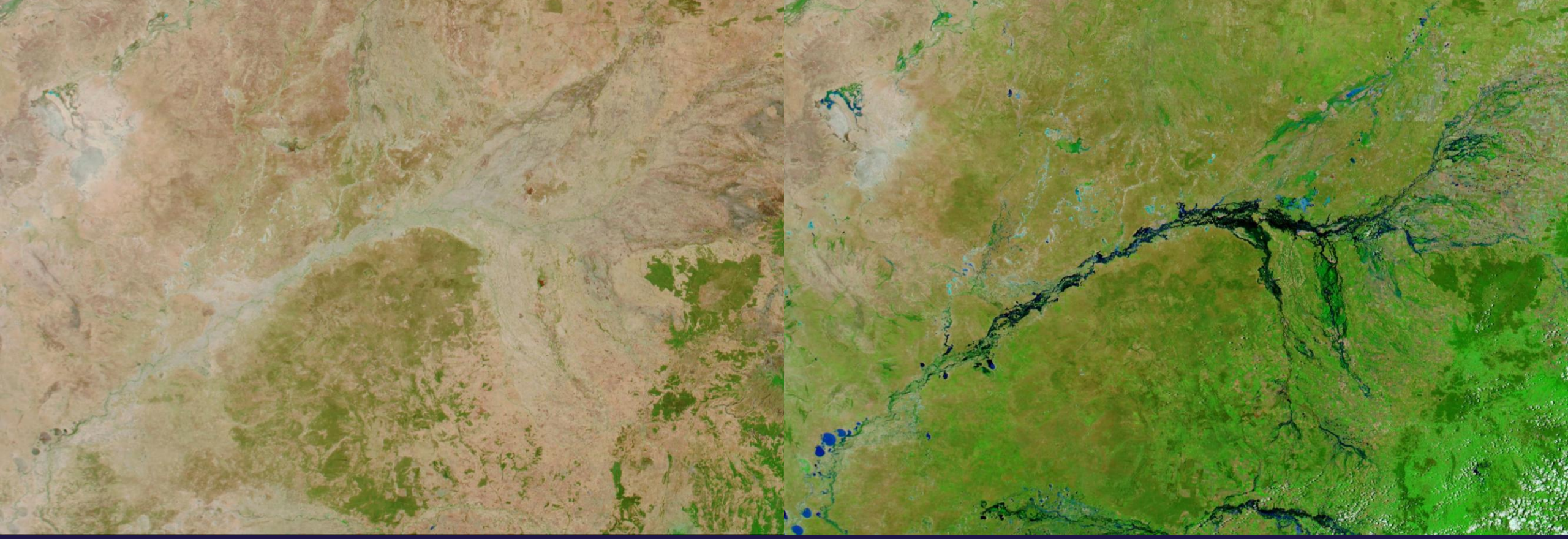
