bushfire CRC

BCRC Research Project - F.I.R.E. D.S.T.
Fire Impact and Risk Evaluation Decision Support Tool

Bob Cechet

Email: bob.cechet@ga.gov.au | phone: 02 6249 9246 | Geoscience Australia, Cnr Jerrabomberra Ave and Hindmarsh Dr, Canberra, ACT

Outcomes from recent extreme fires have demonstrated a need for a tool to assess future bushfire impacts on regional and peri-urban communities. Such a tool will enable fire and land management authorities to develop appropriate fire risk treatment options at local, regional and national levels. The tool will characterise vegetation, extreme fire weather, firespread, smoke production and dispersion, and estimate the consequences of extreme fires in three case study scenarios. The case studies will be directed at extreme fires.

Research Questions

To answer the fundamental question 'What are the impacts and risks of extreme fire events on regional populations and infrastructure in Australia?' research questions include:

(1) What is the sensitivity of extreme fire behaviour to atmospheric conditions and complex terrain?
(2) What definitions of fuels are appropriate?
(3) What are the requirements of asset databases?
(4) What models are required to describe potential house loss (neighbourhood scale)?
(5) What are the risks to population health and mortality from extreme fire smoke?
(6) What are the potential impacts to movement of emergency services and local residents from reduced visibility?
(7) How will the tool improve strategic fire management through 'what if' scenarios?

Methodology

The methodology is outlined in Figure 1. A software platform will integrate the components and deliver 'what if' scenarios, based around the further development of the Phoenix RapidFire fire-spread model (Figure 2). The project will also explore the model sensitivities and their effects on outputs. End user collaborators will play a major role in choosing and preparing the scenarios. At the end of three years a research tool will be available to agencies for beta-testing, training and evaluation. However, the tool will still be without valuable capabilities such as a capability for probabilistic risk assessment, which are dependent on the outcomes of PhD investigations.

Participant Roles

Geoscience Australia: Impact and risk assessment framework and 'impact zone' infrastructure mapping and loss tool, led by Bob Cechet and Trevor Jones.

University of Melbourne: Phoenix RapidFire fire-spread model, led by Kevin Tolhurst.

Bureau of Meteorology: high-resolution numerical weather prediction, led by Jeff Kepert, Kevin Tory and Graham Mills.

CSIRO: neighbourhood scale vulnerability model and smoke emission model, led by Justin Leonard and Mick Meyer.
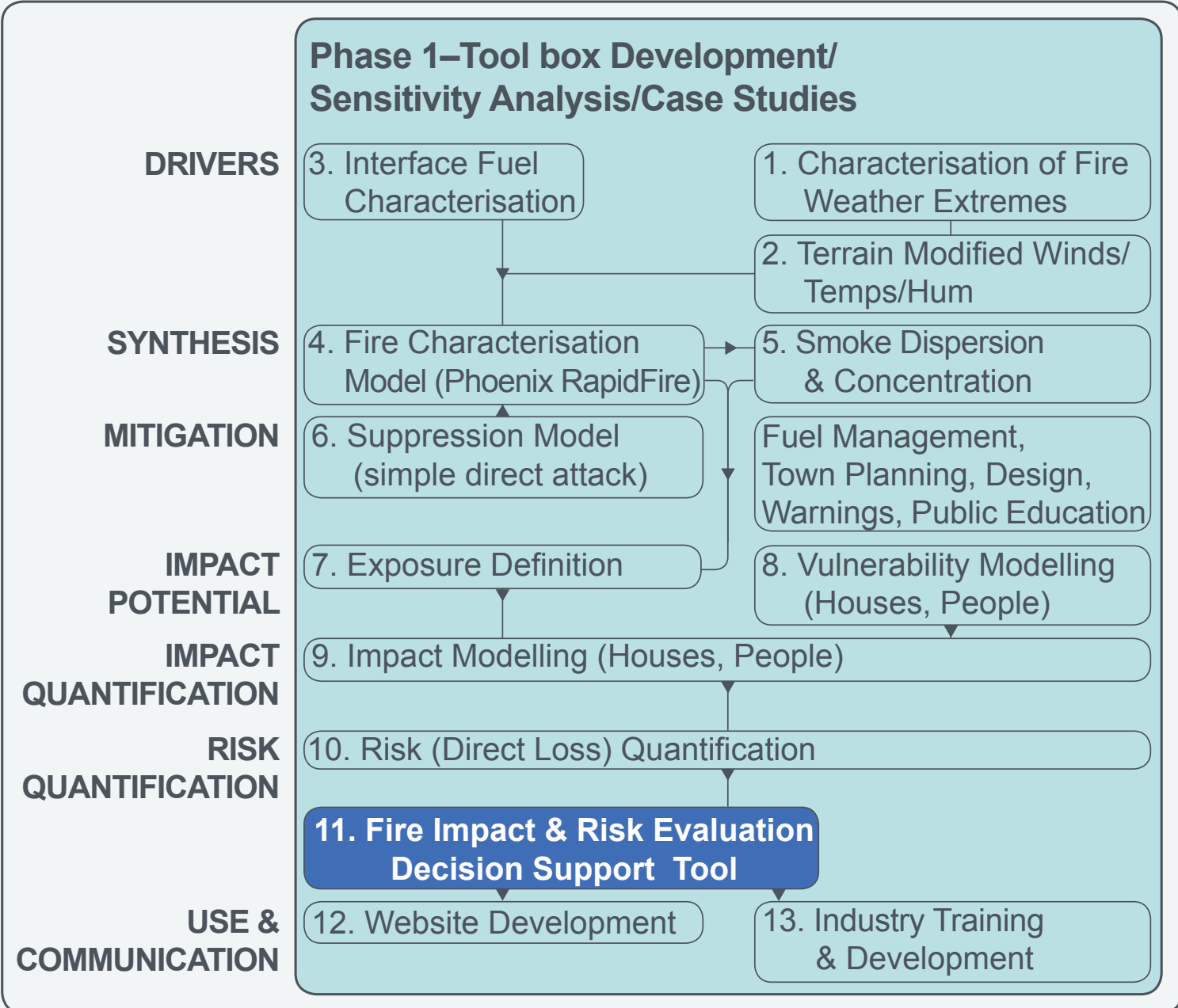

