

Australian Actuaries Climate Index Record for extreme weather reflects a season of severe flooding

28 July 2022

- **Actuaries' climate index at record level during Australian autumn.**
- **Driven by extreme rainfall and extreme high temperatures in NSW and QLD.**
- **An extreme rainfall record was set for the East Coast South region, which includes Sydney and most of coastal NSW.**

The Australian Actuaries Climate Index reached a record level across Australia during autumn, driven by extreme rainfall across the east coast and high temperatures in northern Australia.

The East Coast South region, which covers Sydney and most of the NSW coast, set a record for extreme rainfall. The Wet Tropics region, which includes the northern most parts of Queensland, recorded the second highest index value for extreme rainfall since the index began. This was influenced by the ongoing La Niña weather system that stayed in place throughout the season¹. The rainfall was enhanced by an east coast low that affected the region in early March² (see Figure 1).

On the ground there was a continuation of the severe flooding that started in the previous season. Schools were closed, evacuations took place and supply chains were disrupted³. The combination of saturated soil conditions and continued heavy rainfall throughout the season meant flooding persisted throughout the period for much of QLD and NSW. This continues in winter.

Figure 2 depicts the ongoing nature of the extreme rainfall experienced by this part of the country. It compares how often the regions experienced extreme rainfall in 2022 to the base period average (where extreme is defined as exceeding the 99th percentile of the base period of 1981-2010). By the end of March, the East Coast South region had experienced approximately six times as many observations of extreme rainfall than during the base period. By the end of May, extreme rainfall in both the East Coast South and East Coast North regions had been about four times more frequent in 2022 than during the base period.

Along with extreme rainfall, Australia experienced extreme high temperatures in autumn. This was primarily seen in the northern parts of the country, as is shown in Figure 3. The Wet Tropics and Monsoonal North regions both saw the second highest extreme high temperature index value, while the East Coast North region recorded the third highest value since the index began.

The Bureau of Meteorology observed similar trends, noting that rainfall totals were more than double their seasonal average for several parts of NSW⁴, and that the national mean temperature was the third highest on record⁵.

The La Niña event that contributed to the wet year so far ended in June, but may re-form in spring and bring back with it above average rainfall. Also, a negative Indian Ocean Dipole event is predicted for the coming months⁶. This increases the chances of above average winter and spring rainfall for much of the country.

The Australian Actuaries Climate Index, which was launched in November 2018, is an objective measure of extreme weather conditions and changes to sea levels. It is designed to provide an easy to interpret and valuable metric for actuaries, policy decision-makers and the general public when monitoring changes in climate.

¹ <http://www.bom.gov.au/climate/enso/outlook/#tabs=ENSO-Outlook-history>

² <https://phys.org/news/2022-03-nsw-one-two-east-coast-lows.html>

³ https://en.wikipedia.org/wiki/2022_Eastern_Australia_floods

⁴ <http://www.bom.gov.au/climate/current/season/nsw/summary.shtml>

⁵ <http://www.bom.gov.au/climate/current/season/aus/summary.shtml>

⁶ <http://www.bom.gov.au/climate/enso/#tabs=Overview>



"The Australian Actuaries Climate Index clearly shows extreme weather conditions are a 'here and now' challenge," said Actuaries Institute President, Annette King. "It underscores the importance of all stakeholders embracing solutions - from investment in adaptation and resilience to improved disclosures and reducing greenhouse gas emissions," she said.

