



The Leadbeater's possum

Overview

VicForests is committed to learning about and protecting the critically endangered Leadbeater's possum.

We are at the forefront of research to understand the species' habitat, distribution and ecology.

VicForests' team of scientists and expert foresters are focused on the protection of endangered species while overseeing sustainable timber harvesting.

About the Leadbeater's possum

The Leadbeater's possum is usually found in Ash forest living in colonies of 2 to 12 animals and actively defend territories of approximately 1 to 3 hectares. Their critical habitat includes hollow bearing trees for nesting and a dense midstorey of acacia for foraging.

The Leadbeater's possum is only found in Victorian forests within the Central Highlands. Its restricted distribution means bushfire in Victoria is a significant threat to the species and this is predicted to increase under climate change modelling.

In 2015 the Leadbeater's possum was listed as critically endangered due to the impact of the 2009 bushfires across a third of its known distribution.

In 2019, the Threatened Species Scientific Committee conservatively estimated the Leadbeater's possum population at between 2,500 and 10,000¹.

Protecting Leadbeater's possum habitat

Since the introduction of the 1998 Central Highlands Forest Management Plan VicForests has identified and excluded from harvesting key Leadbeater's possum habitat. This includes protecting different kinds of habitat, such as:

- Zone 1A habitat, where there are 10 large live hollow bearing trees per 3 hectares.
- Zone 1B habitat, where there are 12 live and dead hollow bearing trees per 3 hectares (in patches greater than 10 hectares) with a acacia understorey.

In 2013, VicForests worked with the government and other authorities to establish a Leadbeater's Possum Advisory Group to manage and protect the species. In 2014 we implemented the group's recommendation to:

- apply Regrowth Retention Harvesting in over half of Central Highlands ash species coupes — this retained mature forest elements within harvested areas increases structural complexity across the forest landscape and improved ecological integrity
- modify regeneration practices to reduce the intensity of regeneration burning to better protect and maintain forest values and support development of future species habitat
- create a 12.6 hectares harvest exclusion zone around a Leadbeater's possum sighting.

VicForests has since established around 1000 exclusion zones in State forests. This has resulted in an additional 5,500 hectares of ash forest being reserved from harvesting activities to date.





Latest research improves knowledge of Leadbeater's possum habitat

The use of the latest LiDAR technology, coupled with improved detection methods, is leading to a greater understanding of the species' habitat.

The Leadbeater's possum has a strong preference for forests with high densities of midstorey connectivityⁱⁱ. In this case 'connectivity' refers to the distance between branches that allow the small possum to move freely and safely across its territory and have better access to feed treesⁱⁱⁱ.

New research uses LiDAR to map forest structure including midstorey connectivity and has helped identify critical habitat for the Leadbeater's possum.

The research shows that the best midstorey connectivity exists in forests that are 20 to 30 years old and often consist of acacia and eucalypt regrowth trees. The connectivity increases in the years following disturbance, but starts to decrease after about 30 years, with lower levels in forests older than 50 years.

This is reflective of the lower numbers of Leadbeater's possum detections in older undisturbed forests which were previously considered critical habitat and the increasingly higher numbers in younger regrowth forests.

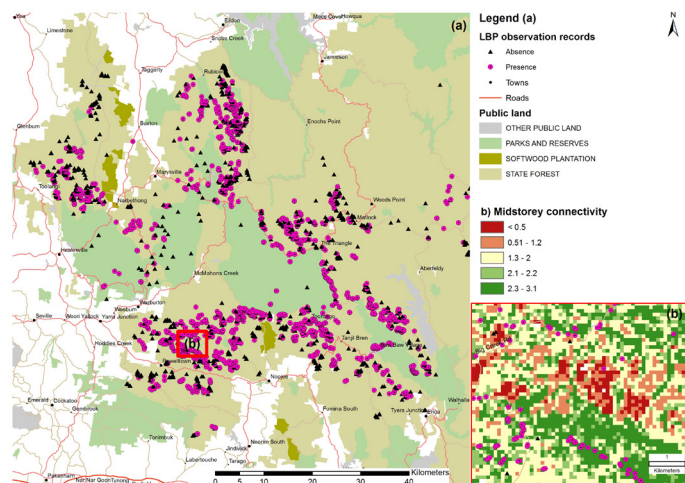


Figure 1: By combining data from Leadbeater's possum surveys and LiDAR technology, researchers have found a strong correlation between species detections and high midstorey connectivity. LiDAR technology is used to map forest structure and as indicated in this figure, the Leadbeater's possum presence records align strongly with midstorey connectivity.

