

Development of a model system to predict wildfire behaviour in pine plantations

M.G.Cruz

Bushfire Research, Ensis (Forest Biosecurity and Protection, CSIRO), ACT
Bushfire CRC Project A1.1 Fuel and Fire Behaviour Modelling

Objectives:

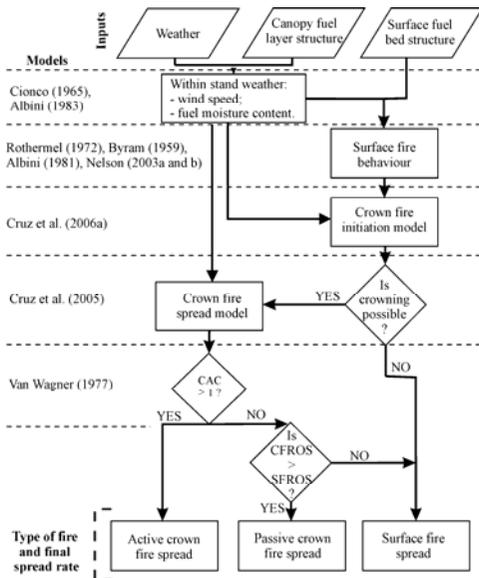
To develop a model system aimed at predicting the rate of spread and other associated fire behaviour characteristics in pine plantations. Sought system attributes were: (1) applicability over the full spectrum of fire behaviour (i.e., from gentle surface fires to fully-developed, high-intensity crown fires); (2) explicit inclusion of the effects of relevant fuel complex variables determining the start and spread of crown fires; and (3) adequate quantitative description of fire behaviour factors and processes determining crowning.



Fuel dynamics in pine plantations



Model system structure



The proposed model system -- Pine Plantation Pyrometrics (PPPY) -- aims to predict the rate of spread and type of fire over the full range of fire behaviour for a variety of pine plantation fuel complex structures.

The system encompasses a suite of fire environment and fire behaviour models that describe the relevant processes occurring within and above a spreading fire. PPPY distinguishes three modes of fire spread: surface fire, passive crown fire and active crown fire. In order to be able to do this, the system relies on three core models; a surface fire spread model, a model assessing the onset of crowning, and a model predicting the type of crown fire and its associated spread rate.

Further information:

- Cruz, M.G., Alexander M., Fernandes P. 2007. Development of a model system to predict wildfire behaviour in pine plantations. 2007 ANZIF conference.
- Cruz, M.G., Alexander M., Fernandes P. Development of a model system to predict wildfire behaviour in pine plantations. In review Australian Forestry.
- Cruz, M.G. and Fernandes P.M. Development of fuel models for fire behaviour prediction in maritime pine stands. In review IJWF.

Head fire spread rate as a function of open wind speed for 12-year-old unthinned and thinned radiata pine plantation stands.

