

RESILIENCE
TO NATURE'S
CHALLENGES

Kia manawaroa
– Ngā Ākina o
Te Ao Tūroa

National
Science
Challenges



Wildfire risk to forests and communities in a changing hazard environment

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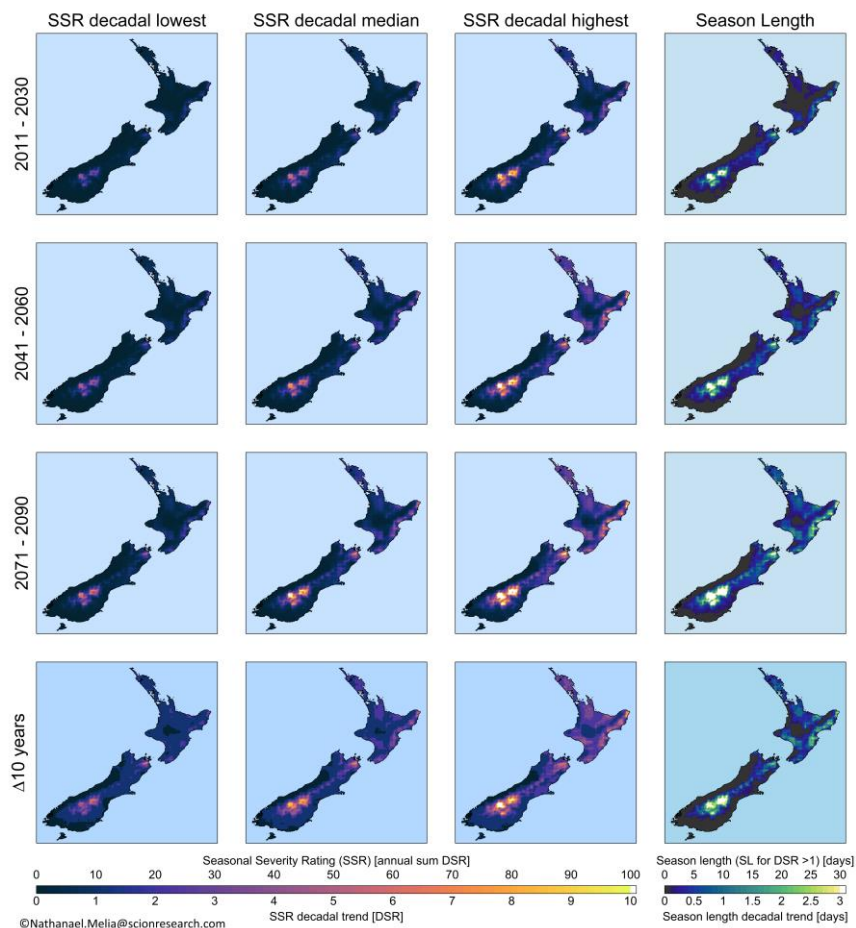
Image: Joseph Johnson/Fairfax NZ

Wildfires in New Zealand

- Small frequent wildfires (10-year average 2005/06-2014/15)
 - about 4,100 fires per annum
 - about 5,500 ha of forest and rural lands per annum
- > 99% caused by human activity
- Fire widely used as land management tool, recreation and cultural purposes in rural areas



Changing hazard environment



- Wildfire prone areas
 - East coast North and South Islands
- Climate change modelling predicts
 - NZ will become hotter and drier
 - increase frequency and severity of wildfire events

N. Melia, Scion

Significant NZ forest fires (2000 – 2017)

