

## Australian Actuaries Climate Index: a cool autumn, with a wet start

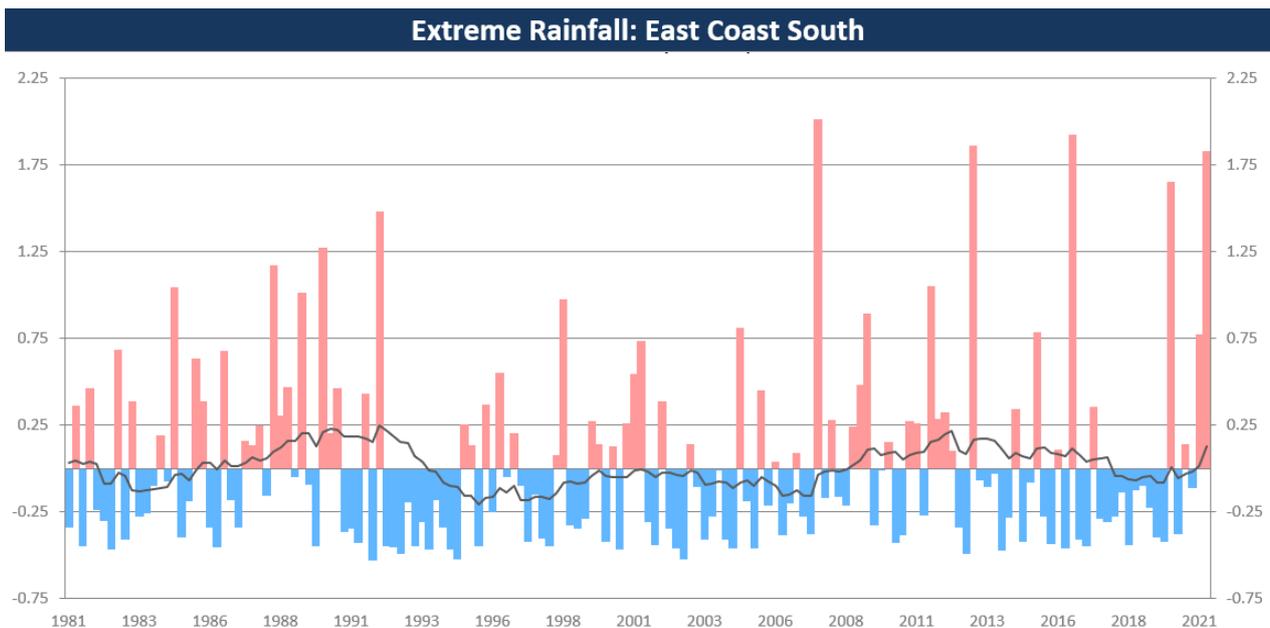
4 August 2021

- Autumn began with lower temperatures and higher levels of rainfall.
- Eastern Australia experienced widespread flooding in March, after extreme rainfall.
- Extreme high temperature and extreme low temperature were both below the reference period average.

The Australian Actuaries Climate Index showed a positive value for autumn 2021, indicating that the weather was more extreme than in the reference period from 1981-2010. Extreme rainfall early in the season and high sea level values, mitigated by milder temperature indices, drove the overall index results during autumn.

Heavy rainfall between March 16 to 23 in NSW caused significant flooding, which resulted in the deaths of five people, and damage costing approximately \$1 billion <sup>(1)</sup>. This is reflected in the fourth highest extreme rainfall index value recorded for the East Coast South cluster, which covers eastern NSW, including Sydney. This is shown in Figure 1.

**Figure 1 – Australian Actuaries Climate Index: Extreme Rainfall Index**



The Index, which was launched in November 2018, is an objective measure of extreme weather conditions and changes to sea levels, to help policymakers and Australia's businesses assess how the frequency of weather extremes is changing over time.

It is updated quarterly and shows changes in the frequency, or the rate of occurrence, of extreme high and low temperatures, heavy precipitation, dry days, strong winds and changes in sea levels across 12 Australian regions that are climatically similar. Each season is compared to the same season in previous years, and against a reference period from 1981-2010.

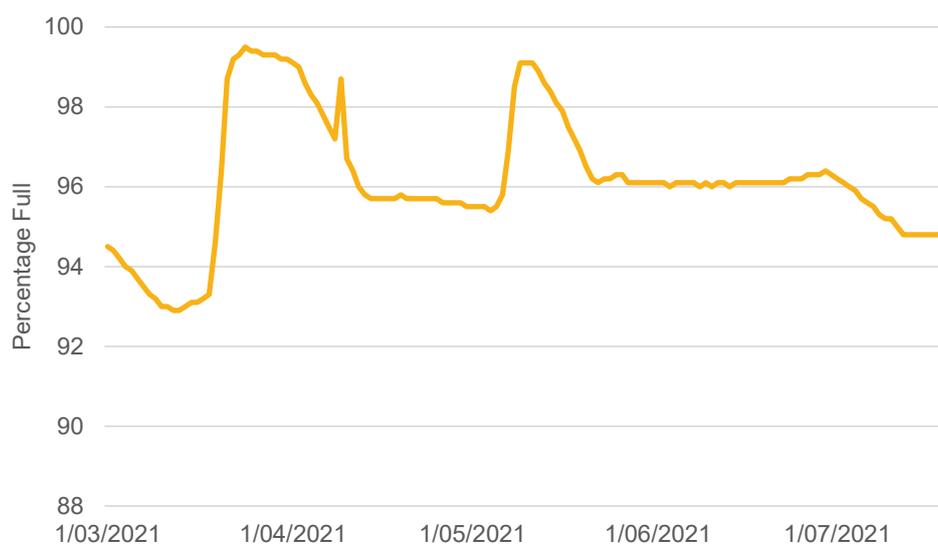
<sup>1</sup> <https://www.news.com.au/world/insurers-forecasting-a-1-billion-damage-bill-due-to-nsw-floods/video/1ef3d1e61d2aaff1d94555811ffa0717>



“The aim is to help us understand how the most hazardous weather, and hence risk levels, may be shifting as a result of climate change,” said Actuaries Institute Chief Executive Elayne Grace.

