Improving the Representation of Bushfire Risk

Research Fact Sheet

Forests, Fire and Regions Group invests in the *Integrated Forest Ecosystem Research Agreement* (IFER) with the University of Melbourne (UM), which delivers critical science projects to support policy and operational practices. The core research themes of IFER include biodiversity, carbon, hazards, socio-economic, vulnerability and water. *Improving the representation of bushfire risk* is the core IFER hazards project. The project commenced in July 2016 and the current project cycle is due to be completed by June 2019.

The Project

The potential impact of bushfires on both human and ecological systems can be significant. The *Improving the representation of bushfire risk* project will improve the Department of Environment, Land, Water and Planning's (DELWP) capacity to manage risk across forested landscapes in an 'all hazards' framework, through the development of methods to better understand and predict bushfires, supporting management planning and assisting with decision making to protect a wide range of values, including:

- improved methods to identify parts of the landscape most at risk from bushfire using fire simulation modelling
- the development of methods to measure the potential impacts of fire on values such as people, infrastructure, carbon, water and biodiversity
- systems to allow a range of management strategies to evaluate and compare a range of different values.

In addition, the project will focus on building better foundations for predicting bushfires, including:

- investigating processes by which the landscape transitions from being too wet to burn to flammable
- understanding how vegetation acts as fuel and how burning different vegetation types may affect subsequent fires
- investigating uncertainty in fire predictions and how this can be represented in operational and strategic fire prediction.

Project Outputs

The project will provide DELWP with:

- methods to measure the impacts of fire on a range of environmental and social values
- a framework for comparing the outcomes of various management strategies on a wide range of values
- improved methods to forecast risk – in particular, methods that allow DELWP to map a change in risks through time
- improved understanding of relationships relating to vegetation, fuel and flammability to better understand how fire (both planned and unplanned) may alter these relationships
- methods to measure and communicate uncertainty in forecasts or management strategies.

Figure 1: Modelled outcome of a prescribed burn in complex terrain

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Policy and Operational Implications

The project will assist DELWP in the risk-based approach to managing bushfires, including minimising the impacts of bushfire on a wide range of assets, and managing public land in a way that minimises potential impacts on communities whilst maintaining the resilience of natural ecosystems.

In addition, the '*Improving the representation of bushfire risk'* project will support the Victorian Government's Safer Together program by:

- developing new tools for evaluating landscape hazards
- improving the scientific foundation beneath the tools already in use.

This will be achieved by focusing on a research-to-practice approach and by working closely with DELWP staff to meet their needs.

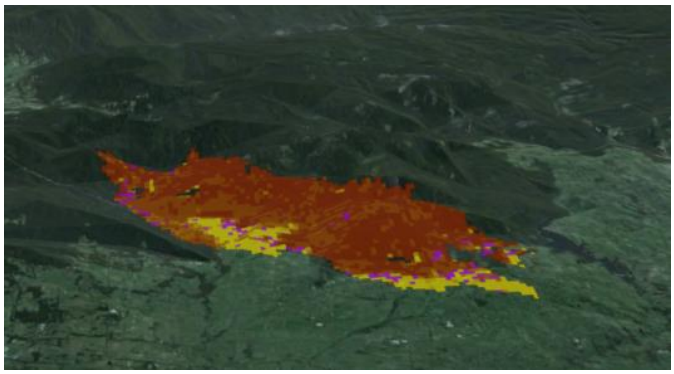

Figure 2: Simulation of a bushfire using the bushfire prediction model PHOENIX RapidFire

The Research Team

The project is being delivered by the Bushfire Behaviour and Management team within the School of Ecosystem and Forest Sciences at University of Melbourne. The project is led by Associate Professor Trent Penman, assisted by Dr Thomas Duff and Mr Dan Abebei.

Image 1: University of Melbourne researchers taking measurements at a prescribed burn
Photo: Brett Cirulis

Project Status (December 2018)

Work has commenced on developing a new programming framework that will allow long term fire regimes to be simulated. This will allow the comparison of management strategies, taking into consideration the potential for changing climatic conditions. This work has been a collaboration with researchers from other IFER core themes, to incorporate modelling of fire impacts on carbon storage, hydrology and biodiversity.

A review into how various values in the landscape are currently incorporated into bushfire risk modelling has been completed. This is the starting point in developing systems that consider these values in future fire models.

A review of methods used to map vegetation as fuel throughout the world has been undertaken to help understand alternative ways to consider vegetation fuels in ecological terms to better understand how the vegetation responds after fire.

An important component of understanding the effectiveness of prescribed burns is being able to predict their outcome. The research team have developed a prototype model that predicts the patchiness of prescribed burns.

Work has progressed on methods to better understand the role of moisture in landscape flammability. This work will be developed into a landscape model that will improve predictions made with the fire model Phoenix RapidFire.

Image 2: Fire in the Central Highlands of Victoria
Photo: Brett Cirulis