| Year | Fire | Location | Forest Type | Total Area Burnt (ha) |
|------|--------------------|------------------|--------------------------|-----------------------|
| 2001 | Para Road | Marlborough | Exotic plantation | 102 |
| 2003 | Aupori | Northland | Exotic plantation | 240 |
| 2004 | Irvines | Nelson | Exotic plantation | 200 |
| 2004 | Papatotara | Southland | Native cut-over | 300+ |
| 2005 | Mohaka | Hawkes Bay | Exotic plantation | 204 |
| 2006 | Maringi | Wairarapa | Exotic plantation | 189 |
| 2006 | Canvastown | Marlborough | Exotic plantation | 215 |
| 2007 | Waipoua | Northland | Native + plantation | 224 |
| 2008 | Para Road | Marlborough | Exotic plantation | 95 |
| 2008 | Mt Cook | South Canterbury | Wilding pine | 756 |
| 2010 | Glenhope | Nelson | Beech + plantation | 600 |
| 2010 | Mt Allan | Otago | Exotic plantation | 820 |
| 2010 | Papatotara | Southland | Native forest | 100 |
| 2010 | Mt Allan | Otago | Exotic plantation | 200 |
| 2010 | Poutu | Northland | Exotic plantation | 115 |
| 2011 | Horeke | Northland | Exotic plantation | 345 |
| 2013 | Poutu | Northland | Scrub + plantation | 208 |
| 2013 | Hinakura | Wairarapa | Exotic plantation | ~70 |
| 2015 | Onamalutu | Marlborough | Exotic plantation | 600 |
| 2015 | Waikakaho | Marlborough | Exotic plantation | 450 |
| 2015 | Whareama | Wairarapa | Exotic plantation | 200+ |
| 2015 | Wairau Valley | Marlborough | Exotic plantation | 1150 |
| 2017 | Hasting Complex | Hawkes Bay | Native + plantation | 520 |
| 2017 | Port Hills complex | Christchurch | Plantation + grass/scrub | 1661 |
| 2017 | Hanmer springs | North Canterbury | Plantation + scrub | 60 |

Other notable plantation forest fires

- 1946 Tahorakuri, Taupo - largest plantation forest fire recorded in NZ's history (30,738 ha, incl. indigenous forest)
- 1955 Balmoral forest fire (3155 ha)
- 1981 Hira forest fire (1972ha)
- 2019 Pigeon Valley fire (2300 ha - incl. 2000 ha pine plantation)



Historical fires affecting NZ communities

- 1918 Raetihi fire, central North Island
 - 120 houses, 60 commercial premises and 9 sawmills destroyed
 - 3 lives lost
 - many people severely burned



1918 Raetihi Fire Centenary

Increasing fires affecting NZ communities

**Nelson, Feb 19 – 3000 people & 700 livestock
evacuated, 1 house destroyed**

**Port Hills, Feb 17 – 1500 people evacuated, 9 houses
destroyed & 5 damaged, pilot killed**

**Hastings, Feb 17 – 1 house destroyed & others
threatened**

**Whitianga, Jan 17 – 4 houses destroyed & many
evacuations**

**Karikari Peninsula, Jan 17 – 2 houses evacuated/
close to campground**

Mahia Peninsula, Jan 17 – threatened homes.

Wildfire causes

| | |
|-----|--|
| 25% | escaped camp, bonfires and rubbish fires |
| 19% | unknown |
| 18% | land clearing burns |
| 9% | arson |
| 7% | fires involving vehicles |
| 3% | pyrotechnics/fireworks |

