Australian Bushfire Impact Study

January 2020

Aon | AGRC | Data Analytics

Empower Results®

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Executive summary

Overview

South Eastern Australia is recognised as one of the world's most prone areas to bushfires. As a network service provider in this region, the impact of bushfires is a material risk for AusNet Services. The most significant insurable risks arising from the occurrence of a Bushfires are categorised as:

1. Property Damage, which includes losses from physical destruction or damage; and

2. Personal Injury, which includes injury and death from the occurrence of a bushfire.

The management of bushfire risk is through optimising prevention and risk transfer strategies.

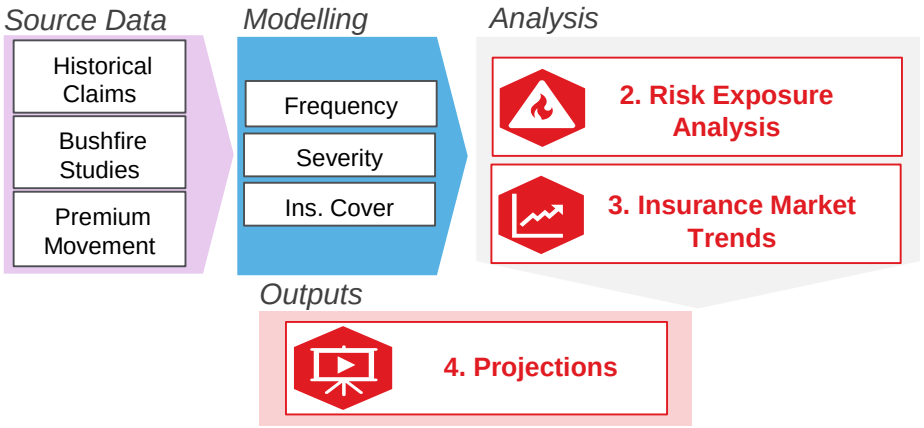
Purpose

This paper seeks to identify if a step-change is occurring for AusNet Services in relation to its bushfire liability risk such that stakeholders are informed in allocating resources for bushfire risk management strategies.

Scope

The scope of the analysis is based on available data collected and studies from local and international fire events. Due to the timing of the report, complete set of data from the November 2019 and January 2020 has not been included.

Methodology



Key Findings

AusNet Services is facing growing bushfire exposure arising from a changing climate that has disproportionately affected the south eastern areas of Australia where AusNet Services, and other NSP's, operate. If this trend continues going forward then the current trends are expected to continue in the foreseeable future:

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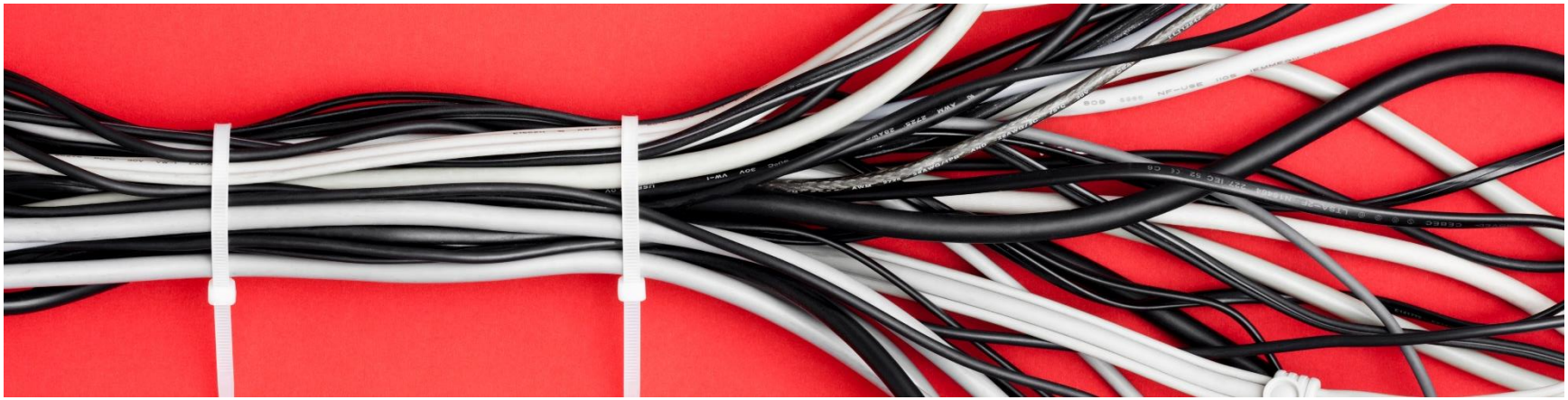
Further analysis of the exposure and risk transfer strategies are required to design an optimal response.



