsewhere, that suggests males may lose their adult male plumage during winter.

This dearth of sightings of adult male birds therefore raises the question as to where adult males spend the winter. Do they remain at or near their breeding sites? Providing food is available, it would seem advantageous for them to do so. This would enable them to retain contact with the breeding site and not be exposed to the hazards of migration. Some evidence that this may happen is provided by Lamm and Wilson (1966) who observed 'mostly adult males' during visual censuses at New Chums Road during the winter.

Wintering Golden Whistlers at Wollomombi, 42 km east of Armidale, NSW, re-occupy territories annually (Bell 1986). There was no indication that this occurred in Melba. Bell also reported that wintering Golden Whistlers, particularly females, frequently participated in mixed-species feeding flocks (see also Bell 1980). During the cooler months mixed-species feeding flocks frequently moved through the garden at Melba. However, as few details were recorded of their species composition, the extent to which Golden Whistlers participated in these flocks is unknown.

The landscape of the area occupied by Canberra is changing from largely grassland to what, in many cases, can be best described as 'urban forest'. Will this result in more Golden Whistlers breeding in Canberra? Although Golden Whistlers are reported to have bred at Lake Ginninderra (Taylor and COG 1992) and in the Australian National Botanic Gardens (Department of the Capital Territory 1974), the only detailed record of breeding in Canberra appears to be that of an incubating bird observed by Barbara Allan at Lake Ginninderra on 27

August 1988 (COG 1990). We assume this to be one of the three records referred to in Taylor and COG (1992).

In addition to providing some information on attitudinal migration, the results of this study, particularly in relation to the Melba site, have raised a number of questions. The answers to these questions are beyond the scope of the present study. Perhaps someone can provide them.

References

Bell, H.L. (1980). Composition and seasonality of mixed-species feeding flocks of insectivorous birds in the Australian Capital Territory. *Emu* 80: 227-232.

Bell, H.L. (1986). Sexual differences in the behaviour of wintering Golden Whistlers *Pachycephala pectoralis* at Wollomombi, N.S.W. *Emu* 86: 2-11.

Canberra Ornithologists Group (1990). Annual Bird Report: 1 July 1988 to June 1989. *Canberra Bird Notes* 15: 69-122.

Canberra Ornithologists Group (1996). Annual Bird Report: 1 July 1991 to June 1992. *Canberra Bird Notes* 21: 69-124.

Canberra Ornithologists Group (1997). Annual Bird Report: 1 July 1992 to June 1993. *Canberra Bird Notes* 22 (Suppl).

Department of the Capital Territory (1974). *Birds in Canberra Botanic Gardens*. Australian Government Publishing

Lamm, D.W. and Wilson, S.J. (1966) Seasonal fluctuations of birds in the Brindabella (*sic*) Range, Australian Capital Territory. *Emu* 65: -207.183:

Lenz. M. (1982). Bird Report 1 July 1980 to 30 June 1981. *Canberra Bird Notes* 7: 2- 33.

Marchant. S. (1973). Birds in the Caswell Drive area. *Canberra Bird Notes* 2(5): 2- 16.

Schodde. R. and Tidemann, S.C. (editors) (1986). *Reader's Digest Complete Book of Australian Birds*. (2nd edition) Reader's Digest Services: Sydney.

Taylor. I. (1984). Annual Bird Report: 1 July 1982 to June 1983. *Canberra Bird Notes* 9: 50-139.

Taylor, M. and Canberra Ornithologists Group (1992). *Birds of the Australian Capital Territory - an Atlas.* Canberra Ornithologists Group and National Capital Planning, Authority: Canberra.

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.

Wilson, S.J. (1984). Golden Whistler, in Frith, H.J. (editor) *Birds in the Australian High Country*. Angus and Robertson: Sydney.

Wilson, S.J. (1995). Survival of Brown and Striated Thornbills in the Brindabella Range, Australian Capital Territory. *Corella* 19: 138-146.

Further reading on *Bird Movements in the ACT* in *Canberra Bird Notes*

Migration

Butterfield, M. (2017) Arrival of migrants in Carwoola. *CBN* 41(3) 257-260.

Dabb, G. (2025) The distribution and movements of the Freckled Duck with particular reference to places used during non-breeding periods, as shown by ebird data. *CBN* 50(1) 77-96.

Lenz, M., Clark, J., Nicholls, A.O. (2023). Dynamics of Eurasian Coot populations and their response to La Niña events on two Canberra urban ponds. *CBN* 48(1) 35-49.

Olsen, J. (2019) Telemetry and colour-banding confirm predictions about Little Eagle migration and territory desertion. *CBN* 44 (3) 241-249.

Taylor, I.M. (1985) The Arrival of Canberra's Summer Migrants - A Re-Examination. *CBN* 10(3) 105-109.

Honeyeaters Autumn

Davey, C., Prendergast, H., and Taylor, I. (1994) Honeyeater Migration through the Canberra. Region. A Project Proposal. *CBN* 9(4) 142-146.

Davey, C. (1986) Honeyeater Movement Pattern Through the Canberra Region Autumn 1985. *CBN* 11(1) 2-14.

Taws, N. (2004) Honeyeater migration in the ACT, autumn 2003. *CBN* 29(1) 1-8.

Wilson, S.J. (1998) Our early knowledge of honeyeater migration in the ACT. CBN 23(1) 1-2.

Honeyeaters Spring

Brookfield, M. (2002) The spring migration of honeyeaters into the Canberra region: what do we really know? *CBN* 27(3) 126-132.

Compston, E. *et al*. (2001) Inward migration of honeyeaters across the upper Shoalhaven Valley - Spring 2001. *CBN* 26 (3) 77-83.

Nix, H. (2010) Inward migration of honeyeaters across the Bredbo Badlands, Spring 2009. *CBN* 35(2) 117-120.

Altitudinal movement

Lenz, M. (2023) Out-of-season movement of some tall forest bird species from the mountains to lower-lying woodlands and suburbia. *CBN* 48(2) 79-85.

Banding

Clayton, M. (2014) Bird banding in the ACT – The early years and my involvement. *CBN* 39 (COG 59th anniversary) 58-62.

Stokes, T. (1975) A Report on banding activities at New Chums Road, A.C.T. *CBN* 3(2) 2-5.

Canberra Bird Notes 50(2) (2025): 290-324

6. Theme: *Birds of the Region – Biology, Behaviour and Breeding*

STEVE READ (steve.read123@gmail.com)

From its early issues to the present, *Canberra Bird Notes* (*CBN*) has contained articles on birds of the ACT and surrounding region. As befits a bird club, these are often reports of unusual occurrences or behaviour or breeding provided by members of the Canberra Ornithologists Group (COG, now Canberra Birds). Such articles reflect careful recording and observation of natural history, and are of intrinsic value, an early example being a record of friarbirds feeding on scale insects (D'Andria 1972). However, careful documentation of these 'Odd Observations' in a publication such as *CBN* also allows them to build the body of knowledge of our avifauna for future analysis, as they are searchable and citable by researchers planning research projects or compiling longer descriptive or analytical papers.

Over time, *CBN* articles have extended from individual observations to cover a wide range of enquiry: to detailed work on identifying individual difficult birds, decadal studies of changes in species distribution, and scientific studies on breeding success, then larger compilations or syntheses that put local work in a wider (often national) context, and finally to formal papers with significant impact on conservation actions. The consequent credibility of the journal has given *CBN* a much broader impact than the initial editors might have suspected would accrue to a bird club newsletter.

Across this evolution, articles track the use of newer technologies and methods. One coming into common use is acoustic identification and monitoring, and spectrograms representing complex sounds are increasingly shown. Well established is modern digital photography, with quality that would amaze earlier birders. This is exemplified by the article of Dabb (2016), on identification of a hybrid honeyeater at Jerrabomberra Wetlands, telling a story about a single bird, its origins and likely offspring, but with a level of analysis and accessible detail only possible through the careful assembly of striking images. And in good natural history fashion, continued observation over time has extended the narrative (see Dabb 2023 for example).

Some articles report unusual occurrences, such as of Glossy Black-cockatoos (Holliday 2004), a Powerful Owl (Munro *et al*. 2016) or more recently a large group of Black Kites (Rae 2025). Articles that report the first occurrence of a species in the ACT, or the first breeding records, often also foreshadow series of papers describing the progressive spread of the species across Canberra: an example is the first breeding records for koels in Canberra (Lenz *et al.* 2009; then see Holland 2021). Trends over time in the distribution of Crested Pigeons, Superb Parrots and Satin Bowerbirds, among others, have also featured.

Some articles on birds carefully report individual breeding events, one example being Metcalf and Metcalf (1986) on a breeding pair of Collared Sparrowhawks; others report unusual behaviours, such as video analysis of diving Australasian Shovelers (Wallace 2017). Lastly, compilations of knowledge of individual species can have conservation impacts. In this way, the Bounds (2019) paper on the Brown Treecreeper, using Canberra Birds monitoring data and other datasets, supported the successful nomination of loss of mature native hollow-bearing trees as a major threatening process for this and other declining woodland species in the ACT.

References

Bounds J (2019) Brown Treecreeper (*Climacteris picumnis*), its occurrence and status in the ACT, and dependence on mature, hollow-bearing eucalypts. *Canberra Bird Notes* 44: 109-121.

Dabb, G. (2016) The observing of a first-generation hybrid honeyeater, and the appearance of second-generation hybrids. *Canberra Bird Notes* 41: 206-217.

Dabb, G (2023) A hybrid *Phylidonyris* honeyeater has produced young intermittently between 2016 and 2023 at a site in Canberra. *Canberra Bird Notes* 48: 96-116.

D'Andria, A.H. (1972) Friarbird feeding on scale. *Canberra Bird Notes* 2: 11.

Holland, J. (2021) The rise and rise of the Eastern Koel in the ACT. *Canberra Bird Notes* 46: 105-118.

Holliday, S. (2004) The Glossy Black-Cockatoo in the Australian Capital Territory. Canberra *Bird Notes* 29: 125-130.

Lenz, M., Haygarth, S, Oren, Y. (2009) The first breeding records for the Eastern Koel *Eudynamys orientalis* in Canberra. *Canberra Bird Notes* 34: 93-102.

Metcalf, R., Metcalf, E.D. (1986) Notes on a breeding pair of Collared Sparrowhawks: arrival to hatching. *Canberra Bird Notes* 11: 114-120.

Munro, T., Bell, T., Bundock, J. (2016) Turner's Powerful Owl (*Ninox strenua*). *Canberra Bird Notes* 41: 194-196.

Rae, S. (2025) A concentration of Black Kites in the ACT area in March 2025. *Canberra Bird Notes* 50: 99-101.

Wallace, S. (2017) Shoveler diving. *Canberra Bird Notes* 42: 117-127.

Reprinted feature articles (3) originally published in:

Canberra Bird Notes 11(4) (1986): 114-120

NOTES ON A BREEDING PAIR OF COLLARED SPARROWHAWKS: ARRIVAL TO HATCHING

R. METCALF AND E.C. METCALF

For the last six years members of the COG Raptor group have been observing a pair of nesting Collared Sparrowhawks (*Accipiter cirrhocephalus*) in a Canberra park reputed to have supported breeding Sparrowhawks for at least 20 years. We are unable to say whether it was the same two birds over the last six years but there was no competition from other pairs of the same species within the park. The only other confirmed breeding pair resided 1.5km away though there was a possible third pair some 3-4km in the opposite direction.

All the nests were situated in *Pinus radiata*, most were about 18 metres up, near the crown of mature trees, though in 1984 the nest was only 9 metres up in a slender 30-year-old tree. Cupper and Cupper (1981) report a preference for Belar in areas where they occur. The actual site could be either in a fork or along a horizontal branch at a point where branchlets take off.

Usually new nests were made each year as the structure did not survive the winter. The 1981/82 nest, built in a fork, was an exception. A female was observed sitting on the nest in the following season but no young were fledged from that nest. However the presence of a newly fledged very vocal young female in March 1983 (two months later than our usual observations) suggests a second breeding attempt. Hollands (1984) reports that all five nests

he recorded were used for only one season. The young were fed almost exclusively on House Sparrows (*Passer domesticus*) though a European Goldfinch (*Carduelis carduelis*) was recorded on one occasion. The late youngster was twice fed very young squabs, presumably Feral Pigeon (*Columba livia*) which took some three hours to eat. Table 2 summarises the breeding success of the years 1980-1985. Further information on a single male is to be found in Metcalf (1981) and Olsen (1981) while information on the nestling and fledging stages has been reported previously, Metcalf (1982). Brown and Amadon (1968) stated that, 'nothing is recorded on display and mating.'

1983-84 BREEDING SEASON

The following notes on courtship, nest-building and brooding are based on some 120 hours of observations. Table 1 helps to show the almost perfect monthly duration of the phases of courtship, nest-building, incubation and nestling.

CALL

On August 30 1983 (counted as Day 1) a very vocal adult female was heard in the area. Calaby's epithet of "silent" (in Frith 1984) does not apply to these birds during the breeding season. The female called daily in mid-morning from one perch, with a constant raucous "Kkkwark". The male was first observed some ten days later and on Day 15 both were heard using a gentle "Kee-kee-kee" call. A louder more intense version of this call is used with increasing intensity when the birds are alarmed or are harassing birds such as Pied Currawongs (*Strepera graculina*). Once nest-building began the female was seldom heard but after the young fledged (Day 124) she reverted to the raucous tones that announced her arrival. The male's common call is a persistent whistling "Chew chew" once heard continuously for 70 minutes. There was also a call heard during copulation. It is believed that the male makes the call as the female appeared to be eating prey.

NUPTIAL FLIGHT

The nuptial flight was only observed twice, on 21 September (Day 23). It started with the birds circling about above the canopy. Then while one continued to circle the other climbed swiftly to 100 metres to fall with folded wings towards its mate only to shoot skywards again at the moment of meeting. The impression at the time of observation was that the larger (female) was the climber. (This would be unusual, generally the males would be the ones to engage in a display flight - Debus, and Ed.).

