

# 2020 Australian Wildlife Society

University of Western Sydney Wildlife Ecology Research Scholarship

## Koalas Going with the Flow

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The 2019 drought, and the hot smokey summer that followed, threatened many koala (*Phascolarctos cinereus*) populations with overheating and dehydration. We have seen pictures of koalas approaching cyclists for a drink of water from their water bottles, and Kulin people tell of the koala taking control of the water in the country when it is mismanaged. During the drought, some koalas were forced to leave their dry *Eucalyptus* trees to hydrate and cool themselves down by means other than sweating. Suppose you braved the forest during the drought; a unique behaviour in the journey of koala thermoregulation may have been witnessed. Suppose you did manage to spot the solitary animal without the help of Global Positioning System tracking. In that case, the koala may have been observed spreading its limbs and belly across a large cool branch close to the ground, allowing heat to be drawn away into the bark. 'Tree-hugging' is a behaviour used during high air temperatures, above approximately 30°C, along with increased panting and shade seeking to lower the body temperature.

In many koala populations, clearing habitat for agriculture, development, and forestry limits the number of 'habitat trees' available for koalas to cool during high temperatures. Generally, fewer trees persist, and the resulting communities have warmer and drier local climates than densely treed communities. Across koala habitats, climate warming and drying is occurring mainly due to climate polluting industries. As a result, New South Wales and Queensland ecosystems will experience more frequent and intense periods of heat stress, and koalas must rely on 'tree-hugging' to deal with the physiological pressure. Researchers from Western Sydney University established a project to identify and improve the understanding of the capacity of tree-koala heat transfer, which can reduce heat stress at critical times.

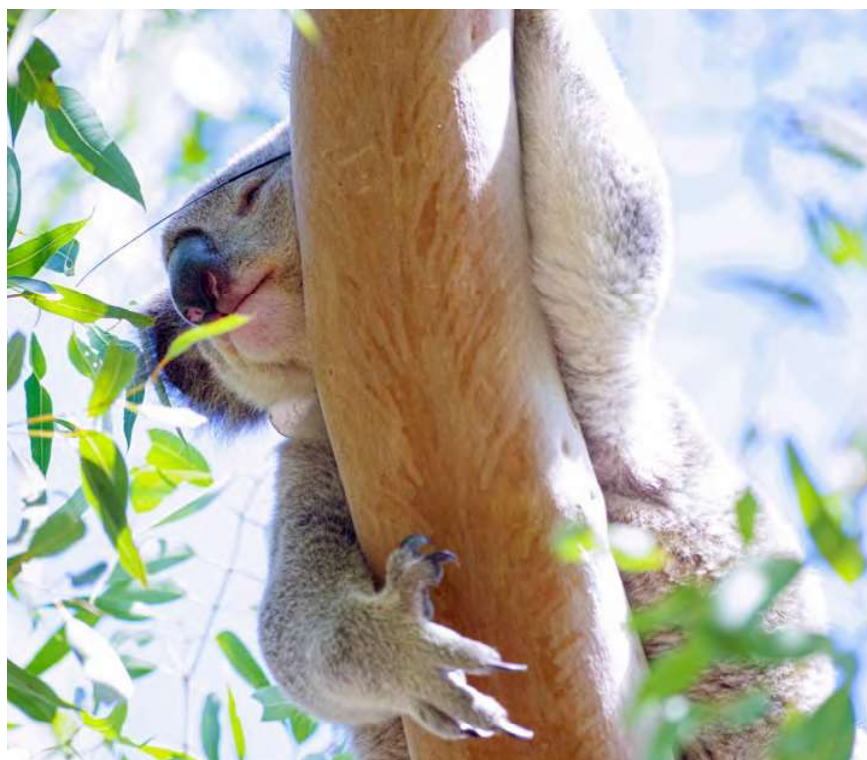
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We already know from Natalie Briscoe and others that the temperature difference between the bark of a tree and the surrounding air can be up to 9°C – at the base of a 'habitat tree' during hot weather. The temperature difference is significant compared to the temperature of a koala (35.5°C to 36.5°C); however, we do not know how the temperature difference changes as the trees adjust to extreme and variable weather conditions. Some *Eucalyptus* trees can move up to thirty-eight litres of water or more per day in the sap flow under the bark of a tree – the water transfers from the roots out of

the soil, which is cooler than the air temperature. Sap flow creates a drop for external heat sources in the bark of 'habitat trees' by transferring heat further up the tree and drawing the cool water from the soil below. Koalas feel the transfer of cooler temperature when 'tree-hugging', and you may too after hiking on a warm day. There is no better place to cool down than at the base of a big smooth-barked gum tree (*Angophora costata*).

Koalas will retreat from their preferred feed tree to take up a cooling position in a characteristic and cooler 'habitat



Marble, the koala, losing some heat through the bark of a habitat tree'. Image: Matthew Stanton.

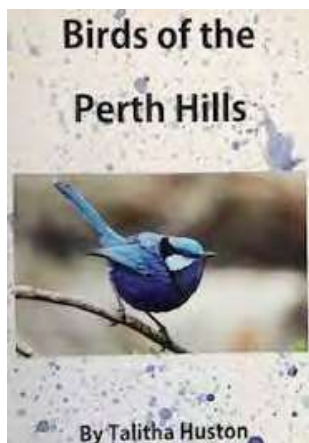
tree'. However, good cooling options are limited by the tree availability in the koala's home range. The selection of an ideal cooling position can be decreased by mismanaging koala habitat, where only a small list of specific feed trees is being preserved. Additionally, bark heat conductance is most likely controlled by the rate of sap flow and water transpired from the tree's canopy after it passes through the branches of the tree. Consequently, there may be times of drought and heat where the low sap

flow rate does not allow much cooling by 'tree-hugging' when the koala needs it most.