In autumn, other clusters in south-eastern parts of Australia also exhibited very high levels of rainfall. From March 18 to 24, water storage in the Greater Sydney dams increased by 6.2 percentage points or almost 160,000 ML, enough water to supply the area for 124 days <sup>(2)</sup> (Figure 2).

**Figure 2 - Greater Sydney Dams: Total Percent Full in the Autumn of 2021**



Since the end of autumn, the outlook has changed significantly. At the end of March, the Bureau of Meteorology declared that the La Nina weather system returned to a neutral state <sup>(3)</sup>. This typically indicates that we can expect lower levels of extreme rainfall in the months ahead. However, in July a negative Indian Ocean Dipole was established, which increases the likelihood of above average rainfall in south-eastern parts of Australia in the winter and spring <sup>(4)</sup>.

Australia continued to get some respite from the extreme high temperatures that were seen in 2020. As shown in Figure 3, the extreme high temperature index was below the reference period average for Australia as a whole, for the second consecutive season, after eight years of positive index values. Only two of the 12 clusters experienced above reference period values.

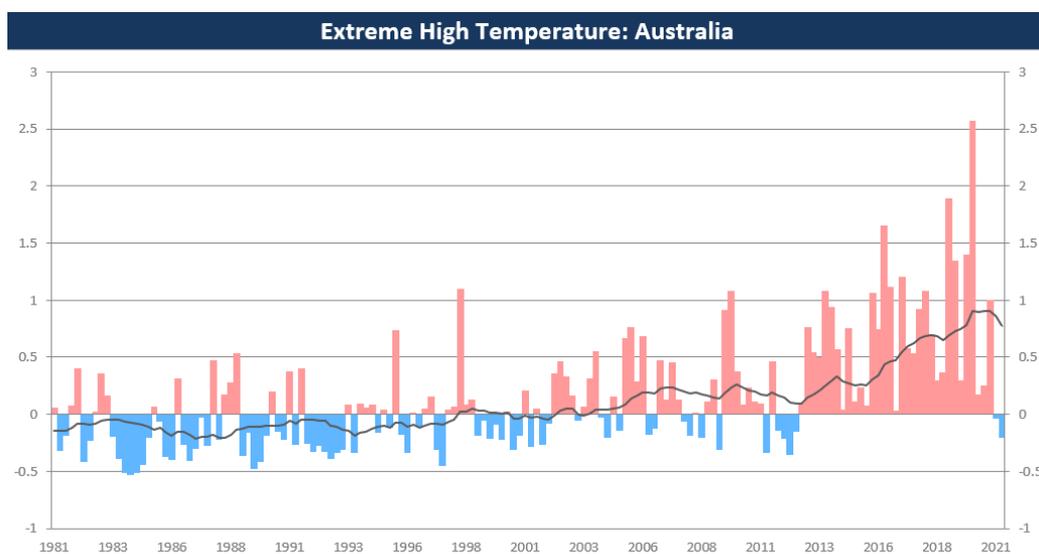
<sup>2</sup> Based on water use from <https://www.watarnsw.com.au/supply/Greater-Sydney/greater-sydney-catchment>

<sup>3</sup> <http://www.bom.gov.au/climate/enso/outlook/>

<sup>4</sup> <http://www.bom.gov.au/climate/enso/wrap-up/archive/20210720.archive.shtml>



**Figure 3 – Australian Actuaries Climate Index: Extreme High Temperature Index**



Similarly, the extreme low temperature index showed negative values for only the third time since 2012. This shows that minimum temperatures, which have been higher than reference period averages for some time, were cooler than those observed between 1981-2010. This was particularly pronounced in the Central Slopes, which covers inland parts of NSW and QLD and recorded the second lowest extreme low temperature index value ever.

The sea level index continues its rising trend, with all clusters recording a positive value. The Rangelands North region recorded the highest ever sea-level index value.

“The index shows that we continue to see an increase in historically unusual weather and an inexorable increase in sea levels. Flooding has replaced fire as the main hazard affecting property. We need to continue our focus on future-proofing our building stock,” said Rade Musulin, Convenor of the Actuaries Institute Climate Risk Working Group.

The Index is calculated by Finity Consulting for the Actuaries Institute at the end of each season, following the release of data from the Bureau of Meteorology.

**Footnote:** References to temperatures, dryness etc. 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.

**A link to the [AACI](#) is here.**

**Rade Musulin, Convenor 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 assess risks through long-term analyses, modelling and scenario planning across a wide range of business problems. This unrivalled expertise enables the profession to comment on a range of business-related issues including enterprise risk management and prudential regulation, retirement income policy, finance and investment, general insurance, life insurance and health financing.