

Investment in prevention and suppression: Who can reduce the risk of house loss?



Trent Penman and Ann Nicholson

Fire risk management

- Fire management is a contentious issue
 - High costs
 - Emotional



Victorian Nillumbik Council
Under Radical Greens
Have constructed
a tinderbox of such
magnitude they should be
prosecuted and jailed...
See how they have
prepared for bushfires
just around the corner

sosnews.org

Social costs of wildfire

- Divorce rates increase
- Incidence of suicide increases
- Disruption to business
- Breakdown in communities



Economic costs of wildfire

- Canberra Fires in 2003 ~ \$350 million

- 4 lives lost
- 414 urban houses destroyed
- 87 rural dwellings destroyed
- 416 km fencing

Source: Ganewatta 2008



- Black Saturday fires Victoria 2009 - > \$1 billion

- 173 lives lost
- Over 2000 houses destroyed
- 25 600 tonnes stored grain and 211 000 stored hay
- Up to 10 000 km of fences

Source: Leonard et al. 2009



Management expenditure



<http://pasadenaindependent.com>





Despite management of the landscape, fires will continue to impact on people and property

Management problem

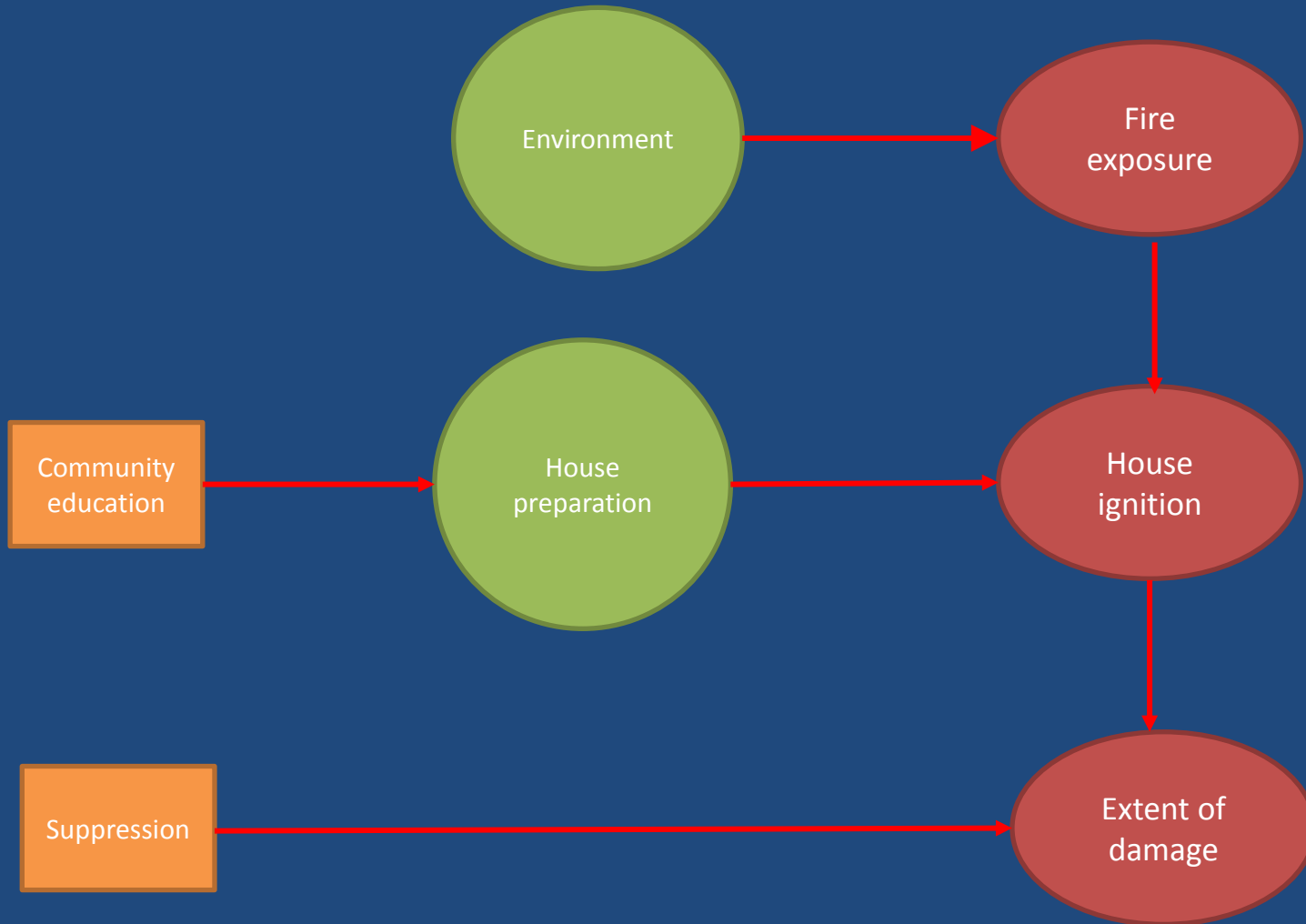
- Management of the interface is vital to reducing risk to people and property
- Which is the best approach sword or the shield?



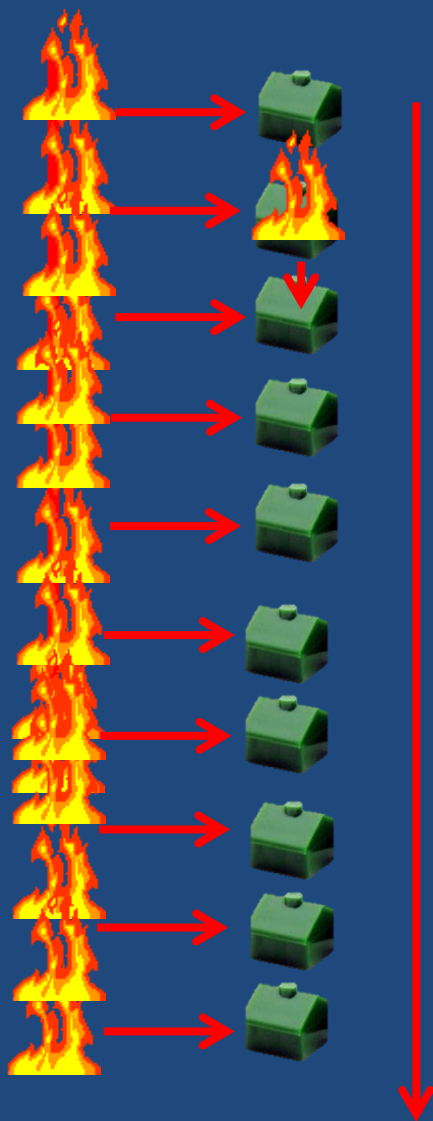
The model

- Determine optimal approaches for minimising the extent of house loss at the interface
 - Urban planning 
 - Community education
 - Suppression levels 
- Objective – Minimise the number of houses lost at the interface during a fire

