3.3 CLIMATE-RELATED PHYSICAL RISKS

Acute physical risks impacting entities in Australia

Important notice
This unit is part of a package of learning materials designed to support understanding of foundational concepts relating to climate-related disclosures. These learning materials do not constitute application or regulatory guidance for the preparation of climate-related financial disclosures and are not to represent legal or other professional advice. We encourage you to seek your own professional advice to find out how the Corporations Act 2001 (Corporations Act) and other relevant laws may apply to you and your circumstances, as it is your responsibility to determine your obligations and how to comply with them.

Key topics

- Climate-related physical risks
- Acute physical risks that may impact entities in Australia
- How acute physical risks can affect different sectors

Relevance for climate-related disclosures

Understanding climate-related risks, including climate-related physical risks, will help entities in their climate-related disclosures. Climate-related risks include climate-related physical risks and climate-related transition risks. Climate-related physical risk is made up of acute physical risk and chronic physical risk.

In this unit, you will be introduced to the main categories of acute physical risk that may impact entities in Australia. You will learn about how these risks are unfolding today, how they are projected to change in the future and how they may affect different sectors. This information will help you begin to identify the risks that are most relevant to your entity.

Overview

Depending on their location and circumstances, entities in Australia may face acute physical risks from some or all of the following types of events:

- extreme heat
- bushfires
- extreme rainfall leading to flooding
- severe storms including tropical cyclones.

Already, at today's level of global warming, Australian entities face significantly greater climate-related physical risks from these events than in the past. The severity of acute physical risks, and their implications for your entity's financial performance, financial position and cash flows may continue to grow over the coming decades as climate change intensifies. These risks can affect different sectors in a variety of ways.

How acute physical risks might impact Australian entities

Australian entities may face a variety of acute physical risks, including an increased number of days of extreme heat, heavier rainfall, and longer fire seasons.[1]

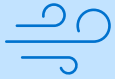
The Australian climate has already warmed by 1.51°C since national records began in 1910.[1] Already, at this current level of warming, Australian entities and the wider economy are experiencing the consequences of climate change.

For example:

- The national financial impact of the 2019-2020 Black Summer fires has been estimated at over $10 billion.[2]
- Extreme rainfall and flooding on the east coast in 2022 are estimated to have caused a total cost of $7.7 billion within Queensland alone.[3]
- Heat stress during the summer has been shown to cause substantial productivity loss,[4] and there is evidence that Australian farms are already seeing their profitability reduced due to climate change.[5]

Table 1 shows the main categories of acute physical risks that may impact entities in Australia. We examine their impacts today, and how these impacts are projected to increase over the short and medium term.

Table 1: Main categories of acute physical risk that may impact entities in Australia[6,7]

Acute physical risks	Potential impacts on Australian entities	Current risks	The future
Extreme heat 	• Health and safety of workers • Reduced productivity • Greater energy demand • Failure of equipment	Australia's climate has already warmed by 1.51°C since national records began in 1910. This has led to an increase in the number of extreme heat events. For example, our record warm year of 2019 saw about 3 times more heat events than any year prior to 2000. Extreme heat has caused more deaths than any other climate hazard in Australia and has major impacts on ecosystems and infrastructure.	Australia's climate will continue to warm, with more extremely hot days. Example: number of severe and extreme heatwave days, future change relative to current:[8] GWL* +1.5°C: +2 days GWL +3.0°C: +14 days
Bushfires 	• Loss of physical assets • Reduced air quality • Rising insurance premiums	Large parts of Australia have seen an increase in extreme fire weather and an increase in the length of the fire season since the 1950s.	Higher temperatures and drier conditions will increase the risk of bushfires in most currently forested areas. Dangerous fire weather days are projected to become more frequent in southern and eastern areas with a longer fire season and the potential for more megafires.
Extreme rainfall leading to flooding 	• Property loss • Supply chain disruption • Rising insurance premiums	There has been an increase in the intensity of heavy rainfall events in Australia, increasing flood risks.	More intense short-duration heavy rainfall events, even in regions where the average rainfall decreases or stays the same.
Tropical cyclones 	• Damage to infrastructure • Entity interruption	Higher sea levels mean that storm surges – the rise in sea level when strong winds and low atmospheric pressure cause the sea to rise above the normal tide level – are more destructive.	Fewer tropical cyclones, but a greater proportion are projected to be of high intensity. The amount of rainfall associated with tropical cyclones is projected to increase. Rising sea levels will continue to amplify the impacts from tropical cyclones.
Drought 	• Crop and/or livestock losses • Economic ripple effects (for example, reduced consumer spending)	Cool season (April to October) rainfall has declined by around 16% since 1970 in the south-west of Australia, and by around 9% since 1994 in the south-east of Australia. Cool season rainfall is particularly important in these regions, as it is the growing season for many crops.	Regions in the south and east are likely to see an increase in the average duration of drought. Example: increases in time spent in drought (currently 19 months per decade) GWL +1.5°C: +4% GWL +3.0°C: +11%

