



EUROBODALLA NATURAL HISTORY SOCIETY

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White-winged Chough *Corcorax melanorhamphos* (Vieillot, 1817)

There is something about seeing these birds in their noisy flocks that brings a smile to most faces. Professor Rob Heinsohn from the Australian National University, a long-time observer of the species, describes them as 'comical and endearing'. Some of their behaviour, though, is far from endearing. If you don't know about this already, you will just have to read on to find out more.

The White-winged Chough *Corcorax melanorhamphos* and the Apostlebird *Struthidea cinerea* are the only members of the Corcoracidae or mud-nest builder family. The nominate subspecies, *C.m. melanorhamphos*, inhabits much of eastern Australia, from the Mackay area south across the eastern half of Queensland and all NSW except the northwest, through Victoria, to the Mount Lofty Ranges in South Australia. The rarer subspecies *C.m. whiteae* is found only in the Mount Lofty Ranges and on the Eyre Peninsula. The two subspecies 'integrate' (mix) in Southeast South Australia and are sometimes treated as 'monotypic' (the same type).

This is a large bird, about the size of the Australian Raven. It has a smallish head, a slender, downward curving bill and a long tail. Adult plumage is black, except for a white wing panel, seen in flight and display. Adults have black legs and bills and red eyes. Sexes are similar. Young birds have dusky plumage and brown eyes that change to orange then red as the bird matures.



White-winged Chough Photo R Soroka

In the Eurobodalla, the White-winged Chough is most likely to be confused with the Australian Raven. But its small head, down-curved bill and long tail distinguish it. In adults, eye colour is also distinctive, as adult Australian Ravens have white eyes.

White-winged Choughs are sedentary. They have a home range of about 1000 hectares in the non-breeding season, and a smaller, fixed territory when breeding. They are very social birds, usually seen in flocks of 20 or so, sometimes much larger in the non-breeding season. Preferred habitat is open woodlands and open-canopied forests, particularly eucalypt woodlands but also pine plantations, wooded farmland, suburban parks and large gardens. They like areas with a sparse understorey where they forage, mainly on the ground, digging through leaf litter with their bills. To enhance food-finding, they sometimes forage in a line, each bird a metre or so from its neighbour. Their main foods are insects in summer and seeds in winter. They have also been seen killing and eating house mice during a mouse plague and digging in the mud of creek beds for mussels.



Photo R Soroka

Probably the most familiar call is the descending whistle. But these are noisy birds with a range of complex vocalisations, many of which have not

yet been categorised. They have at least three alarm calls, each for a specific type of threat, such as an aerial predator. Because their language is complex, it takes young birds many months to learn and respond correctly to calls.

White-winged Choughs display frequently, not only when mating, but also to assert dominance over younger group members and to ward off predators. Display behaviours include opening the wings to show the white feathers, ‘bulging’ the eyes by pumping blood into the surrounding tissue, jumping about, and calling loudly. These birds usually breed between September and December. In drier areas, they may breed at other times if it rains. They sometimes have two broods. Each flock usually has one breeding pair. The rest help with nest-building, incubation, feeding and brooding, defending the nesting area and protecting the young once they leave the nest, which allows the breeding female to re-nest. Larger groups are more successful at breeding, and breeding pairs with no helpers never succeed in raising young.



Nest with young Photo R Soroka

The nest is a large mud bowl, usually placed 8-10 m above ground on a horizontal branch or in a tree fork, most often in a eucalypt. Nest-building is slow, as each layer of mud must dry before another layer is applied. In drier times when mud is scarce, it may take months to complete a nest, and sometimes mud is supplemented with dung from cattle or emu.

A clutch is usually 3–5 eggs. Sometimes more than one female lays, resulting in larger clutches. Eggs are cream spotted with brown. The nestling period is 24–30 days. When first out of the nest, the young cannot fly and are vulnerable to predators. After about 4 weeks, they can fly strongly and at 6-7 months they are independent, though it takes them a couple of years to perfect their foraging.

Adults remain with the flock unless a nearby group needs a breeding adult, in which case a bird may switch groups. The flock also increases its size when numbers are low by kidnapping birds from other groups. Professor Heinsohn was the first person to report this behaviour.

More extreme antisocial behaviour was observed by one of the professor’s PhD students, who was studying the birds during a severe drought. Rival flocks engaged in what Heinsohn described as ‘gang warfare’, not only kidnapping young but also destroying rival nests and fighting fiercely, resulting in many deaths. When the drought broke, they resumed their normal behaviour.

Conservation status is least concern. They are widespread though not common, being sparsely distributed due to the need for a large home range. The main threats are habitat loss due to clearing for agriculture; fire (both natural and man-made hazard reduction which removes the understorey); and decreasing rainfall in some areas, preventing nest building. Gillian Macnamara

What’s coming up:

Saturday 13 July, 2pm 1080 Beach, Mystery Bay (2-3km Grade 2) Meet at the carpark on Mystery Bay Rd just past the campground, opposite Lamont Young Drive, in Mystery Bay. A walk through coastal forest to 1080 Beach. Hooded Plover, White-bellied Sea-Eagle, Red-browed Finch, various honeyeaters, thornbills and fairy wrens, Australasian Gannet, as well as macropods.

Sunday 28 July, 9am Cadgee (2-3km Grade 2) Meet opposite the Bodalla Police Station, on the corner of the Princes Hwy and Eurobodalla Rd. Cadgee is a 15 minute drive west of Bodalla. A drive and walk in the Cadgee area. Open areas with treed sections. Farmland and bush birds including Flame, Rose and Scarlet Robin, Jacky Winter, Whistling Kite, Wedge-tailed Eagle, White-eared Honeyeater, Peaceful Dove, Superb Lyrebird, Yellow-rumped Thornbill.

