

Changing worlds and fire regimes? Possible consequences of global change for bushfire risk management in the Sydney region

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Key elements of global change include shifts in climate, human populations, invasive species and land use. All have potential to alter fire regimes in the future. Efforts to understand effects of global change involve fundamental and unresolved questions about the key determinants of fire regimes. Various methodologies can be used to investigate responses of fire regimes to global change – particularly climate change.

Addressing these questions will be especially challenging for the Sydney region, where a wide range of values, natural and human inputs to fire regimes, and options for fire management co-exist. Recent work (Hennessey et al. 2005) indicates that a substantial positive shift in FFDI (Forest Fire Danger Index) in the Sydney region by 2050 may result under plausible climate change scenarios. While average FFDI may increase, resultant responses of fire regimes are not easy to predict. Elevated CO₂ may not only alter fire regimes directly via effects on weather (i.e. FFDI) but also indirectly through changes to plant growth, decomposition and thus fuel dynamics. Further complexity may be added by changes to the distribution of key plant functional types. We outline a framework for understanding the effects of global change on fire regimes in the region. Evidence from statistical and simulation models is presented, suggesting that fire regimes may be altered substantially by climate change, with an increased probability of large fires as a key driver of change. Consequences of other facets of global change such as increased population density are likely to compound this effect. Lessons learned from this region will have wide application in temperate Australia and elsewhere, particularly in urban and peri-urban landscapes.

Managing bushfire in a changing climate