Risk Frontiers'

FireAUS
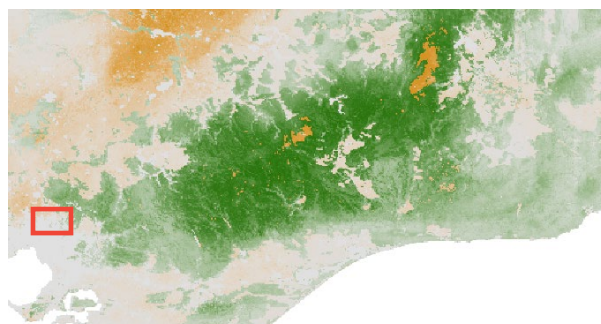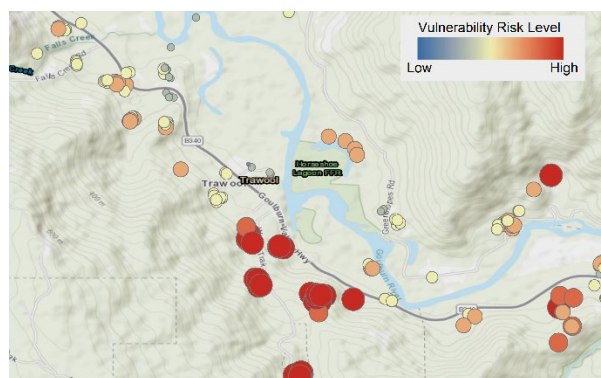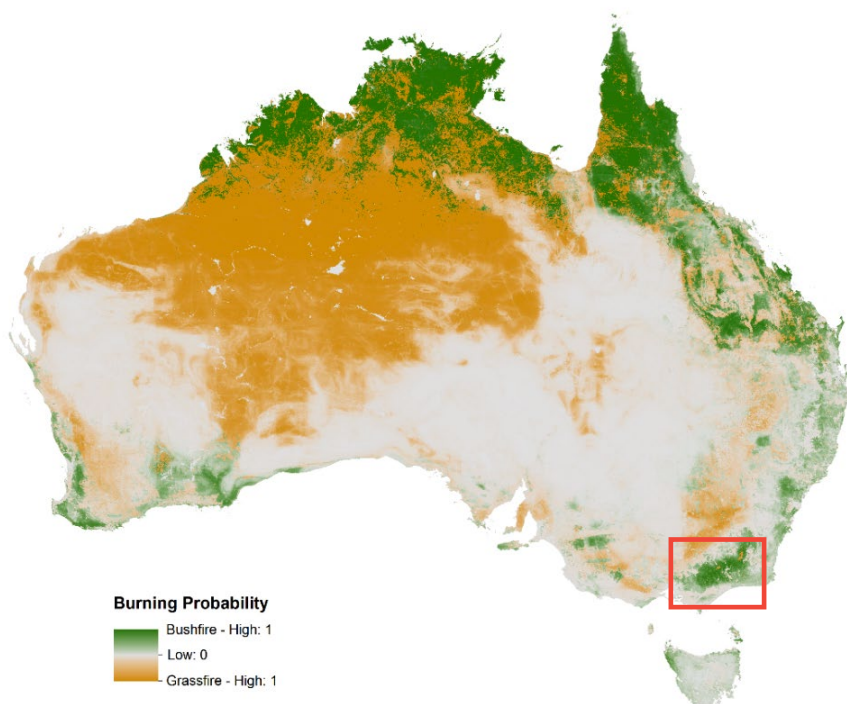## Detailed Loss Model

Intelligently Designed. Location and Portfolio Level Intelligence.

For 25 years, Risk Frontiers has been leading the development of natural catastrophe models for the Asia-Pacific region. The latest release of FireAUS, covering bushfire and now grassfire risk across Australia, represents another leap in the quantification of risk at the location and portfolio level. Building on our recognised machine learning capability, peer reviewed research and on the ground post-event surveys, FireAUS has national coverage at the individual address level.

At the Cutting Edge

FireAUS takes advantage of the intersection of two cutting edge technologies: MODIS satellite data and machine learning.

