

Summer 2024

Angair Quarterly

Bringing you stories from the Anglesea, Aireys Inlet Society
for the Protection of Flora and Fauna.



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Jack Pascoe: Giving back to Country

Angela Rutherford



Jack Pascoe will be known to some Angair members through the annual Otways Ecological Research Forum. I spent an hour with Jack at home in the foothills of the Western Otway Ranges, on Gadabanud country, in a conversation accompanied by a chorus of cheerful birds.

Growing up on Cape Otway meant Jack as a boy was completely at home in the ocean and the bush; his only interests were football, cricket and fishing. His Year 10 careers teacher advised him to do 'Conservation'. He hadn't thought of that: now Jack is an environmental scientist, and holds the Excellence in Diversity Fellowship at Melbourne University. Recently he was awarded an Australian Research Council grant of nearly \$860,000 which will support research led by indigenous scholars, early-career researchers and higher degree students. Jack has worked for years on Eastern Maar Country, where he has a close relationship with the traditional custodians.

Undergraduate and graduate studies were heavily field-based, so Jack spent a lot of time alone in the bush. He studied owls in the Otways and apex predators in the Blue Mountains. The University of Western Sydney gave him 'a ute and a chainsaw and the keys to the World Heritage Area'. He loved it. But it was difficult to find work in the industry, and he spent some years running a kitchen in Kew on and off.

He returned to the Otways and country that he loves. After about a year with Landcare on weed management, he got a job for 11 or 12 years with the Conservation Ecology Centre where he now has an honorary strategic advisor role.

Jack is proud of his achievements at the centre. He did 'good science', and built a network. Work included landscape restoration at Cape Otway such as revegetation and bringing fire back into it, pest control of feral pigs and understanding koala populations. He established one of the first internship programs for graduates which proved a game-changer for their employment prospects. Eighty interns went through in Jack's time and most are now 'doing really wonderful things all over the place'. This exercise was a big motivator for Jack, who loved the feeling of giving back.



A major achievement was the formation of the Otways threatened species network, now known as the Otways Ecological Research Network. Begun in 2016 with philanthropic funding, it is essentially an informal list of emails, and an annual research forum. Jack enjoys building teams and working collectively, making it easier for researchers to do applied research that answers important questions in the Otways, such as practical land management.

The network began with around 15 members, and now has over 100. Members include researchers, land managers, conservation groups, traditional custodians. While it doesn't sound a lot, Jack says 'the conservation community is small, so it does contribute good science and generate questions that really matter, about stuff that's really complicated ... The heart of it is to inform people of stuff going on that's relevant to them'.

Jack contributes regularly to public debate via radio, podcasts and columns. He is co-chief counsellor on the Biodiversity Council, an independent expert group to promote evidence-based solutions to Australia's biodiversity crisis. Working to influence government and politics is hard, particularly in an era of misinformation and disinformation. Politicians have told Jack there are not enough Australians who care about the environment to give the politicians an environmental mandate. Jack is pretty disillusioned.

He remains, however, passionate about the challenges of conservation and forests. The end of logging is not a reason to lock up the forests. Wilderness is a misnomer: Country has always been managed. He says there are significant issues in forests to do with overstocking, but having the conversation about appropriate management is a minefield. The conservation narrative can be captured by the anti-logging narrative. Often traditional cultural practices are conflated with clear-felling. Too often the discussion is reduced to a black-and-white choice of fire or no fire.

Jack is a Yuin man. A couple of times a year he travels to Yuin country, on the south coast of NSW to spend time with his Yuin elders. Jack has learnt a lot from them, including patience. The elders have acquired land that Jack may be involved in caring for in the future.

Asked about last year's Voice referendum, Jack expresses his sadness. The 'Vote No' campaign and disinformation allowed indigenous people to see what other Australians really thought about them. Despite seeing 'the writing on the wall', when the referendum failed, he was rocked. He withdrew, couldn't go to work for a week. He now considers that in every forum in which he's working, there are people who voted No.

Asked about his future, Jack is clear that he is acting because of his responsibility and his right 'to look after the joint'. The identity of his future employer is not key so long as he can look after the joint. But, given the challenges of influencing the national debate, it may be better to choose to influence local decisions.

A lot of Jack's work is done remotely. He loves working on the property with his wife and daughter: looking after the bush, making the property self-sustaining with orchards and garden beds. The property is beautiful, full of very old manna gums which provide a home to many birds, all of which Jack can identify. He had a childhood passion to learn the names of birds, and the Slater Field Guide was well-used.

He does not eat beef or lamb due to their damage to the environment: he hunts venison. His doctoral supervisor at the University of Western Sydney was also a venison quality expert and Jack learnt how to butcher the meat. He says deer are unlikely now to be eradicated from the Otways.

Jack's extended family includes his parents, Lyn Harwood and Bruce Pascoe. Jack helped his father establish Black Duck Foods and was on its board for a while, but has stepped away. He has more than enough work of his own.

Late last month on World Kindness Day, the Conservation Ecology Centre sent an email to its network asking for donations to fund further research.
Go to #LoveYourOtways appeal.

Protecting the endangered Southern Brown Bandicoot

Marita Bak

The Southern Brown Bandicoot, *Isodon obesulus* *obesulus*, once lived in abundance across south-eastern Australia but is now rare, so it felt like I'd discovered treasure when I spotted a bandicoot foraging in woodland around Anglesea. My first encounter was last autumn, on a walk through the coastal dunes just as the sun disappeared behind the hill near O'Donohue's. There was no mistaking it was a Southern Brown Bandicoot; I was right beside one of the photographic signs that Parks Vic has installed to alert people of their presence.