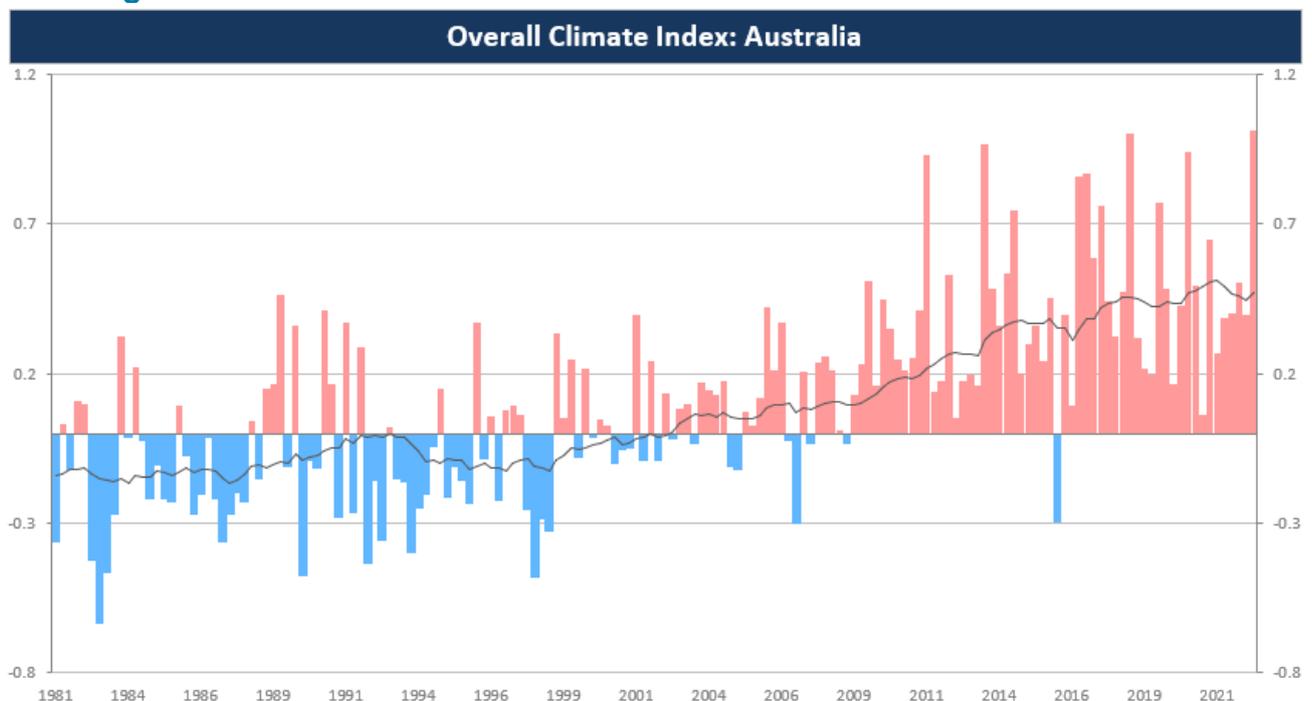
Rade Musulin, Chair of the Actuaries Institute Climate Risk Working Group and Principal at Finity Consulting, said "this extreme weather is consistent with the warnings of climate scientists, recently summarised in a joint paper by the International Actuarial Association and the Intergovernmental Panel on Climate Change, [Climate Science: A Summary for Actuaries](#). It is important that we invest in improving the resilience of our communities in light of trends in extreme weather." Mr. Musulin was a lead author of that paper.

The Index is updated quarterly. It draws on six component indices measuring changes in the frequency of extreme high and low temperatures, heavy precipitation (rainfall), dry days, strong winds and changes in sea levels across 12 Australian regions that are climatically similar. The Index reached 1.01 in autumn, the highest since the index began. Each season is compared to the same season in previous years, and against a reference period from 1981-2010.⁷

The Index is calculated at the end of each season by Finity Consulting following the release of data from the BoM.

Footnote: References are based on the data underlying the AACI, which tracks changes in the frequency of extreme high and low temperatures, heavy precipitation, dry days, strong wind, and changes in sea level, mainly concentrating on the 99th percentile of observations.

