FUTURE BUSHFIRE SCENARIOS

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1. Bushfire CRC workshop

A workshop on 'Future Scenarios of Bushfires in Australia', was held at the Australian National University, Canberra. Seventeen researchers with expertise in bushfire dynamics and effects, bushfire management, land planning and bushfire law, explored:

(i)   effect of global change on fire regimes;
(ii) implications for socio-economic and environmental assets;
(iii) potential mitigation strategies;
(iv) law & planning responses (See Figure 1).

3. Management

Increased rates of highly-strategic prescribed burning could conceivably mitigate future increases in unplanned fire, although total area burned will increase significantly. Intensive programs aimed at reducing rates of bushfire ignition, along with rapid initial attack of fires will also remain critical. Fire managers are likely to face increasingly difficult conflicts in allocation of resources to address the complex and interacting facets of fire management.

5. Law and planning

Bushfire policy is significantly influenced by the particular circumstances of the most recent events, rather than necessarily forecasting future requirements on time-scales relevant to global change. Therefore, society tends toward becoming readied to respond to the last disaster, not the next one, and this discourages agencies to prepare adequately for the future. Noteworthy is an increasing tendency for land management agencies to be defendants in bushfire litigation, and this may be a trend that continues in the future.
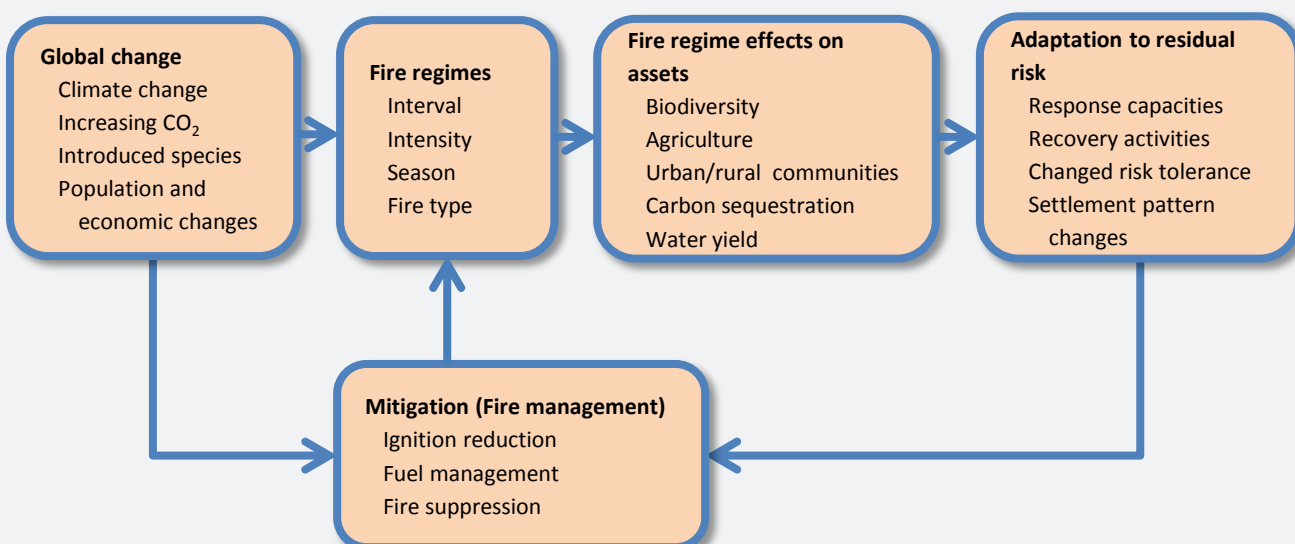