COPULATION

The first observed mating took place at 9.00am the following day (24). The male returned to the female, who had been calling spasmodically for 90 minutes. He carried a small piece of prey and flew with a fluttering beat, unlike his usual glide, to land near the female. She sidled up the branch towards him and they engaged in a little hopping dance, both birds balancing with spread wings. Then the female accepted the prey from the male and they mated for three seconds before flying off, the female to eat and the male to rest. There did not appear to be any sign of aggression in the manoeuvre. Copulation was then observed on most visits to the site and rose to a maximum number of six times on Day 57 and duration of 11 and 12 seconds on Day 59. It was last observed on 30 October (Day 62) about the time brooding started. However, watch on the nest site relaxed once brooding was established and our previous study had shown that copulation occurs again later in the season once the young have hatched. This was confirmed in the 1986 season with another pair.

TWIG DROPPING AND TERRITORIALITY NOTE

Numerous other birds were nesting within 50m of the Sparrowhawks' nest. These included Australian Magpies (*Gymnorhina tibicen*), Australian Magpie-larks (*Grallina cyanoleuca*), and Pied Currawongs the last being both the instigators or receivers of most of the physical harassment observed as they attempted to steal food and cached prey. The territorial boundary which received greatest respect was that between the Sparrowhawks and a pair of Australian Ravens (*Corvus coronoides*) who were already nesting when the raptors showed up. Though active harassment was never observed between them, three times during the nest-selection stage, the Ravens appeared to reassert their territorial rights. They were observed to break off a twig from the lower part of their tree and hop to the top and drop the twig. The boundary marked by this display was respected by the Sparrowhawks even after the Raven family moved away.

NEST BUILDING

On the day of the first mating, 22 September (Day 24) the female started to collect dry straight pine twigs about 30 cm long. To collect them she selected a dead branch and walked down it balancing on spread wings and testing branchlets with her weight until one broke off. She would fly off with the selected twigs in her beak. At first she seemed to be practising as she often dropped the twigs. This may have been before she started nest-site selection, when motivation was low. It may also have territorial significance or be an example of redirected aggression, apparently also shown by neighbouring Ravens.

The female took ten days over the choice of a nest site during which she tried out five positions but when she came to the sixth site on 1 October (Day 33) it was obvious that this was it. Most building was done in the late morning. She would work for 20 minutes placing and readjusting five or six twigs and then rest for ten minutes. On the first day she laid a platform of parallel twigs and on the second she set down a similar platform at right angles across the first. By the third day she was using carefully selected fine twigs to build up the body of the nest and on the fourth day set in place some large forked twigs that would later be used by the young as perches. Finishing touches and decoration continued for another four days and the nest was finished around 9 October (Day 41) but over the next two weeks an occasional twig would be placed and the female would sit briefly. By this time the male was bringing food to the female but on two occasions he was observed trying to break off dry twigs and several times brought dry or green twigs to the nest. These offerings seemed more of a ceremonial than a utilitarian nature. In 1980 the male brought green leaves to the nest on the days that the two young fledged. In 1983 his first offering was on Day 41 when the nest appeared to be structurally completed.

NOTES ON USE OF GREEN TWIGS

On the third day of building the female brought a terminal spray of *Eucalyptus rossii* leaves to the nest and was seen to repeat the action 14 more times until the young hatched. The female used only Eucalyptus sp. but the male brought in some Chinese Elm (*Ulmus chinensis*) and a green pine twig on a total of three occasions. It has been suggested that green leaves have antibiotic benefit (Clarke & Mason 1985). This may be so, or fresh leaves may simply be better (more pliable) nest lining than old leaves, therefore there is value in renewing them. Cupper and Cupper (1981) suggest that this relining stopped at about the time the chicks grew feathers. (They misuse the word "fledge" - Ed).

BROODING

By 21 October the female was spending more time at the nest than before. She had been the main defender of the territory in September but now left that more to the male, who had become more vocal and aggressive as she grew quieter with the approach of moulting and egg-laying.

The two fixed points in the area were the nest and the feeding bough where the male and female exchanged food. The male had a special perch but would not always sit on it and changed it twice during the season.

On day 62 (when copulation was last observed) the female had her usual early morning flight but for the first time the male sat on the nest, for 34 of the 48 minutes she was away, presumably on an egg. By Day 64 the female was definitely brooding, sitting low on the nest. The male would take over daily for periods of 40 to 70 minutes while the female ate the prey he had brought in. On day 90, there was a change in behaviour, she left the nest 2 hours late and after feeding she called the male from the nest and the pair spent five minutes calling and flying through the trees, a display possibly indicative of pipping. On day 93 she had been seen apparently inspecting the contents of the nest. On one occasion on 2 December (Day 95), prey supplied by the male was inadequate and the female shot off for 30 seconds and returned with a Sparrow, despite the fact that half her new tail feathers had only just appeared. At that time it was obvious that something had hatched as she was sitting higher in the nest.

Despite the difficulties of precisely pinpointing laying and hatching times, incubation time would appear to be around 30 days rather than the ‘probably incorrectly’ recorded 19 days still mentioned in Frith (1984) and mentioned with apparent reluctance by Brown and Amadon (1968). T. Ross has separately confirmed an incubation period of 35 days.

NESTLING

From 5 December (Day 98) intensive observations ceased. However inspection of the nest revealed one young and one addled egg. The youngster flew on 1 January 1984 (Day 125) and finally left the area on 20 January 1984, 144 days after the female was first sighted. This was some 22 days later than in the 1980 brood, which had moved out by 29 December 1980, but 4 days earlier than the brood that left in 1985.

REFERENCES

Brown, L. and Amadon, D. (1968), *Hawks and Eagles Falcons of the World*. Country Life Books.

Clark, L. and Mason, J.R. (1985), *Oecologia* 67, 169, (quoted in 'Keeping Clean the Starling Way', *New Scientist*, 21 November 1985, 1483, 31.

Cupper, J. and Cupper, L. (1981) *Hawks in Focus*. Jaclin Enterprises, Mildura.

Frith, H.J. (1984) *Birds in the Australian High Country* (Revised), Angus & Robertson.

Hollands, D. (1984) *Eagles, Hawks and Falcons of Australia.* Nelson, Melbourne.

Metcalf, E.C. (1981) Collared Sparrowhawk: Extracurricular Activities? *Canberra Bird Notes* 6: 84-85.

Metcalf, E.C. (1982) The Nestling and Post-Fledging of a family of Collared Sparrowhawks. *Canberra Bird Notes* 7:48-53.

Olsen, P. (1981) Collared Sparrowhawk collecting twigs for nest. *Canberra Bird Notes* 6: 87.

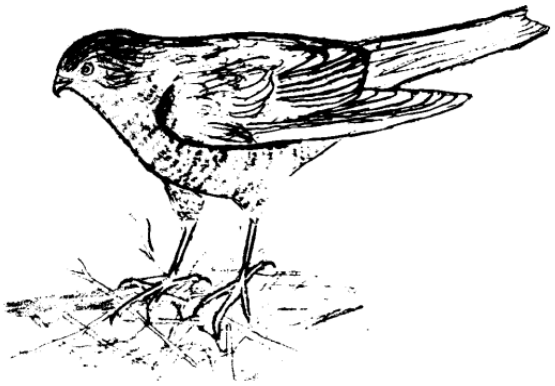

TABLE 1 SUMMARY OF EVENTS IN 1983-84
COLLARED SPARROWHAWK BREEDING SEASON

DATE	OBSERVATION DAY	ACTIVITY
30/8/83	1	Calling female first seen. Male seen in area.
8/9/83	10	Nuptial flight.
21/9/83	23	First Mating. Female starts
22/9/83	24	breaking off twigs. For next six days female builds at
25/9/83	27	five nest sites. Female decides on a nest site and
1/10/83	33	building proper begins. Nest structurally complete. Male
9/10/83	41	brings green twigs. Male on nest for 34 minutes of 48
30/10/83	62	minute break taken by female. Presumably there was at least one
1/11/83	64	egg in nest. Brooding underway. Female fed on
27/11/83	90	nest as Currawongs attack. Male and female do short vocal flight together. Nest unattended for ten minutes. Male brings dry twig under stimulus of pipping?
1/12/83	94	hatching?? Over next few days small changes in behaviour eg. inspection of nest before settling and more movement while brooding. Female sitting high on nest.
2/12/83	95	Female catches her own prey. Her
5/12/83	98	tail feathers just growing back after moult. Male feeds young.
8/12/83	101	Tree climbed. Contents: one young
1/1/84	125	(banded) one addled egg. Young flies.
20/1/84	144	Young leaves area altogether.

TABLE 2 SUMMARY OF BREEDING SPARROWHAWKS IN CANBERRA 1980-1986

YEAR	AREA	NEST	FIRST OBS.	ACTIVITIES	YOUNG	LAST SIGHTING OF YOUNG
1980	A	1	28 Oct.	Nest being built by single male. Gave up after 1 month (Metcalf 1981 and Olsen 1981).	none	
1980	B	2	12 Nov.	Nest found with brooding female.	two	30/12/80
1981	C	3	3 Dec.	Nestling and fledgling recorded by Metcalf (1982).	two	18/12/81
1982	C	3	14 Oct.	Nest and young. 1 sighting of adult female on nest. No young.	none	-
1982/3	B	-	6 Mar.	1 vocal juvenile observed over 1 month no nest found.	one	3/4/83
1983/4	B	4	30 Aug.	Nest building observed. Young	one	20/1/84
1984/5	D	5	Sep.	banded.	two	24/1/85
1985/6	-			Female seen flying in direction of Area D. Two fledged young found there later in season.		
				All areas checked through season. Adult female seen once in Area 2.	none	

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THE OBSERVING OF A FIRST-GENERATION HYBRID HONEYEATER, AND THE APPEARANCE OF SECOND-GENERATION HYBRIDS

GEOFFREY DABB[1]

24 Brockman St. Narrabundah, ACT 2604

Abstract. *This article reports on and discusses the appearance and continued presence, during 2016, of an unusual small honeyeater at a Canberra nature reserve. The bird in question is a cross between a New Holland Honeyeater and a White-cheeked Honeyeater. In spring 2016, the hybrid mated successfully with a New Holland Honeyeater, producing a second generation of natural hybrids. The author's own detailed observations began in mid-October 2016, but the observational story began several months earlier.*

The Two Species

The New Holland Honeyeater *Phylidonyris novaehollandiae* ('NHH') has a distribution in eastern Australia from south-east Queensland to South Australia, the ranges west of Canberra being about the inland limit at that latitude. The species is also found in south-western Australia. For the Canberra area, it is described as an 'uncommon breeding resident, often nomadic'. Its distribution is largely influenced by a strong preference for nectar-rich trees and shrubs, particularly banksias (*Banksia* spp.) and grevilleas (*Grevillea* spp.).

Around Canberra it particularly favours out-of-area plantings of such vegetation, and can be found year-round at the Australian National Botanical Gardens (ANBG) and in suitable pockets at Jerrabomberra Wetlands Nature Reserve (JWNR).

The White-cheeked Honeyeater *P. nigra* ('WCH') is also found in eastern and south-western Australia, the eastern coastal range being a narrow strip, generally not extending far inland of the Great Dividing Range. While nominal distribution needs to be treated flexibly in relation to nomadic honeyeaters, the WCH had not previously been regarded as occurring within 100km of Canberra.

The two species are closely related, having been treated as forming an 'infra-genus': *Phylidonyris (Meliornis)'* (Schodde and Mason 1999). They have a similar appearance in the field. Where both occur together they can be separated readily by the conspicuously large white cheek patch of the WCH or the conspicuously white iris of the NHH –'the bird with the "life-saver" eyes' (Hoskins 1991).

There are some differences between the two species in foraging behaviour, song, display flight, and habitat and nest site preference (Recher 1977).

An early but misconceived association of the two species may be found in the published journal of Surgeon-General White of the First Fleet. In that, the naturalist Dr George Shaw described the WCH as the female of the NHH (then called the 'New Holland Creeper') (Chisholm 1962).

[1] With the exception of Figures 1 and 2, all photos in this article by the author.

For the WCH, across its range breeding has been recorded in all months with a peak for egg records in July, coinciding with winter flowering of banksia species in the main areas of occurrence. The peak of grevillea flowering at JWNR, on which the NHH seems to rely, is in spring and early summer. Along the Murrumbidgee loose breeding colonies use the flowering *Grevillea juniperina*, again in spring and early summer (Frith 1969). COG data suggest the nesting season extends from August to March, with most breeding records from August to October. At JWNR dependent young were noticed from October to December 2016.

The earlier reporting

Reports of sightings of 'a WCH' at JWNR may be found at the eBird listing site (maintained by the Cornell Lab of Ornithology) and in the archives of the Canberra Ornithologists Group discussion list. The first report was by Brian Deans, a visiting observer, on 10 Dec 2015. Subsequent reports and photographs confirmed the continuing presence of a typical adult WCH, that being endorsed formally by the COG Rarities Panel.

