PORTFOLIO COMMITTEE NO. 4 – INDUSTRY

LONG TERM SUSTAINABILITY AND FUTURE OF THE TIMBER AND FOREST PRODUCTS INDUSTRY

Hearing – 29 September 2021

Supplementary question to Professor Lindenmayer

Thinning Research

1. As mentioned by you in your opening statement on page 27 of the transcript, *"We have now done the empirical analysis of that, both in the 2009 fires in Victoria and the 2019-20 fires in New South Wales and Victoria, and thinning either has limited effect or actually increases the probability of high-severity fire."* Can you elaborate on the empirical analysis you mentioned and what it shows about thinning and impact on fire-risk in forests.

Response from Professor Lindenmayer

The results of the research published in the paper by (Taylor et al. 2021) can be summarized as follows:

The probability of a crown burn was higher in younger stands of thinned forest than in unthinned forest. Crown burn
risk in thinned forest was characterised by an inverse relationship with increasing time since the last disturbance; there were no such effects in unthinned forest. Our analyses showed the efficacy of thinning was variable, depending on fire severity, type of forest targeted for management and the age of that forest (as reflected by the time since the last major disturbance). Therefore, thinning interventions to mitigate fire severity should not be implemented without consideration of these factors and are unlikely to be a viable management option in many circumstances. This is because, in some cases, thinning can lead to elevated fire severity (e.g. soon after thinning for crown burn and in older forests for crown burn/crown scorch) and hence have opposite effects to those intended from such activities.

The results of the research published in the paper by (Taylor et al. 2020) can be summarized as follows:

For the statistical relationship for Crown Burn, there were no thinning effects in ash-type forests. For mixed species forests, thinning reduced the probability of Crown Burn in young stands but increased it in older stands. Data for the fire severity category of Crown Burn/Crown Scorch

revealed that thinning generally elevated fire severity, irrespective of stand age, forest type, or fire zone. Except for 20- to 40-year-old mixed species forest subject to Crown Burn, proposals for thinning to reduce fire severity have limited support.

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Supplementary question to Professor Lindenmayer

2. In what forest types was this evidence gathered and does it provide information that is relevant to NSW forests?

Response from Professor Lindenmayer

The research of the relationships between thinning and fire severity was conducted in several key forest types in north-eastern Victoria following the 2019-2020 fires - wet/damp forests and lowland forests (as per the Ecological Vegetation Class system) (Taylor et al. 2021). The primary tree species in thinned ecosystems included Tree species targeted for thinning included Silvertop Ash (*Eucalyptus sieberi*), mixed commercial species, cut tail (*Eucalyptus fastigata*), Messmate (*Eucalyptus obliqua*) and White Stringybark (*Eucalyptus globoidea*). All of these tree species are widely or relatively widely distributed in New South Wales (Boland et al. 2006).

The work on thinning and fire severity following the 2009 Black Friday wildfires (Taylor et al. 2020) focussed on: **(1)** Mountain Ash and Alpine Ash forests (the former do not occur in New South Wales), but the later is widespread in New South Wales (Boland et al. 2006), and **(2)** mixed species forests, such as those supporting Messmate *(Eucalyptus obliqua),*Mountain Grey Gum *(Eucalyptus cypellocarpa),* and Manna Gum *(Eucalyptus viminalis)* trees – all of which occur in New South Wales (Boland et al. 2006).

In summary, the work published on thinning and fire severity clearly has strong relevance to the forests of NSW (where there are similar kinds of forests to those examined by (Taylor et al. 2020, Taylor et al. 2021)). Notably, a number of other studies have found that thinning contributes to elevated fire severity (LaSala 2001) (Buckley and Cornish 1991).

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Supplementary question to Professor Lindenmayer

3. Several people who gave evidence to the inquiry suggested that thinning of forests was important for encouraging a quicker and healthier regrowth of forests post logging. Disregarding the research you have mentioned in regards to fire risks associated with thinning of forests, what is your view of the suggestion thinning improves forest health and regrowth rates?

Response from Professor Lindenmayer

With respect, there is very limited empirical evidence that regrowth forest that has been thinned are in better "health". It is unclear what is meant by better "health"? Health for what? For many species, changes in stand structure associated with thinning are likely to disadvantage them – such as those forest taxa that require access to an intact understorey.

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Additional question from the Hon Sam Farraway

The Hon. SAM FARRAWAY: Whilst I think I still have some time, to the other two professors, do you have a view on that question I posed to Dr Lindenmayer around DPI and the statistical analysis, and have you been able to do any equivalent research using that analysis to what DPI have done?

