



CLIMATE  
COUNCIL



Emergency Leaders  
for Climate Action



# STATE OF QUEENSLAND: DISASTER GROUND ZERO

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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 38 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 plays a critical role communicating the seriousness of the climate threat, the need for further, faster cuts to climate pollution, and how we ready communities and fire and emergency services for increasingly frequent and damaging extreme weather events.

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Responsibility for the final content of the report remains with the authors.



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Emergency Leaders for Climate Action and the Climate Council 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.

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# Contents

<b>Key findings</b> .....	<b>i</b>
<b>1. Introduction</b> .....	<b>1</b>
<b>2. Climate pollution is driving worsening unnatural disasters</b> .....	<b>3</b>
<b>3. How climate change is hurting Queenslanders</b> .....	<b>4</b>
The climate impacts Queenslanders are already experiencing	5
– Bushfires	5
– Tropical cyclones	8
– Severe storms	10
– Heatwaves	10
– Marine heatwaves	11
– Ocean acidification	12
Climate drivers of Queensland’s weather	13
<b>4. Worse is on its way for Queensland</b> .....	<b>15</b>
The season ahead	18
<b>5. Recommendations</b> .....	<b>19</b>
<b>6. Conclusion</b> .....	<b>21</b>
<b>References</b> .....	<b>22</b>
<b>Image credits</b> .....	<b>24</b>

# Key findings

## 1 Queensland is Australia's most disaster-prone state, with climate change fuelling more intense bushfires, floods, cyclones, storms and heatwaves.

- › Since 1910, average temperatures in Queensland have increased by more than 1.5°C, largely because of climate pollution from coal, oil and gas.
- › Climate change is disrupting the natural 'climate drivers' that influence Queensland's weather patterns, like the El Niño-Southern Oscillation (ENSO) that swings between El Niño and La Niña. The latest research indicates that this could be shortening periods between drought, extreme rainfall and flooding.
- › Most Queenslanders have experienced one or more floods (70%), heatwaves (86%) and/or cyclones and destructive storms (57%) within the past five years – which is a higher proportion of people than in any other state or territory.
- › Half (52%) of all Queenslanders have been forced to relocate due to disaster, or know someone else who has, over the past five years.

## 2 Once known as a cyclone state, Queensland has become increasingly prone to killer heatwaves and deadly bushfires, with the 2023 fire season the most destructive on record.

- › Since the early 2000s, the Queensland Fire Department has noted an increase in the frequency, severity, size and property damage of bushfires in Queensland that culminated in the unprecedented 2023 fire season.
- › From August to November 2023, fires burned 1.36 million hectares of land. This impacted a third of Queensland's local government areas, claimed five lives and destroyed more than 180 structures, including 74 homes.
- › Warmer than usual overnight temperatures made the 2023 bushfires more difficult to contain, with five times more night-time hot spots than usual in the South East and Western Downs regions. The town of Tara lost 59 homes to fires, more than were lost in the entire state of Queensland during the Black Summer bushfires of 2019-20.
- › Climate change is making heatwaves hotter, last longer and occur more often. Heatwaves like those that hit Queenslanders from November 2023 to January 2024 are considered a 'silent killer' of Queenslanders, increasing ambulance calls by 12% and claiming 100 lives every year.
- › Global ocean warming is also driving more frequent, severe and longer-lasting marine heatwaves, resulting in mass bleaching events on the Great Barrier Reef in five of the past eight summers (2016, 2017, 2020, 2022 and 2024).



### 3 More severe tropical cyclones and storms have decimated Queensland's coasts and communities over the past 12 months, fuelled by a warmer ocean and wetter atmosphere.

- › Climate change is rapidly transforming our ocean, which has absorbed 93% of the excess heat trapped by climate pollution. The rate of ocean warming has more than doubled since the mid-1990s, and today the ocean is absorbing enough excess heat to boil Sydney Harbour every eight minutes.
- › For every degree of additional warming, the atmosphere can hold 7% more water vapour, which fuels extreme rainfall events and provides more energy for powerful cyclones. Warmer sea surface temperatures are also linked to the destructiveness of tropical cyclones, by increasing intensity, rainfall and storm surge.
- › In December 2023, Tropical Cyclone Jasper brought record-shattering rainfall, landslides, floods and destruction to Cairns and surrounding areas, damaging at least 1,863 properties and destroying 20 of them with an estimated \$357 million in insurance losses.
- › From Christmas Eve 2023 through to the January 3, 2024, communities in South East Queensland experienced severe storms and rainfall, leading to flash flooding, hail, landslides and widespread power outages, resulting in almost 100,000 insurance claims totalling \$1.33 billion in damages.
- › In January 2024, ex-Tropical Cyclone Kirrily led to heavy rainfall and flooding across Queensland. In the aftermath, more than half (41) of Queensland's local government areas required disaster recovery funding.

### 4 As global temperatures continue to rise, Queensland will continue to be hit by unnatural disasters – the severity of which will depend on how rapidly we slash climate pollution this decade.

- › This spring, the Australasian Fire and Emergency Services Authorities Council has warned of an increased risk of unusually high maximum temperatures and increased fire risk for large parts of Queensland.
- › In the coming decades, long-term climate projections show that climate change will continue to harm Queenslanders through more hot days, more extreme bushfires and fewer but more intense cyclones.
- › These projections also show that we can limit the severity of such impacts into the future by cutting climate pollution further and faster this decade.
- › If we cut climate pollution drastically this decade, we can limit Queensland's mean temperature increase by century's end to 1.28°C. Based on the actions we are taking today, temperatures are projected to increase by 2.40°C, and will rise even further to 3.56°C if we fail to maintain our progress.
- › For the Great Barrier Reef, doing more to cut climate pollution further and faster this decade could be the difference between giving the Reef a fighting chance of survival or watching it mostly disappear.

**5 To protect more Queenslanders from worsening unnatural disasters, the Queensland Government needs to stop approving new or expanded coal and gas projects, grow firefighting capacity and help households and communities better prepare for increasing climate risks.**

- › The Queensland Government has made positive and necessary commitments to cut climate pollution by 75% by 2035, achieve net zero emissions by 2050, and close all publicly-owned coal-fired power stations by 2035.
- › To prevent avoidable escalations in heatwaves, bushfires, cyclone intensity and floods, the Queensland Government now needs to halt approvals for new or expanded fossil fuel projects that lock in more climate pollution and dangerous climate impacts, and undermine the state's positive momentum.
- › As bushfires become more frequent, severe and damaging, fighting them will require more effort and capacity. The Queensland and Federal Governments should consider piloting a program of paid seasonal firefighters similar to other jurisdictions such as Victoria and California, and establish new volunteer units to support community-led preparation and recovery.
- › To help Queensland communities prepare for future climate risks, the Queensland Government should ensure that both the Resilient Homes Fund and Household Resilience Program are informed by the most up to date climate risk projections, and that both are made ongoing, permanent programs.
- › The Queensland Government should work with the Federal Government to ensure that there is dedicated funding available for household resilience programs, including for household buy-backs, house raising and retrofitting.