VicForests' fauna survey program and the Department of Environment, Land, Water and Planning's (DELWP) Forest Protection Survey Program have identified Leadbeater's Possums in the areas burnt in the 2009 bushfires. These forests now contain dense regeneration of acacia and eucalypts that is highly suitable for foraging, especially where there are hollow bearing trees nearby.

The research also found high midstorey connectivity generally takes longer to return following fires compared to harvesting and the Leadbeater's possum has been detected in regenerated forests as early as 5 years post-harvest.

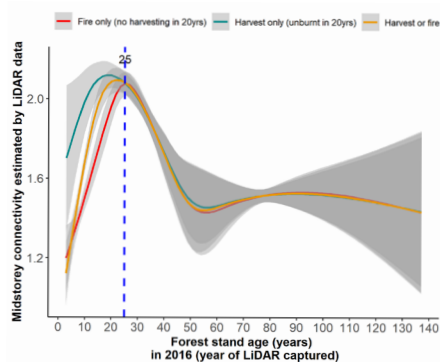


Figure 2: Researchers used LiDAR to compare midstorey connectivity with forest age. This graph shows the best midstorey connectivity occurs in forests aged between 20–30 years (or 20–30 years since disturbance). It also shows midstorey connectivity returns sooner in forests that have been harvested compared to those that have experienced fire.

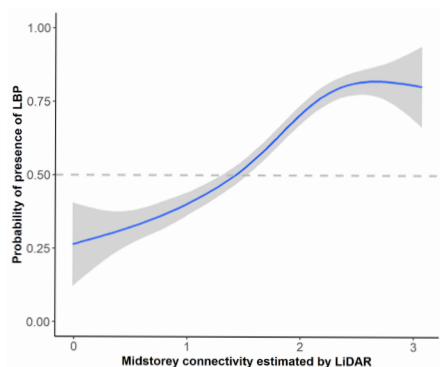


Figure 3: The probability detections of Leadbeater's possums are higher in forests that have greater midstorey connectivity. From Figure 2 forests aged between 20–30 years have higher densities of midstorey connectivity.

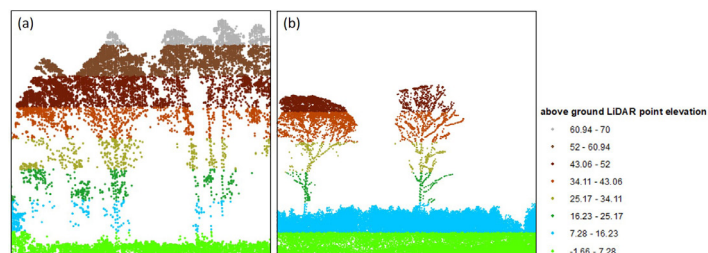


Figure 4: LiDAR data showing midstorey connectivity: (a) low midstorey connectivity, (b) high midstorey connectivity.



Hollow bearing trees

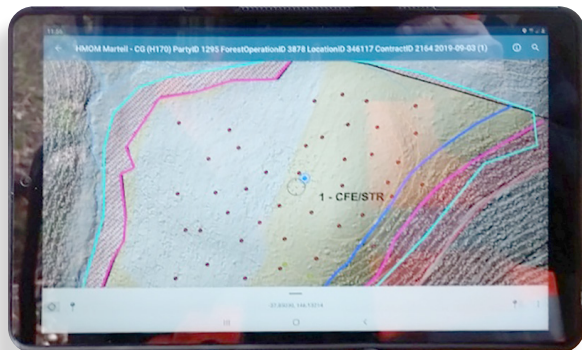
The ideal Leadbeater's possum habitat is a combination of forage habitat with high midstorey connectivity with nesting sites in close proximity.