Risk Exposure Analysis

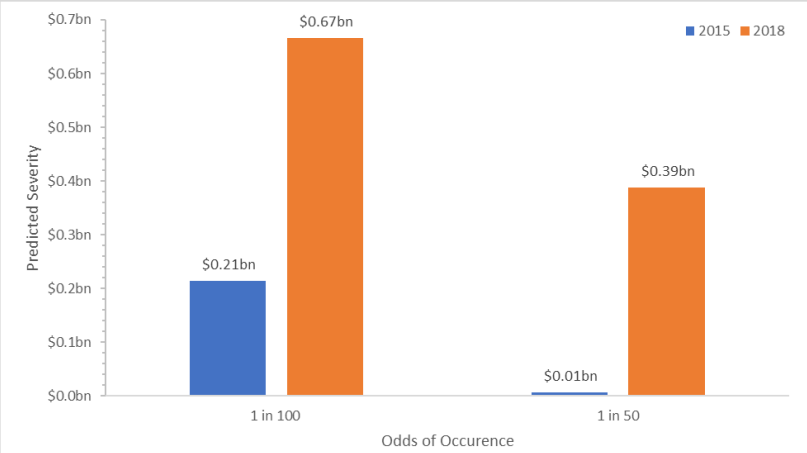
Increasing Frequency and Severity of Bushfires

Major domestic bushfire occurrences have increased significantly over the past 50 years from an analysis of the data collected from the Insurance Council of Australia.

In recent years, the frequency of major bushfires have accelerated with the average frequency of major fires per year at 3.2 between 2015 to 2019, compared to 1.3 between 2000 to 2004.

Although the Australian data does not indicate such a pronounced increase in severity, the AIR model analysis which overlays AusNet Services specific asset locations with geospatial data and bushfire conditions demonstrate a mark increase in severity most notably by 310% to 0.67bn for 1 in 100 events from 2015 to 2018.

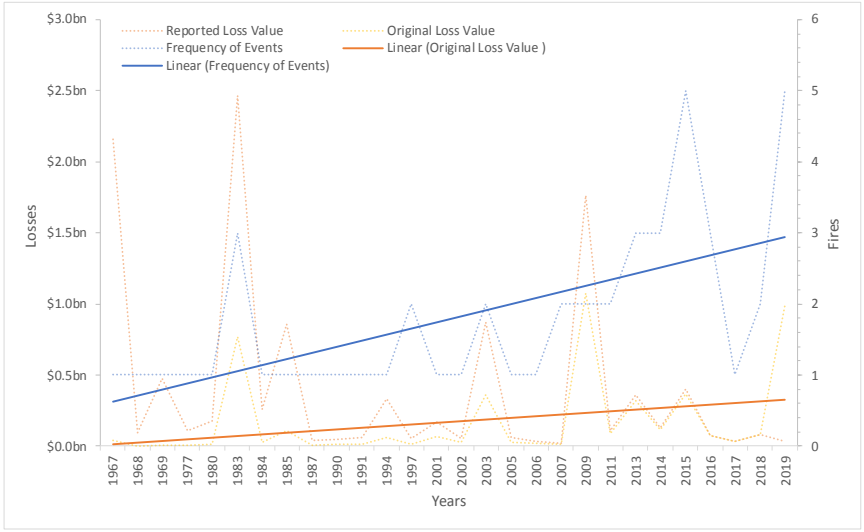
AusNet Services AIR Model Outputs



Source: Aon AusNet AIR analysis 2015 and 2018

Note depending on location, the AIR model in its projected scenarios has factored 7.4% to 17.4% increase in asset values in Australia during this period.

Major Australia Bushfire Trends



Period	No.	Avg.	Total Loss	Avg. Loss
2015 – 2019	16	3.2	1.5bn	96.5m
2010 – 2014	8	2.7	0.5bn	65.4m
2005 – 2009	6	1.5	1.1bn	189.9m
2000 – 2004	4	1.3	0.5bn	114m

