

# Predicting Factors Affecting Fire Behaviour in Heathland Vegetation



**PhD Thesis - Brendan Pippen**  
 Bushfire CRC Program A1.1 *Fire Behaviour Modelling*

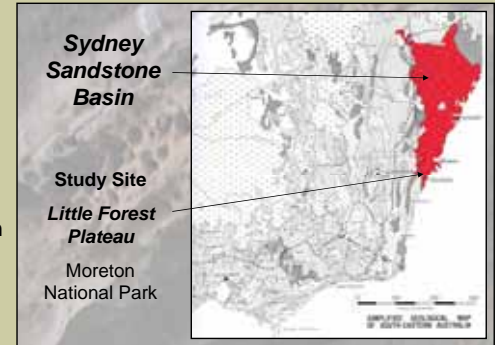
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## Fires in Heathlands

Australia has some of the most fire prone vegetation in the world. Generally regarded as the most volatile fuels are heathlands (shrublands) and sparse dry-sclerophyll eucalypt woodland with a heath understorey. In these fuel types up to 80% of fuel burnt can be live fuels.

The Sydney Sandstone Basin has vast areas of these vegetation types close to its 6,500km of urban interface. Fires in heathland and heathy woodland surrounding Sydney have caused millions of dollars of damage and claimed the lives of a number of people. Following the death of 4 National Parks and Wildlife Service staff in Kuring-Gai-Chase National Park (Jun 2000) a key recommendation of the State Coroner was that there be a burn guide formulated for the Sydney Basin.

A prescribed burning guide is formulated by measuring fires in a given vegetation type and modelling the relationship between the Rate of Spread (ROS) and Dead Fine Fuel Moisture (FFM), Live Fine Fuel Moisture (LFM), fuel characteristics, topography and wind speed at the fire.



## Project Overview

Fire behaviour in heath & heathy woodland is governed by a number of factors including:

- **Dead fine fuel moisture** (<6mm diameter)
- **Live fine fuel moisture** (<3mm diameter)
- **Sedge live:dead ratio**

In this project field and laboratory data will be collected and used to investigate, develop and test methods for predicting these factors for Sydney Sandstone Basin heathy fuels.

**3 year PhD initiated January 2004. Poster details progress at May 2005 (15 months).**



## Dead Fine Fuel Moisture (FFM)

**Lab:** Controlled Environment Chamber:

- Samples exposed to a range of RH's for adsorption and desorption at a standard temperature
- Periodically weigh samples to determine drying curves



**Field:** Compare FFM in heath with adjacent heathy woodland:

- Drying after rain & diurnal FFM
- Flat site
- 5 x 3 day sets, hourly sampling
- 2 autumn & 1 spring completed:

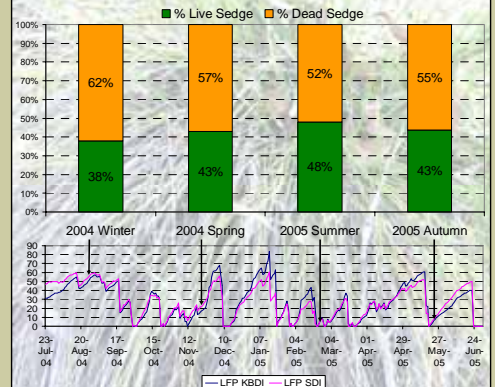


- Woodland:**
- Surface litter
  - Elevated litter
  - Duff
  - Sedge
- Heathland:**
- Sedge
  - Duff

## Sedge Live:Dead Ratio

**Field:** Measure the live:dead ratio of sedge (grass like vegetation) seasonally :

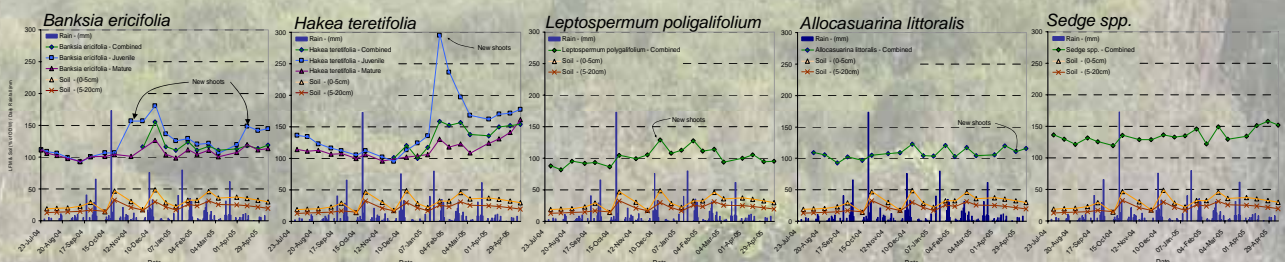
- Last week in each season
- 3 Transects, each 10 x 0.05m<sup>2</sup> quadrants
- Sort samples into live and dead, herbs & sedge then oven-dry and weigh



## Live Fine Fuel Moisture (LFFM)

**Field:** Measure LFFM of 4 common shrubs, one sedge species and soil moisture fortnightly

- Over two years
- Test against KBDI, SDI & DF(Forest)



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The University of New South Wales



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