

Context Summary

This project provides information to underpin the management of karri in the immature stage of stand development (25-120 years old). Regenerated karri stands have important values for future timber production, biodiversity conservation and as a store of terrestrial carbon. Immature stands regenerated following timber harvesting and bushfire comprise more than 50,000 hectares and represent around one third of the area of karri forest managed by the department. There are a number of well-designed experiments that investigate the dynamics of naturally regenerated and planted stands managed at a range of stand densities. These experiments span a range of site productivity and climatic gradients in the karri forest, and have been measured repeatedly over a period of several decades, providing important information to support and improve management practices. This project addresses emerging issues likely to be of growing importance in the next decade, including climate change and declining groundwater levels, interactions with pests and pathogens, and increased recognition of the role of forests in maintaining global carbon cycles.

Aims Summary

To quantify the response of immature karri stands to management practices that manipulate stand density at establishment or through intervention by thinning. Responses will be measured by tree and stand growth, tree health and other indicators as appropriate (e.g. leaf water potential, leaf area index).

Progress

- Findings from the Warren block thinning experiment were reported in a book on long term ecological monitoring studies in Australia (*Biodiversity and environmental change*: CSIRO Publishing, February 2014).

Management implications

- Thinning concentrates the growth potential of a site onto selected trees and provides forest managers with options to manage stands for particular structural characteristics.
- Tree mortality associated with *Armillaria* root disease appears to reduce in older stands, and small gaps created by dead trees become less obvious as stands mature. Localised tree mortality can be regarded as a natural process and is likely to contribute to patchiness in the mature forest. However, the extent of tree mortality in silviculturally managed stands should be monitored to ensure that stand productivity and other forest values remain within acceptable ranges.

Future directions

- Analyse and report on trends in tree and stand growth, with a focus on possible links between climate and growth.
- Analyse trends in the incidence and severity of *Armillaria* root disease at Warren block since 2000.
- Develop a plan for a second thinning at Warren block.