Standing on that sandy path with the animal only metres away, the bandicoot's most distinctive features were a big round bottom, short tail and long pointy nose. Smaller than a rabbit and larger than a rat, it seemed unaware of my presence as it snuffled in the moist sandy ground. The golden tips of its brindle brown coat were shining in the fading sunlight as it scurried from one grass tuft to the next. I was expecting the bandicoot to use its large hind legs to hop like a kangaroo, but I was surprised to see it walking and running.

As a first-year student of conservation, I get to spend many hours outdoors and observing nature. When I came across this little brindle-brown character in the coastal dunes, it ignited my desire to learn more about our small marsupials and what it means when a species is regarded as 'endangered'. The definition of an endangered species is any type of fauna or flora that is likely to become extinct in the near future. The Australian Government and Victorian Governments have all listed Southern Brown Bandicoots as endangered. The Victorian Government upgraded the listing as recently as this year.

Southern Brown Bandicoots feed mostly at night and rest during the day in nests they construct in dense grasses or beneath Austral Grass-tree, *Xanthorrhoea australis*, fronds. They feed on fungi, insects, roots, seeds, berries, worms and small lizards. They use their long strong claws to dig for their prey, leaving telltale funnel-shaped holes in the ground. They can turn over tonnes of earth every year, spreading fungal spores, increasing water filtration and soil aeration, so helping plants to grow.



Female Southern Brown Bandicoots are multi-oestrous with a short gestation period of about 11 days, the shortest among marsupials. They can have multiple litters in a season, birthing up to five babies, though typically only one or two survive. These busy little marsupials have backward-facing pouches, like the wombat, so that the young aren't showered with dirt when their mothers are foraging.

Southern Brown Bandicoots are solitary animals and their populations are becoming increasingly fragmented; hence, retaining a healthy population is difficult. Land clearing for housing developments and agriculture destroys vital dense vegetation and disrupts movement corridors that the bandicoots need to sustain their genetic variation.

When their habitat is destroyed, Southern Brown Bandicoots become much more susceptible to predation by foxes and feral cats. Studies at the Royal Botanic Gardens Cranbourne have shown that the average weight of Southern Brown Bandicoots is one to one-and-a-half kilograms, 'the critical weight range that is the perfect snack size for feral cats and foxes.' (Parks VIC, 2024). The threat from these introduced predators is great for all bandicoot species and the decline in their populations are particularly evident in outer-urban areas, such as Melbourne's east and south-east.



Southern Brown Bandicoots have proved they are survivors, despite the threats to their existence. We can potentially improve their survival by keeping our cats inside at night and avoiding use of rat-baits in our gardens and sheds. By introducing appropriate and evidence-based management practices, such as well-planned fire-management regimens, active removal of introduced predators, and provenance planting programs, we may help to protect the Southern Brown Bandicoot.



Image: Kerri-Lee Harris

Watching this cute, pointy-nosed marsupial forage in its natural habitat is something all animal lovers should have the privilege of doing. I certainly hope Vic Parks will advertise additional Southern Brown Bandicoot habitats along the Victorian coast. Increased education such as the photographic beach signage along the Great Ocean Road, and broader science programs in Victorian primary school about endangered species, may help everyone, not only the local community, to become guardians of the Southern Brown Bandicoot.

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The complexity of insect flight patterns

Wendy Cook



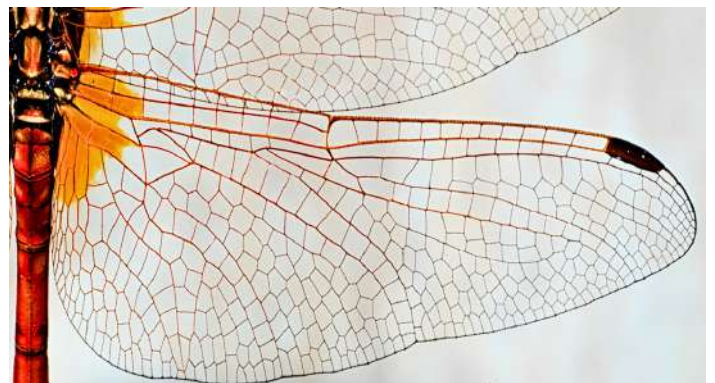
Australian Emperor Dragonfly. Image: Rob Shepherd

The Dragonfly

The dragonfly hovered near the water's edge, his black and yellow body bobbing, his wings a blur. His four wings, two in front and two behind them, could all move independently, controlled by muscles attached to the bases of his wings. As he hovered, the front wings moved up while the rear wings moved down, flapping continually in an alternating pattern which allowed him to conserve energy. He was watching for a female to enter his territory to mate, but he also needed to guard his space from other males. As one approached too close, he changed the pattern of his wing beats, so that all four wings flapped together, maximising lift. His wings shimmered in the sun as he darted above the water, using their independent movement to change direction abruptly as he followed the other male, chasing him until he left the area.

The dragonfly's wings were strong and flexible, made of two transparent layers of membrane, strengthened by a complex pattern of black veins. The vein at the front edge of each wing was strongest, helping him to cut through the air.

Close to it, towards the end of each wing was a darker denser area, which added weight to the wing tip and improved the stability of his flight. The veins also helped to protect his wings from damage. If a tear occurred in a wing, it would not spread beyond the surrounding veins. He needed his wings in good condition, not only to patrol his territory, but also to find food and shelter and escape from predators.



Dragonfly wing. Getty Images via Canva

Dragonflies were one of the first groups of insects to evolve and have become strong flyers and fearsome hunters of other insects. The male's wings and flight muscles were the technology that allowed him to survive, but technology changes over time. More recently evolved insects use different strategies to enhance their flight.



