LANDSCAPES & POLICY hub

National Environmental Research Program

Fire Masterclass

Fire in the future: the journey may be just as important as the destination

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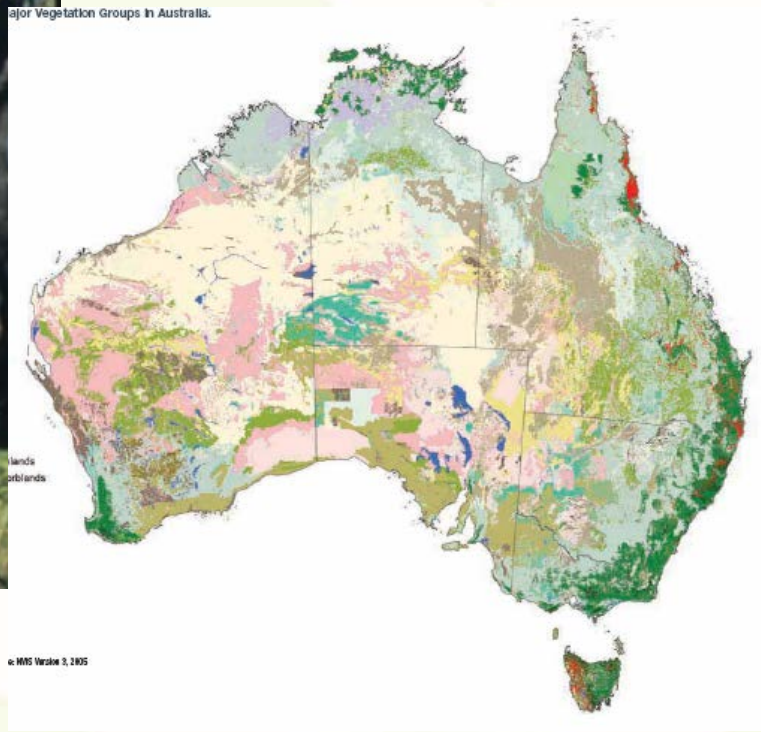
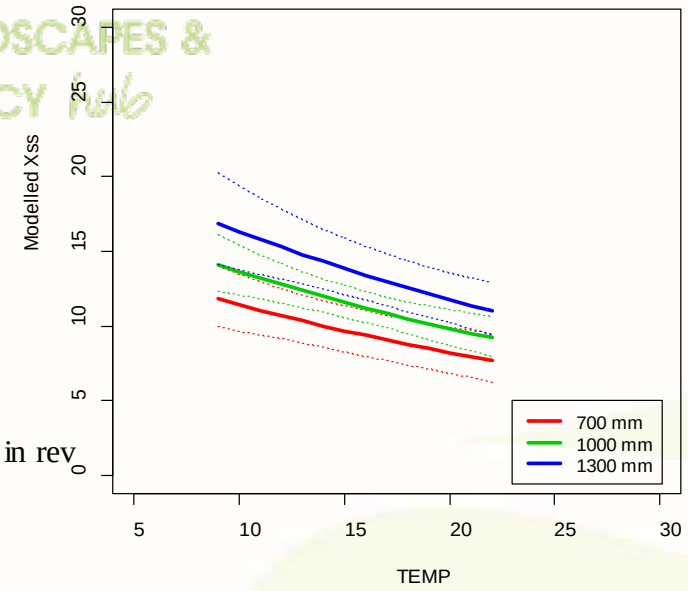
What and Why I model…

XXX(X)