Saturday 10 August, 2pm Potato Point (2-3km Grade 2) Meet at the toilet block near the intersection of Riverview Rd and Blackfellows Pt Rd, near the bridge. A walk amongst Spotted Gum/Cycad coastal forest and fringing Swamp-oak Forest as well as dune vegetation with views of the ocean. A mix of sea birds, shorebirds, water birds and forest birds.

Sunday 25 August, 9am Broulee Island (2-3km Grade 3) Meet at the carpark at the end of Harbour Drive, Broulee. A walk to and around Broulee Island. Seabirds such as Australasian Gannet, terns, and possibly albatross. Pied and Sooty Oystercatcher, White-bellied Sea-Eagle, New Holland and White-cheeked Honeyeater and the possibility of whales and dolphins.

Saturday 14 September, 2pm Benandarah/Boyne State Forest (2-3km Grade 2) Meet at the turnoff to Long Beach, intersection of Cullendulla Dr and the Princes Highway. The exact location will depend on conditions at the time. Migrating honeyeaters, Crescent and Yellow-tufted Honeyeater, Gang-gang Cockatoo, Superb Lyrebird, Eastern Shrike-tit, Rose Robin, and possibly Swift Parrot.

Sunday 29 September, 9am Belowra (3-4km Grade 2) Meet opposite the Bodalla Police Station. Please note Belowra is a 1hr drive from the meeting place. Conditions permitting, Julie and Peter Collett will lead a walk on their farm. Rufous Songlark, White-winged Triller, Dusky Woodswallow, Diamond Firetail, Varied Sittella, Brown Falcon, Wedge-tailed Eagle, Australasian Pipit.

Saturday 12 October, 2pm Old Mill Rd, Turlinjah (2-3km Grade 2) Meet at the car park at the Tuross turnoff, corner of Princes Hwy and Hector McWilliam Dr. A walk along a dirt road in mixed eucalypt forest. Yellow-faced, Crescent and Fuscous Honeyeater, Red Wattlebird, Rose Robin, Superb Lyrebird, Pilotbird, Varied Sittella, Eastern Whipbird, Red-browed Treecreeper

Report of the Annual General Meeting

The AGM was held in the Spotted Gum Pavilion at the Eurobodalla Regional Botanic Gardens on Sunday 26 May, with 14 members in attendance.

In business arising from last year's AGM, Julie Morgan reported that the process of documenting habitat types in the Eurobodalla had begun and that there will be a call out for photos to illustrate the different habitat types across the Eurobodalla for use on the ENHS website.

Chair's report: Julie reported that ENHS is in its 38th year and continues to flourish, with a strong membership base, a sound financial position and publications that continue to track the changes in the natural environment of the Eurobodalla. Julie thanked those that have steered the ENHS over this time, as well as the current Secretary, Treasurer and members of the Committee. She also thanked the newsletter team and noted that a number of newer members had contributed articles to the newsletter. She acknowledged the work that Roman Soroka has done in updating the website and administering the ENHS Facebook page and David Kay's work on the annual publication, *Nature in Eurobodalla*. She also thanked all members who contribute sightings to this publication. Julie reported on the submission of a data mobilisation grant application with the Atlas of Living Australia, which was unfortunately unsuccessful, but which will be revisited next year. She then spoke about a Linnean Society conference to be held in Bateman's Bay in September where she plans to submit a proposal to speak about the ENHS, its history and the data it collects. She stressed the importance of this data and the need to encourage new members to collect data to fill some of the data gaps across the Eurobodalla. She then thanked all members for their continued support.

Secretary's report: Annie Loveband began by thanking the Committee and members for contributing to the field meeting program which has been varied and fruitful allowing the society to collect valuable data and members to share common interests. She noted the fungi walk at Mummuga Lake as a particular highlight, thanks to local fungi expert Teresa Van Heul, and flagged the interesting field meeting program that has been compiled for the second half of 2024. Annie encouraged members to make suggestions for future walks either directly to her or to Committee members and to volunteer to lead walks. Membership has dropped from 80 to 74 but there were 7 new members. The ENHS Facebook site is very active and has grown to 427, with 77 new members. She thanked Roman for his work in administering both it and the website and concluded by thanking Mandy, who will continue as Minutes Secretary, Deb for standing in for her while she is unwell and Julie for her assistance, as well as other committee members for their support.



A visitor to the AGM
(Grey Shrike -thrush)
Photo N Clark

Treasurer's report: Malcolm Griggs tabled his report and indicated that the Society is in a sound financial position, with a surplus of \$798.28 over the past year, and with funds of \$13,906.40.

Election of office-bearers: All positions were declared vacant. The Committee is as follows: Chair and Recorder – Julie Morgan; Secretary – Annie Loveband; Treasurer – Malcolm Griggs; Committee – Mandy Anderson, Julie Collett, Nicola Clark, Paul Gatenby, Gee Hounsell, Marjolein Kromhout, Deb Stevenson.

General Business:

Malcolm Griggs proposed that future AGM meetings be held indoors. There was some discussion of the increase in cost and funds available as well as the comfort of members. Deb Stevenson suggested that we invite a guest speaker which may attract more members to the AGM. The meeting agreed to hold future AGM gatherings indoors.

The meeting was followed by lunch and a walk through the Gardens.

Field Meeting - Mummaga Lake – 13 April 2024

On a pleasant Saturday afternoon, a large group of enthusiastic ENHS members, including some brand new members, gathered at the Bodalla Park Rest Area to meet up with local fungi expert Teresa van Heul and her photographer husband John who had volunteered to lead this walk. Teresa and John have been studying the fungi and slime moulds of our region for over 30 years and between them have a wealth of knowledge which they were very willing to share.

