

Patchiness of prescribed burns in dry sclerophyll forests in south-eastern Australia

Penman, T.D., Kavanagh, R.P and

Forest Science Centre, Department of Primary Industries, New South Wales

Binns, D.L

Native Forest Division, Forest NSW, New South Wales

Introduction

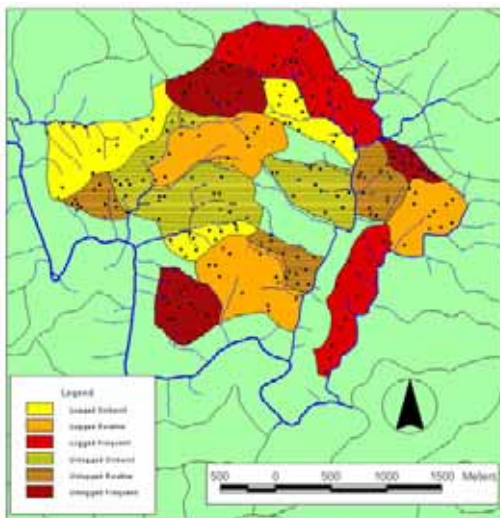
The dry sclerophyll forests of south-eastern Australia are among the most fire-prone forest communities in the world. Prescribed burns are commonly used in these forests to reduce future fire risk in order to provide protection to people and assets.

There has been considerable debate over the ecological impacts of frequent prescribed burning however few data are available for dry sclerophyll forests. We examined the factors which influence spatial variability of repeated low-intensity fires under two burning regimes for a 17 year period from 1988 to 2005 in the Eden Burning Study Area (EBSA).

Methods

The study was conducted in the EBSA which is located in the Yambulla State Forest, 29km south west of Eden, New South Wales. The EBSA is comprised of 18 experimental coupes in a randomized block design (Figure 1).

Figure 1: The Eden Burning Study Area



Burns were attempted in the frequent burn sites in 1990, 1992, 1996, 2001, 2003 and 2005 and in the routine burn sites in 1992, 1996, 2001 and 2005.

Within each coupe, 18 permanently marked plots were used to assess the extent of burning. Each plot was assessed for burn coverage within three months of a burn. Using Generalized Estimating Equations (GEE's) we examined the variables (environmental and historical) that affect how a site will burn at the coupe and plot scale.

Results

- Fires burn in a patchy manner on both the coupe and plot scale (see Figures 2 and 3 below)
- Moisture affects the extent of fire at both the coupe (aspect) and plot scale (distance from stream).
- Recent fire history (i.e. time since fire and coverage of the last fire) influences fire behaviour at coupe and plot scale
- Ridge sites are unlikely to burn within 5 years of a fire and gully sites are unlikely to burn within 10 years (Figure 4).

Figure 2: Percentage of coupes burnt

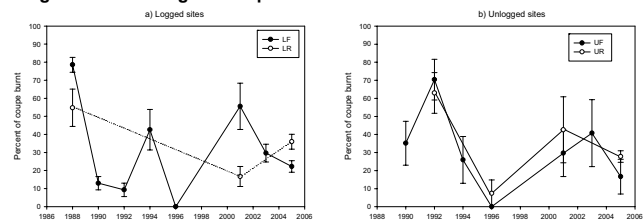


Figure 3: Percentage of plots burnt

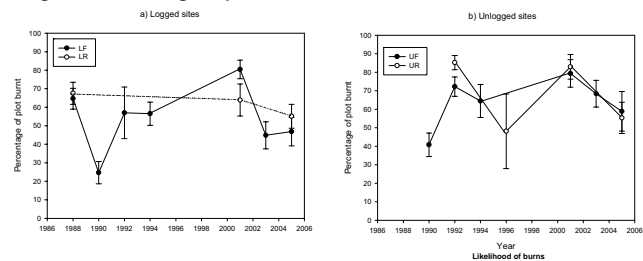
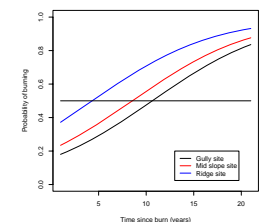


Figure 4: Predicted probability of plots burning for gully, mid-slope and ridge sites. Black line indicates a 50:50 chance of burning.



Discussion

The results confirm anecdotal reports that prescribed burning in dry sclerophyll forests is patchy, and quantify the degree of patchiness at both the site and the coupe scale. The heterogeneity of these fires is likely to minimize the ecological impacts. Unburnt areas provide refuges for fire sensitive species, while colonizing species are able to exploit the newly burnt areas. Gullies provides a longer term refuge site, as they are less likely to burn over longer time periods regardless of management intent. These results suggest that the ecological impacts of high frequency, low intensity fires are likely to be far lower than is often predicted based on assumptions of homogeneous landscapes and uniform burning. The results of this study will be used in combination with empirical vegetation response data to further investigate and test this conclusion.