**Image 1:** Extreme fire danger in Tara, Queensland. On 30 October 2023, 115 firefighters and 28 trucks were on the ground supported by heavy machinery and several aircraft.  
**Source:** Queensland Fire Department 2023.





# 1. Introduction

Queensland may be known as the Sunshine State, but it's also Australia's ground zero when it comes to climate-fuelled disasters.

At the tropical end of the country, Queensland has long been prone to destructive cyclones, storms and flooding. But as climate pollution from the burning of coal, oil and gas intensifies extreme weather, Queensland has become increasingly prone to killer heatwaves and deadly bushfires too.

**Image 2:** Climate supercharged Cyclone Jasper leaves destruction in its wake. The community of Holloways Beach in Far North Queensland has been among the worst hit by flooding, with more than 150 people needing urgent help.





That spells disaster for Queenslanders, who are being pummelled with back-to-back extreme weather events. This climate whiplash has never been more evident than over the past 12 months:

- › From August to November 2023, Queensland was hit by its worst bushfire season on record – tragically claiming five lives and 74 homes.
- › In December 2023, Tropical Cyclone Jasper wreaked havoc on Cairns and surrounding areas, bringing record-shattering rainfall, landslides and floods.
- › Over the 2023 Christmas holidays, South East Queensland was pummelled by severe storms, flash flooding and land slips leading to 100,000 insurance claims.
- › In late January 2024, ex-Tropical Cyclone Kirrily smashed into Townsville and brought heavy rainfall, flooding and damage to huge swathes of Queensland.
- › Throughout the 2023-24 summer, Queenslanders sweltered through intense heatwaves and in March 2024, the fifth mass coral bleaching event on the Great Barrier Reef was confirmed.

The impacts of these more intense – and in some cases, more frequent – disasters add up. More lives claimed, more homes destroyed, insurance costs through the roof and tourism industries under threat.

The bad news is, it's likely to get worse. Long-term projections show that climate change will bring more hot days and nights, more extreme bushfires and fewer but more intense cyclones to Queensland over the coming decades.

The good news is, slashing climate pollution now can limit how much worse these disasters become. Setting strong climate targets and accelerating the rollout of clean energy to cut climate pollution is a good start, but it's not enough. The Queensland Government needs to stop approving new or expanded fossil fuel projects such as coal mining and gas production. It can also help communities prepare for the climate impacts that are already locked in – by trialling getting more paid seasonal firefighters and emergency responders on the ground, similar to other jurisdictions like Victoria in Australia and California in the United States of America, as well as expanding its household resilience program to help households become more disaster-ready.

The future safety and prosperity of Queenslanders depends on how rapidly we cut climate pollution this decade. As Queenslanders stare down the barrel of another high-risk fire season, it's time for the government to act now and secure a safer future.

## 2. Climate pollution is driving worsening unnatural disasters

Climate pollution from the burning of coal, oil and gas is fuelling increasingly severe bushfires, floods and destructive storms such as cyclones. Queenslanders are being repeatedly pummelled by these events, with the majority of people having experienced one or more floods (70%), heatwaves (86%) and/or cyclones and destructive storms (57%) over the past five years – more people than in any other state or territory. Half (52%) of all Queenslanders have been forced to relocate due to disaster or known someone who has during this period (Climate Council 2024a).

Limiting the impact of these unnatural disasters in future means addressing the root cause by slashing climate pollution this decade. The Queensland government has made some progress on this, legislating targets to cut climate pollution by 75% by 2035 and achieve net zero by 2050. The Sunshine State is also cleaning up its grid with the \$62 billion Energy and Jobs Plan that is set to create 100,000 clean energy jobs by 2040 (The State of Queensland 2024), including providing significant employment opportunities in regional communities like Townsville, Mackay, Gladstone and Toowoomba. While committing to closing all publicly-owned coal-fired power stations by 2035 is a step in the right direction, the Queensland government has simultaneously continued to approve new coal mining projects, locking in more climate pollution and dangerous climate impacts and undermining the state's positive momentum (Climate Council 2024b).

Approving new coal and gas projects puts Queenslanders in harm's way of supercharged extreme weather driven by climate pollution.

# 3. How climate change is hurting Queenslanders

As Australia’s most disaster-prone state, Queensland is on the frontlines of climate change (Climate Council 2024c). Since 1910, average temperatures in Queensland have increased by more than 1.5°C largely because of the burning of coal, oil and gas (BoM 2024a).

As temperatures continue to rise, unnatural disasters will become more severe and in some instances more frequent. Communities across Queensland are already seeing some of these impacts firsthand, experiencing devastating bushfires, cyclones and severe storms over 2023-2024.

