

# Proposal for SOAR: Suppression Optimisation in Allocation of Resources

## A Strategic fire management model for optimising suppression resources

**M. Plucinski, J. Gould**

Bushfire Research, Ensis (Forest Biosecurity and Protection, CSIRO), ACT

**R. McAlpine**

Visiting fellow, Bushfire CRC - Ensis (Feb- Mar 2007)

Ministry of Natural Resources, Aviation, Flood and Fire Management Branch, Sault Ste. Marie, Ontario, Canada



### BACKGROUND

A resource allocation model developed and operated in Ontario Canada (McAlpine and Hirsch, 1999) has been used to determine resource mixes and regulate operational policies and budgets. The model, known as LEOPARDS (level of protection analysis system), has a framework that is transferable to other jurisdictions and is currently being developed for use in other Canadian provinces. The LEOPARDS model design is similar to the SOAR model (Suppression Optimisation in Allocation of Resources) proposed by project A3. A plan for developing a resource allocation model for use in Australia is presented here.

### MODEL FRAMEWORK

The core of a resource allocation model is based around the direct attack of a single fire (illustrated below). Information about the fire and allocated suppression resources determine fire growth, intensity, and suppression rates, which are used to generate outputs such as fire size, time to containment, and suppression costs.

While the structure of this module is applicable to any fire, the input information is specific to geographic and administrative regions. An Australian case study area will need to be selected and studied to develop these rules.

### Fire Information

Historical database with information including: location, date, time, cause, weather; fuel, terrain; & size

*A database spanning many years will allow simulations to cover the full range of scenarios experienced, including quiet and busy seasons*

### Suppression Resources



#### Dispatch Rules

Resources to be dispatched under different conditions in each defined management zone

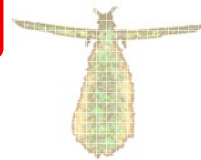
#### Travel Times

Time taken for different resource types to travel to fires

#### Fireline Production

Rates of perimeter containment for resource types and mixes in a range of fuel, weather and topographical conditions

*These sections will be sub-projects producing discreet and relevant results*



**Model**  
Fire intensity & growth  
Resource suppression



**Results**  
e.g. fire size,  
time to containment,  
suppression effectiveness,  
cost efficiency



### APPLICATIONS

- Identifying the optimal (cost and effectiveness) mix and number of fire fighting resources for normal and severe fire seasons
- Examining the effects of a range of fire management policies and budgets
- Comparing the overall effectiveness and efficiency of different suppression resources
- Predicting suppression requirements under changed climatic conditions



**REFERENCE:** McAlpine, R. S., Hirsch, K. G. (1999) An overview of Leopards: the level of protection analysis system. *The Forestry Chronicle*; 75(4):615-621.