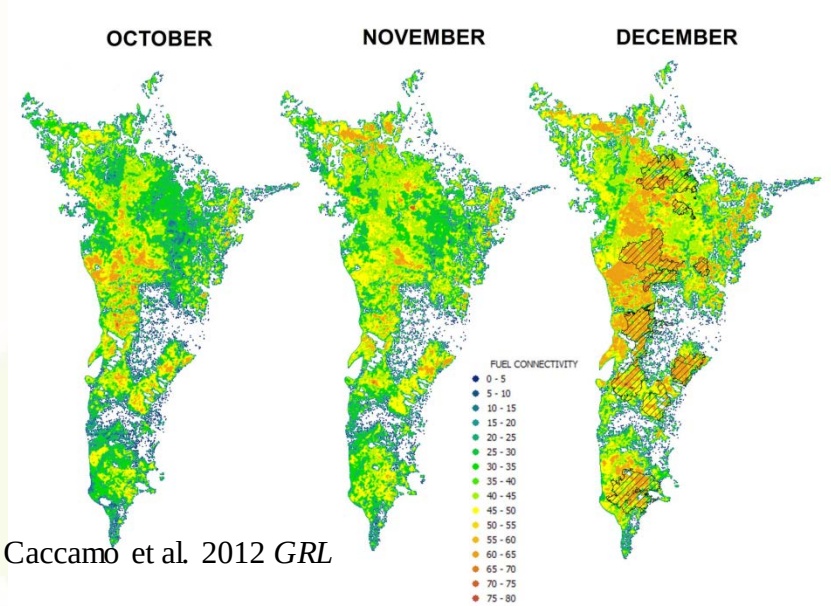
- What motivates your modelling activities? My H factor (but seriously ….. its beautiful)
- Why do you model, what you model? Out of a perverse sense of pleasure…….. I like to challenge the orthodoxy which portrays this a 'monochrome' problem
- What are you trying to better understand? Risks to people and property. Risks to ecosystem values. The role of fire as a process that organises the fundamental ecological furniture.
- Include geographic scale and time resolution? Various but mainly sub-continental to local.
- When you model, how do you balance climatology and ecology? Its not a question of balance. You model what matters and you represent what you best know. Modelling should explore the potential degree of influence of these things.

What does my modelling mean?

