Leadbeater's Possum Fact Sheet

Fenner School of Environment and Society
The Australian National University
Canberra, ACT, 2601

Scientists at The Australian National University have been researching Leadbeater's Possum since mid-1983. They have published more than 200 peer-reviewed scientific articles and 8 books on the Victorian Central Highlands and Leadbeater's Possum. This Fact Sheet provides key information on Leadbeater's Possum and the threats to its habitat.

What is a Leadbeater's Possum?

Leadbeater's Possum is an arboreal (tree-residing) marsupial. It weighs 120 grams – about the weight of an iPhone. Leadbeater's Possum was first described in 1867 but by 1909 was thought to be extinct. It was rediscovered east of Marysville in 1961 and in 1971 it was chosen as a faunal emblem of Victoria.

What is its conservation status?

Leadbeater's Possum is classified by the Australian Government as Critically Endangered (the highest level before Extinct in the Wild, and then Extinct). The species has a very high risk of extinction within the next 30 years unless protection of its habitat is significantly bolstered. Three processes in particular threaten Leadbeater's Possum – clearfell logging, fire, and the loss of large old trees.[1] These threats interact because logging increases the risk of high-severity fire and hastens the loss of large old trees. In addition, fire can kill or even totally consume large old trees.

Where does Leadbeater's Possum live?

Leadbeater's Possum is largely confined to the wet eucalypt forests of the Victorian Central Highlands, an 80km x 60 km region about 1.5 hours drive east of the centre of Melbourne. The species also occurs in small numbers in sub-alpine woodland at Lake Mountain and Mt Baw Baw as well as in the lowland swamp forests

at Yellingbo near the town of Woori Yallock, also east of Melbourne. Leadbeater's Possum is the only native mammal species restricted to Victoria and the size of its limited distribution is one of the smallest of any native Australian mammal.[1]

What habitat does Leadbeater's Possum prefer?

In wet eucalypt forests (including Mountain Ash trees and Alpine Ash trees), Leadbeater's Possum typically inhabits areas containing numerous large old trees with hollows and an understorey of wattles.[2,3] Colonies of up to 12 animals spend about 75% of their lives nesting inside large trees that are 150-400 years old. Individuals in a colony frequently switch between several such trees.[4]

What is happening to the large old trees on which Leadbeater's Possum depends?

The 120+ year old trees which are critical for the survival of Leadbeater's Possum are typically 65-80m tall, but can exceed 100m in height and are some of the most spectacular trees on earth. However, such big trees are now rare and populations of them are declining at an extremely rapid rate. Recent ANU research has shown that between 1997 and 2015, more than 41% of the large old trees collapsed.[5] Fire, logging, and natural attrition are the biggest causes of tree collapse. Aligning with this loss of trees, data from long-term work by ANU shows that populations of Leadbeater's Possum are in rapid decline in all ages of forest.

But aren't the large old trees needed by Leadbeater's Possum protected from logging?

No. It is true that logging companies do not cut these large old trees. However, the trees around them are often logged, leaving the large old trees isolated in clearfelled areas. After harvesting, logging debris is burnt, and these high-intensity fires severely damage large old trees; they are either totally consumed by these regeneration burns or they collapse soon after.

How many Leadbeater's Possums are there?

We don't know the exact number, but this is really the wrong question to be asking. The far more important question is 'Is the population increasing or decreasing?' Our field surveys over 33 years show that populations of animals are declining across all age classes of these forests. In addition, sites that used to be occupied but were burned in the 2009 fires no longer support Leadbeater's Possum.[6] Modelling work by the Victorian Government also shows a steep decline in populations of Leadbeater's Possum.[7] Recent surveys have found some new colonies of possums but this does not mean there has been a surge in numbers. Rather, this reflects a great effort to survey wet ash forests over the past 18 months.

How much old forest is left?

Above we focused on individual large old trees in the Victorian Central Highlands. Another crucial habitat area for Leadbeater's Possum is old forest, as this is where the abundance of large old trees which provide potential nest sites is greatest. A total of 1887 ha or just 1.16% of Mountain Ash forest in the Central Highlands is old growth forest. This is less than 3% of what used to exist in the Central Highlands historically.[1] Alpine Ash forest is even rarer, and just 0.47% of it is old growth.

Is old growth forest still logged in Victoria?