Australian Painted Lady butterfly. Image: John Lenagan

The Butterfly

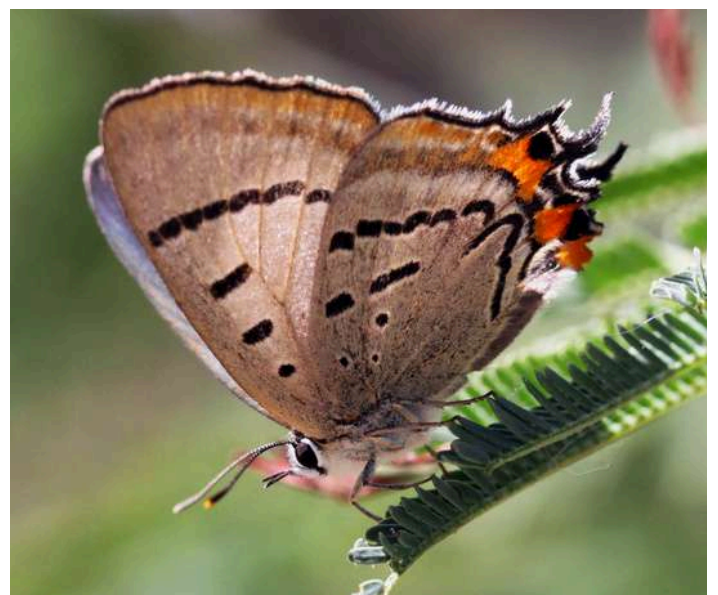
Just outside the dragonfly's territory, in a tree beside the water, was a Grey Fantail watching for an insect to eat. He launched himself from a branch towards a passing butterfly. The brown and black patterns on the undersides of the butterfly's wings made her well-camouflaged when she perched on the ground among dead leaves, with her wings held together above her body, but in flight she was far more obvious. The fantail flew close and tried to catch her, but the butterfly's flight was erratic and she was never quite where the bird anticipated.

The muscles attaching her wings to her body could change the angle of her wings helping her to manoeuvre through the air. These muscles were not used to power her flight; instead, muscles within her body changed her shape. As they pulled the top of her body downwards, her wings moved up, generating lift. This upward stroke was easy and energy from it was stored within an elastic hinge in her body, ready for the downstroke.

Again, muscles changed her shape, her back bulged and her wings moved downwards using the stored energy to push through the air. This method of flying is common to most insects and requires less energy than the dragonfly's flight.

The butterfly's wings were unusual among insects, as they were very large in proportion to her body. While many insects use bristles or hooks to hold the front and hind wings together, so that they work as one, the butterfly achieved a similar result by having an area of overlap.

As she raised her flexible wings above her body, they formed a cup shape. The air between them was pushed backwards, helping to propel her forwards.



Imperial Hairstreak butterfly. Image: John Lenagan

The fantail soon decided that the effort of chasing and catching the butterfly was not worthwhile for the size of the meal he would gain. He returned to his perch to await the next insect to fly past.

The Beetle

On a branch lower in the tree, a beetle prepared for flight. She raised the brown shiny wing cases on her back, to reveal one pair of membranous wings, carefully folded, and protected by the hard wing cases. She rotated her wings forwards, unfolding them ready for flight. Her wing cases helped to generate lift as she took off. They remained open and clear of her wings allowing them to move freely, but created drag, reducing the aerodynamic efficiency of her flight. She flew in a straight line without the unpredictable twists of the butterfly's flight. The fantail saw her, predicted her flight path, flew down and easily caught her in his beak.



Hairy Christmas Beetle with wing shields open.
Image: John Lenagan

The dragonfly, butterfly and beetle show a few of the variations in wings and flight that may be found among insects. There are many others. Flies have one pair of wings with structures behind them called halteres which help with balance during flight.



Hover Fly. Image: John Lenagan



Flying Ant. Image: Larena Woodmore

The only ants that grow wings are queens and their partners. They use them in mating flights after which the males die, and the females shed their wings in preparation for their underground life.

There are small insects that use rising air currents to assist their flight. Insects that spend their lives in one place, without moving far, have no need to fly. These groups of insects may have small wings, no longer useful for flight, or no wings.

There are many ways in which wings aid in the success of insects, and although not all of them can fly, wings have contributed greatly to their survival as the largest group of animals on Earth.

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The changing sands of time

Regina Gleeson*

Summer means sea, surf, salt, sun and, most of all, sand. These days, we bask on flat stretches of sand but in the bad old days, a day at the beach usually meant the kids tumbled down sand dunes and raced back up them to do it all again. They didn't realise they were having a big impact on the coastal environment.

Sand dune systems act as a vital buffer between the land and the sea. They are eroded during storms and rebuilt during calmer weather. Without this buffer zone, the sea would easily claim the delicate land plants which are adapted to soil, fresh water and unsalted air. The dunes also protect coastal communities from strong wind and salt. On the Surf Coast dunes are critically important.

A sand dune is any hill of loose sand shaped by the wind, salt, the available supply of sand, vegetation and fire. Sand within the dunes is a mixture of mineral grains and the broken-up remains of marine creatures such as molluscs. These materials come from land surfaces carried to the coast by rivers or wind, cliff and shore erosion, and other materials washed up from the seafloor. They are part of one of Earth's cycles of deposition and erosion.