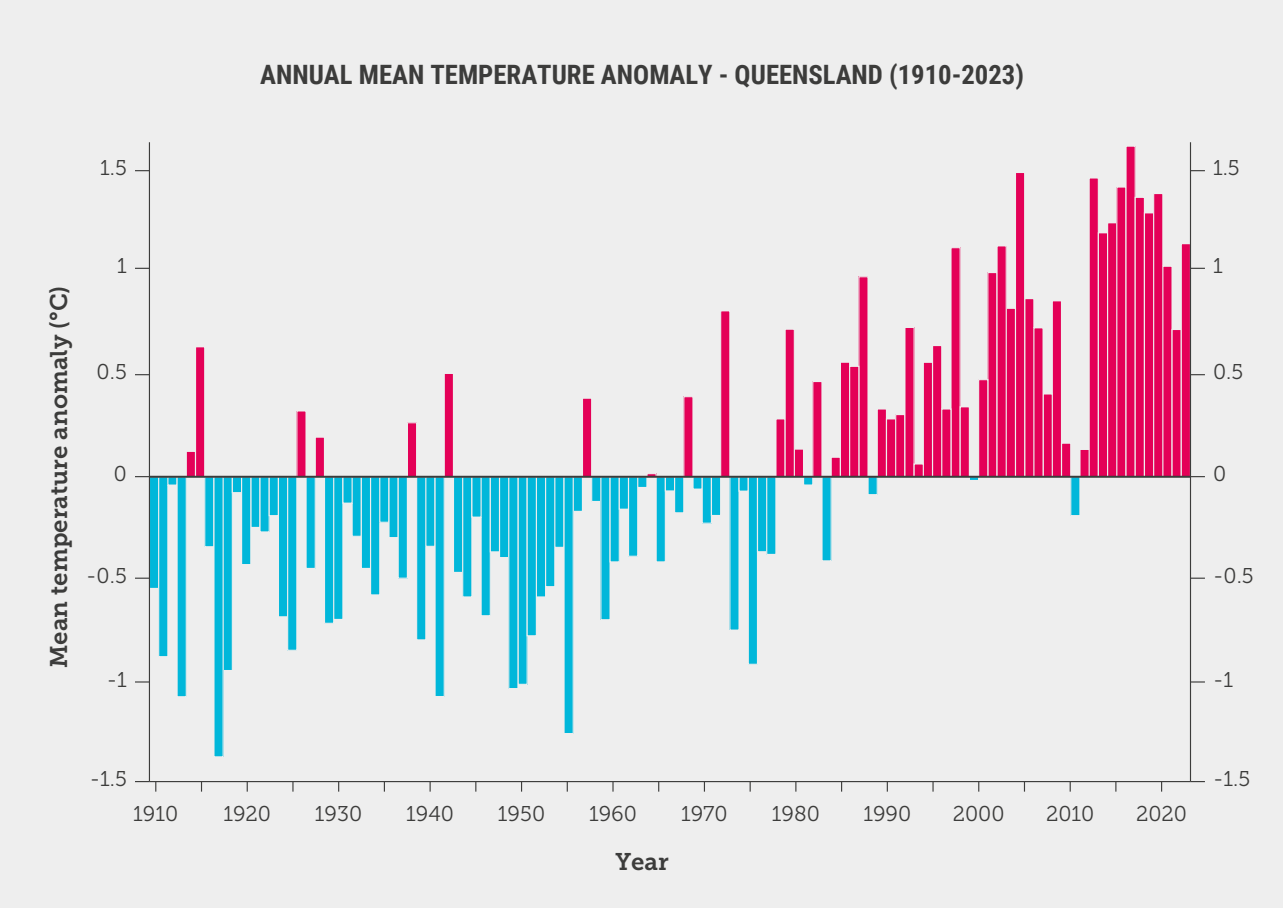


Figure 1: Annual mean temperature anomaly Queensland (1910 to 2023). Source: Adapted from BoM 2024a.



## THE CLIMATE IMPACTS QUEENSLANDERS ARE ALREADY EXPERIENCING



### Bushfires

Bushfires have traditionally been seen as a lesser threat to Queenslanders than cyclones and flooding. However, since the turn of the century Queensland has become a bushfire state - experiencing fires of increasing frequency, severity and size (Canadell et al. 2021, Johnson 2023).

Queensland experienced a severe fire season in 2018, followed by its greatest loss of homes (49) due to bushfires to date in the fire season of 2019/2020 (State of Queensland/ Queensland Reconstruction Authority 2020).

In September 2023, hot and dry weather, spurred by an El Niño and large fuel loads after three years of wetter La Niña, saw fires take off across Southern Queensland, impacting 17 local government areas (QLD Government 2024b). By the end of October there were over 1,000 fires burning across Queensland. The town of Tara, Western Downs lost 59 homes to fires, more than were lost in the whole state during the Black Summer bushfires (Bui et al. 2023).

### BOX 1: WHEN RAINFORESTS BURN

In 2018 it became clear that hotter temperatures and longer dry spells - driven by climate change - were creating more intense bushfires when rainforests burned for the first time in living memory. The fire that took off in Japoon National Park destroyed about 250 hectares of mature rainforest trees (Smee, 2019a). Ordinarily, rainforests are natural fire suppressants due to their cool microclimates, canopy that limits ground fuel, and denseness acting as a windbreak (McCutcheon, 2019). While the fire in Japoon National Park may have been seen as an anomaly, subsequent fire seasons have shown that it was a portent of the

more intense bushfire seasons Queenslanders are now experiencing. In 2019 fires ripped through almost 30,000 hectares of rainforests across Lamington, Mount Barney and Range National Parks (Churchill et al. 2023). In November last year bushfires took off across the Atherton Tablelands, in the tropics of Far North Queensland (Smee, 2023). In just a few years bushfires in rainforests went from an outlier to a scary new reality - pushing firefighters to the limit as they contend with longer firefighting seasons and more intense fires.

Crucially, overnight temperatures were warmer than usual, making it more difficult to contain and suppress fires that often burned intensely overnight when firefighters would normally expect to gain the upper hand. The South East and Western Downs regions had five times more night-time hot spots than usual (Bui et al. 2023). From September to November 2023, at least a third (32.5%) of all local government areas in Queensland were impacted by bushfires (NEMA 2024)<sup>1</sup>. During a very active fire season, the ability of firefighters to contain bushfires was impacted by a decline of 10,000 rural firefighting and SES volunteers over the past four years (Brown 2023).

Bushfires between 1 August and 14 November 2023 burned 1.36 million hectares of land,<sup>2</sup> claimed five lives and destroyed more than 180 structures, including 74 homes (Response 2023).

Given the extensive spread and impact of the bushfires in 2023, it is not surprising that the chief of the Rural Fire Brigade Association warned that Queensland was experiencing its ‘worst fire season in 70 years’ (Sheehan et al. 2023).

**Image 3:** On 17 November 2023, Queensland Fire Department crews work to control fires at Jackson, about 85 km east of Roma.



1 Number of local government areas requiring Disaster Recovery Funding to support bushfire recovery, based on the National Emergency Management Agency’s historical dataset of Disaster Recovery Funding Arrangements. activations by location. There are 77 local government areas in Queensland (Electoral Commission of Queensland 2024).

2 This only includes hectares burnt in bushfires attended by the Queensland Fire Department and data is unavailable for some bushfires. The real figure is likely to be significantly higher.

## BOX 2: CONTRIBUTING FACTORS TO QUEENSLAND BUSHFIRES

Factors that contributed to the 2023 bushfire season: the worst in Queensland's history.

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Fuel load accumulation due to three years of wetter La Niña

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Switch to El Niño

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Hot, windy and dry weather conditions

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Hotter than usual overnight conditions

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Climate pollution is making bushfire conditions more dangerous than in the past, and the risk to people and property has increased. It is also becoming more dangerous to fight bushfires.