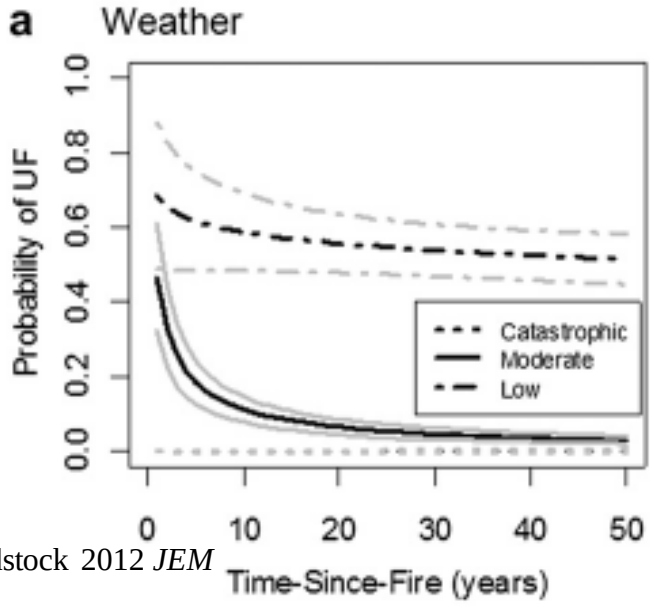




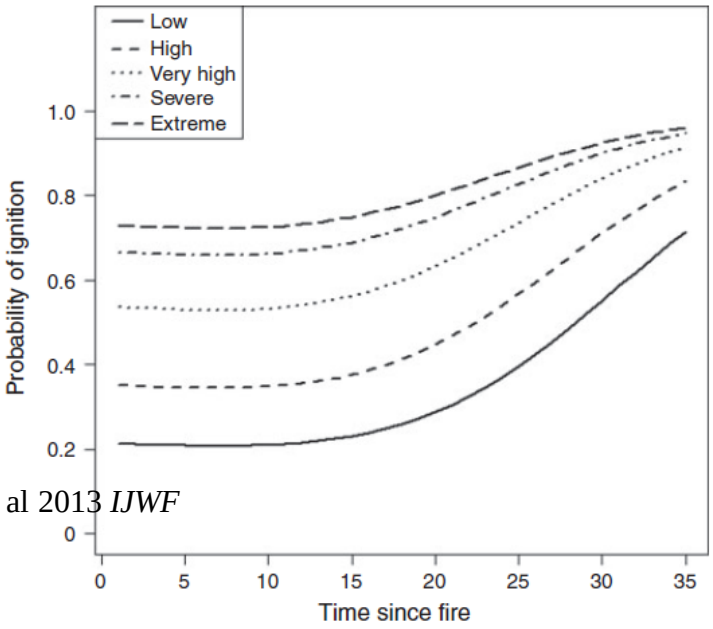
Thomas et al. in rev



Caccamo et al. 2012 *GRL*



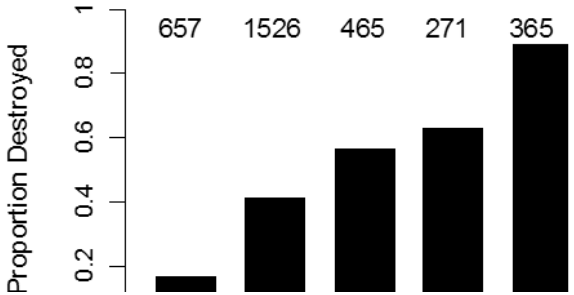
Price & Bradstock 2012 *JEM*

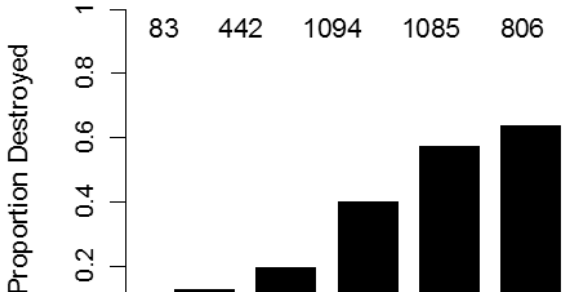


Penman et al 2013 *IJWF*