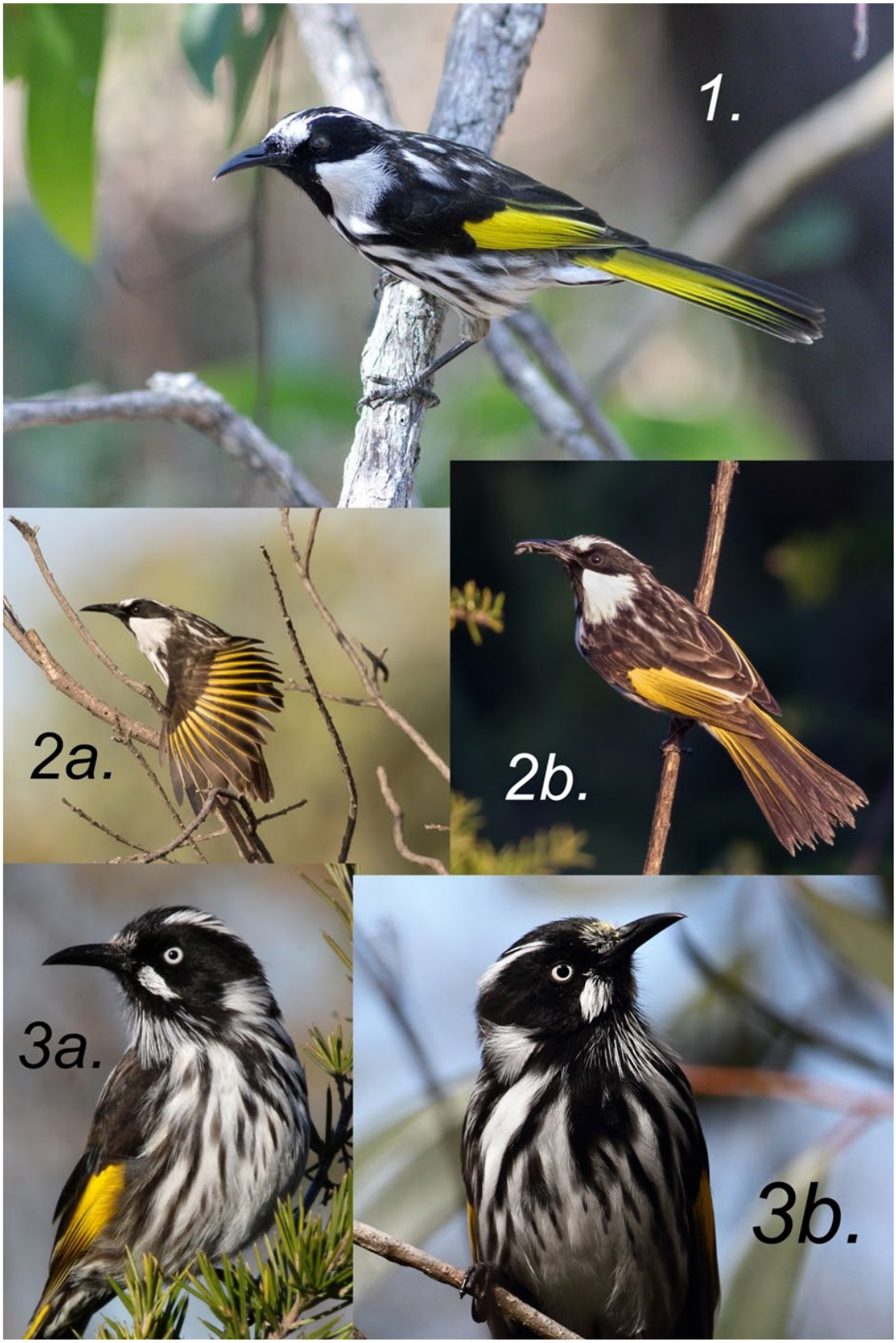
On 24 Sep 2016 Shorty Westlin took a photo, presumably of that WCH, and also obtained a photo of a similar but different bird of unusual appearance, suggested to be a possible young bird. On 30 September he obtained another photo of the unusual bird which he had observed being fed by a NHH. He suggested the possibility of a hybrid, WCH x NHH.

As shown under Characters below, the possible hybrid is of sufficiently distinctive appearance to justify the belief that local sightings and photographs of a bird of hybrid appearance during 2016 are probably all of the same bird. The bird in question is referred to here as the 'hybrid'.

In February 2016 photos were obtained by two separate observers of 'the WCH' which reveal, with the advantage of the September photos, the distinctive head features of the hybrid, so as to exclude the possibility it was the typical WCH that was being reported around the same time. Moreover the February photos suggested a sub-adult bird perhaps in post-juvenile moult, with a part-grown tail and some residual down. Photos accompanying some later reports are of the hybrid rather than the typical WCH. It seems likely that the hybrid is a bird from a local nesting in or around spring 2015, being the result of a mating between the single WCH reported in December and a NHH. A less likely hypothesis is that a very unusual individual of hybrid appearance occurred independently of, but at the same time and place as, a very rare WCH.

The possibility that two or more 'hybrids' were present at JWNR cannot be completely ruled out. Shorty Westlin has photos of a bird from March 2016 of slightly different appearance (depending on how the development of the facial plumage is interpreted), raising the issue of existence of a sibling of the hybrid. In a possibly related observation, Peter Milburn reported a White-cheeked Honeyeater at ANBG on 20 June 2016.

At the time of writing (December 2016) the hybrid can still be observed in its usual haunt at JWNR. However there has been no confirmed report of the typical WCH since late September.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2a.
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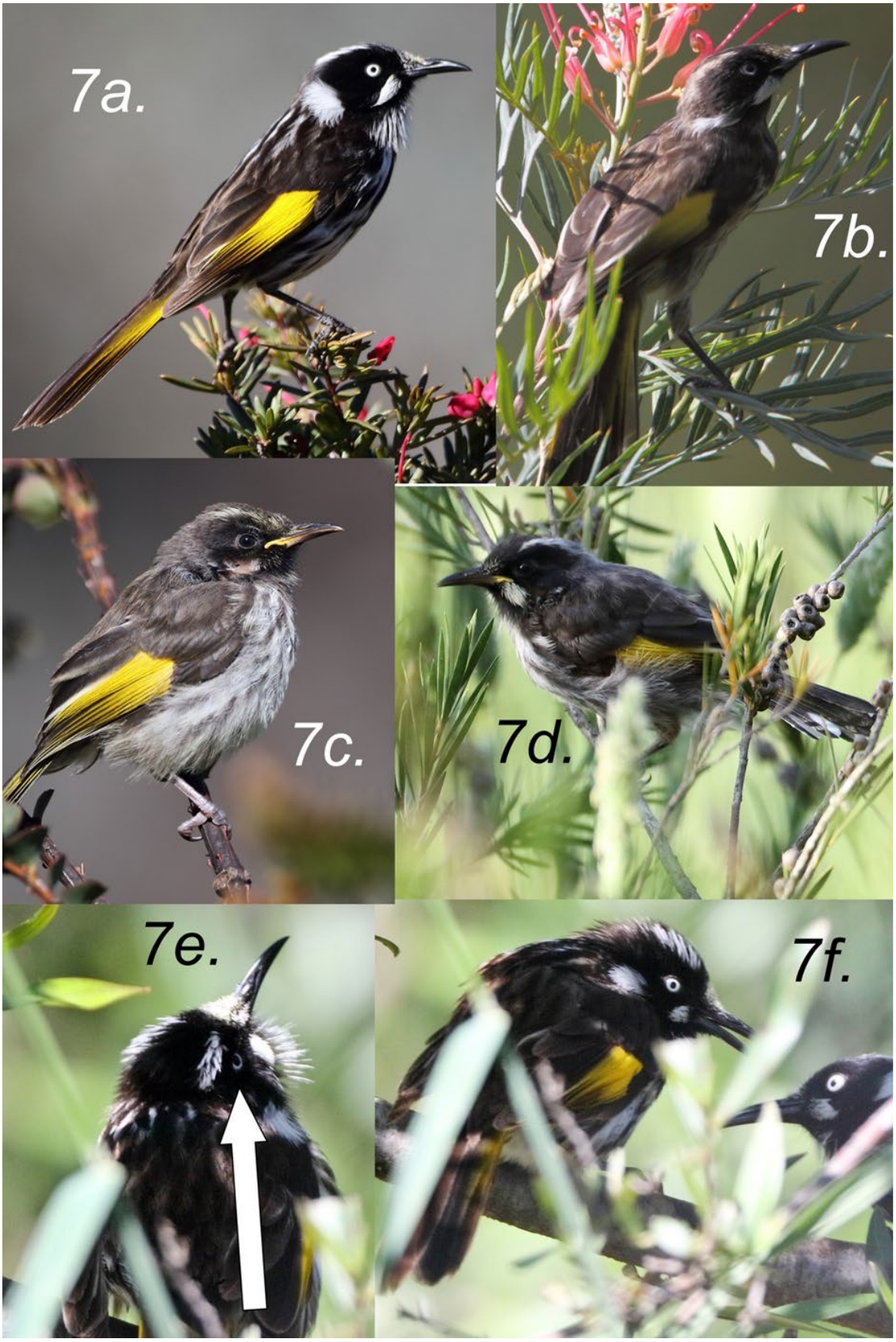
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Breeding, October-November 2016

The following observations are by the author. The hybrid was seen at JWNR carrying nest material on 19 October. This is evidence that it is a female, as in both parent species the female builds the nest (HANZAB). The probable nest site was within a metre of the ground in a dense tangle of Blackberry (*Rubus fruticosus*) and other low vegetation, about 20m from Jerrabomberra Creek. Both parents, the hybrid and a NHH, were seen carrying food to that site, and defending it. The marshy location recalls the comment that in the Sydney area the WCH 'inhabits thick vegetation bordering creeks, swampy situations with a rank growth of Sword-grass …' (Hoskins 1991).

On 18 November the hybrid was seen carrying food (many tiny arthropods) after foraging at the top of a small eucalypt. (Fig. 9).

On 20 November a speculative photo of the hybrid deep in the Blackberry revealed a begging nestling nearby. The next morning two fledglings were seen fluttering to a semi-obscured perch on dead African Boxthorn twigs (*Lycium ferocissimum*) in rank Blackberry growth. They remained in that thorny refuge for at least 40 minutes, being fed by both parents. (Fig. 10 – the NHH parent is shown with chicks in one frame, the hybrid in the other three.)

To monitor progress of the fledglings, visits to the site were then made about every second day up to 9 December. Initially the fledglings tended to remain out of view, their presumed locations being indicated by begging calls and repeated visits by the parents into dense shrubby vegetation. The pair including the hybrid continued to feed out-of-sight young until 6 December. At least one other brood of (NHH) dependent young was in the same area and the young seen could not be attributed to particular parents. What unusual plumage characters might have been transmitted to the new generation will only become evident when the young acquire their basic plumage.

Characters of the hybrid

Fig. 1 shows a typical WCH (photo: Graeme Chapman). Figs. 2a and 2b show the WCH observed at JNWR (photos: Shorty Westlin). Figs. 3a and 3b show a typical NHH. Fig. 4 shows the hybrid from various angles. All photos in Fig. 4 are of the same bird, some apparent differences being caused by varying light. The bird at top left shows reduced white head plumage due to matting following heavy rain. Attention is drawn to the following:

The lateral crown stripe of the NHH does not meet the white forehead patch. By contrast the relatively broad crown stripes of the hybrid, like those of a typical WCH, join at the forehead to create a white 'V' when seen from above.

(a) In its natural position the prominent white cheek patch (better described as a plume) of the WCH resembles a rough triangle with the apex coming within 3mm of the eye. The corresponding patch of the hybrid, while unlike the ear patch of the NHH, is a different, irregular shape and further from the eye with a concave upper margin tapering to a scattering of small white feathers among the black, in the malar area.

(b) The hybrid lacks the white malar tuft of the NHH.

(c) The hybrid has short black bristles at the throat with which are interspersed a few white bristles. In that area all of the NHH specimens in the CSIRO collection at Gungahlin ('ANWC') have longer white hair-like bristles, forming the prominent beard. No WCH specimens have bristles like the hybrid.

The hybrid has terminal white spots on the eight outer tail feathers (Fig. 5). Similar spots can be seen on NHHs foraging at the same location (Fig. 6). All the NHH specimens in the ANWC, of all ages, show such spots. None of the WCH specimens show such spots.

An unusual feature of the hybrid is the iris colour (Fig. 4), which might be described as 'pale chestnut' or 'reddish-brown'. The iris ring is darker adjacent to the pupil and pale and diffuse at the outer rim. The iris of an adult WCH is usually described as 'dark brown'; that of an adult NHH is a conspicuous white. Photographs and reports of the hybrid in February 2016 suggest (but not very clearly) a dark iris at that time, possibly an indication of a young bird. One would expect the eye colour of the hybrid to have stabilised by now, at the end of at least the first year.

In the absence of better guidance from the literature, Fig. 7 is intended to convey, for the NHH, some idea of age characteristics. Fig. 7a shows a relatively brown-backed bird, adult or near-adult, with well-developed white facial patches and a fully white iris. Fig. 7b shows an obviously younger bird (from ANBG), very brown with an undeveloped ear patch, but with a white or whitish iris. Fig. 7c is a bird perhaps 3 weeks after fledging, with a dark iris – 'muddy brown' in strong light – at JNWR on 17 October. Fig. 7d is a bird a few weeks older, in December, still with a dark iris. Figs. 7e and 7f are from the same location and show an older bird again, but still a 'dependent young', being fed by a parent in dense shrubbery. That bird shows a whitish iris.

The back of the hybrid, from nape to tail including the wings, is quite brown by comparison with most NHHs at the same site. Study skins of both species show back plumage of a range of brownish colours from very dark to pale. It is difficult to give, as attempted in HANZAB, a generalised description of the variable shades and textures. Stages of moult vary between individuals in the first year (HANZAB). However, examination of ANWC study skins of both species indicates younger birds are generally paler, with plumage wear being a possible additional factor contributing to brownness.

As an illustration of appearance in the field, Fig. 8 shows the hybrid (H) alongside a NHH (N) which, according to back colour, might be presumed to be younger than other NHHs at the site and possibly the same age as the hybrid. The two individual birds are remarkably similar.

Apart from the head and throat, the appearance of the hybrid is much closer to a typical NHH than to a typical WCH, but the possibility that it is an aberrant NHH is difficult to accept. (See Comments below.)

Hybridism

The following comments are drawn from McCarthy 2006. The traits of different parent species are expressed in hybrids in two typical ways. The size, shape or colour of a characteristic (e.g. a wing, bill or crest) might be intermediate between those of the two parent species, or the

hybrid might combine a trait of one parent with respect to one characteristic (e.g. wing pattern) with a trait of the other parent with respect to another characteristic (e.g. breast colour). (Here the hybrid appears to reflect both genetic possibilities in different body parts.)

McCarthy's hybrid category of a natural (i.e. non-captive) hybridisation that is neither 'ongoing' nor 'extensive' is (not surprisingly) the least reported category. Many single instances of hybridising in the wild are unlikely to be detected and reported. There are only two instances listed in relation to Australian honeyeaters, and neither involves either of the species considered here. There is no information about how frequently the cross presumed here might have occurred, or about its likely fertility. Some hybrids are fertile, some not, and some fertile but reproductively disadvantaged (McCarthy 2006; Gill 1995).

On the other hand, in McCarthy's list several instances of 'ongoing' hybridisation are mentioned among honeyeaters. Those usually involve a hybrid zone between two species or subspecies where the hybrid population might be, but need not be, treated as a *separate* species or subspecies. There is also a category of 'extensive' natural hybridisation, where there are many reports of the cross occurring in a natural setting. (Locally, Little Corella X Long-billed Corella might be in that category, although the question arises whether the original cross or crosses occurred in a captive setting.)

Comments

Some might not be convinced of the hybrid status of the 'hybrid' by the evidence of plumage and eye colour anomalies alone. However, if hybridising has not occurred here, the 'hybrid' must be a very unusual NHH. That would raise the question of what other genetic factors could have led to such striking plumage and eye colour anomalies in a non-hybrid individual.