Sand dune structure

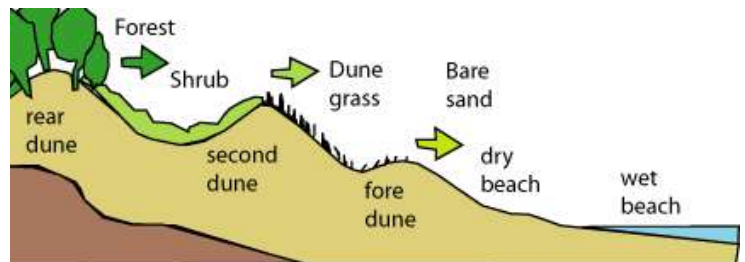


Image: Ray Chai

A classic dune system is made up of a foredune (the dune face immediately inland from the beach), a dip called a swale, and then a secondary dune. Sometimes there is a larger rear dune as well with a more substantial swale. At Anglesea you can see that system at Gaps beach near the O'Donoghue's beach steps.

The postcard below, possibly from the 1940s, shows that Anglesea Main Beach had a fore dune and a rear dune, at least until the 1960s. Bathing boxes and paths indicate that human activity in the dune was common.



By the time the following photos were taken, probably in the 1960s judging by the beach fashions, the fore dune was gone. The pressure of human activity, such as board running or entering the dunes, causes the face of the dune to lose vegetation and then a ‘blow-out’ occurs whereby the wind blows the dune away.

Today only the rear dune remains.



The Rose Series: Photographer George Rose’s company, the Rose Stereograph Company, produced hundreds of postcards of Australian images from 1913 to 1967.

Dunes must be free of vegetation to move. They become inactive when stabilised by a vegetation cover or when patterns of wind and sand source change. The cover of dune plants is all that holds the sandy soil together. If this protective cover of plants is damaged or destroyed, the bare sand is exposed to the wind and easily blown away.

Sand dunes are considered extremely harsh environments for plants to live in. Sand dune-adapted plants experience lengthy periods of drought, exposure to extreme heat, buffeting wind and under scouring, sand blasting, sand inundation and salt spray.

The plants on the foredune – the primary species or pioneers – cop the brunt of these harsh conditions. Because pioneer species trap travelling sand across the dune intercept most of the sea spray and supply nutrients to these sandy soils, they pave the way for plant species on the secondary and tertiary dunes, not adapted to sand blasting and extremely low levels of nutrients.

Because sand dunes exist in such a harsh environment, they are extremely vulnerable to human impacts such as erosion caused by trampling of vegetation, animal and plant invasion, pollution, coastal development, and global warming.

Rising sea levels mean higher tides and storm surges undercut the dune, causing big chunks to collapse. The dune loses its vegetation and stability and erodes. A much-loved Moonah lost the fight at Point Roadknight near the boat ramp in June this year.



Point Roadknight Moonah, April 2021. Image: Pattie Beerens

Endangered species such as the Southern Brown Bandicoot nest in the swales. A range of other animals move between the dunes and the nearby swamps: Swamp Antechinus, the Broad-toothed Rat, the Long-nosed Bandicoot, Jacky Lizard and the Hooded Plover.



Southern Brown Bandicoot
Image: Trevor Pescott



Hooded Plover Image: Margaret Lacey



Jacky Dragon
Image: John Lenagan

Management responses to dune loss are to fence off these precious forms, to create staircases and vehicle access as sacrifice zones to protect the surrounding dunes, to remove weed species and replace them with local species, placing brush matting and planting, as well as declaring dunes as conservation zones. Signs to respect the dunes are nailed to fences.



September storms this year caused significant damage to this dune at O'Donoghue's beach
Image: Sean Benz, Ecologic

You and your pets can help by staying out of the dunes, respecting the fragile species, and using staircases to access the beach from the carpark.

Education programs by Ecologic Education teach about dunes and include hands-on work to remove weeds, lay brush matting and planting. Organisations such as GORCAPA, Angair, the CCMA and Parks Vic work in the dunes to protect and restore. Local schools such as the Santa Monica campus of St. Bernard's College, Lorne P-12, Surf Coast Secondary College, among others, regularly work in the dunes.

It takes a community to care.

* Regina Gleeson is Co-Manager at Ecologic Education, Anglesea.

The challenge of finding summer orchids

Margaret MacDonald and Alison Watson

Despite the dry conditions and the general lack of terrestrial orchids flowering in Victoria, Anglesea once again enthralled all those orchid enthusiasts who ventured out into the field during spring. There were many exciting finds. Click here for full details which are posted on the Angair website www.angair.org.au/knowledge-bank/orchids-in-the-district.

What should be flowering this summer?

The Large Duck Orchid, *Caleana major*, and Small Duck Orchid, *C. minor*, should continue to flower. Many people have already shared their viewing of these fascinating species. Common Bird Orchids, *Chiloglottis valida*, are flowering, with their flowers opening up like the beaks of baby birds. Cinnamon Bells, *Gastrodia sesamoides*, flowered early this year and it was good to discover this species in a new area, in a recently burnt section on Forest Rd. It could still be found in early summer, and the impressive Tall Potato Orchid, *G. procera*, might also be found amongst trees in moist forested areas during December.



Large Duck Orchid



Small Duck Orchid



Cinnamon Bells

Even though it is so dry there are still orchids to be found. Rosy Hyacinth Orchids, *Dipodium roseum*, look like they will have a good flowering season with just so many stalks in bud popping up all through the district. Some were even seen flowering early in November. Keep an eye out for the Spotted Hyacinth Orchid, *D. pardalinum*, a paler flower with spots on the labellum rather than the stripes as are found on the labellum of the Rosy Hyacinth Orchid. Last year we had an unusual sighting of a few hybrids between the two species: a mixture of spots and stripes!



Rosy Hyacinth
Orchid



Spotted Hyacinth
Orchid

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There are three greenhood orchids that may be seen flowering during summer. They are all extremely rare so good detective skills are needed. The Sickie Greenhood, *Pterostylis falcata*, will flower in the next month in wet gullies. We have recently seen the rosettes of these greenhoods. The other two species of greenhoods that could possibly be seen, are the Dark-tipped Greenhood, *P. atrans*, and Mountain Greenhood, *P. alpina*.