Teresa began by introducing us to the world of fungi. She explained why they are so important for ecosystem function and talked about the multiple ways in which they benefit humans. She briefly touched on the main groups of fungi and provided a very helpful handout that can be used in the field to identify fungi based on their physical characteristics as well as the habitat they are found in and the substrate on which they are growing. She also shared some useful resources for those of us who were keen to find out more about the fascinating world of fungi and a really useful guide on how to take good photographs of fungi.



Photo B Stevenson

The walk was along a narrow forest track that runs down to the northern edge of Mummaga Lake. Progress was slow and the group was strung out along the track as people got ‘down and dirty’ to inspect mushrooms peeking out from under leaf litter or growing on fallen timber. We saw a number of different groups of fungi including Agarics, or the classic gilled mushrooms that most of us are familiar with, Boletes or fungi with



Photo B Stevenson

pores instead of gills, Polypores or bracket fungi, Leather fungi, which as their name implies are thin and tough, and Puffballs, which have spherical or club-shaped fruiting bodies filled with spores. Teresa also pointed out a number of slime moulds or Myxomycetes which only an expert in this field would notice. Myxos, as they are commonly known, were once grouped with fungi but are now classified as a separate kingdom, the Protoctista.

It was a fascinating afternoon and different to most ENHS walks where people tend to spend most of their time looking up for birds. ENHS is extremely grateful to Teresa and John for sharing their interesting world with us, as well as their beautiful photographs of the fungi we saw that day which can be viewed on the ENHS Facebook page. Deb Stevenson

Vale Mike Crowley

It is with sadness that we mark the passing of Mike Crowley, who was one of the founding members of the Eurobodalla Natural History Society. Our thoughts are with his wife Colleen and the family at this sad time.

On 5 June 1986, Stephen Marchant presided over the first meeting of the Society which was held at Moruya High School. The meeting agreed on the rules of the society and the first ENHS Annual General Meeting followed, in which Mike was appointed Treasurer. Mike continued to serve on the committee in various roles until 2010. He served as Chair of the Society between 1992 and 1995 and from 2004 and 2010.

Mike was very knowledgeable about all aspects of nature including animals, plants and geology. His library was the most comprehensive collection of natural history books I had seen outside an official library. He was very generous in sharing his knowledge and a field meeting led by Mike was a real treat. I recall a field meeting to Wallaga Lake where we came across a Blue Planarian Worm, a long, thin, shiny black worm with a yellow stripe running down its length. Mike picked it up using a stick and twirled the stick so that the worm was wrapped around it. We were all enthralled as he shared what he knew about this fascinating creature. His article, which appeared in the newsletter at the time, follows this article.

Another memorable field meeting that Mike led was to South Durras where he told us about the geology of the area. He pointed out where the Sydney Basin sandstone overlaid the much older igneous rocks of the south coast and showed us huge drop stones which had been carried by glaciers and now were embedded in the rock shelf. Mike explained how the tessellated pavement at Wasp Head was formed and showed us fossils of *Eurydesma* and several species of brachiopods. Mike had a way of opening a window into the natural world that we could all look through and that we could then explore for ourselves.

Mike taught me and other members of the society how to count large numbers of creatures. His experience in ecology and in survey work enabled him to get a good sense of how many birds or other creatures were present. In 2012, I was conducting Swift Parrot surveys in the Eurobodalla with other ENHS members, and we came across a large group of Swift Parrots in the Bodalla State Forest. I excitedly called Chris Tzaros (the BirdLife Swift Parrot coordinator at the time) and provided an estimate of numbers, which I thought was around 500 birds. Chris told me that it was common to underestimate the number of Swift Parrots in an area and said that if I thought there were 500, there were probably closer to 1,000. He suggested we do a count at sunset as the birds returned to their roosting trees. In preparation for the count, a group of ENHS members met at the location where the birds had been seen at midday to plan our count. We arrived at the location and found ourselves surrounded by Swift Parrots; the noise of their calls was deafening! Mike immediately assessed the situation, watched and listened as these birds flew and fed on Spotted Gum blossom around us, and estimated that there were 1,000 birds. We returned to do the roost count at sunset and counted 1200 birds that evening, which is the largest recorded gathering of Swift Parrot.

Mike was fascinated by Grey-headed Flying Fox and in 2009 when they set up a large camp at Moruya Heads, he wanted to get an idea of the size of the camp and organised a visit for interested members of ENHS to the property where the camp was located. We walked among the she-oaks where the flying fox were roosting, but it was difficult to get a sense of numbers as the camp was scattered across a large area. Mike estimated that there were over 150,000 in the camp and suggested that we do a count at sunset when they would leave their camp to feed. He taught us to count at a rate per minute so that we could keep up with the thousands of flying fox that he had seen leaving the camp on previous days. As the flying fox typically flew north and west from the camp over Moruya Heads, we agreed on the locations to do the count. I volunteered to go to Pedro Swamp to count any that may fly south and much to our surprise, that night the entire camp flew south. I watched with disbelief as the skies over Pedro Swamp turned black with the exodus of flying fox. A few nights later, I was able to count the flying fox as they moved south from Moruya Heads from a different vantage point using the methodology Mike had taught me. The count that night in a one hour period was 163,300.



