

Fire history and productivity of the jarrah forests of south-western Australia

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Abstract

The jarrah forests of south-western Western Australia are highly prone to wildfires owing to a combination of flammable vegetation and warm dry weather conditions in the summer months. Prescribed fire is often used in these forests to manage fuel loads. The frequency and intensity of burning can strongly influence vegetation community composition but less is known about interactions between forest productivity and fire history. We hypothesized that high fire frequency, in terms of many consecutive short intervals, as well as extremely low fire frequency with few fire events and long fire intervals, can lead to a decrease in jarrah forest productivity. We estimated aboveground biomass and leaf area index (LAI) of 16 one hectare plots in jarrah forest sites of known fire history in the Warren region of southern Western Australia. We measured DBH, height and stem density of all overstorey species, rates of litterfall and cover of understorey species. We estimated crown cover and LAI using digital cover photography, and undertook destructive harvesting of both understorey and overstorey to develop allometric relationships for predicting ecosystem biomass. Remotely-sensed data were also used to estimate landscape-scale variations in productivity and estimates ground-truthed by plot-based measurements. Multivariate statistical analyses are being undertaken to assess relationships between spatial variation in productivity and fire history to determine the effects of fire regime on the long-term productivity within the jarrah forest ecosystem.

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