A Vegetation System Health Model

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A decline in the health and vitality of the dominant tree species in two of the main Western Australian woodland ecosystems has been observed over the last two decades. The decline in Wandoo has been observed since the early 1980s while the severe decline in the Tuart woodland has occurred more recently. Tree decline is often the result of a number of interacting abiotic and biotic factors.

The multiplicity of factors which cause tree decline and death fall into three categories (Manion 1981)
Predisposing factors are defined as long term factors such as climate, soil and landscape factors (nutrient supply, soil depth, and position in the landscape). These factors weaken trees growing in inappropriate locations or in situations where there is a change in these factors, such as a long-term reduction in rainfall.
Inciting factors are short-term factors such as drought, frost and insect defoliation, which produce a sudden injury from which trees have difficulty recovering.
Contributing factors are long term factors such as bark beetles; canker and root rot fungi that are able to invade weakened host trees. They are often very conspicuous but are best regarded as indicators of severely stressed or dying trees.

The major abiotic factors that determine the distribution and vitality of trees in the Mediterranean ecosystems of southwest WA are water and nutrient supply. However, salinity, changed fire regimes, and biotic factors such as fungal pathogens and insects are also influential in determining the health of forests and woodlands. A simple model of the processes involved in tree growth has been modified to identify the factors that may influence the health and vigour of trees in woodland ecosystems

Manion, P.D. (1981) Tree Disease Concepts, Prentice-Hall Inc., New Jersey.

Profile - John McGrath

Currently I manage the Forests and Tree Crops Group within Science Division. The research carried out by scientists in this group covers the range from forest ecology through to work on plantation productivity

My own research (stretching back to 1977) has concentrated on understanding the nutrient and water requirements of tree crops and how these factors interact in determining the productivity and sustainability of commercial tree species in south-west W.A.

This work has involved investigations of the nutrient requirements of the trees growing on the inherently infertile soils of Western Australia. As well the interaction of nutrient uptake and nutrient cycling within trees with the annual cycle of water availability in the very seasonal Mediterranean climate of south-west W.A has been studied.

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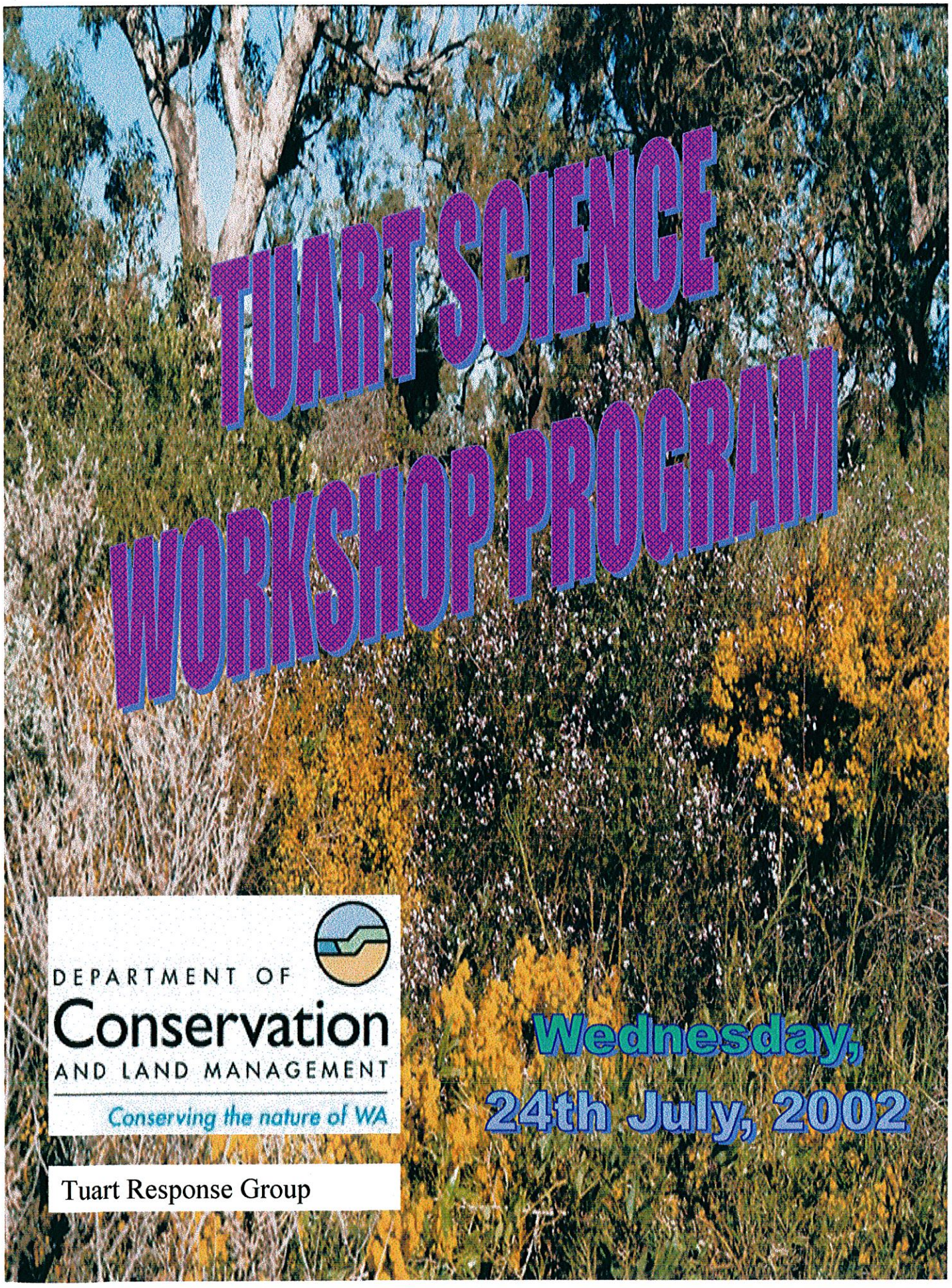

TUART SCIENCE WORKSHOP PROGRAM

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Tuart Response Group