Emergency Leaders
for Climate Action

Prepare or Pay:

Counting the Cost of Climate-fuelled Bushfires

Emergency Leaders for Climate Action (ELCA) fights for greater protection of communities from climate-fuelled disasters and to ensure effective responses when disasters occur.

Drawing upon the expertise of its members, including 37 former state and territory heads of emergency management and fire services, ELCA works with civil society organisations, the private sector and governments to shape policies and investments that minimise disaster risks and support effective response and recovery.

ELCA acknowledges the Traditional Owners of the lands on which we live, meet and work. We wish to pay our respects to Elders, past and present, and recognise the continuous connection of Aboriginal and Torres Strait Islander peoples to land, sea and sky. We acknowledge the ongoing leadership of First Nations people here and worldwide in protecting Country, and securing a safe and liveable climate for us all.

This report would not have been possible without the support of Climate Councillor Janice Lee, and bushfire modelling work completed by Jessica Yu, Director and Reza Gharibnavaz, Senior Advisor, at Connell Griffin.

ELCA would like to thank Professor David Bowman from the University of Tasmania and Professor Jason Sharples from the University of New South Wales (Canberra) and Climate Councillor Nicki Hutley for their generosity in reviewing this report and providing feedback.

Published by Emergency Leaders for Climate Action and the Climate Council of Australia Ltd.

ISBN: 978-1-923329-31-7 (print)
978-1-923329-30-0 (digital)

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Cover Image: Firefighters return to Briagolong base camp after battling bushfires on December 10, 2006 in Melbourne, Australia. Credit: Quinn Rooney / Getty Images.

This report is printed on 100% recycled paper.

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Key Findings

1 New modelling shows bushfires will cost Australia an average of $6 billion a year over the next 30 years, as climate change drives more frequent major fires.

- The $6 billion bill includes lost homes (17%), damaged businesses and public buildings (20%), harm to health and wellbeing (32%), lost trade (25%) and lost work (6%).
- This is the first national study to show what cutting that damage is worth: making fires a fifth less damaging could protect more than 5,600 jobs every year.
- Insurance data shows bushfire years and events costing more than $500 million in insured losses are already more frequent than 25 years ago.
- The modelling factors in a new era of climate-fuelled disasters, with major fires striking every three to four years as pollution from coal, oil and gas worsens fire weather.
- Actual costs are likely to be higher, as the modelling excludes anything that can't be accurately quantified such as the loss of wildlife, damage to ecosystems or loss of cultural heritage.

2 Climate pollution has driven a step change in bushfires, making them more ferocious, damaging and costly.

- **Deadlier days:** Southeast Australia now experiences 14 more days a year of extreme fire weather than before 1998.
- **More often:** Victoria's worst fires used to hit once in a generation, or about 40 years apart. Three have struck in the past 18 years.
- **Fire storms:** Recorded extreme fire-generated storms have risen six-fold, from 20 in 1983–2003 to 121 in 2004–2024.
- **Dry lightning:** Forests in southeast Australia recorded 50% more dry lightning strikes in 2000–2016 than in the previous two decades, sparking more remote fires.
- **Higher losses:** Almost half of the 14,000 homes lost to bushfires in Australia since 1901 were destroyed after 2001.

3 The next two summers pose a significant risk to communities, as a hotter climate and strengthening El Niño collide.

- The El Niño underway is tracking as the strongest on record, and comes on top of the highest levels of climate pollution in human history.
- In some high risk areas, insurance premiums have risen by as much as 400% after major fires, and some properties can't get bushfire cover at all, leaving families exposed when the next fire hits.
- Many people also underestimate the risks: just before the 2026 Victorian fire season, the Country Fire Authority found half the residents in bushfire-prone areas didn't view bushfires as a threat.
- Inquiries have found face-to-face community engagement through local brigades is highly effective, but faces resourcing challenges.

4 Firefighters are facing longer, fiercer fire seasons with fewer volunteers and less backup across jurisdictions.

- Australia had 10,336 fewer firefighting volunteers in 2023/24 than four years earlier, while paid positions grew by only 433.
- Fire seasons are 21% longer than in 1979, which is shrinking the window available for hazard reduction burning and limiting the ability of states and territories to assist each other during major fires.
- Our fire seasons also increasingly overlap with North America's. During Black Summer, 11 of the 12 large air tankers Australia used came from overseas.
- Every extra firefighter, aircraft and early warning counts: in NSW during Black Summer, firefighters saved almost six homes for every one lost.

5 Better preparation could save lives and billions of dollars, while cutting climate pollution will limit how bad fires become.

- The same modelling found that the more bushfire damage we prevent through better preparation, the more jobs and income we save.
- Governments can help communities prepare by finalising and funding a detailed National Adaptation Plan, including measures to:
  - ensure communities have access to the knowledge and information they need to co-develop solutions to locally identified risks.
  - retrofit homes at highest risk to the national bushfire standard, at an estimated average cost of $39,466 per home;
  - ensure at least 48 hours of backup power for mobile towers in high-risk areas, so warnings and emergency calls get through;
  - invest in early detection and rapid response to stop fires before they get out of control; and
  - build a sovereign aerial firefighting capability that reduces our reliance on overseas aircraft, as fire seasons increasingly overlap.
- To help limit how bad fires become, the Australian Government must cut climate pollution from coal, oil and gas further and faster, by:
  - strengthening the Safeguard Mechanism, so big polluters can't use loopholes and offsets to delay pollution cuts;
  - stopping approvals of new or expanded coal and gas projects; and
  - capping the diesel fuel tax handout to big mining corporations to reinvest the savings in better preparation.

Bushfires will cost Australia $6 billion a year, but better preparation can cut that bill.

Introduction

The total cost of a bushfire is difficult to measure: how can a dollar figure be put on a lost home full of treasured family photos and keepsakes? Or the loss felt when bushland alive with bird song and cultural significance becomes silent and blackened. Let alone the loss of loved ones, like on Black Saturday 2009 when 173 people's lives were devastatingly cut short.

Some losses cannot be counted. Those that can be measured are growing.

Bushfires have long been a part of Australia's landscape, but pollution from the burning of coal, oil and gas has made our fire seasons longer, hotter and more dangerous. Against the background of a hotter climate and decades of worsening fires, an El Niño event - that raises the risk of catastrophic fires - is building towards being the strongest on record (BoM 2026). This dangerous double act is setting the scene for record heat, flash drought, and the possibility of worsening bushfires over the coming summers.

While trying to prepare for ever-worsening bushfire seasons, Australia's fire services are being asked to do the impossible: keep pace with a major step-change in bushfire risk driven by an overheating climate. Bushfire seasons now start earlier and finish later, there are fewer, shorter windows to carry out vital hazard reduction, and overlapping bushfire seasons nationally and internationally mean that extra help isn't always available when fire services can't spare resources to support others. This has put fire and land management agencies under increasing strain, and placed more pressure on a shrinking pool of volunteer firefighters.

Costs to all Australians from bushfires are climbing, with more Australians now living in harm's way. Significant fires and fire seasons causing insured losses greater than $500 million (normalised to 2022 values) have become more frequent over the past 25 years.

Image: *A Country Fire Authority (CFA) volunteer takes a break.*

New economic modelling commissioned by Emergency Leaders for Climate Action quantifies that burden in the most up-to-date figures with bushfires costing the Australian economy an average of $6 billion a year. Cutting pollution from coal, oil and gas faster and more deeply worldwide can limit how severe future bushfires become, while greater government investment in preparedness can reduce their cost. Bushfires are projected to cost more than $180 billion over the next 30 years.

These costs, losses and associated misery are not inevitable.

The economic modelling by ConnellGriffin shows that the more damage better preparation prevents, the more jobs and income we save. This report sets out how deeper cuts to climate pollution, together with smart investment in fire agencies, households and communities, can meaningfully reduce the cost of bushfires in the decades ahead.

Every cut to climate pollution and every dollar invested in preparedness means more homes saved, more communities recovering faster, and fewer families counting what they've lost. The choice is ours, and the time to act is now.

CHAPTER 1

Fuelling The Fire: How Climate Pollution Worsens Bushfires

How dangerous a bushfire becomes once it starts depends on weather and landscape conditions: how dry soil and vegetation is, how much potential fuel, and how hot and windy the day is. Climate pollution loads the dice to worsen most of these conditions.

When we burn coal, oil and gas, resulting pollution acts like a blanket around the planet and traps heat. That extra heat dries out forests, grasslands and soils, so more of the landscape is ready to burn. It pushes up temperatures and creates more of the dangerous fire weather that turns fires into disasters. And, in parts of Australia, it's resulted in more dry lightning, sparking multiple fires in places firefighters often struggle to reach.

The result? A step change in fire conditions that's putting Australian fire services and the communities they protect under severe threat.

Image: *Aerial view of bushfire in Sydney, Australia.*

Five Ways Fire Risk is Changing

1. BIGGER, MORE INTENSE BUSHFIRES

Climate pollution has driven a sharp rise in dangerous fire weather over the past three decades, with fires burning larger areas and causing greater losses. Since 1998, southeast Australia has averaged an extra 14 days of extreme fire danger (those in the worst 5% on record or 95th percentile) compared to 1958-1997 (Richardson et al. 2021). This shift is consistent with the findings of other studies that point to how dangerous fire weather worsened across many parts of Australia in the late 1990s and early 2000s (Jones and Ricketts 2023; Harris and Lucas 2019). Human-caused warming has driven a worsening of bushfire risk in Australia with the likelihood of the weather conditions that led to the Black Summer bushfires at least 30% more likely since 1901, and four times more likely to occur if the planet warms by 2°C (van Oldenborgh et al., 2021).

Dangerous fire weather days are not only more common, but are also more likely to hit for several days in a row. From 1998 to 2019, stretches of three or more days of extreme fire danger were twice as likely to occur compared to 1958-1997 (Richardson et al. 2021). Several days of serious fire danger in a row can overwhelm firefighting resources, deny firefighting crews the chance to control fires overnight, and result in increased property losses.

Australians are already living with the consequences of worsening fire weather and more dangerous fires. After Black Saturday in 2009, Australia introduced a new top-tier fire danger rating of “Catastrophic” because fire conditions - driven by climate pollution - had pushed beyond the previous scale (Hollis et al. 2024). During the 2019/20 Black Summer bushfires, fire agencies recorded multiple days of Catastrophic fire danger, including six in parts of New South Wales and five in South Australia (Owens & O’Kane 2020; Keelty 2020). On 9 January 2026, Catastrophic fire danger hit four of Victoria's weather districts at once (Parliament of Victoria 2026).

In Australia, Extreme and Catastrophic fire weather conditions result in the greatest losses of life, homes, and infrastructure, because fires become uncontrollable and new ignitions are more likely. This can force firefighters to concentrate solely on saving lives.

Australian fire seasons have lengthened by 21% since 1979.

