Australian Actuaries Climate Index reflects devastating Summer bushfires and storms

4 May 2020

- Records set across Summer for extreme high temperatures and consecutive dry days.
- Extreme wind levels and consecutive dry days for parts of NSW were the highest ever.
- Fire and storms caused significant losses.
- The combination of extreme heat, dryness and wind resulted in the third highest climate index value for Australia.
- Greater Sydney dam levels rose from historically low levels at 44.1%, to 64% capacity in a single day.

The Australian Actuaries Climate Index[1] reflects the extreme weather conditions that enabled the destructive bushfire season that resulted in $2.3 billion of insurance losses and claimed 34 lives over the Summer of 2019 and 2020[2]. It also reflects the extreme rainfall that accompanied severe hail in ACT, NSW, and VIC, in late January.

Not a single region experienced below reference period[3] average extreme high temperatures, and seven out of the 12 regional clusters set records[4], as can be seen in Figure 2. Australia has not recorded below average extreme high temperatures relative to the base period of 1981 to 2010 since 2012 (see Figure 3).

In addition to extreme high temperatures, significant dryness was also observed, with Australia setting a record for consecutive dry days (see Figure 4).

NSW was particularly affected by these conditions. The East Coast South region, which includes Sydney, experienced not only the highest value for consecutive dry days, but also the second highest value for extreme high temperature. These hot and dry conditions, coupled with wind that facilitated the spread of fire, led to NSW having 81% of Australia's total general insurance claims for the period. NSW also suffered 25 of the 34 fatalities recorded nationally.

As well as the extreme bushfires that consumed much of the country throughout the summer, the index also reflects the damaging East Coast Low storms that hit the eastern parts of Australia in late January with severe rain, wind and hail. The East Coast South region saw the fifth highest extreme rainfall value ever. A record was also set for extreme wind. The hail and East Coast Low caused approximately $1.4 billion[5] and $0.8 billion[6] of damage respectively, with significant losses for both home and motor vehicles. The ACT experienced 57% of all claims for the period, while NSW and VIC were also badly damaged.

[1] Use the dropdown menus across the top of the website to access graphs displaying results for Australia or for specific regions and for the AACI or by specific component.

[2] Refer https://disasters.org.au/current-catastrophes/2019/11/13/november-bushfires

[3] The Australian Actuaries Climate Index measures extreme values relative to a reference period of 1981-2010 and is based on measurements taken by Bureau of Meteorology from its extensive network of meteorological and coastal tide stations

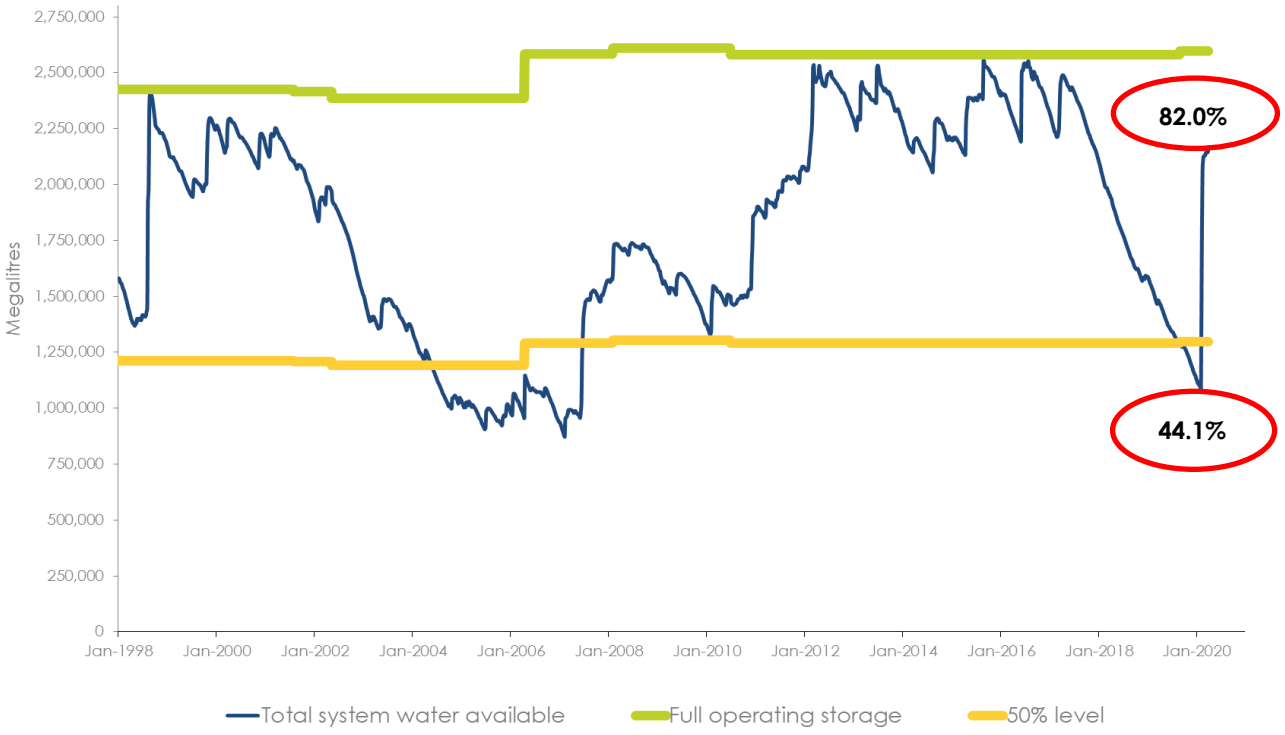
[4] Records here refer to a value that is in the top 3 most extreme values of the index.