Figure 1. Conceptual framework for exploring future bushfire scenarios. Global change will affect fire regimes that will influence assets directly, as well as indirectly via fire management efforts. More broadly, adaptation may involve changes to management, planning and legislation .
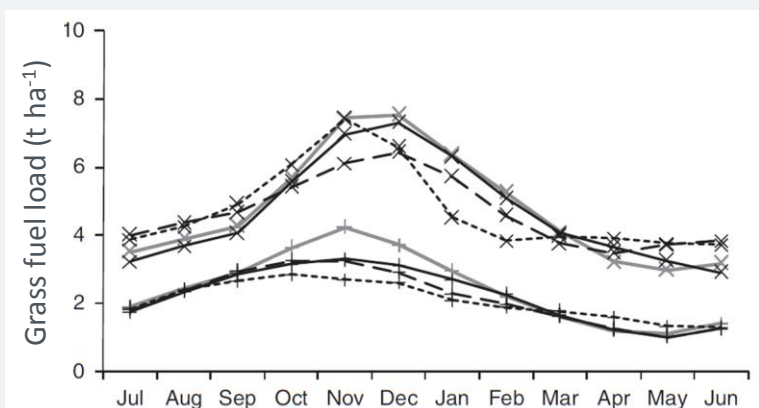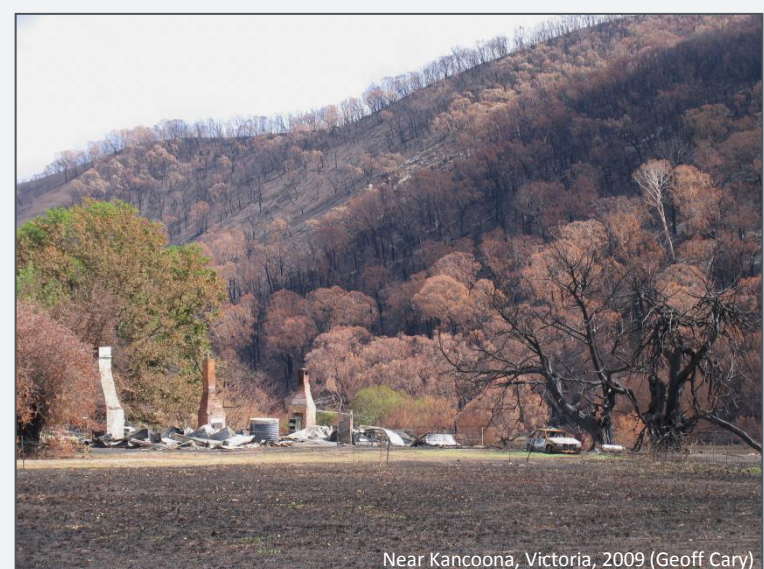

Figure 2. Simulated monthly 50th (+) & 95th (x) percentile fuel loads for exotic perennial species grasslands in the Sydney region assuming different climate/atmospheric [CO_2] scenarios: grey = Historical climate/350 ppm; Black solid = 2030 A1B/450 ppm; Black dashed = 2070 B1/518 ppm; Black dotted = 2070 A1FI/707 ppm. (Source: King, Cary, Gill, Moore 2012).

2. Global change drivers

Fire regimes are governed by climate, fuel, ignition rates, suppression efforts and terrain (Cary et al., 2012). Observed greenhouse gas emissions are close to the IPCC A1FI emission scenario, indicating global warming will likely be near upper estimates (+ 3 to 4°C) by 2070, increasing bushfire danger in many Australian ecosystems. New research indicates, however, the effects of climate and atmospheric CO_2 may result in lower fuel loads in temperate grassy ecosystems (Figure 2, King et al. 2012), although outcomes for litter fuel types (woodland/forest) are more speculative. Fire ignitions are correlated with human population size, indicating increases for areas of future population growth, although socio-economic status will likely remain a strong controlling influence. Evidence indicates that changes in land-use, novel native plant communities, and introduced plant species will influence fire regimes significantly, presumably involving complex interactions.

4. Implications for assets

Fire management involves protection and enhancement of natural and built assets, depending on location and legislated mandates. Peri-urban areas and the urban fringe (see photo) are at significant risk. Future scenarios range from continued development, with little restriction in fire prone areas, to one that is highly regulated effectively prohibiting any further development. Changed fire regimes will also affect Australia's flora and fauna, which, at the same time, could be directly affected by climate change: understanding the adequacy of present conservation reserves in this context will be important. Carbon stocks are increasingly viewed as key assets. Higher (simulated) fire frequency is expected to cause a 10 % reduction in carbon stocks in SE Australian forests under an A1FI climate projection. Fire-induced effects on vegetation will influence water yields, although ecosystem models are required to fully understand dynamics and make reasonable projections for the future.

Near Kancoona, Victoria, 2009 (Geoff Cary)

6. Ongoing research

2050-2070 fire regime projections will be derived from the A1FI scenario for key regions. The analysis will draw on some aspects of scenario planning but will not take the form of a traditional scenario planning exercise. Future scenarios will focus on carbon stocks and built assets in peri-urban environments. Insights will provide critical input into economic evaluation of bushfires in Australian society, both currently and in the future.

Cary ,G.J., Bradstock, R.A., Gill A.M. & Williams R.J. (2012) Global change and fire regimes in Australia. *Flammable Australia: Fire regimes, biodiversity and ecosystems in a changing world*. Pp. 149 – 169. CSIRO Publishers, Melbourne.

King, K.J., Cary, G.J., Gill, A.M. & Moore A.D. 2012. Implications of changing climate and atmospheric CO_2 for grassland fire in south east Australia: Insights using the GRAZPLAN grassland simulation model. *International Journal of Wildland Fire,* Online.