

1 Why are the tuarts dying?

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Introduction

Tuart (*Eucalyptus gomphocephala*) is a magnificent woodland tree endemic to the Swan Coastal Plain of Western Australia and is one of the few eucalypts that is adapted to calcareous soil profiles (Eldridge *et al.* 1994). Prior to European settlement there were more than 111,609 ha of tuart woodlands (Hopkins *et al.* 1996) but this has been reduced to 30,317 ha (W.A. Government 2003). In Yalgorup National Park and private property ca. 100 km south of Perth, tuart is undergoing a severe decline or 'dieback'. (Fig. 1A and 1B)



Figure 1: An example of a magnificent, healthy tuart (left) and one with classic decline symptoms.

The values of tuart woodlands include conserving biodiversity, protecting ecosystems functioning, and providing connectivity between remnant vegetation. Tuart woodlands also provide important landscape, cultural, social and economic values.

Tuart Response Group, 2004

In June 2003, the Tuart Health Research Group (THRG), then known as the Tuart ARC, comprising members from Murdoch University, Edith Cowan University, the former Department of Conservation and Land Management, Alcoa Alumina Australia and the City of Mandurah were awarded funding from the Australian Research Council (ARC) 2003 National Linkage Grants Program to conduct research over three years into the cause(s) of this decline. The THRG is investigating a range of factors, including hydrology and water relations, environmental correlates, fire and competition, pests and pathogens, and nutrition and mycorrhizae, as represented in the Tuart Vegetation System Health Model (Fig. 2).



Collaboration, integration and adaptation

These three words represent the approach undertaken by the THRG to the research program. It is very important, when conducting research into a forest decline that is likely to have very complex causes, to not just focus on one particular aspect of research, and ensure that all projects undertaken work closely together. Strong emphasis is placed on collaboration between the partners involved. This is achieved through meetings on a six weekly basis, providing the opportunity for all members to have input into the direction of the research. This also provides valuable feedback to the research scientists. The aim is for a highly integrated approach to ensure the research scientists benefit from

one another. Once again, this is possible through regular contact at meetings, but also by selecting field sites where a number of projects can be conducted in unison. As the project has progressed interesting findings have been revealed – some of these unexpected. This has necessitated an adaptive approach to the research. This has been achieved by attracting additional students and research scientists to undertake particular aspects of research.

The role of the THRG

The THRG has sometimes been confused with the Tuart Response Group (TRG). The THRG currently has 27 members consisting of senior research scientists, postgraduate students, policy officers and environmental officers from universities, State Government, local authorities, and private industry. The THRG is primarily responsible for conducting scientific research and producing research outcomes regarding tuart health. This is completely separate to the TRG which was appointed by the previous Minister for the Environment, Dr Judy Edwards, to coordinate the development of projects such as the Tuart Conservation and Management Strategy.