Image: *Forest fire at night.*

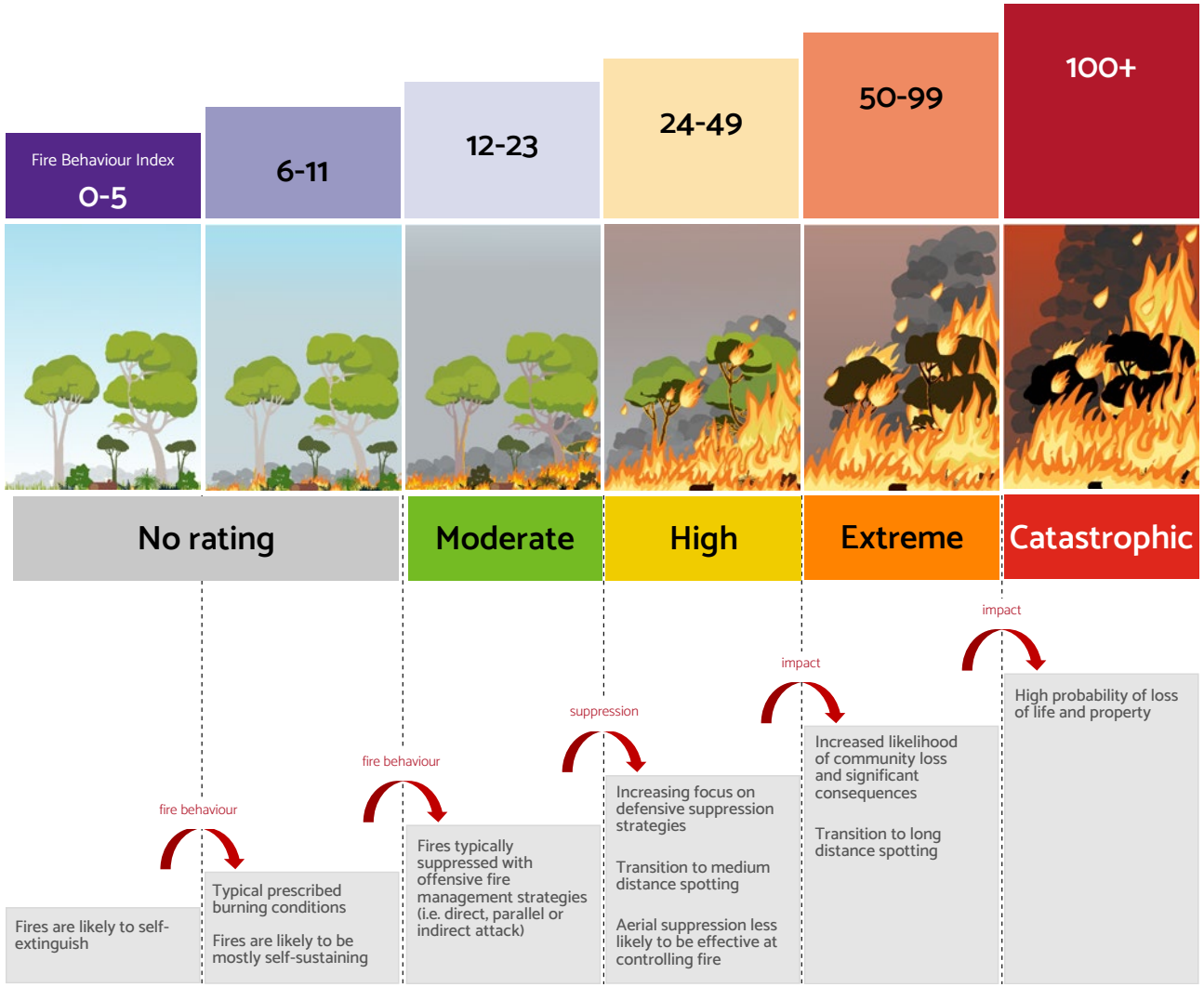


Figure 1: *The higher the fire danger, the greater the losses. Up to 70% of house losses to fire have occurred under Catastrophic conditions with categories outlined by the Fire Behaviour Index for Forest Fuels.* **Source:** *AFDRS Quick Guide: Forests.*

As climate pollution has worsened fire weather, the forest area burned during major bushfires has increased dramatically. Between the 1930s and 2000, there was only a single year when more than one million hectares of Australian forests burned (Canadell et al. 2021). Since 2000 it has happened three times. The average area of forest burned by bushfires each year rose by 350% between 1988–2001 and 2002–2018 (Canadell et al. 2021).

The area of forest burned each year has more than quadrupled since the turn of the century.

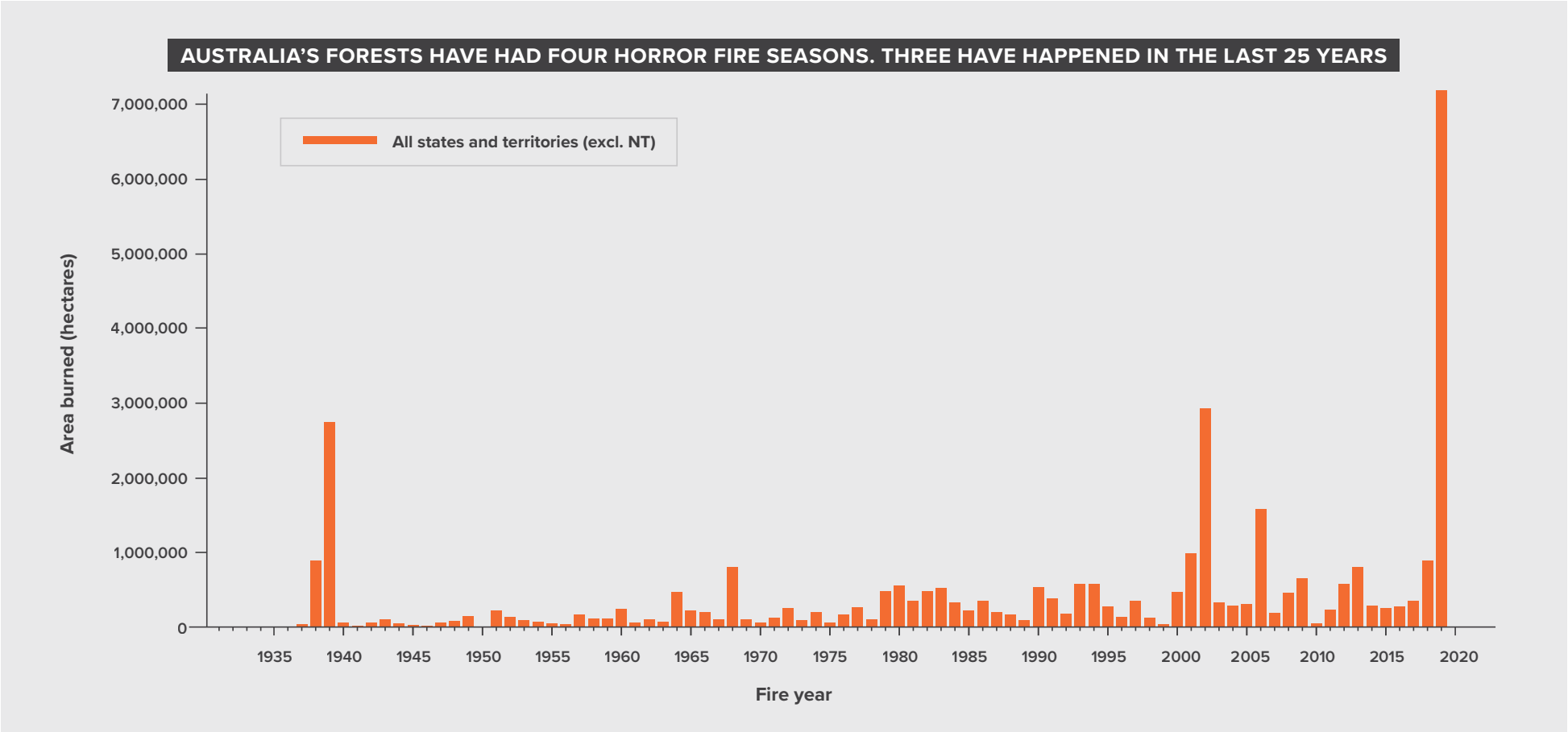


Figure 2: *Four horror fire seasons: Three in the last 25 years.* **Source:** *Canadell et al. 2021.*

Devastating fires that arrived once in a generation now occur far more often.

2. MAJOR FIRES HITTING MORE OFTEN

From the 1990s onwards, climate pollution has fuelled more intense and frequent bushfires across Australia, producing a succession of fires without historical precedent:

> Canberra 2003 - an urban conflagration with the world's first-recorded fire generated tornado and the fastest rate of fire spread ever recorded (Doogan et al. 2006).

> Victoria 2009 - Record fire conditions beyond anything on record that killed 173 people (Bowman and Murphy 2011); and

> 2019/20 Black Summer bushfires - unprecedented fires that burned across the nation for months on end, with every state and territory impacted, 33 people killed, and thousands of buildings destroyed.

Victoria used to face its most devastating fire seasons roughly once every 40 years: 1851, 1898, 1939, 1983. That pattern has broken. Three of the state's worst events on record have all hit within the last 18 years: Black Saturday (2009), Black Summer (2019/20) and the January 2026 fires demonstrate that the worst fire weather conditions are recurring more often (Climate Council 2026a).

Worsening bushfires are also affecting states that once considered bushfires to be a lesser risk. In Queensland, bushfires now sit alongside cyclones and floods as a major hazard, with dangerous fire seasons recorded in 2011, 2018, 2019, 2020 and 2023 (Queensland Government 2023). In 2023, major fires struck in February and March and then again from September. More homes were lost in the state over the near-continuous 11-month fire season than were lost in Queensland during the Black Summer bushfires. It pushed the state's firefighting capacity to its limits, and required interstate crews to relieve exhausted firefighters (AIDR 2023, 2024; ABC 2023).

Image: *Australian Parliament House in bushfire smoke.*

3. FIRE SEASONS STARTING EARLIER, AND FINISHING LATER

More than 20 years ago, scientists warned that climate change would increase the frequency, intensity and size of fires and extend periods of fuel drying (Ellis, Kanowski & Whelan 2004). That warning is now our reality: fire seasons across Australia have lengthened by 21% since 1979 (Jones et al. 2022).

Earlier fire seasons are now something state and territory fire agencies routinely prepare for. In 2019, the NSW fire season started in the middle of winter (July 1) - three months ahead of the Statutory Bush Fire Danger Period (AIDR 2020). In 2023, both Queensland and Tasmania dealt with earlier starts to their traditional fire seasons (AIDR 2024). In 2025, Victorian fire agencies brought their preparations forward by two months after years of below-average rainfall and hotter conditions dried out grasslands early (Parliament of Victoria 2026).