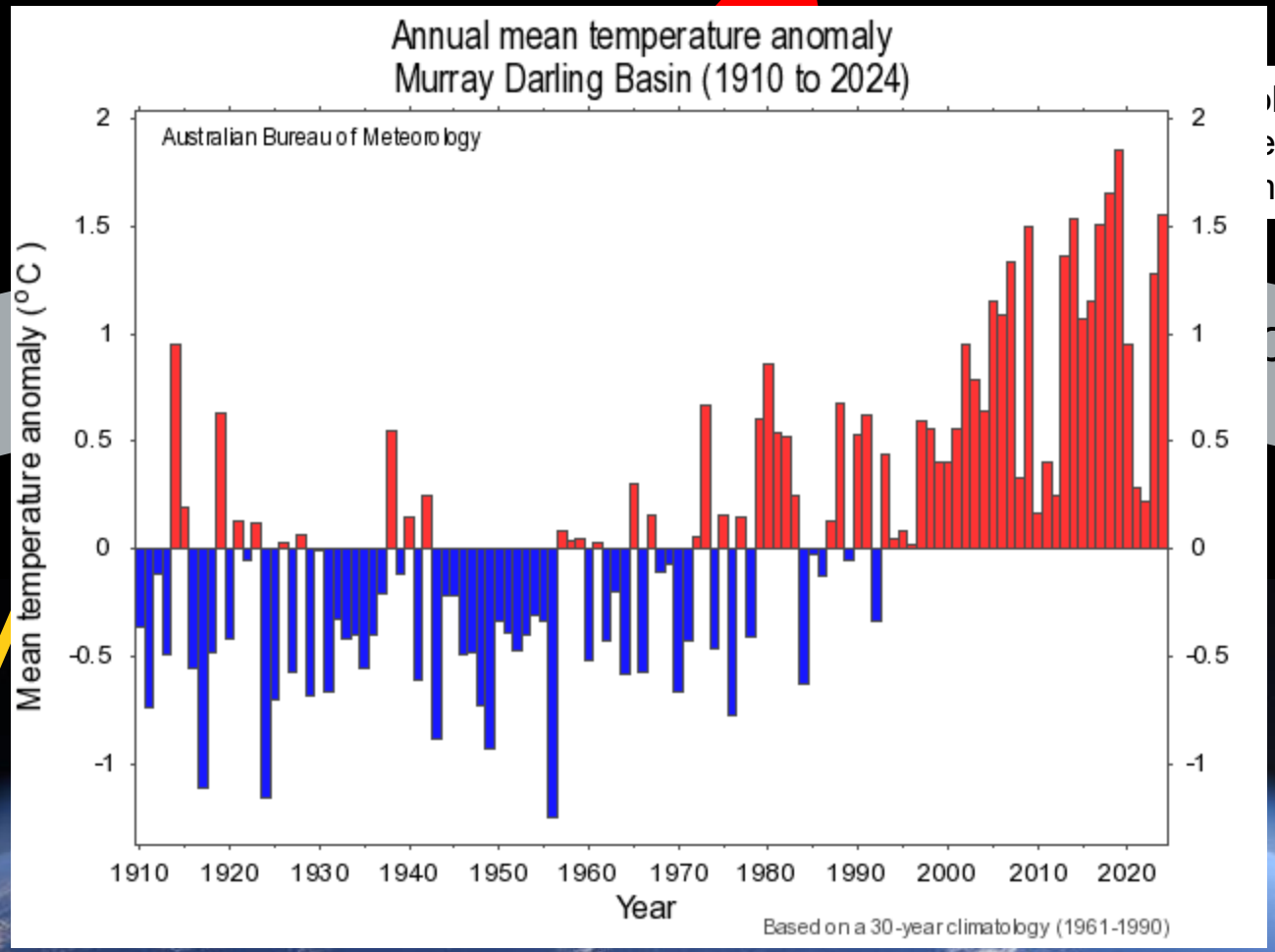