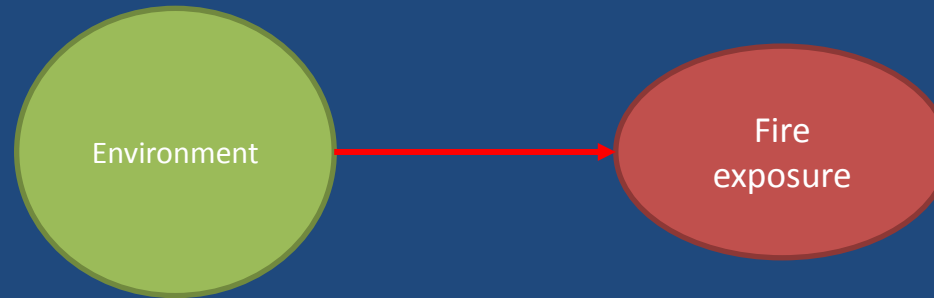
Conceptual model



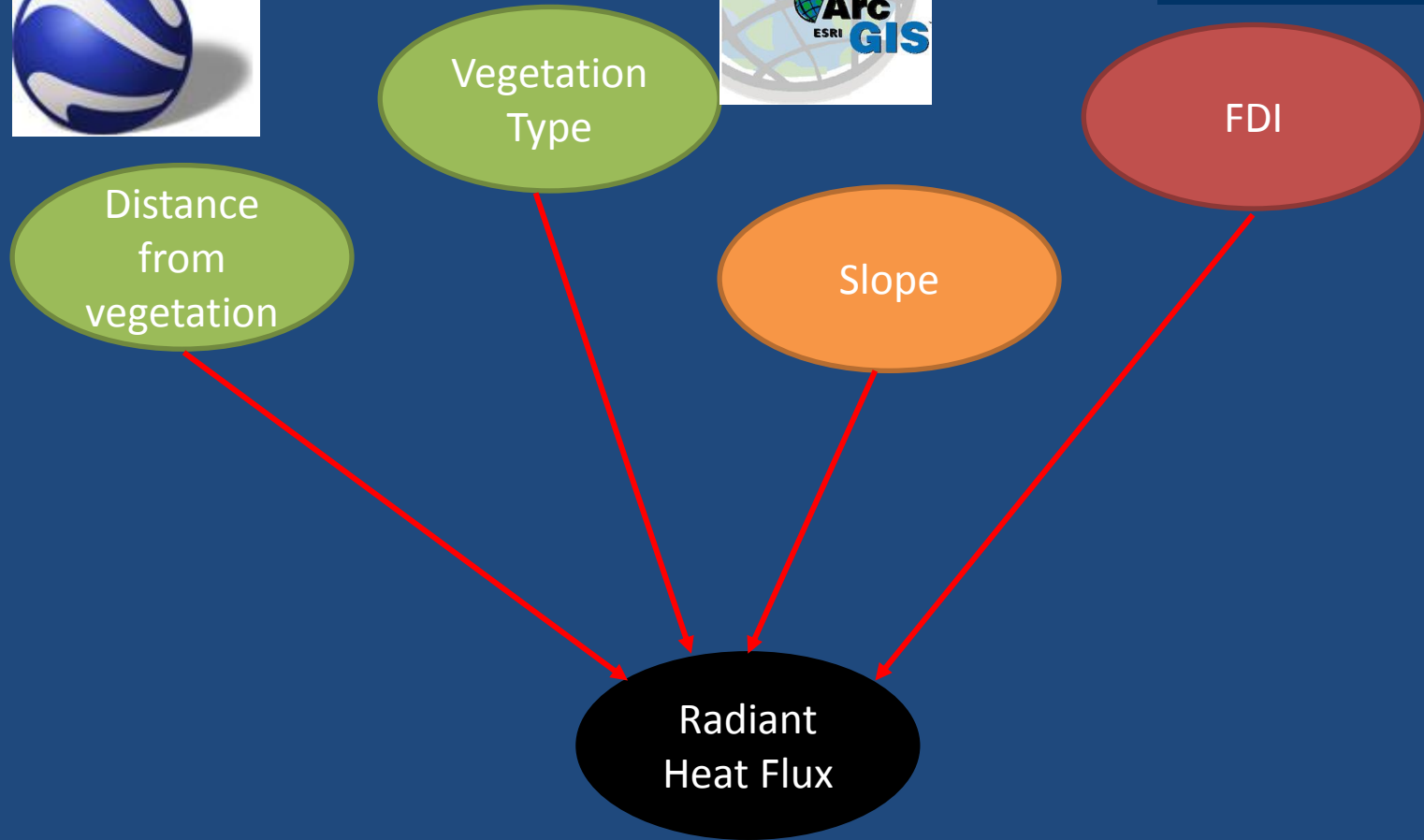
Model setup



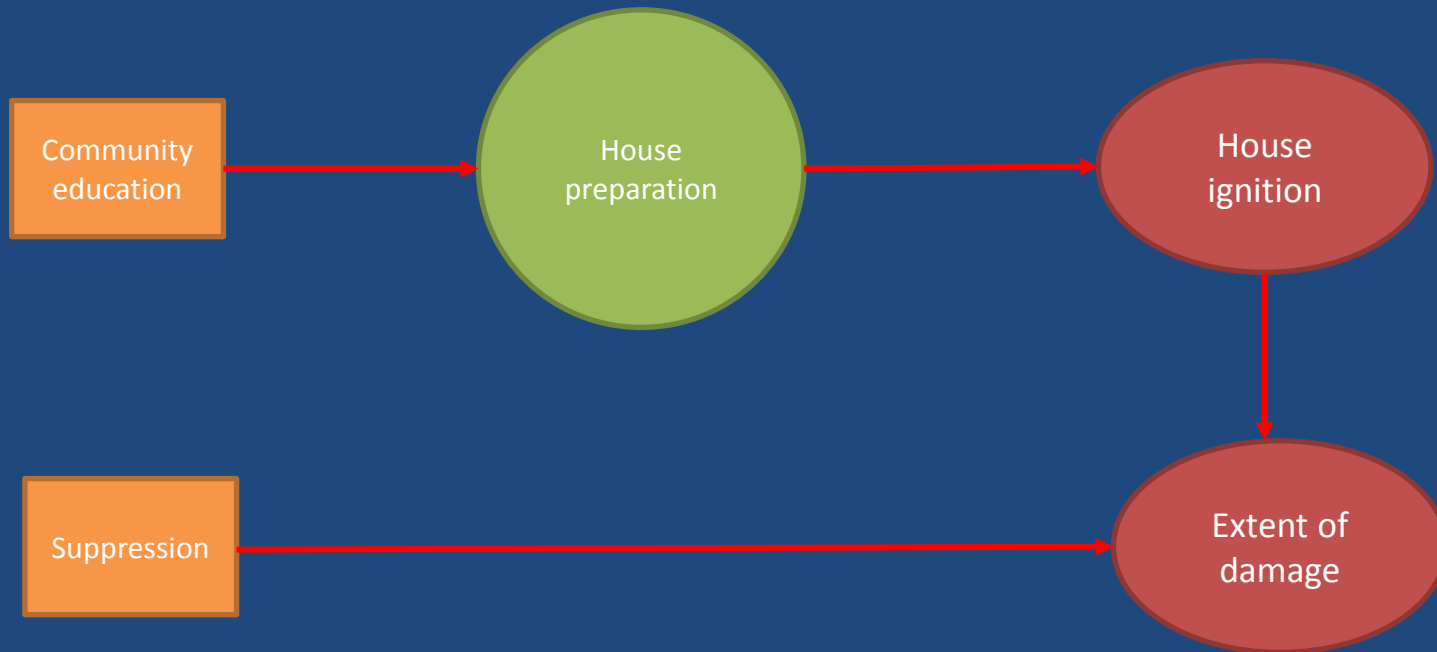
Data



- AS3959-2009
- Inputs: Distance to vegetation, slope, FDI, vegetation type
- Outputs: Radiant heat flux