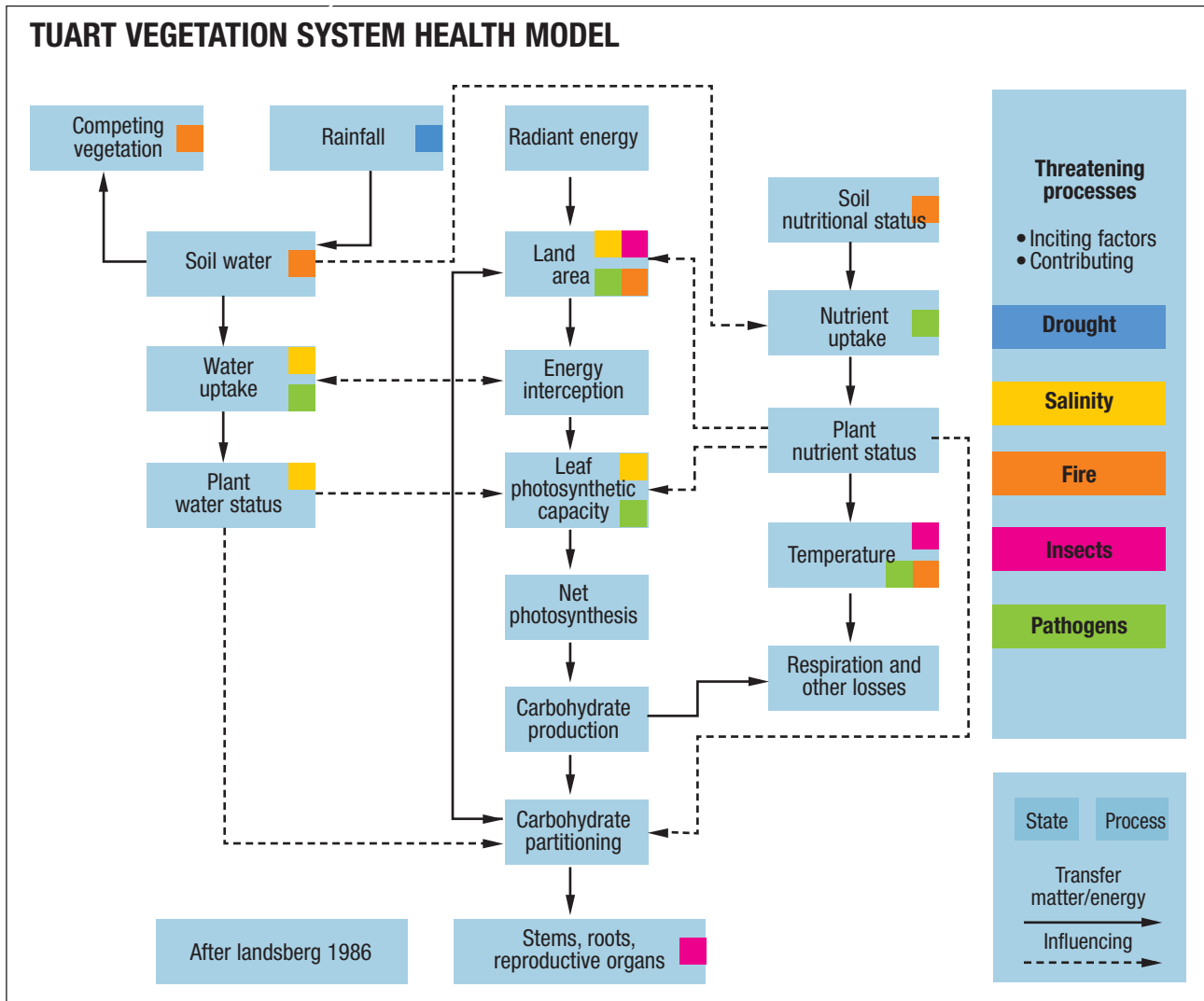


Figure 2: Tuart Vegetation System Health Model (Government of WA 2002).

Notes in the series on Researching of Tuart Health

- Bulletin 1. Why are the Tuarts dying? (P.A. Barber, D. Haswell)
- Bulletin 2. Environmental correlates and associations of tuart decline at Yalgorup (T.A. Edwards, E.B.J. van Etten, R.H. Froend)
- Bulletin 3. The role of water relations in the health of tuart. (P. Drake, R.H. Froend)
- Bulletin 4. The impact of foliar pathogens on tuart revegetation. (P.A. Barber, A. Hewison, R. Archibald, G.St.J. Hardy)
- Bulletin 5. The role of Pythiaceae soil-borne micro-organisms in tuart decline at Yalgorup? (P. Scott, P.A. Barber, M. Calver, G.St.J. Hardy, B. Shearer)
- Bulletin 6. The role of fire in tuart decline at Yalgorup? (R. Archibald, B. Bowen, L. McCaw, D. Close, G.St.J. Hardy)
- Bulletin 7. Tuart regeneration and restoration. (K. Ruthrof, D. Close)
- Bulletin 8. Beneficial fungi and the health of tuart. (B. Dell, B. Bowen, P.A. Barber, S. Thomas)
- Bulletin 9. The nutrient requirements of tuart. (B. Dell, P.A. Barber, H. Eslick, P. Scott, M. Calver)

Copies of the above bulletins on Tuart Health and the decline of tuart in Yalgorup National Park are available for downloading from the THRG website, www.tuarthealth.murdoch.edu.au. Further bulletins in this series will be published on the THRG website as they are produced.

References

- Eldridge, K., Davidson, J., Harwood, C. and van Wyk, G. (1994) *Eucalypt domestication and breeding*, Clarendon Press, Oxford.
- Government of Western Australia (2003) *A Tuart Atlas: Extent, density and condition of tuart woodlands on the Swan Coastal Plain.*, Prepared by the Department of Conservation and Land Management for the Tuart Response Group, pp. 38.
- Hopkins, A. J. M., Coker, J., Beeston, G. R., Bowan, P. and Harvey, J. M. (1996) *Conservation status of vegetation types throughout Western Australia: Final Report.*, In Australian Nature Conservation Agency National Reserves System Co-operative Research Program.
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