

Climate Variability and Change in Water Management

Development of methods to inform
Regional Water Strategies

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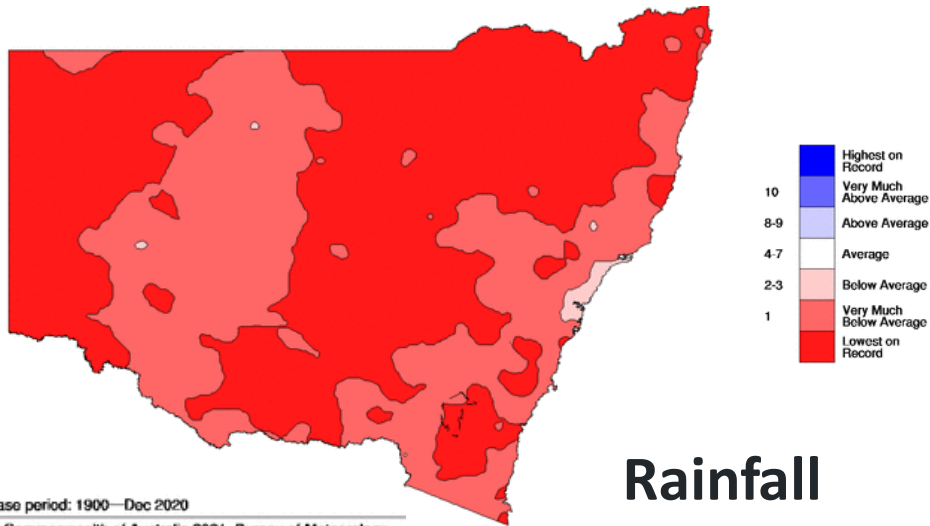


Acknowledgements

The multiple sources of evidence climate modelling approach described here was developed in conjunction with University of Newcastle (Anthony Kiem), Adelaide University (Seth Westra) and the DPE Hydrology team (Richard Beecham and Dushmanta Dutta). We would also like to acknowledge the role our expert panel, led by the Office of Chief Scientist and Engineer have played in providing advice and guidance.

The recent past

Our existing water management framework is based on our knowledge of the last 130 years of **historic climate**.