[5] Refer https://disasters.org.au/current-catastrophes/2020/1/21/cat201-january-hailstorms-vicactnsw

[6] Refer https://disasters.org.au/current-catastrophes/2020/2/10/cat202

The graph below shows that the dams in the Greater Sydney area, which were at historically low levels at the beginning of 2020, saw increases in water storage levels from 44.1% to 64.0% of capacity in a single day[7] during these storms.

Figure 1 – Water Storage in Greater Sydney Dams[8]



By the end of February, the dams had almost doubled their water storage to 82.0% of capacity[9], in one of the sharpest increases on record. This represents enough water to supply Sydney for almost two years[10].

The extreme conditions were related to a combination of cyclical climate conditions: an unusually strong positive Indian Ocean Dipole (IOD), a negative Southern Annular Mode (SAM), and a neutral El Niño–Southern Oscillation (ENSO). Historically, these cycles have led to the type of conditions experienced last summer.

The Indian Ocean Dipole has now returned to neutral.

[7] Refer https://www.waternsw.com.au/__data/assets/pdf_file/0005/153698/Greater-Sydney-water-storage-and-supply-report-weekly-edition-Thursday-13-February-2020.pdf
[8] Refer https://www.waternsw.com.au/__data/assets/image/0008/155663/Thursday-2-April-2020.png
[9] Refer https://www.waternsw.com.au/__data/assets/pdf_file/0020/154550/Greater-Sydney-water-storage-and-supply-report-weekly-edition-Thursday-5-March-2020.pdf
[10] Refer https://www.waternsw.com.au/supply/Greater-Sydney/greater-sydneys-dam-levels

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"Australia can expect to see weather that aligns more closely with normal conditions over the coming months, although the effect of global warming continues a push towards more extreme weather conditions," said Rade Musulin, the Australian Actuaries Climate Index spokesman.

"The components of the index reflect both the cyclical nature of rainfall in Australia and the longer-term trends toward a warmer world with higher sea levels," he said.

Mr Musulin said the consecutive dry days component of the index (Figure 4) and Greater Sydney Dam storage levels (Figure 1) show a cyclical pattern, while the extreme high temperature (Figure 3) and overall index show the long-term trend.

"The Australian Actuaries Climate Index helps us understand the factors driving our climate, and illustrates the conditions that led to the catastrophic fires we saw this summer," said Actuaries Institute Chief Executive Elayne Grace.