Mike Crowley with Gould's Petrel chick
Photo L Gibson

Mike was very knowledgeable about Moruya Heads and the Moruya estuary. He published a report of the Flora and Fauna of the Moruya Estuary in 2005 which is on our website (<http://enhs.org.au/wp-content/uploads/2023/09/MoruyaEstuaryFloraAndFauna-2005-10.pdf>). He recorded many firsts in the Shire, most recently the Southern Marbled Gecko in April 2022, the first gecko he had seen in the Eurobodalla. In his work on Montagu Island, he was with the team that discovered the first Gould Petrel breeding on the island. He also recorded some lasts, including the last Green and Golden Bellfrog in the Eurobodalla at Pedro Swamp.

Mike's influence will stay with me, and I hope that I can promote a curiosity of the natural world in others as he did for many of us. We will all miss him. Julie Morgan

The Blue Planarian Worm, *Caenoplana coerulea*

The worm found on the recent ENHS outing to Wallaga Lake was a Blue Planarian Worm, *Caenoplana coerulea*. It belongs to the group of animals called Platyhelminthes or Flatworms. This group includes many internal parasites such as Tapeworms and Liver Fluke, but some species are free living and are grouped in the family Geoplanidae or Land Planarians, a much understudied but important group of flatworms that belong to the soil ecosystem.

There are many different land planarians and most common of these is the Blue Planarian. It's about 6 - 20cm long and is a deep navy blue with a pale stripe down its back, bright blue underneath and a pink or red-tipped head end. They are predators of other invertebrates such as earthworms, snails, slugs and insects which they



Blue Planarian Worm, Wallaga Lake
Photo Bruce Penman

hunt for, attack and capture using physical force and the adhesive and digestive properties of their mucus. They cruise along old trails and drown any victims in slime before sucking out their insides with a mouth located on its belly. If this all sounds a bit ugly, consider that the planarian digestive system has only one orifice – all wastes must exit the same way the food went in, via the mouth. They lack water-retaining mechanisms and are therefore very sensitive to humidity variations in their environment. Because of their limited ecological requirements, some species have been proposed as indicators of the conservation state of their habitats. Mike Crowley

Can birdwatching make you happy?

In his new bird identification guide "Getting to know the birds in your neighbourhood" Dr Daryl Jones poses the question "Can birdwatching make you happy?" Of course, he answers unreservedly in the positive. But we already knew that. For me, not only does spending time in the bush, or in my garden, or along the shoreline, with my binoculars make me happy, it is also a form of meditation - in fact the only meditation practice that I have ever attempted with success. Whether in company or alone, I can become totally focused, both physically and mentally, on the bird I am watching or listening to or trying to identify, to the exclusion of all other thoughts.

But Jones takes his argument further by citing important research which has demonstrated that watching birds, or being immersed in nature in any context, has helped people recover much more quickly from surgery. He makes special mention of brain surgery patients. Even just the sight of a real tree through the patient's window, as opposed to a picture of a tree on the wall, can accelerate the recovery process. Watching birds is proven to enhance mental well-being and fight depression. This is largely because you must get outside and into a more nature-based setting. "Equally astonishing – and important", says Jones "- is the discovery of a 'dose' aspect to connecting with nature. Like medicine, the higher the dose, the stronger the effect".

As we witness on the daily news what appears to be an epidemic of violence, particularly although not exclusively, in urban areas, I have often reflected that these perpetrators have no connection with the natural world. They are living in a foreign, unnatural environment which is not conducive to good mental health. Or, more simplistically, I ask "Why don't they just go and get a pair of binoculars?" (and use them for their intended purpose).

During the height of the Covid pandemic, when most of us were forced to stay either indoors or within a small radius of our homes, the interest in nature and birding amongst people who had never showed any such enthusiasm in the past, soared exponentially. Birdwatching was taking their minds off their sense of isolation and powerlessness. Birdlife Australia reported vast numbers of new inquiries, and the 2020 Birds in Backyards event was by far the most successful ever.

Jones admits that birdwatching can also have its frustrations, when, for example, everyone in the group except yourself can see a sought-after species, or when identification proves really difficult - for example during the Brown Goshawk-Collared Sparrowhawk debate - or when we see dogs or kids encroaching on shorebird nesting sites.

In justifying the publication of yet another field guide, Jones writes in his introduction that this book is designed for beginning birders. It includes only 139 of the possible 936 species recorded in Australia and its territories. And the location is restricted to the major population centres where 80% of the population lives. In other words, it is aimed at making bird identification more manageable for urban dwellers new to the hobby. For novice birdwatchers, a full field guide can be daunting to confront. Jones' goal is to make the new pastime more accessible and rewarding. Then the whole experience becomes more fun - and makes you happy. Mandy Anderson

Ref: Jones, Daryl Getting to know the birds in your neighbourhood. Syd., UNSWP, 2023

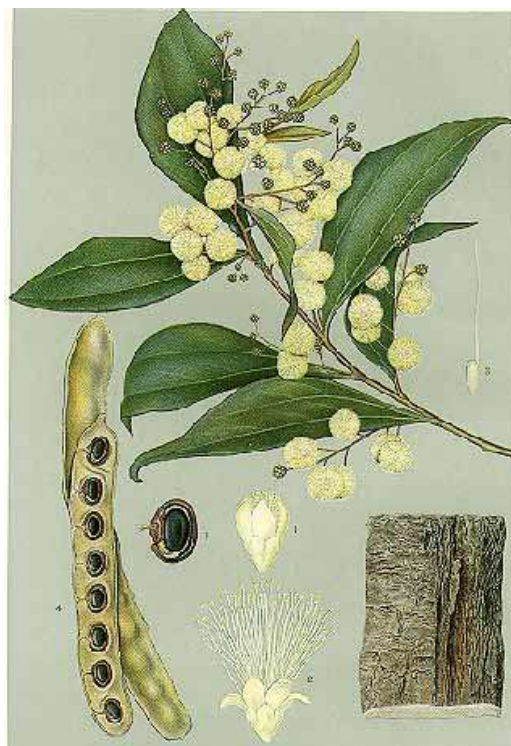
Daryl Jones is Professor in Ecology at the Griffith University in Brisbane, where, for over 30 years, he has been studying the way that people and nature interact.