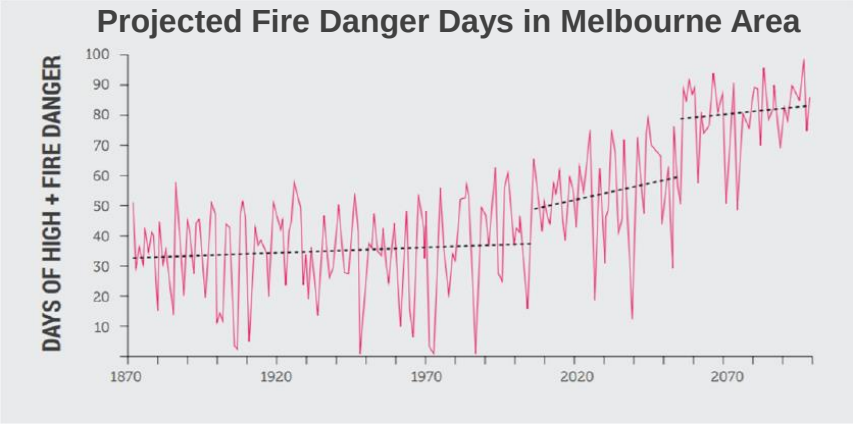
Source: Insurance Council of Australia

Climate change a major driver of Bushfire Exposures

Major domestic bushfire occurrences have coincided with increased extreme fire weather over the past 30 years, especially in south eastern Australia where fire weather days have increased by 10%. This trend of longer periods prone to catastrophic fire conditions is illustrated by the distribution of very warm and high monthly maximum temperatures, which occurred 2% of the time between 1951 to 1980, compared to 6 times as often at 12% of the time between 2003 to 2017.

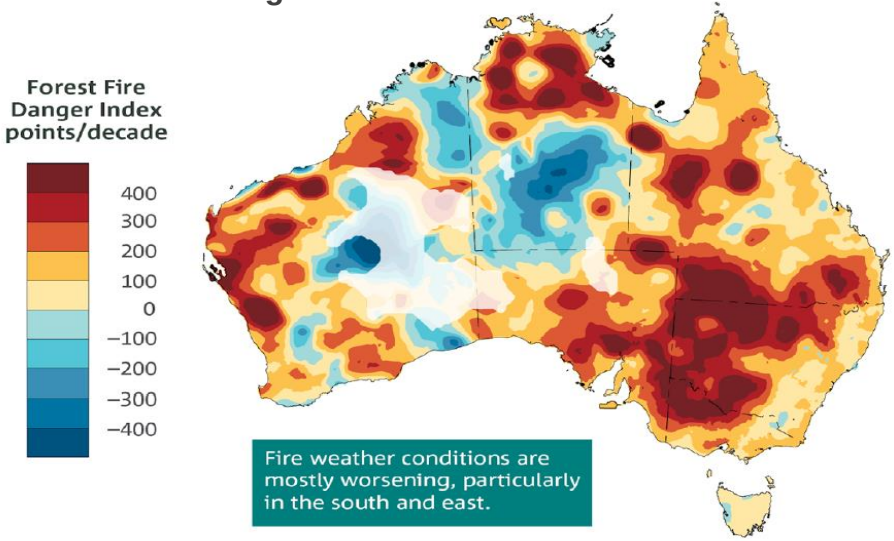
The changing climate is characterised by the following:

- **Heat waves** with higher temperatures for longer periods more frequently;
- **Low rainfall** from shorter cool seasons and prolonged drought; and



Source: Climate Council of Australia

Worsening Fire Index from 1978 to 2017

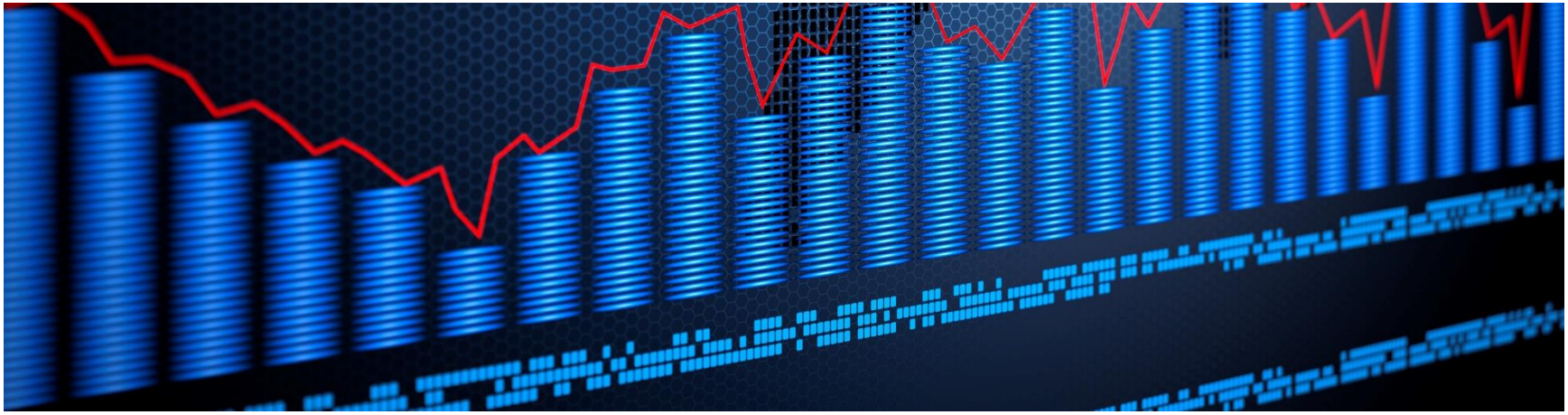


Source: Australian Bureau of Meteorology

- **Lengthening bushfire season** with more days every year prone to catastrophic fires.

