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- Professor Tim Brodribb

## **Vulnerability of global forests 'similar to corals', researchers find**

The vulnerability of forests to future climate change is likened to that of coral reefs in a [paper](#) published in *Science* today.

The University of Tasmania-led review of recent research, *Hanging by a thread? Forests and drought*, highlights an emerging view that, similar to corals, tree species have rather inflexible damage thresholds, particularly in terms of water stress.

Lead researcher Professor Tim Brodribb explains: "This review of recent research into drought explains how trees die by breakage in their vascular systems, and how that will be more common in the future.

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The review team found that extremely rapid pace of climate change appears to be introducing enormous instability into the mortality rates of global forests.

However, predicting which tree species might die during drought is complicated by the process of evolution.

"The fitness of tree species may benefit from traits that either increase growth or enhance drought resilience. Complexity arises because improving either of these two beneficial states often requires the same key traits to move in opposite directions, which leads to important trade-offs in adaptation to water availability.

“This conflict promotes strategic diversity in different species’ adaptations to water availability, even within ecosystems.”

Most models reviewed predict major damage to forests in the next century if current climate trajectories are not ameliorated.

Debate remains as to the magnitude of stabilising forces, such as tree acclimation and positive CO<sub>2</sub>-associated effects on water use. Still, most observational data suggest that forest decline is well underway.

“Future improvements in physiological understanding and dynamic monitoring are needed to improve the clarity of predictions; however, changes in community structure and ecology are certain, as are extinctions of tree species by the direct or indirect action of drought and high temperatures,” the review team concludes.

In addition to Professor Brodribb, the team included researchers from the University of Minnesota, the Université Clermont Auvergne in France and Western Sydney University.

### **Captions:**

*Kains Flat in NSW. The large-scale mortality of eucalyptus trees (seen as recently killed dry canopies) contrast with the more cavitation-resistant conifer species.*

*The East Coast of Tasmania, similarly drought-stricken.*

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