

## CAT Resource Center Post-Event Report

# AUSTRALIAN EAST COAST FLOOD

Report Date: March 11, 2022

## Australian East Coast Flood

Information as of March 11, 2022



States affected: [Queensland \(QLD\)](#) and [New South Wales \(NSW\)](#)



Flood Levels: Brisbane River reached the highest level since the 2011 floods at the City Gauge  
Wilsons River at Lismore reached 14.37m, exceeding the 1954 flood levels by 2m



Precipitation: Rainfall totals exceeded 400mm across large parts of SE QLD and NE NSW  
Rainfall exceeded 700mm in just 30 hours in Lismore, NSW

- Largest flood event to occur since 2011 Queensland floods, and one of largest in Australia's history.
- Worst-affected regions are Lismore (NSW), Ballina (NSW), suburbs around Brisbane River (QLD), and Gympie (QLD).
- The Insurance Council of Australia (ICA) reported 118,106 claims, with estimated insured losses of AUD 1.77 billion.
- The event has placed emphasis on town-planning concepts of resilient rebuild and relocation.
- Climate change likely increased the severity of the rainfall, but it was not responsible for the type of meteorological setup that led to this event.

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### The Australian East Coast Flood post-event report comprises the following sections:

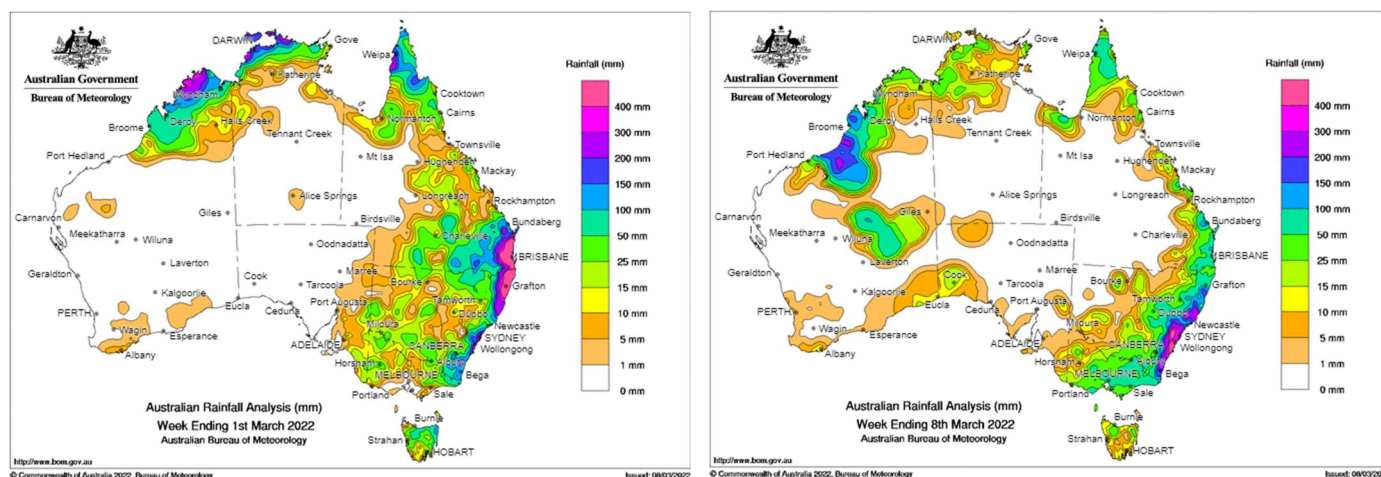
- [Meteorological Background](#)
- [Areas with Extreme Rainfall](#)
- [Damage Impacts](#)
- [Large Insured Losses](#)
- [Climate Impacts](#)

## Meteorological Background

The 2021/22 summer has experienced above average rainfall for the east coast of Australia. According to the Bureau of Meteorology, a La Nina event has been active since November 2021. In this period, the subtropical ridge shifted farther south throughout the summer during a positive Southern Annular Mode. Under the influence of these two climate drivers, tropical air expanded farther down to the southeastern states, increased onshore wind, and brought more moisture to eastern Australia.

