PROGRAM A - PhD Student 2007-2010

Behind the flaming zone: woody fuel consumption and fireline intensity in the changing climate of Australia

Jennifer J. Hollis [1,3] & W. Lachie McCaw [2,3]

[1] University of New South Wales at the Australian Defence Force Academy, Canberra ACT

[2] Department of Environment and Conservation, Manjimup WA

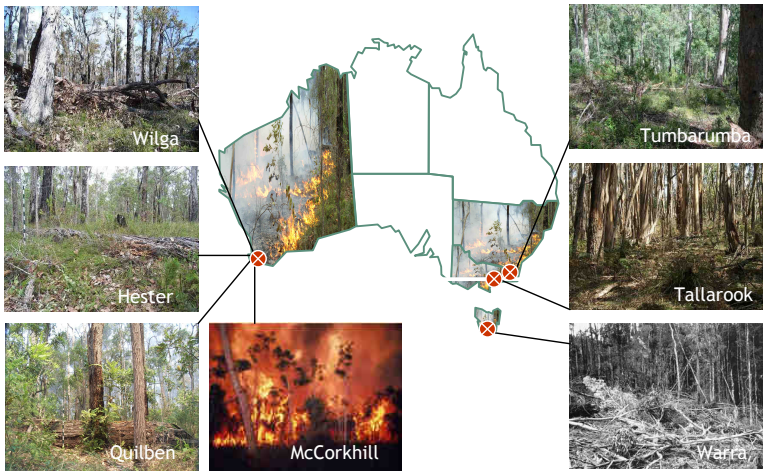
[3] Bushfire Cooperative Research Centre0

Background & Research Objectives

Fire intensity is one of the components of a fire regime that has the potential to be altered by climate change along with fire size, frequency and the length of the fire season.

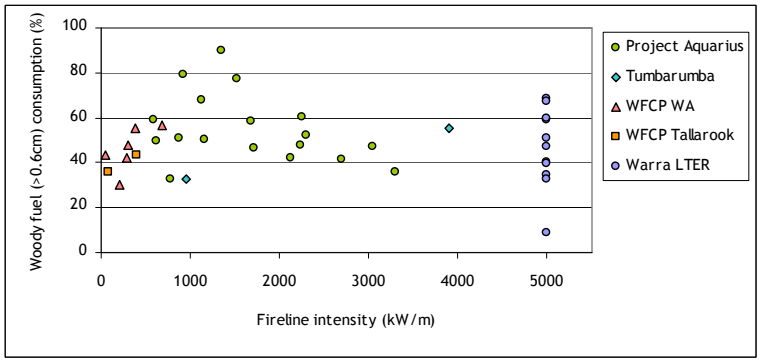
This research focuses on determining the proportion of woody fuel consumed as a function of fireline intensity in southern Australian eucalypt forests.

Field Data Collection & Sources

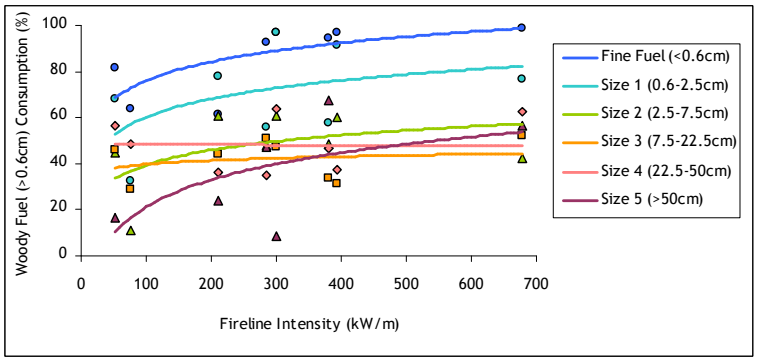


Woody fuel consumption project (WFCP) field data was collected at Wilga, Hester and Quilben in southwest WA and at Tallarook in northern-central Victoria. To increase variability within the data analysed, data was also sourced from McCorkhill (WA, Project Aquarius), Tumbarumba (NSW) and the Warra LTER (Tasmania).

Woody fuel consumption & fireline intensity



Best regression relationships: size class (WFCP)



Equations & strength of regression relationships

Fuel Size Class	Regression Equation	R^2
Fine fuel (<0.6cm)	$69.9 + 0.0534\ I_B$	0.48
1 (0.6-2.5cm)	$11.511Ln(I_B) + 7.2271$	0.23
2 (2.5-7.5cm)	$9.3444Ln(I_B) - 3.6022$	0.24
3 (7.5-22.5cm)	$37.7 + 0.0138\ I_B$	0.09
4 (22.5-50cm)	$44.6 + 0.0123\ I_B$	0.04
5 (>50cm)	$13.6 + 0.0731\ I_B$	0.41

* I_B *is Byrams' Fireline Intensity (1959)*

Preliminary conclusions

- without the ability to isolate the effect of fireline intensity on woody fuel consumption, it is difficult to assess its direct relationship and is unclear
- regression analysis indicates that fireline intensity appears to influence fine fuel consumption and to a lesser extent large woody fuels >50cm while fuels 7.5cm-50cm are not affected
- this suggests that under prescribed burning conditions, the consumption of woody fuels will be little affected by changes to fire intensity as a result of climate change
- varied statistical techniques and further research are required to improve data analysis and increase variability in the dataset

A camera captures a time sequence as a prescribed fire engulfs a marri log in the jarrah forest at Hester, WA.

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