Preparing for future climate in the Murray-Darling Basin

Matthew Coulton | Associate Director – Water and Environment

September 2025

Background image shows the Barwon-Darling system in December 2019 (left) and November 2022 (right)



bal warming is caused by more
rgy entering the Earth's
osphere than leaving it

Shortwave radiation (light)

CO_2

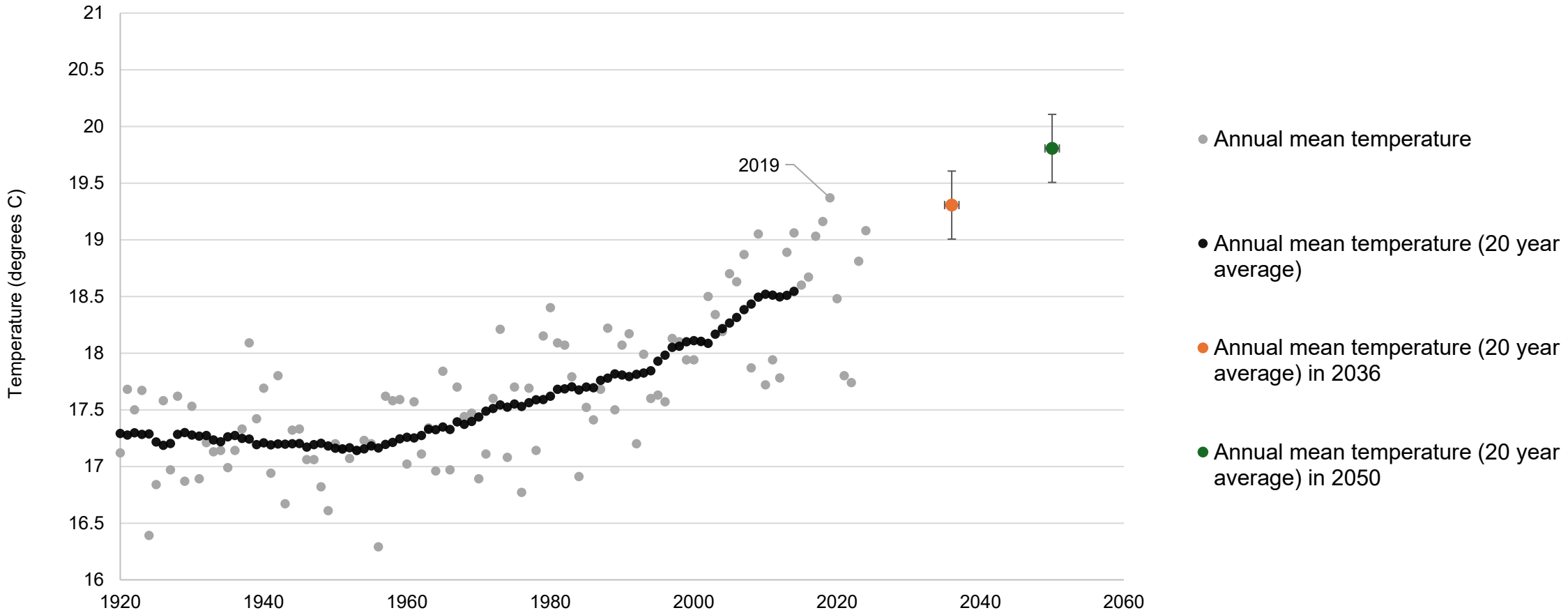
NH_2

NO_2

For a more detailed version of this diagram, google "Earth Energy Balance"

Climate change in the context of the Basin Plan Review

Observed and projected annual mean temperatures in the Murray-Darling Basin



Two main ways global warming change rainfall

Direct impacts of a warmer atmosphere

Basic principles of physics tell us that a warmer atmosphere holds more water. This means a **~7% increase in rainfall intensity** for each degree of warming.

Picture of the 2022 floods in Lismore from ABC News

Changes to rainfall-runoff relationships – droughts will start quicker and take more rainfall to break.

Changes to weather patterns

The way that energy and water is transported around the globe has changed and continues to change. These changes are more complex and can be harder to attribute.