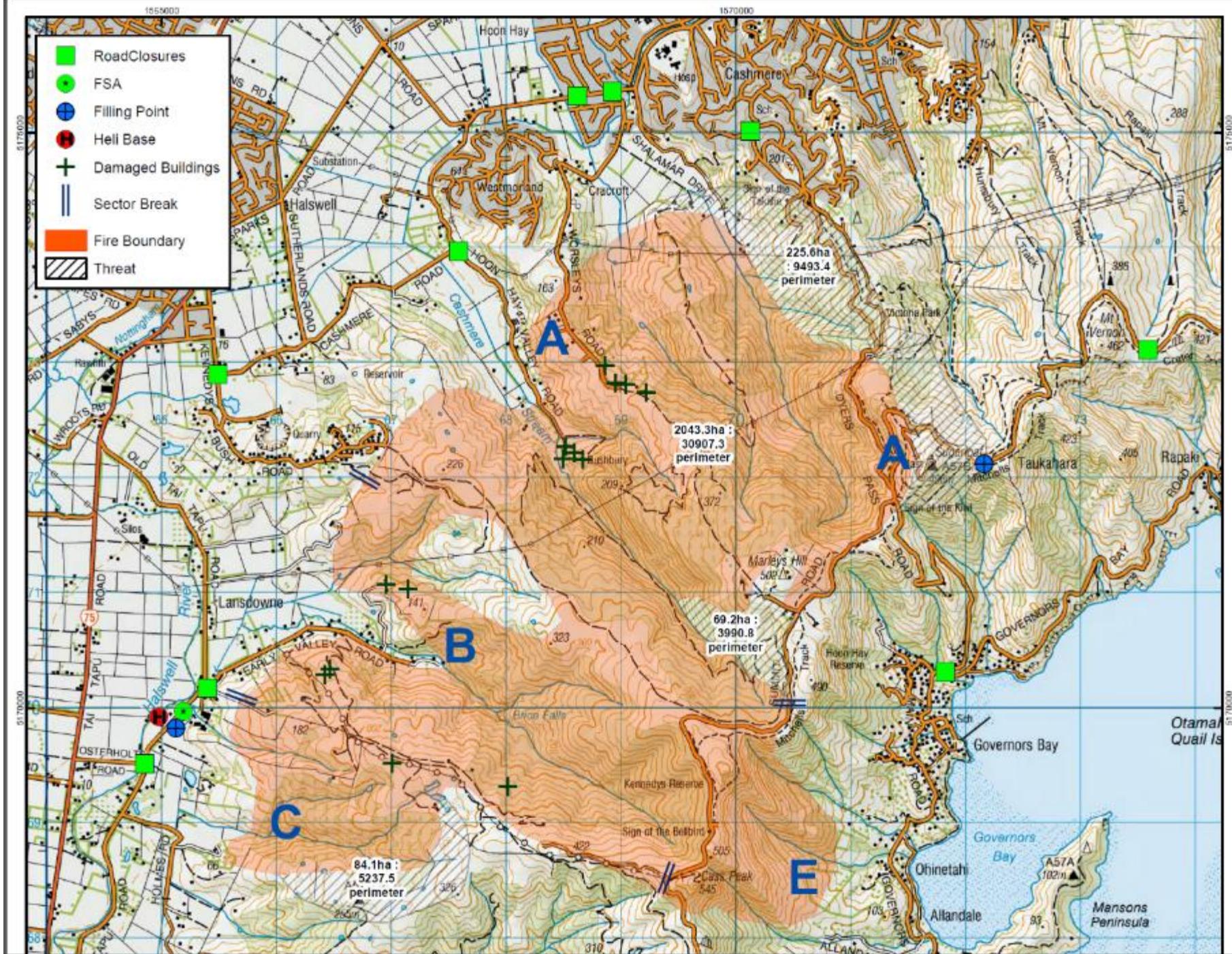
(National Rural Fire Authority data 2016/17)



2017 Port Hills: extreme wildfire

- Margin of Christchurch
- 1400-2800 residents evacuated for 3-9 days
- 9 houses destroyed, 6 fire damaged
- 1660ha with a perimeter of 60km
- 83 ha remnant indigenous forest and plantation destroyed
- Believe fires were deliberately lit
- Police continuing criminal investigation
- State of emergency was declared to support emergency services
- Not officially extinguished for 66 days





Rural-urban interface, Port Hills wildfire

Interface /
dense
urban
fringe
properties
(typically
<0.15 ha)

Lifestyle
properties
(typically
>2 ha)