Fire seasons are also running for longer. After bushfires hit western Sydney in April 2018, an independent review warned that: “NSW faces a fire season that can run for eight months of the year” (Keelty 2018). It proved prescient: the following year the state’s Black Summer fire season ran for nine months (July 2019 through to March 2020).

CALLING IN OUTSIDE HELP IS GETTING HARDER

For decades, Australia, New Zealand, Canada and the USA have shared firefighting equipment and personnel when fire seasons overwhelm local capacity. During Black Summer (2019/20), hundreds of overseas firefighters came to help, and 11 of the 12 large air tankers used were sourced from overseas (Richardson et al. 2022). The arrangement worked because northern and southern hemisphere fire seasons had historically occurred at different times of year.

That is changing. Between 1958 and 2000, dangerous fire weather in eastern Australia and western North America overlapped only once. Since 2000, it has happened at least seven times, and the length of that overlap has been growing by one day each year since 1979 (Richardson et al. 2022; Richardson et al. 2025).

Since Black Summer, governments have invested in Australia’s own aerial firefighting fleet. However, national capability for large air tankers still relies almost entirely (all but one) on contracted arrangements with private aircraft companies based in the northern hemisphere (Binskin 2020; NEMA 2024; NEMA 2025). As fire seasons lengthen and overlap across both hemispheres, that contracting model will come under increasing pressure.

Image: *Helicopter dumping water on a wildfire.*

4. FIRES CREATING THEIR OWN WEATHER AND STORMS

Many of the most destructive climate-fuelled bushfires Australians have faced in recent years share a common feature: pyroconvective (pyroCb) events, or fire-generated storms.

These form when large fires generate intense heat and convection columns that can reach into the stratosphere, forming pyrocumulonimbus storm clouds. A pyroCb can cause already intense fires to expand and behave explosively, with storm-force winds coming from different directions (storm squalls), collapsed storm cells, and lightning that ignites new fires up to 100km away (see Dowdy et al. 2017), and downdrafts that can damage buildings, fire trucks, and flatten trees[1]

PyroCb events were once rare, but as the climate warms, are now becoming more frequent worldwide (Peterson et al. 2025, Ma, Sharples and Jovanoski 2026). In 2026, France recorded its first recorded pyroCb event during its worst fire season (Bowman, Cunningham and Williamson 2026).

Four violent pyroCbs were recorded during the Canberra 2003 firestorm, including one near McIntyres Hut that produced the world's first recorded fire-generated tornado (Fromm 2006; McRae 2026). Five more occurred during the 2009 Black Saturday bushfires; the nation's deadliest fire event. Both were eclipsed during Black Summer 2019/20, when up to 45 were recorded (Climate Council 2026a). The pyroCb register shows how much more frequently these events are occurring: with 20 events recorded between 1983 and 2003, compared to 121 between 2004 and 2024; a six-fold increase (McRae 2026).

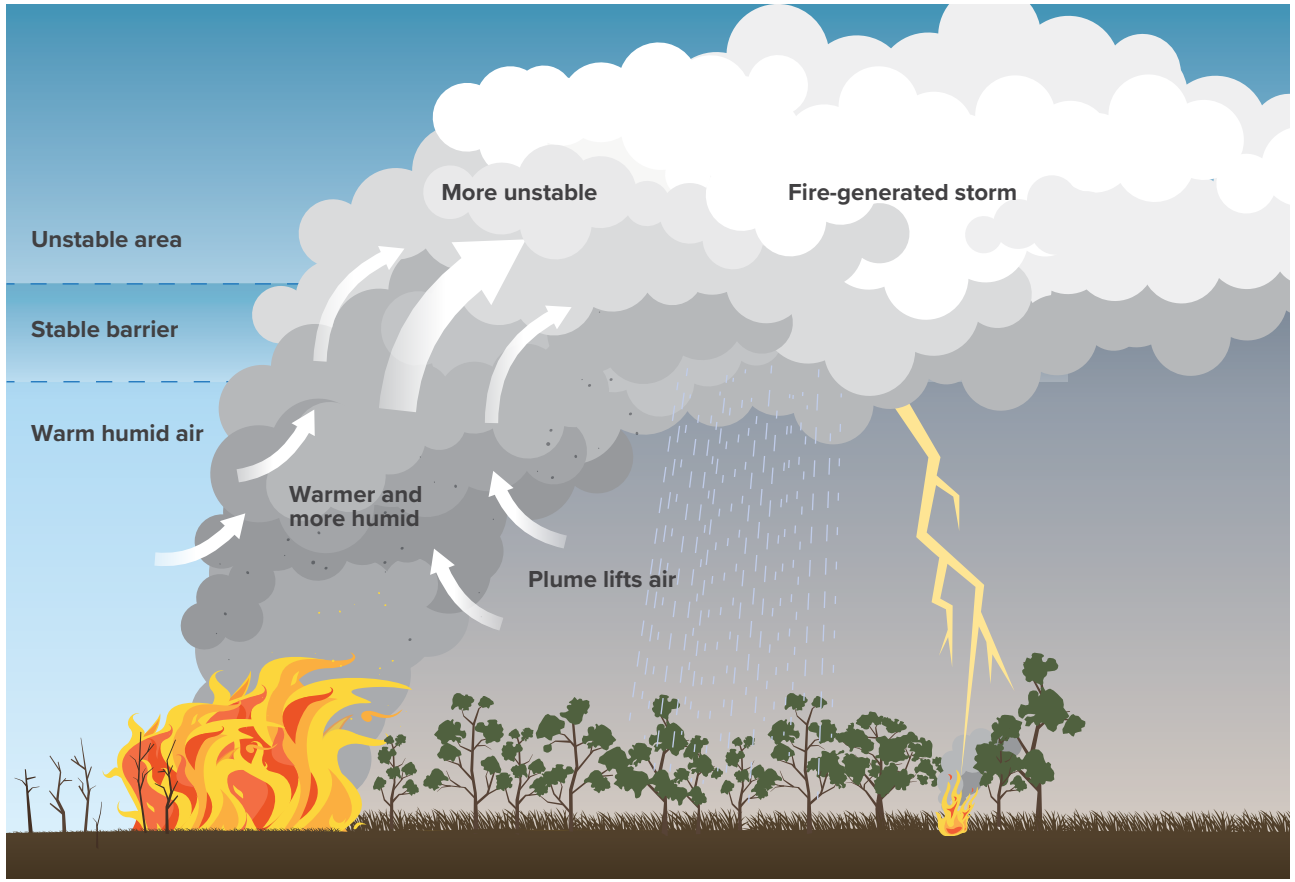


Figure 3: *Pyroconvective storm development.* **Source:** *Adapted from BoM 2020 (ELCA and Climate Council 2023).*

1 For a more detailed explanation on pyroCbs see Climate Council 2026a and Climate Council and ELCA 2026

When a pyroCb occurs, the fire's behaviour is beyond the capacity of existing firefighting equipment or technologies. Firefighting aircraft must be grounded, and firefighting crews are often forced to seek refuge. If firefighting services cannot safely operate at the height of a pyroCb, communities can be forced to fend for themselves.

When fires create their own storms, no aircraft or fire truck can stop them.

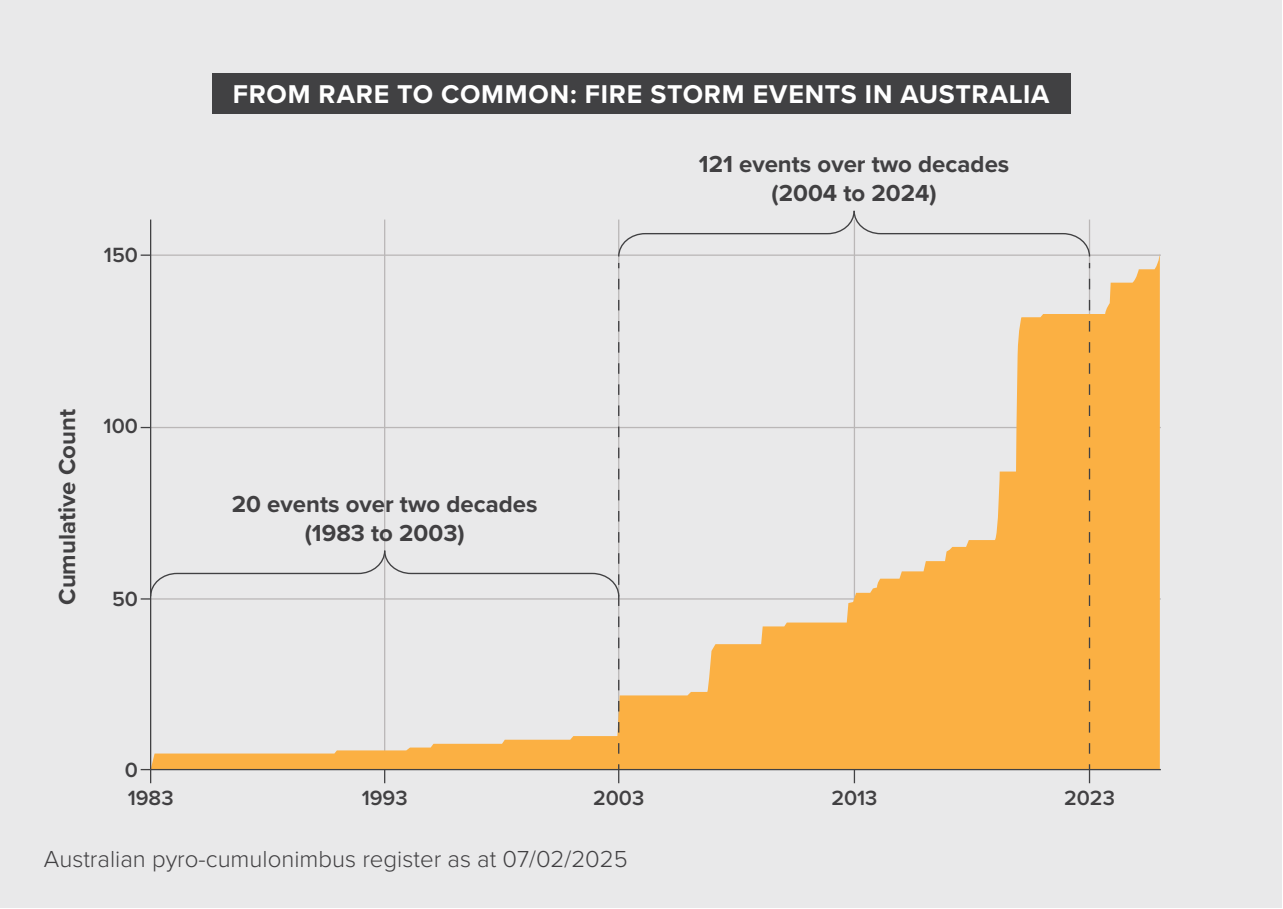


Figure 4: *Pyrocumulonimbus events are now a regular occurrence in a hotter, more volatile climate.*

5. MORE DRY LIGHTNING, MORE REMOTE FIRES

The drying climate in southeast and southwest Australia and a trend of more dry lightning storms associated with the warming climate is increasing the risk of remote fires. Lightning strikes often start fires in remote mountainous areas that are difficult for fire agencies to access to establish early control. If coupled with Extreme and Catastrophic fire weather conditions, these fires can grow quickly then burn for weeks or even months causing significant damage.

