bushfire&natural HAZARDSCRC

MEASURING THE IMPACTS OF NATURAL HAZARDS ON HUMAN FATALITIES AND BUILDING LOSSES

Rob van den Honert, Katharine Haynes, Lucinda Coates
Risk Frontiers, Macquarie University, NSW

An Australian Government Initiative

CRC AUSTRALIA

RISK FRONTIERS

MACQUARIE UNIVERSITY

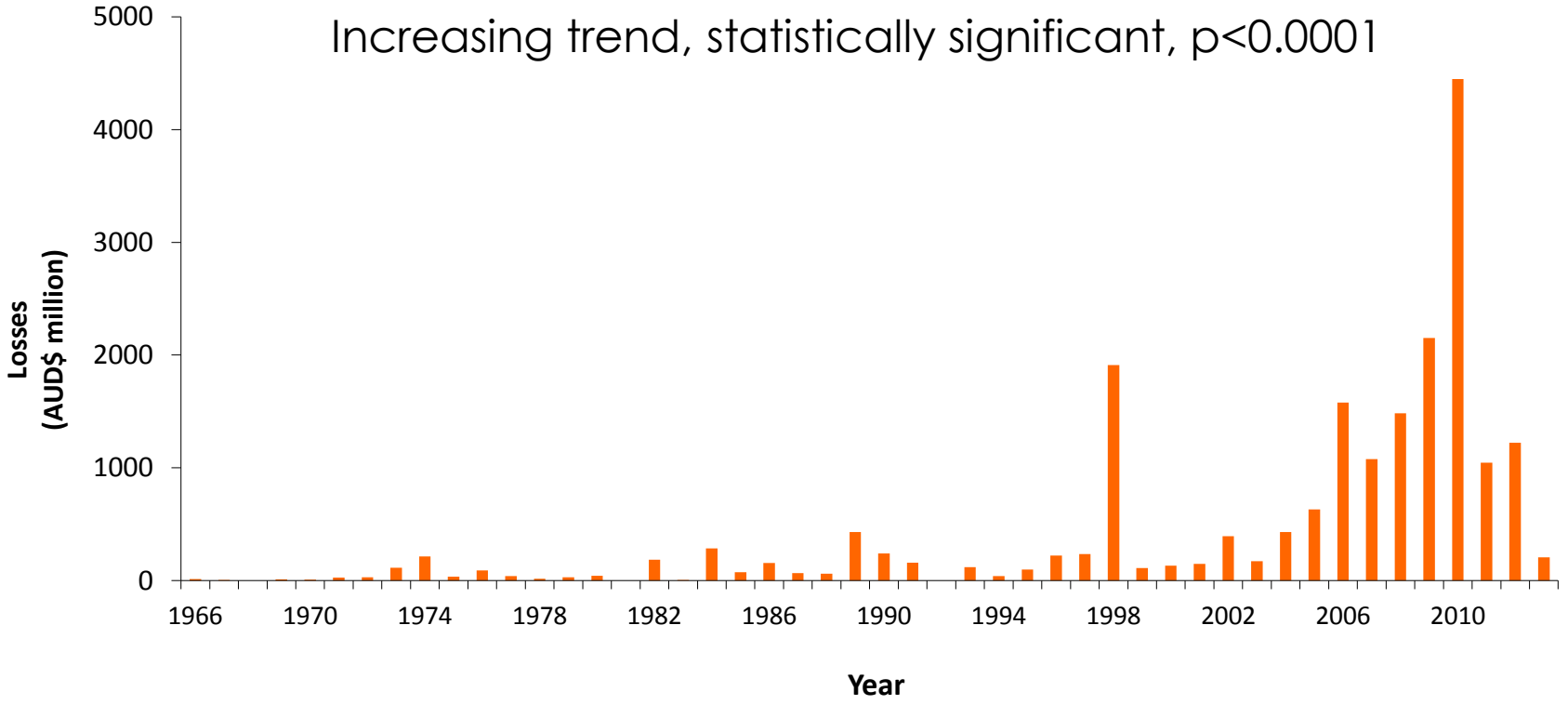
Objectives of the CRC project

To measure and understand the impacts of natural hazards in terms of

- the toll on human life and injuries, and
- building losses and damage

in order to provide an evidence base for emergency management policy and practise.

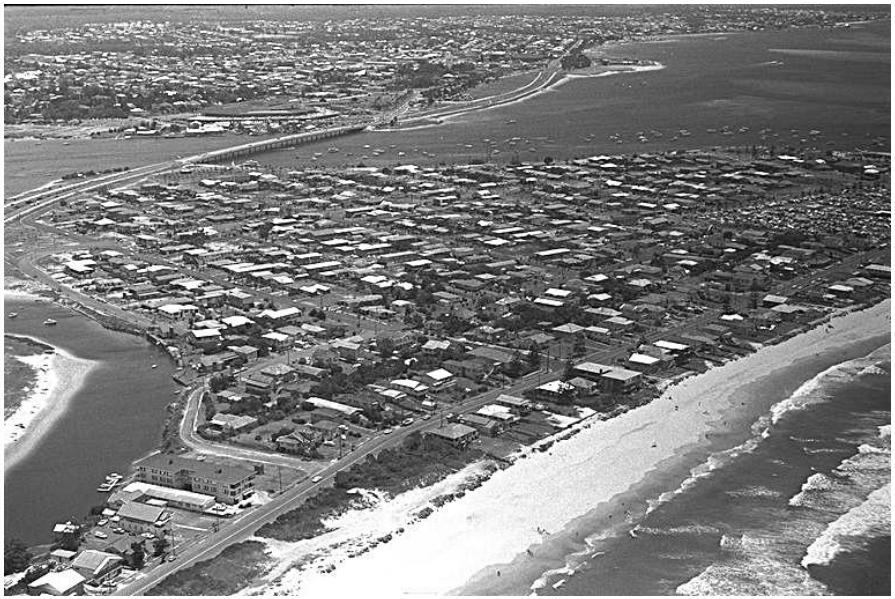
Australian weather-related natural disaster losses