The issue seems to be one calling for resolution by trapping, sampling, and molecular analysis.

Acknowledgements

But for Shorty Westlin's observations and photos of September 2016 the presence of the hybrid might have gone unnoticed for a long time. Photos or observations by the following were also useful: Brian Deans, Alastair Smith, Kym Bradley, Christine Darwood, Roger Williams, and Steve Wallace. Graeme Chapman gave comments and provided photos from other locations. Harry Recher, who has worked extensively on both the species in question, made helpful comments and suggestions. Leo Joseph gave helpful advice and enabled access to the ANWC material. Dick Schodde gave informative comments. Barbara Allan provided information about relevant deliberations of the COG Rarities Panel. The ornithologists consulted are thanked for their interest and encouragement, although their individual views do not necessarily coincide with all the conclusions expressed in this article.

References

For constructing the account of earlier reporting, the digital holdings are of particular importance. Anyone interested in pursuing those might search the two relevant sites by species name and/or location for the period from December 2015. The sites are:

'eBird' – 'a real-time, online checklist program', launched in 2002 by the Cornell Lab of Ornithology and the National Audubon Society –

http://ebird.org/ebird/australia/explore

The Canberra Ornithologists Group's Canberra Birds email list – http://bioacoustics.cse.unsw.edu.au/archives/html/canberrabirds

COG data: http://canberrabirds.org.au/birds/

Chisholm, A.H. (ed.) (1962) *Journal of a Voyage to New South Wales by John White* (originally published 1790). Angus & Robertson, Sydney.

Frith, H.J. ed. (1969) *Birds in the Australian High Country*. Reed, Sydney.

Gill, F.B. (1995) *Ornithology* 2nd ed. W.H. Freeman and Company, New York.

Higgins, P.J., Peter J.M., and Steele, W.K. (Senior Eds.) (2001) *Handbook of Australian, New Zealand and Antarctic Birds*. Vol. 5. Oxford University Press, Melbourne. ('HANZAB')

Hoskins, E.S. (1991) *The Birds of Sydney* 2nd ed. Surrey Beatty & Sons, Chipping Norton, NSW.

Longmore, W. (1991) *Honeyeaters and their Allies of Australia.* Collins Angus & Robertson, North Ryde.

McCarthy, E.M. (2006) *Handbook of Avian Hybrids of the World.* Oxford University Press, Oxford.

Recher, H.F. (1977) 'Ecology of co-existing White-cheeked and New Holland Honeyeaters'. *Emu* 71, 136.

Rogers, K., Rogers A., and Rogers D. (1986) *Bander's Aid: A Guide to Ageing and Sexing Bush Birds.* A. Rogers, St Andrews.

Schodde, R. and Mason, I.J. (1999) *The Directory of Australian Birds: Passerines.* CSIRO Publishing, Collingwood.

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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.

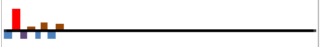
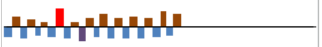
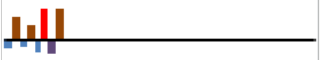
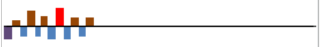
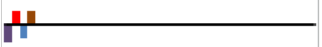
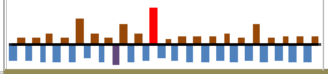
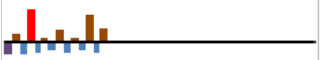
Seq.		*Time underwater (under) and time at the surface (above)*	Min (sec)	Max (sec)	Range (sec)	Av (sec)	StdDev	Number of dives	Percent under water	Dive rate per minute
1	Above		2.9	13.0	10.1	6.2	4.64			
	Under		5.4	5.7	0.3	5.6	0.13	4	47	5.1
2	Above		3.2	5.1	1.9	4.1	0.97			
	Under		5.4	5.6	0.2	5.5	0.08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

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

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.

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).

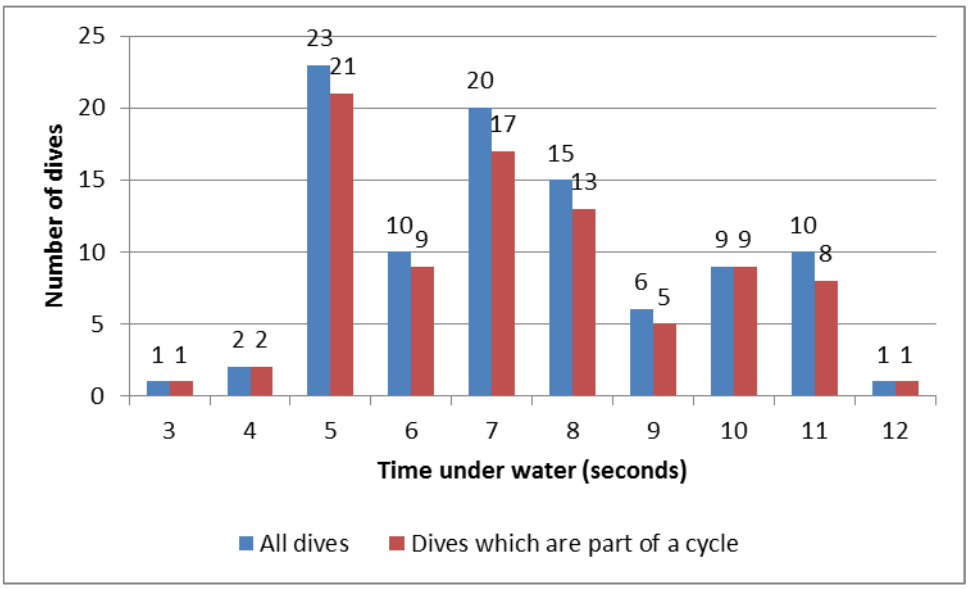


Figure 6. Distribution of time under water.

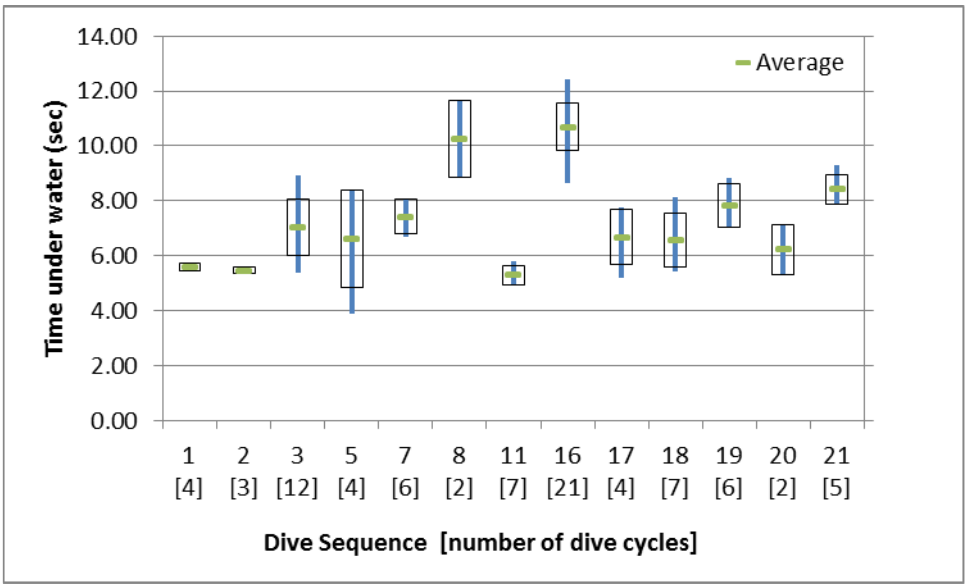


Figure 7. Range of dive times, average dive time and standard deviation box for dive sequences with more than one dive cycle.

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.

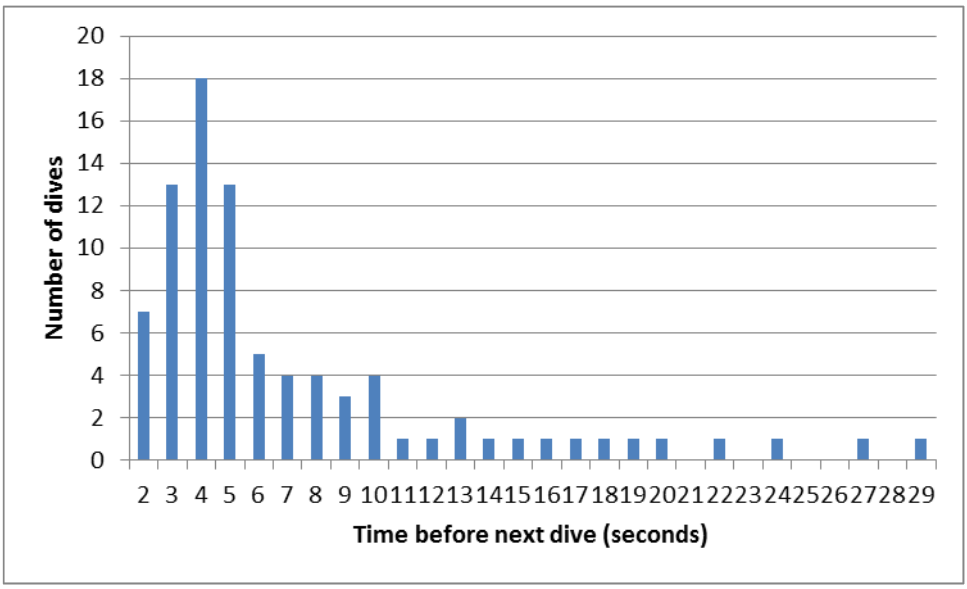


Figure 8. Distribution of time before the next dive.

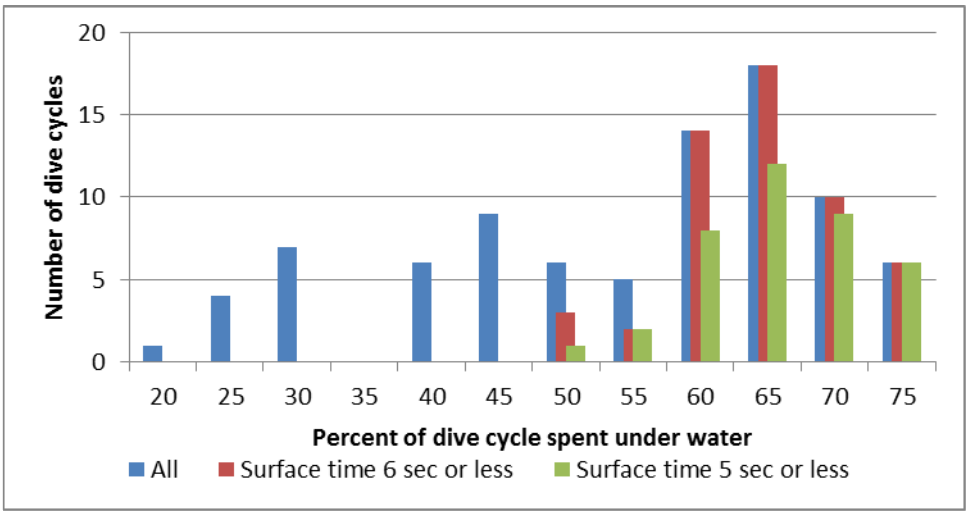


Figure 9. Distribution of the percentage of the dive cycle spent under water for different times on the surface between dives.

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).

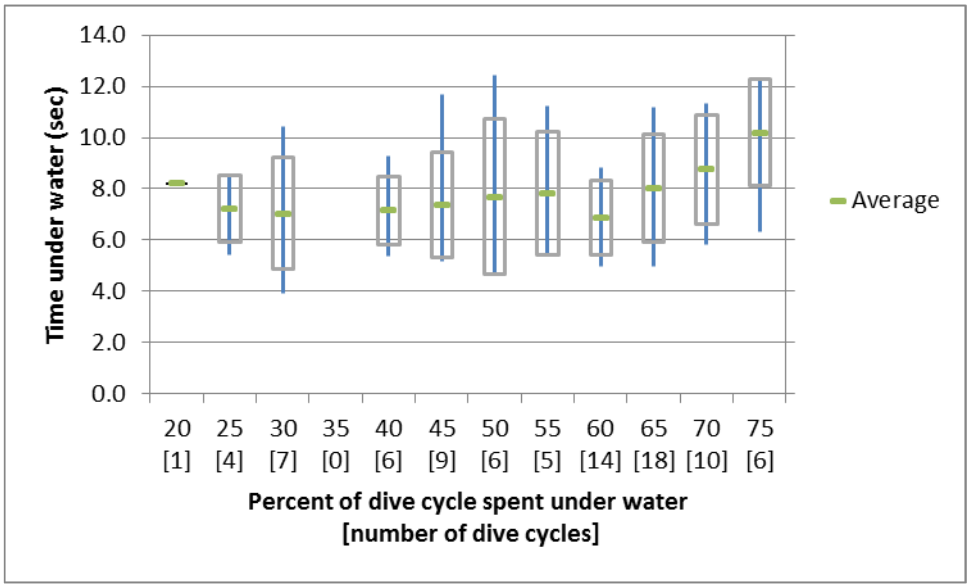


Figure 10. Range of dive times, average dive time and standard deviation box for the percent of dive cycle spent under water.

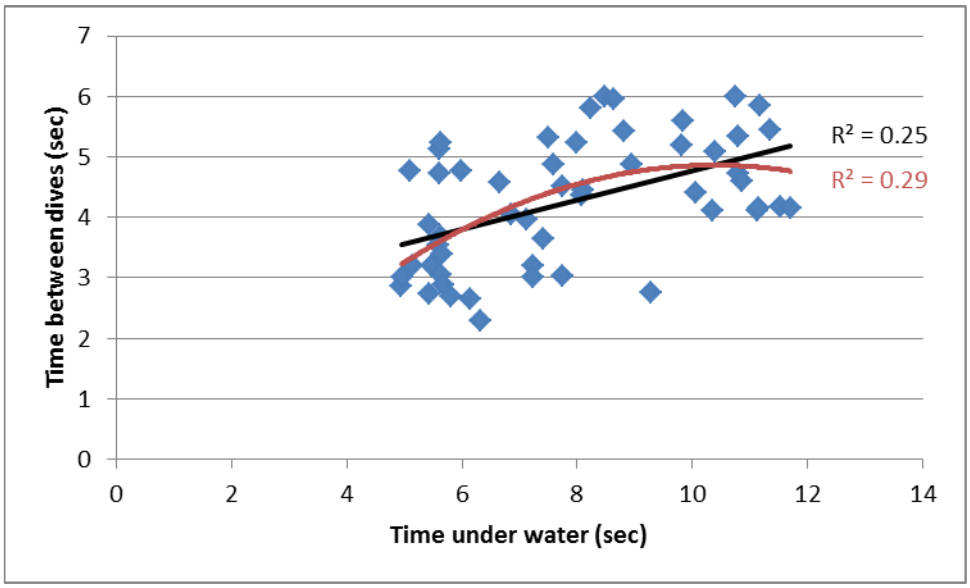


Figure 11. Relationship between time under water and time above water before the next dive for data where time between dives is 6 seconds or less (r2=0.25 for linear with no intercept defined, Time between dives = 0.2412 x Time under water + 2.3605; r2=0.29 for 2nd order polynomial, Times between dives = -0.0554 x Time under water^2 + 1.1504 x 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 x rate^3 - 1.63 x rate^2 + 6.51 x rate + 0.52) gives an R^2 of 0.50.