## Tropical cyclones

Climate change is rapidly transforming our oceans, as they absorb mind-boggling amounts of excess heat from human-induced global warming (Climate Council 2023). The ocean has absorbed 93 percent of the excess heat trapped by greenhouse gas emissions and the rate of ocean warming has more than doubled since the mid-1990s (IPCC 2019). Today, the ocean is absorbing excess heat energy equivalent to five atomic Hiroshima bomb explosions every second (Cheng et al. 2022, Cheng et al. 2023), or enough to boil Sydney Harbour every eight minutes (Climate Council 2023).

A warmer ocean can drive serious impacts thousands of kilometres away on land, like fuelling the conditions that sparked Australia’s Black Summer bushfires, or generating monstrous cyclones that decimate coasts and cities (Climate Council 2023).

When Tropical Cyclone Jasper crossed the Far North Queensland coast on the 13<sup>th</sup> of December 2023, it brought record-shattering rainfall, landslides, floods and destruction. After making landfall, the ex-tropical cyclone became largely stationary, dumping huge volumes of rain on Cairns and surrounding areas. The Daintree and Barron Rivers reached record-breaking highs, flooding nearby communities (BoM 2024b).

With a mid-December arrival, Cyclone Jasper was unusually early for a landfalling cyclone during an El Niño event. While only a Category 2 storm upon making landfall, its slow movement, long life, and ability to dump enormous amounts of rain were consistent with what we’ve been warned to expect of cyclones on an overheating planet (Climate Council 2024c).

Tropical Cyclone Jasper damaged at least 1,863 properties and destroyed 20 of them in Cairns and surrounding areas. The destruction caused an estimated \$357 million in insurance losses (Byrne 2024, Insurance Council of Australia 2024).

One month later, ex-Tropical Cyclone Kirrily cut across Queensland, crossing the coast south of Townsville and travelling across to the Gulf of Carpentaria. While it had weakened to below tropical cyclone intensity, it rebounded southward toward the southwest of Queensland. It led to heavy rainfall and flooding for western Queensland (BoM 2024c). Ultimately, 41 local government areas required disaster recovery funding (NEMA 2024).



**Image 4:** Tropical Cyclone Jasper damaged at least 1,863 properties and destroyed 20 of them in Cairns and surrounding areas. The destruction caused an estimated \$357 million in insurance losses (Byrne 2024, Insurance Council of Australia 2024).

**BOX 3: WHAT INFLUENCES CYCLONES IN QUEENSLAND?**

Cyclones are influenced by several factors in Queensland:



They are twice as likely to make landfall during periods of La Niña, and do so earlier in the season compared to El Niño (BoM 2016)



Warmer sea surface temperatures are linked to the potential destructiveness of tropical cyclones, increasing intensity, precipitation and storm surge (Lavender et al. 2018)



For every degree of additional global warming, the atmosphere can hold 7% more water vapour, fuelling extreme rainfall events and energy for cyclones (BoM and CSIRO 2022)

Since 1982 there has been a decrease in the number of tropical cyclones observed for Australia (BoM and CSIRO 2022). With continued warming due to climate change it is expected that the decline in cyclones will continue, but those that do occur are likely to be more intense.

Climate pollution from the burning of coal, oil and gas is supercharging powerful storms such as tropical cyclones.



### Severe storms

From Christmas Eve 2023 through to the January 3, 2024, communities in South East Queensland experienced severe storms and rainfall, leading to flash flooding, hail, land slips, damage to properties and widespread power outages (BoM 2024a, Queensland Government 2024a). Due to the damage left by the storms and rainfall, eight local government areas were activated for disaster assistance from the state and Commonwealth governments (Queensland Government 2024b). The severe storm – which also hit communities in New South Wales and Victoria – resulted in almost 100,000 insurance claims, costing \$1.33 billion in damages (Insurance Council of Australia 2024).



### Heatwaves

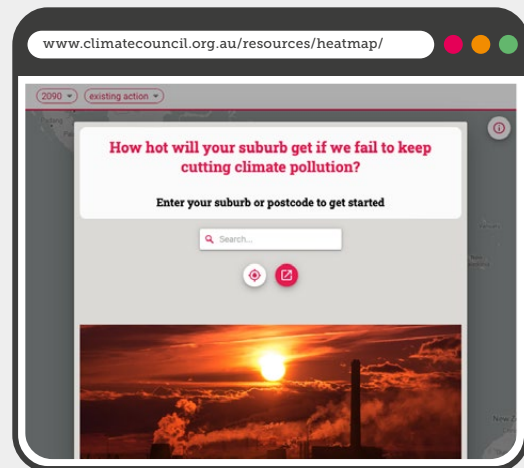
Climate change is already increasing the intensity and frequency of heatwaves in Australia. Heatwaves are becoming hotter, lasting longer and occurring more often. Heatwaves are often referred to as the ‘silent killer’ among extreme weather hitting Queenslanders, claiming 100 lives every year – more than any other form of climate-fuelled disaster (State of Queensland / Queensland Reconstruction Authority 2024; Queensland Fire and Emergency Services 2023).<sup>3</sup> Heatwaves pose significant health risks to children, older people, disadvantaged community members and people living with chronic health conditions (Queensland Fire and Emergency Services 2023). When they occur, heatwaves lead to a 5% increase in deaths and 12% increase in ambulance calls in Queensland (Franklin et al. 2023; Mason et al. 2023). After experiencing scorching heat in October, parts of Queensland experienced heatwaves from November 2023 through to January 2024 (Queensland Government 2023, Kurmelov 2024).

#### BOX 4: HOW HOT WILL YOUR COMMUNITY BECOME?

The Climate Council’s Heat Map of Australia is an interactive tool that shows how cutting climate pollution will limit extreme heat in Queensland neighbourhoods and elsewhere. It projects the average number of hot and very hot days, as well as very hot nights, for each suburb by 2050 and 2090, and across three scenarios: no action, continuing with existing action, and taking necessary action in line with Climate Council’s recommendations.

Enter your suburb in the search bar of the map in link below to see how stronger action can affect the heat in your local area:

[www.climatecouncil.org.au/resources/heatmap](http://www.climatecouncil.org.au/resources/heatmap)



<sup>3</sup> Queensland Fire and Emergency Services are now known as the Queensland Fire Department.





**Image 5:** Mass bleaching driven by climate pollution from the burning of coal, oil and gas has had devastating impacts on the globally significant Great Barrier Reef.