(Crompton et al. 2010)

Australia – coastal developments

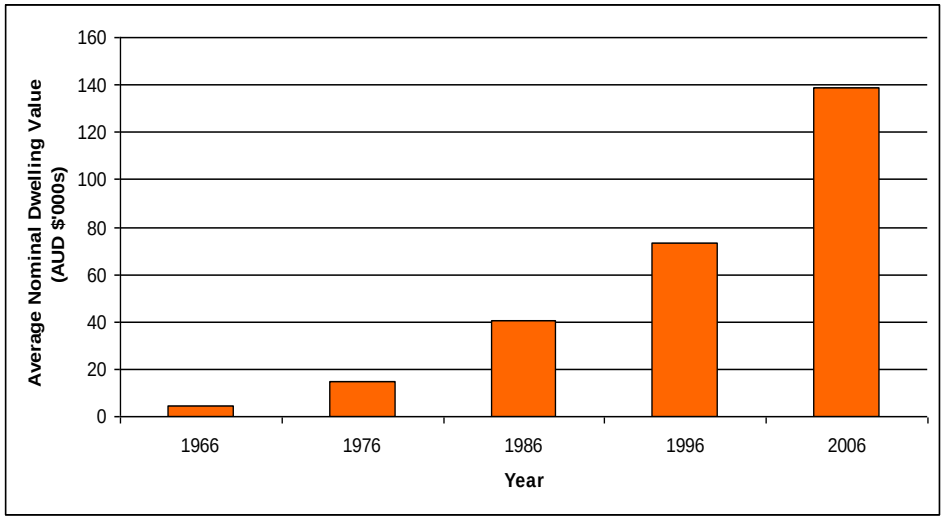
Gold Coast Main Beach
circa 1970



Gold Coast Main Beach
2003

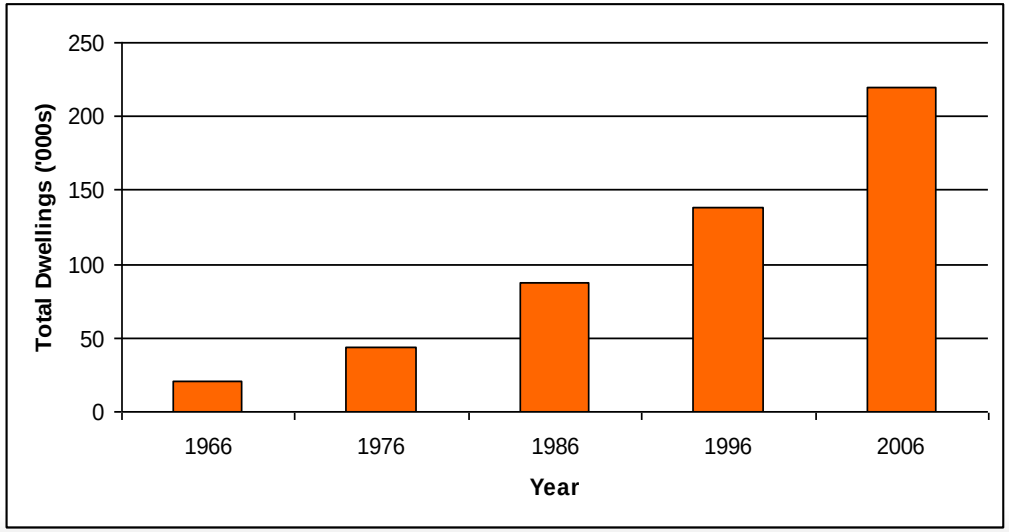
Source: Local Studies Library, Gold Coast City Council

Gold Coast - Tweed Heads



Cost per dwelling

Number of dwellings



Normalisation of natural disaster loss data

- *Normalisation* refers to the process of adjusting historical losses for known societal changes (e.g. numbers of homes, the value of these homes, and improvements in building codes and construction).
- Normalised losses effectively estimate the losses as if *past events* were to impact *present-day society* (i.e. an 'apples-versus apples' comparison of event losses over time).