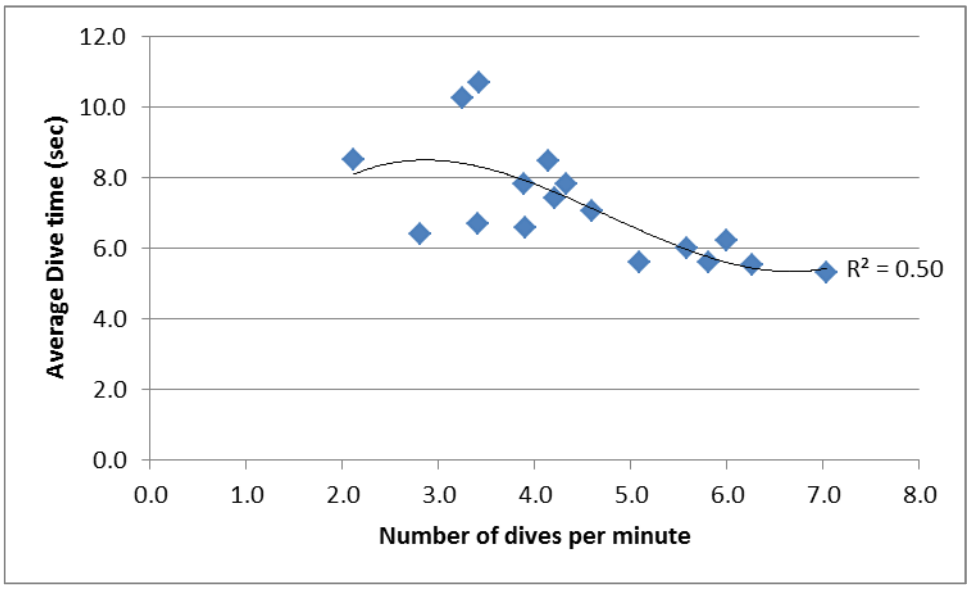


Figure 12. Relationship between the dive rate and the average dive time. Average dive time = 0.11 x rate^3 - 1.63 x rate^2 + 6.51 x rate + 0.52, R^2 = 0.50.

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 membranaceous*) (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 is 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. Sequences 8 and 16 look as if 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

References

Black, M.S. (1959) Shovelers diving for food. *Notornis* 8: 118-9.

Forsyth, A. (2008) Shoveler Diving. https://www.youtube.com/watch?v=m_Qm5exaZt4 (Viewed 1 Sept 2016).

Heath, J. (2006) Eider diving. Loaded by E. Smith (2009). Accessible at https://www.youtube.com/watch?v=-euc940SCsk (Viewed 1 Sept 2016).

Heath, J.P., Gilchrist, H.G. (2010) When foraging becomes unprofitable: energetics of diving in tidal currents by common eiders wintering in the Arctic. *Marine Ecology Progress Series* 403:279-290.

Heath, J.P., Gilchrist, H.G. and Ydenberg, R.C (2007) Can dive cycle models predict patterns of foraging behaviour? Diving by common eider in an Arctic polynya. *Animal Behaviour* 73:877-884.

Houston, A.I. & Carbone, C. (1992). The optimal allocation of time over the dive cycle. *Behavioral Ecology* 3:255-265.

Sask birder (2014) Northern Shoveler duck is diving. Location: Regina, SK Canada Oct 23, 2014, *Youtube* 24 Oct 2014. Accessible at https://www.youtube.com/watch?v=irPv6I0i7q0 (Viewed 23 June 2016).

Thompson, D. and Fedak, M.A. (2001) How long should a dive last? A simple model of foraging decisions by breath-hold divers in a patchy environment. *Animal Behaviour* 61: 287–296.

Wallace, S. (2016a) IBC1244597. Accessible at http://hbw. com/ibc/1244597 (Viewed 23 June 2016).

Wallace, S. (2016b) IBC1244598. Accessible at http://hbw.com/ibc/1244598 (Viewed 23 June 2016) [Australasian Shoveler diving near vortexing Pink-eared Duck].

Wallace, S. (2016c) IBC1244669. Accessible at http://hbw.com/ibc/1244669 (Viewed 1 Sept 2016) [Hardhead diving near vortexing Pink-eared Duck].

Further reading on *Birds of the Region - Biology, Behaviour and Breeding* in *Canberra Bird Notes*

Biology and Behaviour

Butterfield, M. and Clifton, G. (2017) Predation of microbats by falcons. *CBN* 42(3) 241-244.

Callaway, R. (2019) Census of Sulphur-crested Cockatoos and Little Corellas in Canberra during winter 2018. *CBN* 44(2) 136-140.

Callaway, R. (2019) Observations of ibis roosts and movements in Tuggeranong 2015 – 2018. *CBN* 44(2) 141-144.

Dabb, G (2018) Age-related variations in plumages of Eastern Koel *Eudynamys orientalis*. *CBN* 43(2) 161-17.

Dabb, G. (2019) The Feral Pigeon: a discussion, *CBN* 44(3) 250-270.

Dabb, G. (2023) A hybrid *Phylidonyris* honeyeater has produced young intermittently between 2016 and 2023 at a site in Canberra. *CBN* 48(2) 96-116.

Dabb, G. (2024) Noisy Miners and Common Mynas in suburban Canberra in spring 2024. *CBN* 49(2) 108-131

Darwood, C. (2015) Observations of Eastern Koels in Flynn during the early months of 2015. *CBN* 40(2) 162-171.

Holland, J. (2015) Observations on the roosting behaviour of the Magpie-lark in Chapman/Rivett. I. Summer and autumn 2015. *CBN* 40(3) 242-254.

Holland, J. (2015) Observations on the roosting behaviour of the Magpie-lark in Chapman/Rivett. II. Winter and spring 2015. *CBN* 40(3) 255-269.

Holland, J. (2017) Observations on the roosting behaviour of the Red-rumped Parrot in the Chapman area. I. Roost flights from 2005 to 2016. *CBN* 42(2) 159-172.

Holland, J. (2017) Observations on the roosting behaviour of the Red-rumped Parrot in the Chapman area. II. Other roost sites and flights in 2016. *CBN* 42(2) 172-182.

Hurrell, J. (2024) Spotted Harrier observations in the Molonglo River Reserve March – May 2023. *CBN* 49(1) 21-29.

Lenz, M. (2004) Numbers and behaviour of Welcome Swallows at a suburban roost in Kingston, ACT. *CBN* 43(3) 236-251.

Lenz, M. (2017) Behaviour of a congregation of Weebills in the absence or presence of large honeyeaters. *CBN* 42(2) 146-155.

Lenz, M. (2018) Numbers and behaviour of Welcome Swallows at a suburban roost in Kingston, ACT. *CBN* 43(3) 236-251.

Olsen, J and Trost, S. (2020) Southern Boobooks in the Black Mountain, Aranda, Cook area 2019.*CBN* 45(3) 220-223.

Peachey, M. (2012) Time budget and behaviours of White-winged Choughs (*Corcorax melanorhamphos*) in Weston Park, Canberra, in winter. *CBN* 37(3) 167-179.

Peachey, M. (2013) Psittacine beak and feather viral disease in parrots in the ACT. *CBN* 38(2) 106-118.

Peneaux, C. and Griffin, A. (2015) Opportunistic observations of travel distances in Common Mynas (*Acridotheres tristis*). *CBN* 40(3) 228-234.

Smith, A. (2018) Sleuthing the vocalisations of the ACT's first accepted record of Black Bittern, *CBN* 43(2) 179-185.

Wallace, S. (2013) Australian Little Bittern behaviour. *CBN* 38(2) 119-133.

Wallace, S. (2024) Australian Little Bittern (*Ixobrychus dubius*) – behaviour updated. *CBN* 49(2) 91-107.

Notable Breeding Observations

Abernathy, V.E. and Langmore, N.E. (2016) Observations of the breeding behaviour of the Pacific Koel in relation to its newest host *CBN* 41(2) 124-134.

Antram, F. (2022) Long-staying Singing Honeyeater and attempted breeding near Goulburn, NSW. *CBN* 47(1) 45-48.

Ayliffe, D. (2012) Early breeding record for Common Bronzewing (*Chaps chalcoptera*) in Fraser ACT, August 2012. *CBN* 37(3) 202-205.

Bounds, J., Brookfield, M. and Delahoy, M. (1996) Observations of a breeding colony of four pairs of Regent Honeyeaters at North Watson, Canberra. *CBN* 21(3) 41-55.

Bounds, J., Clayton, M. and Taws, N. (1999) Observations of Regent Honeyeaters in failed breeding attempts at Mulligan's Flat Nature Reserve and Gooroo in the 1998/99 summer. *CBN* 24(1) 18-25.

Butterfield, M. (2009) Royal Spoonbills breeding at Kelly's Swamp. *CBN* 34 (2) 86-92.

Butterfield, M. (2013) Carwoola Frogmouths: business as usual and unusual. *CBN* 38(3) 229-232.

Butterfield, M. (2017) Breeding of Whiskered Tern (*Chlidonias hybrida*) in the COG area of interest. *CBN* 42(2) 128-133.

Clark, J. (2016) Breeding of rails, gallinules and coots in Gungahlin in the 2015/2016 season. *CBN* 41(3) 225-232.

Clark, J. (2018) Red-capped Robins breeding in suburban Amaroo: 2017-2018. *CBN* 43(2) 172-178.

Clark, J. (2020) A juvenile Eastern Koel (*Eudynamys orientalis*) in our Amaroo garden - 2020. *CBN* 45(3) 311-315.

Darwood, C. and Lenz, M. (2021) First breeding attempt by Singing Honeyeater in Canberra. *CBN* 46(1) 51-56.

Darwood, C. and Curnow, R. (2022) Blue-billed Ducks breeding at West Belconnen Pond. *CBN* 47(1) 81-83. 34-38.

Davey, C. (1987) Local waterbird breeding records 1974 to 1985. CBN 12(1) 2-7.

Davey, C. (1995) Territoriality and breeding success of Australian Magpies in a Canberra suburb. *CBN* 20(2) 25-31.

Davey, C. (2006) Australian King Parrots breeding within the Canberra Nature Park. *CBN* 31(2) 111-115.

Davey, C. and Fullagar, P. (20111) Silver gulls breeding on Spinnaker Island, Lake Burley Griffin, spring 2010. *CBN* 26(2)

Er, K, Wong, T.H. and Chee, Y.E. (1995) Tree species preference of nesting Magpie-larks in the Australian National University campus – native or exotic? *CBN* 20(3) 64-69

Davey, C. and Fullagar, P. (2016) Silver Gulls breeding on Spinnaker Island, LBG, spring 2013 and 2015. *CBN* 41(3) 197-205.

Gleeson, J.A. (1999) Breeding observations of Crimson and Eastern Rosellas in suburban nestboxes. *CBN* 24(3) 167-172.

Graham, B. (1990) Habitat requirements of two pairs of Hooded Robins near Canberra - a preliminary report. *CBN* 15(2) 22-27.

Graham, B. (1993) Further notes on Hooded Robins near Canberra. CBN 18(2) 23-28.

Graham, B. and Clark, J. (2015) Australian Spotted Crakes breeding in Forde, Canberra. *CBN* 40(2) 115-121.

Handel, K. and McDonald (2022) A trio of White-necked Herons (*Ardea pacifica*) breeding in Wamboin, NSW. *CBN* 47(1) 22-28.

Hedley, W. and Holland, J. (2018) Breeding observations of the Grey Butcherbird, including a repeat brood, in the Chapman/Rivett area. *CBN* 43(2 143-148.

Henderson, S. (2016) The Red Rocks Gorge Peregrine Falcons. *CBN* 41(2) 155-160.

Henderson, S. (2021) Three unusual breeding events for the ACT: Silver Gull, Great crested Grebe and Blue-billed Duck – Personal observations (mostly). *CBN* 46(1) 36-44.

Higgins, M. (2023) Lyrebird nest at Black Range NSW, May-August 2023. *CBN* 48(2) 69-78.

Higgins, M. (2025) Tawny Frogmouth nest, Black Range NSW, 2023. *CBN* 49(1) 35-40.

Holland, J. (1998) Observations of successive nesting attempts by Crested Pigeons in a Chapman garden. *CBN* 23(2) 17-19

Holland, J. (2000) Further observations of nesting by Crested Pigeons on the border of Chapman and Rivett. *CBN* 25(2) 72-76.

Holland, J. (2004) Silver gulls breeding on moored boats on Lake Burley Griffin. *CBN* 29(1) 9-15.

Holland, J. (2014). Flame Robins breeding in brown plumage at Campbell Park in 2014, and an analysis of their peri-urban breeding records in Canberra. *CBN* 39 (3) 185-192.

Holland, J. (2015) Further observations of Eastern Koel fledglings in Rivett during the summer of 2015. *CBN* 40(2) 147-161.

Holland, J. (2017) Further observations of Eastern Koel adult and fledgling behaviour in Chapman/Rivett during the summer of 2016-2017. *CBN* 42(3) 267-280.

Holland, J. (2017) Changing adult behaviour and a significant increase in Eastern Koel breeding in Canberra in the summer of 2016-2017. *CBN* 42(3) 281-292.

Holland, J. (2018) The 2017-2018 Eastern Koel season. iii. Observations of adult and fledgling behaviour in wider Canberra. *CBN* 43(3) 274-289.