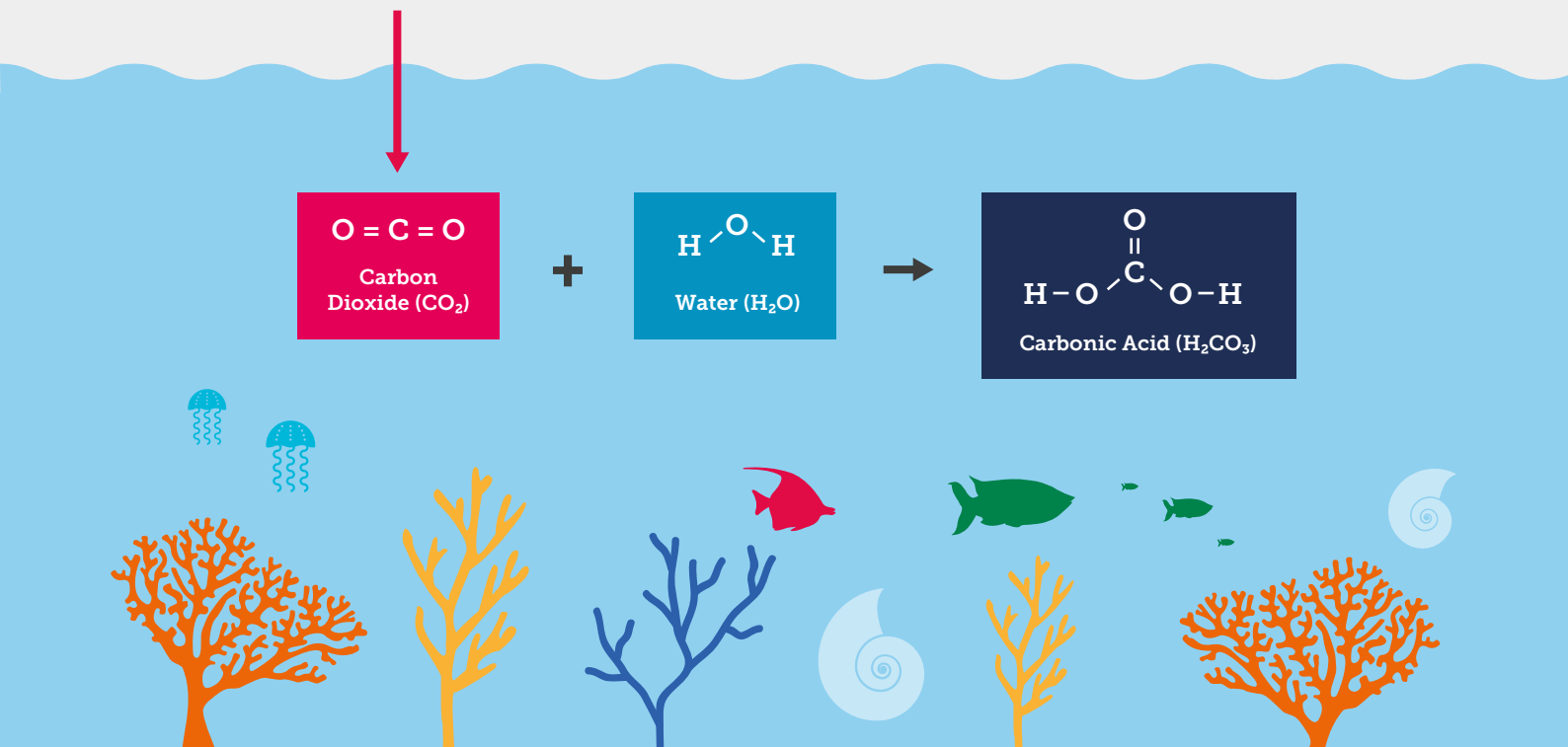
## Marine heatwaves

Global ocean warming, caused primarily by the burning of fossil fuels, is driving an increase in the incidence and severity of marine heatwaves. Similar to a heatwave on land, a marine heatwave is a prolonged period of anomalously warm water in a particular location. Marine heatwaves can be more prolonged than those on land, sometimes lasting many months. Around the world, the incidence of marine heatwaves has doubled since the early 1980s, and they have become longer-lasting, more intense, and more extensive (IPCC 2019).

Ocean warming has devastating impacts on Australia's marine ecosystems and the industries and communities that depend on them. More frequent marine heatwaves have already brought rapid changes to Australia's unique ecosystems, including mass bleaching on the Great Barrier Reef, off the coast of Queensland.

These marine heatwaves have become more frequent and severe in recent decades. Australia's Great Barrier Reef has been affected by five mass bleaching events in just the past eight summers – 2016, 2017, 2020, 2022 and now 2024 (Hughes 2024). The bleaching event in 2022 was the first to take place during a La Niña event, which usually brings a reprieve due to greater cloud cover. For the Great Barrier Reef, stronger action this decade to cut climate pollution further and faster could be the difference between giving the Reef a fighting chance of survival or watching it mostly disappear.

Oceans absorb carbon dioxide from the atmosphere, creating carbonic acid in the water.  
Globally, oceans are around 30 percent more acidic than they were in the 1850s.



**Figure 2:** Climate pollution is changing the chemical make-up of all oceans - making it much more acidic.

## Ocean acidification

By burning vast amounts of coal, oil and gas, we are changing the very chemical makeup of the world's oceans. Around 30 percent of the carbon emitted by burning fossil fuels has been absorbed into the ocean (IPCC 2019). As carbon dioxide dissolves into seawater it creates carbonic acid. This in turn has made the entire ocean more acidic.

Surface waters around Australia are acidifying 10 times faster than at any time in the past 300 million years (BoM and CSIRO 2022). Dramatic changes in ocean chemistry makes it harder for many marine species to thrive. Ocean acidification reduces the concentration of carbonate in seawater, which makes it more difficult for organisms like corals, mussels, oysters and some plankton to form shells and skeletons (Fitzer 2019, Figure 8). In coming decades acidification will have widespread consequences for ocean biodiversity, and for fisheries and aquaculture in Queensland and elsewhere.

We are on a collision course of grave consequence for marine life and Queensland fisheries and aquaculture. We must reduce climate pollution much faster and deeper to avoid this.

