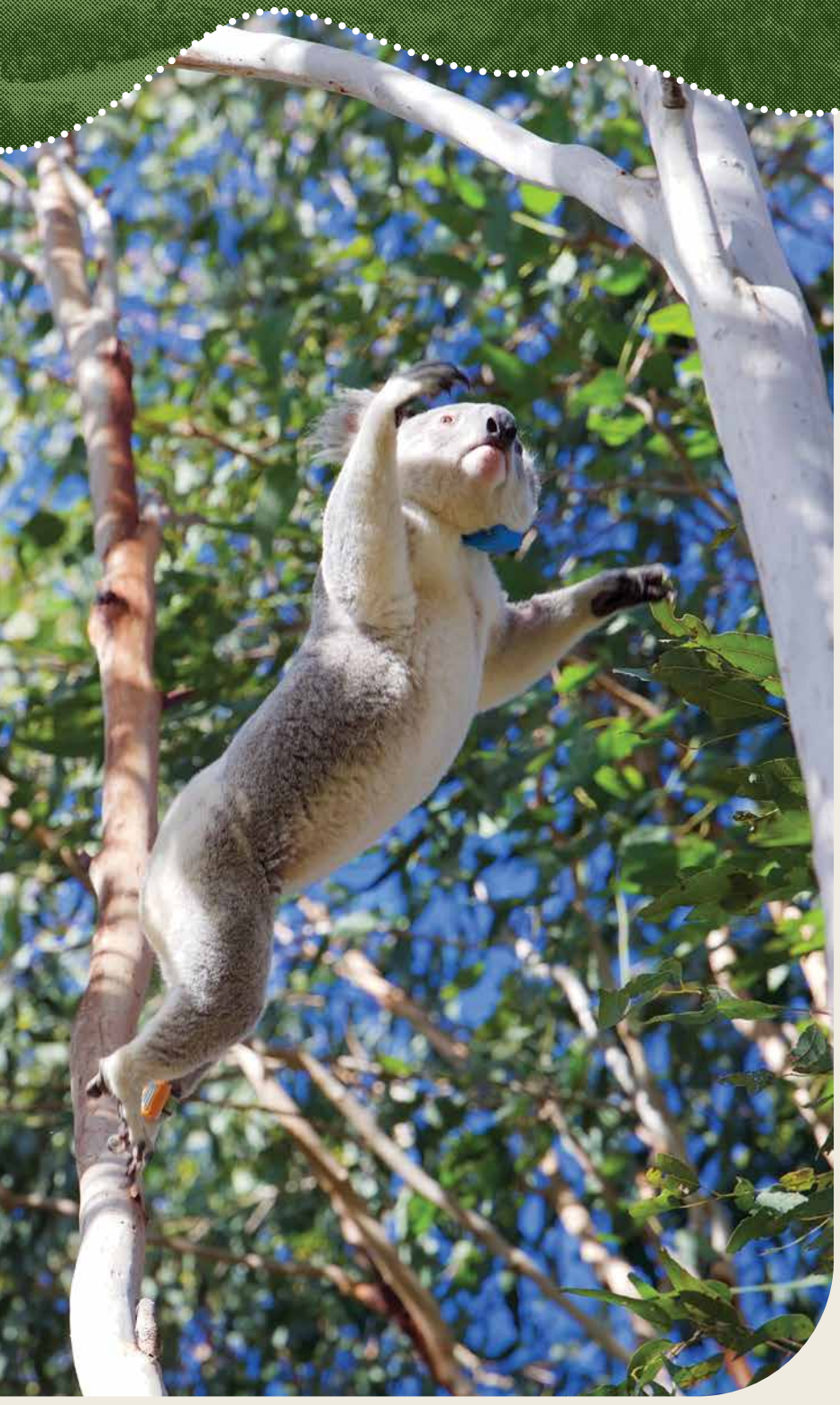
ISSUE 8 WINTER 2021

Hidden Vale Tails

– HIDDEN VALE WILDLIFE CENTRE NEWSLETTER –



Saving Our Koalas

Australia's koalas are under significant threat from disease, bushfires, vehicles and attacks by domestic animals. Expanding urbanisation is also destroying and fragmenting vital koala habitat.