Holland, J. (2021). Summary of the 2020-2021 Eastern Koel season in the ACT, with record numbers of fledglings. *CBN* 46(2) 118-144.

Holland, J. (2024) An Australian Hobby breeding attempt in Chapman. *CBN* 49(1) 30-34.

Hotchin, J. and Read, S. (2025) A Gerygone observation and the phenomenon of multiple nests. *CBN* 50(1) 21-24.

Kent, J. (2024) Willie Wagtails with a taste for a bonsai home. *CBN* 49(1) 16-20.

King, D., Arblaster, J. and King, B. (2021) Kookaburra sits in the new gumtree: Laughing Kookaburra (*Dacelo novaeguineae*) breeding habitat in suburban Belconnen. *CBN* 46(1) 18-35.

King, D. (2023) Diet of suburban Laughing Kookaburra (*Dacelo novaeguineae*) nestlings. *CBN* 48(1) 18-34.

Lenz, M. and Dabb, G. (2003) Breeding by Painted Honeyeaters in the Canberra Region during the 2002-03 influx. *CBN* 28(1) 1-9.

Lenz, M., Dabb, G., Green, T., Gourlay, T., Holliday, S., Buckley, P. and Oren, Y. (2004) First record of Glossy Black-cockatoos breeding in the Australian Capital Territory. *CBN* 29(4) 131-136.

Lenz, M., Haygarth, S. and Oren, Y. (2009) The first breeding records for the Eastern Koel *Eudynamys orientalis* in Canberra. *CBN* 34 (2) 93-102.

Lenz, M., Nicholls, N (A.O.) and Williams, R. (2013) House Sparrows nesting in mistletoes and nests of Fairy Martins near Gundaroo. *CBN* 38(3) 233-236.

Lenz, M. (2014) How prolific are Noisy Miners? The 2010/11 breeding season on the campus of the ANU. *CBN* 39(2) 140-146.

Lenz, M. and Nicholls, N. (AO). (2017) The breeding season of White-winged Triller and Rufous Songlark in the high-rainfall year of 2016 at a site near Canberra. *CBN* 42(3) 258-267.

Lenz, M. (2019) Notes on the breeding of Masked and White-browed Woodswallows in the 2018/19 season in the COG Area of Interest. *CBN* 44(2) 152-162.

Lenz, M., Darwood, C. and Clark, J. (2022) A second year of breeding attempts by Singing Honeyeaters in Canberra. *CBN* 47(1) 39-44.

Magrath, R.D. (1997) Breeding season of White-browed Scrubwrens in Canberra. *CBN* 22(1) 15-17.

Metcalf, E.C. (1982) The nestling and post-fledging of a family of Collared Sparrowhawk. *CBN* 7(2) 49-55.

Rae, S. (2017) Breeding success of Tawny Frogmouths in relation to rainfall. *CBN* 42(2) 140-145.

Rae, S. (2024) Evidence of polygamy in the Tawny Frogmouth. *CBN* 49(2) 132-135.

Rowley, I. (1999) Cooperative breeding by Dusky Woodswallows. *CBN* 25(2) 49-58.

Smith, A. (2016) First breeding record for Pink-eared Duck in the ACT. *CBN* 41(2) 167-170.

Smith, A. (2020) Interbreeding between Red-capped and Scarlet Robins. *CBN* 45(3) 289-292

Wallace, S. (2012) 161 Autumn breeding of the Speckled Warbler in the ACT. *CBN* 37 (3) 161-166.

Wallace, S. (2015) Observations on the development of the Australian Spotted Crake. *CBN* 40 (2) 122-131.

Wallace, S. (2020) Breeding of Bassian Thrush at the Australian National Botanic Gardens in 2018. *CBN* 45(2) 107-110.

COLUMNIST'S CORNER

Canberra Bird Notes 50(2) (2025): 325-328

The hobby of birds in the 21st century.

The above title is used to refer to today's wide range of bird-related recreational activity. In the view of this columnist, the terms 'bird watching' and 'birding' are not adequate for present purposes.

The last 25-odd years have seen a lot more people become interested in birds. This is partly because there are more people around, particularly retired ones with time on their hands and enough money to buy a pair of binoculars and a camera, and to travel. Another reason is new technology. Here I mention some changes under these headings: photography, communicating, recording, books, and the globalising of the hobby.

Photography

This has become much easier and less expensive. With film in the camera, it used to cost about $2 to attempt a bird image with one click of the shutter. Now, the film-free bird snappers I see in the field, with their ever-improving gear, have increased by a factor of 20 or more. Clearly, many of them only acquired an interest in birds by first making use of them as an interesting photography subject. Moreover, unlike 25 years ago, many experienced observers now carry and use a camera.

The better bird photos are now of a much higher quality than 25 years ago. On a smaller scale, you might have noticed the corresponding boom in audio recording.

Communicating

The digital medium helps you to show other people your bird photos, and to air your sound recordings. It also provides a whole new avenue for talking about birds, and for sharing information, about where unusual ones are to be found, for example.

In Canberra a notable change occurred at about the turn of the millennium. In the 1990s something called the 'ACT Bird Watchers Hotline' enabled you to dial a phone number and listen to a taped summary of local bird news. At the end, you had the opportunity to state your own news for the next edition.

Then email changed the bird scene for Canberra's birdians, most being members of 'COG', the local bird interest group. This development was reported by COG's president, for the year 2000 (CBN 26:1 March 2001):

> COG's email discussion list 'canberrabirds' continued to operate effectively throughout the year. It has over 90 subscribers and averages about two messages per day, providing a useful forum for members and friends of COG to discuss topical issues relating to birds and birding in the Canberra region.

The same report noted that at that time the steam-age COG Hotline was still chugging along, but the number of contributors 'had declined since the email discussion list [had] been established'. The amount of traffic on 'canberrabirds' has itself now declined, perhaps due to popularity of other digital forums and networks.

Making records

This activity covers a spectrum that includes (a) systematic recording for a scientific project, (b) recording just about every bird seen in the hope it will be of some use in learning whether birds are declining, increasing or moving around, (c) the pursuit of a life list, year list, backyard list or similar personal record, and (d) recording simply to have something to show for a day's outing.

For many birdian organisations, a regular production has been a published annual bird report (ABR), based on sightings over a year of each species in a given region. It is usually the result of volunteer efforts for both the sightings and the compilation.

The COG ABR in 2016 (CBN 41:1) noted that in 2014-2015 there had been a significant increase of sightings to 118,565. These came from 7860 'sheets' from 245 observers. (In 2009-2010, there had been 2578 sheets from 143 observers.) The trend was due in part to 'the large increase in sightings submitted through eBird'.

In 2018-2019, for the (sadly) final COG ABR, the 209,239 sightings from eBird represented 94.4% of total recorded sightings. These were becoming too many for processing by the traditional COG ABR method, which had inferred trends from year-to-year comparisons, given a fairly even level of observer activity. The remarkable rise of eBird as an international phenomenon is referred to below.

BirdLife Australia's annual week-long October bird count should be mentioned here. This is strongly promoted for wide public participation. Changes in format make it difficult to compare yearly numbers, but 'participants' this year are likely to exceed the reported 57,012 of 2024.

A word about books, one in particular

Bird books have been around for a long time. Quite a few households will have one or two on the shelf, perhaps a field guide or a book of bird pictures. From about 1980 the trickle of new ones became a torrent. At the serious end, among hundreds of new bird-related publishings, appeared the *Handbook of Australian, New Zealand, and Antarctic Birds*, 7 vols., 1990-2006 (HANZAB). Although a remarkable collection of information, this had the disadvantage that it was a BOOK, in fact a set of large expensive books. Many people did not have access to it.

A book is no longer the preferred way for most of today's information-seekers to look at published text and images. Happily, due to the efforts of BirdLife Australia and Steve Wallace, the contents of HANZAB have recently been added to the great reading-room of field guides and other bird-related material that may be viewed on your device.

The globalising of the hobby

'Globalising' is a useful but sometimes vague expression. Here is one definition:

> [It] is the process of increasing interdependence and integration among the economies, markets, societies and cultures of different countries worldwide (*Wikipedia*).

Much has happened with birds in this regard, including recognising species. From early in the 20th century, in various forms, there was an at least semi-official list of Australian bird species based on species recognised by Australia-based authors. The latest version was by Les Christidis and Walter Boles in 2008. In the 1990s, for the dedicated record-keeper, Canberra's Simon Bennett made available his *BirdInfo* software. That program used the Australian species list together with a global component for which Simon obtained the permission of the compiler, a James Clements of California. More would be heard of that name.

Around 2010-2015 several things happened. The reconstituted national bird society, BirdLife Australia (BLA, a union of the former RAOU and BOCA), faced difficulty in updating a national species list, given the rate at which taxonomic proposals were emerging. It formed a partnership with the UK-based BirdLife International (BLI), formerly International Council for Bird Preservation. BLI, in turn, had joined with a Barcelona-based publisher to produce what became *Handbook of the Birds of the World*, 17 vols., 1992-2013 (HBW). BLA produced 'for its own purposes', including species recording, a 'working list' of Australian birds ('WLAB'). This was based on recognition of species in the HBW/BLI taxonomy. It is that list which is followed by COG (as at October 2025).

Meanwhile, many serious Australian observers were making use of the website 'Eremaea Birds' to record and maintain their bird sightings in Australia and overseas. In another international link-up, in 2014, what became 'eBird Australia' was established when Eremaea Birds was merged with the Cornell Lab of Ornithology eBird project.

A further international dimension came into play when several Australian authors, editors, and publishers, and State bird societies, decided to use, rather than WLAB, the global taxonomic list issued and updated by the USA-based 'IOC' group of ornithologists. Another world recording system was offered by AviBase, from a Canadian partner of BLI, which gave a choice of ten taxonomies and a large amount of statistical information. (AviBase is to be distinguished from AviList, the unified taxonomy that has appeared in 2025 under the sponsorship of the International Ornithologists' Union.)

Today, support for the hobby keeps coming from Cornell Lab, based in the university in upstate New York. Cornell has taken over the online updating of *Handbook of Birds of the World*, and acquired the associated online collection of bird videos and photos. It took over the updating of the Clements world species list, much used by travelling North Americans, thereby becoming an influential international taxonomic authority. Most important for present purposes, it manages the ever-expanding eBird system. Cornell Lab announced in June that its

worldwide pool of records had reached two billion, with a leap from one billion in just four years.

Most of that startling number comes from the US and Canada, with Australia, by my calculations, in 4th place, with about 3.3%. Using eBird records, Cornell lab provides the continuing total of observations for each species. For many species, including some Australian ones, records are accumulating at a brisk rate (see table, source Cornell Lab Birds of the World https://birdsoftheworld.org/bow/home). This must be due, in large part, to the growing number of new participants in this international hobby, regularly adding their sightings. According to the informative eBird maps, these mainly come from around population centres and from easily-reached places.

Table: eBird records over 50 days for six Australian species, Sept-Oct 2025

	Australian Magpie	Magpie-lark	Willie Wagtail	Superb Fairy-wren	Gang-gang Cockatoo	Australian Painted-snipe
All eBird records at 27 Oct 2025	1,496,664	1,077,251	885,512	750,812	40,143	1,738
Records added from 6 Sept 2025	38,271	28,591	24,821	21,797	956	25
% increase in 50 day period	2.62%	2.73%	2.88%	2.99%	2.44%	1.46%

Stentoreus

Canberra Bird Notes 50(2) (2025): 329-331

Birding in Cyberspace, Canberra Style

Undoubtedly, the most significant birding in cyberspace event since the previous issue of *Canberra Bird Notes* was the 11 June 2025 **launch of Avilist: A Unified Global Checklist of the World's Birds** https://www.avilist.org/. As Birdlife International explained:

> The publication of AviList today means that, for the first time ever, there is a unified global checklist of all bird species found on planet Earth.
> AviList is a brand-new, complete global checklist of species and taxonomy. Containing 11,131 species, 19,879 subspecies, 2,376 genera, 252 families and 46 orders, it brings together the latest global thinking on what constitutes a species and shakes up our understanding of the avian world. Until now, ornithologists, conservationists and birders have used a selection of global checklists, each with its own reasoning on what constitutes a specific species of bird. AviList's unified view has been developed by the Working Group on AvianChecklists, containing representatives from BirdLife International, the Cornell Lab of Ornithology, the American Ornithological Society, the International Ornithologists' Union IOU) and Avibase. The new checklist will replace the International Ornithological Community and Clements lists, and will be updated annually. (https://www.birdlife.org/news/2025/06/11/avilist-unites-the-worlds-bird-species/)

As part of the launch, a webinar was produced to discuss various aspects of the endeavour. It presents the perspectives of most of the key organisations that developed Avibase: 'Introducing AviList: a unified global checklist of birds', 90 minutes,
https://www.youtube.com/watch?v=ZrhNDXLRLDY

It is likely that, before long, both eBird and Birdlife Australia will adopt Avilist. Should Canberra Birds do the same as the basis of updating, and organising, its databases, checklists, and other local birding resources?

I am writing this column in mid-Spring, 2025, and right now the **367 Collins Street, Melbourne, Peregrine Falcons** are breeding yet again. The webcam high up in the building is showing us the progress, 24/7. Mum and Dad and three chicks are getting on fine!

The advent of the internet, and of webcams, means that we can all follow along with the breeding progress each year. A YouTube search on '367 Collins Falcons 2025' will reveal all! Perplexity AI advises that 'A well-known pair of peregrine falcons has been nesting on the roof top of 367 Collins Street, Melbourne (the Optus Centre) since 1991, making it the only known nesting site for this species within Melbourne's CBD. The nesting site is supported by a man-made box on the building's upper floors, and their breeding success is closely monitored and celebrated by the public through an ongoing livestream that began in 2016. These birds have become social media stars, drawing tens of thousands of viewers annually, especially during the spring hatching season.'

In this column I often refer to eBird and the many related resources provided online by the Cornell Lab of Ornithology, and for good reasons. It could be, however, that some readers are not familiar with another wonderful resource for recording information on our biodiversity, one that provides, in return, identification of images that are uploaded. I refer, of course, to **iNaturalist**: 'a community for naturalists' https://www.inaturalist.org/. They advise that 'Every observation can contribute to biodiversity science, from the rarest butterfly to the most common backyard weed. We share your findings with scientific data repositories like the

Global Biodiversity Information Facility to help scientists find and use your data. All you have to do is observe.'