Fig. 5. Probability of lightning as a function of time since fire (years) and FFDI. Predictions are made for mean values of all other variables in the best model.

Price & Bradstock 2013 *PlosONE*





Bradstock et al. 2012 *JEM*

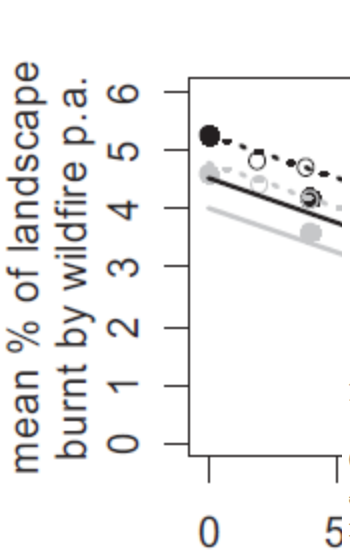
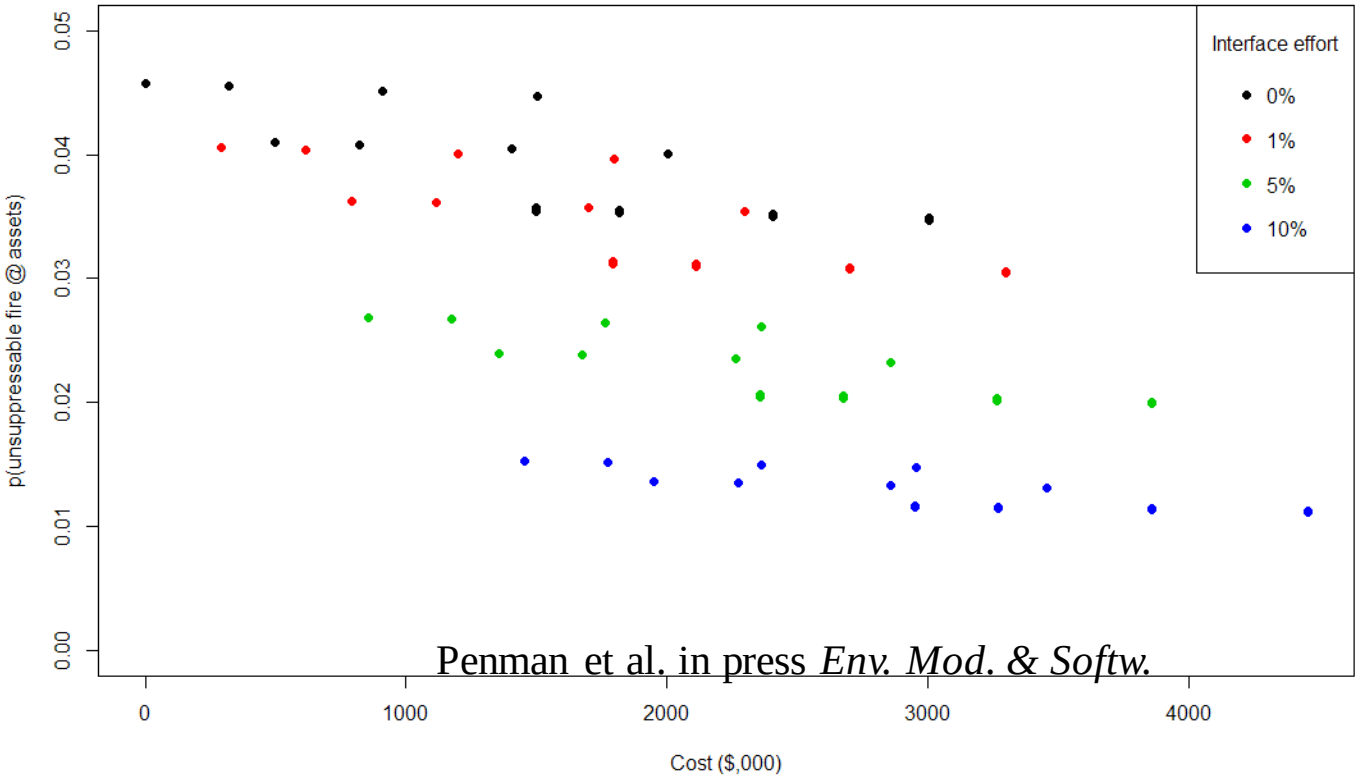
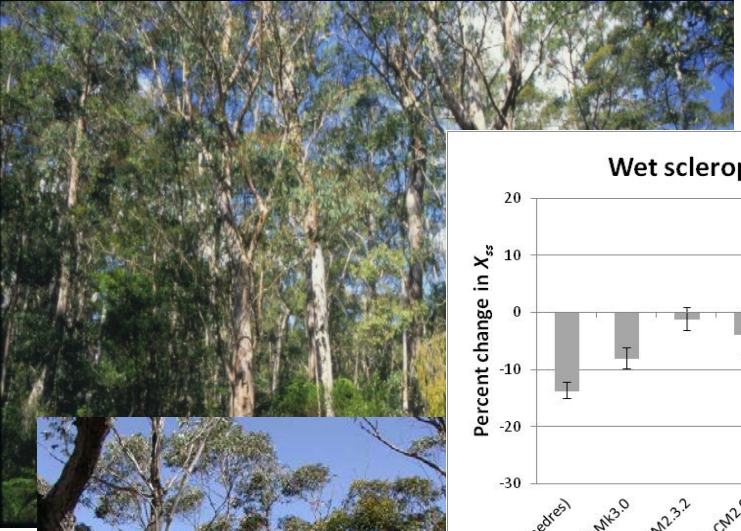