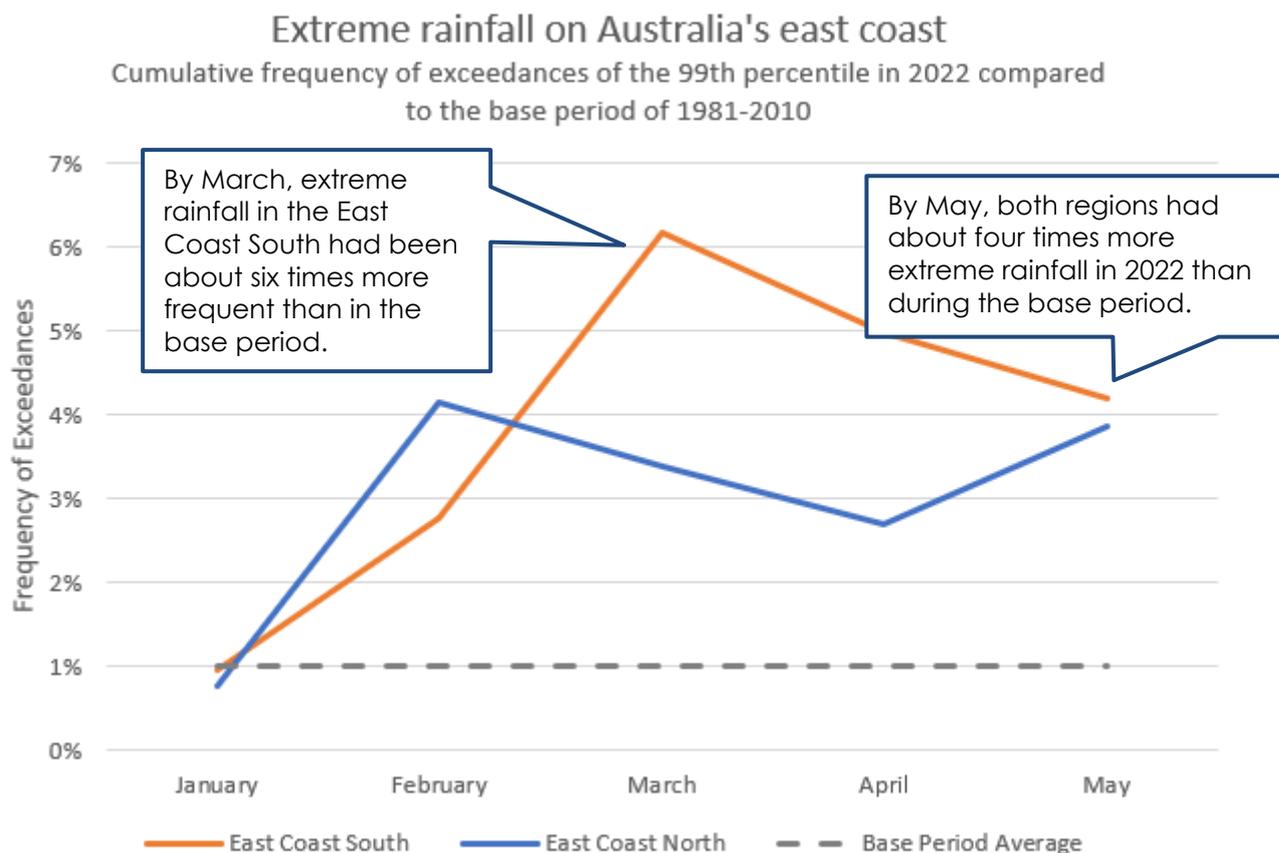
Figure 1: Autumn 2022 sets a record for the Australian Actuaries Climate Index



⁷ The detailed AACI Design Documentation is available at <https://www.actuaries.asn.au/microsites/climate-index/about/development-and-design>