Australian iNaturalist data, including bird observations and all kinds of other things found in nature, are also shared with the **Atlas of Living Australia** (ALA): https://www.ala.org.au/blogs-news/an-inaturalist-australia-milestone/. The milestone referred to in the URL is the fifth anniversary of the linkage between iNaturalist and the ALA. October last year's update from the ALA highlighted this:

> Australia is one of the most significant contributors to iNaturalist globally, punching well above our weight relative to our population. We rank third in the world for the number of observations, second for the number of species (behind only the United States), and first in the southern hemisphere across all key metrics. As of October 2024, there are more than 9 million Australian observations on the platform across approximately 60,000 species, contributed by 100,000 users. Importantly, more than 34,000 users have contributed identifications to Australian iNaturalist observations. The most observed Australian species is the Australian Magpie, with almost 35,000 observations, followed by the Laughing Kookaburra, Koala, Superb Fairywren and Rainbow Lorikeet. The most observed major group, however, is plants with 2.85 million observations, followed closely by insects with 2.51 million observations.

Not familiar with iNaturalist? Check out this April 2025, 13-minute, TED talk by iNaturalist's Executive Director, Scott Loarie: 'The surprising power of your nature photos': https://www.ted.com/talks/scott_loarie_the_surprising_power_of_your_nature_photos.

On 30 July this year I (and many others) received a welcome email from the Cornell Lab of Ornithology with the subject line 'Merlin Sound ID in Australia—Thank You'. It read, in part, as follows:

> We're incredibly excited to share that we've just released an update to the Merlin Bird ID app that supports 19 new species in Merlin Sound ID for Australia. Thank you so much to the 12082 eBirders who have contributed sound recordings to train Merlin Sound ID, and to eBird Australia for coordinating the model training process for this update.
>
> There are now 128 species supported by Merlin Sound ID in Australia. If you want Merlin to support more species for Australia, you can help! To learn how to identify a new species, Merlin needs at least 150 audio recordings of each species to capture variation between individuals and populations. In Australia there are still many species that don't have 150 recordings. By continuing to add recordings to your eBird checklists, and by following best practices for recording and editing, you can help us to cover even more regions and species—as well as improve accuracy on species already covered. Check out the link below to view a list of target species for your country that Merlin needs more recordings for.

The list of target species, as at 5 June 2025, is online at https://merlin.allaboutbirds.org/help-expand-merlin-in-australia/. There we find 103 Australian species that, in June, were nearing the threshold of 150 recordings required to start training Merlin Sound ID. I am a little surprised that many common birds had not reached the 150 mark. Those closest to 150 were shown (in descending order) as Pacific Black Duck, Crested Pigeon, Dusky Moorhen, and Black Swan. It represents a challenge to us all to include bird call recordings, including for common species like these, in our eBird checklists.

T. alba

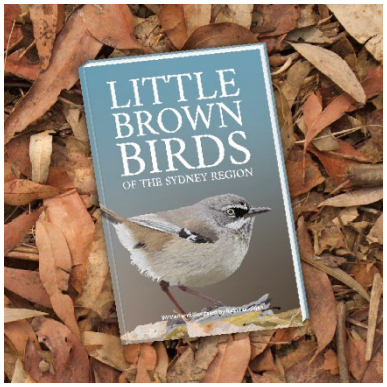
This column is available online at http://canberrabirds.org.au/publications/canberra-bird-notes/. There you can access the web sites mentioned here by clicking on the hyperlinks.
To join (subscribe to) the CanberraBirds email discussion list, send an empty email message to canberrabirds-subscribe@lists.canberrabirds.org.au. To unsubscribe, either permanently or temporarily, send an email message to canberrabirds-unsubscribe@lists.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 REVIEWS

Canberra Bird Notes 50(2) (2025): 332-333

Little Brown Birds of the Sydney Region. **By Ricki Coughlan.** Pub: Aussie Wild Nature Discovery. 2025. ISBN 978-1-923333-94-9, 168 pp, $38.00 from https://aussiewild.com.au

Reviewed by STEVE READ, Stirling ACT 2611 (steve.read123@gmail.com)



Little Brown Birds is a lovely little book, and is refreshing in the way it combines ornithology, birding skills, and bird identification. I can give no better reason for it being written than the following paragraph from the Introduction:

Although diverse in habitat, behaviour and detail, birds which are small and brown tend to confound many bird watchers, particularly those new to the craft. Their superficial similarities and constant rapid movements call on birders to have excellent binocular skills, field skills, observation skills and knowledge about these birds and their behaviours.

We have all struggled at times in Canberra to separate Striated and Brown Thornbills, and I'm sure I often misidentify Yellow Thornbills as something else most times I might see them. Then early winter brings the exhilaration of mixed feeding flocks, and the frustration of not being able to work out half the small birds involved. But Coughlan teaches you to look and listen, to hear and see, and to watch and understand behaviour as much as plumage. Deciding to learn how to tackle LBBs – the abbreviation for little brown birds in Australia, LBJs or little brown jobs elsewhere - is a mark of wanting to be a true birder, in the garden or in the bush.

Little Brown Birds is self-published by the author Ricki Coughlan; she is a bird guide so knows how to explain birds to people. The only comparable volume on this component of our avifauna is Lloyd Nielsen's *The Identification Guide to the Difficult Small Birds of Australia*, also self-published, but that national volume is focussed solely on identification, somewhat more idiosyncratic, and perhaps no longer available (vale LN). The strength of *Little Brown Birds* is that it's not until over half-way through the book that the reader gets to the species accounts and identification information: the earlier chapters are full of useful, interesting and informative writing that gives context to what we do and see as birders. There is lovely advice on how to bird quietly, what to wear and not to wear, and how to look for and at birds. And there are chapters on bird breeding, and how birds search for food. My favourite is the chapter on bird evolution and biogeography, which explains how the diversification of the acanthizid and malurid families of little brown birds has paralleled the changes in climate and vegetation as Australia has drifted north over the past many millions of years.

Little Brown Birds covers Weebill, Pilotbird, Speckled Warbler, Chestnut-rumped Heathwren, White-browed Scrubwren, Southern Whiteface, five thornbills (Yellow-rumped, Striated, Yellow, Brown and Buff-rumped), White-throated Gerygone and Superb Fairy-wren. Targeted at a Sydney audience, it does omit one species found here that Canberra birders need to know (Western Gerygone), and it shows the yellower coastal subspecies *nana* of the Yellow Thornbill rather than our inland subspecies *modesta* with its more obvious apricot throat. In addition, the book includes a number of species not found in the ACT (Rockwarbler, Yellow-

throated and Large-billed Scrubwrens, Mangrove Gerygone, Red-backed and Variegated Fairywrens, and Southern Emu-wren), as well as a species found here only as a vagrant (Brown Gerygone), but this does make the book useful for anyone who travels from Canberra down to the coast. All these species are from two families, the acanthizids and the malurids, but no pardalotes are covered presumably because although little birds they are not brown.

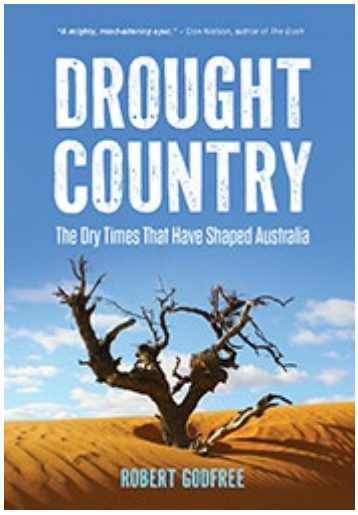
Book reviews often point out errors in the book being reviewed but I've always thought that a game designed for the reviewer to show off, so will not play – there are few errors anyway. But I did have one issue with the book, although this is perhaps an understandable consequence of the exigencies of self-publication. The species accounts contain sets of side-by-side illustrations of similar species with key identification features usefully noted. However, the grey background to the illustrations does not assist clarity, and the birds are shown in pastel shades which can hinder visualisation of key features: a white background and brighter colours, as for birds seen in the sun, would help. As an example, the Brown Gerygone and Mangrove Gerygone are a species pair where the visual differences in the illustrations are so slight that they are really not visible. Those birds in the wild would be easier to separate than those birds in the book!

Ricki Coughlan should be proud of this book, which contains much of her distilled experience of birding. This is definitely a good book for a birthday or Christmas present, and all interested in birds will learn from it. *Little Brown Birds* will teach you to slow down or stop next time you see a little brown bird in the shrubbery, and really watch and listen. The amount of joy these birds can give is inversely proportional to their size.

Canberra Bird Notes 50(2) (2025): 333-335

***Drought country: the dry times that have shaped Australia*. By Robert Godfree.** CSIRO Publishing. 2025. ISBN: 9781486314041. Paperback, 304 pp with chapter endnotes and index. RRP AU$74.99.

Reviewed by DAVID MCDONALD, Wamboin, NSW 2620 (david@ dnmcdonald.id.au)



Don Watson calls this book a 'mighty, mind-altering epic' (p. iii), and Ian Fraser describes it as 'utterly riveting and I think that it will become seen as something of a classic in time' (https://www.publishing.csiro.au/book/7989/#review). Given such praise from these respected scholars, the book merits close attention.

This is a book about drought in Australia, and about much more. The author recognises that this is not a book one reads for entertainment, stating, in his introduction, that '… this is not a cheerful journey, but, if nothing else, it is an honest one' (p. xviii). He concludes his preface with these words:

'This book is built on a skeleton of memories scavenged from time. In it you will find little of cheer, but then droughts have always been the physical and metaphorical embodiment of material and spiritual poverty. For the reader who perseveres it is my hope that in the stories of those who have faced down a drought and

> survived you will find green shoots growing among the cracks, and perhaps a source of future hope and prosperity. All the signs are that we are going to need it' (p. ix).

This excerpt gives a good sense of Godfree's style. He is a scientist with a wonderful gift for writing. He beautifully balances scientific explanation with empathy for the human experience, and an awareness of our responsibilities as caretakers of the natural and modified environments that we inhabit.

Godfree is a CSIRO ecologist who grew up on a farm near Mount Kaputar in north-central NSW. As the publisher explains, the book reflects understandings that 'Droughts have lurked behind Australia's major nation-shaping moments from European settlement at Port Jackson to Federation. They have caused catastrophic damage to Aboriginal, colonial and modern societies and, of course, to the very land itself. Indeed, by depriving us of water, that element most fundamental to life, droughts cut to the very essence of living in Australia.'

Structure and contents

The book is structured in a loosely historical manner. It has 21 chapters divided into five parts. However, if you wish to use its table of contents as a guide to what is covered in the various chapters, you will be disappointed. The part and chapter titles are catchy but largely uninformative. For example, Part 3 is titled 'A sky untroubled by clouds', and its chapters are 'The poverty of confinement', 'The stillness of death', 'Depressed times', and 'Transitions'. One might hope that the index would compensate for this lacuna, but it does little to help us to find what we are looking for. I doubt that it was compiled by a professional indexer as it is primarily a list of proper names, almost totally ignoring the conceptual and thematic approaches that the best indexers use. A good index is a map, not just a list.
Many chapters are brief—one is only three pages—while the longer ones include subheadings that help guide the reader through the book's progression. It contains numerous illustrations and graphs that skilfully complement the text.

Godfree deals with three centuries of drought events from colonisation to the present, interweaving historical accounts with ecological and climatological analyses. Early parts of the book pay detailed attention to the impacts of climate, weather and (especially) drought on the early decades of colonial settlement. The role of drought in the colony's expansion from its inception is handled particularly well. The interrelationship of smallpox with the environment is tackled, along with the overwhelming impacts of the Federation Drought and related economic depression. His writing about dust-bowl conditions, heatwaves, and ecosystem collapse in eastern Australia will, I am sure, create a lasting impact on many readers. The book concludes with a discussion of ecosystem collapse in the Anthropocene and ends with hope for a future that is not as devastating as it currently appears.

Strengths and limitations

As I have hinted above, one of its great strengths is the author's interdisciplinary approach, combining history, ecology, and climate science, and with some sociological insights. It uses vivid historical episodes to illustrate the impact of drought, while presenting a wealth of scientific information, often in call-out boxes that help readers decide what to explore in depth and what to skim. His writing seems to reflect his background as a farmer, adding authenticity and empathy.

I suspect that some readers, including those of us who do not have scientific backgrounds, may find some of the sections dealing with the climatology somewhat demanding but, I suggest, still worthy of the effort. Its focus is largely on south-eastern Australia, probably because that is the main area of his research, although it does deal with other parts of Australia to some degree. There is limited discussion of how Aboriginal peoples adapted to drought before the European invasion, though Godfree offers fascinating—and often disturbing—insights into the effects of drought on central Australian Aboriginal communities since colonisation.

Conclusion

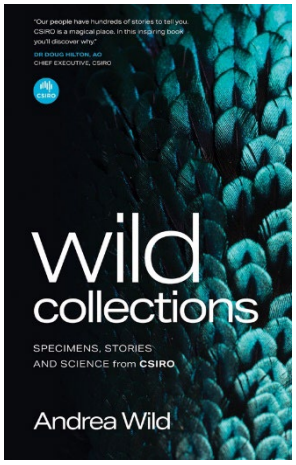
Godfree highlights the Millennium Drought and the 2017-2020 drought (with the latter now becoming increasingly known as the Tinderbox Drought, although he does not use the term). He emphasises that these droughts were far more severe than earlier ones and warns that we risk slowly redefining what we consider 'normal'—a phenomenon he calls 'shifting baseline syndrome' or 'environmental generational amnesia'. Those two devastating droughts were far from normal. That fact, combined with what is almost certainly an increasing prevalence and severity of drought in Australia, is perhaps the key takeaway message from the book.

A compelling and highly recommended book.

Canberra Bird Notes 50(2) (2025): 335-336

Wild Collections, specimens, stories and science from CSIRO by Andrea Wild.
CSIRO publications, 2025 185pp. $39.99

Reviewed by Peter FULLAGAR, Belconnen ACT 2615 (peter.fullagar@gmail.com)



This book is based on an exploration of the natural history material assembled and curated by the CSIRO. The collections include National Collections of algae, fish, plants, wildlife and a 'Tree Seed Centre' along with the Tropical Herbarium, a joint venture between CSIRO and James Cook University. These collections are natural history collections. Unlike many other preserved biological collections, they are not museums. Instead, they are a resource for research and an important part of Australia's infrastructure.