***Acacia binervata* - Two-veined hickory**

Many years ago, Dave and I noticed a small stand of what we thought was an unusual acacia beside the track leading to Mullimburra Point. At the time Dave was volunteering at the ERBG herbarium and took a sample in and asked Jenny Liney, the Curator, what it was. She quickly identified it as an *Acacia binervata* and asked that we take her along so that she could collect some proper herbarium specimens (rather than the scrappy bits he'd collected). Since then, I've always been on the lookout for them and, despite reading that this is a common species, only see a few other trees on our regular walks.

Acacia binervata whose common name is two-veined hickory grows along the east coast of Australia from Narooma to Mt Tambourine in southern Queensland and as far west as Mittagong. It is less common in drier areas.

Acacia comes from the Greek Akakia, which refers to an Ancient Greek preparation made from one of the many species; the name of which derives from akis, meaning "thorn" - referring to the thorns of species in Africa. *Binervata* is from the Latin *bi-* (two) and *nervus* (nerve), referring to the phyllodes having two, though often three to five, prominent longitudinal nerves (veins).



Drawing of *Acacia binervata*
From "The Flowering Plants and Ferns of New South
Wales - Part 5" (1896) by JH Maiden (1896)

It has dark brown scaly bark, and its leaves are wider than the more common coastal wattle, with two prominent veins running lengthwise along the leaf. Its flowers are different too; they form many spherical flower heads as distinct from the cylindrical flower spikes of the coastal wattle. It flowers between August and November.

The species often grows along the interface between forest and cleared land, where it sometimes forms dense thickets. It grows on moist sites in sandy or basaltic soils as a part of tall sclerophyll forest on the margins of rainforest communities.

This wattle is fast growing and at maturity has a dense crown. It is a popular choice for bush regeneration projects and often planted to provide shelter for rainforest plants. Helen Kay

Territory Locations: A Vexed but Important Issue.

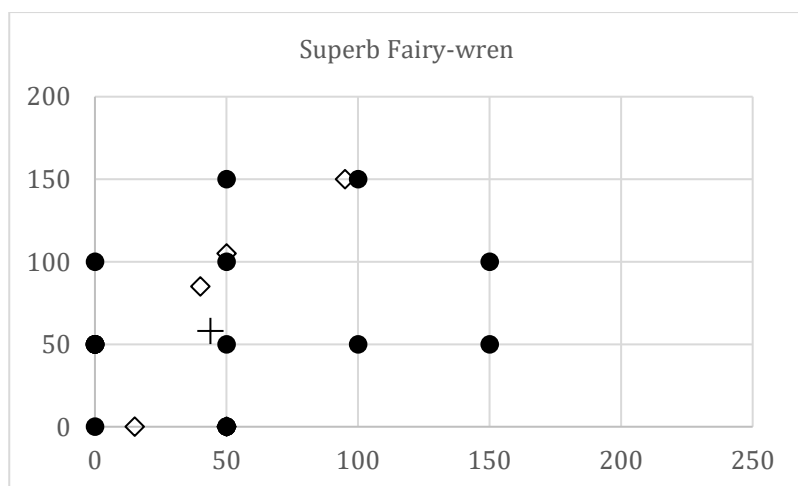
Have you ever wondered whether the territories (we call them home-ranges) of the male and female of a breeding pair of birds are in the 'same' place? What about the Yellow Robin that breeds in the same patch of bush five seasons in a row? Is its home-range in the 'same' place each season? Or that Rufous Whistler that migrates north each year, then comes back to breed in August? Does he come back to the 'same' home-range?

There's been a lot of work done on these questions over the years. For example, the similarity between the home-ranges of the male and female of a pair have been assessed by measuring the overlap between the home-ranges. Home-range fidelity has been variously defined as a bird returning to 'essentially the same home-range in successive years'; or as the distance between nest boxes in successive years; or as two home-ranges overlapping by at least 50%; or as repeat nests being within a certain distance of each other; or as a bird returning to the previous year's nesting area (defined as an area encompassing a variable number of nest boxes); or as two home-ranges with their centres (undefined) within 70 m of each other; or as a bird that moved (undefined) less than 62 m.

Lots of studies, lots of information, but see the problems? First, many of the criteria are not objective measures, or appear to be randomly defined. Second, because there are so many different ways of defining the position of a home-range, it is mostly impossible to make comparisons between the different studies. So for example, with regard to home-range fidelity, or positions of the home-ranges of the male and female, are there similarities between the Great Tit and the Tropical Oriole? We don't know because we cannot compare the data.

We have recently written a paper on this issue, using the data we have collected over the years on our study site. The paper has now been accepted and we will put it on the ENHS website when it appears. What we did was to use home-range centroids to define the position of a territory.

So what is a centroid? Imagine our rectangular study site. Along the bottom of the rectangle is the X-axis; it is divided into 50m sections, and runs from 0 to 200, the width of our study site. Up the left-hand side is the Y-axis, which runs from 0 to 500, the length of our study site. So when we see a particular bird, we can record its position in terms of an X co-ordinate and a Y co-ordinate. We have put an example Figure below.