Professor GIBBONS: No, I have not done any analysis of that type. I would direct you to a very recently published paper on the 2019-20 fires by David Bowman and others that also looked at severity. I have only glanced at that paper, so I would just direct you to it perhaps.

Professor LINDENMAYER: Look at figure 3 of that paper because that was the dataset we just reanalysed. They mistakenly put the two kinds of fire together. When you pull them apart, the effect is very strong, but even when you put them together, if you look at figure 3 of Bowman et al, 2021, you will see that logged forest always burns at higher severity.

The Hon. SAM FARRAWAY: Correct me if I have missed something here, but are you suggesting that maybe the DPI research is not quite correct?

Professor LINDENMAYER: I would suggest that that is likely.

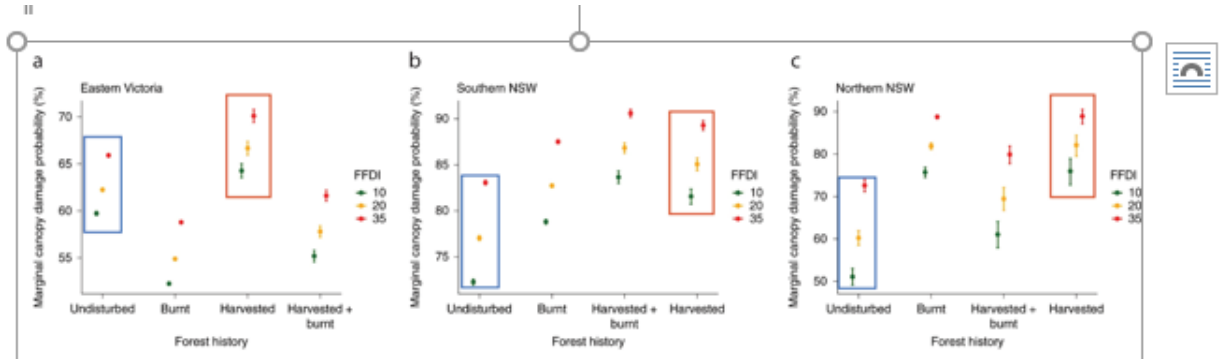
The Hon. SAM FARRAWAY: So you are saying that in your opinion—

Professor LINDENMAYER: No, not in my opinion. I will happily send you the figure from our paper that has just been submitted, which shows exactly what is happening in terms of differences in fire severity.

Response from Professor Lindenmayer

In the exchange with the Hon Sam Farraway, Professor Lindenmayer noted that logged forests always burned at higher severity than intact forests. Figure 3 of the paper by (Bowman et al. 2021) shows this quite clearly – and I have pasted a snipping tool image of that figure below.

Figure 1. (a - c) Reproduction of Figure 3 from Bowman et al. (2021) showing that logged forests (red boxes) always suffered a higher probability of canopy damage than undisturbed forest (blue boxes) at equivalent values of fire weather.



Notably, a re-analysis we have just completed of the data in the paper by Bowman et al. (2021) further confirms that logged forests ALWAYS burns at higher severity than intact forest -and this effect is especially pronounced when the most severe form of fire (crown burns) are appropriately separated from cooler, less intense and less severe canopy scorch fires (Lindenmayer et al., in review).

References

Boland, D. J., M. I. Brooker, G. M. Chippendale, N. Hall, B. P. Hyland, R. D. Johnson, D. A. Kleinig, M. W. McDonald, and J. D. Turner. 2006. Forest Trees of Australia. CSIRO Publishing, Melbourne.

Bowman, D., G. J. Williamson, R. Gibson, R. A. Bradstock, and R. J. Keenan. 2021. The severity and extent of the Australia 2019-2020 Eucalyptus forest fires are not the legacy of forest management Logging. Nature Ecology Evolution.

Buckley, A. J., and N. J. Cornish. 1991. Fire hazard and prescribed burning of thinning slash in eucalypt regrowth forest. CSIRO and Department of Conservation and Environment, Melbourne.

LaSala, A. 2001. Thinning Regrowth Eucalypts. Division of Forest Research and Development, Forestry Tasmania, Hobart.

Taylor, C., W. Blanchard, and D. B. Lindenmayer. 2020. Does forest thinning reduce fire severity in Australian eucalypt forests? Conservation Letters **14**:e12766.

Taylor, C., W. Blanchard, and D. B. Lindenmayer. 2021. What are the relationships between thinning and fire severity? Austral Ecology.