Remaining data

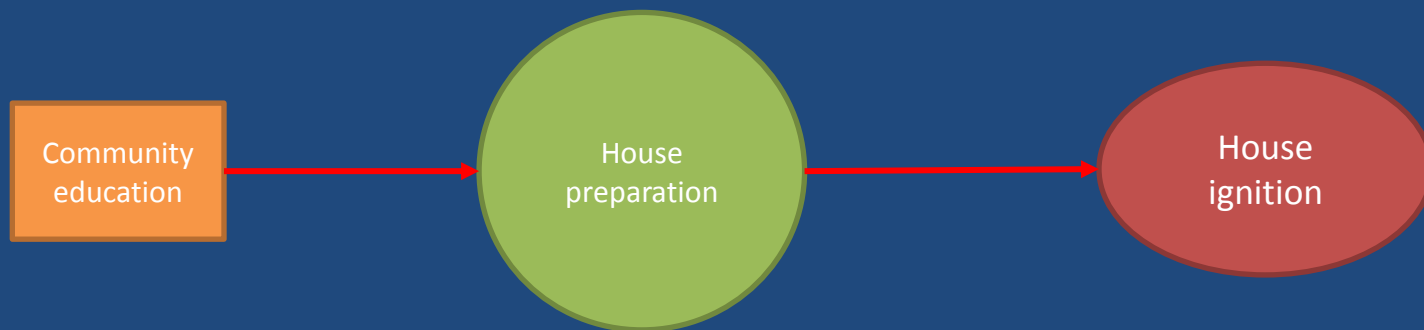


Expert elicitation

- NSW RFS Community Engagement Conference
- Four workshops @ 40 minutes each, 2 themes
- Four facilitators
- 80 participants

Themes - Education

- Community education programs
 - Letterbox drops, Street walks, Television advertising
- Community education effect on house preparedness
- House preparedness effect on the probability of ignition



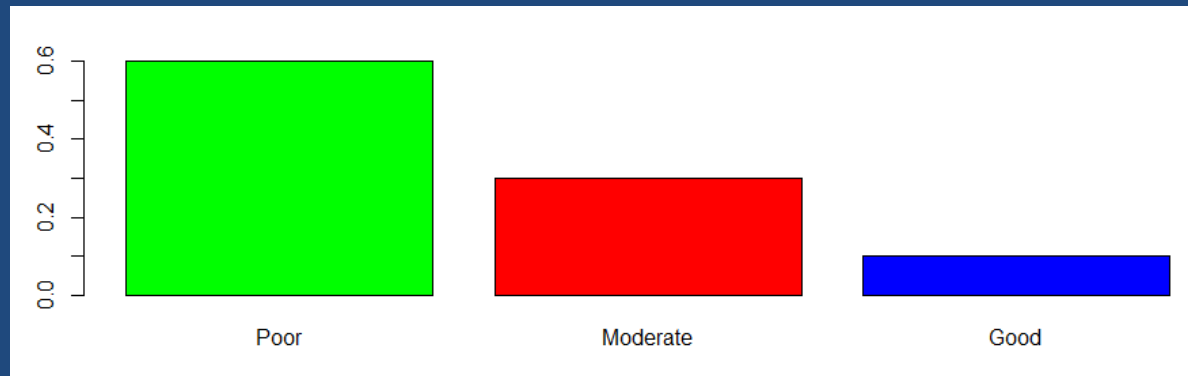
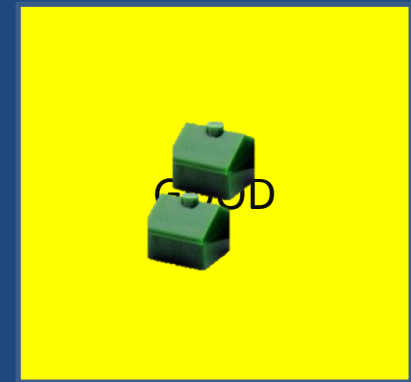
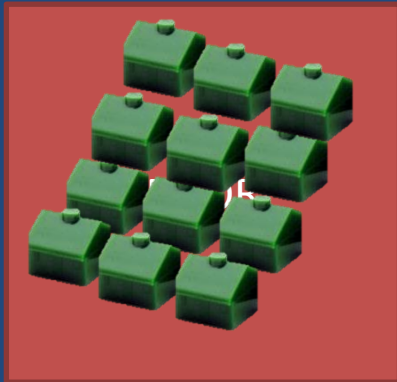
Themes - suppression

- Suppression resources
 - CFU, Ground crews, Ground crews with aerial support
- Resource capability of suppression crews
 - How many houses at once?
- Resource success
 - Probability of success



Approach

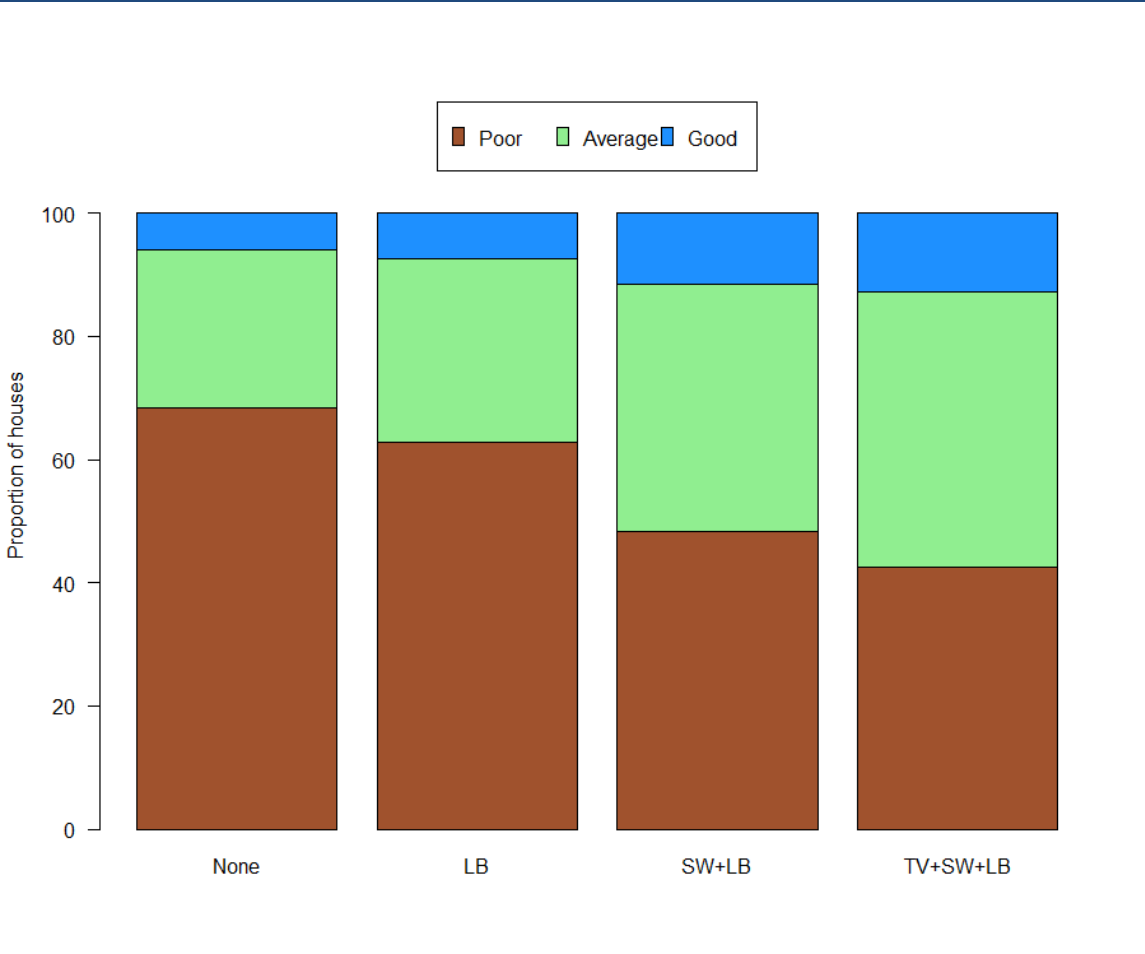
If the NSW RFS invested in [INSERT ADVERTISING] what would proportion of houses would be in each of the three states?