This is a male Superb Fairy-wren in 2012. In this case, the Y-axis (left hand side) only goes up to 200 as this bird was only seen in this portion of the site. He had a good year, and had three nests, shown as open diamonds. The round black dots are sightings over the season. So the lower of the two sightings at the extreme right would be written as X = 150, Y = 50. There were actually 18 sightings over the season, but multiple sightings at the

same place show as one black dot. It is important to remember this, as not all black dots are equal. Like the pigs in the novel *1984*, some are more equal than others, or have more influence or strength than others, depending upon how many sightings are contained in that dot. The centroid of all these sightings is the average of the X and Y values of all the sightings. In this case the centroid (see the + on the Figure), is $X = 44$, $Y = 58$. The + doesn't look like it's anywhere near the 'centre' of the sightings, but remember the pigs, some dots have more influence and strengths than others. So for example, the bird was sighted more times at 50:100 than it was at 150:50.

So, you can appreciate then, that a centroid, an abstract concept, can in the case of bird-home ranges, be considered to be the 'centre of activity' of that bird. It's an informative co-ordinate, as it can be calculated for irregular shaped spaces, and is sensitive to the various strengths of the points from which it is calculated. Home-range centroids are easily and objectively calculated, and are unambiguous, high-resolution, numerical descriptors of home-range positions. They can be calculated using data from any study of home-ranges and can be used in any subsequent analysis. It therefore follows that they can also be used to objectively compare data, its analysis, and the conclusions drawn from the analysis, between any studies involving home-range positions. A home-range centroid is also useful in studies that attempt to determine the location of activities within a home-range, as these locations can be defined in relation to this centroid. An example is nest site selection.

We used our centroid data to ask three questions. First, what are the distances between the home-range positions of the male and female of a breeding pair, and how do these compare to the distances between the positions of non-breeding pairs of birds? Second, what is the scatter of the multiple home-range positions of an individual that breeds on the site in more than one season, and do these distances suggest that the same home-ranges are used in successive seasons? Third, is there any evidence to suggest that the 'centre of activity' of a home-range is a factor when nest sites are chosen? We used data from 11 species (see Table below), so for at least the first two questions we were able to test for differences between species.

Table of species we used.

White-throated Treecreeper
Superb Fairy-wren
Variegated Fairy-wren
White-browed Scrubwren
Brown Thornbill
Eastern Spinebill
Lewin's Honeyeater
Yellow-faced Honeyeater
Eastern Yellow Robin
Golden Whistler
Rufous Whistler

We found that the distances between the home-range centroids of the male and female of a breeding pair, were at least 5-fold, and up to 8-fold less than the distances between random pairs of birds. The spread of the centroids of repeat territories was either less than, or equivalent to the distances between the centroids of the male and female of breeding pairs. This included repeat nesters that were resident, like the Yellow Robin, and the migratory Rufous Whistler. Both the Yellow Robin and the Rufous Whistler included examples of individuals that nested in four successive seasons. There were no differences between species for any of these measures. As for the third question (above) there was no evidence that nest placement was influenced by the position of the home-range centroid.

We concluded that the home-ranges of the males and females of a breeding pair, unlike those of non-breeding pairs, are in essentially the 'same' position. As far as nest sites are concerned, we interpreted our data as showing that the birds choose nest sites based on a variety of criteria, as you would expect. There was no evidence that nests were preferably located close to the home-range centroid position. Siting a nest close to the home-range centroid would get it away from home-range boundaries, which could be an advantage, but there are so many other factors to consider, like which bush is more suitable, where is there more cover, etc.

There is only one other study that used centroids to address our first two questions. The bird was a Tropical Oriole, found in Puerto Rico. This species is larger than any of the species we used, and the territories are larger, but the data, proportionately are remarkably similar. The centroid concept may uncover general principles associated with home-range positions, across species and habitats.

Finally, you may think that the answers to these questions were obvious before we did the study. But often the obvious answer is not the right one, as nature is surprisingly, and sometimes unbelievably complex. It can only be understood by thorough investigation, and it can only be protected and conserved if we understand how it works. Michael and Sarah Guppy.

Highlights from ENHS records - Autumn 2024

Avian species	Number	Place	Observer	Comments
Stubble Quail	10	Com	JC	
Brown Quail	4, 2	Bingie/Com	DHK/JC	
Musk Duck	2	Kianga	FM	
Australian Shelduck	Up to 11	Com	JC	
Hardhead	6	Com	JC	
Australian Shoveler	1	MYA	MA	
Australasian Grebe	20, 3	Com/MYA	JC/FM	
Hoary-headed Grebe	1	MYA/PS	FM/JM	
Peaceful Dove	2	Broulee	GLM	
Bar-shouldered Dove	1	MB	A Christensen	
Topknot Pigeon	7	NA	MA	
Superb Fruit-Dove	1	Deua NP	FM	Female
White-throated Nightjar	1	PS	JM	Departed by end of March
White-throated Needletail	50	PS	JM	In early March
Eastern Koel	2	MB	MA	
Brush Cuckoo	1	PS/MB	JM/A Christensen	Immature in MB
Dusky Moorhen	3, 2	Com/Kianga	JC/FM	
Eurasian Coot	180	Kianga	FM	
Little Penguin	1	NA	MA	
Royal Spoonbill	56, 23, 16	NA/Com/TS	MA/JC/GM	
Striated Heron	1	TS	M Craig	
Cattle Egret	100, 35	MYA/Tilba	JM/MA	
Intermediate Egret	2, 1	MYA/Com	FM/JC	
Little Egret	8, 2	MB/Broulee	MA/GLM	
Eastern Reef Egret	1	Bingie Pt/MB Broulee	DHK/MA/ GLM	
Australasian Gannet	8, 2	Bingie Pt/MB	DHK/MA	
Great Pied Cormorant	5, 4, 2	Kianga/NA/ Bergalia	FM/MA/DHK	
Aust Pied Oystercatcher	50	Brou L	MA	
Sooty Oystercatcher	12, 7	MB/TS	MA/GM	
Pied Stilt	Up to 8	Com	JC	Including immature
Pacific Golden Plover	Up to 16	MB	MA	In full breeding plumage
Red-capped Plover	13, 8	Sth DS/Brou L	JCof/MA	
Double-banded Plover	2, 1	MB/Broulee	BH/GLM	
Hooded Plover	3	MB	BH	
Black-fronted Dotterel	6, 2	Com/Bingie	JC/DHK	
Far Eastern Curlew	3, 1	Brou L/BI	MA	
Bar-tailed Godwit	180	Brou L	MA	
Caspian Tern	8, 1	Brou L/Sth DS/ MB	MA/JCof	
Whiskered Tern	2	MB	MA	
Powerful Owl	1 or calls	PS	JM	
Barking Owl	Calling	Surfside	DB	
Masked Owl	Calls	PS	JM	
Osprey	3	NA	MA/T&A Ross	On nest
Little Eagle	1	Tilba	MA	
Swamp Harrier	1	Com	JC	