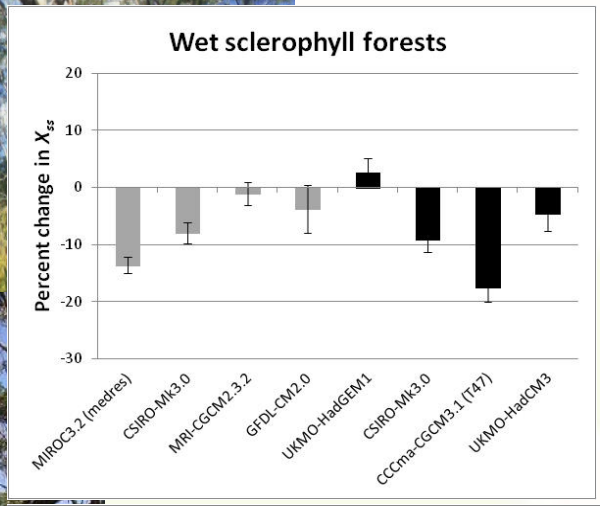
Fig. 2

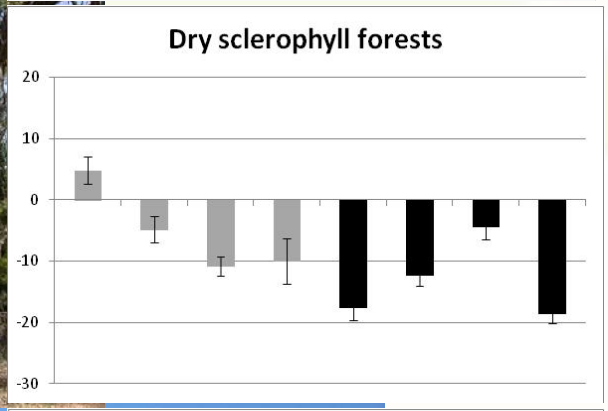


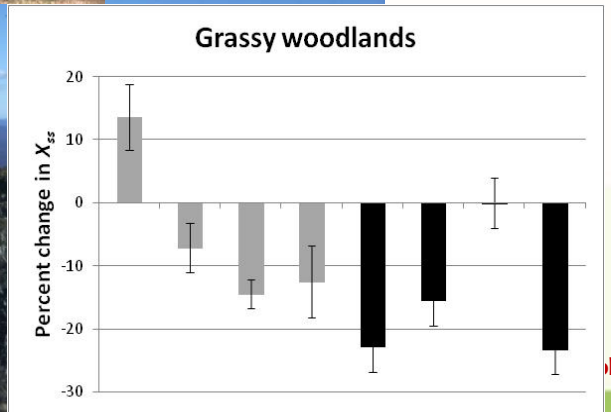
Penman et al. in press *Env. Mod. & Softw.*

Woody litter fuel in the future?









The engine of fire behaviour in local forests and woodlands

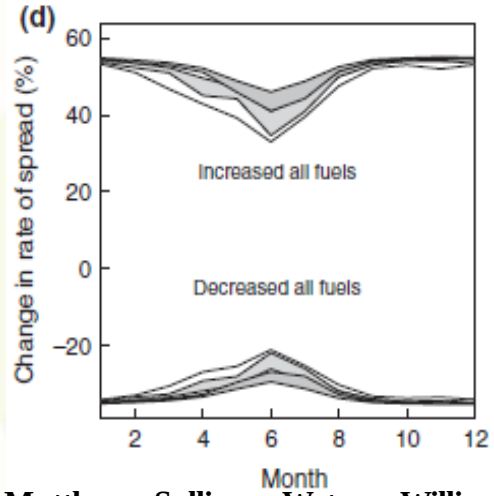
Widespread decline predicted due to future warming and drying

Thomas, Watson, Bradstock, Penman, Price (in rev.)
Watson, Thomas, Price, Bradstock, Penman (in prep.)

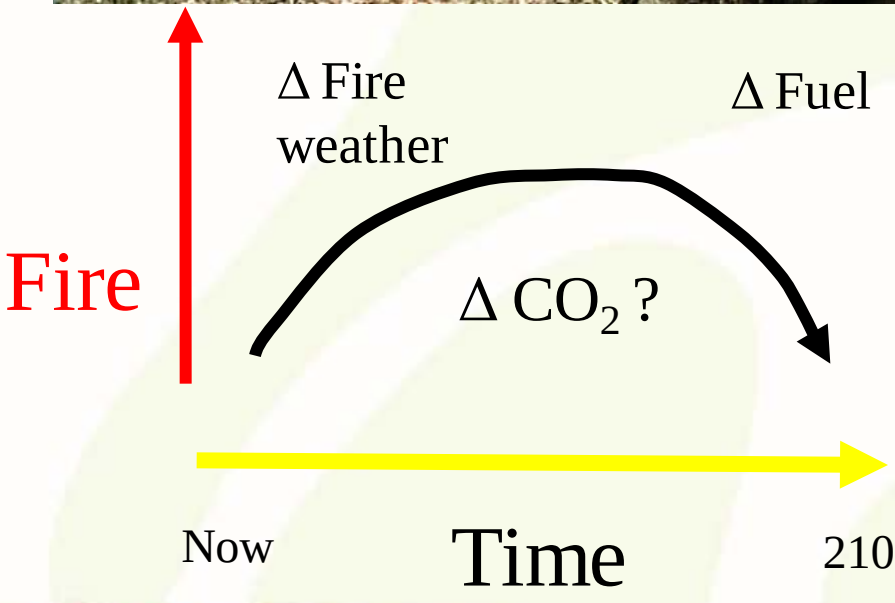
NSW Environmental Trust Grant RD0173

Consequences of a future decline in future fuel in local forests?