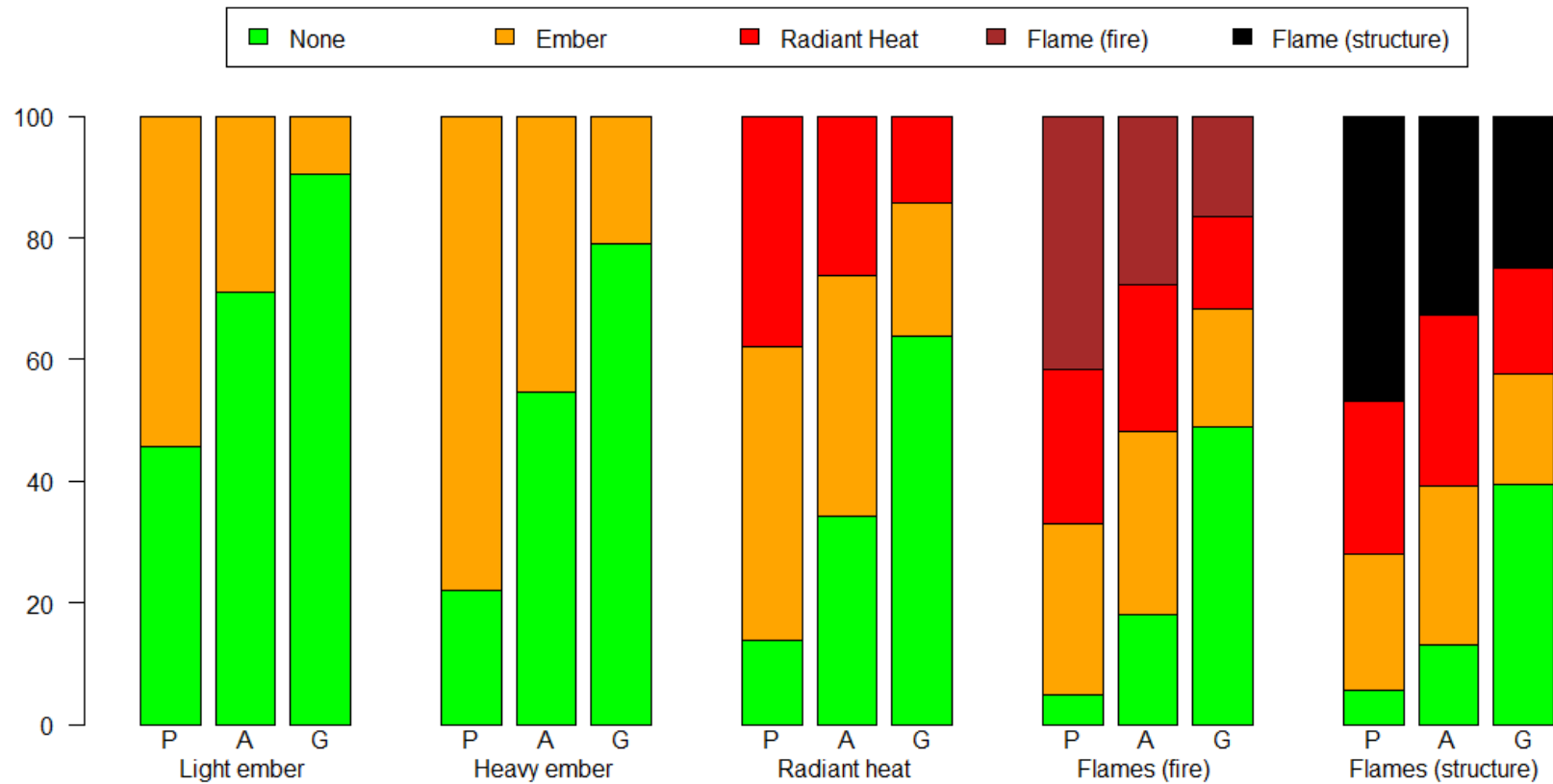
Rationale

- 20 houses = 5 % increments
- 1 house = 0.125% of the days value
- Anchoring an issue, but a time saver
- Changes were the important issue.