While these threats are not new, catastrophic bushfires that ravaged parts of eastern Australia in the summer of 2019/20 galvanised concern for thousands of animals killed or severely injured during this disaster.

As new life returns to scarred bushland areas, knowledge about rebuilding and maintaining healthy koala populations is vital. That's where researchers at Hidden Vale Wildlife Centre come in.

Since 2018, our koala experts and researchers have been honing techniques for tracking, monitoring and conserving koalas to support healthy and sustainable populations.

The Hidden Vale Koala Project has been working to shed light on the number and health of the koala population at Hidden Vale, and refine research techniques that can be used elsewhere to support koala conservation efforts.

In just three years, the project has identified close to 40 koalas on the property and seen around 20 new joeys added to the population through successful breeding in the wild.

Read more about the Hidden Vale Koala Project on pages 2 and 3.

Above: 'Skroo' leaping between branches at Hidden Vale's 'koala hotspot'

The Hidden Vale Wildlife Centre is a collaboration between the Turner Family Foundation and The University of Queensland into the study and research of native ecosystems and wildlife.

Further information is available at turnerfamilyfoundation.com.au and hiddenvalewildlife.uq.edu.au

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Koala tracking

Koala tracking at Hidden Vale

A state-of-the-art wildlife tracking system at Hidden Vale allows for real-time location of identified koalas and enables a regular catch-and-release health check program.

Koalas on the eastern side of the 4,560-hectare property are tracked, monitored and assessed. In completing this work, the research team has driven more than 8,000 kilometres and walked many more in undertaking over 4,300 field events including capture-and-release, relocation and interventions, and leaf-cutting to provide food for koalas in care.

The project has also included around 350 veterinary examinations to assess and treat koalas in the study.

"At the same time, we're undertaking a lot of landscape management actions – planting corridors and improving the habitat," explained Turner Family Foundation Hidden Vale Wildlife Centre Manager Dr Zeke Davidson.

"What we know is that the survival rate following our intervention and treatment is very good – 65% of the animals we have treated are still out there in the wild and most likely wouldn't be without our intervention."

Koalas can live 10 to 13 years in the wild and have few natural predators. Feral predators such as dogs and foxes are a persistent threat to koalas when on the ground. Hidden Vale researchers are undertaking corroborative research into the impact of feral predators, and how best to mitigate this threat.

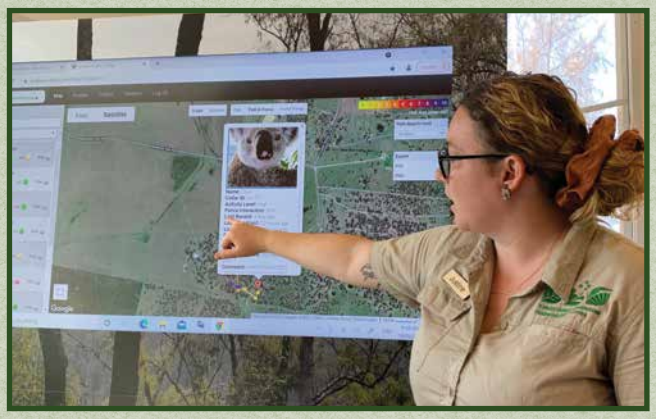
Chlamydiosis is the most prevalent disease detected in the Hidden Vale koala population and has decimated koala populations elsewhere.

Read more about the impact of Chlamydiosis on page 3.

KOALA TRACKING – BY THE NUMBERS

4,560 hectares
38 koalas tracked
8,000+ kilometres driven
4,300 field events
(including capture and release)
350+ veterinary examinations
16 independent joeys

The disease threatening our koalas



Caused by the bacteria *Chlamydia pecorum*, Chlamydiosis often results in death and generally destroys the reproductive capacity of female koalas. It can also cause conjunctivitis, an inflammation or infection of the eyes, which can strike males and females and can lead to blindness.

Infected koalas are at greater risk of death or injury from predation and are also susceptible to malnourishment as they become less capable of fending for themselves.