The journey is just as important as the destination



Matthews, Sullivan, Watson, Williams (2012)
***Global Change Biology* 18: 3212-3223.**



CSIRO Climate Adaptation Flagship *Future Fire Regime Trajectories* project (2013 - 2015)

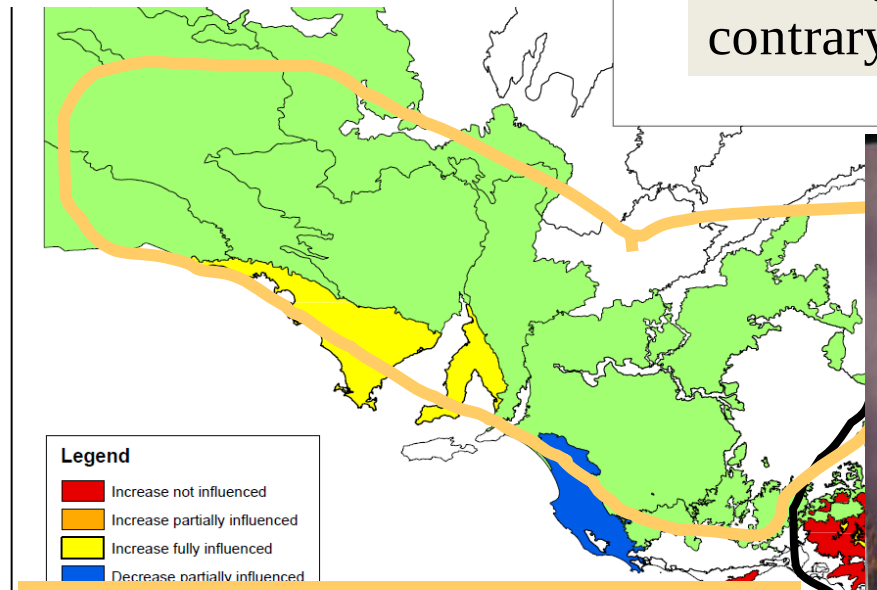
UWS ARC Disco. Project *When Fire and Water mix* (2013 – 2016)

Trends in fire across SE Aust. Bioregions (1975 to 2009)

Bradstock, Penman, Boer, Price & Clarke *GCB* (in press)

Fire activity low – arid grass and shrublands, sparse populations, low grazing

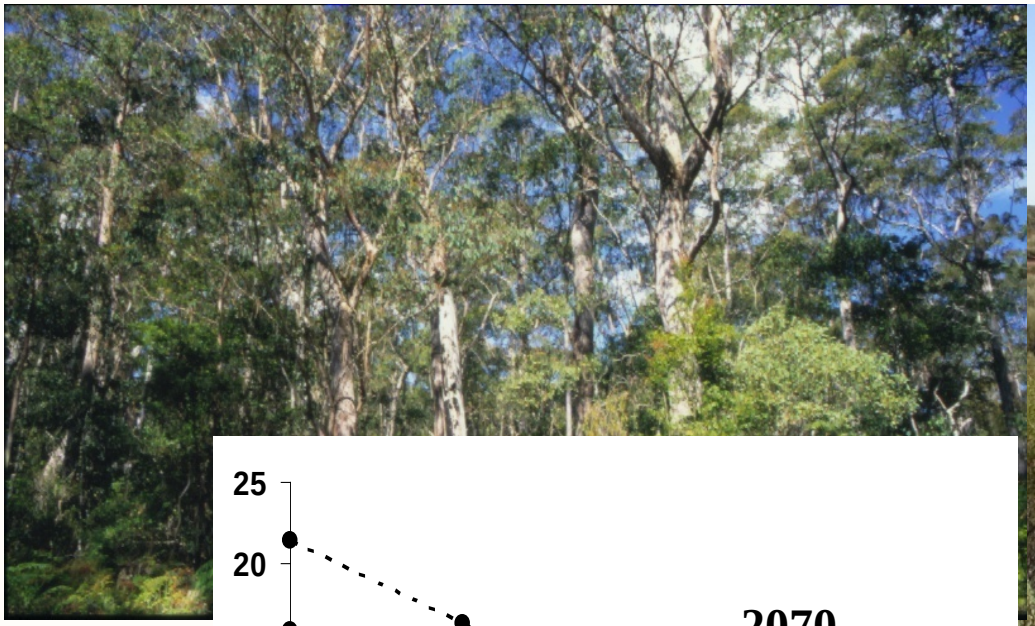
Increases in densely populated, forested Bioregions mostly unrelated to warming & drying trends: in 3 cases contrary to "wetting" trend