The trend from the change in climate has resulted in the following factors leading to the increased bushfire exposure:

- **Higher availability and supply of fuel** with the growth in vegetation dried from constant heat and limited rainfall; and
- **Conditions favouring rapid spread** after ignition during hot, dry and windy days.

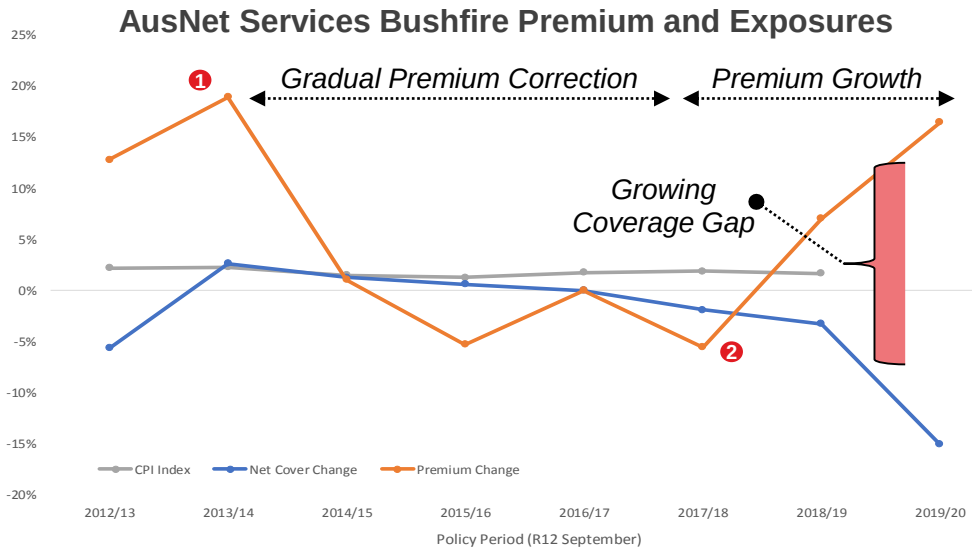


Insurance Market Trends

AusNet Services premiums impacted by Bushfires

Historical trend analysis of AusNet Services bushfire coverage and premiums show carrier underwriting sensitivity to major global and local catastrophic bushfire events. Since the policy year 2013/14, premiums saw a gradual correction on average by 4% YoY inflation adjusted decline in premiums until September 2018, with only minor adjustments in net coverage (less than 2%).

Post September 2018 structural changes to global underwriting primarily driven by the California wildfires have led to premium increases by 10% YoY, on average, after adjusting for inflation. More notably during this period a sharp fall in net coverage by 11% YoY, on average, adjusted for inflation. Representing greater retained risk, with all other things being equal.



Source: Aon AusNet Services Premium and Exposure Data

Most notable occurrences of bushfires impacting AusNet Services include the following:

1. Mickleham-Kilmore and Yarram, which was followed by a inflation adjusted increase in premiums by 17% in September 2014 for the same net coverage

2. California wildfires, which was followed by an inflation adjusted increase in premiums by 5% in September 2018 for a reduction in net coverage by 5%; and again in September 2019 an increase in premiums by 14% for a reduction in net coverage by 14%.

Period	Prem. Change	Net Cov. Change	CPI Change
2012 – 2013	19%	3%	2%
2013 – 2018	(2%)	-	2%
2019 – 2020	12%	(9%)	2%

Structural change to Electricity NSP Pricing

There have been consistent strong signals that the insurance market will continue to raise premiums for bushfire liability amidst claims filed as at 8 November 2019 reaching $1.34bn and counting and claims for the most recent 2019 and 2020 bushfires estimated to exceed $939m (Insurance Council of Australia).

There are two key contributing factors supporting this structural change in the market:

1. **Tightening insurance market**, where a string of natural disasters including the bushfires have become recognisably more consistent and severe that have created additional demand and significantly reduced carrier reserves. This combined with consistently low global interest rates, have also diminished asset management returns for carriers, putting greater pressure on premiums for the foreseeable future.

