

What Can I do to Help?

If planning to conduct a prescribed burn, steps should be taken to mitigate the potential impacts of fire on at-risk trees and large logs on the ground. This should also be employed at the start of the fire season or during periods of elevated fire danger. Some examples include:

1 Look out for the presence of hollow-bearing trees and note the locations as points or areas on your fire management plan map or data recording sheets in the Hotspots Fire Project Monitoring Guide.



2 Where possible, record the location of dead trees and those with large ground level fire scars or entry points as they are more susceptible to collapse from fire.



3 Where possible, rake back litter 1-2m from around the base of at-risk trees and logs, this is an effective mechanical method for reducing the impact of fire.



4 Wetting down the base of as many at risk trees and logs as possible in preparation for a prescribed fire can offer short-term protection to hollow-bearing trees.

5 Create species-appropriate artificial hollows to provide habitat for mammals, birds and invertebrates in areas where hollow presence is low. In the past nest boxes have been the primary type of artificial hollow but other techniques are being developed. A variety of cavity sizes, shapes and entrances are desirable unless targeting a species that has specific requirements. Some examples include:



Nest box

- **Nest boxes:** plywood, timber and polyethylene boxes mounted to trees.
- **Ground logs:** hollow logs left lying on the ground.
- **Relocating tree hollows:** recovered hollows cut down from trees marked for removal and placed into a new tree in a protected area.



Ground log



HOTSPOTS FIRE PROJECT

Protecting Our Hollows

Who uses hollows?

Large Hollows:

- Powerful owls
- Cockatoos

Medium Hollows:

- Parrots
- Tree creepers
- Ducks
- Kingfishers
- Possums

Small Hollows:

- Microbats
- Invertebrates
- Gliders
- Phascogales

Ground Logs:

- Antechinus
- Lizards
- Snakes
- Frogs

Information in this fact sheet

- The value of hollows
- What landholders can do to help
- The different types of habitat you can create
- The role of fire in protecting hollows
- The value of logs staying on the ground

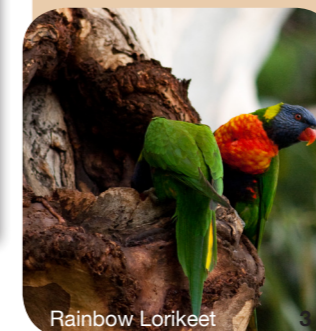
In Australian forests and woodlands, tree hollows and fallen logs are some of the most valuable parts of the landscape for the conservation of biodiversity; they are critically important habitat features.



Barking Owl

In excess of 300 Australian native vertebrate species as well as countless invertebrates are entirely dependent on hollows. Hollows provide a range of conditions that are ideal for shelter and breeding sites for these native vertebrates.

The absence of hollows and fallen logs across many landscapes means that these areas are not suitable for hollow-dependent species. Hence, these areas may be ecologically impoverished and dysfunctional with substantially reduced biodiversity.



Rainbow Lorikeet

REFERENCES:

- Mackowski, C. M. (1984). The ontogeny of hollows in blackbutt, *Eucalyptus pilularis*, and its relevance to the management of forests for possums, gliders and timber. *Possums and Gliders*. (eds A. P. Smith and I. D. Hume.) pp. 553–567. (Australian Mammal Society: Sydney.)
- Ruegger, N. (2017). Artificial tree hollow creation for cavity-using wildlife – Trialling an alternative method to that of nest boxes. *Forest Ecology and Management*. 405 (2017) pp. 404–412
- Smith, L., Cordy, E., Bluff, L. (2017). Reducing the effect of planned burns on hollow-bearing trees., paper presented to NCC Bushfire Conference, Sydney, 30-31 May, viewed 27 June 2019, <https://www.slideshare.net/mrose2014/bushfireconf2017-19-reducing-the-effect-of-planned-burns-on-hollow-bearing-trees>

FURTHER INFORMATION:

- <http://hotspotsfireproject.org.au/>
- <http://www.environment.nsw.gov.au/resources/nature/Factsheet5TreeHollows.pdf>
- <https://www.environment.nsw.gov.au/determinations/LossOfHollowTreesKtp.htm>

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Owlet-nightjar



The Value of Hollows

Hollows are present in both living trees and standing “stag” trees, often persisting for many years after they die. Tree hollows can vary from tiny pockets only centimetres across, to massive pipes in tall old growth Eucalypts with entrances exceeding a metre in width and depths of up to tens of metres.

This diversity of physical structure allows for occupation by an equivalent diversity of creatures spanning several orders of magnitude in size; from miniscule microbats and feathertail gliders weighing a few grams, to powerful owls, glossy black cockatoos, greater and yellow-bellied gliders, exceeding half a metre in length and weighing many kilograms.