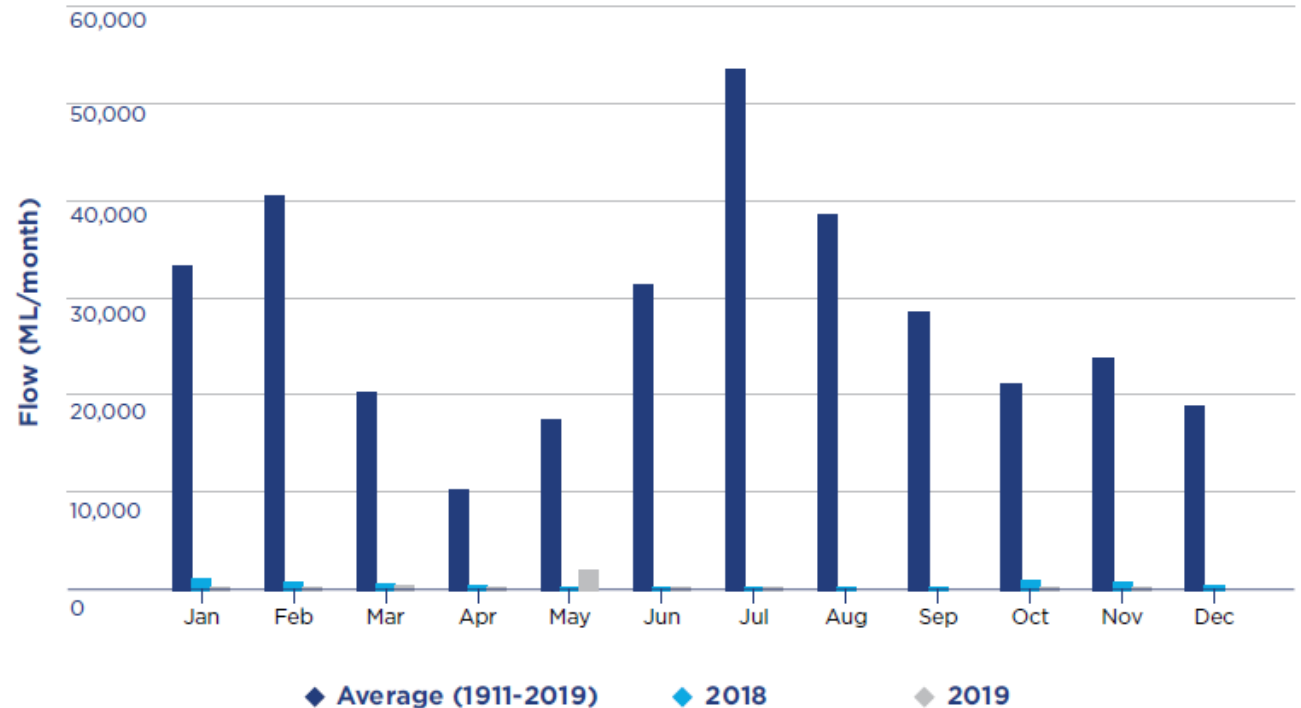
Rainfall deciles

1 Jan 2018 to 31 Dec 2019

Base period: 1900—Dec 2020
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Keepit / Split Rock catchment runoff