Dry lightning ignited some of Black Summer's largest and most destructive fires, including the Gospers Mountain fire complex, which burned more than one million hectares. In NSW during the 2019/20 season, fires started by lightning burnt an area six times larger than fires caused by human actions, and caused 58% of house losses (Nolan et al. 2021).

Dry lightning is now more common in parts of Australia, raising the risk of remote fires.

Image: *Wildfire is burning trees and grass in forest.*

Image: *Tasmania Fire Service conducting a planned fuel reduction burn.*

An overall drying trend is also putting places at risk that were once too wet to burn intensely and therefore were not considered fire-prone. Fires started by dry lightning threatened Tasmania's Wilderness World Heritage Area (TWWHA) in 2013, 2016, 2018/2019 and again in 2024/25 (Bowman and Lehman 2025). These ancient Gondwana forests had historically been too wet to burn intensely, and are not adapted to intense fire. When they do burn it can take decades or centuries to recover, if they do at all.

Forested areas of southeast Australia recorded 50% more dry lightning between 2000 and 2016 than in the two preceding decades (Canadell et al. 2021). Tasmania recorded a significant increase in lightning-ignited bushfires between 1980 and 2019 (Wickramasinghe et al. 2025), and dry lightning storms are projected to become more frequent as the climate warms (Bowman and Lehman 2025).

Tackling fires started by lightning in remote hard to access areas will increasingly require rapid fire detection technologies such as AI cameras and satellites, dedicated aerial firefighting response including firefighting drones (yet to be developed) and conventional firefighting aircraft, and larger numbers of highly-trained remote area firefighting teams (RAFT). During the 2019/20 Black Summer bushfires there were insufficient RAFT available to put out numerous remote fires, highlighting that more investment in remote area firefighting is needed (Owens & O'Kane 2020).

CHAPTER 2

Bushfire Damage Costs Australians $6 Billion Per Year

Over the past 50 years, the majority of insured losses due to bushfires were incurred during a handful of major events, including 1983's Ash Wednesday. Major fire years and events with insurance losses of $500 million or more (normalised to 2022 values) have occurred more frequently over the past 25 years - including the 2003 Canberra bushfires, the 2009 Black Saturday bushfires, and the 2019/20 Black Summer bushfires (ICA 2026). There is growing evidence that Australia has entered a new era of fire risk, driven by fire weather supercharged by climate pollution, and by more people living where suburbs meet the bush.

In order to provide the most up to date information possible, Emergency Leaders for Climate Action (ELCA) commissioned economic modelling from ConnellGriffin to estimate what bushfires will cost Australia over the next 30 years, and whether or not investment in better preparedness could reduce costs. The analysis followed four steps, shown below.

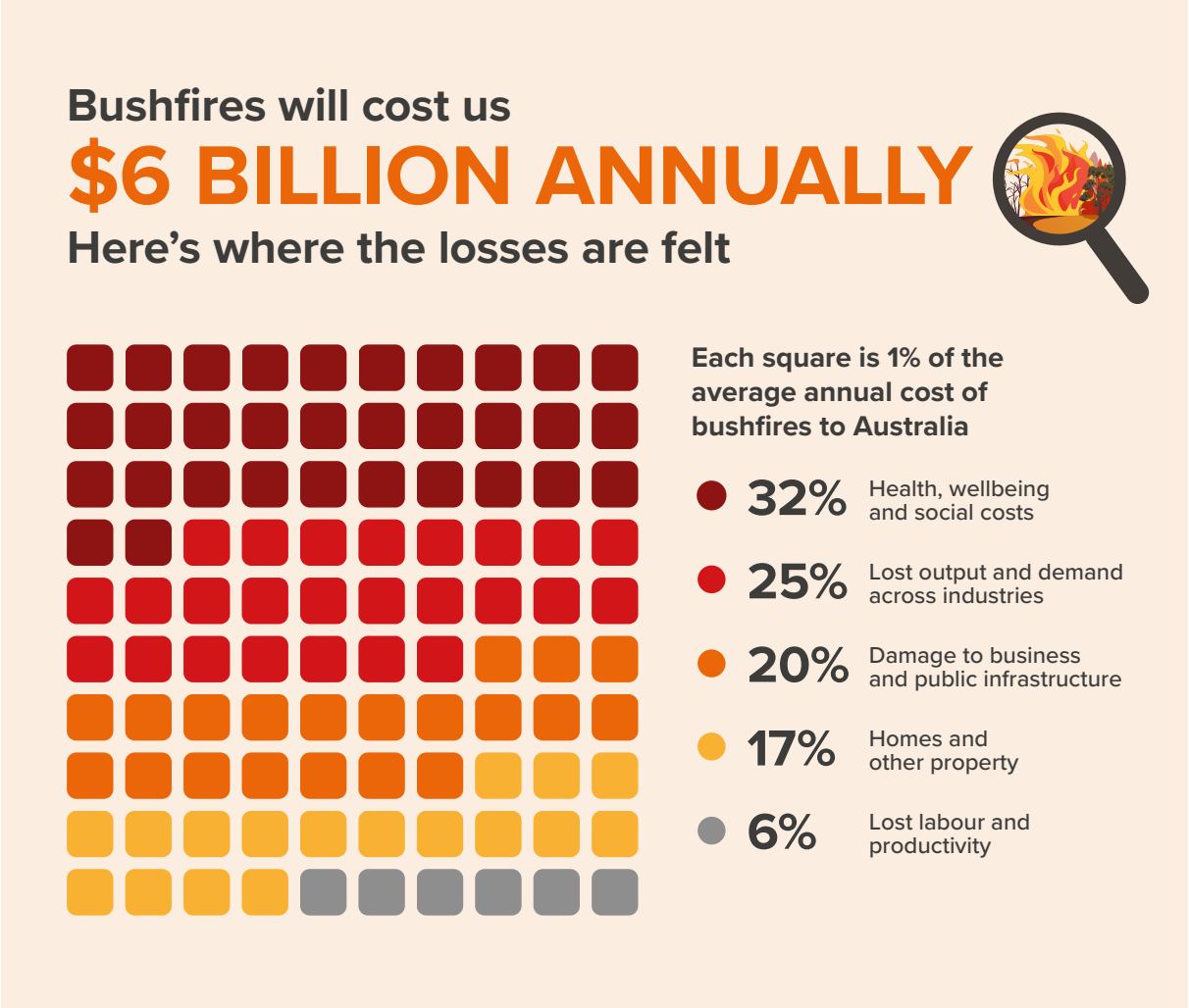


Figure 5: *Harm to peoples health and well-being makes up the largest share of bushfire costs.* **Source:** *ConnellGriffin modelling for ELCA (2026). Prepare or Pay.*

ESTABLISHING THE COSTS OF SOCIALLY AND ECONOMICALLY DAMAGING BUSHFIRE EVENTS

1 Establishing what bushfires cost today

Insured losses can show how often and where socially and economically disastrous fires occur, which can inform modelling of future bushfire costs. The normalised value of historical bushfire losses has been highest for Victoria (50%) and then Tasmania (22%), followed by NSW (9%), SA (9%), the ACT (7%), WA (3%) and Queensland (0%). However, NSW accounted for 81% of insured losses arising from Black Summer, signifying how insured losses across jurisdictions may change over time.

The broader bushfire impact literature indicates that the total economic and social impacts can be several times the value of direct losses, with estimated multipliers ranging from approximately 3 to 5.3 across studies. The full methodology for the multipliers applied to the bushfire costs are provided in Appendix 1.

2 Projecting how often damaging fires will occur

Climate change is driving more frequent and intense bushfires. ConnellGriffin drew on projections from the *Independent Review of Commonwealth Disaster Funding* of extreme fire weather days, defined as being equal to or above the 95th percentile for the worst fire weather.

Between 1995 and 2014, the highest state average was 20.7 days a year. By 2050, that peak is projected to reach 28.3 days under a low emissions scenario and 31 under a high emissions scenario (SSP3-7.0), an increase of 37–50%. NSW, Victoria and Western Australia face the biggest increases.

The midpoint of the historical number of extreme fire weather days per year and increases projected under a high emissions scenario, along with recent climate research (Dowdy and King 2025) and interviews with fire weather experts, informed assumptions about how often fires of different severity will occur. ConnellGriffin grouped fires into three bands: Compound major / disaster level events (Black Summer-scale) occurring once every 30 years, major fire events occurring every four years to 2040 and then every three years after that, and other damaging fires occurring annually.

3 Modelling the impact on the national economy

To understand how the increasing frequency of major bushfire events impacts the broader Australian economy, ConnellGriffin mapped the data on bushfire impacts, their costs and distribution to a Computable General Equilibrium (CGE) framework. CGE modelling can capture the direct and indirect costs of an economic shock including how labour, capital and other resources are reallocated across industries, households, governments and trade in response to an economic shock.

4 Testing the benefits of better preparedness

ConnellGriffin modelled two illustrative scenarios to understand how greater levels of bushfire preparedness would impact the national economy. The first assumes that greater investment in bushfire preparedness reduces bushfire damages by 10%, the second by 20%.

Both scenarios were tested against evidence from bushfire inquiries, other research and expert advice on what measures like early detection, fuel management and home hardening can achieve. They test - and demonstrate - what better preparedness could be worth to the economy. They are not predictions of what any single program could deliver.

ConnellGriffin developed an annual bushfire cost estimate based on three categories of bushfire severity, each with its own cost and expected recurrence (Table 1 right).

A disastrous Black Summer-scale event costs an estimated $27.7 billion (in current dollar terms) and is assumed to recur roughly once every 30 years. This is a conservative estimate likely to be exceeded as the planet continues to overheat. In the next band, major fire events are estimated to cost $16.1 billion on average, are assumed to occur every four years until 2040, and then every three years thereafter. The last category of "other damaging fires" is modelled to cost $1.2 billion each year on average and occur most years. Modelling calculated that the average cost of bushfires overall to the Australian economy is $6.04 billion a year, a cumulative burden of $181.7 billion out to 2055–56 (ConnellGriffin 2026). The modelling also assumes no overlap between the severity bands.