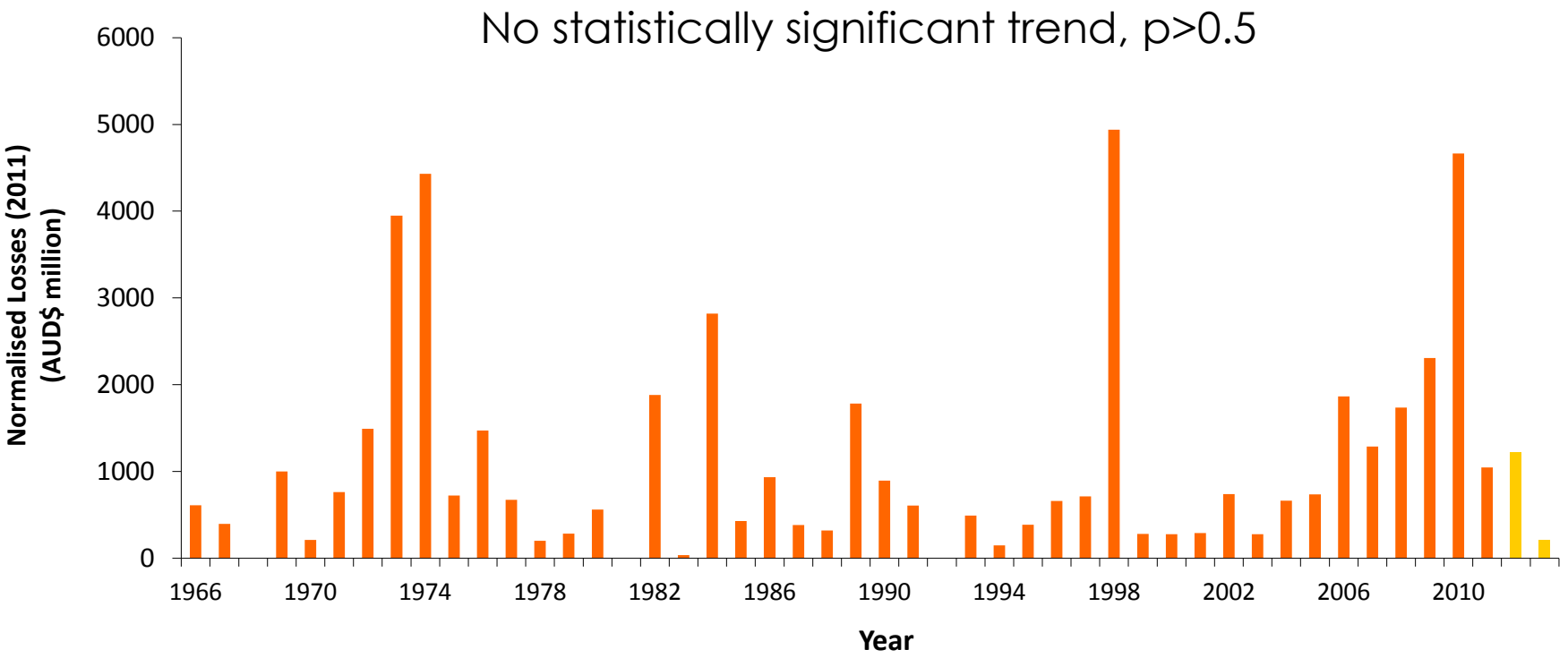
Major Australian Disaster Losses (normalised)

What perils have caused the greatest losses?

Event	Ranking	Year	Normalised cost
Sydney Hailstorm	1	1999	4.3 Billion AU$
Tropical Cyclone Tracy	2	1974	4.1 Billion AU$
Newcastle Earthquake	3	1989	3.2 Billion AU$
QLD Floods	5	2011	2.5 Billion AU$
Ash Wednesday Bushfires	7	1983	1.8 Billion AU$

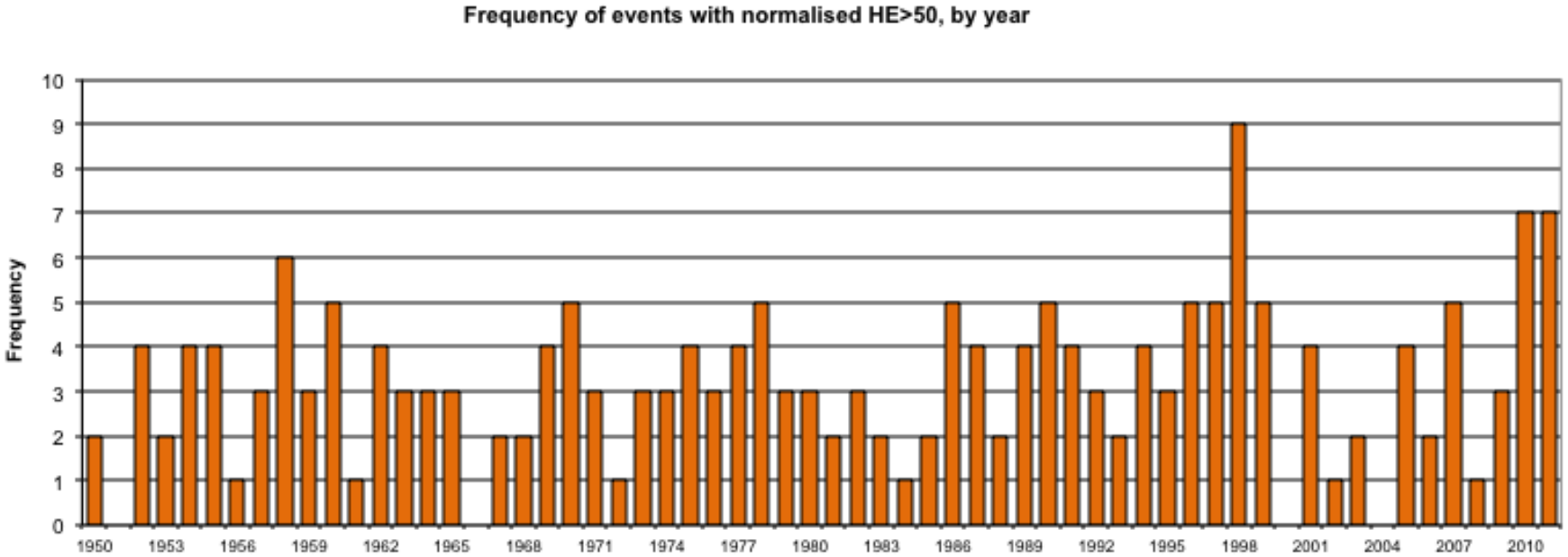
Normalised insured losses as if all events were to impact upon 2011 societal and demographic conditions (Source: ICA/Risk Frontiers)

