

Taking the temperature of Australia’s climate risk and response

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For 5 consecutive years (2017–21), extreme weather has been rated the top global risk by likelihood in the World Economic Forum’s Global Risks Perception Survey. In the preceding 3 years (2014–16) it was rated the second likeliest global risk.

The annual survey is completed by more than 650 members of the World Economic Forum’s diverse leadership communities and serves as foundation of the *Global Risks Report 2021*.¹

In the 16th edition of the report, environmental concerns dominated the top risk categories, with respondents ranking climate action failure as the most concerning risk globally. In regard to likelihood and impact, environmental risks featured prominently in the survey results (Table 1).

Table 1: Top risks as assessed by Global Risks Perceptions Survey 2020 respondents.

By likelihood	By impact
Extreme weather*	Infectious diseases
Climate action failure*	Climate action failure*
Human environmental damage*	Weapons of mass destruction
Infectious diseases	Biodiversity loss*
Biodiversity loss*	Natural resource crisis*

*Risks categorised as environmental.

In a year that will be defined by the response and recovery of the COVID-19 pandemic and related consequences, the survey responses are a clear reminder that extreme weather – and the effects of a changing climate that intensify them – persist as a leading cause for concern across the globe.

Interconnected risk

While the report centres on the risks and consequences of widening inequalities and societal fragmentation (many of which have been generated or exacerbated by the pandemic), it notes that these risks will only be compounded by climate action failure:

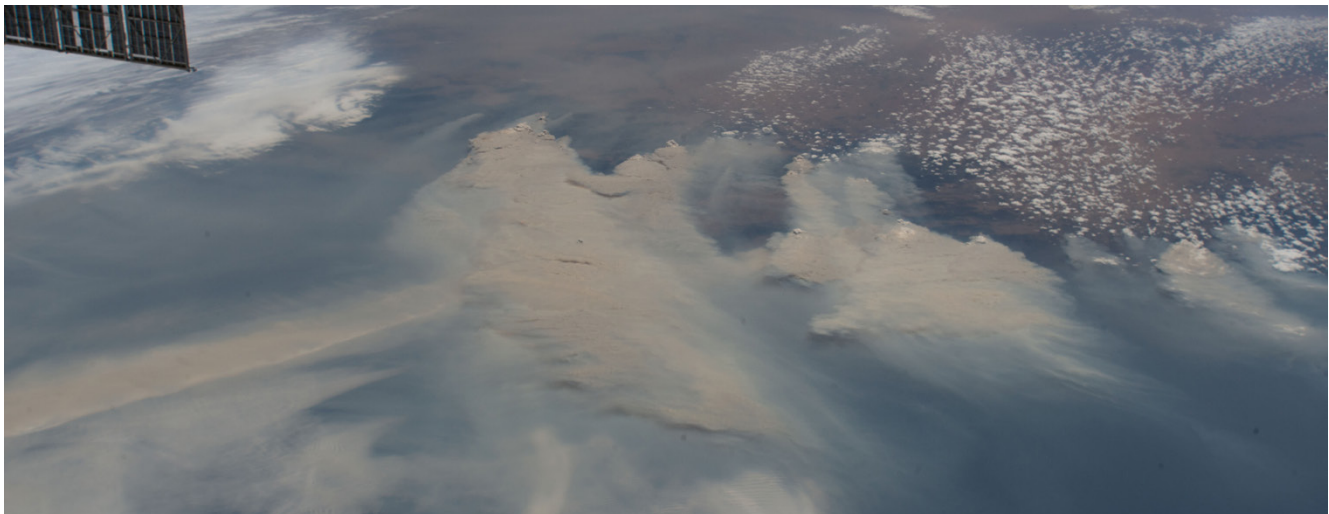
Most critically, if environmental considerations—the top long-term risks once again—are not confronted in the short term, environmental degradation will intersect with societal fragmentation to bring about dramatic consequences.

Global Risk Report 2021, p.5.

A silver lining to the pandemic was the sudden and significant downturn in global CO₂ emissions. Despite the obvious injury to economic and social wellbeing, the *Global Risks Report 2021* states that emissions dropped 9 per cent in the first half of 2020, putting the world on track to reach the 1.5°C global warming target by 2030. A similar decrease is required every year for the next decade to maintain progress toward this target. While this may prove challenging as vaccinations are rolled out and economic activity is reinvigorated, the report notes:

The speed and scale of policy responses to the pandemic have shown what is possible: citizens now know the power political leaders can wield when they are convinced that the challenge demands it. Many citizens who feel they have nothing left to lose will demand equally swift responses to deeply felt concerns.

Global Risk Report 2021, p.42.



International Space Station image of the smoke produced from the bushfires ongoing in the forests area of Australia, at an altitude of 424 km on 4 January 2020.