Grey Goshawk	1	PS/Bingie Pt/ Com	JM/DHK/JC	
Brown Goshawk	1	PS	JM	
Collared Sparrowhawk	1	PS	JM	
Oriental Dollarbird	2, 1	MB/Com	MA/JC	In March
Azure Kingfisher	1	Com/Tilba	JC/MA	
Australian Hobby	2, 1	TS/MYA/PS/ Com	GM/MA/JM/ JC	
Peregrine Falcon	1	Com/PS	JC/JM	
Glossy Black Cockatoo	10, 5	Broulee/PS	GLM/JM	Copulation at Broulee
Yellow-tailed Black Cockatoo	More than 40	MB	MA	
Gang-Gang Cockatoo	15, 12	Broulee/PS	GLM/JM	
Eastern Rosella	10, 8	Com/MYA	JC/FM	
Swift Parrot	20, 5, 4, 1	DY/Mummuga L/Deua NP/PS	L Gibson/FM/ JM	
Musk Lorikeet	More than 60	MB	MA	
Little Lorikeet	10, 2	MB/PS	MA/JM	
Australian King Parrot	Up to 30	Com	JC	
Superb Lyrebird	4, 3	Deua NP/NA	AM/JM/MA	
Southern Emu-wren	Up to 5	Candlagan Ck	GLM	
Crescent Honeyeater	8, 1	Deua NP/MYA/ Cool	FM/JM/DO	
White-cheeked Honeyeater	4	Deua NP	AM/JM	
White-naped Honeyeater	More than 300	PS	JM	Strong migration
Brown-headed Honeyeater	8, 6, 4	PS/Com/MB	JM/JC/A Christensen	
White-eared Honeyeater	3, 2, 1	Mummuga L/ Deua NP/PS/ ERBG/Cool/ Bergalia	FM/JM/DO/ DHK	
Noisy Friarbird	Up to 40	PS	JM	On flowering Spotted Gum
Scarlet Honeyeater	20	Deua NP	AM/JM	On flowering mistletoe
Fuscous Honeyeater	3, 1	PS/MKS/Deua NP	AM/JM/SMG	
Yellow-faced Honeyeater	More than 500	PS	JM	Strong migration
Yellow-tufted Honeyeater	4	Deua NP	AM/JM	
Striated Pardalote	2 or calls	Com/PS	JC/JM	Migrating with Silvereyes at PS
Large-billed Scrubwren	1	Deua NP/PS	AM/JM/FM	
Varied Sittella	12, 6, 5	Deua NP/NA/ PS/Com	AM/JM/MA/ JC	
Australasian Figbird	Up to 4	MYA	JM	
Spotted Quail-thrush	4	Donalds Ck Rd	AM/JM	
Eastern Shrike-tit	1	Mummuga L/ Tilba	FM/MA	
Rufous Whistler	4, 3, 2	Deua NP/PS /Com	AM/JM/JC	Until the end of April
White-bellied Cuckoo- shrike	1	PS/Com/MB	JM/JC/MA	
Common Cicadabird	6	PS	JM	In March
Dusky Woodswallow	20, 15, 10	Com/Deua NP/ Cool	JC/AM/JM/DO	
White-breasted Woodswallow	11, 10, 6	MHS/PS/ Broulee	NC/JM/ W Platts	In March

Rufous Fantail	1	PS/Brou L/MB/ Tilba	JM/MA	
Spangled Drongo	1	MB	A Christensen	In March
Restless Flycatcher	1	Com	JC	
Leaden Flycatcher	2	MB	MA	In March
Black-faced Monarch	2, 1	MB/Cool/ Broulee/MKS	MA/DO/GLM/ SMG	
Little Raven	100, 80, 60	MYA/Com/ MKS	FM/JC/SMG	
White-winged Chough	18, 10, 8, 4	Com/MB/PS/ Bergalia/Cool	JC/MA/JM/ DHK/DO	
Rose Robin	4, 1	Deua NP/ Bodalla/Cool/ Mummuga L	AM/JM/MA/ FM/DO	Calls elsewhere
Little Grassbird	1	Kianga	FM	In March
Tree Martin	20, 10	MYA/Com/ Tilba	JM/JC/MA	
Silvereye	More than 200, 100	PS/Com	JM/JC	Moving north through shire
Mistletoebird	10	Deua NP	AM/JM	At flowering mistletoe
Australasian Pipit	6, 4	MB/Com	MA/JC	