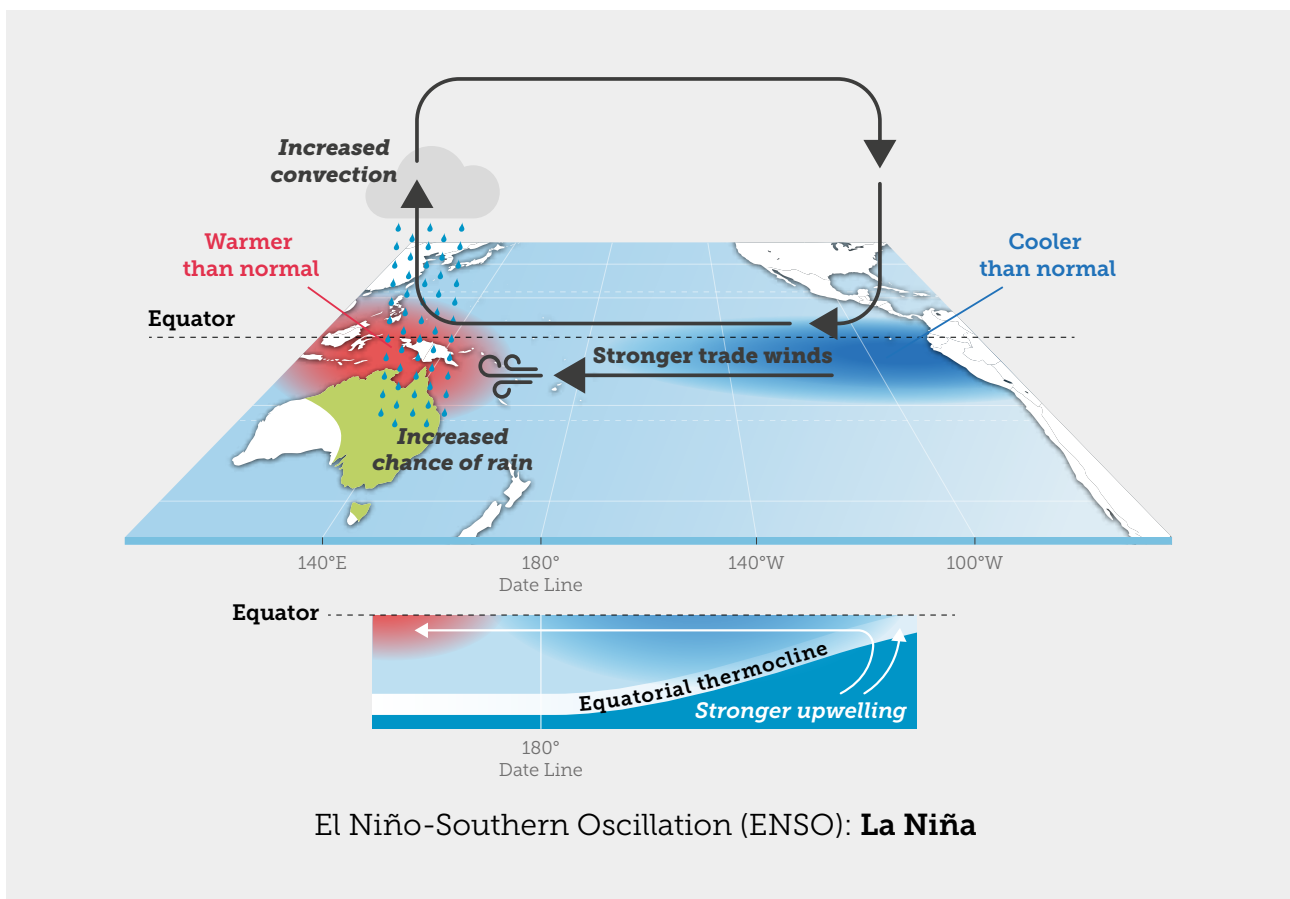
## CLIMATE DRIVERS OF QUEENSLAND'S WEATHER

The year-to-year variations in our weather are determined by a series of natural 'climate drivers'. The most important of these relate to what's happening in the seas around Australia: the Pacific Ocean to our east, Indian Ocean to our west, Southern Ocean to our south, and the tropical waters to our north. Of these, the El Niño-Southern Oscillation (ENSO) – the periodic but irregular changes in winds and temperatures across the tropical Pacific – is the most significant.

By changing the climate, we are changing the conditions for these climate drivers and the conditions under which all weather

forms. While it is too early to draw any conclusions, there are early signs that as the planet warms, the way in which these drivers interact may be changing. The burning of coal, oil and gas is leading to stronger variability in the ENSO, potentially leading to shorter periods between drought, extreme rainfall and flooding (Cai and Santoso 2023). Climate change is likely to drive more positive phases of the Southern Annular Mode, potentially bringing drier winters to southern parts of Australia during winter and wetter summer conditions in the South East (CSIRO 2021).

**Figure 3:** La Niña. Trade winds strengthen, increasing the temperature of the warm water north of Australia. Cloudiness and rainfall north of Australia are enhanced, typically leading to above average winter–spring rainfall for eastern and central parts of the country, and a wetter start to the northern wet season. Source adapted from BoM 2024c.



Queensland's weather is influenced by a number of different climate drivers, including the El Niño-Southern Oscillation, the Southern Annular Mode (SAM), the Madden-Julian Oscillation and tropical cyclones.

The ENSO refers to the El Niño and La Niña weather patterns that impact much of Australia and is the most significant influence on rainfall in Queensland. When an El Niño occurs, there is below average rainfall in Queensland and a drier northern wet season. La Niña, in contrast, brings a wetter start to the northern wet season and above average rainfall for other parts of Queensland in spring and winter (BoM 2024d).

The Southern Annular Mode (SAM) also has an impact on rainfall in parts of southern Queensland. When positive, the SAM is likely to bring more rainfall, and when negative, less rainfall and drying westerly winds (BoM 2024e).

The Madden-Julian Oscillation influences the timing, development and strength of global monsoon patterns, and in Australia it has an effect on the timing and intensity of monsoons as well as the development of tropical cyclones. Its influence is greatest from October to April each year (BoM 2024f).

The Indian Ocean Dipole (IOD) is a type of year-to-year climate variability, similar to the El Niño-Southern Oscillation, but in the Indian Ocean rather than the Pacific. The influence of the IOD on Australian rainfall is specifically for winter and spring because the Monsoon breaks it down in summer. The impacts of the IOD are most pronounced in central and southeastern Australia, with a weaker, mixed signal in Queensland (BoM 2024g).

Crucially, while these climate drivers influence the weather that Queenslanders experience, they are also susceptible to the influence of climate change. For example, one study finds that smoke from Australia's climate change-driven 2019-20 Black Summer fires could have been a major factor in the rare "triple dip" La Niña that lasted from 2020 to 2022 (Fasullo et al. 2023) that severely impacted Queensland and large swathes of Eastern Australia.