Normalised Australian weather-related natural disaster losses



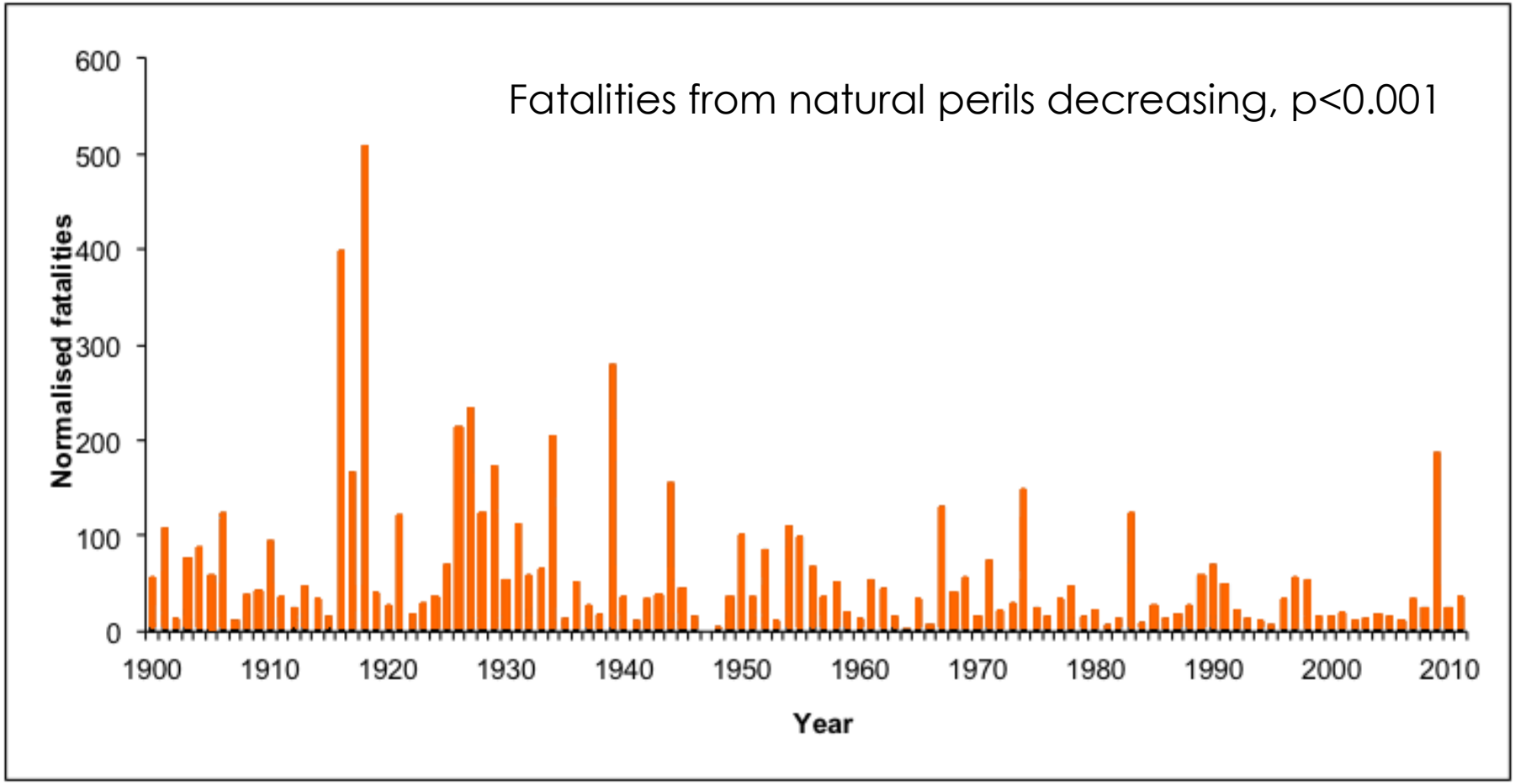
(Crompton et al. 2010)

Australian bushfire frequency



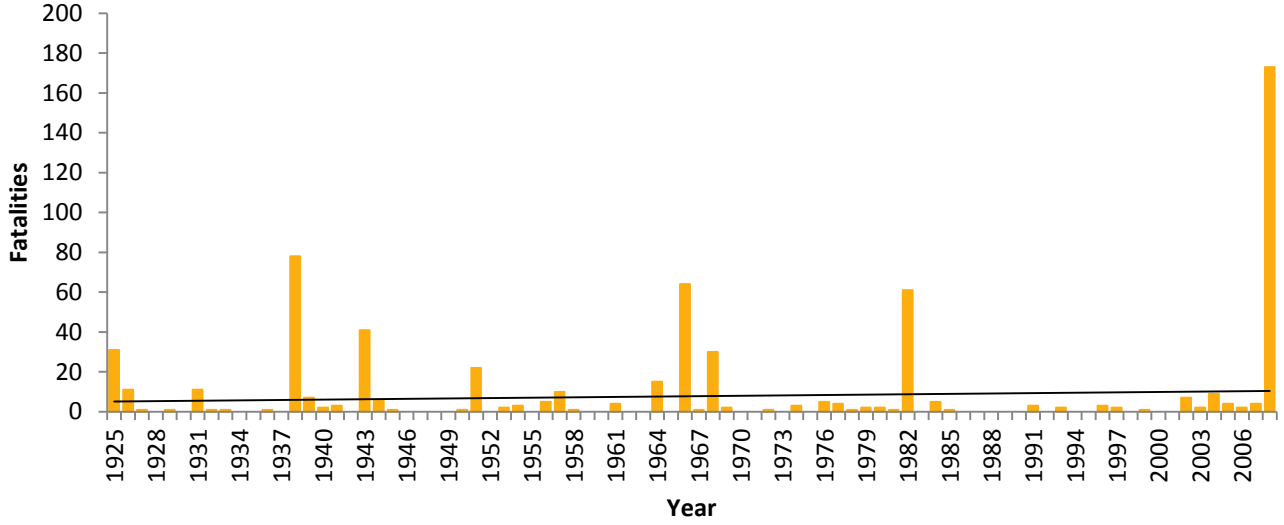
- Normalised losses > 50 HE, i.e. fairly large fires only
- Slope is *not* statistically significant