2. **California wildfires,** has served as a case study for global underwriters where infrastructure such as power lines, poles and other equipment operated by the Electricity Network Service Provider (NSP), Pacific Gas and Electric Company was found to be the cause of at least 17 of the 24 major bushfires during 2018. These events have created caution amongst underwriters in relation to Electricity NSPs operating in bushfire prone climates, especially when capital is constrained.

Further analysis of this structural change in underwriting practises has been evidenced from the analysis of Electricity NSP benchmark made up of utilities operating across Australia with coverage for bushfires. Although the recent premium growth is consistent to that experienced by AusNet Services, there are, however, notable exceptions.

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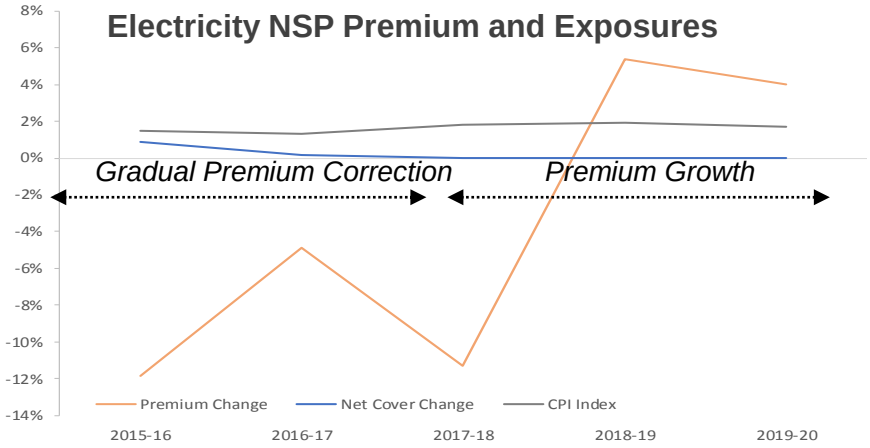
The differences can be attributed to the favourable bushfire conditions for other network service providers in South East Australia and the higher limit AusNet Services seeks to secure in comparison to other network service providers.



Source: Aon Premium and Exposure Data

Projections

AusNet Services Net Cover Forecast

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Source: Aon AusNet Services Premium and Exposure Data

AusNet Services Insurance Net Cover Scenario Analysis

[C - I - C]

Source: Aon AusNet Services Premium and Exposure Data

Appendix A: References

A1. References

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- Aon AGRC Data Analytics, *Aon Premium and Exposure Data*
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- NASA (2019), *Drought Exacerbates Australian Fires.* available at https://earthobservatory.nasa.gov/images/145599/drought-exacerbates-australian-fires
- The Australia Institute (2017), *Bushfire Weather in South East Australia.* available at http://www.climateinstitute.org.au/articles/publications/briefing-bushfire-weather-in-south-east-australia.html/section/478

Appendix B: Analysis Tables

A2.1 AusNet Liability Coverage Time Series

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A2.2 Electricity NSP Benchmark Limit Information

Client	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Number	4	6	5	5	5	5
Total	$3.08bn	$4.31bn	$3.00bn	$3.6bn	$3.6bn	$3.6bn
Average	$0.77bn	$0.72bn	$0.60bn	$0.72bn	$0.72bn	$0.72bn
Max	$1.05bn	$1.05bn	$1.00bn	$1.00bn	$1.00bn	$1.00bn
Min	$0.86bn	$0.45bn	$0.45bn	$0.45bn	$0.45bn	$0.45bn

A2.3 Electricity NSP Benchmark Deductible Information

Client	2014-15	2015-16	2016-17	2017-2018	2018-2019	2019-2020
Number	4	6	5	5	5	5
Total	$16.05m	$18.55m	$13.55m	$13.03m	$13.03m	$13.03m
Average	$4.01m	$3.09m	$2.71m	$2.61m	$2.61m	$2.61m
Max	$10.00m	$10.00m	$10.00m	$10.00m	$10.00m	$10.00m
Min	$0.05m	$0.05m	$0.05m	$0.05m	$0.05m	$0.05m

A2.4 Electricity NSP Benchmark Net Coverage Information

Client	2014-15	2015-16	2016-17	2017-2018	2018-2019	2019-2020
Number	4	6	5	5	5	5
Total	$3.08bn	$4.31bn	$3.00bn	$3.60bn	$3.60bn	$3.60bn
Average	$0.77bn	$0.72bn	$0.60bn	$0.72bn	$0.72bn	$0.72bn
Max	$1.05bn	$1.05bn	$1.00bn	$1.00bn	$1.00bn	$1.00bn
Min	$0.20bn	$0.20bn	$0.20bn	$0.45bn	$0.45bn	$0.45bn