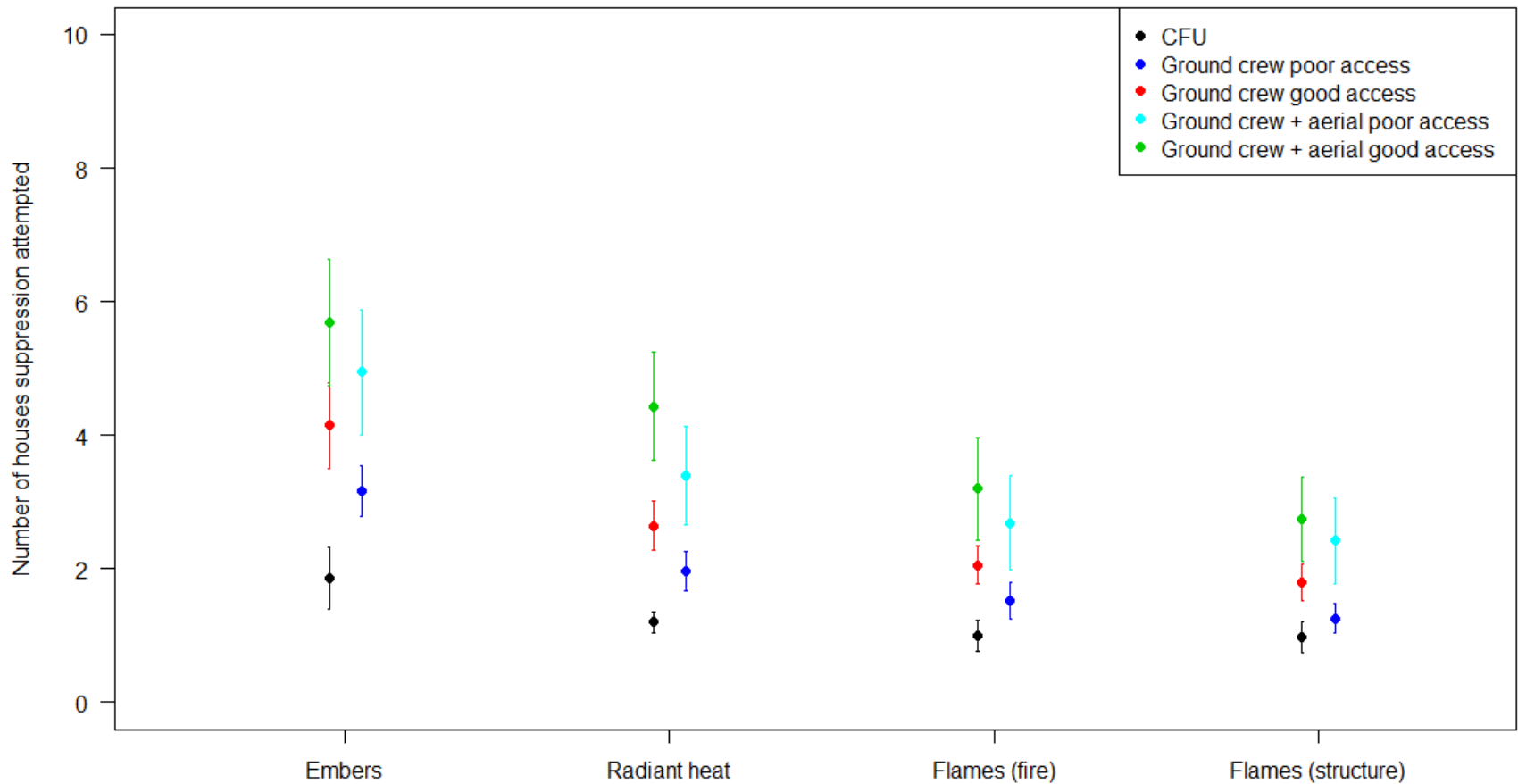
Elicitation summary - Education



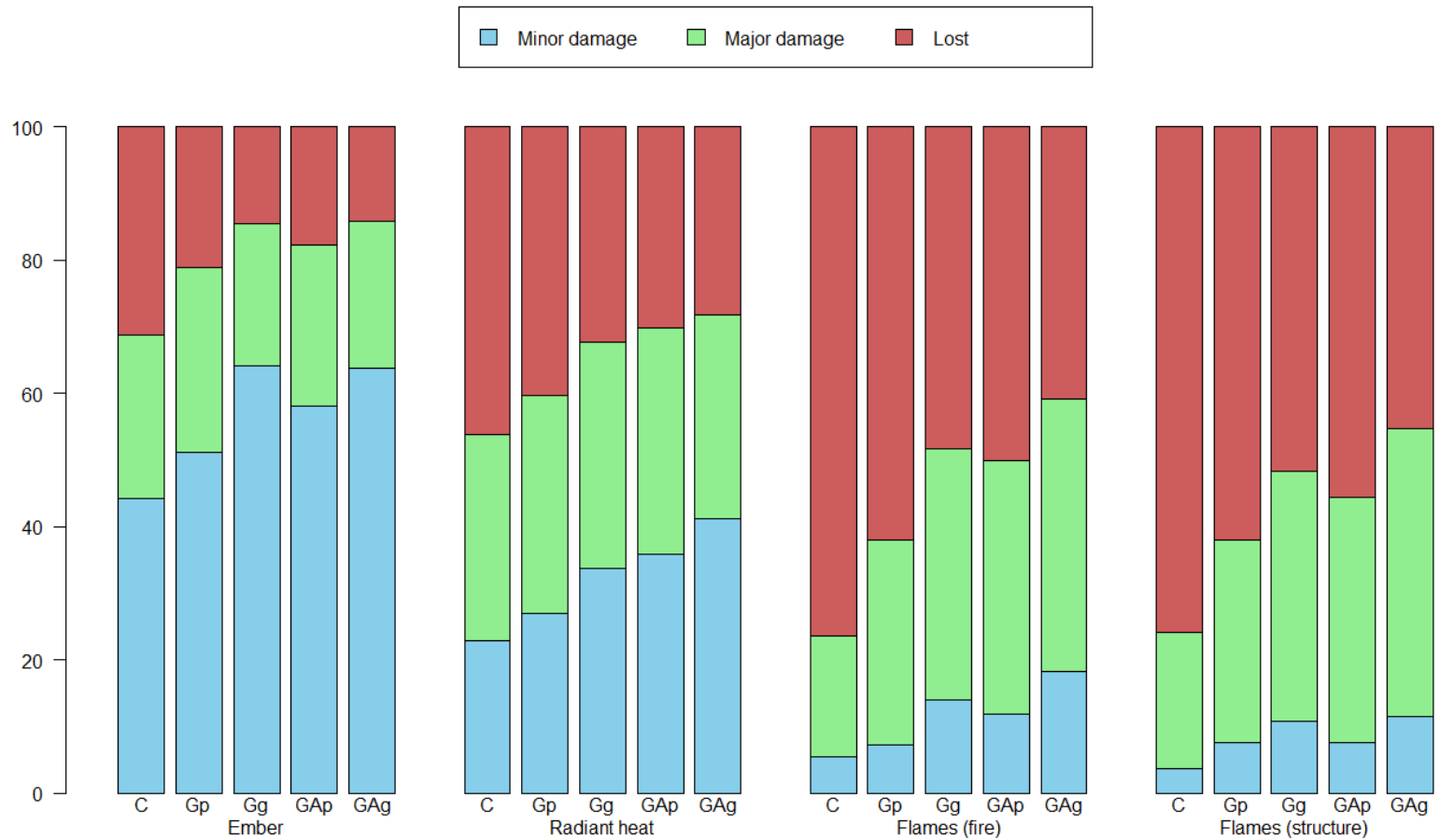
Elicitation - ignition



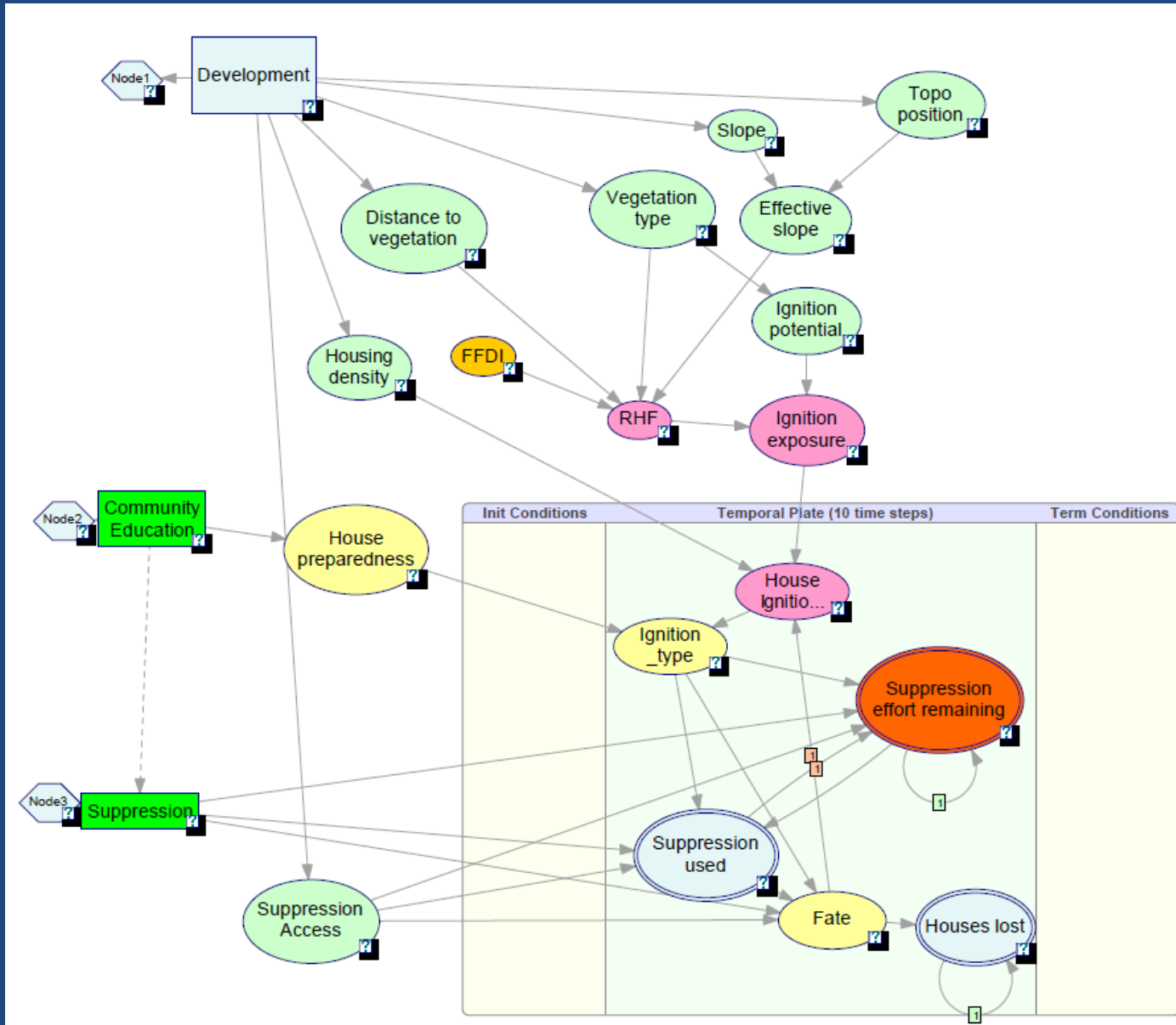
Elicitation – suppression resources