The preferred nesting habitat of the Leadbeater's possum is in hollow bearing trees, however they have also been known to nest in other locations including artificial hollows and nesting boxes^{iv}.

Hollow bearing trees exist throughout the landscape. While the probability of hollows occurring in trees increases with age, they do occur in trees much younger than the assumed 120 years old^v. This can be through natural processes such as storm events, fires, and insects, or even silvicultural interventions^{vi}.

Ecological assessments

VicForests works closely with DELWP, who oversee the protection of endangered species in Victoria, to implement the Code of Practice for Timber Production 2014. The Code incorporates elements of the Central Highlands Forest Management Plan and Leadbeater's Possum Action Statement.



Many biodiversity and habitat components are considered to assess the potential presence of the small nocturnal possums.

VicForests' reviews maps, field and spatial data that identify types and quality of forest habitats, historical sightings of endangered species and the impact of previous fires on the forest.

Independently, DELWP undertakes desktop reviews of coupes to prioritise the top 80 per cent of coupes it will survey for important biodiversity values including Leadbeater's possum habitat. Where high quality habitat features are identified, nocturnal surveys are undertaken using spotlights, thermal imaging and baited camera traps to detect the species' presence.

Similarly, VicForests undertakes spotlight surveys in coupes not surveyed by DELWP that have the potential to be occupied by Leadbeater's possums.

New initiatives

In 2019, VicForests refined its approach to harvesting and regeneration to bring a greater focus on threatened species protection for all coupes planned for harvesting.

Selected coupes are intensively surveyed to record an estimate of the presence and density of current and potential hollow-bearing trees.

This detailed understanding of forest values allows us to identify important threatened species habitat and refine our predictive models to an unprecedented level of accuracy to identify potential species habitat.

Future species habitat value is further protected during harvesting by contractors using tablets with live operational maps identifying hollow bearing trees and other coupe habitat values.

i. Threatened Species Scientific Committee, 2019, "Conservation advice *Gymnodelidius leadbeateri* Leadbeater's Possum", 22 June 2019. <https://www.environment.gov.au/biodiversity/threatened/species/pubs/273-conservation-advice-22062019.pdf>

ii. Smith, A. P., and D. B. Lindenmayer (1992), "Forest succession and habitat management for Leadbeater's possum in the State of Victoria, Australia." *Forest Ecology and Management* 49:3-4: 311-332.

Lumsden, L. F., et al. (2013), "A new strategic approach to biodiversity management—research component", Arthur Rylah Institute for Environmental Research unpublished client report for the Department of Environment and Primary Industries, Melbourne.

iii. Nelson, J. L., et al. (2017), "Targeted surveys to improve Leadbeater's possum conservation", Arthur Rylah Institute for Environmental Research Technical Report Series No. 278, Department of Environment, Land, Water and Planning, Heidelberg, Victoria (2017): 5. www.ari.vic.gov.au/_data/assets/pdf_file/0024/93138/ARI-Technical-Report-278-Targeted-surveys-to-improve-Leadbeaters-Possum-conservation.pdf

iv. Department of Environment, Land, Water and Planning (2016), "Supporting the Recovery of the Leadbeater's Possum: Progress Report December 2016", www.wildlife.vic.gov.au/_data/assets/pdf_file/0023/27914/Progress-Report-December-2016.pdf

v. Fox JC, Hamilton F, Occhipinti, S (2009), "Tree hollow incidence in Victorian state forests", *Australian Forestry*, 72:1, 39- 48, DOI: 10.1080/00049158.2009.10676288.

vi. Ryan MF (2013), "Adaptive silviculture in regrowth eucalypt forests in Victoria and the implications for water, wood, wildlife and wildfire", *Australian Forestry*, 76:3-4.