Sickie Greenhood



Dark-tipped Greenhood



Mountain Greenhood

Large Tongue Orchids, *Cryptostylis subulata*, are in bud at Moggs Creek amongst reedy vegetation and should open soon. The large, leathery and evergreen leaves have been observed in other moist areas, but they are extremely rare. Look carefully for the uncommon Horned Orchids, *Orthocerus strictum*, which will appear soon hiding amongst grassy vegetation. The flowers may vary from brownish-green to yellowish-green.



Large Tongue Orchid



Horned Orchid



Elbow Orchid

Finally look for the tiny Elbow Orchids, *Thynninorchis huntianus*, along the track edges in open forests and woodlands. The unusual flower has a hinged labellum designed to attract the male wasp. When the wasp lands on the labellum it is swung against the column and pollination occurs.

Please let us know of any of your interesting discoveries. It is a more challenging game to play in summer.

All of our orchids are documented and photographed in *Orchids of the Anglesea District*. The new edition is available from the Angair Natural History Centre on Monday and Thursday mornings, online through the Angair website and from Anglesea News & Lotto and Great Escape Books in Aireys Inlet.

Lowdown on swooping birds

James Orton

As you read this, we will be past the swooping season of the black and white terror: **the magpie**. Everyone who has been swooped has a story or two of their own, and often has a sibling or friend who has been terrorised or even injured by a magpie. The magpies are protecting their babies but the ferocity and persistence of their attack is bad press for magpies.



Swooping Magpie. Canva



Noisy Miners. Marg Lacey

A few observations from my magpie swooping experiences. I have been regularly swooped in Melbourne, but have never been swooped within the Angair postcode. The birds are generally swooping the dog and not me. I find if you look the bird directly in the eye they won't swoop. A development of this idea, noted on the internet, is to paint eyes on the back of your hat/bike helmet. This then hopefully stops the swoop when you can't (really) see the bird. Great ideas aside, if a bird swoops you today, it is very likely it will swoop you in the same place tomorrow, and the best solution is to take a different route for three or four weeks.

There is, of course, a website for reporting magpie swoops: [MAGPIE ALERT!](#) It publishes a range of statistics:

- the number of swoops – for instance, there is a maximum of around 150 swoops per week in mid-September across Victoria;
- geographical distribution of swoops -- the ACT is a dangerous place to live with high swoop levels (maybe the politicians also make the magpies go crazy),
- percentage of injuries -- consistently around 13% of swoops cause injuries,
- activity when the swoop occurs which shows it is much safer to walk than cycle, since two-thirds of swoops are on cyclists.

Noisy Miners are also common swoopers in Melbourne parks. The members of the miner gang work together in the swoop. Again, they swoop the dog and not me, and the noisy collaboration of the miners gives you good warning when the swoop is gathering momentum. I find the miners swoop all year round, and they swoop because the park is their territory and not because of baby miners.

Other birds listed as swoopers on the internet: **Magpie-lark**, a very manoeuvrable swooper; **Masked Lapwing** which is famously aggressive and that fearful screech is scary enough for me; **Laughing Kookaburra** (being swooped by a kookaburra would be no laughing matter); **Red Wattlebird** as wattlebirds are mean and aggressive to smaller birds and would be accomplished swoopers; and **Grey Butcherbird**. A MAGPIE ALERT! contributor recently reported 'two Butcherbirds attacking in rotation'.

Having said all that, the motivation for this article was getting swooped by a **Willie Wagtail** a month or two ago. Well, the first time it happened the 'swoop' was so gentle and unthreatening, it was like being swooped by a rhythmic gymnastics ribbon. This was alongside the Maribyrnong River. A couple of weeks later it happened again in the same spot. And this time I noticed the nearby nest stuck to a eucalyptus branch above the river, and the swoop partner sitting on the nest. So again, baby birds were the cause of the swooping. However, I am happy to be swooped by a Willie Wagtail anytime!



A Willie Wagtail having words with a Laughing Kookaburra
Image: Rob Shepherd

Endemic glories of the WA Fitzgerald River National Park

Neville Millen

When I gazed recently across the 330,000 hectares of wilderness within the Fitzgerald River National Park in Western Australia I recollected the early chapters of Samuel Butler's satirical Utopian novel *Erewhon* (1872), where the narrator Higgs is confronted by extensive vistas of ragged ranges and extensive plateaus covered by bizarre plants. Butler had spent four years working in the Canterbury region of the North Island of New Zealand, its landscapes a dramatic contrast to England. A visitor to the Fitzgerald River area gets the same feeling of being in a truly alien landscape, while still being in Australia.



Fitzgerald River is 220 kilometres from Perth midway between Albany and Esperance. It was discovered by John Septimus Roe in 1858 and named for the first Governor of the Colony of Western Australia, Captain Charles Fitzgerald. What Roe, the first surveyor-general of the colony, found were numerous spectacular species of plants new to science. There are 75 species of plants found nowhere else and the park contains 20 per cent of all WA flora. The park is recognised by UNESCO as a Biosphere Reserve and is home to some unique species, none more so than the bizarre Royal Hakea, *Hakea victoria*, and the most attractive Velvet Regelia, *Regelia velutina*.

Royal Hakea



The Royal Hakea genus was named for Baron Christian von Hake, an 18th Century German patron of botany while the species name honours Queen Victoria of England (1819-1901).

Royal Hakea grows up to three metres in height and about a metre wide. It has a central woody stem from which stiff, leathery, stem-clasping leaves with toothed margins (on average 200 mm by 120 mm) radiate out in colours of yellowish orange and red. I did not see any plants with their creamy-white curled flowers, but most had hard brown woody seed pods which release seed only after the intense heat of a bushfire.