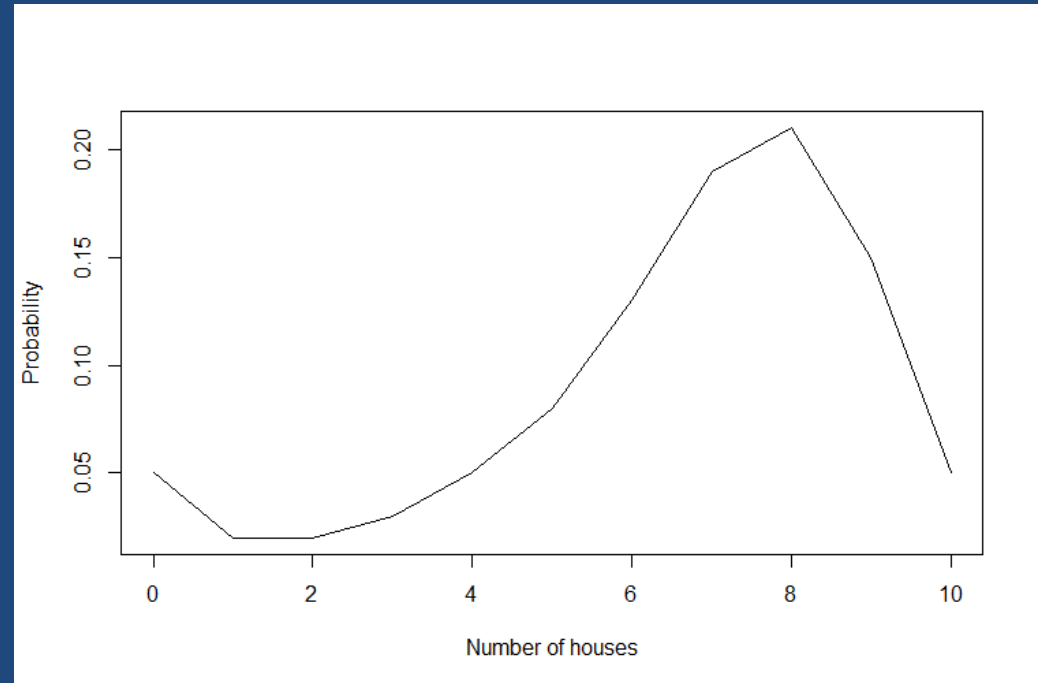
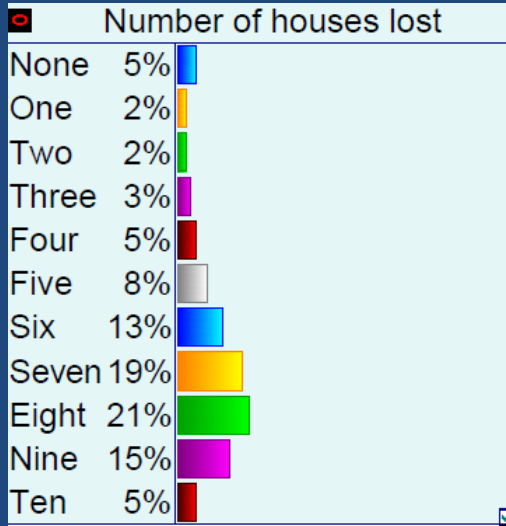
Elicitation – suppression effectiveness



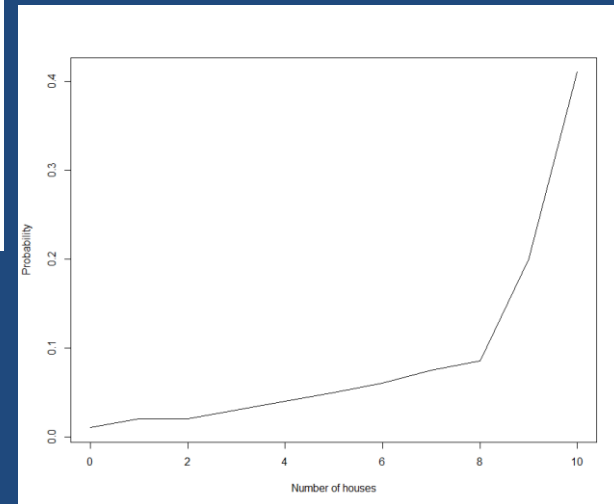
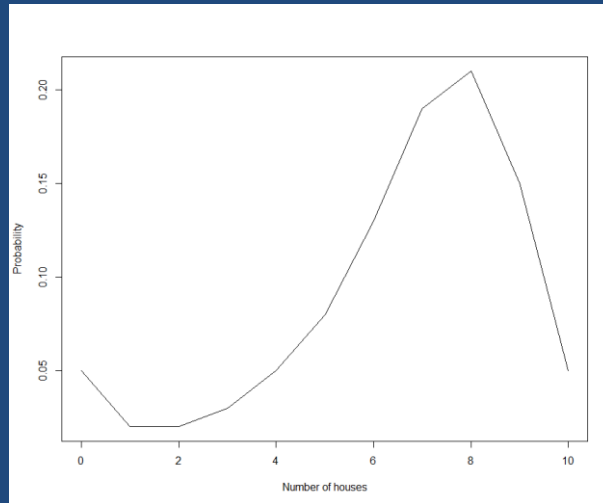
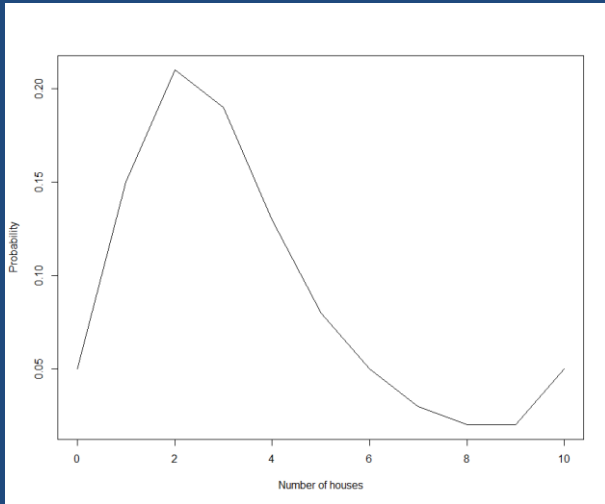
Model