A2.5 Utilities Bushfire Liability Cover Change over Time

Underwriting Year	Premium Change	Net Cover Change	CPI Index
2015-16	-12%	0.86%	2%
2016-17	-5%	0.17%	1%
2017-18	-11%	0.00%	2%
2018-19	5%	0.00%	2%
2019-20	4%	0.00%	2%

A2.5 Utilities Bushfire Liability Cover Change over Time

Underwriting Year	Premium Change	Net Cover Change	CPI Index
2015-16	-12%	0.86%	2%
2016-17	-5%	0.17%	1%
2017-18	-11%	0.00%	2%
2018-19	5%	0.00%	2%
2019-20	4%	0.00%	2%

Appendix C: . Analysis: the Impact of Australia's bushfires on Reinsurance - Report

Analysis: the impact of Australia's bushfires on reinsurance

Estimates suggest the ongoing bushfires have burned through more than 10 million hectares (100,000 km^2), or around 8% of Australia's total vegetation, as at January 8, 2020 [i]. This national burnt extent is extreme but not unprecedented. A total of over 100 million hectares (1 million km^2), 15% of Australia's land mass, burnt across largely remote grassland areas of central Australia during the 1974-75 season, but due to the remoteness of the area, experienced limited property loss [ii].

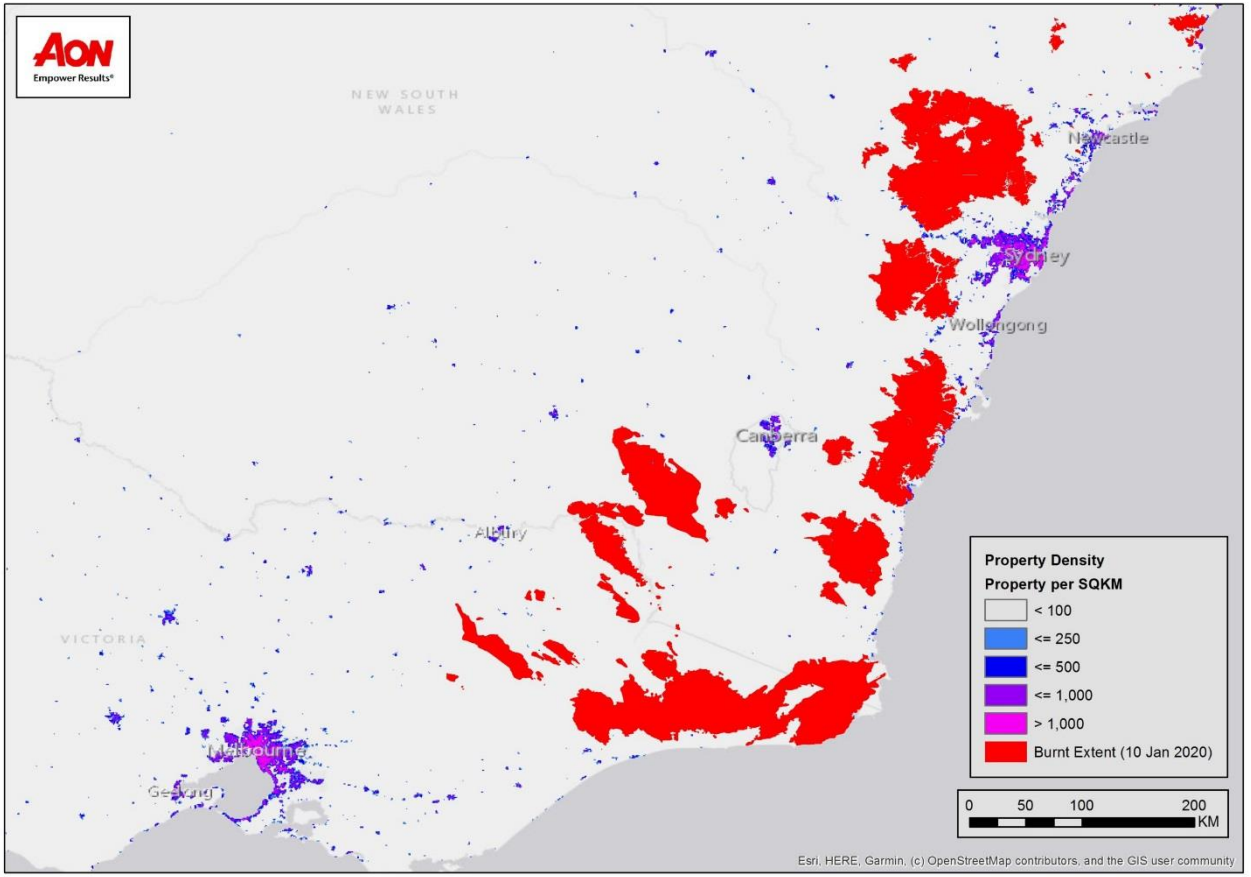

Figure 1.1: The major fire extents in NSW and Victoria. Source: Aon/RFS/CFA [iii].