The *H. victoria* thrives and dominates the hilly landscapes around the bays and inlets and spreads further inland. These reminded me of cacti, standing tall and dominant in the low shrubby heathland between sea and ranges.

H. victoria is hard to grow in eastern Australia for it needs quartzite sandy soil, good drainage and a full sun location. I grew a plant in Torquay to about a metre tall and 500 mm wide, but it never developed the rusty red colour in the leaves, remaining pale lemon in colour. It died suddenly after an extremely cold wet winter but for several years of drought-like conditions it appeared to thrive.

Velvet Regelia



Velvet Regelia (or Barrens Regelia) takes its genus name, *Regelia*, from another 18th German, the botanist Eduard August von Regel; the species name is from the Latin *velutinus*, meaning velvety describing its soft hairy leaves.

This is another spectacular endemic plant of the Fitzgerald River area that exists on and near the East Barrens Range. This is a large shrub up to four metres high and with a two to three metres spread. It has beautiful foliage of small greyish-green hairy leaves that are cross-linked in a geometric pattern that make the leaves look velvety. It has bright-red terminal flowers with yellow anthers. It grows in deep sandy drifts and along rocky escarpments, usually in full sun. The *Regelia* genus contains only six species, five of which grow in south west Australia.

The Velvet Regelia is an awesome-looking plant, but is notoriously hard to grow outside its limited range, because it requires sandy soil and climatic conditions free from too much moisture. Its hairy leaves catch mist brought in by sea breezes, but the leaves need to dry quickly in the sun to avoid being affected by mould. It sets small woody seed capsules similar to those of *melaleuca*. The genus is closely related to the genera of *Melaleuca*, *Beaufortia* and *Calothamnus*.

References:

<https://exploreparks.dbca.wa.gov.au/park/fitzgerald-river-national-park>

www.wildflowersravensthorpe.org.au

“

There are 75 species of plants found nowhere else and the park contains 20 per cent of all WA flora.

”

Dieback effects on 'old-growth' Grass-trees, biodiversity and landscapes

Barbara Wilson*

The Austral Grass-tree, *Xanthorrhoea australis*, is one of the most significant plants in south-west Victoria but, as anyone who walks in the Surf Coast bushland knows, too many of them have fallen victim to the ravages of the plant pathogen *Phytophthora cinnamomi*, commonly called Dieback. The severity of Dieback and its impact on the affected areas' biodiversity is acknowledged in the fact that, under both states and Commonwealth legislation, it is classed as a Key Threatening Process to the country's natural ecosystems.

Grass-trees, although neither a tree nor a grass, are a succulent flowering endemic plant that has iconic status in many Australian landscapes. They are distributed predominantly in forest, woodlands and heathlands from Cape York Peninsula to Tasmania, South Australia and south west WA. Grass-trees are long-lived with some estimated to be 600 years old. Most grow slowly at about 0.8 to 6 cm a year and some species can grow to over three metres tall. They thus represent a major 'old growth' species in these habitats.



Images: Top: Ellinor Campbell. Below: Gail Slykhuis

There are 66 species of *Xanthorrhoea*, of which the iconic Austral Grass-tree is the most widely distributed. Some species have a 'trunk' formed of the overlapping bases of old leaves stuck together with resin; some have branched 'trunks' and some, like our local Small Grass-tree, *X. minor*, never form one. The flowers form on upright spikes and their thin linear leaves grow in a terminal crown.

Grass-trees are highly significant to indigenous people who have traditionally harvested them to make tools and weapons, such as spears and fire sticks, for the food from edible roots and nectar and medicine. The resin can be harvested and heated to form a reusable glue which is mixed with other materials to provide binding for axe heads to handles or spear points to shafts. It is also useful for patching damaged water containers. The Noongar of south-west Western Australia call the Grass-tree **balga**, the Gunditjmara of western Victoria call it **bukkup**, the Wurundjeri know it as **baggup** and the Nunga Peoples of southern South Australia speak of **yacca**. The Wadawurrung name is **wiyn**, meaning fire.

It is not only humans who utilise Grass-trees. They are used by hundreds of vertebrate and invertebrate species. They provide optimal habitat as nesting sites and refuge from weather and predation for endangered mammals (Southern Brown Bandicoot, Northern Bettong, Kangaroo Island Dunnart) as well as the Southern Bush Rat, Eastern Pygmy Possum, White-footed Dunnart, and Yellow-footed Antechinus.

Diseased vegetation infected with *P. cinnamomi* was first detected in the Otways in 1972 and seen later in heathy open forest, heathy woodland, heathland and riparian open forest. Researchers at Deakin University assessed the floristic and structural changes in heathland communities in the eastern Otways for eight years up to 1995 and found the pathogen significantly affected not only the floristic diversity but the vegetation structure. The diseased areas had less cover of the Austral Grass-tree and shrub species and a greater cover of sedges, grasses and open ground.

There was also a decline of cover of vegetation up to 60 cm in height within the affected areas. Further long-term studies at the test site found the disease progressed dramatically between 1989 and 2005 and by 2015 only 8 per cent of the site was clear of disease.

These findings formed a baseline for research under the federally-funded Wild Otways Initiative, launched in 2018. For more information on the Corangamite Catchment Management Authority's project on Dieback research and mitigation strategies click on the image below to visit the website.

More recent Deakin research has concentrated on the extent of loss of the actual Grass-trees rather than the overall effect on the vegetation community



Eastern Pygmy Possum. Image: Trevor Pescott



Southern Brown Bandicoot. Image: Mark Garkaklis

It has found that there was a ten-fold less cover of *X. australis* within infested and post-infested vegetation compared to that of uninfested areas.