The book mostly takes the form of brief but fascinating interviews with many of the staff at these collections, giving an insight into the ways they have been assembled and the special curatorial needs required to preserve their value into the future. Two important aspects of their preservation are to make them more accessible without having to loan them, or it being necessary to travel to where they are housed in order to examine them. Nowadays a major project is to digitise all material and this often entails concentrating on the most important features required by researchers. Another rapidly increasing value of these collections is that they can provide access to tissue samples for use in the advancing technology of DNA analysis and sequencing.

As stated in the Preface, the author invites us to join her as she explores these CSIRO collections and meet the people working towards a brighter future for Australian biodiversity. We are taken on tours of the different collections explaining the intricacies and special need to

preserve specimens and provide access to material across the wide range that they cover. At the same time the opportunity is taken to talk about some of the fascinating outcomes of recent research. The opening chapter starts with an account of the extraordinary discovery of a parasitic nematode found by a neurosurgeon while operating on the brain of a patient in Canberra.

The chapters that follow take the reader to all of the CSIRO collections. Many extraordinary species are discussed, including parasitic worms, wasps, orchids, deep sea fish, birds and mammals. The fanciful 'wasp from Jupiter' as described by A. A. Girault even gets a mention!

Birds figure only occasionally. Leo Joseph, Director of the Wildlife Collections, explains in an interview how the rediscovery of the Night Parrot and the chance finding of a dead specimen in Western Australia led to the successful extraction of DNA from its preserved muscle material. This enabled the full sequencing of its genome. Another example of the value of extracting DNA information from the specimens in the bird collection is the ability to recognise formerly cryptic species. The example Leo talks about is the work on Black-winged Monarchs. He also explains how, in another example of DNA studies, it has been possible to unravel confusion over the original scientific naming of the Galah and where the type specimen must have come from. The extinct Paradise Parrot and its two closest surviving species are mentioned with respect to the specialised moths associated with their nest sites, located, as they are, within the structures built by mound-building termites. Historical data and DNA extracted from specimens in collections has helped to establish that Sugar Gliders are a recent introduction to Tasmania, where they are now a serious predator at nest sites of the Swift Parrot. Parrots as a whole are also mentioned in discussions with Leo about the evolution of modern birds.

I am a little disappointed that there is no mention of the sound library assembled over many years within the Australian National Wildlife Collection. After all, it is a significant resource, assembling the largest and, for that matter, the only comprehensive collection of wildlife sounds from Australia, now mostly digitised and shortly to be available via the internet.

A set of 25 colour plates at the back of the book helps to visualise some of the strange specimens mentioned in the book. There is a useful index.

An engaging and highly recommended read.

Peter Fullagar

Canberra Bird Notes 52(2) (2025): 337-339

Hello Cocky – A stickybeak at the cockatoo. **By Hilary Bell. Illus. Antonia Pesenti.** Scribble (an imprint of Scribe), 18-20 Edward Street Brunswick 3056. Publ. 5 August 2025. ISBN 9781761381577; Hardback, 290 x 200mm. 32 pp.; RRP AU $24.99.

This Bird – Noticing Our Urban Birds. **By Astred Hicks with Holly Parsons.** CSIRO Publishing, Clayton South. Publ. 1 August 2025. ISBN 9781486318452; Hardback, 280 x 215mm. 32 pp.; RRP AU $32.99.

The Great Dawn Choir. **By Sarah Speedie. Illus. Cindy Lane.** CSIRO Publishing, Clayton South. Publ. 1 August 2025. ISBN 9781486318339; Hardback, 250 x 250mm. 32 pp.; RRP AU $26.99.

Reviewed by JANETTE LENZ, Lyneham, ACT (lenz.janette.gardens@gmail.com)

These delightful picture books showcasing some Australian birds would be just right for birdwatchers or naturalists to buy for their children or grandchildren aged 5-9 and are recommended.

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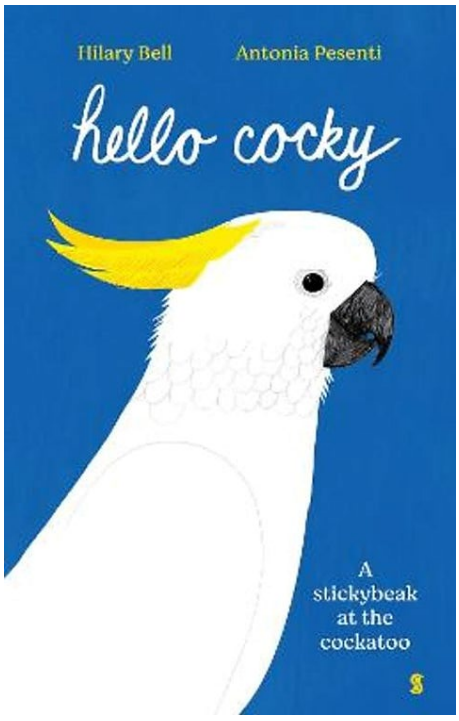
Hello Cocky – A stickybeak at the cockatoo. **By Hilary Bell. Illus. Antonia Pesenti**



Who hasn't been amused (or annoyed) by the antics of cockatoos: swinging upside down on a street light as the rain begins, or demolishing the best plants in the garden, or nibbling at the fascia boards of the roof?

Hilary Bell and Antonia Pesenti have turned their delight in the Sulphur Crested Cockatoo (though a Black Cockatoo also makes a cameo appearance) into a celebration of its nature and place in Australian culture.

The four-line rhyming verse is easy to read and will delight readers and young listeners.

I remembered that Beatrix Potter insisted that unusual words should be in her books (e.g. 'soporific' lettuce) so that children are exposed to a wider vocabulary. One verse in this book has 'inquisitive', another, 'laryngitis'.

There was also a new collective noun and I checked to find its authenticity: according to Wiktionary, a flock of cockatoos is known as a *crackle* of cockatoos, a term that is apparently gaining semi-official status and is particularly fitting for the social and loud nature of these Australian birds.

This review cannot describe the book in any better terms than from the loose-leaf letter inserted into the review copy:

> 'Dear Reader,
> We are excited to share this book with you – Hello Cocky marks a new chapter for us - with a new publisher and a bold graphic approach – and we hope you'll love it as much as we do. The vivid palette and striking vertical format reflects the cocky itself – standing proud and impossible to ignore.
> Everyone has a cockatoo story. There's the wheelie-bin raiding suburban gangs and the pot-plant-throwing city dwellers. There's a cocky that spent 4 weeks locked in a supermarket surviving on brioche. And there's Fred who, on his 100th birthday, received a telegram from the Queen.
> We loved making this book, and we think it taps into the enormous amount of affection that people (of all ages) have for the cockatoo. These curious, clever and fun-loving birds have screeched their way into all our hearts, and we thought it was high-time for a book that celebrates cockatoos in all their wild and cheeky glory – from the Twisti-gobbling hoon who loves to divebomb traffic to the magnificent flocks who paint the sky at dusk. It's time for a stickybeak! From Hilary + Antonia'

If there was any criticism to be made, it would be that the language is distinctly Australian, which may limit its readership: stickybeak, mullets, chewy, hoons, pavlovas, and even the shortening to 'Cocky'. But, perhaps, these common words and usages will be the source of much of its appeal to Aussie children.

Recommended.

This Bird – Noticing Our Urban Birds. **By Astred Hicks with Holly Parsons.**

Part science and part art, with engaging illustrations and fun, surprising facts, this book explores the remarkable lives of many of Australia's urban (and some water or sea) birds - the flashy, the overlooked, and the everyday wonders.

Written by a self-confessed bird-nerd, illustrator and emerging author, Astred Hicks, in collaboration with bird scientist, Dr Holly Parsons, the book invites readers to notice the birds right outside their windows, from fairy-wrens in the backyard to parrots on powerlines.

The Introduction says that, '"Bird Noticing" is a lovely way to connect with nature and the world around us.'

The next two pages are a diagrammatic reference to: What birds eat; Types of birds (found in the book); the Names for parts of a bird's body; and Size comparisons.

Many bird species are described, each on a fact-filled two-page spread allowing an interested reader to distinguish and identify them by paying attention to appearance, behaviour, habitat and calls. A section with an 'eye' symbol highlights what each bird looks like, while the section with a 'binoculars' symbol explains where the bird is likely to be found.

A catchy phrase or characteristic in the opening paragraph entices the reader to engage with the more detailed description. For example: the Galah is cheeky; the Red-browed Finch is gregarious; the Spotted Pardalote is a digger.

A glossary at the end of the book helps with unfamiliar words.

Although the blurb says, "Reading level varies from child to child, but we recommend this book for ages 6 to 12," I would suggest that only older children would have the interest to read it all, even if the text is often humorous and easy to read. (The Royal spoonbill has "built-in cutlery", and some Silvereyes "seek warmer climates, just like your grandparents might in their caravan".)

There is a glossary in the last pages. Teacher Notes aligned to the Australian Curriculum are free to download from the CSIRO publishing website:
publish.csiro.au/book/8166/#forteachers.

It is also published for electronic devices ePDF |August 2025 ISBN: 9781486318469 and ePUB August 2025 ISBN: 9781486318476
Available from eRetailers

The Great Dawn Choir. **By Sarah Speedie. Illus. Cindy Lane.**

Each day the Great Dawn Choir
greets the morning sun.
Together in the growing light,
their voices join as one.

The 'Dawn Choir' refers to the dawn chorus, of course. Sarah Speedie and Cindy Lane have selected eight types of birds known for early morning calls.

Each is featured on a double-page spread and is accompanied by a small verse where the last line morphs into a simple representation of the sound each makes: the Magpies 'Ordle', the Sulphur-crested cockatoos 'Caw', Rainbow Lorikeets 'Tweet', Kookaburras 'Ha', Fairy wrens 'Chitter', Ravens 'Aah' and Crested Pigeons 'Woo'. Lyrebirds are the exception to a one-sound call, being given three: 'Ordle', 'Caw' and 'Tweet'.

There is a recommendation that this book is for children aged 5 to 9, but I think it is more suited to ages 2 to 6 as the rhythmic reading of the verse aloud could easily switch to both the reader and the child enjoying making the actual (simplified) call.

Oddly there are two double-page spreads showing many other Australian birds, none of them named, (although the Kookaburra, Fairy-wren and Lorikeet are again pictured). But perhaps the depictions are intended to be a prompt for children to ask about other birds as the pages come just before a more detailed explanation of the dawn chorus and a further paragraph on each of the featured birds. There is also a short Glossary.

Canberra Bird Notes 50(2) (2025): 340

THE 2025 RECIPIENT OF THE STEVE WILSON MEDAL – *PHILIP VEERMAN*

At the Annual General Meeting on 12 November 2025 Philip Veerman was awarded the Steve Wilson Medal, following assessment by the Steve Wilson Medal Committee (Sue Lashko, Nicki Taws and Kim Farley).

PHILIP VEERMAN

Philip arrived in Canberra in August 1983 and quickly joined COG, already with a background in bird research and publication through his involvement with several bird organisations in Victoria and Queensland. Philip has a BSc (Hons) in zoology (1978) and in 1990 was awarded a Graduate Diploma in Resource Management, in part using the Garden Bird Survey (GBS) as subject material.

Philip served on the COG Committee between 1984 to 1989 and contributed regularly as conservation officer and GBS Coordinator from 1992 to 2002. He edited *Canberra Bird Notes* from 1986 to 1988 and he has contributed many articles (and illustrations).

In 1988 Philip became involved with COG's Garden Bird Survey. He coordinated the project for many years, including building the GBS database, redesigning the chart, managing the data, and providing analysis. Philip has contributed 47 GBS charts (from home and work places). The publication of three editions of his reports on the GBS has gone around Australia and worldwide, along with many presentations, with broad acclaim. He was a major contributor to the book *Birds of Canberra Gardens*.

Philip's long contribution also includes participating in most of COG's surveys over the years (through ideas and field work). He contributed to the COG Atlas, from initial planning stages, to conducting many surveys, and involvement in the writing. He helped with many COG stalls, promoted and designed the winning "Capital birding" COG car window sticker, and he has participated in every annual Canberra Birds Blitz, featuring Castle Hill near Tharwa. Philip has led some COG outings and attended most COG meetings for 42 years, and shares expertise by giving talks and as a regular contributor to the Canberra Birds email Chatline.

Photos:
Top: Philip at Lamington National Park, August 1997 (*Maria Lukacs*)
Bottom: Philip at the 2025 AGM (*Steve Read*).

RARITIES PANEL NEWS

ENDORSED LIST 107, DECEMBER 2025

RARITIES PANEL NEWS

Of the occasional records of 'unusual' birds observed in the ACT in the last six months and publicly reported on ebird or the Canberra nature map, only one was presented to the Panel for its consideration. The Panel notes but will no longer formally 'endorse' the now-not-infrequent reportings of Spiny-cheeked Honeyeater at Rock Valley and elsewhere, the almost annual sighting of Black-tailed Native Hen at Mulligans Flat, the occurrence of Caspian and Whiskered Tern at Jerrabomberra, Blue-faced Honeyeaters, Channel-billed Cuckoos *etc* unless they are presented to it, as the vetting processes for the above lists appear satisfactory.

The Brown Honeyeater is an interesting record. Although common throughout Australia, this honeyeater tends not to be found in the south-east. The scientific name says it all – it is relatively indistinct. The small yellow triangular patch behind the eye in adults is diagnostic.

ENDORSED LIST 107, DEC 2025

Brown Honeyeater *Lichmera indistincta*

1, 2 Sep 25, C Darwood, Fassifern pond, West Macgregor – ebird S271021288

Barbara Allan (*allanbm@bigpond.net.au*)

Canberra Bird Notes: Information for Contributors

Canberra Bird Notes (CBN) is published three times a year by the Canberra Ornithologists Group Inc. and is edited by Michael Lenz and Kevin Windle. Major articles of up to 5000 words are welcome on matters relating to the biology, 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 these email addresses: CBN@canberrabirds.org.au or michael.lenz.birds@gmail.com.

Please submit contributions in Times New Roman, with 12-point Font Size and 'No Spacing'.

Please note that the views expressed in the articles published in *CBN* are those of the authors. They do not necessarily represent the views of the Canberra Ornithologists Group Inc. (COG). Responses to the views expressed in *CBN* articles are always welcome and will be considered for publication as letters to the editor.

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

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Enquiries can be directed to cogoffice@canberrabirds.org.au.

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