Analysis: the impact of Australia's bushfires on reinsurance

There has been significant attention paid to the size of the burnt area with many commentators comparing it to the land mass of various countries around the world, and in some cases, other historic fires.

From an insurance loss perspective, to do this in isolation from other key criteria, particularly property exposure, often renders the statistic misleading. For instance, the Californian fire seasons of 2017 and 2018 burned through a combined area of less than 1.5 million hectares (15,000 km^2) but had a total insured loss of AU$47 billion given the significant density of the built environment located in bushfire-prone areas [iv]. In the main areas of burnt extent in California, there were approximately 30 to 40 destroyed buildings per km^2. Comparatively, the current events across Australia have seen less than 0.1 destroyed buildings per km^2 to date. As a point of reference, the 2009 Black Saturday bushfire season saw approximately 1 destroyed building per km^2[v].

When we examine the total number of structures inside the current burnt extent from this fire season (therefore defined as being 'exposed'), we find there is approximately 4.5 km^2 of burnt area for every single exposed property.

When we examine other significant fire seasons in Australia (Victoria in 2009, ACT in 2003, NSW in 2013), we find there is more than one exposed property every 1 km^2. This analysis highlights that although there has been an extremely large total area burnt throughout the 2019-20 bushfire season to date, the impact on the built environment has been significantly less than what might have been expected compared to previous Australian fire events. This is due to fires burning through large remote areas of each state, mostly NSW and VIC, with the majority of impacted towns having populations less than 10,000.

One of the main driving factors assisting the spread of these fires is the abundance of burnable bushfire fuel thanks to the ongoing record drought conditions across Australia. Australia experienced its driest spring ever in 2019 according to the Bureau of Meteorology [vi]. Wednesday, 18th December 2019, was the hottest day in the country's history, with average temperatures hitting 40.9 degrees Celsius (105.6 degrees Fahrenheit).

Analysis: the impact of Australia's bushfires on reinsurance

In the past 15 years, Australia has experienced eight of its ten warmest years on record; as demonstrated by Figure 1.2 below there has been a definite warming trend since 1990 [vii]. This trend is being experienced in many countries and regions (see California in Figure 1.2). Winter rains, which can help reduce the intensity of summer fires, have declined significantly in recent years. The record positive phase of the Indian Ocean Dipole is partially to blame for the severity of drought conditions.

For large infrequent events the level of uncertainty associated in predicting losses is very complex and the potential impacts of climate change only compound that uncertainty. It should also be highlighted that climate change is a trend and not an event per se in that impacts will result in gradual movements in current averages over time rather than sudden dramatic shifts. The total extent of the damage from the 2019-20 fire season remains to be fully understood although there have been at least 2,679 homes lost, with at least 2,162 of those located in NSW. At the time of writing, there have been 29 fatalities with 20 of these occurring in NSW. In the 2008/09 season which included Black Saturday there was a total of 2140 homes lost, with 173 fatalities.

The most expensive bushfire seasons in Australia in terms of insured loss (AU$1.76b in 1983 including Ash Wednesday (VIC), AU$2.16b in 1967 including Black Tuesday (TAS) and AU$1.76b in 2009 including Black Saturday (VIC) – all ICA normalised to 2017) will be potentially challenged by the eventual total insured loss from the 2019-20 bushfire season as losses from the bushfires continue to rise as access to fire damaged regions opens and damage assessments continue [ix].

These bushfires are significant in terms of duration and geographic breadth of burnt area. Definitions applied to bushfire events in reinsurance contracts limit recoverable damage either by time (i.e. a maximum duration) or geographical extent (i.e. distance or territorial boundary). The nature of the current losses from the bushfires means there is the possibility that reinsurance impact will not be as significant as some previous events.

The economic loss is likely to be extreme, perhaps unprecedented, and the longer-term impacts must be considered, with improving Australia’s urban environment resilience at the centre of those discussions.