Table 1: *Bushfire cost severity bands.*

Fire type	Description
Compound major / disaster level events	Bushfires or fire seasons that are among the worst recorded, leading to the highest social and economic losses. They are characterised by well above-average Catastrophic and Extreme Fire Danger Days, widespread fire-generated storms (pyroCbs) and major property losses. National resource sharing arrangements reach their limit, and are potentially overwhelmed (Example: Black Summer 2019/20.)
Major fire events	Above average to Catastrophic bushfire seasons and events. An individual state or territory experiences an above-average to worst-on-record fire or fire season, while other states and territories face heightened bushfire risks. These are characterised by Catastrophic, and Extreme Fire Danger days, and the presence of pyroCB (potentially several). Property losses range from hundreds to thousands. Individual jurisdictional fire response required interstate and at times international support. (Captures a range of major fire types, such as Canberra 2003, NSW 2013, Black Saturday 2009)
Other damaging fires	Characterised by fire seasons and events that can largely be dealt with by state and territory resources, but still incur significant losses from private property damage. Average number of dangerous fire weather days.

Costly, major fires are already more common due to climate pollution.

Image: *Aerial view of bushfire in Sydney, Australia.*

The direct impacts of bushfires on people, their wellbeing and health account for the largest share (32%) of the costs. This is followed by sector output and demand losses, for example farmers unable to harvest or tour bookings being cancelled (25%), productive private and public capital damage, such as office buildings, schools (20%), residential and other non-productive asset damage like homes and sheds (17%) and lost work and productivity losses for example, lost shifts when businesses are forced to close due to fires (6%) (ConnellGriffin 2026).

These estimates are likely to understate the full cost of bushfires because they exclude environmental, some social costs or the destruction of cultural heritage, for example Aboriginal and Torres Strait Islander cultural sites and don't account for growth in the homes, people and assets exposed to fire.

Table 2: *Estimated average annual bushfire costs 2025-2055*[2].

Severity band	Cost per event ($bn, FY2025)	Net events used	Average annual cost ($bn, FY2025)
Compound major / disaster level events	$27.7	1	$0.9
Major fire event	$16.1	8	$4.3
Other damaging fires	$1.20	21	$0.8
Total average annual cost			$6.0
Total economic costs	Undiscounted over 30 years		$181.7
	Discounted over 30 years		$72.6

32%

people, their wellbeing and health

25%

sector output and demand losses

20%

productive private and public capital damage

17%

residential and other non-productive asset damage

6%

labour and total factor other productivity losses

2 These are conservative estimates of annualised bushfire costs. The costs for a Black Summer type event exclude environmental and ecological costs. More information on the methodology is available in the Appendix.

CHAPTER 3

Fire Agencies and Communities Paying the Price

The intensity and extended duration of the Black Summer fires meant that many paid and volunteer firefighters were left exhausted, suffering from fatigue and financial loss. This was the experience for many South Australian firefighters, who had helped fight fires in Queensland and New South Wales and were then too exhausted or could no longer commit to firefighting when fire danger peaked in South Australia in December 2019 and January 2020 (Keelty 2020). Federal and state governments instituted an income supplementation scheme for volunteer firefighters, particularly the self-employed, who had been fighting fires and receiving little or no income for weeks and months on end (ABC 2019).

Nationally there are fewer firefighting volunteers than during Black Summer

In the years following the 2019/20 Black Summer bushfires, volunteer firefighter numbers have declined. In 2023/24, there were 10,336 fewer people volunteering their time with Australian firefighting agencies compared to four years earlier, effectively a loss of seven percent of the volunteer base that responded to fires during the Black Summer bushfires. During the same period, paid fire fighting positions measured as full time equivalent (FTE) increased by just 433 people (Productivity Commission 2026).[3] Most paid firefighters work with urban fire and rescue services but are trained and equipped to deal with bushfires in the urban / bushland interface. Others are employed by national park and forestry agencies, but in relatively small numbers. Volunteers are primary first responders to bushfires in regional and rural locations across Australia and the small increase in paid firefighter positions does little to make up for the reduction in volunteer numbers.

Climate-fuelled bushfires are outpacing firefighting capacity and capability

Worsening fire weather and bushfires fuelled by climate change are outpacing state and territory government's efforts to build firefighting capacity and capability. In the aftermath of the 2019/20 Black Summer bushfires the Royal Commission into National Natural Disaster Arrangements found that low numbers of Level 3[4] Incident Controllers, aviation specialists and fire behaviour analysts represented a systemic national vulnerability (Binskin et al. 2020). Six years on these challenges persist. During the January 2026 Victorian bushfires, concurrent fire risks in South Australia and Western Australia constrained the pool of domestic resources that could be shared. Victorian requests for Deployment Managers, Incident Management Teams and specialised aviation roles were not always able to be immediately met as these specialist roles had significant responsibilities within their own jurisdictions (AFAC 2026). Victoria sought additional overseas assistance from New Zealand and Canada (AIDR 2026).

The increasing frequency of intense bushfire seasons, longer fire seasons, and the threat of back-to-back major fire seasons will inevitably mean that baseline funding for fire agencies must increase to expand paid workforces, better support volunteers, and update equipment, technology and infrastructure. In the decade to 2024/25, Victorian fire agency costs grew by 29% from $1.844 billion to $2.386 billion (Productivity Commission 2026).

Nationally, volunteer firefighter numbers have shrunk since the Black Summer bushfires.

3 The methodology for counting volunteer firefighters changed in NSW in 2024/25. For this reason the analysis above focuses on the years 2019/20 to 2023/24. The reduction in firefighting volunteers across Australia was due largely to declines in NSW, Victoria and Queensland. South Australia and Western Australia have seen some improvements.

4 Qualified to manage large bushfires requiring complex multi-agency and regional support (DBCA 2025; AFAC 2023)

Risk Frontiers have estimated that the costs that Victorian agencies incur from major fire events and seasons could reach close to $6 billion by 2055 to meet the twin challenges of worsening climate-fuelled fire weather conditions and greater demand on fire agency personnel and equipment (VIC IGEM 2020).[5] That projection appears increasingly likely. However, given the trajectory of worsening fire weather, with one study predicting that the record fire weather during Black Summer could become an "average summer" by 2040 (Sanderson & Fisher, 2020), it could end up conservative.

Almost one-in-two Australian homes face bushfire risks

While climate change is worsening fire weather and increasing the frequency of the worst fire seasons, the challenges that firefighters face are also being compounded by growing numbers of people living in areas facing bushfire risk. Between 1901 and 2020 an estimated 14,000 homes were lost to fire in Australia, with almost half destroyed since 2001 (Gibbons et al. 2025). Between 2003 and 2020, almost one million Australians had lived in a home that at some time was located within 1km of an active fire front (Schug et al. 2023). Retrofitting homes at highest risk of bushfire to the national bushfire standard is estimated to cost $39,466 per home on average (Penman et al. 2016; ABS 2026).

As our population continues to grow alongside increases in climate-driven fire weather, the number of people living in bushfire-prone areas and potentially directly impacted by fire will grow. This creates problems for fire and land management agencies that have increasing risks to mitigate but funding profiles that fail to keep pace with the scale of the problem (ACT Legislative Assembly 2024).

The trend of increasing property loss associated with worsening fire risk patterns is evident from the 2003 Canberra fires (about 500 structures destroyed), Black Saturday 2009 fires (more than 5,600 structures), the Black Summer Bushfires (over 8,000 structures), and January 2026 Victorian bushfires (1,590 structures) (AIDR n.d; 2009 Victorian Bushfires Royal Commission 2010; VIC IGEM 2019).

Authorities in NSW noted after the historic structure losses during Black Summer that major urban areas had been largely untouched by the fires (Owens and O'Kane 2020). Had the fires impacted the densely populated urban / bushland fringes of Sydney, the lower Blue Mountains, Newcastle, the Central Coast or Wollongong, losses would almost certainly have been even greater.

In January 2025 Australians watched in horror as fires in Los Angeles destroyed 16,000 structures. The risk of major urban fire events in Australia should not be under-estimated.

HOMES LOST, AND SAVED

While the number of homes lost to bushfires is rising due to climate-fuelled increases in dangerous fire weather and more people living in places where suburbs meet the bush, firefighters still save significantly more homes than are lost to fire, even in the worst of circumstances.

During the Black Summer bushfires, the NSWRFS reported that a record 2,448 homes were destroyed and 1,013 damaged. Another 5,469 other structures were destroyed. However, an estimated 14,519 homes, 1,486 facilities and 14,016 outbuildings were saved through protective measures (AIDR 2020).

In other words, for every home lost, almost six were saved by firefighters.

Insurance costs are rising, and more people live in harm's way, with many Australians' homes at risk of bushfires.

5 The original figures from Risk Frontiers were provided in 2020/21 with an estimate that fire service expenditure would reach $5 billion by 2055. Adjusting the estimate to 2024/25 values brings the estimated mid century cost to $5,967,341,686.84

Bushfire-prone households face rising insurance costs

Australian home insurance premiums continue to rise, driven in part by exposure to climate-fuelled hazards such as bushfires, floods and storms. For many bushfire exposed and impacted communities, insurance premium costs are becoming unbearable. After being hit by successive bushfires in February 2024, December 2024 and January 2025, households and businesses in the Grampians region are seeing huge increases in premiums and in some instances, businesses have been unable to get insurance cover for bushfires (ABC 2024, 2025).

Following the Black Summer bushfires, some properties in popular alpine tourism destinations struggled to obtain insurance cover due to their exposure to bushfire risk, others saw their premiums increase by as much as 400% (ABC 2020). In 2024 it was estimated that 1.6 million Australian households experienced insurance affordability stress, largely due to growing exposure to climate risks including bushfire, floods and cyclones (Grace 2025).

Where properties are uninsured or underinsured, a greater share of the financial consequences of a major bushfire is borne directly by households, businesses and governments rather than being absorbed through insurance. This is what happened in the aftermath of the January 2026 fires when the Australian and Victorian governments announced assistance payments of up to $52,250 for uninsured households to re-establish their place of residence (State Government of Victoria 2026). As climate change fuels more intense and destructive extreme weather in future years and insurance premiums respond to that growing risk, authorities such as the banking regulator APRA expect the number of Australians foregoing insurance will increase (APRA 2026).

Image: *After the destructive fires in the south east of Australia, a group of volunteers help farmers rebuilding fences.*

Many communities are under-prepared for the fire threats they face

Despite warnings of heightened fire risk, many communities in high-risk areas underestimated the scale of the 2019/20 Black Summer bushfires (Owens & O'Kane, 2020). Given the record number of pyroCb storms, major fire complexes, and fires sometimes burning intensely at night, it is not surprising that many people were caught off guard.

Far South Coast communities in NSW and nearby Gippsland in Victoria were devastated on New Year's Eve 2019 when remote fires burning on the Great Dividing Range were driven into coastal communities by sustained strong westerly winds from midnight, destroying hundreds of homes, driving thousands of people into the ocean to take refuge, and taking lives.