Chlamydiosis is primarily transmitted via sexual contact between infected koalas. Mother-to-young transmission is also believed possible. Almost half of the study population at Hidden Vale were found positive to the Chlamydia bacterium and unable to reproduce.

A management program where infected animals are caught, treated and then returned to the wild has had a 65% survival rate, resulting in a lower prevalence of chlamydia throughout the population. This has given breeding females a chance to rear young to weaning age, and others the possibility of being able to reproduce again after treatment.

The Hidden Vale Koala Project has observed 38 koalas to date. Of these, 16 continue to be monitored, nine have died, four have moved away from Hidden Vale, and nine have dropped their collars and are currently unmonitored. Another two treated juvenile koalas left the study population to establish home ranges elsewhere.

Overall, the project's intervention through veterinary care and clinical treatment has ensured an additional 20 koalas in the population. The population size has increased by 32%, whereas if nothing was done, approximately 47% of the adult population would likely have succumbed to Chlamydiosis, and reproduction would have been negligible.

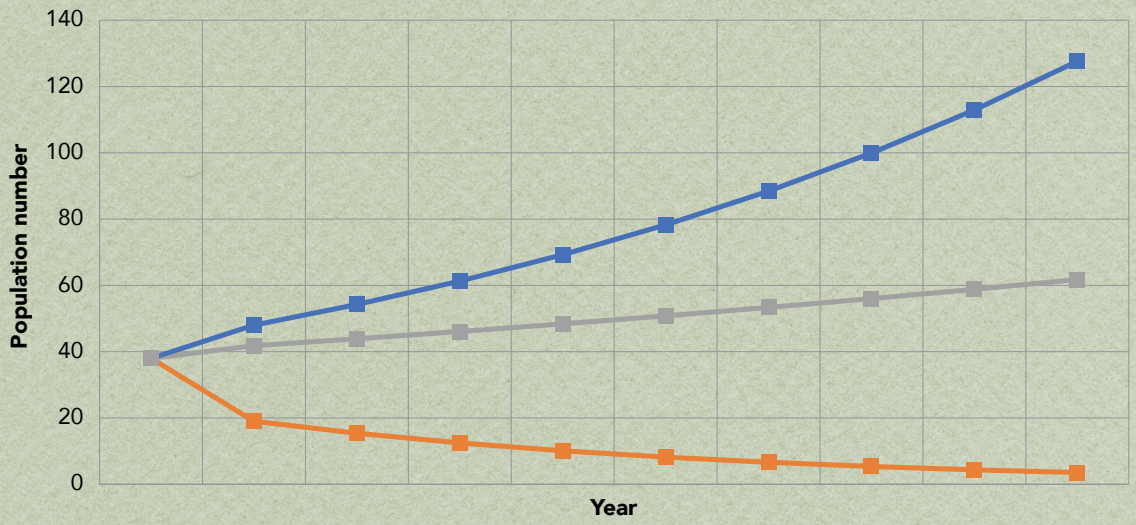
Wildlife Manager Dr Andrew Tribe said: "When we first started the project we found there was a very low level of Chlamydiosis. During the drought, and at the end of 2019 when the koalas were under stress and more susceptible, we saw the numbers of infected animals increase.

"We aimed to create a koala haven at Hidden Vale, and we have done that," Dr Tribe said. "Our next aim is to create a 'koala fountain' where healthy animals are dispersing from Hidden Vale and adding to the overall population of young, healthy koalas."

A high level of community interest in koala conservation has seen the recent addition of "Koala Safari" nature tours from the Hidden Vale Wildlife Centre. The tours provide a guaranteed opportunity to spot koalas in the wild (thanks to the tracking technology!) and also present a valuable opportunity to educate visitors on the very latest research methods, koala habitat and behaviour.

"If you came on a tour in the middle of summer, the koalas would be much lower down in the trees where it's shadier, and closer to the tree trunk which is cooler than the outer branches," explains Dr Tribe. "In winter, you will generally find them much higher up in the trees, enjoying the new leaf tips."