“Hollow bearing trees provide stable, moist and sheltered conditions that ensure the survival of an array of different organisms.”

Mulga Snake

For this reason, they are functionally a non-renewable resource and require active management to ensure survival.

In lower productivity habitats and drier climates, growth rates are slower and hollow formation is likely to be much slower. Different types of hollows can form on smaller branches, major branches, upper trunks and the base of trunks. Cracks and fissures are also important for microbats and other small creatures. Depending on the processes involved and the aspect of the site, these can provide physical conditions (such as temperature, humidity and dryness) that are suitable for completely different vertebrate groups and species across space and time.



In Australian ecosystems tree hollows are mostly present in the many species of Eucalypt and close relatives such as apples (*Angophora* spp.), bloodwoods (*Corymbia* spp.) and boxes (*Lophostemon* spp.). Hollows commonly form within Eucalypt trunks and branches following consumption and decay of heartwood by fungi, termites and other invertebrates. This typically commences in the heart of the stem at a relatively early age and spreads slowly into larger branches as the tree matures. After the collapse of the decayed internal material, cavities are formed and the first hollows are created.

In most habitats this process can take many decades. Some hardwood species take at least 100 years before they start to form hollows. For example coastal blackbutt (*E. pilularis*) are known to take 200 years to begin to form large hollows (Mackowski, 1984).

Hollows and fallen logs harbour a myriad of organisms that feed on rotting wood (such as fungi and invertebrates). These in turn provide food for many other species, creating an entire “inner realm” centred on these habitat features. Large tree hollows and fallen logs are also occupied by other organisms including mosses and lichens, mostly due to the availability of moist conditions, shelter and the physical availability of extensive organic surfaces. These living surfaces host invertebrate and vertebrate populations needing stable, moist and sheltered conditions to survive. Several species of lizards and snakes depend on these large habitat features and their “cloaks” of moist organic material.

Many native plant species require fallen logs as germination sites or to provide additional organic material for juvenile growth and adult establishment. Hollow-bearing trees and fallen logs are essential for the cycling of nutrients through ecosystems and the retention of water in the landscape; all these processes result in the maintenance of ecosystem health and ensure ecosystem viability.



Letting Logs Lie

Fallen timber is an important habitat feature in native vegetation particularly in open forests and woodlands where the ground cover may be sparse, drier and subject to more frequent fire.

Fallen logs and other woody debris provide shelter and places to forage for grey-crowned babbblers, bush stone-curlews, rufous bettongs and many other threatened inhabitants of these forests and woodlands. With the loss of fallen timber these native species lose important food sources and shelter and are far more prone to predation by cats and foxes.

Many of these birds and mammals have declined substantially across their range, local extinctions have been documented and many face ongoing decline because of removal and loss of fallen logs. Across many farming landscapes these features are mechanically removed to “clean up” paddocks; they are removed for firewood (many of the box species being highly sought-after firewood) or lost through combustion.



Interestingly, large logs are not readily available as fuel and are not normally considered to be fire hazards. They can be protected by raking around, where possible, prior to burning.

“With the loss of fallen timber native species lose important food sources and shelter and are far more prone to predation by cats and foxes.”



Tawny frogmouth

The Role of Fire

Fire plays a powerful and often transformative role across the landscape of NSW. Fire may create and destroy tree hollows and fallen logs; because of this there is the potential for managing fire to reduce the loss, and facilitate the creation, of these critically important habitat features. Fallen logs do not contribute to the initial faster moving fire front but keep burning after the fire has passed.

There are many ways in which fire can destroy hollow-bearing trees and large logs including direct flame contact, radiant heat and ember attack during prescribed fire and wildfire events. Even low intensity burns, if too frequent, can create scars and openings at the base of the tree leading to structural weakness and tree collapse. Sustained flame contact and radiant heat can also contribute to ignition of part or all of the hollow-bearing tree or fallen log, causing tree collapse, and removing these valuable habitat features from the landscape. Due to the size of large hollow-bearing trees and fallen logs, complete combustion does not happen immediately, instead happening over what are often considerable timeframes (hours to days and weeks). If safe to do so, extinguishing burning hollow-bearing trees and fallen logs after the fire will ensure their survival into the future.

Fire can also have a positive impact on hollow formation, fire can damage bark and heartwood, creating conditions conducive to hollow formation including providing access for termites and fungi to heartwood. In high intensity fires (often bush fires) with greater flame and scorch heights, physical damage can occur in upper trunks and branches, contributing to the formation of hollows in the tree crown. These hollows are critically valuable to many threatened and significant hollow-dependent forest fauna species.