Patches of old growth forest exceeding 5 ha are not logged in the Central Highlands of Victoria (old growth logging still occurs in East Gippsland). The protection of old growth in wet ash forests is a positive step but it is of limited value. This is because there are very few patches larger than 5 ha remaining in State Forests where logging can occur. Far more common are scattered remnant individual old growth trees located within

younger regrowth forest. There may only be one or two of these individual old trees within stands supporting several hundred younger trees, but nevertheless these large trees determine whether hollow-dependent species like possums, gliders, owls and other animals can survive in these younger forests. Current codes of practice should prevent the cutting of any tree older than 116 years (those that germinated pre-1900), but they do not prevent forest around large old trees from being clearfelled. Nor do current codes of practice prevent these large old trees being destroyed by fires lit to regenerate logged forests. Recent research has shown that places where the number of collapsed large old trees is greatest are regrowth forests that were logged in the last 30 years.[5] Therefore, while large old trees are usually not cut directly, there are nevertheless significant numbers of them being lost as a result current logging practices. Current protection of large old trees is totally inadequate; buffers of uncut forest of at least 100 m radius are needed around every single remaining large living and dead old tree in Victorian wet ash forests.[8]

How much old forest should we aim to protect and how do we get to that level of protection?

Currently only 1.16% of the montane ash forest estate is old growth. The size of the old growth estate must be expanded significantly. The Leadbeater's Possum Advisory Group (LPAG) accepted the ANU recommendation that a minimum of 30% of the montane ash forest estate should be old growth. That level comes from estimates of historic cover being between 30-60% in these forests and would provide a reasonable level of ecological resilience in these forests. The next oldest forest is regrowth from the 1939 fire. The key problem is that there is less than 40% of the landscape that is of 1939 age and it needs to survive for at least another 50+ years before it begins to reach an old growth age. The other problem is that this 1939 age cohort is being heavily targeted by the forest industry for paper and wood production. To have any chance of reaching the stated target of 30% old growth, the 1939 aged forests must be considered to be 'the next old growth' and as much of it must be protected as possible.

Why is the Mountain Ash forest ecosystem classified as Critically Endangered?

Mountain Ash forest is classified as Critically Endangered due to significant threats from logging, fire, climate change and a combination of these problems.[9] New methods developed by the International Union for the Conservation of Nature allow ecosystems to be assessed for whether they are vulnerable, threatened or of least conservation concern – similar to the process for assessing individual species.

How else does clearfell logging threaten Leadbeater's Possum?

Beyond accelerating the loss of large old trees, clearfelling has other negative effects. First, animals living on sites that are logged die during harvesting operations. Second, the proposed 50-80 year interval between harvesting operations at a site means that trees never grow old enough to develop the kinds of hollows required by Leadbeater's Possum. Third, logging makes forests more prone to burning at high severity (see below) – and Leadbeater's Possum does not inhabit burnt forests. Fourth, the extensive road network constructed for logging operations creates significant barriers to the movement of animals throughout the forest.[1]

Does logging make forests more fire prone?

Yes. Researchers at the University of Melbourne have shown unequivocally that young forests regenerating after logging have a significantly elevated risk of crown-scorching wildfire.[10] This increased risk of crown-scorching fire occurs between 7 and 40 years after logging. Logged regions with many logging coupes therefore support many areas with a greater risk of burning at high severity in the event of a wildfire, and

such fires can spread across entire landscapes.[11] Widespread clearfell logging in Victorian ash forests therefore adds to the State's fire burden.

Isn't fire a more significant threat to Leadbeater's Possum than logging?

Yes and no. Fire is a significant threat in part because past and current logging, and fires in the recent past, have eliminated so much old forest (which tends to burn at lower severity in the event of a wildfire). Fire would not be a problem for Leadbeater's Possum if there was a lot more old forest in the Central Highlands. Indeed, Leadbeater's Possum has survived many past fires and persisted for millions of years in the Central Highlands because the region was formerly dominated by large areas of old growth forest. Fires in old growth forest eventually produce suitable habitat – fires that burn young regrowth forest do not. The key way to recover the old growth estate is to not log existing 77-year old forest that regenerated at the 1939 Black Friday wildfires. Increasing the amount of old growth will have significant benefits not only for conserving Leadbeater's Possum but also for reducing the fire burden in wet ash forests.

Isn't only a small part of the Mountain Ash forest logged?

No. Approximately 80% of the wet ash forests in the Central Highlands of Victoria occurs outside the closed water catchments (which are exempt from logging) and are broadly designated for timber harvesting. Extensive parts of these landscapes have been clearfelled since the 1980s and most were selectively cut before that. From vantage points over many State Forest landscapes, it is easy to see 20, 30 or even more logging coupes that have been clearfelled in the past 5-15 years.[1] These logged areas will not support suitable habitat for Leadbeater's Possum for another 120-150+ years. Unlogged areas within the wood production landscapes typically include steep and rocky areas and streamside strips – which are often not suitable habitat for Leadbeater's Possum.[12]

Are current reserve systems for Leadbeater's Possum adequate?

No. Two studies, one by researchers from the Victorian Government[7] and another led by scientists at the University of Melbourne, have shown that the current reserve system is inadequate. Both studies demonstrate that almost all wet ash forest needs to be protected for Leadbeater's Possum to have a reasonable chance of persistence over the next 30-50+ years.