To find out more about the Hidden Vale Koala Project, and book a 'Koala Safari', visit turnerfamilyfoundation.com.au



Modelled koala population outcomes based on (Blue) actual population size increase (12.5%) 2018 – 2020, (Grey) hypothetical population increase of 5% per year and the alternative of a loss (Orange) of -19% per year to the adult population should no intervention take place.

Researcher Profile:

Shania Watson

How to teach an old possum new tricks

My research showed that wild animals do not need to be housed in captivity to be trained to use microchip doors. The possums excelled in their training, with most fast-tracking through some of their training stages.

I've been part of the Hidden Vale Project for three years and undertaken some quite diverse roles – from beginning as a volunteer, to becoming a part of the husbandry team, joining the Koala Project, and then conducting my Honours research at Hidden Vale.

My Honours research focused on the use of microchip-automated technology with native animals in the wild. This was a continuation of research already conducted with captive wildlife at Hidden Vale. However, it was the first time wild animals were trained in their natural environment to use microchip-automated doors attached to nest boxes.

I was able to successfully train seven out of eight brushtail possums *(Trichosurus vulpecula)* to use these doors – the eighth just did not seem to like his peanut butter sandwiches as much as the others!

I was also able to successfully train a brush-tailed phascogale *(Phascogale tapoatafa)* to use these doors. This was quite an achievement considering how elusive these animals can be.

My research showed that wild animals do not need to be housed in captivity to be trained to use microchip doors. The possums excelled in their training, with most fast-tracking through some of their training stages.

So, what's the point of this training and why is this technology so cool?

The microchip doors only let individuals with registered microchips into the nest boxes. This means we can supplement specific animals with housing and protection from predators that can't enter the boxes as they don't have a microchip.

Microchip-automated technology has the potential to assist with the 'soft release' of re-introduced animals, or to help sustain populations of a target species while resources recover, such as after devastating fires.

The current challenge with resource supplementation for reintroduction and sustaining population is that often it is the more competitive and more common species that benefit from provisioning resources.

This technology could solve this challenge by targeting the individual animals we are seeking to support.

Head to Australian Mammalogy to see our publication on the phascogales training (First use of a microchip-automated nest box in situ by a brush-tailed phascogale *(Phascogale tapoatafa))*, and keep an eye out for our soon-to-be published (currently accepted) possum publication in the American Journal - Wildlife Society Bulletin.

Native or nuisance?

Muridae, or murids, are the largest family of mammals and rodents in the world with over 700 species of mice, rats and gerbals found throughout Australia, Africa and Eurasia.

Worldwide there are over 2,000 murid species. In Australia, we have 59 recognised species with seven found in south-east Queensland, and many more native marsupials, such as antechinus and phascogales, being mistaken for an introduced mouse.

Given the mouse plague currently impacting New South Wales and parts of southern Queensland, it's timely to look closer at our smaller compatriots and consider what's native, what's introduced and which species pose problems.

In south-east Queensland, there are three introduced rodents being the house mouse *(Mus musculus)*, ship rate or black rat *(Rattus rattus)* and sewer rat *(Rattus norvegicus)*. These need to be identified and managed.

Native Australian rodents, for example hopping mice, pose little or no threat to public health and should be left alone. They are a protected species.

Introduced rodents may infest residential and agricultural areas, cause damage and carry disease.[1] The black rat *(Rattus rattus)* is among the world's worst invasive species, having spread across the globe in close association with the spread of human settlement and trade. It is the source of some of the worst diseases affecting humans and is thought to have had a devastating impact on native wildlife, especially in island ecosystems.[2]

The current house mouse plague has been caused by a "perfect storm" of optimal weather conditions for breeding and the end of the 2017–2019 drought. The mice first appeared in larger numbers in the spring of 2020 when farmers were harvesting a bumper crop. There was plenty of grain in the paddocks and in storage for the mice to eat, as well as fewer predators, many of which died during the drought. That year, regional New South Wales and Queensland had a particularly mild, moist summer that allowed the mice to keep breeding throughout summer and into autumn. Winter crops and well-established burrows kept the population well-fed and protected from the colder weather as farmers struggled to control the mice.