A monsoon trough first developed off the coast of Queensland in late February. The trough drew tropical moisture from the Coral Sea and lifted it over the coast, causing widespread heavy rainfall in SE Queensland and NE New South Wales on February 24. A high pressure system near New Zealand prevented the trough from moving away from the coast, resulting in prolonged and widespread heavy rainfall. Record-breaking rainfall was observed over the Sunshine Coast and coastal areas of SE Queensland (Figure 1, left), leading to severe flooding (Figure 1, right).

**Figure 1: Weekly Rainfall Totals Ending March 1, 2022 and March 8, 2022**



While the trough moved southeastward on February 28, it generated a low-pressure system (known as East Coast Low) farther south over the Tasman Sea. The low further deepened and slowly tracked towards the coast of central New South Wales during the following week. On the southern side of the stalling low, strong onshore flow brought moist air and heavy rainfall to the coast of New South Wales, similar to the trough that affected Queensland the prior week. Sydney observed a total of 820mm rainfall since January 1, 2022, smashing the highest record of 782mm set in 1956 and causing flooding across the city.

## Areas with Extreme Rainfall

Some cities experienced extreme rainfall during this period. Below are some examples.

**Table 1: Locations with Extreme Weekly Rainfall**

Locations w/ Extreme Rainfall (in 1 Week)	Rainfall
UKI (TWEED RIVER)	1,313.0 mm
BOAT HARBOUR (ROUS RIVER)	1,028.0 mm
ALDERLEY	956.4 mm
REDCLIFFE	906.2 mm
BRISBANE	760.0 mm
MURWILLUMBAH (DUNGAY (TALESWOOD))	728.0 mm
IPSWICH ALERT	685.0 mm

**Figure 2: Key Impacted Cities**

## Queensland

- The areas with largest damages were around Brisbane, Gympie, Maryborough, and Ipswich.
- In Gympie, flood waters exceeded the 1999 flood level.
- In Brisbane, the flood waters peaked just below 4m at the Brisbane Port Office, which is lower than the 2011 flood levels of 4.46m. However, there was significant flooding across the nearby creeks and tributaries.

## New South Wales

- The areas with greatest damage were around Lismore, Ballina, Murwillumbah, and Grafton.
- The flood levee in Murwillumbah was breached, and river levels there and in nearby Tumbulgum and Chinderah surpassed records established in 1974 and 2017.
- In Lismore, the floodwaters reached 14.37m, which is 2m above the highest flood level recorded (12.27m in 1954).

**Figure 3: Flood Extent in Lismore, New South Wales**

Extensive flooding occurred in Northern New South Wales along the Richmond and Wilsons Rivers, with the worst impacts in the towns of Lismore and Ballina. The figure on the left shows the estimated flood extents for Lismore derived from satellite mapping. Large areas of Lismore were inundated on both sides of the river. Similar flood-extent maps have been constructed for key flood areas and are available for use to estimate policy and exposure accumulations.

*Source: Geospatial Insight*

The Geospatial Insurance Consortium (GIC) in collaboration with the Insurance Council of Australia has captured high resolution imagery of several areas in South-East Queensland and Northern NSW in the days following the event. Access to imagery is available to all ICA members under a cost sharing model through the ICA. The figure on the left shows the imagery over Lismore, where a large number of properties have visible damage, with contents/debris moved to the footpaths. It is estimated that at least 900 homes were deemed uninhabitable in Lismore based on damage assessments.

*Source: Geospatial Insurance Consortium*



## Damage Impacts

The 2022 February/March East Coast flooding event has been declared a national emergency, with impacts on many areas.

### Lives

As of March 5, at least 17 deaths had been reported, 11 from Queensland and 6 from New South Wales.

### Property

As of March 2, S&P estimated that insured losses could increase to AUD 2 billion with ongoing Brisbane River inundation in urban areas as the storm moved south to New South Wales. As of March 10, the ICA reported 118,016 claims valued at AUD 1.77 billion, with 63 percent of the total from Queensland and the rest from New South Wales, and 81 percent from domestic property, 16 percent from motor vehicles, and 3 percent from commercial properties. The city of Lismore was submerged and 900 homes were deemed uninhabitable out of 1,400 assessed, with up to 3,000 homes affected in total. In Ballina, about 6,000 homes may have been impacted by flood water.

