## Short-term impacts of logging on understorey vegetation in a jarrah forest

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### Summary

In 1985, modified silvicultural treatments were implemented in jarrah (*Eucalyptus marginata*) forests available for wood production. As part of a scientific investigation into the ecological impacts of two of these treatments, gap cutting and shelterwood cutting, a retrospective survey was conducted four years after logging to examine the effects of these treatments on understorey vegetation species richness and abundance. Sampling scale was found to be an important factor affecting the results and subsequent interpretation of impacts. At the coupe scale, native plant species richness in unlogged coupe buffers was similar to that in logged patches. However, analysed at a scale of 1 $m^2$, species richness in the buffers was 20-30% higher than in the logged patches. At all sampling resolutions, the abundance (number of plants) of native plants was 20-35% higher in the buffers, but the abundance of introduced (weed) species was significantly higher in the logged patches. Given the low fecundity and low dispersal capacity of many native species, it is our view that many woody shrubs and perennial herbs are unlikely to return to pre-logging abundance levels in the medium term. We attribute the reduction in the abundance of native plants to mechanical soil disturbance, which ranged from 60-80% of the area on logged coupes, and to physical/mechanical damage to the vegetation associated with the logging and post-logging activities.

### Management Implications

We recommend modifying logging practices in jarrah forests to minimise soil disturbance, therefore impact on the understorey. This could be achieved by:

a) Reviewing the practice of mechanically disturbing the soil to create a receptive seedbed for commercial tree species.
b) Reviewing the practice of removing understorey competition by mechanically downing/removing non-commercial tree, lower tree and shrub species.
c) Investigating new systems for accessing, felling and extracting timber that minimises machine traffic on the coupes.
d) Investigating options for utilising machinery with lower ground bearing pressures.
e) Investigating the importance of soil moisture as a factor affecting the extent of soil damage during logging operations.
f) On-going monitoring (perhaps five-yearly) to check that the recommended modifications to logging practices are achieving the desired outcome.

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## 1. Objectives of the workshop

a) To provide forest managers and policy-makers with a comprehensive overview of research findings relevant to the environmental effects of timber harvesting in the Jarrah forest;
b) To identify mechanisms by which current research findings can be incorporated in the revision of silvicultural guidelines and the next Forest Management Plan (FMP).

## 2. Format for sessions

Presenters were asked to:
- Briefly overview the methodology used in their study, sufficient to make results interpretable.
- Summarise the key findings, giving priority to those that have implications for management and that can be manipulated by future silvicultural practices.
- Make recommendations for changes to management practices that could be considered in the context of the next Forest Management Plan.

## 3. Summary of presentations

Attached are brief summaries of most presentations made at the workshop, together with a statement from the authors regarding the key management implications of their findings:

- *Short term impacts of logging on understorey vegetation in the Jarrah forest* (Neil Burrows, Bruce Ward & Ray Cranfield).
- *Evaluation of key soil indicators of sustainability in Australian Mediterranean forests* (Kim Whitford)
- *Using electromagnetic induction to estimate soil salt storage* (Joe Kinal)
- *Hydrological response to logging in the intermediate rainfall zone of the jarrah forest* (Joe Kinal)
- *Logging and burning impacts on cockroaches, crickets and grasshoppers, and spiders in Jarrah forest* (Ian Abbott and colleagues)
- *Short-term Impacts of Logging on Birds in a Jarrah Forest at Kingston* (Graeme Liddelow)
- *Tree hollows in Jarrah and Marri* (Kim Whitford)
- *Response of terrestrial vertebrates to timber harvesting at Kingston* (Adrian Wayne and colleagues)
- *Brushtail Possum (Koomal) responses to timber harvesting at Kingston* (Adrian Wayne and colleagues)