While effects on human infrastructure are obvious, the impact of introduced mice on the natural environment has not been well researched. Potential impacts are likely to include:

- competition with native fauna for food resources
- depletion of agricultural and native seed banks in pastures and native vegetation
- increased risk of soil erosion through the consequent reduction of ground cover and introduced mice burrowing in our fragile dispersive sodic soils
- increased predator pressure on native species at the end of a plague if predator numbers have increased in response to availability of mice during the plague (also called prey switching)
- transmission of disease to humans and to other fauna.

(Continued page 6)

Another important potential environmental impact is non-target mortalities arising from poisons used to control mice. Several rodenticides may legally be used around sheds and buildings, the most commonly used products being the anticoagulants brodifacoum (Talon™) and bromadiolone (Bromakil™). Once consumed, these baits take several days to kill and, as a consequence, can indirectly kill predators that feed on mice that have consumed poisoned bait. For example, carcasses of Australian kestrels *(Falco cenchroides)* are commonly seen around grain handling facilities.

Non-target mortality also occurs during broadacre baiting campaigns. Monitoring during the strychnine baiting campaign in Queensland in 1995 found strychnine was aerially applied to 250,000 hectares of crop to control high densities of mice. Searching for bird carcasses was conducted in two regions. A sample of the birds collected was chemically tested for the presence of strychnine and other poisons. Strychnine poisoning was the attributed cause of death for 117 of 157 birds found[3].

Some rodent poisons kill by preventing blood clotting, so that normal activity can cause lethal internal bleeding. Unfortunately, the poisons can be passed on through the food chain and become deadly to native and domestic predators, including birds of prey that contribute to natural control of rodent numbers. The anticoagulant Bromadiolone can be bought over-the-counter in Australia for use domestically, but is not allowed on farms because of the risk it poses to other animals through secondary toxicity.

Recently the New South Wales Agriculture Minister sought urgent approval from the Commonwealth poison's regulator to hugely expand the use of this poison in response to the mouse plague. "It'll be the equivalent of napalming mice across rural New South Wales," the Minister was quoted as saying.

Luckily, calmer minds were at work. Most farmers are using Zinc Phosphide impregnated wheat as bait. This is less toxic to domestic animals and birds, in which it causes vomiting. Rats and mice don't have the neurological or anatomical features to vomit. However, Zinc Phosphide baits are very dangerous to horses that are also incapable of vomiting, but overall, if well managed, are less dangerous in the environment because the Zinc Phosphide breaks down quickly in the bodies of its victims which are then less of an environmental hazard than animals poisoned with anticoagulants.

Other native animals often get mistaken for introduced rodent pests. These typically include the antechinus and phascogale. Antechinus have short fur and are brown to grey in colour with a conical head, long narrow snout and range from 12 to 31 centimetres in length. The majority of antechinus live on the eastern seaboard of Australia, along the Great Dividing Range.

Phascogales are carnivorous marsupials with three species, including the brush-tailed phascogale, in south-east Queensland. Both antechinus and phascogales are dasyurid species where the males live for only one year, dying after a period of frenzied mating.

At Hidden Vale, our fauna surveys have found native eastern chestnut mouse *(Pseudomys gracilicaudatus)*, antechinus, yellow-footed antechinus *(Antechinus flavipes)* and pale field rats *(Rattus tunneyi)*. While at the Hidden Vale Wildlife Centre, we have current displays of spinifex hopping mice *(Notomys alexis)*.

HOW TO DISTINGUISH BETWEEN A NATIVE AND A PEST

Tail length, body colouring, ear size and behaviour are all factors to consider in identification.

Phascogales are much larger in size than mice or rats, and have bushy tails. Antechinus are also larger than a mouse and feature a long, narrow snout.

And while mice and rats create a musky smell, antechinus have no lingering odour. Antechinus scats (faeces) are also very different to house mouse scats, being larger and cylindrical shaped.

