Project Vesta: field implications from forest fire behaviour research findings

J. S. Gould[1, 3], W. L. McCaw[2,3], N. P. Cheney[1]
[1]Ensis- Forest Biosecurity and Protection CSIRO, Canberra, ACT, Australia
[2]Department of Environment and Conservation, Manjimup, WA, Australia
[3] Bushfire CRC, East Melbourne, Victoria, Australia

There is a universal need for a better understanding of forest fuels and how they determine fire behaviour - particularly under severe weather conditions. This understanding is required not only to build better models to predict fire spread at a local or regional level but also to evaluate the impact of fuel reduction burning on the behaviour of wild fires under dry summer conditions. Project Vesta was an experimental study to quantify age-related changes in fuel attributes and fire behaviour in dry eucalypt forests typical of southern Australia. Over 100 experimental fires were conducted during dry summer conditions at two sites in south-western Australian eucalypt forests. Understorey fuels ranged in age since fire from 2 to 22 years. New fire behaviour models were developed that predict rate of spread and difficulty of suppression according to wind speed, fuel moisture content and variables that reflect the abundance and condition of leaf litter, understorey fuels and bark. These models predict that under conditions of high to very high fire danger the rate of spread and intensity of fire are strongly correlated with fuel age for a period of at least 15 years after fire. Experimental studies have established a clear link between visual ratings of fuel hazard and potential fire behaviour. In forests dominated by trees with fibrous bark the spotting potential and difficulty of suppression may continue to increase for considerably longer periods after fire because of the accumulation of bark on stems. For this reason prediction of fire behaviour based solely on fine fuel loading will tend to under-estimate potential fire behaviour in forests that have been unburnt for some time. The improved understanding of relationships between fuel age and potential fire behaviour in dry eucalypt forests gained from Project Vesta provides a better basis for assessing the benefits of various fuel management alternatives that may be employed to reduce difficulty of fire suppression and protect assets from damage during high intensity wildfires. This new knowledge is important not only for planning prescribed burning programs, but also for determining, monitoring and managing suppression of wildfires.