The Index, which measures extreme weather conditions and sea levels across Australia, and how these vary over time, was launched in November 2018 and is updated quarterly. It shows changes in the frequency, or rate of occurrence, of extreme high and low temperatures, heavy precipitation, dry days, strong winds and changes in sea levels.

It is collated at the end of each season following the release of data from the Bureau of Meteorology. The data is collected nationally and grouped into 12 climatically consistent regions. Each season is compared to the same season in previous years and against a reference period of 1981-2010.

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 is available for comment.

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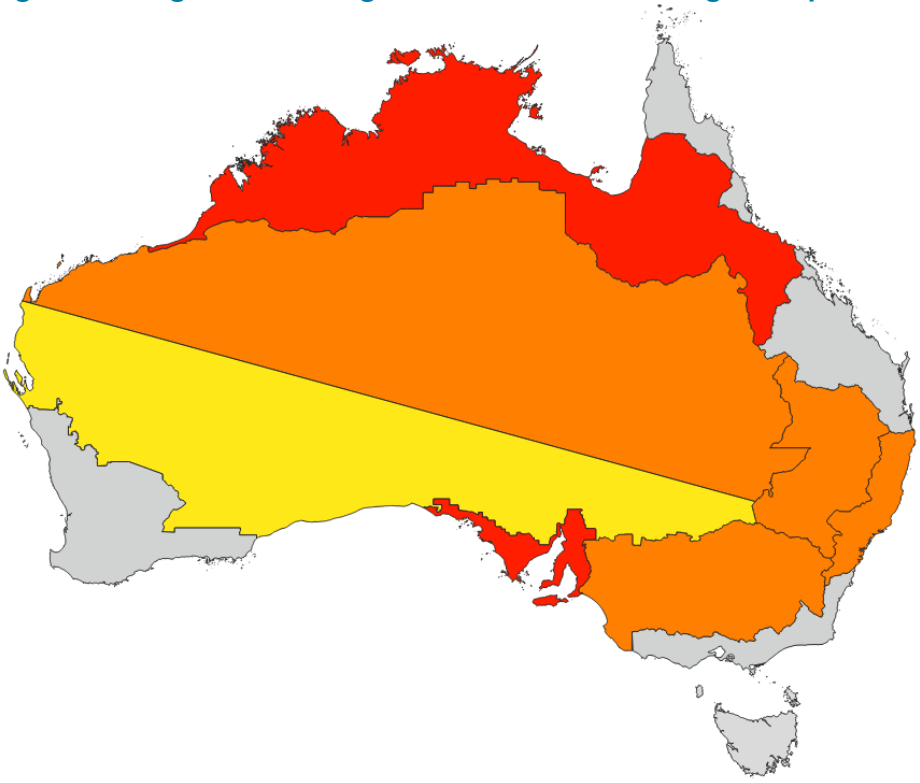
Figure 2 - Regions Breaking Records for Extreme High Temperature



Legend:

	Highest observed value
	Second highest observed value
	Third highest observed value