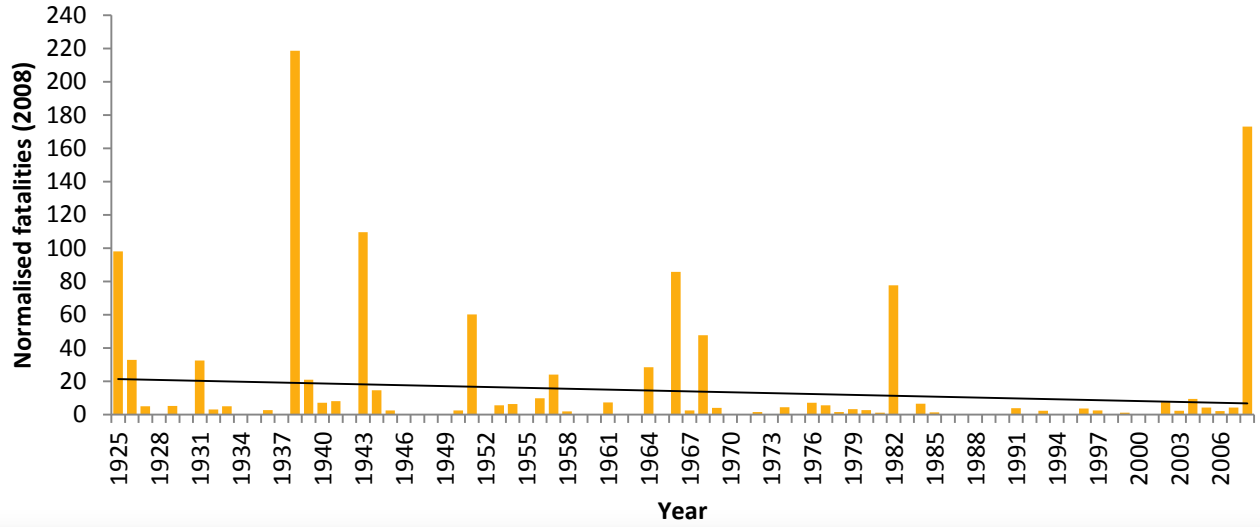
Fatalities from natural perils *normalised* by population



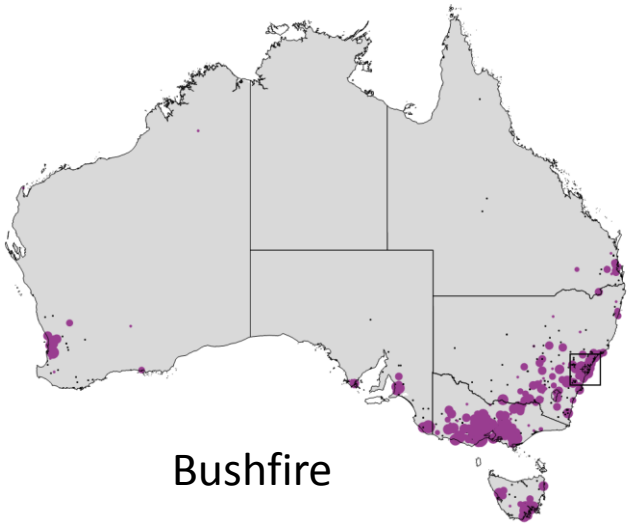
Perils include:
bushfire, earthquake, flood, grassfire, wind gust, hail, landslide, lightning, rain, tornado and tropical cyclone

Bushfire fatalities

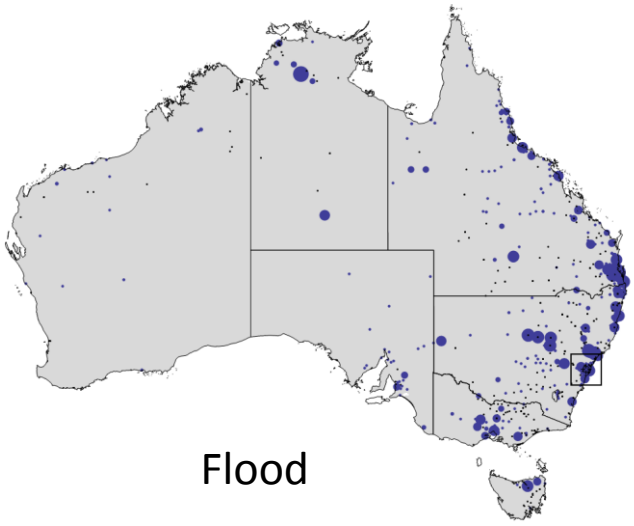




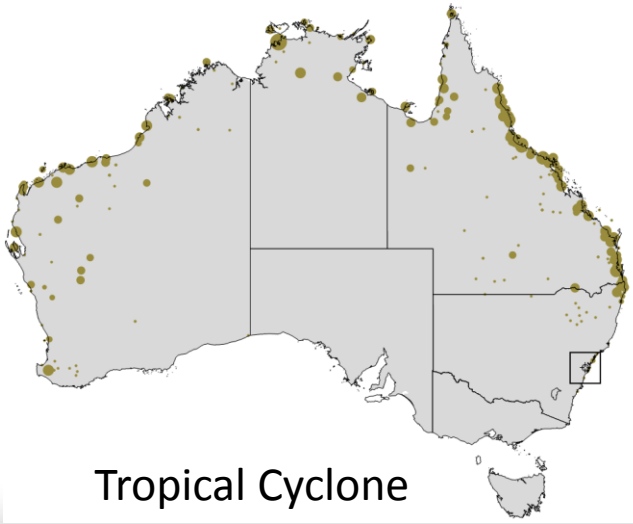
PerilAUS: A History of Natural Disasters