Figure 1: Project components for FIRE DST. Activities will be undertaken by project researchers with CRC and in-kind support.
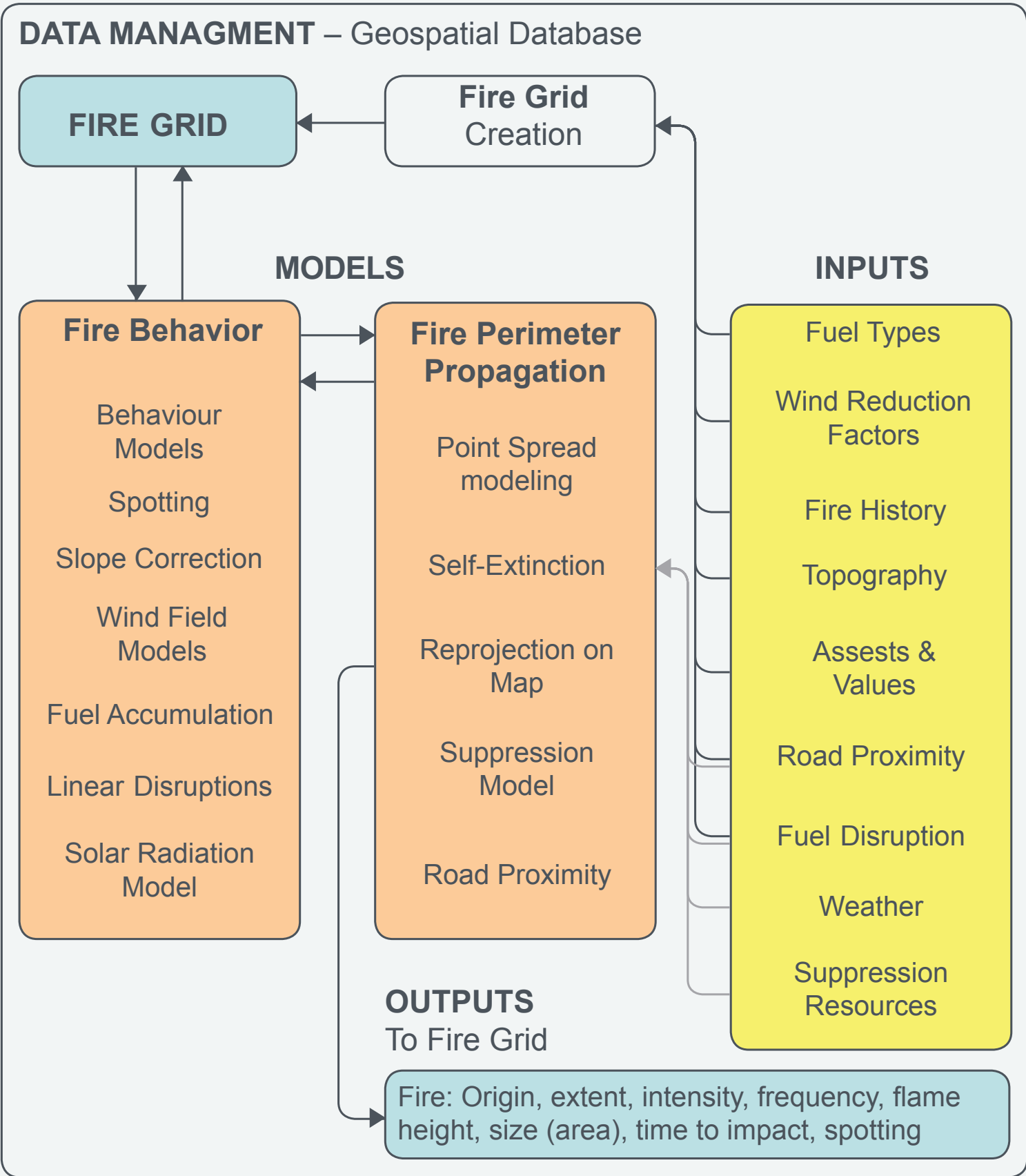

Figure 2: Schematic diagram of Phoenix Rapidfire with inputs, outputs and data storage.

BCRC Theme	BCRC Project	Links	
Understanding Risk	Community Expectations	FIRE DST will assist an evaluation of residual risks from possible changes to land use, building codes and individual responsibility	Economics and Scenario Modelling
	F.I.R.E. D.S.T.		
	Fuels and Risk Planning in the Interface	This northern project links with FIRE DST in methods to characterise fuel and smoke emission models	
Communicating Risk	Effective Communication	FIRE DST will provide graphic scenario descriptions to assist researchers who are testing models for effective communication and human behaviour under stress	
	Human Behaviour under Stress		
Managing the Threat	Incident Co-ordination	FIRE DST scenarios will test models for incident coordination and fire suppression in 'Managing the threat'	
	Fire in the Landscape		
	Suppression, Surge Capacity and OH&S		