For many Australians living in bushfire-prone areas, the threat can quickly fade from memory after fires. A survey conducted just before the 2026 Victorian fire season found that half of residents in bushfire-prone areas didn't consider bushfires as a threat, and 40% weren't concerned enough to engage directly with the Country Fire Authority (CFA) (CFA in Parliament of Victoria 2026). As memories of major fires fade, more people underestimate the risk and fail to prepare. This pattern was also documented after the 2003 Canberra bushfires, the 2011 Perth Hills fires and 2009 Victorian fire seasons (Keelty 2011; ACT Legislative Assembly 2024; Teague et al. 2010; Parliament of Victoria 2026).

As insurance costs rise, more households are going without.

People expect more from fire agencies than they can realistically deliver

Community complacency feeds into unrealistic expectations of what fire agencies can do on the worst days. Firefighters have hard limits on what they can do to protect homes and assets, particularly when fires are intense enough to create their own weather. For example, firefighting aircraft cannot fly during gale force winds often present during extreme or catastrophic fire conditions or during pyroconvective events, and ground crews cannot directly fight fires that generate 100,000 kilowatts of energy per metre of fire front and move at speeds up to 23 km/h (Tolhurst 2009; Keelty 2020).

These are the dangerous fire weather conditions that firefighters are increasingly confronting. As Extreme and Catastrophic fire weather days become more frequent and widespread across the country, firefighters are facing more situations where fires are uncontrollable and their own safety is threatened. This is why fire services overturned 70 years of established national doctrine following the Black Saturday fires of 2009 by accepting that some fires can no longer be fought and that people should not stay to defend their properties once conditions reach Catastrophic.

Local face-to-face engagement builds real preparedness

Fire agencies already run extensive public education ahead of and during major fire seasons. Localised, face-to-face engagement through local brigades and community groups appears to change behaviour far more effectively than passive media campaigns (Parliament of Victoria 2026).

As climate change worsens bushfire conditions nationwide, building community knowledge, preparedness and resilience matters more than ever. That means communities must be equipped with both long-term climate and fire-risk projections, and support to develop locally led responses: resilience committees, community hubs, and detailed bushfire response plans (Owens & O'Kane, 2020; QLD IGEM 2019; VIC IGEM 2019). The fire services are best placed to facilitate this work in partnership with local government, but need more resources to do so.

Critical infrastructure must withstand bushfires

Power and telecommunications are often the first services to fail when fires strike. Once power is lost, failures tend to cascade with loss of reticulated water, sanitation, refrigeration, fuel stations, and the ability to cook. Without telecommunications, communities cannot call for help and cannot access critical warnings. This happened repeatedly during the Black Summer bushfires on the NSW South Coast, and again during the January 2026 Victorian bushfires (Owens & O'Kane 2020, Parliament of Victoria 2026). In Victoria, it is estimated that $23 billion worth of infrastructure will be at risk from bushfires by 2030 (Infrastructure Victoria 2026).

The Parliamentary Inquiry into the January 2026 Victorian bushfires recommended that state and federal governments should work together to strengthen telecommunications resilience, including mandatory resilience standards for mobile towers in disaster-prone areas. Investing in community batteries and microgrids could also let communities keep essential services running during and after a disaster, hastening their recovery.

After Black Saturday, fire services accepted that some fires are now too dangerous to fight or defend against.

CHAPTER 4

Preparation Pays Off

As climate pollution from coal, oil and gas loads the dice for more socially and economically disastrous bushfires, every action we can take to reduce impacts will be vital.

A recent study showed that climate-fuelled worsening fire weather is projected to see an increase in burn area in Europe of close to 192% by the end of the century under a high emissions scenario. However, continued improvements in fire management capacity could moderate those increases, reducing projected burn area under low (SSP1-2.6) and high emissions (SSP3-7.0) scenarios by 72-92% (Billing et al 2026). The same is likely true here in Australia.

Every fire we prepare for costs less: fewer homes lost, fewer jobs gone, faster recovery.

Investing in bushfire preparedness and resilience has been shown to pay dividends over time, with a strong return across a range of specific measures:

- Land-use planning that limits development in areas at high risk of extreme weather impacts could avoid $54 billion (in present value terms) in damage to infrastructure and property between 2026 and 2100 (Productivity Commission 2025).[6]
- Resilient housing upgrades in areas at high-risk of bushfire return an estimated $1.40 for every dollar spent (Deloitte Access Economics 2016).
- Vegetation management returns $1.30 for every dollar spent (Deloitte Access Economics 2016).
- Infrastructure Victoria (2024) modelling found regular drain and vegetation maintenance protects roads from post-fire landslides, returning nearly $5.88 per $1.
- Aerial detection using drones and infrared sensing could potentially cut total suppression costs by 31% compared with helicopters alone (Christensen 2015).

While each of these interventions is cost effective on their own, the greatest benefit is likely to be gained from putting a package of measures into place. For example, a recent analysis by Williamson et al. (2026) has shown that a combination of expanding fuel breaks, hazard reduction, home resilience and garden improvements can reduce the susceptibility of households to ember attack where Hobart's suburbs meet the bush, potentially reducing property loss.

Image: *Person cleans the leaves from the gutter.*

6 Under a moderate emissions scenario (RCP4.5) with a 2.5% discount rate applied. The non-discounted cost is $184 billion.

NATIONAL DISASTER RESILIENCE PROGRAMS

The Federal Government supports Australians to prepare for and recover from climate-fuelled disasters through several key programs:

- **Disaster Ready Fund (DRF):** Launched in July 2023 with $1 billion over five years. State and territory governments also contribute to the DRF, bringing the total investment to $2 billion. Only state and territory Lead Agencies can apply to NEMA, so councils and community groups apply through their state (NEMA 2026a).
- **Disaster Recovery Funding Arrangements (DRFA):** The main disaster recovery funding mechanism, administered by the National Emergency Management Agency (NEMA). It funds councils, small businesses, not-for-profits and individuals through the states and territories across four assistance categories, with the Federal Government covering up to 75 per cent of eligible costs. Proposed reforms would add a Resilient Infrastructure Scheme to help communities build back better, with up to 15 per cent of costs shared with jurisdictions (NEMA 2026b; NSW Government 2026).
- **Mobile Network Hardening Program (MNHP):** Funds upgrades to mobile infrastructure in regional and peri-urban Australia so networks stay online longer during natural disasters (DITRDCSA 2026).
- **Hazards Insurance Partnership (HIP):** A partnership between the Federal Government and the insurance industry to reduce disaster risk and improve insurance availability and affordability (NEMA 2026c).

These programs and others complement other emergency preparedness and response initiatives such as the new national emergency warning system AusAlert which will send warning messages to mobile devices during local and national disasters (AusAlert 2026).

Investing in preparedness can reduce future bushfire costs

Building on the evidence showing that greater investment in bushfire and disaster preparedness is cost-effective and pays dividends over time, ConnellGriffin modelled two scenarios to understand the broader economic benefits of supporting homes, communities, businesses and fire agencies to prepare for worsening bushfires.

ConnellGriffin found increased investment in bushfire preparedness by federal, state and territory governments can reduce the disruptive impact of fires on the national economy and prevent job losses. Avoiding damage and disruptions reduces adverse shocks to productive capacity and economic activity, helping to preserve sectoral output from businesses, household spending and investment, and limiting broader economic losses.

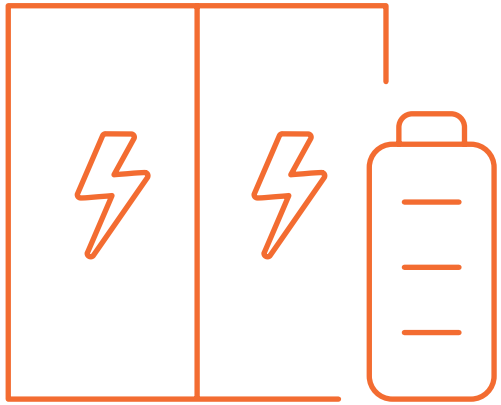
Bushfire preparedness can be cost-effective, saving lives, homes and reducing damages and losses over the long term. However, the greatest benefit comes from acting quickly. The Productivity Commission recently found that speeding up the roll-out of a household resilience program (covering all disasters) down from 15 years to five years could avoid up to $38 billion (in present value terms) in damage to homes between 2026 and 2100 (Productivity Commission 2025). When it comes to protecting Australians from bushfires and other disasters, it's clear we have no time to lose.

Table 3: *Key options for boosting Australians' bushfire preparedness.*

Details	Why
Protecting critical electricity and telecommunications infrastructure in high-risk bushfire areas	Electrical and telecommunications infrastructure keeps communities going during and after a disaster by maintaining the lifelines of power, water, sanitation, refrigeration and fuel. It maintains a community's access to warnings and information and ability to call for help.
Building community led bushfire preparedness	Giving communities access to the knowledge and information they need, building on their existing strengths, and co-developing solutions with fire agencies, local governments and others leads to better bushfire readiness.
Helping Australians to make their homes more resilient to bushfire risks	Upgrading at-risk households to meet AS3959 would mean that more homes can survive fires. This reduces insurance costs, deaths and losses, as well as the impact on communities and governments in having to house the homeless and rebuild.
Targeted investment in technology that detects and responds to fires quickly	All fires start small. When they start in remote and hard-to-reach areas they can grow quickly and lead to massive losses, as occurred during the 2019/20 Black Summer bushfires (e.g. Currowan and Gospers Mountain fires). Being able to detect fires more quickly, whether through the use of satellites, drones, AI camera networks and towers, and enhancing rapid fire attack using aircraft, helicopters and drones, remote area fire teams can help to reduce the spread of potentially disastrous fires.
Developing an Australian fleet of large firefighting aircraft suited to our landscapes and conditions	Australia relies on firefighting aircraft from the USA and Canada, whose fire seasons increasingly overlap with ours. It is not clear that US aerial firefighting strategies are best suited to Australian landscapes and vegetation.

Recommendations

The bushfires documented in this report are part of an established, worsening pattern that is now well understood scientifically. Continued burning of coal, oil and gas is changing our climate and driving more frequent and more intense fire seasons and fire weather. The most important thing we can do to protect Australians is to cut climate pollution fast, while preparing communities for the more dangerous fires they already face.



Prepare for the bushfires we already face

Deeper pollution cuts and smart investment in preparedness keep more homes standing and help communities recover faster. The Australian Government should:

1. **Keep the power and phones on when fires hit.** During bushfires, people rely on their phones for up-to-date emergency information and to reach loved ones. When the power goes out, staying connected becomes much harder, adding stress to an already dangerous situation. Fund at least 20 hours of battery backup, with automatic switchover, at the highest-risk telecommunications sites, and fit resilience hubs in high-risk towns with solar, batteries, generator hookups and satellite communications. Then require telcos to provide at least 48 hours of backup power for every mobile tower, preferably from batteries and solar, and invest in microgrids for the most isolated high-risk towns, building on existing pilots, with the first towns chosen within a year.