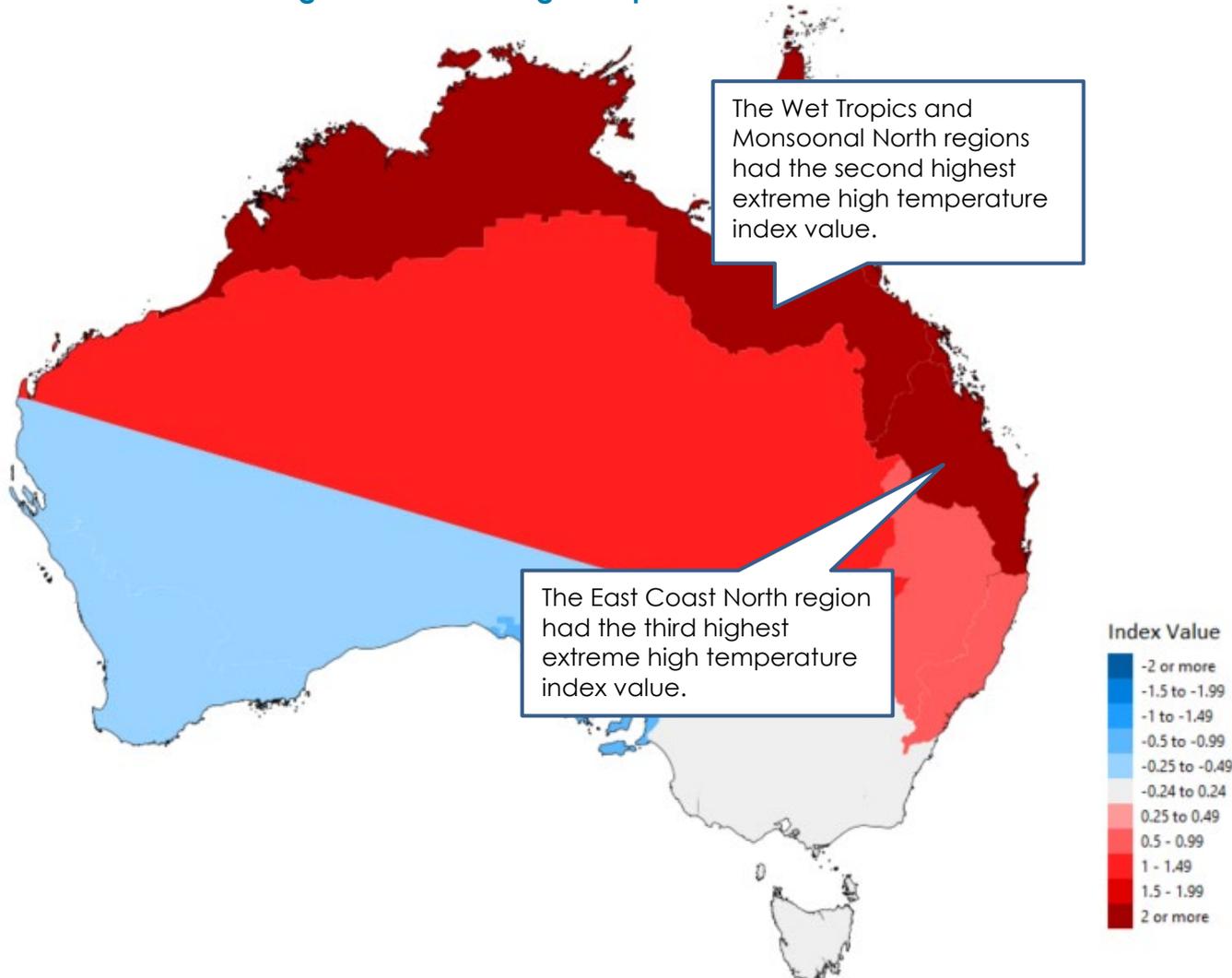
Figure 2: Extreme Rainfall in 2022 on the East Coast



Notes: The cumulative nature of the calculations means that, for example, May = January through May. Extreme rainfall is measured in the Index as a day in which the reading is at, or above, the 99th percentile of observations from the base period.



Figure 3: Extreme High Temperature in Autumn 2022



A link to the [AACI](#) is here. The Actuaries Institute's broad range of papers on climate risk can be found here: [Climate Risk Resource Centre](#).

Mr Musulin, Chair of the Actuaries Institute Climate Risk Working Group and Principal at Finity Consulting, is available for comment.

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As the sole professional body for Members in Australia and overseas, the Actuaries Institute represents the interests of the profession to government, business and the community.

Actuaries use data for good by harnessing the evidence to navigate into the future and make a positive impact. They think deeply about the issue at hand, whether it's advising on commercial strategy, influencing policy, or designing new products. Actuaries are adept at balancing interests of stakeholders, clients, and communities. They're called upon to give insight on complex problems, they'll look at the full picture. Actuaries analyse the data and model scenarios to form robust and outcome-centred advice.