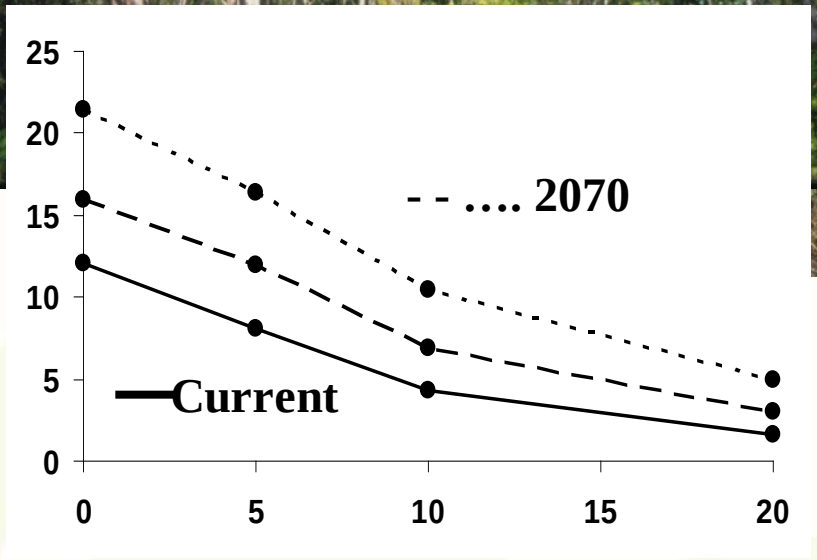
Mostly no change in dry woodland Bioregions associated with extensive agriculture and grazing

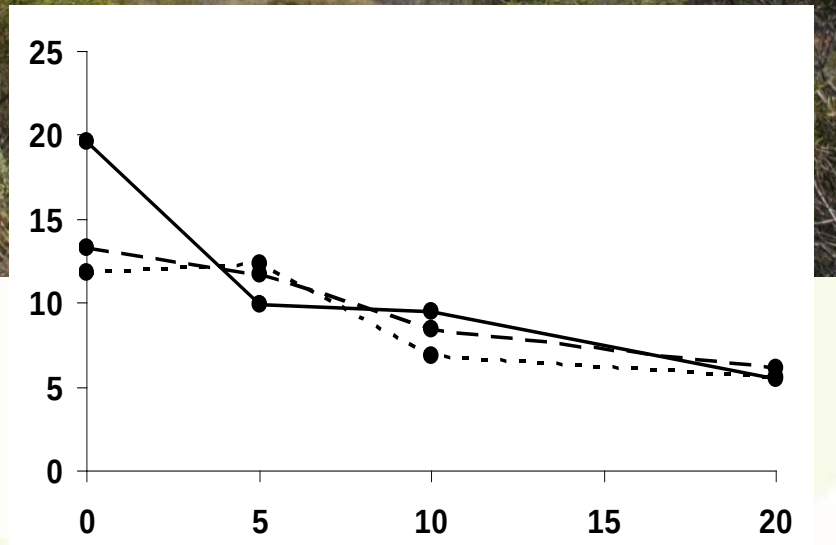
Possible influences of lightning and human ignitions, human and/or land use effects are inferred as the cause of increases in area burned in forest Bioregions.

Climate change PB effects in contrasting ecosystems



Median annual area burned x 10^3 ha





% landscape prescribed burned (per annum)

King, Cary, Bradstock, Marsden-Smedley (2013) *Global Change Biology* 19, 1223–1235

Modelling Caveats

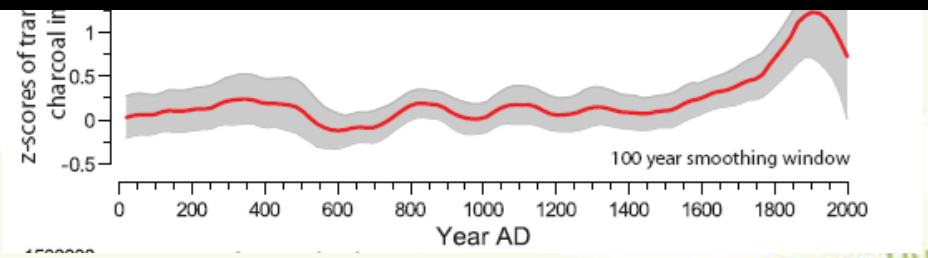
Prediction of future fire for Australia: global methodologies