### Public Infrastructure

Inundation caused bridge and road closures, making it difficult to deliver relief supplies to victims. Windsor Bridge, North Richmond Bridge, and Yarramundi Bridge were closed. The ferry terminal at Hawthorne by the Brisbane River sustained extensive damage and collapsed. On March 7, Queensland's State Treasurer, Cameron Dick, estimated that it will cost the state's economy up to AUD 2.5 billion, with AUD 1 billion spent to repair roads, rail systems, bridges and major infrastructures, and another billion lost in economic activity for the state.

### Agriculture

Australia's largest milk cooperative, Norco, suffered damage to its head office and an ice-cream factory, with many dairy farms and stores inundated with flood water, resulting in damage to livestock, fences, pastures, machinery, and homes. At least 200,000 litres of milk had to be discarded.

According to one estimate, up to 475,000 cattle, approximately 2 percent of the national herd, may have been lost. Some were washed away by strong flood currents or drowned. Numerous dead livestock, including cows and sheep, were seen along the coastline of the Gold Coast.

Crop damage in the region was reported by farmers for macadamias, blueberries, bananas, and avocados.

### Public Health Concerns

Public health officials are monitoring the incidence of tetanus, mosquito-borne Japanese encephalitis, diarrheal diseases, and increased respiratory illnesses due to the breeding of dust mites and mold in damp buildings.

## Large Insured Losses

The table below shows original and normalized loss amounts from large historical flood events. According to the latest ICA estimates, the current event ranks among the largest based on insured losses.

**Table 2: Historical Events with Large Insured Losses**

ICA Code	Event Name	Year	ICA Original Loss (AUD)	ICA Normalized Loss (AUD)
CAT741	Cyclone Wanda	1974	68.0 M	3,160.4 M
CAT073	Queen's Birthday Storms	2007	1,480.0 M	2,197.4 M
CAT112	Queensland Floods	2011	1,356.0 M	2,075.0 M
CAT191	Townsville Floods	2019	1,268.0 M	1,268.0 M
CAT133	Ex Cyclone Oswald	2013	987.0 M	1,130.9 M
CAT153	NSW East Coast Lows	2015	949.6 M	1,059.8 M
CAT202	South East Coast Storms & Flooding	2020	973.8 M	973.8 M
CAT841	Sydney Floods	1984	80.0 M	712.7 M
CAT212	Extreme Weather Event	2021	596.3 M	596.3 M
CAT083	Mackay Flood	2008	410.0 M	575.4 M

Since the 2011 Queensland floods, legislation has provided a standard definition of flood. Many insurers include flood cover as an integral part of a household policy, whereas some allow policyholders to opt out, cover flood at a much lower limit, or do not cover it at all. A licensable National Flood Information Database (NFID) with 11.3 million property addresses is available to help determine flood risk for individual properties. These developments have increased flood insurance penetration. One research paper<sup>1</sup> reported that only about half of home and contents insurance policies included flood cover in 2011, whereas the current covered proportion is around 90 percent. Thus, the current event's insured losses may be higher than for similar previous events. However, in disaster-prone areas, flood premiums are deemed too high by some residents, so covered proportions may be lower. Furthermore, the ICA estimates that 23 percent of Australian households do not have building or contents insurance, meaning that approximately 1.8 million residential households are not protected. There are ongoing discussions about including non-cyclonic floods in the newly proposed Government Cyclone Reinsurance Pool. This event also has placed an emphasis on considerations for resilient rebuild, or even relocation, for areas that have been flooded repeatedly.

## Climate Impacts

Prolonged and intense rainfall led to the flooding in southeast Queensland and northeast New South Wales. There is evidence climate change is increasing the intensity of extreme rainfall globally and regional climate models project flooding will increase in Brisbane and surrounding areas. However, the prolonged nature of the rainfall in this event was caused by a meteorological phenomenon known as blocking, in which high pressure remains in place for an extended period, and there has been limited scientific research on whether climate change influences the frequency of blocking for Australian East Coast Lows. Climate change may have increased the severity of the rainfall, but it was not responsible for the type of meteorological setup that led to this event.

Guy Carpenter has developed inland flood model solutions to inform clients of their potential future risk from flooding under different time horizons and warming levels.

*Sources: Bureau of Meteorology, National Road Transport Association, Insurance Council of Australia, Australian Broadcasting Company, Sydney Morning Herald, The Guardian, Defence Service Homes, S&P Global, AXCO, PERILS*

<sup>1</sup> Lo A (2013a) *The likelihood of having flood insurance increases with social expectations*. Area 45(1): 70–76.

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