Figure 3 - Australian Actuaries Climate Index: Extreme High Temperature

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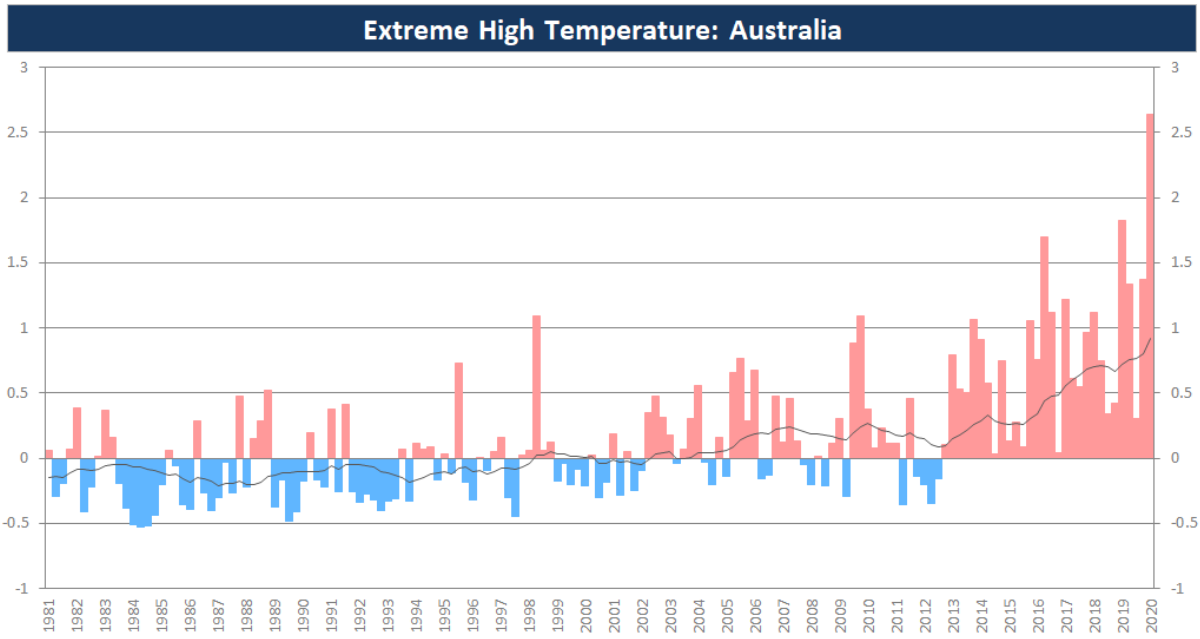
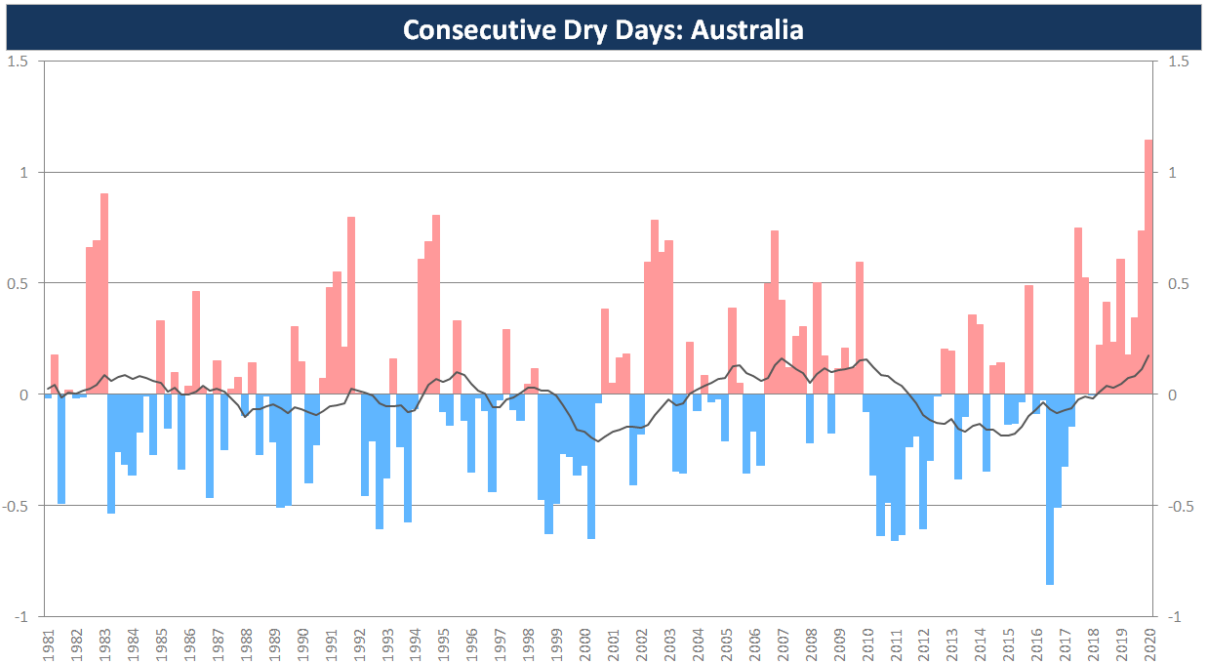


Figure 4 - Australian Actuaries Climate Index: Consecutive Dry Days



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