

# THINNING OF NATIVE FOREST



## CONTEXT

The health and resilience of many native forests are being compromised by factors such as climate change, pests and diseases, altered or inappropriate land management practices and some land use decisions. Australian forest ecosystems have evolved with periodic droughts and bushfires, but the frequency and intensity of these events is increasing. In many forests, tree density has increased due to removal of active management by Aboriginal and Torres Strait Islander peoples, prolific regeneration following intense bushfires, or sustainable timber harvesting practices in selected areas of State forests. High tree densities can make forests more prone to stress and therefore more vulnerable to negative impacts from drought, insect pests, disease and bushfire. In some forest types, over-crowded stand structures can cause the forest to stop growing; which limits further carbon uptake and storage. Forest thinning is a silvicultural practice whereby a selective portion of trees are removed across a site to reduce competition for water and nutrients. This allows the retained trees to grow bigger, more quickly, thereby increasing the size of tree trunks and crowns. While thinning has traditionally been undertaken to improve timber yields, there are many other ecological and cultural objectives that can be achieved through thinning. These include enhancing wildlife habitat, increasing water yields in catchments, and restoring open forest structures to facilitate re-introduction of cultural burning practices.

## FORESTRY AUSTRALIA ADVOCATES THE FOLLOWING:

- In many native forests across Australia, forest thinning is required to support the restoration of Country and to increase forest health and resilience, through creating diverse and more open forest structures.
- Thinning of native forests can achieve cultural, ecological and economic objectives, including through reducing negative impacts from bushfires, droughts, pests and diseases, and enhancing water yield, carbon stocks, timber and biodiversity values.
- Traditional Custodians should be supported by Governments and communities when they choose to implement forest thinning to heal Country, restore culturally recognisable forest structures, facilitate the re-introduction of cultural burning, or to generate wood products for community needs.
- Thinning programs should be strategically planned and guided by clearly defined management objectives. In public native forests, this should include appropriate community consultation and consideration of aesthetic values.
- Maintaining or developing markets for wood products extracted from thinning operations should be given high priority, to prevent waste of valuable wood products, reduce bushfire risks, offset costs involved with undertaking thinning operations to enable further ecological works, and support regionally based, innovative climate-friendly industries.

- Ongoing monitoring and research are required to continually improve the collective knowledge of the benefits, impacts and effectiveness of thinning for cultural and ecological objectives.

## SUPPORTING NOTES

Prior to European settlement Australia's forests had a much more open structure than they do today. Due to the interruption of cultural land management as practiced by Traditional Custodians, changed fire regimes, and some forest management practices that have occurred since colonisation, the density of trees in many Australian forests has increased. Densely stocked forests face increased vulnerability to ecosystem changes and threats including drought, repeated high severity fires, windstorms, insect pest and disease outbreaks. Canopy dieback and reduced forest health and vigour can result. Dense forests can also have reduced value as habitat for wildlife, particularly species that depend on trees with large crowns or hollows and ground-dwelling species that require areas of open sunlight.

Within the next 20 years, forests in many regions of Australia are projected to experience increases in average temperature, decreases in annual rainfall, and an increased frequency of droughts and intense wildfires. Simultaneously, invasive species, pests and diseases are on the rise and some forest management practices and land use decisions are acting to exacerbate these threats. Active and adaptive management practices are required to arrest this trajectory.

Although it has predominantly been applied in Australia for commercial wood production purposes, the potential for thinning to achieve ecological and cultural objectives is being increasingly recognised. In recent years, ecological thinning has emerged as a term used to describe an active forest management tool

# POSITION STATEMENT

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implemented to enhance forest health, resilience and biodiversity. Although it needs to be carefully planned and implemented to avoid any undesirable effects on soil, water or sensitive habitats, ecological thinning has significant potential to reduce stress in overcrowded forests.

While there is relatively limited published research on the benefits of ecological thinning per se in Australia, there is a relatively large body of evidence from monitoring, research and trials in the context of thinning for timber production. A substantial amount of research on thinning has also been done in other countries. This research has shown that for some forest types, thinning of dense regrowth when the forest is young improves long-term forest structure, habitat quality and carbon storage rates. It has also demonstrated that thinning, particularly heavy thinning, reduces the incidence of tree deaths during periods of severe drought and makes forests less susceptible to extensive outbreaks of pest insects and pathogens. Targeted removal of susceptible and infected trees through thinning can also slow the spread of pest and disease outbreaks.