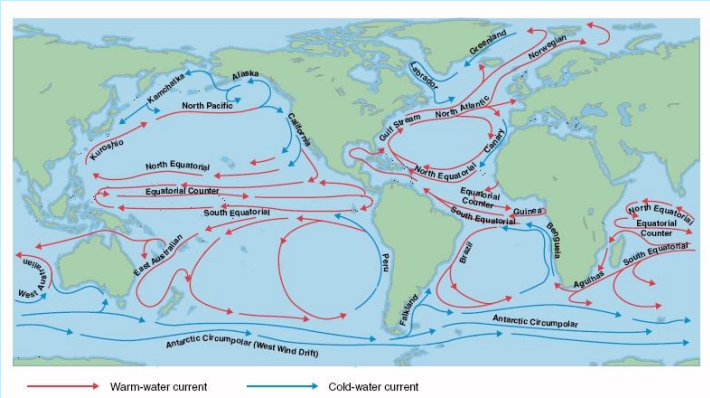


Image from Satellite Applications for Geoscience Education

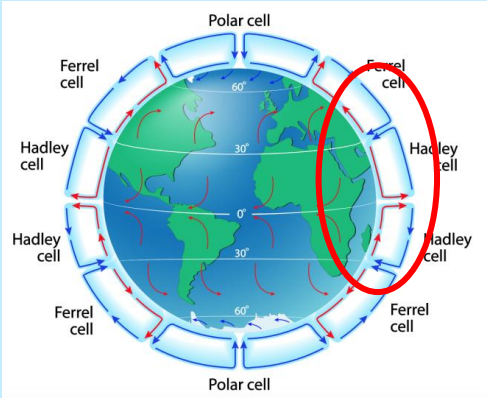
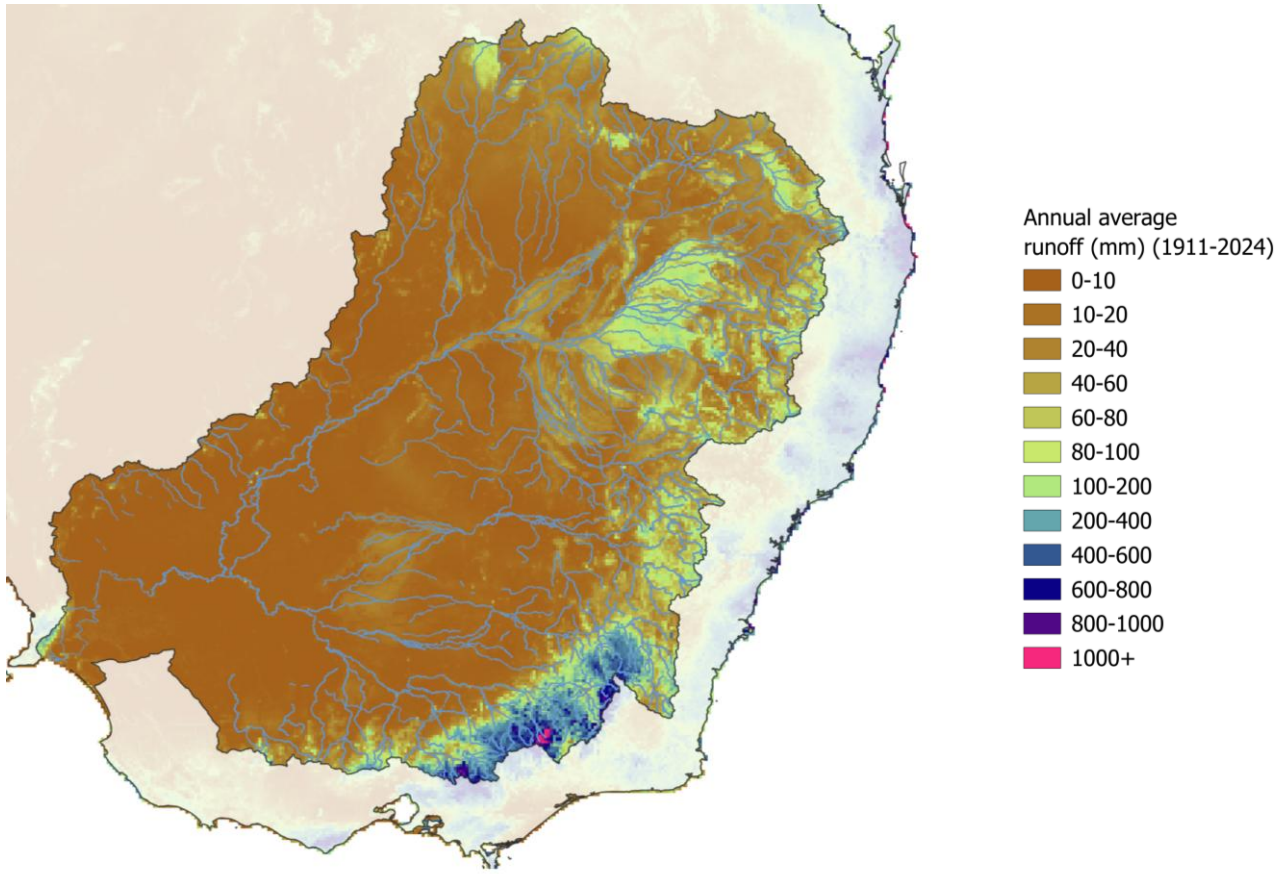