2018 and 2019 compared to average



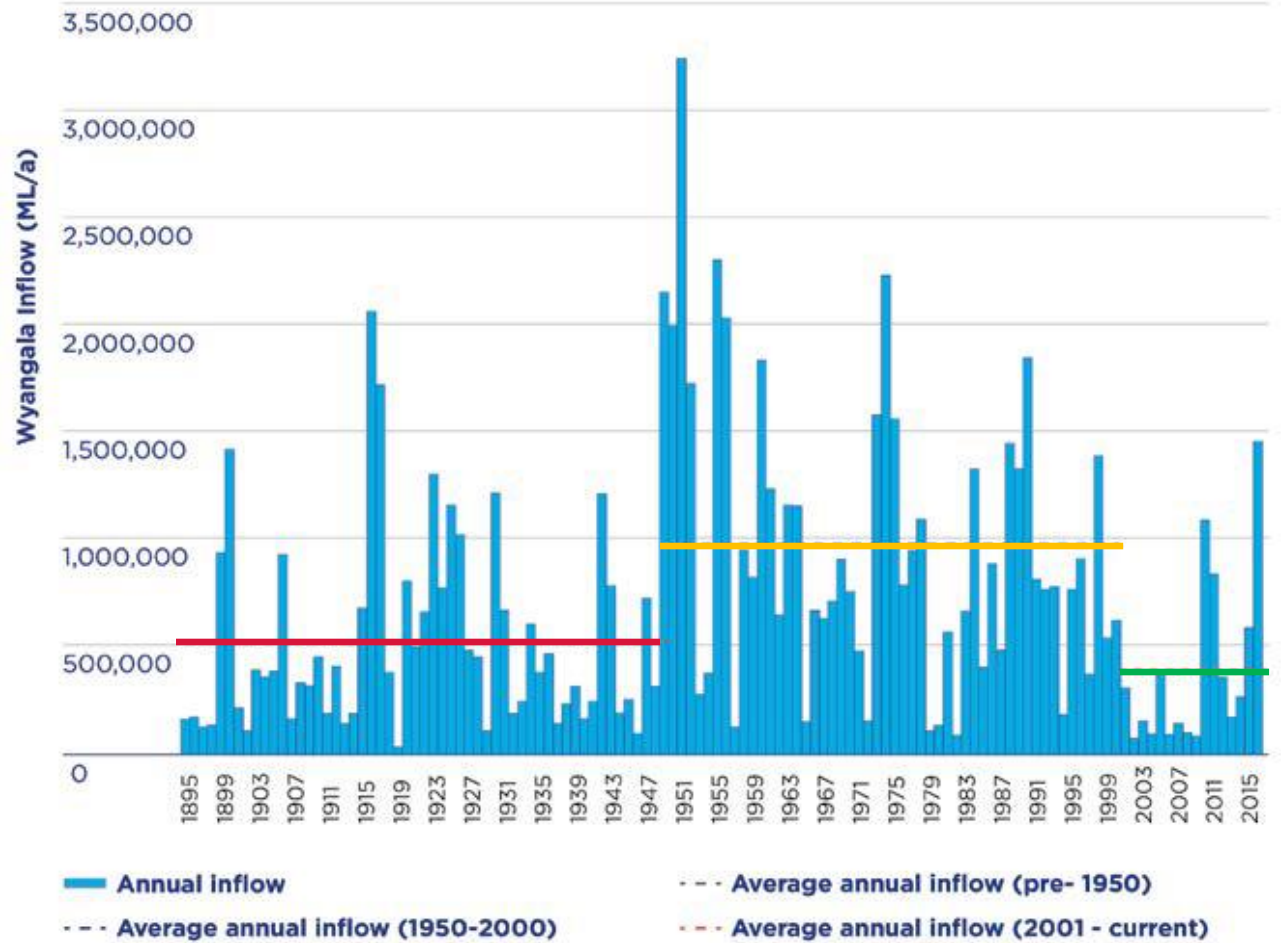
A Trigger for Change



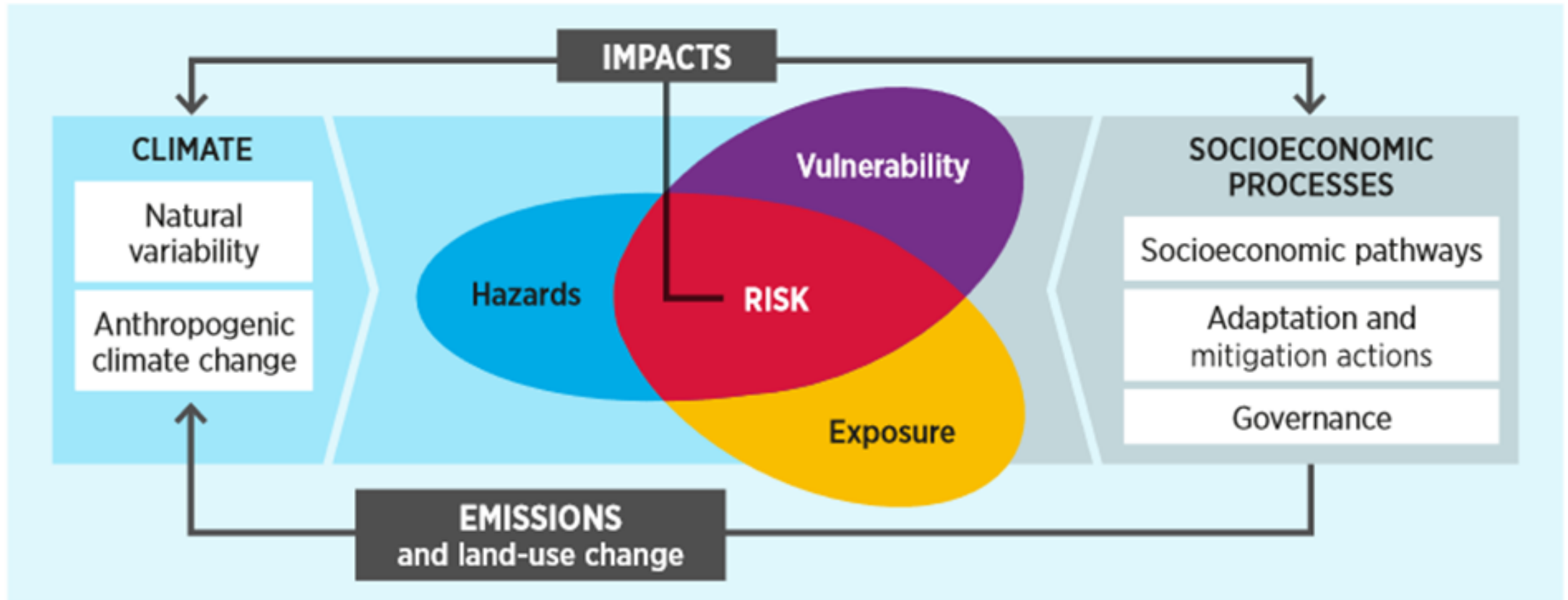
130 years of historic climate record:

- Inadequate for dealing with changing climate
- Does not allow us to understand risk and likelihood

However – we needed a method which could adequately deal with the extreme cyclical variability we see in the Australian climate