Climate pollution is changing the conditions of natural climate drivers like ENSO and the formation of weather conditions.



## 4. Worse is on its way for Queensland

Scientists use global climate models to simulate the Earth's climate system so that we can get a sense of what our future climate may be like. The Queensland Government produces high-resolution climate projections for Australia using a process called 'dynamical downscaling', which involves refining global model projections, especially across coastal and mountainous regions, and improves the simulations of climate extremes such as heatwaves and tropical cyclones. This high-resolution information is useful for projecting future climate change impacts at regional and local levels.

Because future rates of climate pollution are unknown, climate scientists consider different but plausible pathways for future climate pollution concentrations under different social and economic conditions called 'Shared Socioeconomic Pathways' (SSPs). The Queensland Government provides climate projection data for three of these SSPs, representing successively greater climate change impacts (see Table 1).

Due to the burning of fossil fuels like coal and gas, many of the symptoms of a warming planet will continue to hit Queensland over the coming decades. Both minimum and maximum temperatures will continue to rise, and there will be more hot days over 35°C. Rainfall is likely to decline slightly, while evapotranspiration – the loss of water from both plants and soil – is likely to increase, affecting drought and fire conditions. Both bushfires and cyclones are projected to be more extreme when they occur, even if cyclones become less frequent (Queensland Government 2024c).

Despite this, meaningful action to reduce climate pollution now can limit the climate impacts Queenslanders experience in the future. Table 1 shows that under a low emissions scenario, where we cut climate pollution drastically this decade, we can limit Queensland's mean temperature increase by century's end to 1.28°C. Based on the actions we are taking today, temperatures are likely to increase by 2.40°C, and will rise even further to 3.56°C if we fail to maintain our progress so far.

Escalating climate risks for Queensland include hotter days and nights, more extreme bushfires and less but more intense cyclones.

**Table 1:** How Queenslanders will be impacted under different climate pollution scenarios.

	Low pollution scenario (with deeper cuts this decade)	Medium pollution scenario (our current trajectory)	High pollution scenario (if we fail to maintain our progress so far)
Mean temperature (change in °C)	1.28	2.40 2X worse	3.56 3X worse
Heatwave frequency (% increase)	6.1	15.7 2.5X more often	26.7 4X more often
Heatwave duration (increase in days)	1.5	5.0 3X longer	12.6 8X longer
Hot days (over 35 °C) (increase in days)	26.1	47.1 (21 more hot days)	70 (43.9 more hot days)
Hot nights (increase in nights)	26.1	50.3 (24.2 more hot nights)	75.6 (49.5 more hot nights)







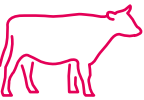
Increases in climate change symptoms by 2090 compared to 1995-2014 baseline, based on low (SSP1-2.6), medium (SSP2-4.5) and high (SSP3-7.0) emissions scenarios across Queensland.<sup>4</sup> **Source:** Queensland Government 2024d

Because of our failure to drastically and deeply reduce climate pollution, we are locked into increasingly severe climate impacts. How severe will depend on our actions this decade. Table 2 outlines the potential range of Queensland’s climate risks and impacts in the coming years.

Because of our failure to greatly reduce climate pollution, severe climate impacts are already baked in for Queensland and elsewhere. To limit further harm, we must advance the rollout of renewables, battery storage and energy efficiency measures.

<sup>4</sup> Figures for temperature increases, heatwave frequency and duration and hot days and nights were collected from the Queensland Future Climate Dashboard - CMIP6. The figures are based on the model average temperature under each emissions scenario for all of Queensland.

**Table 2:** Queensland’s climate risks and potential impacts. **Source:** Adapted from Queensland Government 2024c.

Sector	Increased Climate Hazards	Potential impacts
<b>Communities and built infrastructure</b> 	<ul style="list-style-type: none"> <li>↑ Sea level rise</li> <li>Extreme fire weather</li> <li>Heatwaves and extreme heat events</li> <li>Tropical cyclone intensity</li> <li>Flooding</li> </ul>	<ul style="list-style-type: none"> <li>↑ Inundation, erosion and infrastructure damage along the coastline</li> <li>Maintenance and recovery costs</li> <li>Disruption to services</li> <li>Energy usage</li> </ul>
<b>Business and industry</b> 	<ul style="list-style-type: none"> <li>↑ Sea level rise</li> <li>Fire weather</li> <li>Inundation and flooding</li> <li>Heatwaves</li> <li>Tropical cyclone intensity</li> </ul>	<ul style="list-style-type: none"> <li>↑ Damage from extreme climate events</li> <li>Maintenance costs</li> <li>Disruption to services</li> </ul>
<b>Indigenous communities and culture</b> 	<ul style="list-style-type: none"> <li>↑ Heatwaves</li> <li>Flooding</li> <li>Fire weather</li> <li>Sea level rise</li> </ul>	<ul style="list-style-type: none"> <li>↑ Damage to cultural sites</li> <li>Loss of significant ecosystems</li> </ul>
<b>Biodiversity and ecosystems</b> 	<ul style="list-style-type: none"> <li>↑ Fire weather</li> <li>Temperatures</li> <li>Sea level rise</li> <li>Tropical cyclone intensity</li> <li>Sea temperatures</li> </ul>	<ul style="list-style-type: none"> <li>↑ Damage to landscapes and natural systems</li> <li>Coral bleaching</li> <li>Threats to flora and fauna</li> <li>Changes in the distributions of flora and fauna</li> </ul>
<b>Human health</b> 	<ul style="list-style-type: none"> <li>↑ Heatwaves and heat extremes</li> <li>Fire weather</li> <li>Tropical cyclone intensity</li> <li>Flooding</li> </ul>	<ul style="list-style-type: none"> <li>↑ More demand for health and emergency services</li> <li>Heat-related deaths, particularly among the elderly and vulnerable</li> <li>Mental health effects</li> <li>Changes in disease occurrence</li> </ul>
<b>Tourism</b> 	<ul style="list-style-type: none"> <li>↑ Temperatures</li> <li>Sea level rise</li> <li>Fire weather</li> <li>Heatwaves</li> <li>Tropical cyclone intensity</li> </ul>	<ul style="list-style-type: none"> <li>↑ Threats to tourism infrastructure</li> <li>Damage to popular environmental sites</li> <li>Risks to tourists unfamiliar with conditions</li> </ul>
<b>Agriculture</b> 	<ul style="list-style-type: none"> <li>↑ Temperatures</li> <li>Heatwaves</li> <li>Evaporation</li> <li>Changing rainfall patterns</li> <li>Extreme fire weather</li> <li>Tropical cyclone intensity</li> <li>Sea temperatures</li> </ul>	<ul style="list-style-type: none"> <li>↑ Changes in pest and diseases</li> <li>Changes in agriculture productivity in shifting climate zones</li> <li>Changes in water availability and security</li> <li>Crops destroyed by cyclones</li> <li>Thermal stress for livestock</li> </ul>

## THE SEASON AHEAD

The Australasian Fire and Emergency Services Authorities Council (the National Council for fire and emergency services in Australia and New Zealand) has warned that there is an increased risk of fire for large parts of Queensland, including for Cape York, Peninsula Areas and Tropical Coast, and the central and southern interior of the state during Spring (September - November 2024). Much of central and southern Queensland experienced a curing (drying) event that has increased the risk of grassland fire in early spring (AFAC 2024).