**GWL = Global Warming Level*

How acute physical risks impact different sectors

The type and combination of acute physical risks that you may need to consider will depend on your type of entity and your location, as well as other factors including your entity's exposure to international value chains (see Modules 3, Unit 4). Table 2 below shows a sample of sectors, the types of acute risks that are likely to be most relevant to entities in those sectors, and examples of possible impacts that could result.

Table 2: Examples of acute physical risks for different sectors and their possible impact

Sector	Key acute physical risks	Example(s) of possible impact
Construction and infrastructure	› Extreme heat › Bushfires › Extreme rainfall leading to flooding › Severe wind	› Flooding damaging buildings and roads › Devaluation of property in high-risk areas › Supply chain disruption › Worker health and safety
Transport and logistics	› Extreme heat › Extreme rainfall leading to flooding › Storms	› Damage to roads, rails, ports and other infrastructure, causing disruption of services › Worker health and safety
Manufacturing	› Extreme heat › Extreme rainfall leading to flooding › Storms	› Physical damage to facilities › Supply chain disruption › Worker health and safety
Retail and consumer goods	› Extreme heat › Extreme rainfall leading to flooding › Drought	› Reduced consumer spending › Supply chain disruption
Agriculture	› Drought › Extreme heat › Extreme rainfall leading to flooding › Bushfires	› Crop and/or livestock losses › Disruption of distribution routes › Worker health and safety
Aged care and health services	› Extreme heat › Bushfires	› Increased health risks for vulnerable populations › Greater strain on health services
Technology and services	› Extreme heat › Extreme rainfall leading to flooding	› Greater energy demand › Business interruptions › Supply chain disruptions ›

The effects of compounding impacts

Acute, event-driven physical risks, such as extreme heat, heavy rainfall, elevated fire danger or prolonged drought, do not act in isolation. Rather, they can compound and exacerbate one another. With the growing frequency and severity of extreme weather events, entities may face repeated shocks with little time in between to recover.

Furthermore, as the world continues to warm, we are often faced with rapid and pronounced swings between opposing weather extremes, such as abrupt shifts from severe drought, heat and fire weather to intense rainfall and back again – a phenomenon known as climate whiplash or hydroclimate whiplash.[9]
It is therefore important to consider both individual acute physical risks, and how different types of risk interact with one another.
Module 3 Unit 8 provides links to more detailed information and data on climate-related physical risks for Australia.

Key takeaways

- Acute physical risks are already impacting Australian entities, with many cases of extreme heat, severe bushfires, intense downpours and other extreme weather events causing financial losses.
- Different entities face different combinations of acute physical risks.
- Extreme weather events can compound one another. Entities may be faced with multiple extreme weather events in close succession, with little time to recover.

Sources and explanatory notes

[1] Bureau of Meteorology and CSIRO (2024) *State of the Climate 2024*, Australian Government
[2] Australian Government (2020) *Royal Commission into Natural Disaster Arrangements: Report*
[3] Deloitte Access Economics (2022) *The social, financial and economic costs of the 2022 South East Queensland rainfall and flooding event*, Queensland Reconstruction Authority
[4] Zander, K., Botzen, W.J.W, Oppermann, E., Kjellstrom, T., and Garnett, S.T. (2015) *Heat stress causes substantial labour productivity loss in Australia*, Nature Climate Change, 5: 647-651
[5] Hughes, N., Galeano, D., and Hatfield-Dodds, S. (2019) *The effects of drought and climate variability on Australian farms*, ABARES.
[6] Australian Climate Service (2025) *Australia's Future Climate and Hazards Report*, Australian Government
[7] All information from State of the Climate 2024 and the Australia's Future Climate and Hazards Report (2025) (see endnote 1)
[8] Global warming levels are used in the National Risk Assessment that are likely to be reached in the mid-term (2050) and long-term (2090) they are consistent with global policy goals and describe what Australia may look like at a particular warming level, even if that level occurs earlier or later than projected
[9] Swain, D.L., Prien, A.F., Abatzoglou, J.T., Albano, C.M., Brunner, M., Diffenbaugh, N.S., Singh, D., Skinner, C.B., and Touma, D. (2025) *Hydroclimate volatility on a warming Earth*, Nature Reviews Earth and Environment