

Western Australian Centre of Excellence on Climate Change and Woodland and Forest Health

Giles Hardy

Murdoch University
g.hardy@murdoch.edu.au

Paul Barber
Murdoch University

Erik Vandeklaas
University of Western Australia

Tom Lyons
Murdoch University

Sue Moore
Murdoch University

Richard Hobbs
University of Western Australia

In recent years in Western Australia there have been substantial declines and deaths of a number of forest and woodland tree species. These include *Eucalyptus marginata* (jarrah), *E. gomphocephela* (tuart), *E. wandoo* (wandoo), *E. rudis* (river gum), *Agonis flexuosa* (WA peppermint) and *Corymbia calophylla* (marri).

There has been substantial concern within the wider community about the need to understand and mitigate these disease syndromes. As a result, in 2008 the Western Australian Government together with a wide range of agencies, industry bodies and community groups provided funding and in-kind support to a Western Australian Centre of Excellence on Climate Change and Woodland and Forest Health. The Centre has put in place a multi-disciplinary approach to work towards understanding the causes of these declines, their impact on ecosystem function and health and developing restoration methods to reverse these declines and to restore degraded areas.

There are many theories for the causes of these declines including: (i) global climate change; (ii) habitat loss and fragmentation; (iii) changes in land management, e.g. the absence of planned fire, damage from wildfires, and past timber harvesting and grazing; (iv) weeds, pests and diseases; (v) salinity; (vi) changes in hydrology; (vii) poorly developed links between research and management; and (viii) sub-optimal management policies and strategies at Local and State Government levels.

Four programs make up the Centre:

1. Climate change: woodland and forest declines
2. Decline ecology
3. Restoring biodiversity values
4. Policies and action for woodland and forest restoration.

The Centre is made up of three core research organisations, 27 collaborating industry partners and seven collaborating international and national institutions. An overview of the different research and adaptive management approaches being put into place to understand and mitigate these declines will be discussed. These will include remote sensing tools such as a combination of classified LandsatTM data, mesoscale meteorological models and field-acquired data to determine correlations between historical changes in vegetation health and climate variables; multi-scale simulation modelling to understand and predict how tree-environment interactions contribute to woodland and forest health; biotic and abiotic processes behind these declines; the acquisition and dissemination of key restoration techniques required to restore biodiversity values of declining woodlands and forests; remote sensing tools such as Digital Multispectral Imagery to monitor rates of decline and the effectiveness of mitigation strategies; and methods to explore and develop policy options to facilitate management actions that will improve the health of woodlands and forest ecosystems.