


# Fuels and Flammability

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A photograph of a dense forest with tall, thin trees and a person standing in the foreground for scale. The trees are very tall and thin, with light-colored bark. The forest floor is covered in green ferns and other vegetation. A person is standing in the lower center of the frame, looking up at the trees. The text "Being Wrong" is overlaid on the image in a handwritten style.

"Being Wrong"

# The Forest Flammability Model

## Forest Flammability

*Eucalyptus regnans* (Community C 83yrs)

Scorch height 179.9 m  
 Intensity **203,023** kW/m Stage **Three** Crown runs 40 m  
 Severity Extreme (5) Crown fire **Active** Velocity 28.8 km/h

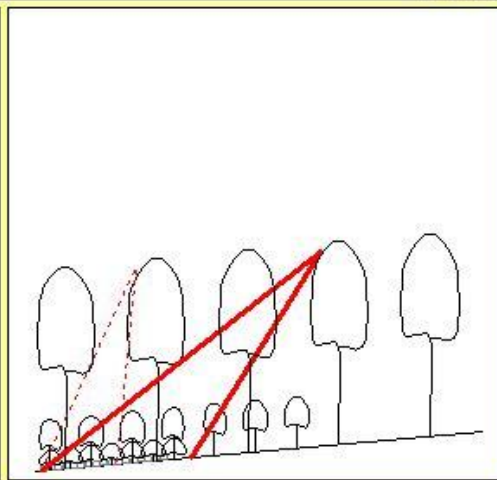
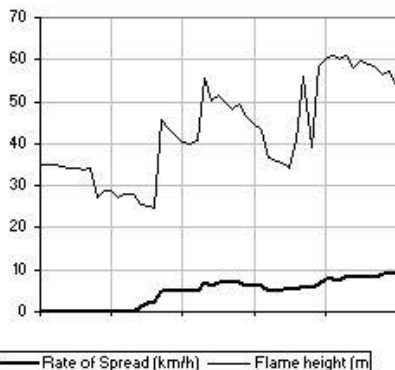
### Conditions

Air Temp	41 C	Last rain	0 mm	Altitude (m)	
Mean		Days since rain	4		680
Relative Humidity	10 %	Soil moisture	%	Soil texture	
Wind	63 km/h	KBDI	100		Clay Loam
Cloud cover	0 /8	Fireline length	100 m		
Date (e.g. 19/03/2009)	7-Feb	Slope	5 degrees		
Time (e.g. 14:00)	15:00				

### Fire behaviour

Stratum	Length (m)	Angle (deg)	Height (m)	ROS (km/h)	% Burnt	% Scorched
Surface	0.39	84	0.38	0.11	100%	
Near Surface	0.90	85	0.88	0.09	100%	100%
Elevated	8.0	82	9.20	0.00	100%	100%
Midstorey	16.1	35	12.91	4.59	100%	100%
Canopy	17.6	47	42.87	4.59	93%	100%
<b>MAXIMUMS</b>	<b>45.5</b>	<b>49.9</b>	<b>42.9</b>	<b>6.29</b>		
<b>MEANS</b>	<b>44.9</b>	<b>49.4</b>	<b>42.9</b>	<i>Crown pulsing</i>	<b>6.29</b> km/h	