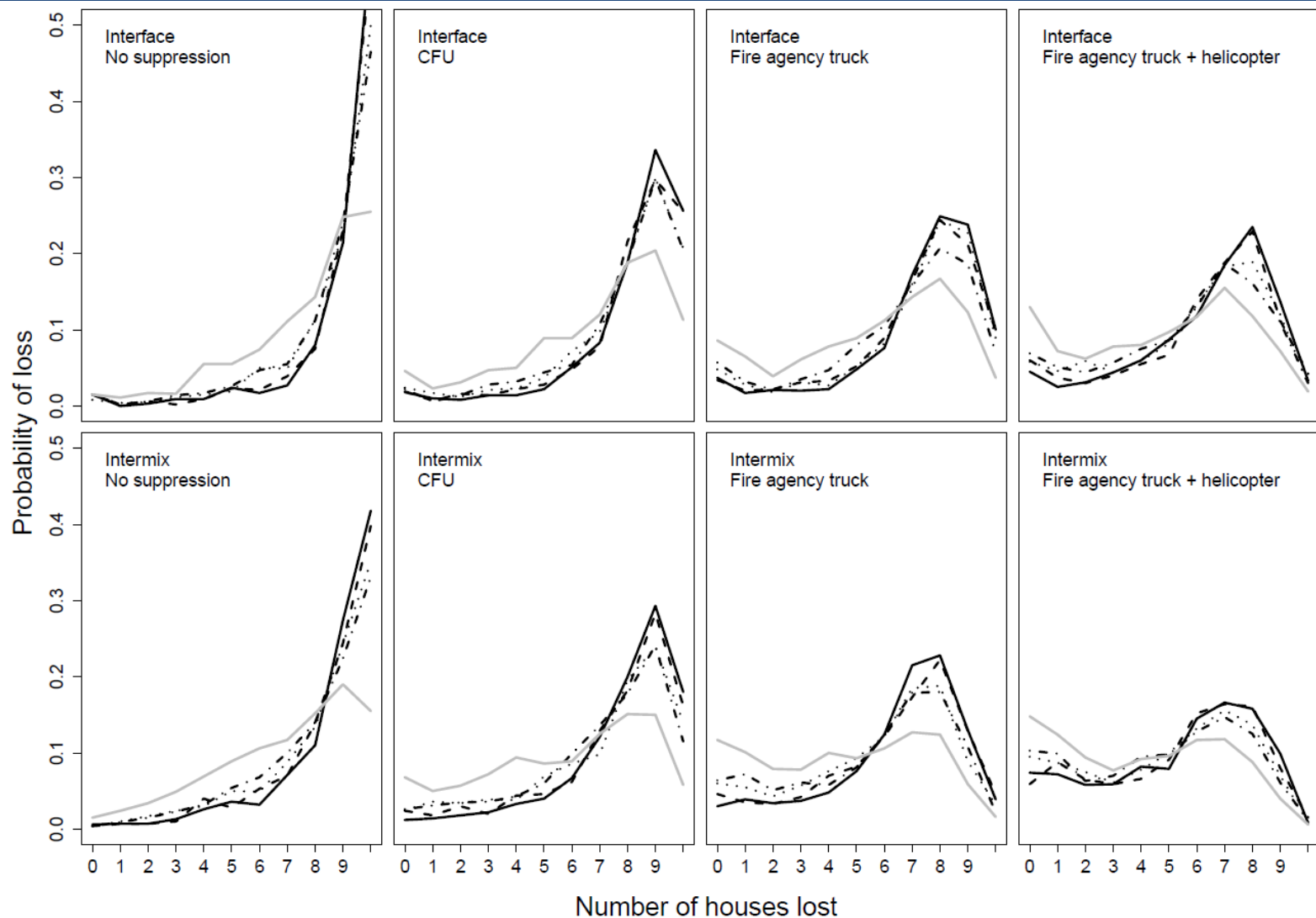
Distributions



The good, the bad and the ugly



Current development patterns



Gibbons et al. 2012

OPEN ACCESS Freely available online



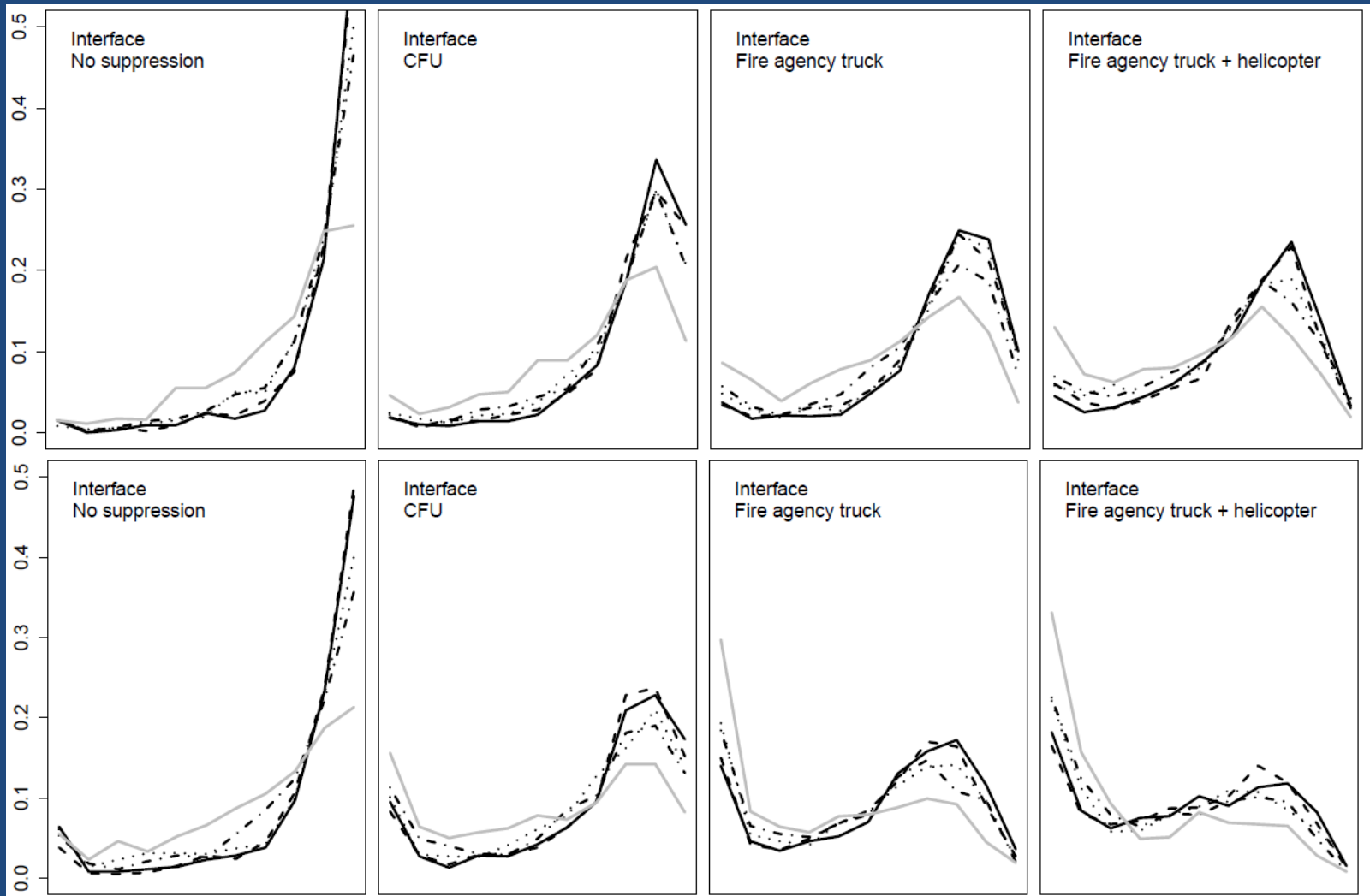
Land Management Practices Associated with House Loss in Wildfires

Philip Gibbons^{1*}, Linda van Bommel¹, A. Malcolm Gill¹, Geoffrey J. Cary¹, Don A. Driscoll¹, Ross A. Bradstock², Emma Knight³, Max A. Moritz⁴, Scott L. Stephens⁴, David B. Lindenmayer¹

¹The Fenner School of Environment and Society, The Australian National University, Canberra, Australian Capital Territory, Australia, ²Centre for Environmental Risk Management of Bushfires, University of Wollongong, Wollongong, New South Wales, Australia, ³Centre for Mathematics and its Applications, The Australian National University, Canberra, Australian Capital Territory, Australia, ⁴Ecosystem Sciences Division, Department of Environmental Science, Policy and Management, University of California, Berkeley, California, United States of America