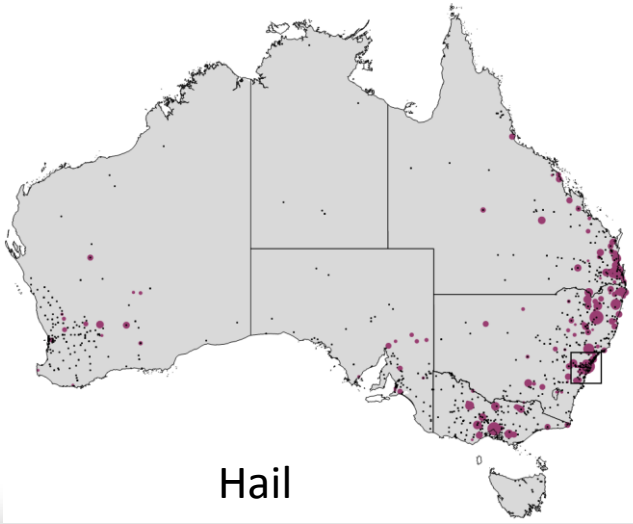
Bushfire



Flood



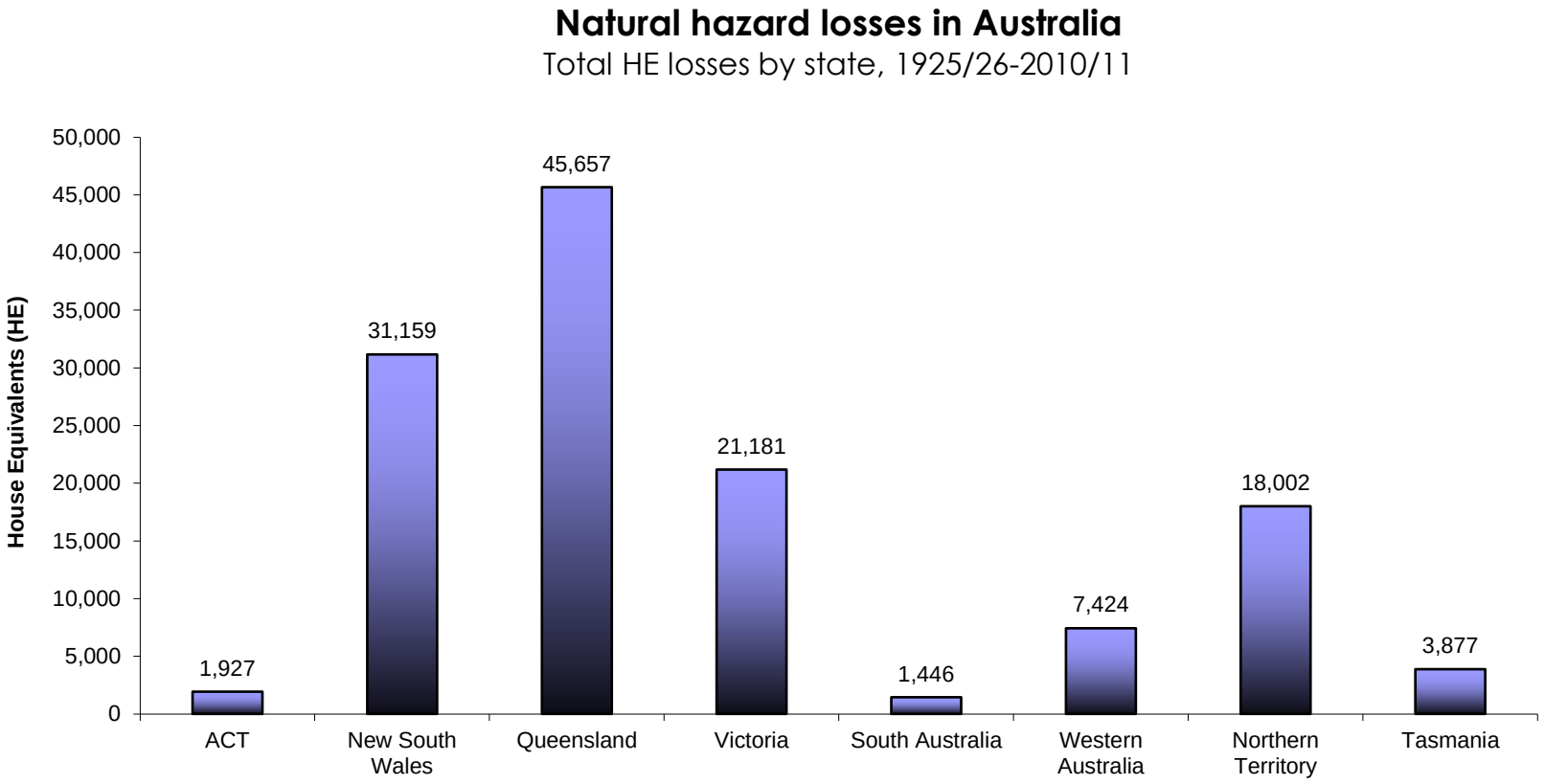
Tropical Cyclone



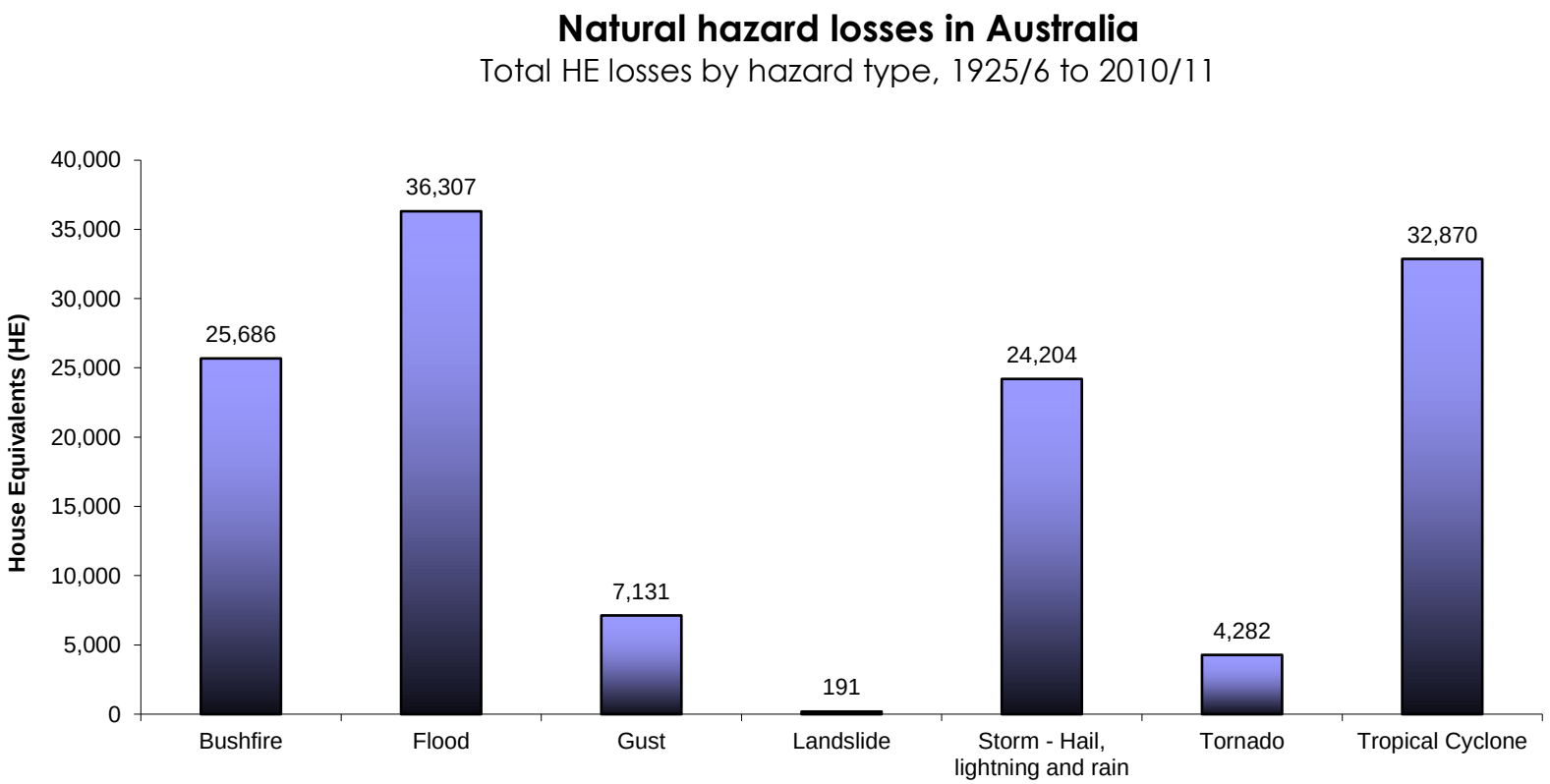
Hail

Historical event losses since 1926. Source: Risk Frontiers' *PerilAUS* database

PerilAUS: A History of Natural Disasters



PerilAUS: A History of Natural Disasters



Natural hazard fatalities

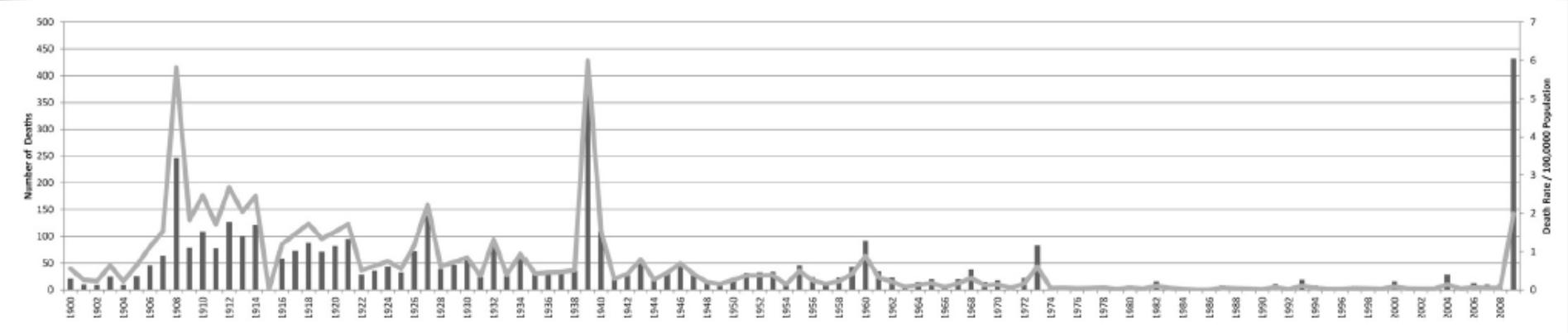
Natural hazard	Deaths 1900–2011	% total natural hazard deaths 1900–2011
Extreme heat	4,555	55.2
Flood	1,221	14.8
Tropical cyclone	1,285	15.6
Bush/grassfire	866	10.5
Lightning	85	1
Landslide	88	1.1
Wind storm	68	0.8
Tornado	42	0.5
Hail storm	16	0.2
Earthquake	16	0.2
Rain storm	14	0.2

(Coates et al. 2014)

Heatwave fatalities, 1900-present

Analysis of heat-related deaths shows that

- Number of deaths (and death rate) have decreased steadily since 1900
- Fatalities have been virtually zero since the mid-1970s