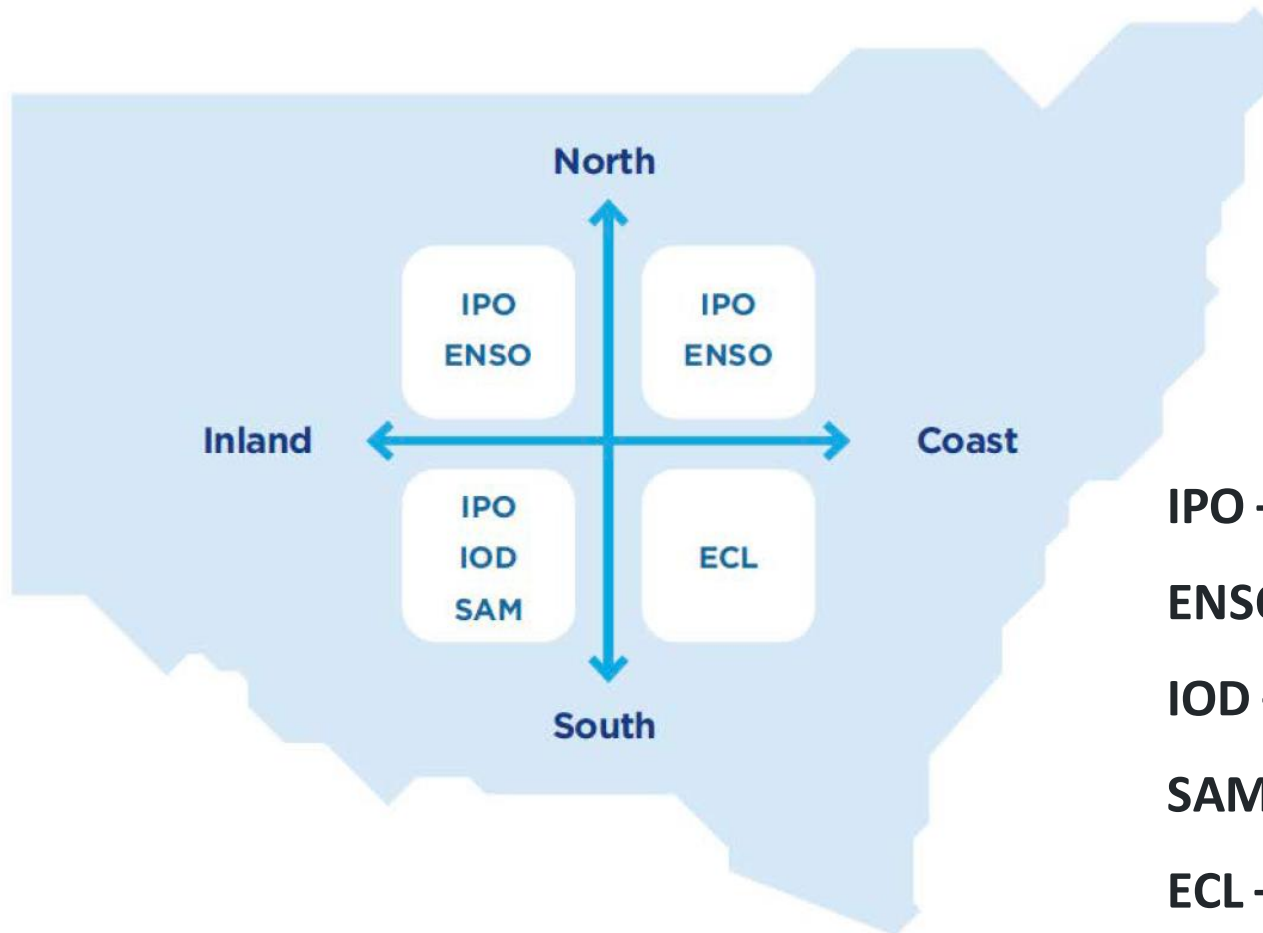


Natural Variability / Climate Change



Source: AdaptNSW

Dominant Climate Drivers in NSW