Some infested and post-infested had zero cover. This research highlighted how significant the biodiversity losses of Grass-trees, dependent fauna and ecosystem function are likely to be across infested landscapes of the Otways. When vegetation dominated by Grass-trees becomes infected, the only viable land management practice is the targeted application of phosphite at the phytophthora dieback front. Until now there have been few techniques used in Victoria to contain or eradicate the pathogen from the bushland. Management has been limited to reducing the potential spread of disease to hygiene procedures when entering and leaving uninfested sites.



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However, research has shown that *X. australis* treated with potassium phosphonate (phosphite) show more intense cellular responses to challenge the pathogen and limit the growth of the *P. cinnamomi*'s hyphae between the plant's cells. In Western Australia, use of phosphite over 30 years has been shown to reduce the rate of spread of the disease, enhance the survival of susceptible endangered species and lessen deleterious impacts on plant community structure.

Although successful phosphite treatment by Deakin researchers was conducted in the eastern Otways 20 years ago, it has only recently been implemented under the federally funded Wild Otways Initiative. The targeted application by hand and aerially across the Otways promises to control the disease progress. A submission to register phosphite nationally for application in native vegetation is being considered. If successful, it will provide a greater ability to protect our iconic Grass-trees and their significant habitats along the southeast and south west coasts of Australia.

* This article is based on a paper by the researchers Associate Professor Barbara Wilson and Professor Mark Garkaklis – *Long-term impacts of Phytophthora dieback on iconic 'old-growth' grasstrees, biodiversity and landscapes*—published by the Australian Flora Foundation.

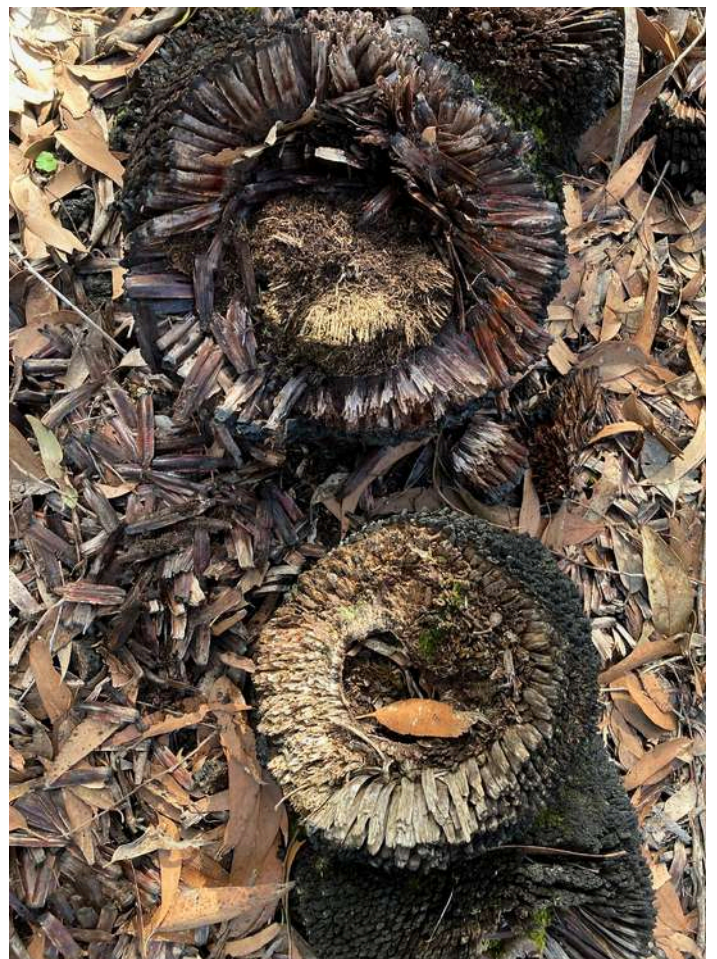
How fast does my Grass-tree grow?

Ann Feilding

On Wednesday 16 February 1983, fire devoured the bush along the Surf Coast from Deans Marsh to Bells Beach. On one private property near Bells dozens of old-growth Austral Grass-trees were burned. But by early April the blackened stumps were sprouting yellowish green leaves, the only green 'pick' available for the local wallabies.

Thirty years later, a number of the grass-trees had succumbed to Phytophthora Dieback. Once the dead leaves were removed on one, the stump formed a natural calendar; the line between the fire-blackened section and the new brown 'trunk' marked the fateful year.

The line was a chance to work out how quickly the Austral Grass-trees grow in local conditions. The measurement between the 1983 line and the top of the brown section was exactly 30 centimetres. So local Austral Grass-trees grow roughly one centimetre a year; it's not a scientific measurement but gives an approximate age of our precious old-growth 'trees'.



An unusual relationship lasts over the years

Christine Forster



Alcoa Site Manager Warren Sharp, discusses the mine rehabilitation process with Angair members, May 2023

Image: Rob Shepherd

A long-term relationship between Angair and Alcoa – an environmental community group and a mining company – seems, on the face of it, to be unlikely. The two entities, quite coincidentally, commenced activities in the Anglesea and Aireys Inlet area at about the same time. Edith Lawn held the first meeting of Angair in 1969 and Alcoa commenced producing power for the Point Henry smelter in the same year. Angair members had identified the importance of the biodiverse Anglesea Heath and Alcoa provided power to develop the region and provide employment to the local community.

The relationship started early. In 1971 Alcoa provided the support structures for the signs that declared the area as a protected wildflower area. In 1987 the heathland, including the Alcoa leasehold, was added to the Register of the National Estate. Alcoa established the Anglesea Heathland Consultative Committee which included Angair. This committee operated until Alcoa surrendered the 50-year mining lease and the State Government included the leasehold in the Great Otway National Park in 2017. Alcoa has continued to seek Angair advice on mine rehabilitation issues.