### Fire Behaviour



### ANALYSES

Clear

Calculate

Wind

Slope

Scenario

Season

Smooth

Monte Carlo

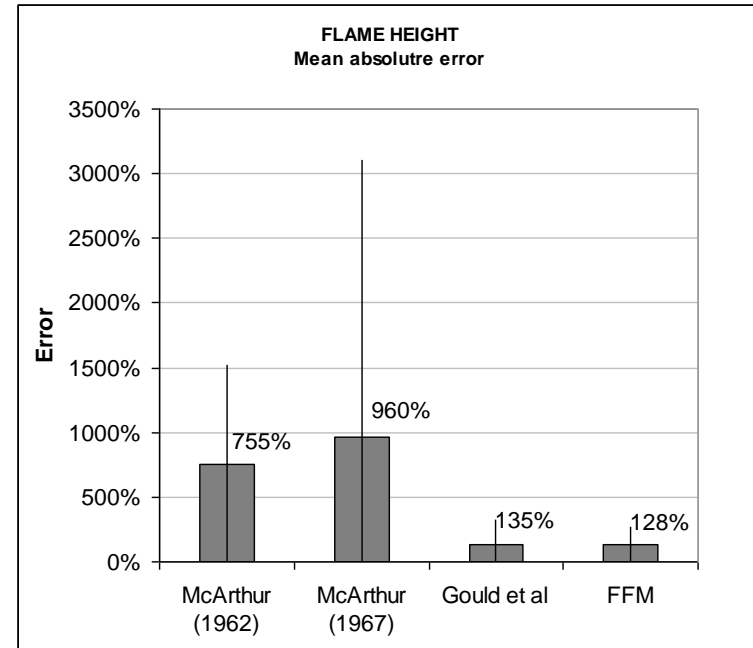
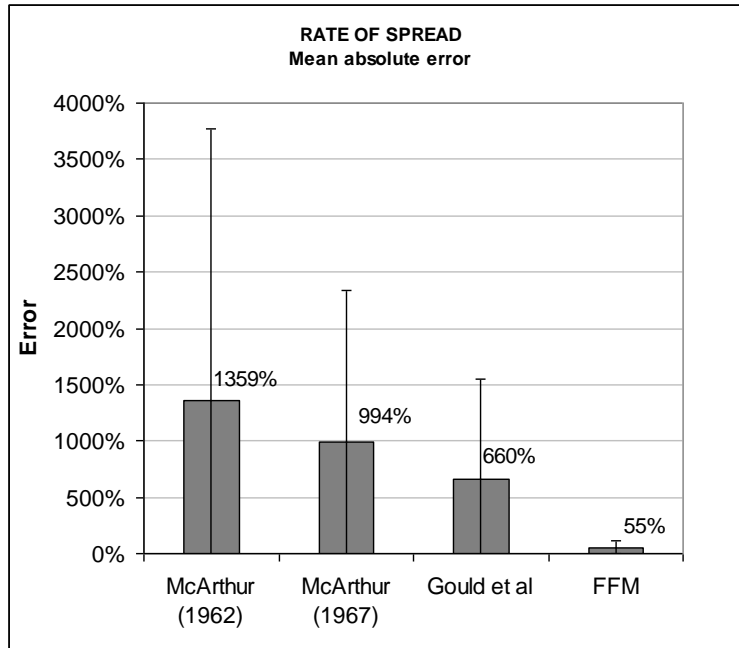
1000

6:41 AM

### Forest Structure

	Plant spacing (m)	Count	Moisture
Near Surface	1.70	T	T
	<i>Folystichum proliferum</i>	1	239%
Understorey	0	T	T
	<i>Lepidosperma elatus</i>	1	100%
Midstorey	9.3	T	
	<i>Bedfordia arborescens</i>	465	250%
Canopy			
	<i>Dilexia argophylla</i>	525	70%
Zoom to forest			
	<i>Acacia dealbata</i>	12.4	135%
	<i>Fomadensis aspera</i>	210.4	100%
	<i>Eucalyptus regnans</i>	47	102%
			102%