2. **Support locally led community preparedness.** Ensure communities have access to the knowledge and information they need to co-develop solutions with fire agencies and local governments to locally-identified bushfire risks.

3. **Make homes safer**. Build a household resilience program in bushfire-exposed areas, focused on the residents most at risk: older people, people on lower incomes and people with limited mobility.

4. **Stop fires while they are small.** Build rapid response capability by trialling large water-dropping drones now, and invest in satellite technology for fire weather forecasting and emergency response, so fires are detected early and hit hard.

5. **Build a national, sovereign aerial firefighting capability.** Research the best approaches for Australian landscapes and conditions, then use that research to develop a national aerial firefighting strategy that builds local capability and capacity.

6. **Plan and fund real preparedness.** Legislate five-yearly updates to the National Climate Risk Assessment and National Adaptation Plan, with a dedicated bushfire sub-plan, matched by states and territories. Back it with strong science by reversing recent cuts at CSIRO and the Bureau of Meteorology and co-funding the next Australian Fire Danger Rating System, so communities get accurate, local warnings.

Cutting climate pollution from coal, oil and gas further and faster

The Australian Government has three key opportunities to drive down climate pollution and secure a safer future for every Australian:

1. **Strengthen Australia's industrial pollution law, the Safeguard Mechanism,** so our big polluters can no longer exploit loopholes and use offsets to delay the pollution cuts needed to reduce climate harm.

2. **Stop approving new or expanded coal and gas projects** that fuel worsening climate disasters and harm our communities, and instead use approval powers to accelerate the shift to cheaper, cleaner, home-grown renewable energy.

3. **Cap the diesel fuel tax handout to big mining corporations,** and invest those savings to support Australian communities and industries with the switch to cleaner, more secure energy, and improved climate adaptation and resilience measures that will help protect communities from growing bushfire threats.

Image: *Maintenance engineers working on wind farms.*

Bushfires will get worse, but the surest way to reduce fire risk into the future is to cut climate pollution from coal, oil and gas.

Conclusion

The burning of coal, oil and gas has heated up our planet, driving more frequent serious bushfire seasons that are more dangerous, damaging, and expensive. These changes have accelerated over the past 25 years as a new era of fire stretches our firefighting services and increasingly endangers Australian communities. Responding to the massive fires we now experience sometimes requires vast numbers of firefighting personnel and equipment from all over the nation, and often from across the world. Our most destructive climate-fuelled bushfire events are no longer the sole responsibility of any particular state or territory government, they are national disasters that require new approaches and responses.

Our worst fires are now national disasters, and they need a national response.

This report shows fire losses and costs will continue to cost the Australian economy billions of dollars every year, but a worldwide phasing out of pollution from coal, oil and gas as quickly as possible will help to limit how bad bushfires become. At the same time, we have to prepare our fire agencies and communities for the reality that bushfires are already far worse than they were last century, and will escalate even further in the near to medium term because of climate pollution.

Making our emergency services, communities and homes more resilient to climate-fuelled bushfires is an urgent national challenge that cannot be ignored but at present is inadequately funded.

The more we invest now in bushfire preparedness, including making our homes more resilient, protecting community infrastructure and building the capacity and capability of fire services, the greater the avoided costs and damages.

Australians are staring down the barrel of heightened fire risks in this and next summer from climate pollution coupled with an El Niño tracking towards the strongest on record. There has never been a better time for governments to invest in preparing for our fire future.

Image: *A solitary blade of new grass, emerging from the charred landscape, of bushfire ravaged forest*

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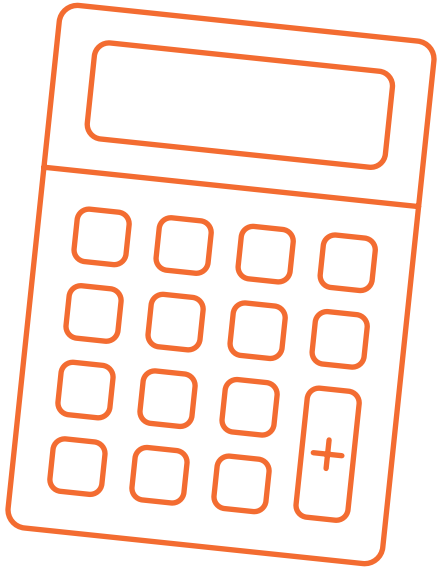
Appendix: Bushfire Cost Methodology

This Appendix summarises how the economic modelling behind this report was done. The modelling was carried out by ConnellGriffin for Emergency Leaders for Climate Action. The full technical report is ConnellGriffin (2026), Preparing Fire Agencies for Catastrophic Climate Threats: Technical Report to ELCA.



A1. ABOUT THE MODELLING

The modelling answers two questions. First, what are bushfires likely to cost the Australian economy over the next 30 years? Second, how much of that cost could be avoided if Australia became better prepared?

It uses a recursive dynamic computable general equilibrium (CGE) model. This kind of model represents the whole economy. It tracks how labour, capital and other resources shift between industries, households, governments and trade when the economy is hit by a shock such as a major bushfire. That allows it to capture the direct damage from fires and the knock-on effects across the wider economy.

ConnellGriffin used its implementation of the Victoria University Regional Model (VURM). VURM is an established multi-regional CGE model developed by the Centre of Policy Studies at Victoria University, and it represents the economies of all eight states and territories. Its inputs include:

- state supply and use tables, built from ABS input–output tables;
- household income and expenditure data, including state average wages by industry and skill level;
- state imports and exports; and
- investment by industry.

Bushfire impacts enter the model as shocks to capital, industry output and labour productivity. The model reports GDP and gross state product, employment, value added by industry, and government tax revenue.

The modelling covers 30 years, from 2025–26 to 2054–55. All dollar figures are in FY2025 dollars. Discounted figures use a 7% real discount rate.

The work drew on expert interviews and peer review of the economic modelling. ConnellGriffin consulted Greg Mullins, Bob Conroy, Lee Johnson, A/Professor Andrew Watkins, David Jones, Emeritus Professor Ross Bradstock, Professor John Quiggin and others. The modelling remains the views and responsibility of its authors.

A2. MODELLING FRAMEWORK

The modelling works from the top down. It first estimates the total cost of bushfires. It then asks what happens to the economy if better preparedness reduces that cost by a set percentage. It does not model individual programs such as aircraft, detection technology or home retrofits one by one. Evidence about those measures is used instead to check that the assumed reductions are realistic (Section A4).

Table A1: *Six-step modelling framework.*

Step	Task	What it involves	Section
1	Set the bushfire cost baseline	Estimate the long-run average annual cost of bushfires across three severity bands.	A3
2	Define damage-reduction scenarios	Scenario 1: preparedness cuts total bushfire damage by 10%. Scenario 2: by 20%.	A4
3	Sense-check the scenarios	Test the 10% and 20% assumptions against published evidence, case studies, and expert and ELCA advice.	A4
4	Allocate avoided damage by state	Distribute costs across states and territories using Insurance Council of Australia (ICA) loss shares, Colvin Review shares, or a mix of both.	A5
5	Convert costs into model shocks	Split costs into five economic channels: capital losses, output losses, productivity losses and social costs.	A5
6	Model impacts and benefits	Run the CGE scenarios and compare GDP, gross state product, employment, value added and tax revenue with the baseline.	A6

A3. ESTIMATING THE BASELINE COST OF BUSHFIRES

A3.1 Three severity bands

Bushfire costs vary enormously from one event to the next. Rather than apply a single average cost, the modelling groups fires into three severity bands, each with its own cost and frequency. These are the bands described in Table 1 of the report.

- Compound major / disaster level events (Black Summer-scale) events: several jurisdictions have severe fires at once, and national resource-sharing is stretched to its limits.
- Major fire events: an individual state or territory has an above-average to worst-on-record fire or season, requiring interstate and sometimes international support.
- Other damaging fires: fires largely managed with state and territory resources, which still cause significant property losses.

The bands do not overlap, and only one band is counted in any year. When a Black Summer-scale event occurs, it replaces the major fire that would otherwise have been counted that year rather than being added on top. This netting prevents double counting.

A3.2 Cost per event: from insured losses to broader economic cost

Black Summer-scale events. The benchmark is Christoff's (2023) estimate of the direct and indirect cost of the 2019–20 Black Summer fires, excluding environmental impacts: $23.1 billion. Escalated to FY2025 dollars, this is $27.7 billion. This sits well below other published estimates of Black Summer's cost, which reach about $100 billion (Quiggin 2020) once a wider range of impacts is included.

Major and other damaging fires. These are calibrated from the ICA Historical Catastrophe List, which records insured losses normalised to 2022 values. Insured losses capture only part of what a fire costs. Uninsured property, public infrastructure, business disruption, and health and social impacts are all missing. The insured figures are therefore converted to a broader economic cost in three steps:

1. Multiply by 4.1, the insured-to-total multiplier from ANU research on the economic impact of early bushfire detection (Biddle et al. 2020).

2. Escalate from 2022 dollars to FY2025 dollars.

3. Multiply by 2.3, the ratio of Black Summer's direct plus indirect cost $23.1 billion to its direct cost $10.2 billion. This adds indirect costs to the major and other bands on the same basis as the Black Summer benchmark.

Table A2: *Cost calibration by severity band.*

Severity band	Starting evidence	Calibration	Cost per event ($bn, FY2025)
Compound major / disaster level events (Black Summer-scale)	Black Summer direct + indirect cost excluding environmental impacts: $23.1bn (Christoff 2023)	Escalated to FY2025	$27.7
Major fire event	ICA average normalised insured loss for major fires: $1.5bn (2022 dollars)	× 4.1; escalated to FY2025; × 2.3	$16.1
Other damaging fire	ICA average normalised insured loss for non-major fires: $0.1bn (2022 dollars)	× 4.1; escalated to FY2025; × 2.3	$1.2

A3.3 How often fires occur

Historical record. ICA insured-loss data show damaging fires becoming more frequent. Comparing two 25-year periods, there were two fires with normalised insured losses of about $0.5 billion or more in the earlier period and six in the most recent period (Table A3).

Projected fire weather. The modelling cross-checks its frequency assumptions against fire-weather projections from the Independent Review of Commonwealth Disaster Funding (Colvin 2024). These projections count extreme fire weather days, meaning days at or above the 95th percentile of fire danger. Between 1995 and 2014, the highest state average was 20.7 such days a year. By 2050 this is projected to reach 28.3 days under a low-emissions scenario (SSP1-2.6) and 31 days under a high-emissions scenario (SSP3-7.0).