- Analysed Black Saturday house loss
- Key result: Reduced probability of house loss with 40m clearing between house and vegetation

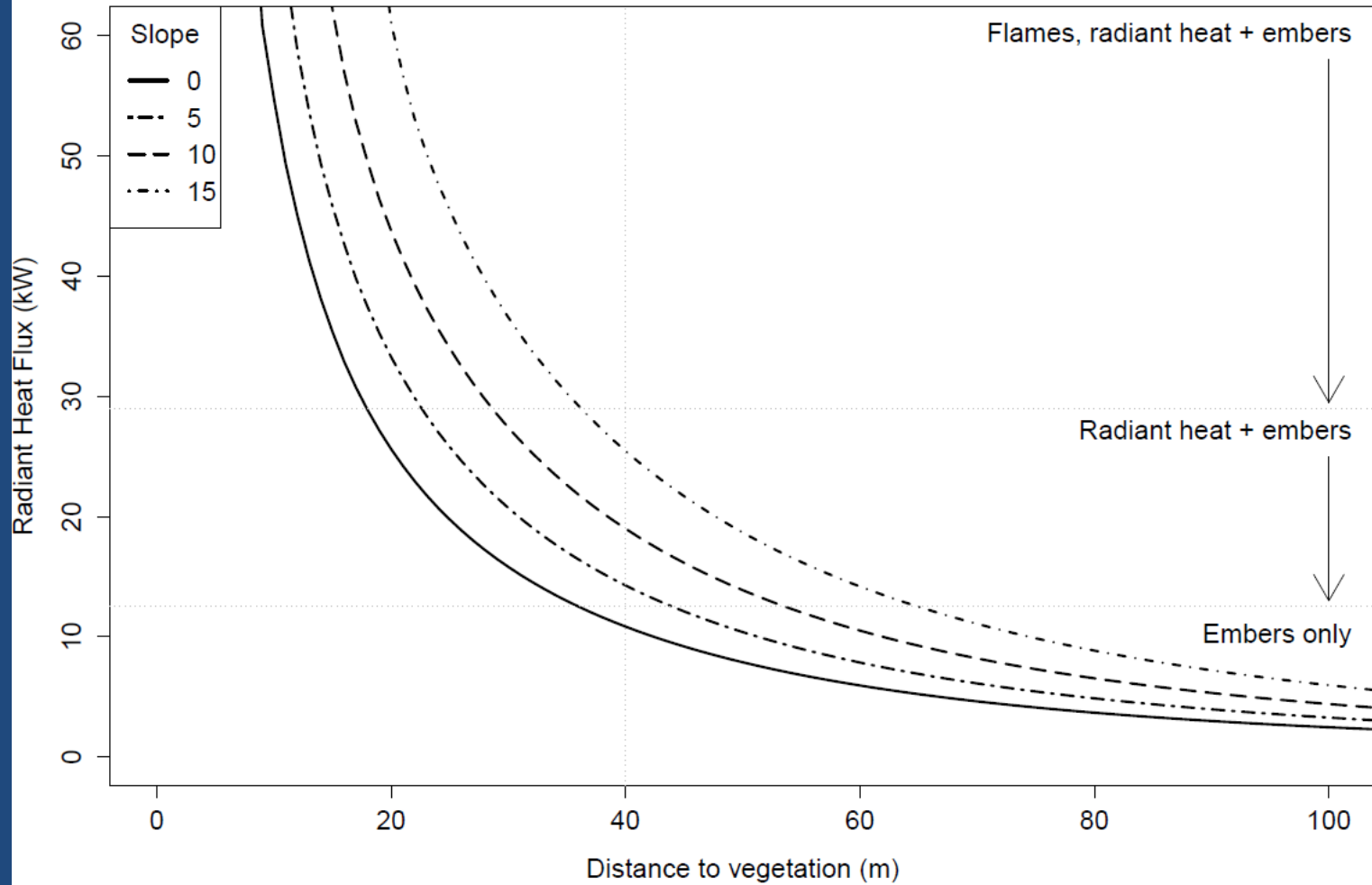
Comparison between the two



Current

40m offset

Offset impacts



Who can reduce the risk of house loss?

- Urban planning can through increasing suppression effectiveness, but only affects future developments
- Residents do not respond to education strategies tested.
- Active engagement of at risk communities will improve preparedness, decreasing the risk of loss
- Suppression is effective now, but is expensive and cannot cover all houses
- Strategic approaches to improve preparedness in high risk areas and investment in suppression resources will result in the greatest reduction in risk