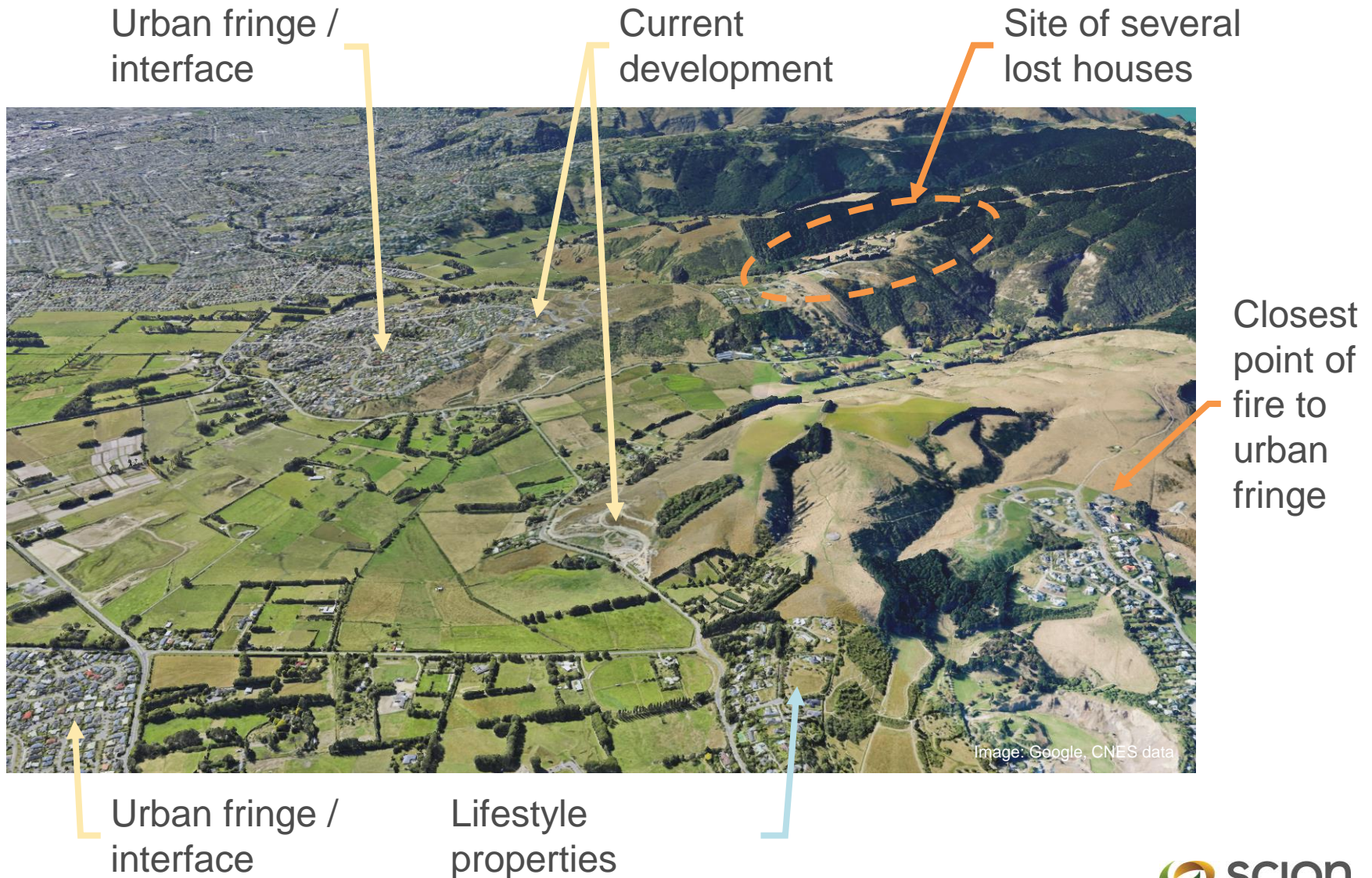


Ongoing
construction

Extent of
wildfire

Sites of
several lost
homes

Rural-urban interface, Port Hills wildfire



Managing wildfire in a different context

- Wildfires on suburban margins increasing worldwide trend risk to lives and property (e.g. Hobart, 1967; Canberra, 2003; and Fort McMurray, Canada, 2016).
- Previous emphasis on rural and lifestyle properties but urban fringe / interface is fundamentally different:
 - vegetation to structure → structure to structure
 - mitigation options may not be appropriate for urban fringe — e.g. defensible space
 - urban feel/expectations versus rural lifestyle feel/expectation
- Education for awareness and preparation, but no FireSmart communities



Management implications

- ➡ Port Hills fire one of most severe wildfires in recent years
- ➡ Greatest reported property loss in individual fire in almost 100 years
- ➡ New wildfire management and community preparedness concerns
- ➡ Proximity of forests to communities – 2-way risk