If you do need to control pest murids, we recommend a Dry Bucket Trap. These are buckets with a ramp for the animals to walk up onto a baited roller. The roller is baited in the middle with peanut paste. The animal walks to the centre of the roller to feed, loses its balance and falls into the bucket. Then the animals can be identified and the natives released back into the wild. We recommend taking good photos and uploading to a trusted nature-based app such as iNaturalist for help with identification.

Native rodents play an important role in our ecosystems and the more we can preserve, the better for all.

1 https://www.sahealth.sa.gov.au/wps/wcm/connect/public+content/sa+health+internet/conditions/bites+stings+and+pests/rats+and+mice+prevention+and+control

2 A review of the evidence for potential impacts of black rats (*Rattus rattus*) on wildlife and humans in Australia. Peter B. Banks and Nelika K. Hughes. *Wildlife Research*, 2012,39, 78–88 Review http://dx.doi.org/10.1071/WR11086

3 Non-target mortalities during aerial strychnine baiting of house mice. Peter R. Brown and Geoff Lundie-Jenkins. *Wildlife Research, 1999,* 26(1) 117-128.

Pictured: Dry Bucket Trap

New Staff Appointments

Dr Zeke Davidson

Dr Zeke Davidson is a talented and inspirational conservationist who has joined the Turner Family Foundation team as Wildlife Centre Manager. Hailing from South Africa, with a DPhil in Zoology from Oxford University, Zeke has spent two decades working with endangered species conservation and remote operations. He has developed and implemented conservation and management strategies for private, regional and national bodies.

Dr Vere Nicolson

Dr Vere Nicolson BVSc has joined the Turner Family Foundation team as Chief Veterinarian and Breeding Administrator. Vere is a renowned veterinarian who brings extensive specialised experience working with a wide range of captive wildlife.

"The recent bushfires have highlighted how important the role of captive breeding for conservation can be. The Hidden Vale Project is uniquely placed to drive that change," Dr Nicolson said.

In another recent appointment, Professor Robbie Wilson has taken on the role of Hidden Vale Research Station Academic Director.

Out and about

The Hidden Vale Wildlife Centre team held its inaugural 'Lunch & Learn' session in May. This session focused on the impact of the 2019/2020 bushfires and subsequent recovery. The event was hosted by the Great Eastern Ranges, an organisation that promotes wildlife corridors along the eastern coast of Australia.

View the presentation here: https://youtu.be/ SMlDu6UvDZE

You can also see what we're doing as a partner of the Little Liverpool Range Initiative here: https:// www.facebook.com/groups/281294570178001

The research journey can be more of a rollercoaster than a walk in the park so it is always great for our researchers (pictured above) to come together at Spicers Hidden Vale to share our trials and tribulations!

Congratulations to our recent graduates! Pictured above from L to R is our Centre Manager Dr Dalene Adam, Shania Watson and Dr Meg Edwards, our first PhD student, first recipient of a Hidden Vale top-up scholarship, and first researcher to house wildlife within the Centre!

The Billabong is proving a popular viewing location among guests and researchers at Hidden Vale. A major improvement project over the past two years is paying dividends with recorded increases in bird numbers and a greater diversity of species.

HIDDEN VALE CONSERVATION TOP-UP SCHOLARSHIPS

Turner Family Foundation research support funding encompasses top-up scholarships of $7,000 per year for three years for PhD students.

Current research project opportunities within the Hidden Vale Project are detailed on our website.

Applications for top-up scholarships close 31 December, 2021.

Further details can be found at https://hiddenvalewildlife.uq.edu.au/research/hidden-vale-wildlife-conservation-top-scholarship-application

INTERNAL RESEARCH FUNDING SCHEME

As part of the Turner Family Foundation's ongoing commitment to fostering high impact research within the Hidden Vale Project, funding is provided to support postgraduate research projects.

This funding is made available on a quarterly basis to current Hidden Vale research students and staff only.

Around $100,000 has been provided for equipment, fieldwork expenses, laboratory analyses, conference attendance and specialist training.

Funding round 3 closes 17 August 2021, and funding round 4 closes 16 November 2021.

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To find out more or to donate to the Turner Family Foundation visit www.turnerfamilyfoundation.com.au