For many parts of Queensland, there is an increased chance of unusually high maximum temperatures compared to the long term spring average (1981-2018) (AFAC 2024). Crucially, much of the Darling Downs region is at increased fire risk, and is likely to experience above average day and night time temperatures (AFAC 2024; BoM 2024h).



**Figure 4:** Spring 2024 Bushfire Outlook for Queensland. **Source:** Adapted from AFAC 2024.



## 5. Recommendations

It is clear that Queensland is Australia's ground zero when it comes to climate-fuelled disasters. Long-term climate projections show that climate change will continue to impact the lives of Queenslanders in the coming decades – through more hot days and nights, more extreme fires and fewer, but more intense cyclones.

However, these projections also show us that we can prevent further escalation of climate-fuelled disasters by rapidly phasing out pollution caused by the burning of coal, oil and gas. This requires cutting our greenhouse gas emissions by 75% below 2005 levels by 2030, and net zero emissions by 2035 (Climate Council 2024a).

### Recommendation:

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#### 1. No more coal, gas or oil projects

The Queensland State Government has set a target to reduce greenhouse gas emissions 75% below 2005 levels by 2035, also committing to net zero emissions by 2050 (Queensland Government 2024e). The Government has also committed to closing all publicly owned coal mines by 2035 (Climate Council 2024b). However, preventing avoidable escalations in heatwaves, bushfires, cyclone intensity and floods, requires that the Queensland Government also halt approvals for new or expanded fossil fuel projects that add more climate pollution, such as coal mining.



**Image 6:** The Resilient Homes Fund (Queensland Government 2024h) is allowing Queenslanders to strengthen their properties against floods or move away from the threat altogether.

**Recommendation:****2. Build on the ground capacity to support firefighting efforts**

The 2023-2024 Queensland bushfire season showed us that bushfire behaviour – spurred by hotter temperatures and drier weather – is changing in unpredictable ways. As bushfires become more frequent, severe and damaging, fighting them will require more effort and capacity. Sadly, Queensland has seen a significant decline in volunteer firefighting at the same time that more support is urgently needed.

The Queensland Government, in collaboration with their federal counterparts, should build on the ground capacity for disaster response and recovery by:

- › Establishing new non-operational emergency service volunteer units that includes people trained in community led resilience and recovery to prepare communities and support their recovery after a disaster.
- › Exploring the possibility of piloting a program of paid seasonal firefighters during predicted periods of heightened bushfire risk to augment resources from volunteer and career fire services (similar to Victoria and California). These crews would be available to assist volunteer rural firefighters during extended firefighting operations when fatigue combined with low volunteer numbers impact, and on a day to day basis work with urban fire services at the urban / bushland interface where properties are most at risk (Emergency Leaders for Climate Action 2024).
- › Maintaining and increasing support for existing flood and bushfire mitigation programs, particularly bushfire hazard reduction works.

**Recommendation:****3. Continue and expand the household resilience program**

The Queensland Government should continue, in partnership with the Australian Government, to invest in the Household Resilience Program. This would complement and build on the recently announced \$116 million energy performance upgrades for tenants in Queensland social housing, aimed at lowering the cost of energy bills and easing the cost of living (Queensland Government 2024e). The initiative is expected to deliver a raft of upgrades, including thermal shell improvements, air cooling solutions and ceiling fans, in addition to solar PV, energy-efficient hot water systems, and fixed appliance upgrades. The funding is expected to provide upgrades to approximately 28,000 public housing dwellings and 4,000 community housing dwellings, to support Queensland's clean energy transformation and reduce the cost of living (Queensland Government 2024f).

There are opportunities to build upon this work and better protect Queenslanders at greater risk of climate-fuelled disasters by:

- › Ensuring that the delivery of the Resilient Homes Fund and Household Resilience Program is informed by the most up to date climate risk projections, including those developed through the Australian Government's National Climate Risk Assessment (ELCA & Climate Council 2024).
- › Making both the Resilient Homes Fund and Household Resilience Program permanent and ongoing programs (ICA 2024).
- › Working with the Australian Government to ensure that there is dedicated and ongoing funding available for household resilience programs, including for household buy-backs, house raising and retrofitting. This could occur through the Australian Government's Disaster Ready Fund, or other fit for purpose arrangements (ELCA & Climate Council 2024; ICA 2024).

## 6. Conclusion

As Australia's most disaster-prone state, Queensland is on the frontlines of climate change. But it could also be at the forefront of climate solutions.

The Queensland Government's strong climate pollution reduction and renewable energy targets, coupled with its significant investment in clean energy and jobs, represent significant progress. Now is the time for Queensland to accelerate its efforts – to slash climate pollution further and faster, and protect more Queenslanders from avoidable escalations in heatwaves, bushfires, cyclone intensity and floods.

This starts with addressing climate pollution at the source by halting all new and expanded fossil fuel projects. But with Queenslanders already experiencing climate whiplash as they ricochet from one unnatural disaster to the next, the government also needs to focus on disaster preparation, response and recovery in the near-term – ensuring firefighters have the resources they need and that more Queensland households are protected from future climate risks.

With the right policies in place, the sunshine state can be both a beacon of Australia's bright future as a clean energy powerhouse – and a guiding light in disaster preparation, response and recovery.

By placing the right climate, energy and disaster preparedness policies in place, Queensland can become a leader.

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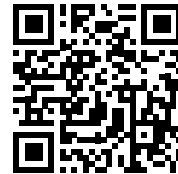
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The Climate Council acknowledges the Traditional Owners of the lands on which we live, meet and work. We wish to pay our respects to Elders, past and present, and recognise the continuous connection of Aboriginal and Torres Strait Islander peoples 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.

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