Over the years Alcoa has supported the annual Wildflower and Arts Weekend by providing the art prizes in earlier days, regular attendance at the show and, more recently, it donated to the building of the Indigenous Plant Centre in the community precinct.

In 2003 Alcoa helped to establish the indigenous garden in the community precinct by providing heavy machinery to clear the site. Alcoa staff and contractors have continued to remove weeds in the heathland.



Angair members Christine Forster, Peter Forster and Helen Tutt with the Victorian Environment Minister Lily D'Ambrosio at the announcement that the Alcoa mining lease would be incorporated into the Great Otway National Park, 1 February 2017.

When the power station ceased to operate in 2015, Alcoa agreed to continue to provide water for the Anglesea River for a year and, since then, allowed the storage of water to top up the river for the summer period as catchment flows have reduced.

When coal resources were becoming depleted Alcoa had to make a decision between taking out a much larger area of leasehold for new resources or mining deeper coal seams. After much consultation it was decided to preserve the heathland and go deeper. While Angair was very happy with that decision the deeper void presents many more challenges for Alcoa in implementing the mine rehabilitation.

Angair and Alcoa have worked together for many years to protect our most valuable heathland ecosystem. While most Angair members want to see the orderly transition from fossil fuel derived energy to renewables, we appreciate the efforts that Alcoa have made in assisting in the protection of the heathland and rehabilitation of the mine site and power station infrastructure. Angair will continue to protect the values of the heathland, especially in respect of the challenges that climate change will bring in adjusting to the new reality.

This article relies heavily on Roslyn Gibson's comprehensive history *Angair: the first 50 years*. This detailed record of Angair's successes and challenges is available and can be bought from the Angair website, www.angair.org.au.

What's killing our trees?

Sally White

A sad topic of conversation has been abroad in the Surf Coast for some time: our gum trees seem to be dying. Why?

One Angair member said that a theory that had some credibility was that the eucalypts are being over-grazed by Ringtail Possums which had reportedly been increasing in population. He said that he had had a good look at numerous trees and the tip foliage had been severely chewed off, and not by caterpillars.

In December 2021, the eucalypts in the Aireys Inlet and Anglesea area suffered an invasion of the moth of Gumleaf Skeletoniser, *Uraba lugens*; its voracious larvae ate leaves back to the veins. Such an invasion is part of a seven-year boom-and-bust cycle shared by many insects. So, this time, it's probably not them.

The possums are still in the frame. One Anglesea resident put possum guards round a couple of trees. Several weeks later they were looking much better than their unguarded neighbours. But the damage is so widely spread, it's hard to imagine that multiplying possums alone can inflict it everywhere.

An Aireys Inlet resident said that the trees along the Painkalac Creek were doing well but that a small stand of eucalypts behind the rock shelves on the Surf Coast Fairhaven to Cathedral Rocks walk were looking very stressed. He wondered if climate change-related large seas depositing salt water on them might be the culprit.

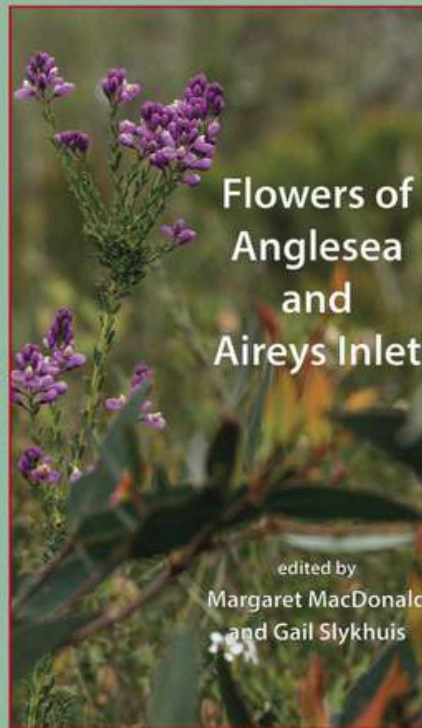
Another person said salt spray was an occasional cause of tree deaths. A period of dry weather bringing ocean spray can build up on leaves which appears to particularly affect Swamp Gums near the coast. But not only Swamp Gums nor coastal eucalypts are suffering.

Other suggestions are: residual herbicide runoff from market gardens near Torquay, fertilising nearby grassy areas with NPK (nitrogen, phosphorus and potassium) much disliked by eucalypts, or overcrowding of mature trees competing for moisture in the deep soil.

There's clearly no single cause, just as there is no one type of tree or place within the Surf Coast that is suffering. But one thing is certain – low rainfall stresses all plants, leading to them to be more susceptible to a variety of deadly factors. So, the overall answer might be the one we already know about: climate change.

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Looking for ideas for Christmas?



Visit the Angair website: www.angair.org.au/publications



Angair (Anglesea, Aireys Inlet Society for the Protection of Flora and Fauna) is dedicated to preserving our indigenous flora and fauna, and to maintaining the natural beauty of Anglesea and Aireys Inlet and their local environments.

www.angair.org.au

We acknowledge the Wadawurrung of the Kulin Nation and the Gadubanud of the Maar People as the Traditional Owners and protectors of this place.

We also acknowledge their ancestors who cared for the land, water and marine areas and all its biodiversity for thousands of years. We pay our respects to their Elders past and present who continue to care for this place.

This issue:

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Next issue:

Our next issue will be published in March 2025 and will be the autumn edition. We welcome any contributions of local, seasonal or general environmental interest. Send your contributions to angair.communication@gmail.com by mid-February and clearly label them 'for Angair Quarterly'.