Western Ringtail Possum (Ngwayir) responses to timber harvesting at Kingston

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Logging impacts on Ngwayir Survivorship

• Two weeks after harvesting completed within the ranges of radio collared animals
- 31% treatment animals alive within coupe
- 80% control animal alive
• All 17 treatment animals were dead before the silvicultural burn (<2 years).
• Average breeding lifespan of Ngwayir was reduced by about 50%).
• Difference in survivorship difference between control and treatment animals was marginally significant (p=0.0559), but statistical power was low (e.g. 80% probability of detecting a 40% difference with 95% confidence).
• Up to 18% of treatment animals died from falling.
• Increased vulnerability to predation during harvest activities (generally acute) was the principal cause of the survivorship decline. Logging impacts on Ngwayir Survivorship

•85% decline throughout greater Kingston since 1997

Refuges used by Ngwayir

• above-ground nests
• typically dreys, more common in dense and/or riparian vegetation
• In jarrah (45%), marri (31%), *Melaleuca incana* (17%)
• forest harvesting debris
• mainly harvest debris, some road piles, rarely natural
• use of debris confined to harvested areas

Nocturnal Habitat Use

• Ngwayir sighted on the ground more than twice as often in harvested forest (ie. increased vulnerability to predation)

•Saplings (Jarrah and Marri) are used more extensively than more mature trees

Daytime Refuge Use

• Broader range of refuge types used than Koomal
• Standing trees with hollows are the most extensive form of refuge
• Balga grass-trees are important refuge
• Use of forest debris problematical during silvicultural burning
• A few refuges are used more extensively than most; these should be targeted for protection
• At least 7.7 refuges/ha (4 to 6 ST/ha)

Modification recommended to Jarrah Silvicultural Guidelines

- Additional fox baiting particularly adjacent to the interface between forest and cleared land
- Retention of balga grass trees, in clumps or large solitary plants
- Schedule advanced burns before harvesting to minimize the intensity of post-harvest burning

Habitat tree retention rates

To provide possum refuges for Koomal and Ngyawir at their current level of demand in Kingston at least 8 habitat trees (>70cm DBH) per hectare should be retained. This figure does not factor in competition by other species for these trees/hollows (e.g. cockatoos, Phascogales and bees), inefficiency of suitable habitat tree selection, future increased densities of recovering fauna populations.

A WORKSHOP ON ENVIRONMENTAL EFFECTS OF TIMBER HARVESTING IN THE JARRAH FOREST
Perup Forest Ecology Centre
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A synthesis of recent research by the Science Division, Department of Conservation & Land Management

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)