Non-avian species	Number	Place	Observer	Comments
Short-beaked Echidna	1	MKS/PS/MB	SMG/JM/MA	
Long-nosed Bandicoot		MB	MA	
Common Wombat	Signs	Com/Cool	JC/DO	
Sugar Glider	Calls	PS/Com	JM/JC	
Common Brushtail Possum	2	Com	JC	
Eastern Grey Kangaroo	43, 20, 18	Sth DS/MB/ Cool	JCof/MA/DO	
Red-necked Wallaby	4, 1	Cool/MKS	DO/SMG	
Grey-headed Flying-fox	20, 10	PS/Broulee	JM/GLM	
Australian Fur Seal	Colony	NA	MA	Numbers increasing
Sambar Deer	1 or 2	Cool	DO	
Bottle-nosed Dolphin	5	Broulee	GLM	
Humpback Whale		Kianga	T&A Ross	
Snake-necked Turtle	Up to 4	Com	JC	
Yellow-bellied Water-skink	3	Com	JC	March-April
Eastern Blue-tongue	1 or 2	Broulee/Com	GLM/JC	
Jacky Lizard	1	Sth DS/Cool	JCof/DO	
Gippsland Water Dragon	Up to 5	Com	JC	March-April
Lace Monitor	1	PS	JM	March-April
Diamond Python	1	MB/Cool	MA/DO	

Frogs JC/JM/FM	Common Eastern Froglet, Brown-striped Frog, Spotted Grass Frog, Tyler's Toadlet; tree frogs: Brown, Eastern Sedgefrog, Jervis Bay, Screaming, Peron's, Tyler's, Verreaux's.
Moths JC/JM	Bardi Ghost, Variable Oxycanus, Fungus, Meal, White Rush, Beet Webworm, Black Geometrid, Brown Twisted, Cream and Varied Wave, Plantain, Mecynata, Sodaliata, Subidaria, Banded Lichen, Variable Halone, Reticulated Footman, Lichen-eating Caterpillar, Heliotrope, Magpie, Tiger, Three-lined Snout, Plain Pantydia, Triangle Owlet, Green-blotched, White-collared Noctuid, Variable Cutworm, Pale Grass Moth, Native Budworm.
Butterflies MA/JC/GLM/ AM/JM/FM	Lilac Grass-skipper, Narrow-brand Grass-dart, Blue Triangle, Orchard Swallowtail, Small Grass Yellow, Imperial and Black Jezebel, Cabbage White, Dusky Knight, Brown Ringlet, Varied Sword-grass Brown, Common Brown, Tailed Emperor, Varied Eggfly, Meadow Argus, Australian Painted Lady, Yellow Admiral, Monarch, Plumbago Blue, Common Grass Blue.

Beetles JC/JM	Argentinian Scarab, Metallic Green Acacia, Small Blue Leaf, Dotted and Variole Paropsine, Three-lined Potato; Ladybirds: Steel Blue, White Collared, 26 Spotted, Variable, Striped, Fungus-eating, Yellow-shouldered.
Bugs JC/JM/FM	Harlequin, Bronze Orange, Green Vegetable, Horehound, Red-green Spined Stink.
Dragon & Damselflies JC/JM	Common Bluetail, Blue Skimmer, Australian Emerald.
Other insects JC/JM/FM	Bees: Blue Banded, Neon Cuckoo. Wasps: Common Paper, Orange Caterpillar Parasite, Yellow Sand, Formosum Mud-dauber, Spider. Other: Black Field Cricket, Yellow-winged Locust, Olive-green Coastal Katydid.
Spiders JC/JM/FM	Black House, Leaf-curling, Jumping, Huntsman, Daddy Long Legs, Golden Orb (over 40 at Com), Two-tailed, St Andrew's Cross, Water, Giant Water, Orange-legged Swift, Garden Orb Weaving, Flat Rock, Joivial Jumping, Little Striped Wolf, Whip.

RAINFALL (mm). **March:** 54.5 at MKS, 50 at Bergalia, 49.5 at Com, 78.5 at MB, 86.75 at Cool. **April:** 136 at MKS (to 23rd), 110 at Com, 117.5 at MB, 79 at Cool. **May:** 285 at Bergalia, 178.5 at Com, 147.5 at MB, 156.75 at Cool.

Contributors

MA	M Anderson, MB	BH	B Harvey, MB	FM	Field Meeting
DB	D Bertzeletos, Surfside	DHK	D&H Kay, Bergalia		A Christensen, MB
NC	N Clark, Surf Beach	GM	G Macnamara, TS		M Craig, TS
JCof	J Coffey, Sth DS	GLM	G&L McVeigh, Broulee		L Gibson, DY
JC	J&P Collett, Com	AM	A Marsh, Bingie		W Platts, Broulee
PG	P Gatenby, Broulee	JM	J Morgan, PS		T&A Ross, Kianga
SMG	S&M Guppy, MKS	DO	D Ondinea, Cool		
GH	G Hounsell, Broulee				
Places					
BB	Batemans Bay	ERBG	Eurobodalla Botanic Gardens	PDD	Percy Davis Drive, MYA
BBWG	Batemans Bay Water Gardens	LP	Lilli Pilli	PS	Pedro Swamp
BI	Bermagui	MKS	Maulbrooks Rd S, MYA	PP	Potato Point
BP	Burrewarra Point	MO	Meringo	SB	Surf Beach
Cool	Coolagolite	MYA	Moruya	SF	State Forest
Com	Comerang	MH	Moruya Heads, N&S	T'bella	Trunketabella
CO	Congo	MB	Mystery Bay	TN	Tomakin
DS	Durras	NA	Narooma	TS	Tuross
DY	Dalmeny	NP	National Park	WL	Wallaga Lake

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