HighFire Risk: Bushfire Risk Management in High Country Landscapes

J.J. Sharples, R.O.Weber
University of New South Wales at the Australian Defence Force Academy
R. McRae
ACT Emergency Services Authority

Introduction

This project is concerned with examining and formalising the key elements of bushfire risk management frameworks that are employed in high-country landscapes.

To properly address the issue of bushfire risk in high-country landscapes it is necessary to understand all of the drivers that significantly contribute to bushfire risk in these regions.

Methods

We will begin with a formal review of the ACT ESA framework. This will be complemented by comparison with frameworks used by NSW, Victorian and other relevant agencies.

We will formally identify the key drivers of bushfire risk in high-country regions and suggest ways through which understanding and operational use of these key drivers can be improved.

Initially, the focus will be on meteorological features endemic to the high-country and the role they play as drivers of bushfire risk.

Phenomena of interest include:

• Mountain winds and waves

• Dynamic channelling of flows by rugged terrain

• Nocturnal low level jet (LLJ) phenomena (see figure 1)

• Local atmospheric instability

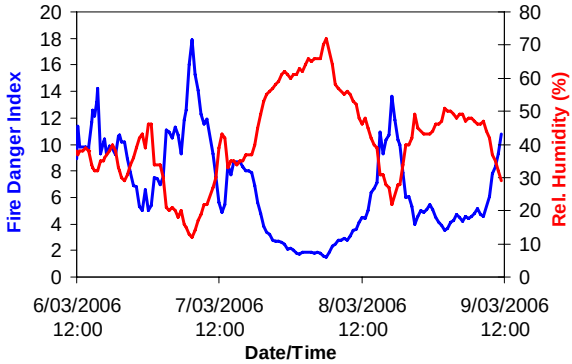

***Figure 1**. FDI and RH data from Mt. Ginini AWS showing peak fire danger at 7am. Probably due to a LLJ.*

We will install networks of at least 5 portable AWS units (see figure 2) to capture some of the phenomena of interest (beginning Spring 2006). Analysis of the ensuing data will allow us to:

• Document and forecast the variance of key meteorological variables in the high-country

• Extend work into identifying areas prone to dynamic channelling according to terrain characteristics (see figure 3)

• Investigate the role of thermal gradients as triggers for channelling events

• Gain knowledge on the extent and frequency of LLJ's and mountain winds (including Föhn-like events) and how they might effect fire behaviour.

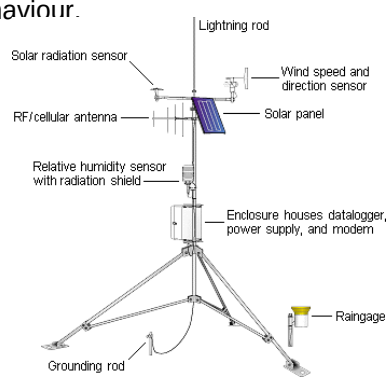

***Figure 2.** A portable AWS unit. These will be deployed in arrays to monitor channelled flows as well as broader scale meteorological effects*

We will also investigate the use of integrative logical structures, such as Bayesian Decision Networks, as an overarching framework to facilitate formal bushfire risk assessment, support public policy making and allow integrated land management. This approach would ideally draw on findings from other research programs within the CRC.

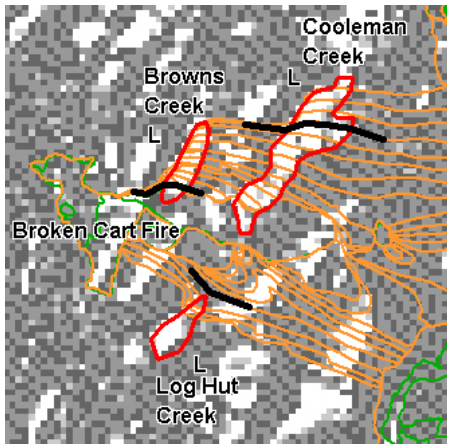

***Figure 3.** A simple terrain filter identifying regions prone to channelling (red lines) compared with fire line data form Jan 2003.*

Discussion

Improvement in our understanding of what we now know to be the key drivers will be gained through meteorological monitoring. Formal identification and quantification of bushfire risk drivers will lead to improved knowledge about the transitions between fire size classes, thus contributing to fire-fighter safety and that of the community as a whole. Collaboration with the Bureau of Meteorology, will lead to better incorporation of mountain effects into risk frameworks. This in turn will result in improved risk management and fire-fighter training materials.