Aren't the Leadbeater's Possum Advisory Group's (LPAG) recommendations sufficient to conserve the species?

No. The terms of reference for LPAG were highly constrained and recommendations that affected the timber industry could not be considered. Key actions that would have the greatest impact on saving the species were not part of the LPAG recommendations. These include: (1) an expanded reserve system, (2) 100m buffers to protect all existing large old trees, and (3) a 1km buffer around known colonies. Work by the Victorian Government under the LPAG process actually showed the importance of an expanded network of protected areas for Leadbeater's Possum.[7] There are many other deficiencies of the LPAG recommendations.

Can nest boxes save Leadbeater's Possum?

Unfortunately this is unlikely. Nest boxes have been successful in the subalpine snowgum areas and also at Yellingbo (although populations of Leadbeater's Possum are still in steep decline there). However, a decade-long study of nest boxes in the wet eucalypt forests has shown they are rarely occupied for prolonged periods by Leadbeater's Possum. Nest boxes in wet ash forests are often badly damaged by falling branches or

infested by bees and pest insects and this substantially limits the amount of time that nest boxes remain viable homes for Leadbeater's Possum.[13] In addition, the costs of installing and regularly inspecting nest boxes over many decades (until new cohorts of large old trees are recruited) are significantly greater than reducing current losses of such trees.[14] Finally, it makes no sense to invest heavily in unproven strategies like establishing nest boxes whilst existing large old trees continue to be destroyed and well documented effective conservation strategies like buffering large old trees are ignored.[1]

Will a Great Forest National Park help secure populations of Leadbeater's Possum?

Yes, and many other threatened species also will benefit. A substantial body of rigorous, long-term scientific work provides compelling evidence of the urgent need for a new large ecological reserve to secure remaining populations of Leadbeater's Possum. Logging is a key process threatening not only Leadbeater's Possum, but also the Mountain Ash ecosystem which provides the majority of suitable remaining habitat for the species.[9] A fundamental principle of effective conservation actions is to remove the threats to a species – in the case of Leadbeater's Possum, widespread clearfelling is a major threat. A Great Forest National Park would help protect large old trees and develop new areas of old growth forest. A Great Forest National Park will not only protect animal habitat, but also protect Melbourne's water supply, store large amounts of carbon, and offer significant tourism and employment potential.[1] It will also protect other forest animals like Sooty Owls, Baw Baw Frogs, Barred Galaxias, Yellow-bellied Gliders, and Greater Gliders.

But isn't native forest harvesting an economically important industry?

Not relative to other industries. Recent environmental accounting work shows that value-added economic activity derived from logging wet ash forests is $40 per ha per year. Water from the catchments in the Central Highlands of Victoria is valued at $850 per ha per year (but logging is well known to significantly reduce water yields[15]). The equivalent value-added estimates for tourism in the region are almost double that for water, that is, $1500 per ha per year. Economic activity and job creation generated from tourism is significantly greater than from extractive industries like timber harvesting, as has been shown in many countries around the world.[16,17]

But won't we need to get timber from overseas to meet local demand?

No. The vast majority of forest products used in Victoria can be sourced from the State's plantations. In fact, plantation timber is the preferred material for manufacturing paper, which is the predominant use of wood currently cut from Victorian wet ash forests. Plantations are the major source of sawn timber – more than 80% of the sawn timber in Victoria (and NSW) already comes from plantations. In addition, in 2013, 77.4% of all employees in the Victorian forestry industry worked in the plantation sector, not in native forests.

Isn't native forest harvesting good for tackling climate change?

No. Wood products store carbon but the vast majority of wood products that our society uses store that carbon for less than 5 years. Notably, just 4% of the biomass of harvested wet ash forests is turned into sawn timber products (and half of that is beer pallets which have a 3-4 month lifespan before being discarded into landfill).[18] For each tonne of carbon stored in long term wood products, over 10 tonnes of carbon will be released to the atmosphere within 5 years.[18] Conversely, when wet eucalypt forests are allowed to grow old, the amount of carbon stored in them continues to increase,[19] with old growth forest storing approximately double the carbon per hectare of 40 year old forests. Society has a strong demand for wood products and they are best sourced from plantations because this leads to lowest levels of carbon emissions.

Will a Great Forest National Park lead to economic decline in regional towns around the park?
No. Evidence from around the world clearly shows that a transition to nature-based tourism industries generates more jobs, longer-lasting jobs, and better paid jobs than industries based on forest exploitation.[16] The Otways in Victoria is just one of many examples nationally and globally.

For further information about the Leadbeater's Possum, or if you have any questions about this Fact Sheet, please contact us at fses-cle-admin@anu.edu.au.

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