

Project FuSE South Australia - Progress Update

Fuel dynamics and fire behaviour in mallee and heath vegetation

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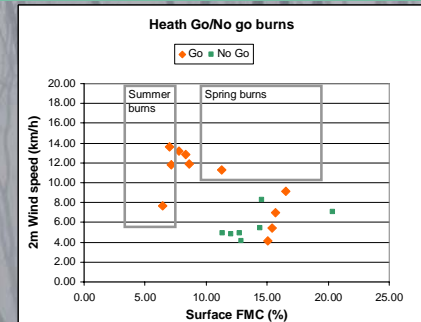
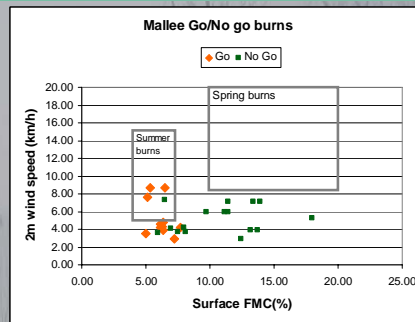


Objectives:

To develop models to support fire management decision making in South Australian mallee and heath fuel types. The project is quantifying fuel dynamics through time, fuel moisture and wind dynamics, as well as modelling fire behaviour, namely rate of spread, the conditions that will sustain fire propagation (go no-go), flame geometry, flame radiant heat fluxes and temperatures.

Progress report:

Forty-eight experimental burns have been carried-out in 7 to 48 year old mallee and heath fuels under 10-m wind speeds ranging from 6 to 25 km/h and surface fuel moisture contents between 5 and 20%. Fires were distributed per fire danger (FFDI) class as: Low=4; Moderate=32; High=8; and Very High=3. Rates of fire spread ranged from 2 to 53 m/min.



Plot of fire sustainability per fuel type as a function of 2-m wind speed and surface fuel moisture content (with grey boxes indicating desired conditions for subsequent burning phases).



Fire Behaviour summary:

Fire dynamics in the mallee fuel complex were characterised by sharp discontinuities in fire behaviour, with abrupt increases in fire behaviour for relatively small changes in the associated wind and fuel moisture conditions. For this fuel type, short distance spotting was a critical factor for sustained fire propagation under moderate burning conditions. In the lower range of burning conditions, the factors that limited fire spread appeared to be the low shrub bulk density and the overall fuel patchiness.

In-Fire video stills (above) from crown fire passing through heat flux measurement towers and T-T profiles (below) in prescribed burn.