Source: NASA ISS

Increasing and compounding risk

The actual and emerging disasters of a warming climate are detailed in the January 2021 Climate Council report, *Hitting Home: The Compounding Costs of Climate Inaction*.²

Authored by Climate Council researchers Professor Will Steffen and Dr Simon Bradshaw, the report outlines the latest science on how climate change is driving more destructive extreme weather events. The report details significant hazard activity in Australia and around the world over the past 2 years as consequences of the current global temperature rise of 1.1°C above pre-industrial levels.

Documenting extreme weather fuelled by climate change, the report includes case studies of heatwaves in Siberia and in Australia (western Sydney) and fire activity on the US West Coast in south-east Australia, as well as Asian monsoon flooding and the North Atlantic hurricane season.

Professor Steffen said, 'Taken alone, any one of the events described in this report would mark the year as unusual. Taken together, they paint a disturbing portrait of our rapidly escalating climate emergency.'

'There is no doubt that we have entered an era of consequences arising from decades of climate inaction and delay', he said.

A key finding from the *Hitting Home* report is that climate effects, such as megafires experienced during Australia's 2019–20 bushfire season, are 'locked in' over the coming years due to previous climate inaction. Similarly, the benefits of today's emission reductions will not be experienced until decades later.

Based on the range of emission scenarios beginning from 2020 onwards, we cannot expect a significant difference in the rise in global average temperature until at least 2040. This implies that worsening extreme weather is locked in for the next decade at least, and very likely until 2040.

Hitting Home: The Compounding Costs of Climate Inaction, p.27.

Unpredictable and evolving risk

Climate change and its influence on the intensity and frequency of extreme weather behaviour was presented in detail to the Royal Commission into National Natural Disaster Arrangements by the Bureau of Meteorology and CSIRO on 25 May 2020.³

Head of Climate Monitoring at the Bureau of Meteorology, Dr Karl Braganza, told the Royal Commission that while climate variability is large in Australia, there are also 'background climate trends' driven by global warming that are influencing that natural variability, most notably increased temperatures and reduced rainfall and humidity.

Table 2: Changes in Australia's climate that are taking affect.

Events clearly influenced by background climate trends	<ul style="list-style-type: none"> • Increased frequency of large-scale heatwaves and record-high temperatures. • Longer fire season with more extreme fire danger days. • Prolonged high ocean temperatures. • Reduced average rainfall.
Events starting to be influenced by background climate trends	<ul style="list-style-type: none"> • An increase in heavy rainfall. • Increased frequency of coastal storm surge inundation.

As presented by Dr Karl Braganza to the Royal Commission into National Natural Disaster Arrangements, 25 May 2020.

Dr Braganza told the Royal Commission that the 20-year period starting in 2000 was both the hottest and driest on record compared to all other 20-year periods, which 'loaded the dice' in favour of dangerous fire weather. These climate trends explain



Bushfires turned skies red over the town of Bruthen in Victoria's East Gippsland. Images of Australia's 'Black Summer' were shared widely and sparked international climate concern.

Source: Country Fire Authority

the conditions that fuelled the devastating 2019–20 Australian bushfire season, but also play into a pattern of increasing intensity and frequency of fire events in Australia over the past 2 decades.

This isn't a one-off event that we're looking at here. Really, since the Canberra 2003 fires, every jurisdiction in Australia has seen some really significant fire events that have challenged what we do to respond to them and have really challenged what we thought fire weather looked like preceding this period.

Dr Karl Braganza

The latest climate research, observations, analyses and projections to describe year-to-year variability and longer-term changes in Australia's climate are available in the *State of the Climate 2020*⁴ report from the Bureau of Meteorology. The report explains how ongoing, long-term climate change interacts with underlying natural variability, and the impact on the health and wellbeing of Australian communities and ecosystems.

CSIRO Climate Science Centre scientists, Dr Helen Cleugh and Dr Michael Grose, also provided evidence to the Royal Commission and presented how climate change projections are indicating increased risks of climate extremes. They shared the challenges of forecasting the climate over multi-years and decades and the multiple future trajectories of the climate depending on emissions released into the atmosphere.⁵

Dr Cleugh reiterated that the impact of climate change on Australia's natural variability and climate drivers (such as the Indian Ocean Dipole, Southern Annular Mode and the El Niño-Southern Oscillation, which contributed to severe conditions during the 2019–20 bushfire season) is altering Australia's risk landscape and predictability.



Mass evacuations and displacement of residents during the 2019–20 bushfire season triggered extensive relief and recovery responses.

Source: Country Fire Authority

This means that understanding the interaction between climate variability and these drivers and climate change is very important for building preparedness for the changing nature of climate risks into the future. Perhaps put more simply, climate change means that the past is no longer a guide to future climate related impacts and risks.