With its sweeping 2,330-km-wide viewing field, MODIS sees every point on our world every 1-2 days across multiple spectral bands. Consequently, MODIS tracks a wider array of the earth's vital climate systems. The MODIS burnt area products are validated against our database of 115 years fire damage data, ensuring reliable machine learning datasets.

Burning Probability
- Bushfire - High: 1
- Low: 0
- Grassfire - High: 1

Vulnerability Risk Level
Low — High

Model Overview

Hazard Resolution	0.01°
Exposure Resolution	Location Address Level
Event Catalogue	50,000 years of stochastic burnt area maps
Fire Ignition and Propagation Parameters	Location, 9 climate variables, 3 population-based variables, 5 topographic variables, 3 environmental variables, railway density, forest fire danger index (FFDI)
Line of Business	Residential / Commercial / Industrial
Business Interruption	Commercial / Industrial
Coverage	All Properties on mainland Australia and Tasmania. 100% GNAF / Geoscape / Geovision

A New Bushfire Algorithm

Fire propagation in FireAUS is simulated using a spatio-temporal modelling approach called cellular automata (CA). The stochastic CA model uses local evolution rules that describe the transitions between areas identified by satellite data as burned and their unburned neighbours for each time step of the model. Rules are defined as a function of burning and directional spread probabilities derived from historical training data processed and modelled through machine learning algorithms. This data-driven approach is able to capture the complex process of fire spread dynamics accurately and is well suited for probabilistic modelling.

Bespoke Climate Analyses

Risk Frontiers is implementing a catastrophe loss modelling solution to enable business and community leaders to better understand their exposure to future climate scenarios. In FireAUS, the ignition model explicitly relies on weather variables that are also available through global and regional climate models. As such, the same ignition model can be used to estimate the changes in fire ignition frequency for a given future emission scenario. We presently offer a future view of fire risk in Australia for 2030s, 2050s and 2090s, under a low, middle and high-emissions scenarios.
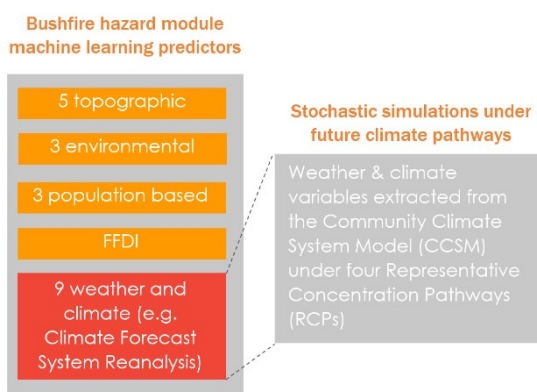

Figure 1: Example of physical climate risk evaluation framework applied to property level bushfire risk
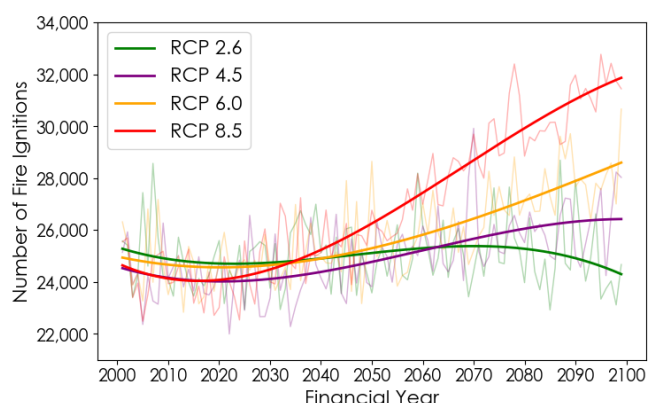

Figure 2: Changes in FireAUS fire ignitions for each modelled RCP.

Contacts:

Dr Ryan Crompton – ryan.crompton@riskfrontiers.com
Dr Mingzhu Wang – mingzhu.wang@riskfrontiers.com
Dr Tahiry Rabehaja – tahiry.rabehaja@riskfrontiers.com
info@riskfrontiers.com

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www.riskfrontiers.com