Analysis: the impact of Australia's bushfires on reinsurance

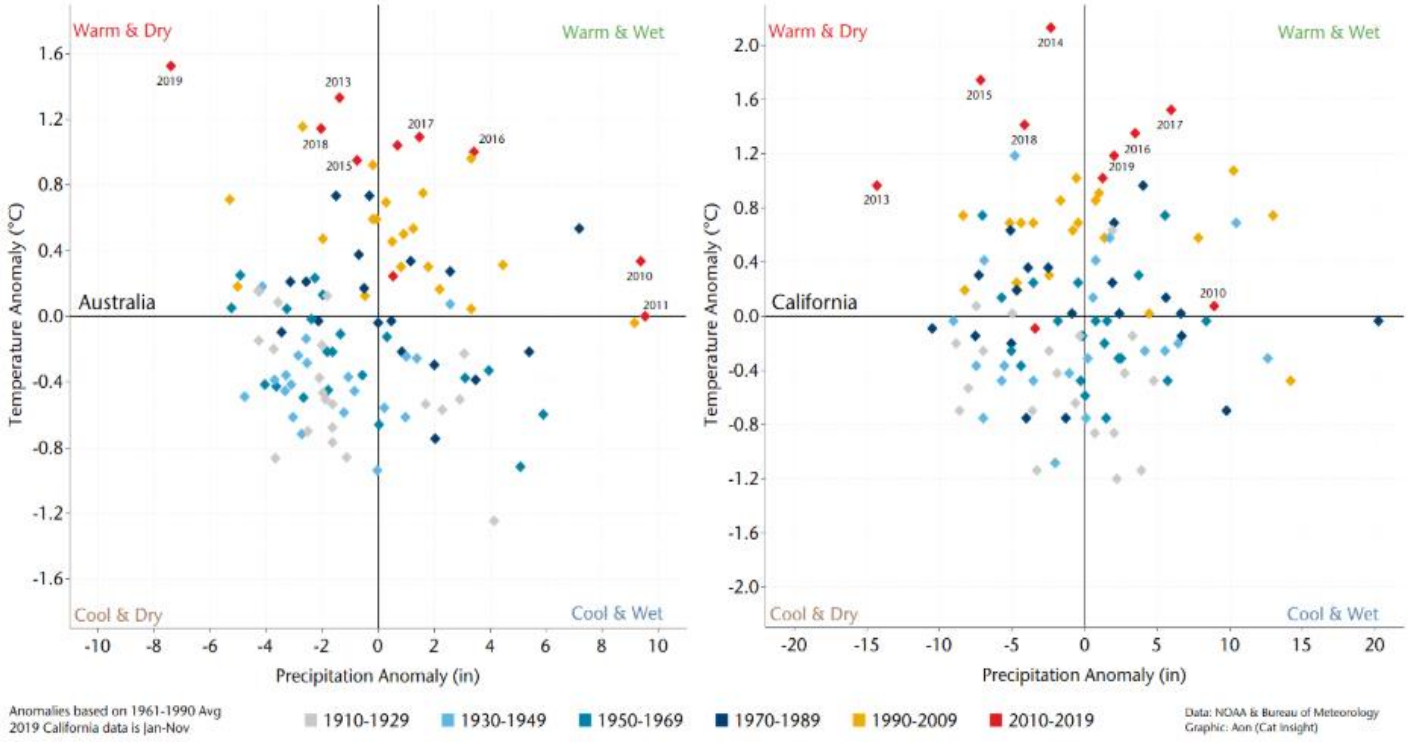

Figure 1.2: The temperature and precipitation maps compare long-term and recent annual patterns in both Australia and California. In both instances, there is a notable warming trend since 1990. This has coincided with increased volatility (spikes and declines) in precipitation patterns. Such conditions are consistent with what scientific literature has suggested will occur in a warming world. These types of patterns are notable for bushfire since elevated rain years followed by drought will cause any new vegetative growth to quickly die out and become fuel for rapid fire spread if ignition occurs [viii].

Analysis: the impact of Australia's bushfires on reinsurance

[i] Source: https://www.theguardian.com/australia-news/datablog/ng-interactive/2019/dec/07/how-big-are-the-fires-burning-onthe-east-coast-of-australia-interactive-map

[ii] Source: https://knowledge.aidr.org.au/resources/bushfire-new-south-wales-1974/

[iii] Sources: State Fire Departments for burnt extent data; PSMA's G-NAF address database for property density.

[iv] Source: Aon Impact Forecasting, 2020

[v] Source: Insurance Council of Australia's Catastrophe Database (1967-Present) (2020) combined with historical burnt extent data published by VIC CFA and FFM. https://www.icadataglobe.com/access-catastrophe-data

[vi] Source: Insurance Council of Australia's Catastrophe Database (1967-Present) (2020) combined with historical burnt extent data published by VIC CFA and FFM. https://www.icadataglobe.com/access-catastrophe-data

[vii] http://www.bom.gov.au/climate/current/annual/aus/

[viii] Aon Impact Forecasting, 2020

[ix] Source: https://www.icadataglobe.com/access-catastrophe-data

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