Dr Helen Cleugh

Following the 2019–20 bushfire season, CSIRO was tasked by the Prime Minister to deliver an independent study to determine how Australia can increase its climate and disaster resilience. The resulting report, *CSIRO Report on Climate and Disaster Resilience*⁶, delivered 6 actionable themes:

1. A harmonised and collaborative national approach is required to achieve global best practice.
2. A national approach requiring systems thinking and solutions to deal with complexity – including foresighting, management of risk and learning and education for stakeholders.
3. Availability of data as an enabler to shift to common approaches and platforms for resilience-planning frameworks and operational management systems.
4. Community plays an essential role in all phases of resilience building and must be appropriately included and engaged.
5. Investment in targeted research, science and technology enables many of the improvements required to build resilience.
6. Build back better. Resilience needs to be embedded as an explicit consideration in future planning, agricultural and urban land use and zoning and investment decisions.

Preparing and adapting for future risk

With indications that extreme weather events driven by climate change are expected to increase and intensify over the coming decades, there is imperative to prepare for an increasingly unpredictable hazard landscape.

The Australasian Fire and Emergency Service Authorities Council (AFAC), convenes a national Climate Change Group comprised of key individuals from emergency management agencies, the Bureau of Meteorology and research centres. The group is tasked with supporting effective climate change risk mitigation, planning and adaptation outcomes for AFAC members, its stakeholders and the community.

The group works with a research team to produce logically plausible scenarios about how the future might unfold in a climate-challenged world and what this means for strategic planning and operations in the fire and emergency services sector. The group has published *AFAC Climate Change and Disasters: Key Messages and Resources*⁷ to provide authoritative and agreed information and resources related to climate change and disasters.

In November 2020, the Australian Government announced a National Resilience, Relief and Recovery Agency as part of its response to the recommendations of the Royal Commission into National Natural Disaster Arrangements. The agency will commence in July 2021 and aims to 'drive the reduction of natural disaster risk, enhance natural disaster resilience, and ensure effective relief and recovery to all hazards across Australia'.⁸

The new agency will initially incorporate the functions of the National Bushfire Recovery Agency and the National Drought and North Queensland Flood Response and Recovery Agency. It will also incorporate the disaster recovery and risk reduction functions within the Department of Home Affairs. A resilience services function will be established by the Australian Government to improve climate and disaster-risk information.

There is a growing body of knowledge to support decision-makers in reducing climate and disaster risk into an increasingly complex future. The Australian Institute for Disaster Resilience (AIDR) updates online collections on the Knowledge Hub, including the Climate and Disasters Collection⁹, which contains overviews of Australian climate influences and their impact on natural hazards, and the Disaster Risk Reduction Collection¹⁰.

An asset of the Disaster Risk Reduction Collection is the suite of resources contained in the *Guidance for Strategic Decisions on Climate and Disaster Risk*.¹¹ Across 6 publications developed by the National Resilience Taskforce, previously operating within the Department of Home Affairs, decision-makers can access information to contextualise the systemic effects of a changing climate. The guidance provides direction on how to access knowledge, capabilities and processes to assist in strategic long-term planning and investment decisions.

AIDR is developing a Disaster Risk Handbook to address the systemic nature of climate and disaster risk. It will give practical effect to the *National Disaster Risk Reduction Framework* and provide guidance for decision-makers on effective risk governance, culture and disaster risk mindset. The handbook will profile different decision-makers and how they navigate the risk and resilience system. A working group from across Australia has been convened to inform the development and review of the handbook, which will be publicly available in the second half of 2021.

Regarding climate change, the global concern has been voiced, the increasing risk has been identified, and the guidance to improve decisions is being developed. While the first steps toward adapting to emerging climate and disaster risks have been taken, they lead in the direction of an increasingly complex future.

Footnotes

1. World Economic Forum 2021, *The Global Risks Report 2021*. At: www.weforum.org/reports/the-global-risks-report-2021.
2. Climate Council 2021, *Hitting Home: The Compounding Costs of Climate Inaction*. At: www.climatecouncil.org.au/wp-content/uploads/2021/01/hitting-home-report-v7-210122.pdf.
3. Commonwealth of Australia 2020, *Royal Commission into National Natural Disaster Arrangements, Hearing Block 1*. At: <https://naturaldisaster.royalcommission.gov.au/hearings/hearing-block-1-canberra>.
4. Bureau of Meteorology 2020, *State of the Climate Report 2020*. At: <http://www.bom.gov.au/state-of-the-climate/>.
5. CSIRO 2020, *CSIRO climate scientists present to Royal Commission*. At: <https://ecos.csiro.au/csiro-climate-scientists-present-to-royal-commission/>.
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7. AFAC 2020, *AFAC Climate Change and Disasters: Key Messages and Resources*. At: https://knowledge.aidr.org.au/media/8452/afac_climate-change-key-messages-and-resources_oct-2020.pdf.
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11. Department of Home Affairs 2019, *Guidance for Strategic Decisions on Climate and Disaster Risk*. At: <https://knowledge.aidr.org.au/resources/strategic-disaster-risk-assessment-guidance/>.