NATIONAL BUSHFIRE BEHAVIOUR KNOWLEDGE System

a suite of fire behaviour tools to support fire management decision making

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Bushfire CRC Project A1.1 Fuel and fire behaviour modeling

Concept Overview:

Fire behaviour prediction combines scientific principles to describe fire physical characteristics, determined by topography, fuels and weather, with user experience to support sound fire management decision making. At the core of this process are state of the art mathematical models that integrate the determinant factors to describe the relevant processes driving fire phenomena. The National Bushfire Behaviour Knowledge System comprises a suite of fire behaviour tools that allow land and fire managers to assess bushfire hazard in the urban interface, devise landscape level fuel management strategies, plan and implement prescribed burning programs and forecast fire behaviour to support wildfire suppression strategies based on the best fire science available.

Components:

The NBBK system is comprised by several sub-systems that aim at answer an array of questions:
- **Fuel Hazard Assessment System**
- **Fire danger rating System**
- **Fire Behaviour Prediction System**
- **Bushfire Forecasting System**

The system will be available in different formats, from circular slide rules, charts and tables for field use to scaled up simulation systems fully integrated with weather prediction models aimed at forecast fire behaviour and growth over complex topography, through variable fuel and evolving weather conditions.
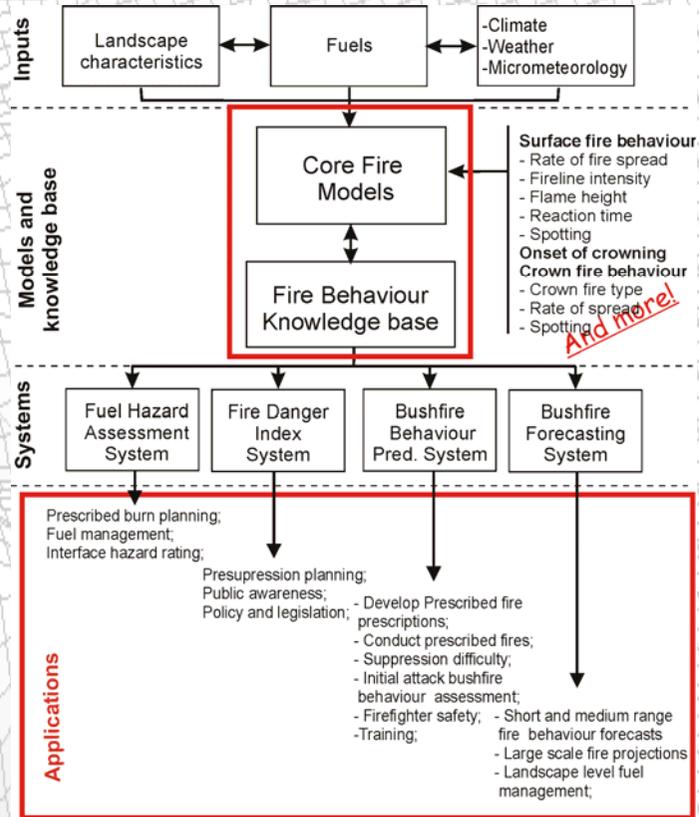
Outcomes:

A conceptual framework for bushfire behaviour knowledge system that describes models, databases, information flow and products is needed to facilitate communication and collaboration among researchers and end users. The desired accomplishments of the proposed National Bushfire Behaviour Knowledge Systems (NBBK System) is to provide fire managers with better operating models to implement prescribed burning programs, suppression resources, risk and biodiversity management programs.

Inputs: Landscape characteristics ↔ Fuels ↔ -Climate -Weather -Micrometeorology

Models and knowledge base: Core Fire Models ↔ Fire Behaviour Knowledge base

Surface fire behaviour
- Rate of fire spread
- Fireline intensity
- Flame height
- Reaction time
- Spotting

Onset of crowning
Crown fire behaviour
- Crown fire type
- Rate of spread
- Spotting

And more!

Systems: Fuel Hazard Assessment System | Fire Danger Index System | Bushfire Behaviour Pred. System | Bushfire Forecasting System

Applications:
Prescribed burn planning;
Fuel management;
Interface hazard rating;

Presuppression planning;
Public awareness;
Policy and legislation;

- Develop Prescribed fire prescriptions;
- Conduct prescribed fires;
- Suppression difficulty;
- Initial attack bushfire behaviour assessment;
- Firefighter safety;
- Training;

- Short and medium range fire behaviour forecasts
- Large scale fire projections
- Landscape level fuel management;

Eucalypt forest

Exotic pine plantation

Sample of fuels complexes in NBBK system

Mallee - heath

Shrubland and moorland

Grassland