ConnellGriffin converted these projections into an index of extreme fire day frequency for each jurisdiction (Table A4). The index uses the midpoint of the historical and projected range under the high-emissions scenario. The midpoint refers to the range of projected fire days, not to a midpoint warming level. Projections cover seven jurisdictions; the ACT is not reported separately.

Recurrence assumptions. Based on the historical record, the fire-weather projections, Dowdy and King (2025) and consultation with fire experts, the modelling assumes:

> one Black Summer-scale event over the 30 years;

> a major fire event every four years until FY2040, then every three years; and

> other damaging fires in every remaining year.

Moving from one major fire every four years to one every three years is a one-third increase in frequency. That is broadly in line with the projected 21% to 43% rise in extreme fire days by 2030 and 2050. The projections indicate that Black Summer-scale events are becoming more likely, but they do not give a precise recurrence interval, so the one-in-30-year assumption is a modelling judgement. After netting (A3.1), the 30 years contain one Black Summer-scale event, eight major fire events and 21 other damaging fires.

Table A3: *Bushfire events and years with normalised insured losses of about $0.5bn or more (2022 dollars)*

Period	Events	Number of events
Earlier 25 years (to 2001)	1983 Ash Wednesday (3.7*bn*);c.1985(1.2*bn*)	2
Most recent 25 years (2002–2026)	2003 Canberra (1.3*bn*); 2009 *Black Saturday* (2.6*bn*); c.2013 (0.5bn); c.2015 (0.5*bn*); 2019–20 Black Summer (2.5*bn*); 2026 *Victoria* (0.6*bn*)	6

Table A4: *Extreme fire day frequency index (historical 1995–2014 = 1.00)*

Jurisdiction	2030	2050
NSW	1.22×	1.50×
VIC	1.22×	1.56×
QLD	1.27×	1.33×
SA	1.12×	1.33×
WA	1.28×	1.60×
TAS	1.21×	1.45×
NT	1.19×	1.27×
Australia	**1.21x**	**1.43x**

Source: *ConnellGriffin (2026), slides 20 and 36, from Colvin (2024).*

A3.4 Average annual cost

Over 30 years, this is a total of $181.7 billion in undiscounted terms, or $72.6 billion in present value terms at a 7% real discount rate. The figure is a long-run average. Actual costs in any one year may be much higher or much lower.

A3.5 What the estimate leaves out

The estimate is likely to understate the full cost of bushfires because:

- it excludes environmental and ecological losses, such as wildlife, ecosystems and biodiversity, which cannot readily be converted into economic shocks in the model;
- It excludes damage to cultural heritage, including Aboriginal and Torres Strait Islander cultural sites, and other intangible and non-market costs;
- All costs are held at FY2025 values, so the estimate does not include growth in population, dwelling values or agricultural output in bushfire-prone areas, all of which are rising (ConnellGriffin 2026, slides 22–24); and
- The ICA data focus on insured and economically significant events, so smaller or poorly insured fires are under-represented.

Future costs will also depend on factors outside the modelled frequency assumptions, including land use, vulnerability, preparedness, firefighting capacity and where fires occur.

Table A5: *Average annual cost of bushfires, 2025–26 to 2054–55.*

Severity band	Cost per event ($bn)	Recurrence	Events in 30 years	Average annual cost ($bn)
Compound major (Black Summer-scale)	$27.7	1 in 30 years	1	$0.9
Major fire event	$16.1	4 years to FY2040, then 3	8	$4.3
Other damaging fire	$1.2	Every remaining year	21	$0.8
Total average annual cost			**30**	**$6.0**

Totals may not add due to rounding.

A4. PREPAREDNESS SCENARIOS

The modelling tests two illustrative scenarios against the baseline:

- Scenario 1, modest improvement: preparedness reduces total bushfire damage by 10% relative to the baseline. This reflects a realistic but moderate uplift, such as better coordination, earlier detection, targeted fuel management and some improvement in response capability.
- Scenario 2, stronger package: a broader package of preparedness, mitigation and response measures reduces total damage by 20%.

These percentages are assumptions, not findings. They do not describe the proven effectiveness of any program. They are used to test what the economy would gain if better preparedness reduced total damage by a given amount. The modelling does not estimate what it would cost to achieve either scenario.

The assumptions were checked against published evidence on avoided losses (Table A6), against case studies, and with ELCA and other experts, to confirm that reductions of this size are plausible in real bushfire conditions.

Table A6: *Evidence used to sense-check the damage-reduction assumptions*

Measure and source	What it shows	Relevance to scenarios
Early detection and response (Biddle et al. 2020, ANU)	Under high climate-change growth, a 30-minute improvement in detection and response cuts the average annual cost of large fires from about $2.16bn to $2.0bn (7–8%). A 60-minute improvement cuts it to about $1.79bn (around 17%).	Supports a reduction of around 10%; supports 20% when combined with other measures.
Fuel treatment (Thompson et al. 2013, cited in Deloitte Access Economics 2014)	Fuel treatments reduced fire size and suppression costs. Suppression costs could fall by 30% within treated areas and by at least 10–12% across a landscape. Supporting evidence: During the 2019/20 Black Summer bushfires, hazard reduction burns occurring within the previous five years and in close proximity to communities were shown to have reduced house loss (Nolan et al. 2022) However, the effectiveness of treatments will depend on local environments and contexts (Clarke et al. 2023). More recent modelling has demonstrated the combined benefit of fuel treatments, fuel breaks and hardening homes and gardens in reducing household exposure to radiant heat and embers (Williamson et al. 2026).	Supports a 10% reduction across a landscape; 20% when combined with other measures.
Home hardening and defensible space (UC Berkeley research, summarised by California Department of Insurance 2026)	Homes with key hardening features and defensible space survived at nearly 50%, compared with about 20% for homes with no mitigation. Clearing vegetation within 5 feet (1.5 m) of homes could cut structure losses by 17%. Supporting evidence: Three quarters (74%) of the buildings destroyed by fire during the 2019/20 Black Summer bushfires were built before AS 3959.2 was included in the Australian Building Code, now Australian Construction Code (Binskin et al., 2020). Proximity to bushland and the amount of vegetation within 40 metres of a household is also a key factor in house loss during bushfires (Binskin et al., 2020; Gibbons et al. 2025).	Supports Scenario 1; supports Scenario 2 where several measures are combined.

Source: *ConnellGriffin (2026), slides 25, 39 and 40.*

A5. TRANSLATING COSTS INTO MODEL SHOCKS

To run through the CGE model, the national baseline cost is split across five channels through which bushfires damage the economy. The same shares are applied to the avoided damage in each scenario. Costs are then allocated across states and territories using ICA historical loss shares, Colvin Review shares, or a mix of both.

Table A7: *Baseline cost split and avoided damage by channel ($m per year, FY2025).*

Cost channel	Share	Baseline	Scenario 1 avoided (10%)	Scenario 2 avoided (20%)	Basis for share
Residential and other non-productive assets (e.g. homes, sheds)	17%	1,027	103	205	About half of the 33.3% asset-damage share in Deloitte (2021).
Productive private and public capital (e.g. businesses, schools)	20%	1,208	121	242	Remaining half of Deloitte asset damage, plus public productive assets.
Sector output and demand losses (e.g. lost harvests, cancelled tourism)	25%	1,510	151	302	Deloitte's 28.6% other financial costs, adjusted to avoid double counting; supported by ANU, RBA and CoPS (2020).
Labour and productivity losses (e.g. lost shifts, business closures)	6%	362	36	72	CoPS (2020) bushfire modelling; a lower share to avoid overlap with output losses.
Social, health, mortality and other costs	32%	1,933	193	387	Remaining share after the production-related channels; benchmarked to Deloitte (2021) social costs.
Total	**100%**	**6,039**	**604**	**1,208**	

A6. RESULTS

Across all indicators, the gains under Scenario 2 are about 1.9 times those under Scenario 1. The benefits extend well beyond the industries directly hit by fire. By FY2040, the largest avoided job losses are in agriculture, forestry and fishing and in manufacturing, followed by accommodation and food services, retail trade, health care and social assistance. The largest avoided losses in value added are in manufacturing, agriculture, financial services and professional services. A few sectors show very small negative or near-zero employment effects.

Table A8: *Economic losses avoided under the preparedness scenarios, 2025–26 to 2054–55.*

Outcome	Measure	Scenario 1 (10%)	Scenario 2 (20%)
GDP losses avoided (FY2025 $)	Undiscounted	$20.9bn	$39.4bn
	Discounted at 7% real	$8.3bn	$15.6bn
Employment losses avoided (FTE)	Average per year	2,950	5,620
	In FY2040	3,100	5,860
Government tax revenue protected (FY2025 $)	Undiscounted	$8.8bn	$16.8bn
	Discounted at 7% real	$3.1bn	$5.9bn

Source: *ConnellGriffin (2026), slides 25, 39 and 40.*

A7. SENSITIVITY ANALYSIS

The core analysis assumes one Black Summer-scale event in 30 years. A sensitivity test assumes two, with every other assumption unchanged. The value of preparedness rises by about 6% across all indicators (Table A9). The increase is modest because the extra Black Summer-scale event replaces a major fire event that would otherwise have been counted that year.

Table A9: *Sensitivity test with two Black Summer-scale events in 30 years.*

Outcome	Scenario 1 core	Scenario 1 sensitivity	Scenario 2 core	Scenario 2 sensitivity
GDP losses avoided (undiscounted)	$20.9bn	$22.1bn (+5.7%)	$39.4bn	$41.6bn (+5.6%)
Employment losses avoided (FTE, average per year)	2,950	3,120 (+5.8%)	5,620	5,935 (+5.6%)
Tax revenue protected (undiscounted)	$8.8bn	$9.3bn (+5.7%)	$16.8bn	$17.7bn (+5.4%)

A8. LIMITATIONS AND INTERPRETATION

- Not a cost–benefit analysis. The modelling does not estimate the cost of achieving either scenario. The results show the value of losses that could be avoided. They cannot be read as a benefit–cost ratio or a return on investment.
- Scenarios, not program evaluations. The 10% and 20% reductions are illustrative assumptions. Individual measures such as workforce, aircraft, detection technology, fuel management, community preparedness and resilient infrastructure are not modelled separately, and their costs and effectiveness will vary.
- Indicative baseline. The average annual cost is a modelling estimate based on assumed event frequencies and representative costs. It is not a formal catastrophe-loss estimate.
- Multipliers are approximations. The conversion from insured losses to broader economic cost is applied consistently, but actual ratios vary between events.
- Rebuilding activity is not modelled. The analysis does not count the economic activity generated by post-disaster rebuilding. It measures avoided losses, not all economic activity after a disaster.
- No emissions-reduction scenario. The modelling does not test how different global emissions pathways would change bushfire costs over the 30 years.

Further cost–benefit and cost-effectiveness analysis of specific preparedness measures would help governments decide the right level and mix of investment in preparedness, alongside response and recovery funding.

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