



Research, monitoring, and protection of Victoria's native forest ecosystems is being gravely neglected by the Victorian State Government

Rubicon Forest Protection Group
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The Victorian State Government, including its Department of Lands, Water and Planning (DELWP), does not understand the ecosystems of Victoria's native forests; is not monitoring ecosystem resilience and is ill-prepared to implement strategic restoration programs.

The ecosystem relationships (nutrient cycles, feedback loops, symbiosis, etc) which shape ecosystem resilience have received only superficial attention in the policy discourse around logging, fire risk mitigation and climate change adaptation (DELWP 2015).

Much of the regulatory framework and policy discourse around native forests has focused on biodiversity including indicators such as hollow bearing trees and sightings of vulnerable fauna (Parliament of Victoria 2000, see Part 3, DELWP 2022). Biodiversity is critical but in large part reflects ecosystem resilience.

The dynamics of Victoria's native forest ecosystems (as distinct from biodiversity) have received inadequate attention in the scientific literature and policy discourse.

An outstanding example of this neglect has been the almost complete lack of attention to fungi and fungal/soil/arboreal/animal relationships and their significance for the resilience of native forest ecosystems. DELWP's Forest Protection Survey Program (DELWP 2022) does not survey for fungi or lichens. The State Government's State of the Forests Report (Commission for Environmental Sustainability 2018) does not include fungi.

Fungi play an important role in plant nutrition and hydration including Eucalypts (Siddiqui 2008). This is of particular importance in the context of poor quality soils, especially soils lacking in phosphorous (Souza, Silva Filho et al. 2004). Logging and fire both compromise the role of fungi in forest nutrition and hydration (Gates, Ratkowsky et al. 2005, Ammitzball, Jordan et al. 2021). Fires and logging diminish soil quality from which forests takes a long while to recover (Bowd and Lindenmayer 2019, Bowd, Banks et al. 2021).

Logging and fire contribute to drying out of soils, with loss of ferns and loss of upper story shading plus the increasing thirst of the regenerating eucalypts. Global warming is contributing to reduced rainfall in Southern Australia (Australian Academy of Science 2021). Logging, fire and reduced rainfall all point to the significance of fungal support in accessing soil water.

Fungal fruiting bodies play a role in the diet of small mammals, birds, and lizards which help to disseminate the spores (Claridge, Tanton et al. 1992, Lepp 2012, Elliott and Vernes 2019). Loss of animals consequent on logging and/or fire will reduce the dissemination of spores and may compromise the role of fungi in nutrition and hydration;

The symbiosis between fungi and eucalypts is an important ecological relationship on which ecosystem stability depends but also appears to be the site of critical tipping points (Suz, Bidartondo et al. 2021).

There is a difference between biodiversity and ecosystem health although they are related. Biodiversity is about the maintenance of species while ecosystem health is about the stability of the ecosystem; the functioning of stabilising ecological relationships and the resilience of the ecosystem, as a whole, in the face of disruption.

Ecosystems are complex adaptive systems which are maintained within a particular domain of stability through a range of stabilising relationships (determining nutrition, hydration, disease risk, fertilisation, etc) which return the system to stability following exogenous disruptions (including logging, fire, global warming, and reduced rainfall). Ecosystem resilience reflects the strength of these stabilising relationships in the face of destabilising influences (increasing in frequency and magnitude).

These are processes which may take time. Lindenmayer and Sato (2018) talk about hidden ecosystem collapse; it is happening while we watch. Burns and colleagues (Burns, Lindenmayer et al. 2014) undertook a systematic ecosystem assessment of the mountain ash forests of the Central Highlands of Victoria and concluded that they are critically endangered. The processes underlying tipping points may be underway while the forest still looks healthy and maintains biodiversity (Suz, Bidartondo et al. 2021). Declining biodiversity may be a late indicator of ecosystem decline. We need much better forward indicators of ecosystem decline, including indicators of the health of fungal/arboreal relationships. The absence of such indicators is a breach of the Precautionary Principle (Parliament of Victoria 2000, Section 4A).

The knowledge base for a full understanding of native forest ecosystems is patchy, particularly in relation to fungal/arboreal relationships.

Monitoring ecosystem resilience would require sufficient research to identify the critical ecosystem relationships and feedback loops which currently stabilise the forest ecosystem, including fungal/arboreal relationships (Gates, Mohammed et al. 2011); the identification of measures to follow those relationships; ongoing monitoring of such indicators (McMullan-Fisher, May et al. 2002); and appropriate restorative practices (Policelli, Horton et al. 2020, Kajihara, Egan et al. 2022).

This is just not happening. See for example the Integrated Forest Ecosystem Research Program (University of Melbourne and DELWP 2016) which makes no mention of fungi. See also the 2018 State of the Forests report (Commission for Environmental Sustainability 2018) which, out of 52 indicators, has only one which addresses "Scale and impact of agents and processes affecting forest health and vitality - mortality, dieback, canopy health" (status fair, trend uncertain, data quality fair) and ignores fungi. See also the Victorian Forest Monitoring Program (Haywood, Thrum et al. 2018) which makes no mention of fungi.

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