IPO – Interdecadal Pacific Oscillation

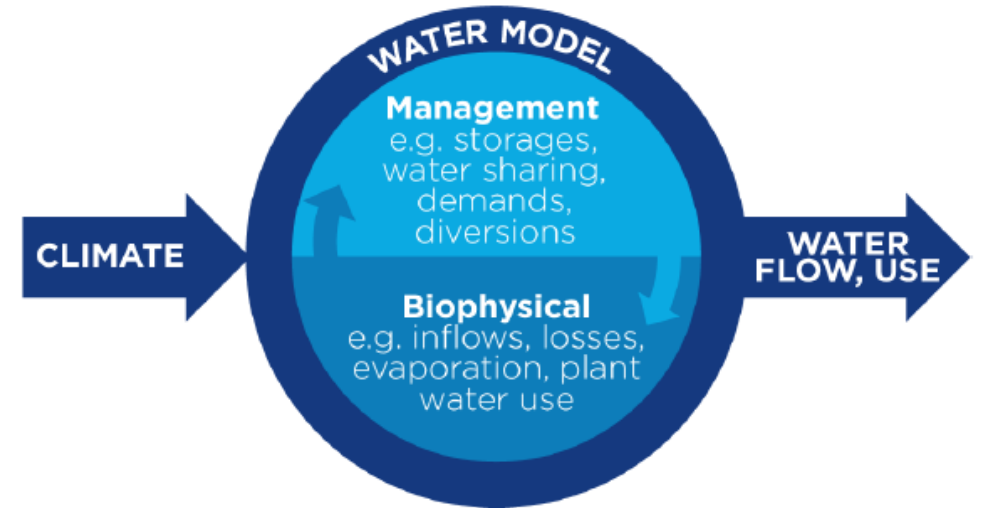
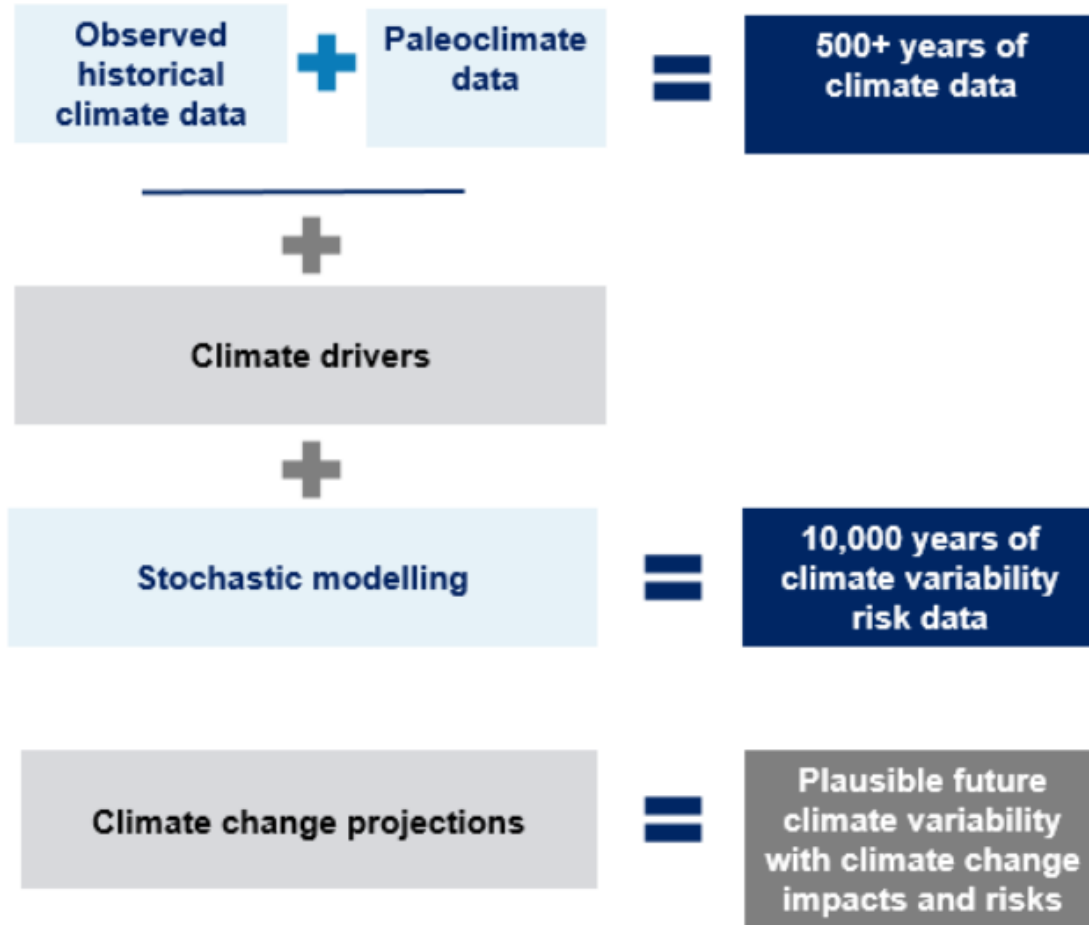
ENSO – El Nino-Southern Oscillation