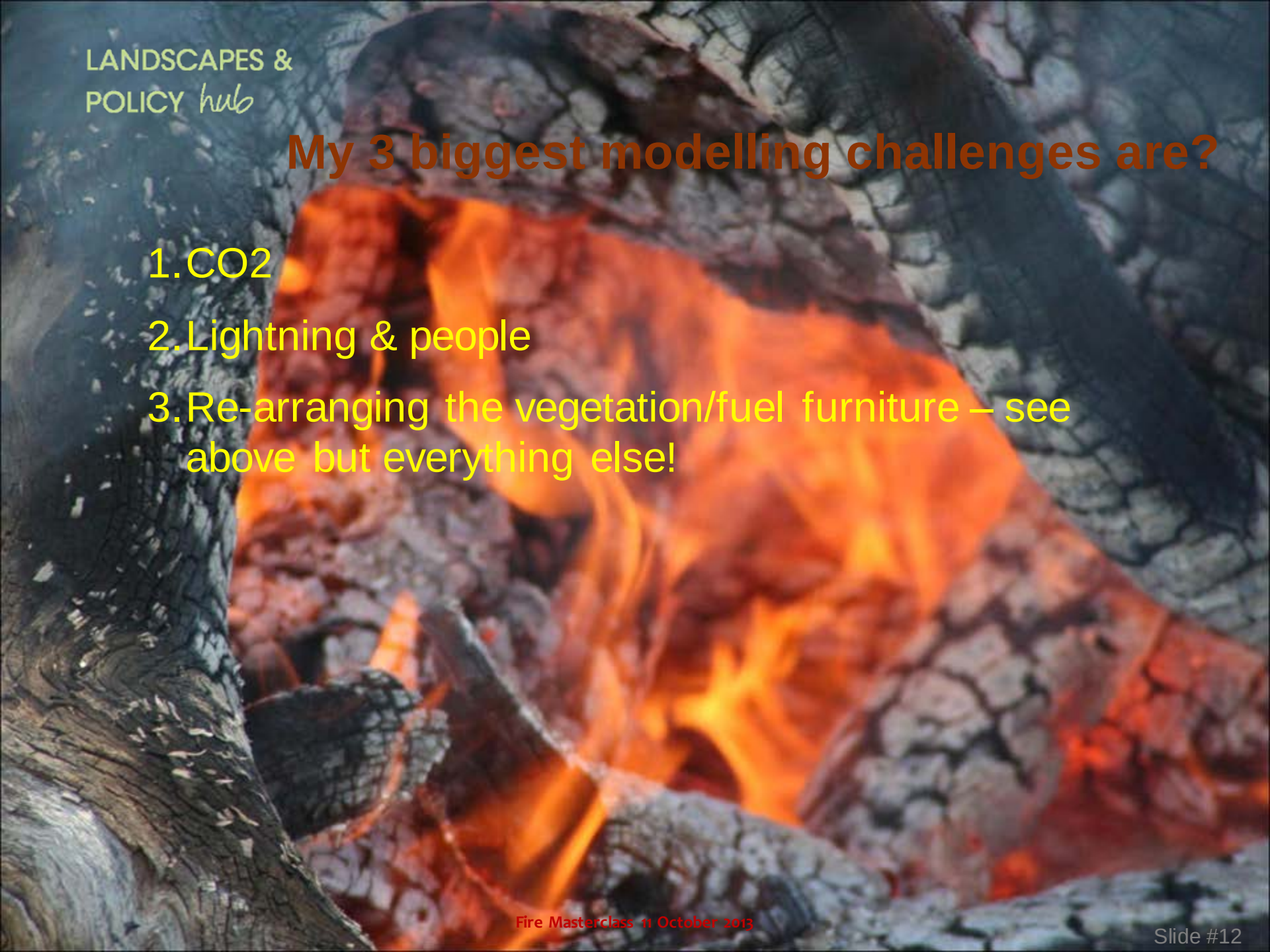
- Global statistical models (remote sensing based)
- DGVM/process fire models
- Palaeo-charcoal meta-analyses

Limited temporal resolution of base fire data; no CO_2

Functional types not representative

Limited data from dry regions





My 3 biggest modelling challenges are?

1. CO_2
2. Lightning & people
3. Re-arranging the vegetation/fuel furniture – see above but everything else!