Evidence from Australian and international research also shows that thinning of forests, when combined with prescribed burning to reduce fuel hazards, can significantly reduce wildfire risks and impacts in dry forests, when compared with no treatment or thinning alone. Reducing the density of trees in forests can reduce wildfire rate of spread, flame height and the probability of crown fires developing. Thinning of forests and the utilisation of woody biomass to reduce wildfire risk has been increasingly practiced by professional foresters in the United States, since the passage of the *Healthy Forests Act 2003* in response to the catastrophic wildfires of 2002.

Many of Australia's major cities and towns obtain a large part of their water supply from forested catchments. Following severe bushfires, the quantity and quality of water from forested catchments is generally reduced. In

addition, stream flows from forested catchments are reduced during periods of drought when trees can only access water from the water table. Australian research has shown that thinning of forests can increase streamflow, water quality and the raise the level of the groundwater table.

Aboriginal and Torres Strait Islander peoples managed and modified forest landscapes over many generations, thereby creating cultural landscapes that provided benefits to all human and non-human inhabitants of Country. The ability of Traditional Custodians to implement cultural management practices has become limited in areas where forests are too densely stocked, because cultural fire cannot readily be introduced to them without significant safety and environmental risks. Densely stocked forests can also limit hunting and foraging potential and are difficult to traverse through. There are now several examples across Australia where Traditional Custodians are considering or implementing thinning as part of contemporary cultural land management practices aimed at restoring culturally recognisable forest structures, facilitating safer implementation of cultural burning and creating livelihoods from the utilisation of wood products.

Thinning operations in forests typically produce large quantities of small diameter woody material, which can increase bushfire risk if left on the forest floor. To reduce these risks and prevent waste of usable, valuable and environmentally friendly wood products, it is essential to have viable markets for the small-diameter timber that is produced. Demand for bioenergy, bioplastics, reconstituted wood composites and innovative sawmilling technologies all present a range of opportunities to enable the utilisation of these small diameter wood products. Recovering and selling the wood biproducts of thinning can also act to offset management costs or be used to provide a revenue stream to fund other important active and adaptive forest management activities, as well as for monitoring and research.

### Further reading

Gonsalves, L., Law, B., Brassil, T., Waters, C., Toole, I. & Tap, P. (2018). Ecological outcomes for multiple taxa from silvicultural thinning of regrowth forest. *Forest ecology and management*, 425, 177-188. <https://doi.org/10.1016/j.foreco.2018.05.026>

Harper, R., Smettern, K., Ruprecht, J., Dell, B. & Liu, N. (2019) Forest-water interactions in the changing environment of south western Australia. *Annals of Forest Science* 76: 95 <https://doi.org/10.1007/s13595-019-0880-5>

Horner, G. J., Baker, P. J., Nally, R. M., Cunningham, S. C., Thomson J. R. & Hamilton, F. (2010) Forest structure, habitat and carbon benefits from thinning floodplain forests: managing early stand density makes a difference. *Forest Ecology and Management*, 259:286–293. <https://doi.org/10.1016/j.foreco.2009.10.015>

Keenan, R.J., Weston, C.J. & Volkova, L. (2021) Potential for forest thinning to reduce risk and increase resilience to wildfire in Australian temperate Eucalyptus forests. *Current Opinion in Environmental Science & Health* 23, <https://doi.org/10.1016/j.coesh.2021.100280>

Moreau, G., Chagnon, C., Achim, A., Caspersen, J., D'Orangeville L., Sánchez-Pinillos M, & Thiffault, N. (2022) Opportunities and limitations of thinning to increase resistance and resilience of trees and forests to global change. *Forestry*: 95 (5) 595–615 <https://doi.org/10.1093/forestry/cpac010>

Weston, C. J., Di Stephano, J., Hislop S., & Volkova, L. (2022) Effect of recent fuel reduction treatments on wildfire severity in southeast Australian Eucalyptus sieberi forests. *Forest Ecology and Management* 505 e119924