

# Saproxylic beetles and industrial fuelwood harvesting: retrospective studies in Tasmania's Southern Forests

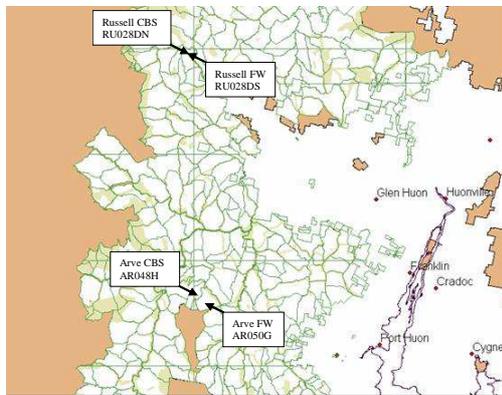
<sup>1</sup>Simon Grove, <sup>2</sup>Marie Yee, <sup>3</sup>Sarah Nash

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Harvesting of wood residues following clearfelling has been proposed to reduce residue loads, generate bioenergy, and improve the potential for eucalypt seedling establishment while reducing the need for high-intensity regeneration burns. While these aims may paint fuelwood harvesting in a positive light, the dependence of many invertebrates and fungi on coarse woody debris raises the possibility of negative impacts too. This poster outlines two studies from Tasmania's southern forests aimed at understanding these impacts on one component of this cryptic biodiversity, saproxylic beetles.

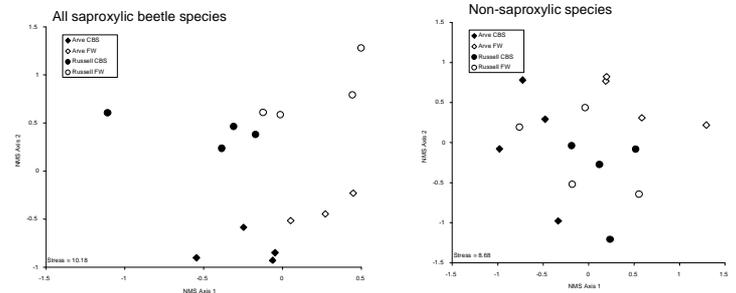
## Study 1: The impacts of past fuelwood harvesting on saproxylic beetle assemblages (Simon Grove and Marie Yee)

This study used combined flight intercept and pitfall traps to compare the saproxylic and non-saproxylic beetle fauna in regenerating stands that had been exposed (in the 1980's) to clearfelling (CBS) with those of a similar vintage in which clearfelling was accompanied by experimental fuelwood harvesting (FW). Sampling units operated from November 2004 to February 2005, in each of 16 locations in two study areas: Arve Road and Russell Road. Both CBS and FW treatments were sampled equally at each study area. This poster reports on analyses from the November samples only, in which 14741 saproxylic beetles (225 species) and xxx non-saproxylic beetles (xxx species) were sampled.



Trends at the two study areas in the numbers of individuals and species, for different categories of beetles, in fuelwood-harvested coupes in comparison to standard clearfelled coupes

		Arve	Russell	Overall
All beetle species	Individuals	↓	↓	↓
	Species	↓	↑	-
--- All saproxylic species	Individuals	↓	↓	↓
	Species	↓	↑	-
---- Facultative saproxylic species	Individuals	↓	↓	↓
	Species	↓	↑	-
---- Obligate saproxylic species	Individuals	↓	↓	↓
	Species	↓	↓	↓
--- Non-saproxylic species	Individuals	↑	↓	-
	Species	↑	↑	↑



### Main findings

- Saproxylic beetle assemblage composition varies by treatment (as well as by site), with obligate saproxylic species apparently contributing most to the separation by treatment; no treatment or site differences for non-saproxylic species (see figures above)
- Saproxylic beetles less abundant in FW compared to CBS; no comparable treatment differences for non-saproxylic beetles (see table to left)
- Fewer species of saproxylic beetles in FW compared to CBS; the opposite pattern for non-saproxylic species (see table to left)

### Conclusion

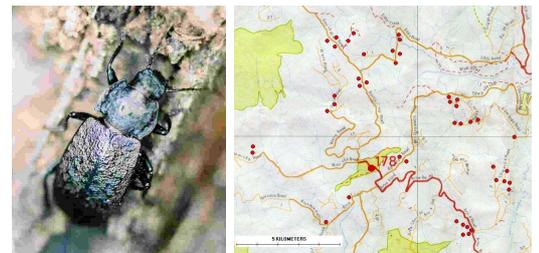
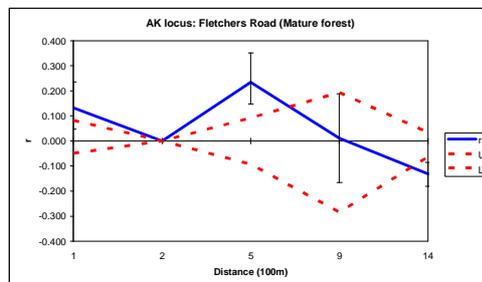
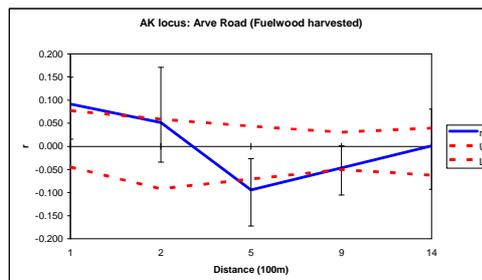
- The past limited scale of fuelwood harvesting makes it difficult to draw firm conclusions about its impact on saproxylic beetles. However, trends in abundance and assemblage composition strongly suggest an impact over and above that of CBS

## Study 2: The impacts of past fuelwood harvesting on genetic structuring in saproxylic beetle populations (Sarah Nash)

This study, conducted in 2004, used some of the same sites as Study 1 (and others nearby – see figure below right) to look at genetic structure within a single species of dispersal-limited (flightless) saproxylic beetle, *Coripera deplanata* (shown below). Nearly 600 beetle larvae for genetic analysis were collected from 22 sample locations, half of which were in mature forest and half in 1980's fuelwood-harvested clearfell coupes.

### Main findings

- Log volumes were lower in fuelwood-harvested areas, and inter-log distances greater, compared to mature forest areas.
- Three polymorphic loci were resolved using allozyme analysis. Spatial structure analyses indicated finer spatial structuring in the fuelwood-harvested coupes than in mature forest.
- The data for a single locus (AK) are shown (right) for a single fuelwood-harvested study site (Arve Road – upper figure) and for a single mature forest study site (Fletchers Road – lower figure). Over the limited range of inter-sample distances in this study, spatial autocorrelation is at a minimum at about 500 m for the fuelwood-harvested site as opposed to about 1400 m for the mature forest site.



### Conclusion

These data are very provisional, but are consistent with the hypothesis that clearfelling and fuelwood harvesting has constrained gene flow in this species, through increasing the distance between habitable logs to a point where it has affected the ability of beetles to successfully disperse.