Every wildfire ignition prevented is one fewer for FENZ to respond to



K. Bayne, Scion

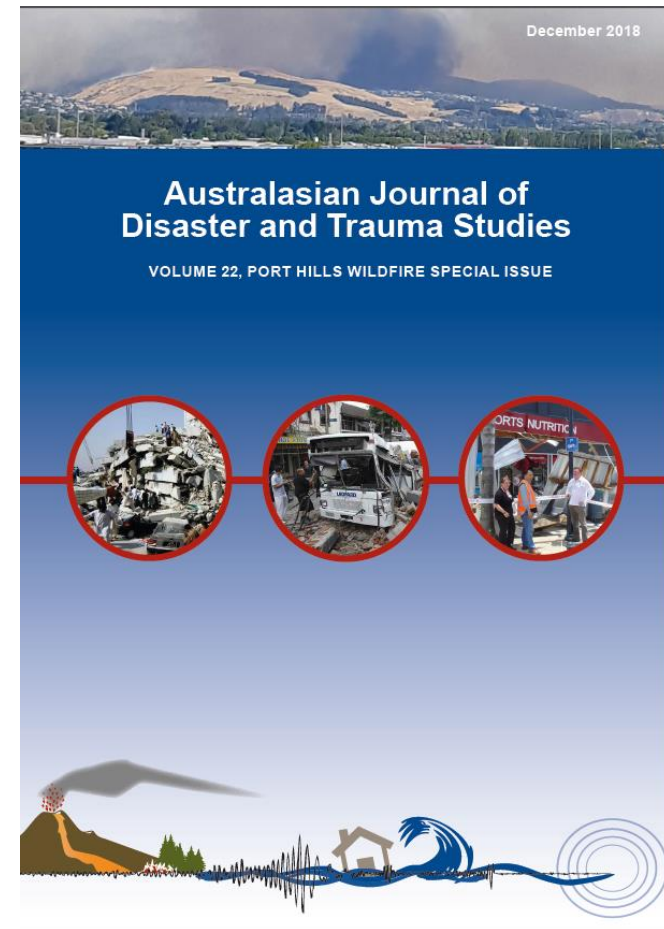
Study of news and social media

Examined

- 230 articles from local and national New Zealand news media outlets, 13 February 2017 - 1 May 2018
 - Associated social media
- Facebook pages of official organisations involved in fire response, e.g. Christchurch Civil Defence and Emergency Management
 - ➡ Provided illustration of social meanings and contexts which shape wildfire risk perception, preparation and response across general public

stuff

facebook



 **scion**

Awareness and preparedness

- Linked to living in high-risk area, rural living or wildfire experience
- But perception of wildfire risk can have limited impact on preparedness, especially ongoing preparedness, heightened awareness quickly diminishes
- Socio-economic, cultural and demographic sub-community differences shape interpretations of fire experience and risk



Urban fringe wildfire risk awareness

- Apparently low wildfire risk awareness and preparedness of urban dwellers
- Surprise that wildfire could reach urban neighbourhoods
- Expectation that wildfires will be controlled by authorities

“When city people come to the country with no idea of the risk.”

“In this day and age, I can't believe that it's let to go that far. You know, so close to a central city like this. It's just unbelievable.”

“Finally urban dwellers might understand...”



Image: David Walker/Fairfax

Reflections on Port Hills Fire

- Wildfire risk reduction
 - House site, design & construction
 - Defensible space in urban context?
 - Low flammability plantings
- Local government planning
 - Few planning restrictions in place; limits on regulatory options
 - Need better wildfire considerations especially in new developments
- Community resilience
 - Uncertain risk ownership
 - Community engagement
 - Work with community networks



Lessons learned to date

- Lessons from other parts of the RUI may not be appropriate
- Urban fringe property owners will require greater focus to ensure:
 - Residents are aware of wildfire risk
 - Residents are adequately prepared for future wildfires
- Need:
 - To develop appropriate planning and mitigation options
 - To understand variation within urban fringe communities
 - New messages and engagement to work with communities.



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<http://www.ruralfireresearch.co.nz>
www.scionresearch.com



www.scionresearch.com



Prosperity from trees *Mai i te ngahere oranga*

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