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Author: Thomas, Peter

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Mountain Ash: Fire, Logging and the Future of Victoria's Giant Forests

By David Lindenmayer, David Blair, Lachlan McBurney, and Sam Banks. Clayton South, Australia: CSIRO Publishing, 2015. xii + 173 pp. AU$ 59.95, US$ 46.95. ISBN 978-1-486-30497-4.

As the title suggests, this book concentrates on the long-term future of the mountain ash (*Eucalyptus regnans)* growing in the eastern highlands of Victoria in southeast Australia. In many ways, mountain ash is a typical mountain tree, growing at altitudes from 200 to 1100 m, with some areas getting more than 2 m of precipitation per year and plenty of fog. The reason for the interest is that these forests are biodiverse and contain some rare and engaging creatures. But even more so, these ash trees are the tallest-growing flowering plant (angiosperm) in the world, regularly topping 85 m, with the tallest specimen reaching 99.6 m—and historically possibly 132 m. This brings the current big trees very close to the tallest trees in the world, the coastal redwoods (*Sequoia sempervirens*) in California, which reach 115.7 m. Large trees are normally long-lived—coastal redwoods can be several thousand years old—but the mountain ash may live for just 350–400 years. So to get to these sizes, it needs to grow rapidly; it can grow more than 1 m annually in the first 60 years of its life. Furthermore, its comparatively short lifespan affects how it interacts with fire.

The main thesis of this book is that fire and logging may be the death knell for this wonderful tree and the ecosystems in which it is a keystone species. This is set against the background not only of the loss of such magnificent trees in this area of Australia, but the loss of large trees worldwide. The book concentrates on the effects of the 2009 wildfires that burnt through 78,300 ha of mountain ash forest, including the fires of the infamous Black Saturday of 7 February, which are among the most intense fires (up to 88,000 kW m^{-1}) ever recorded. The team writing the book have 25 years of pre-fire and 6 years of post-fire research on which to base their findings.

Given the moist climate of these uplands, fires in the past have tended to be infrequent, occurring every few hundred years, and of high intensity. Older stands tend to support less intense fires, so older trees may survive a fire, often becoming hollow and providing irreplaceable habitat for rare animals such as the Leadbeater's possum. The trees do not have lignotubers from which to sprout, unlike many other eucalypts, and so they rely on obligate seeding after a fire; the seeds are stored in the fruits (gumnuts) that are released by the heat of the fire. This natural system has worked well in the past, favoring old, giant trees. But people, as usual, are having a large influence. Logging has been allowed based on the argument that felling trees mimics what fire would remove anyway, so why waste good resources. The research of this team has showed, however, that this is not true. Logged forests are more prone to high-intensity wildfires in the 7–40 years after logging as the stands contain more fuel, and these intense fires kill young mountain ash. The normal logging cycle of 50–80 years keeps stands at the optimum age for maximum fire intensity, creating a "landscape trap" and stopping the stands from developing through to maturity.

As if that were not enough, deliberate management fires are also becoming more frequent in these forests, in line with Goodhart's Law, where "setting a target leads to management actions specifically to meet the target rather than solve the particular problem that the target was initially developed to tackle" (p 31). In this case, a Royal Commission recommended that 5% of public land be prescribed burned every year to reduce fuel loads in residential areas and hopefully prevent future devastating fires that destroy peoples' homes. The idea was to burn around buildings to reduce their future loss, but because this is so difficult to do safely, the state authorities instead have to burn large areas of remote public land to meet their targets. This does little to solve the problem of houses burning and just increases the frequency of fire within the landscape traps. A further problem is the sort of semantics that governments are renowned for. Legislation declared that no "old growth" stands could be felled, so the State authorities redefined old growth from the ecological limit of about 150 years old to about 250 years old, thereby allowing older trees to be harvested.

Clearly, maintaining old mountain ash in the landscape is a typically complex problem that goes beyond just the science. Consequently, there are many considerations in formulating action plans to ensure that big, old trees remain. But the authors take the view that the underlying science and social problems need to be understood by nonscientists, and this book goes to great lengths to achieve this. There are plenty of pictures with informative captions, boxes giving the reasons behind the scientific methodology used, and "myth-busting" boxes that tackle common misconceptions (eg that nest boxes are a good substitute for hollows in trees); and each chapter contains a list of questions that remain to be answered. The text is simply written, as free of jargon as possible. Having said this, it is nonetheless not always easy to follow; many of the figures are not mentioned in the text, and the flow of the text can be interrupted while you decide what to read next. Moreover, the book is written for Australians, so some of the more basic background to fire ecology (such as what fire intensity means and prehuman fire frequencies in these

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areas) is either not included or is given in figure captions, making it more difficult to follow the argument. But overall, this is a highly creditable attempt to bring the results of scientific research to the nonscientist, and to try and banish the many misconceptions about how to manage the landscape to keep these giant trees for future generations of people and wildlife. I can see this being a useful resource for students and others who want to see conservation in practice, not just the science but the underlying social issues. It should also be an excellent resource for managers looking to understand the problems.

AUTHOR

Peter Thomas
peterthomas@fas.harvard.edu; p.a.thomas@keele.ac.uk
Harvard Forest, Harvard University, Petersham, MA 01366, USA; School of Life Sciences, Keele University, Keele, Staffordshire ST5 5BG, United Kingdom