IOD – Indian Ocean Dipole

SAM – Southern Annular Mode

ECL – East Coast Low

Climate Modelling



Method used based on dominant climate driver

IPO dominant

- Used Paleoclimate information to understand distribution dry and wet cycles of different duration.
- Combined this with recorded data to create 10000 year stochastic dataset which match recorded / paleoclimate climate statistics (current conditions)
- Adjusted 10000 year dataset using Climate Change data from NARClIM 1.0 (climate change scenario)

ECL dominant

- Generated 10000 year climate dataset based on statistical characteristics of recorded dataset (current conditions)
- Used ESCCI datasets to perturb observed data by adding or removing east coast lows
- Generated 10000 year datasets based on perturbed historical series (climate change scenarios)

Expert Panel Review

- Noted that the method is a significant advance on relying on 130 years of historical climate data alone
- Agreed with Multiple Sources of Evidence Approach – bringing together representation of variability and change
- Endorsed the method as “consistent with best practice” – noting a number of recommendations for future potential improvements
- Encouraged establishment of community of practice
- Noted that there is still scope for extreme events of greater severity than those modelled

Dr **Chris Armstrong**, Deputy NSW Chief Scientist & Engineer (Chair)

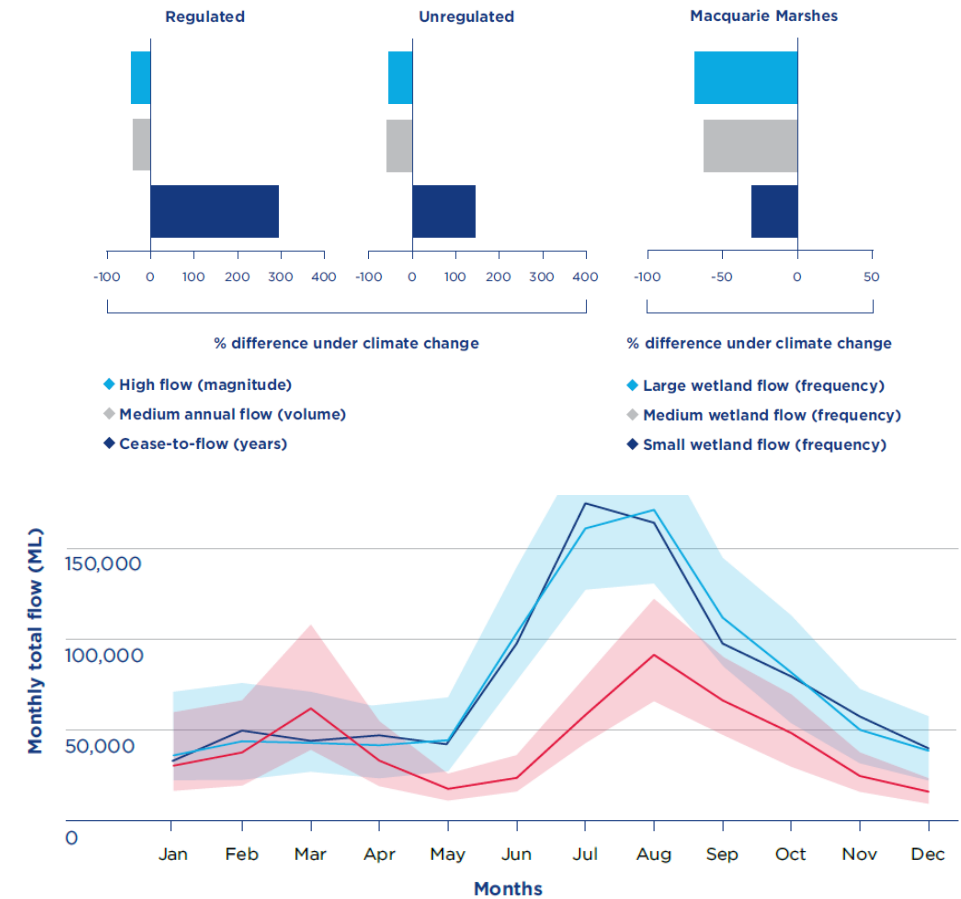
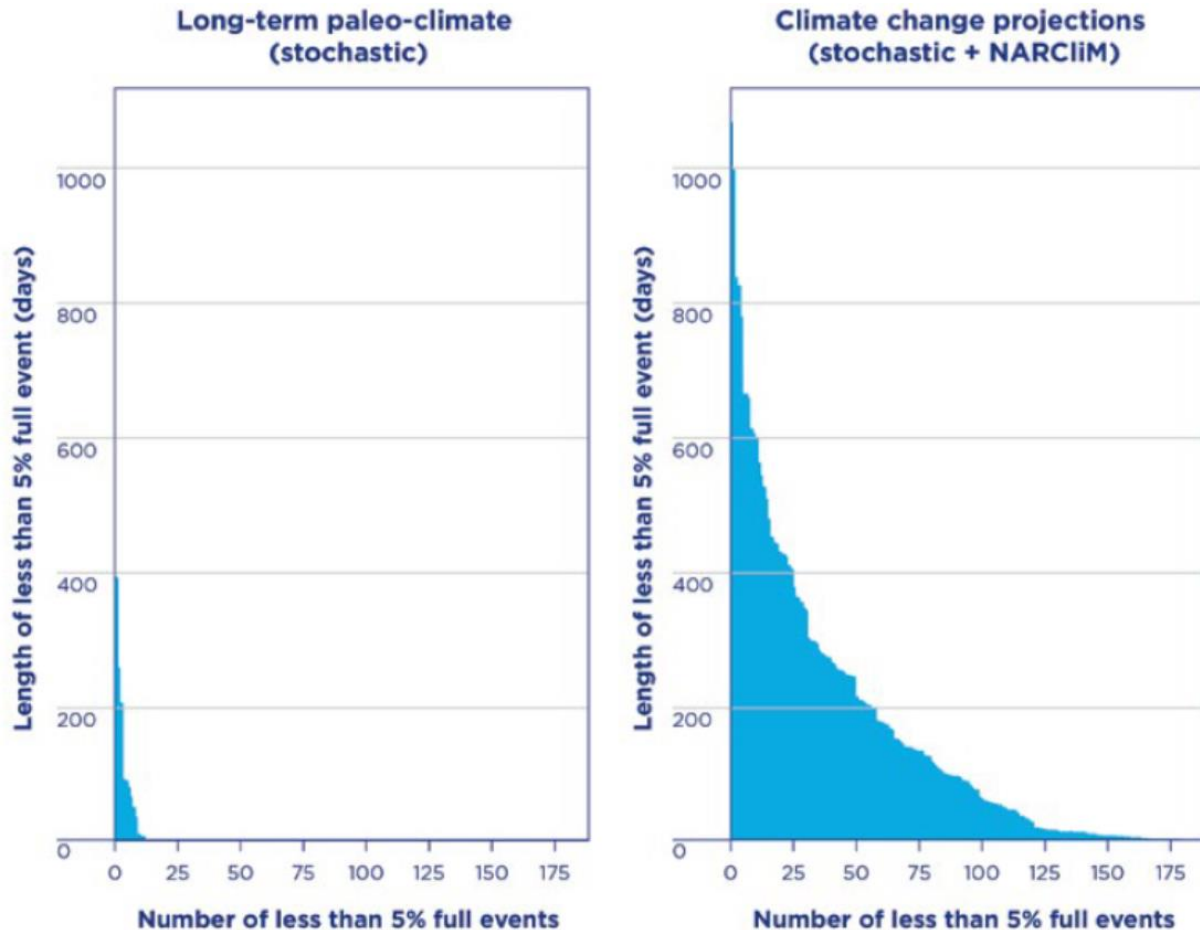
Professor **Bryson Bates**, Adjunct Professor, School of Agriculture and Environment, University of Western Australia

Emeritus Professor **George Kuczera**, School of Engineering, The University of Newcastle

Professor **Andy Pitman**, Director, Australian Research Council Centre of Excellence for Climate Extremes, Climate Change Research Centre, UNSW Sydney

Dr **Scott Power**, Senior Principal Research Scientist, Bureau of Meteorology.

Regional Water Strategies - a conversation





Thank you

<https://www.dpie.nsw.gov.au/water/plans-and-programs/regional-water-strategies>

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