# Model Performance

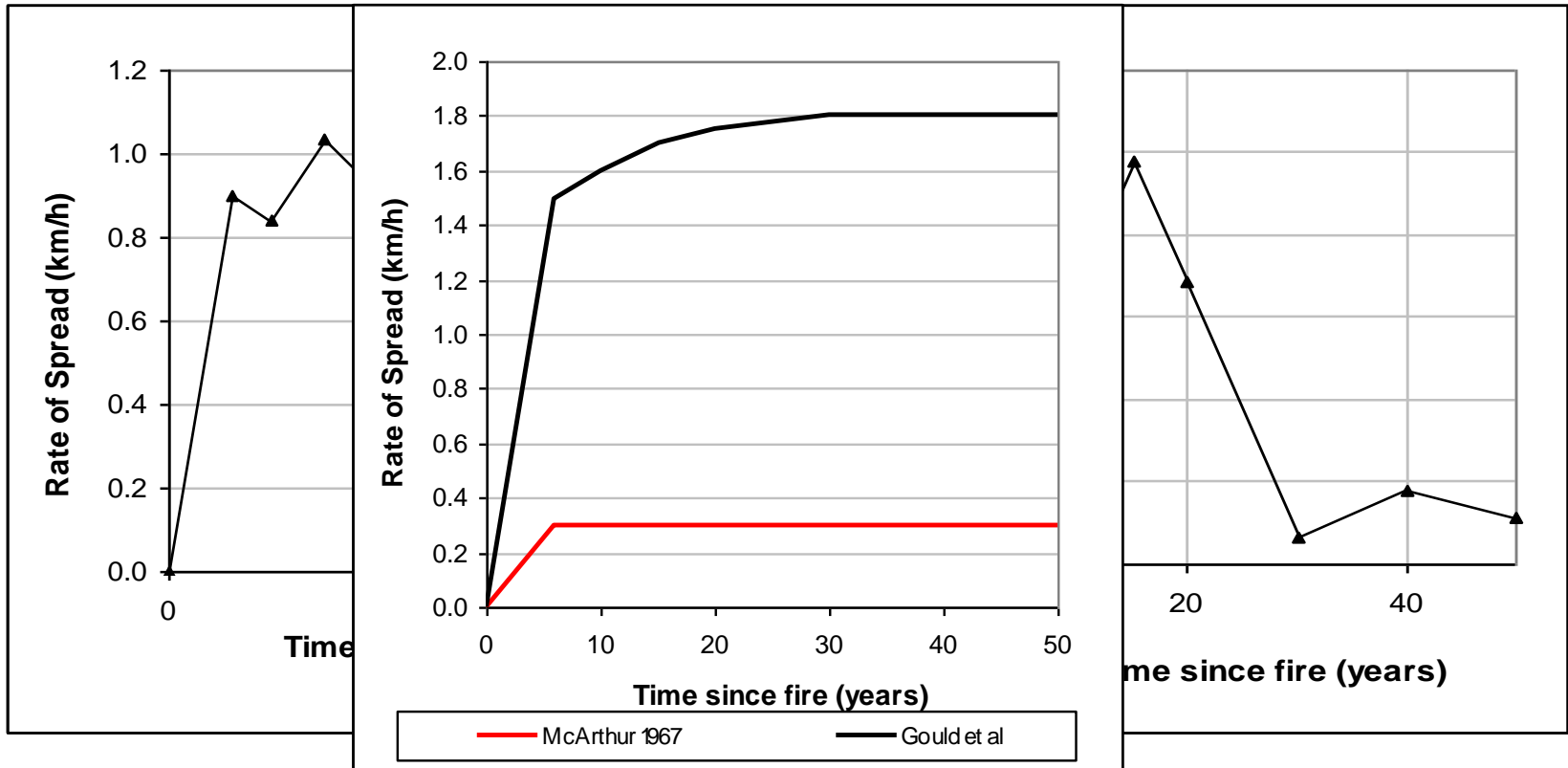


**RATE OF SPREAD**

**FLAME HEIGHT**

MODEL	Mean error	<i>t</i>	Significance	Mean error	<i>t</i>	Significance
McArthur (1962)	1359%	1.51	90.0%	755%	1.16	N.S.
McArthur (1967)	994%	2.96	99.5%	960%	2.64	99.0%
Gould <i>et al</i> (2007)	660%	1.95	95.0%	135%	0.44	N.S.
FFM	55%			128%		

# Targeting fire management outcomes



“We would never burn bush country [above 5000 feet] as it would make it worse and bring suckers up.”

Roy Hedger, snow lease grazier from Farm Ridge



# Implementation

## THE HURDLES

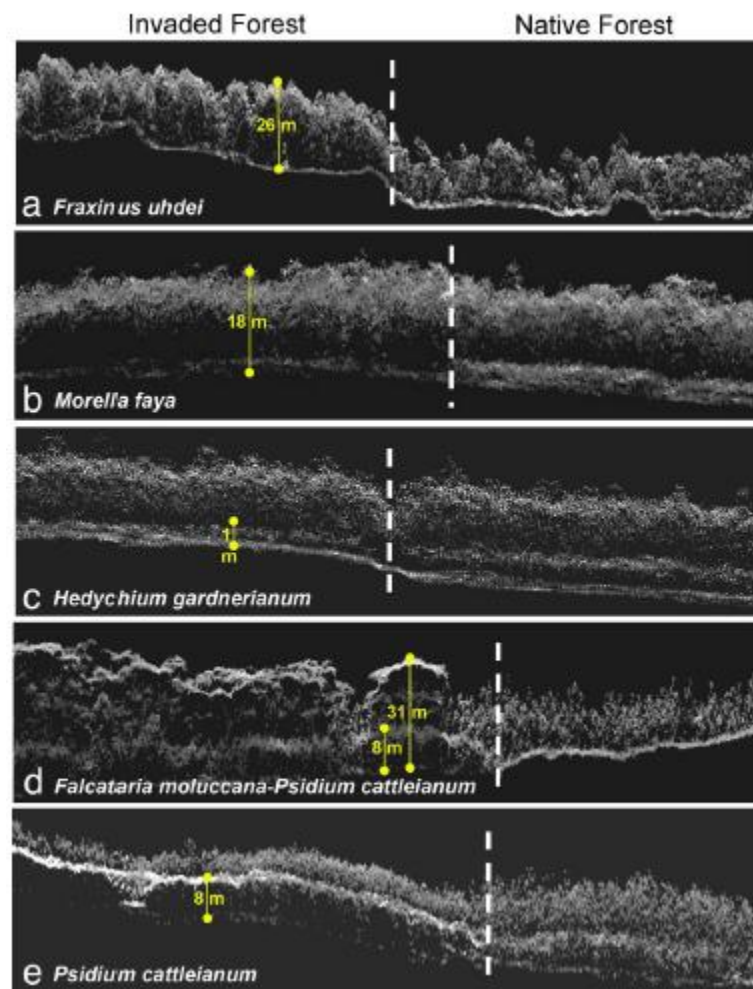
- 15 measurements required per species
- Half a day per site

## THE SOLUTIONS

- Initially research focus
- Database of species measurements
- Model growth/moisture
- LiDAR / MODIS

## THE PRODUCT

- All that will be required will be veg map – database combo with either moisture/succession models or interpreted LiDAR/MODIS imagery



220,000 Ha surveyed from the air via linked LiDAR/hyperspectral imaging. Source: Asner *et al* 2008