The capacity of habitats to protect koalas from stress during seasonal or extreme changes is essential, particularly due to the threat of climate change. However, the koala in average conditions may overlook critical periods where characteristic 'habitat trees' no longer buffer heat effects on a koala's physiological tolerance. By applying energy through

a heat transfer sensor bound to the bark of a 'habitat tree', researchers from Western Sydney University will measure the conductance of the tree bark for its magnitude and changes with temperature, humidity, and tree water availability. So far, the researchers have tracked koalas at a site near Sydney, including the exact trees used. The project will also measure the heat fluctuation in trees in different weather and seasons to see if conductance magnitude makes 'tree-hugging' a cool way to go.

## Book Reviews

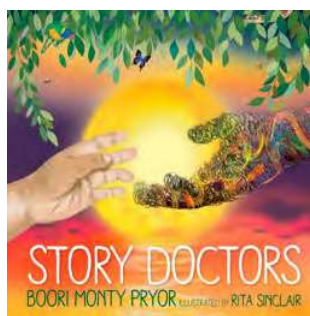


### **Birds of the Perth Hills - Talitha Huston**

After taking over 1,000 photos on her family camera, seventeen-year-old author, and photographer Talitha Huston, has published a book on the *Birds of the Perth Hills* in Western Australia. Primarily dominated by Marri and Jarrah forests, Talitha emphasises the beauty of Western Australia's precious birdlife and environmental surroundings. The book is an identification and information guide of the local birdlife

and includes photography tips, a conservation rating for each bird, and the Noongar names of each species. From the red-capped parrot (*Purpureicephalus spurius*), which is endemic to the southwest of Western Australia, to the Carnaby's black cockatoo (*Calyptorhynchus latirostris*), an endangered species due to habitat loss and competition with other hollow-nesting species, there is sure to be a bird that will become your ultimate favourite. Furthermore, ten percent of the proceeds go to Kanyana Wildlife Rehabilitation Centre (the Australian Wildlife Society's 2018 Community Conservation Award winner).

**Publisher: Self-published | RRP: \$22.00**

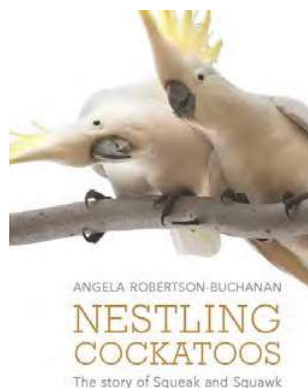


### **Story Doctors - Boori Monty Pryor and Rita Sinclair**

"We as a nation have been unwell for a very long time now..." are the words of legendary and much-loved First Nations storyteller Boori Monty Pryor. Boori offers a rich account of Australia's true history, drawing on his gentle instinct to teach and heal through 'Eco Echoes'

- words of medicine. First Nations people were shaped from and by the earth, and if we listen to Boori's words - we all belong. *Story Doctors* is beautifully illustrated, by Rita Sinclair, from wombat footprints to gecko cave paintings and green shoots so small to trees so tall. *Story Doctors* is inspiring and encourages 'Healing Country' through 'Eco Echoes'.

**Publisher: Allen & Unwin | RRP: \$24.99**

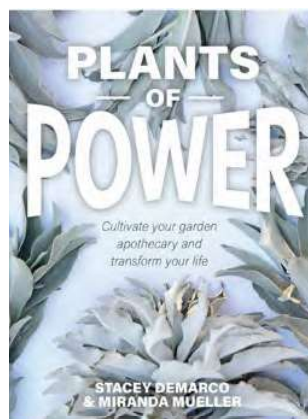


### **Nestling Cockatoos: The story of Squeak and Squawk - Angela Robertson-Buchanan**

Angela Robertson-Buchanan writes wildlife rescue books for children from her unique perspective as a wildlife carer. Her books provide an insight into the care and rehabilitation of our native wildlife, and she hopes to inspire the next generation of wildlife warriors. *Nestling Cockatoos: The story of Squeak and Squawk*

is a beautiful story of two sulphur-crested cockatoos (*Cacatua galerita*) who were rescued when their tree-hollow home was cut down. They were only two weeks old. The book describes Squeak and Squawk's rehabilitation to the point of release back into the wild. With cockatoo facts listed at the end of the book, there is plenty to learn about these beautiful animals.

**Publisher: Wild Dog Books | RRP: \$24.99**



### **Plants of Power - Stacey Demarco and Miranda Mueller**

In times of ongoing uncertainty, people are looking for ways to reclaim their relationship with nature. *Plants of Power* shows how to do just that. Authors Stacey Demarco and Miranda Mueller provide a modern guide to sixty-six foundational plants you can grow in your garden - no matter how much space you have. They show how to reconnect with the natural

world and tap into the power of plants, whether for mood, healing, love, or other aspects of our lives. Readers will learn the history of these plants, understand how to grow them, the medicinal benefits, nutritious recipes, and that planting by seasons increases growing success. *Plants of Power* is a fun and practical guide to understanding our powerful plant allies.

**Publisher: Rockpool Publishing | RRP: \$39.99**