(Coates et al. 2014)

Project activities and aims

- Collect further data to complete the record of natural disasters in Australia (*PerilAUS*) –
  - Descriptions
  - Losses/damage
  - Fatalities (coronial records)
  - Hospital admissions injury data (state health departments)
  - Near miss/rescue data (emergency services)
- Analyses of this complete data set
  - Loss data
    - By peril and state
    - Temporal and spatial characteristics
  - Fatalities
    - Circumstances surrounding deaths

THANK YOU!

http://www.riskfrontiers.com/

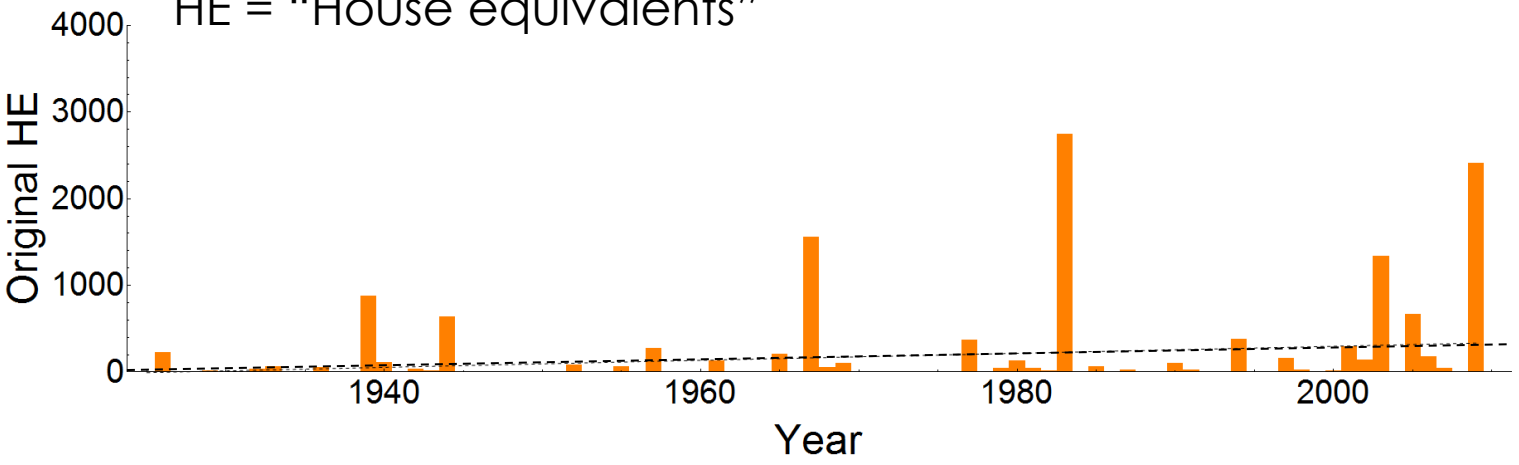
Contact:

Dr Rob van den Honert
tel: +61-2-9850 4421
email: rob.vandenhonert@mq.edu.au

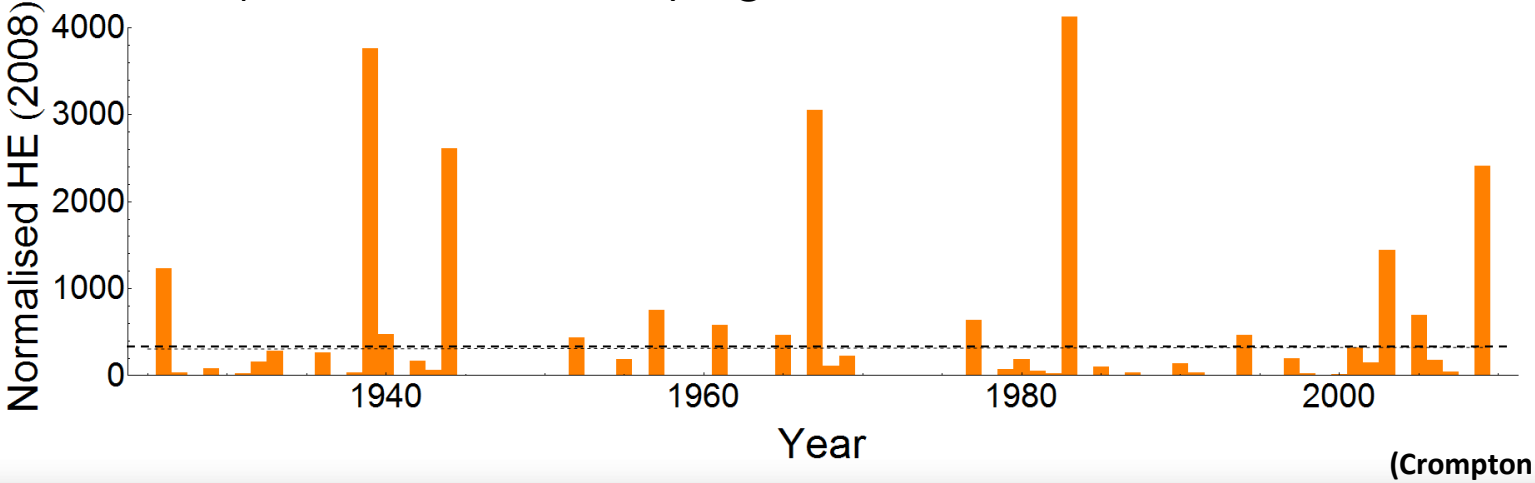
Lucinda Coates
tel: +61-2-9850 6312
email: lucinda.coates@mq.edu.au

History of Australian bushfire losses

HE = "House equivalents"



Slope is *not statistically significant*



(Crompton et al. 2010)