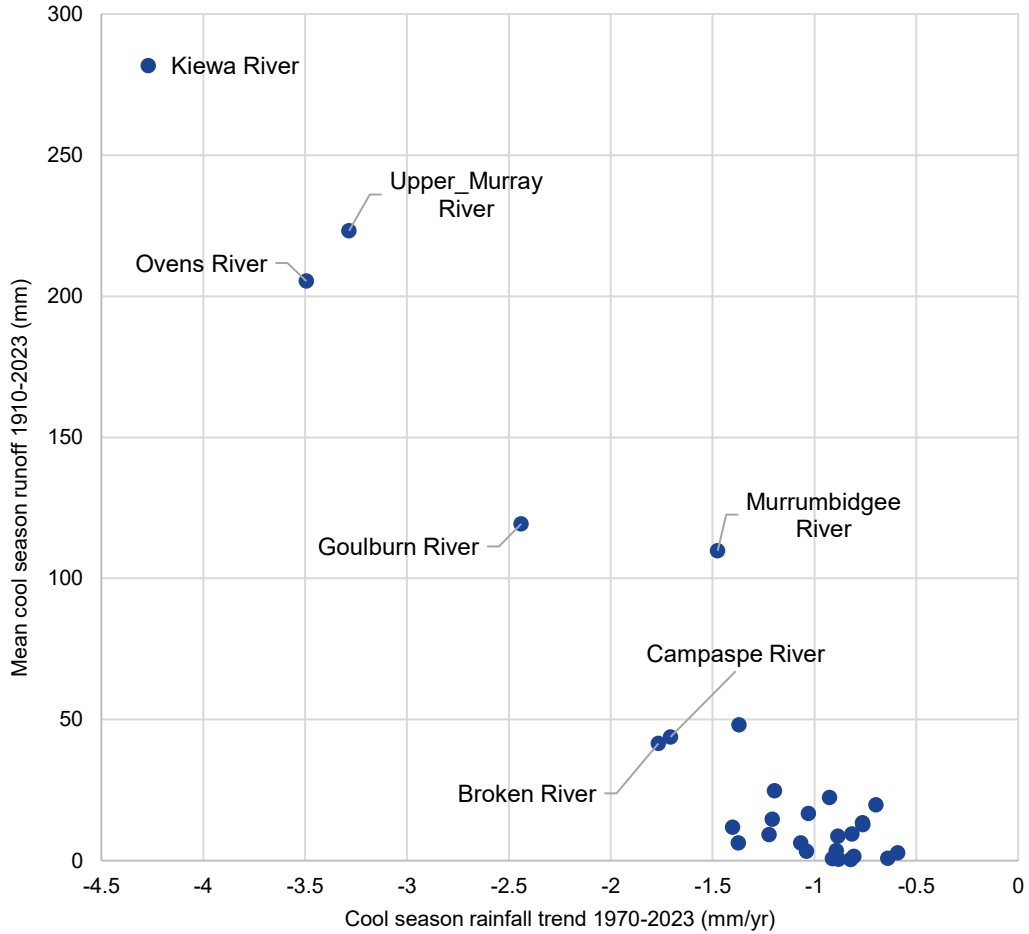


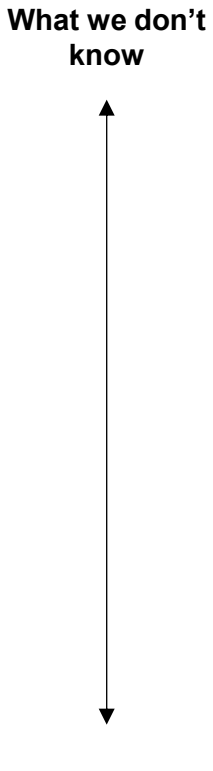
Image from Internet Geography

The wettest catchments are drying the most





Impacts at different timescales (small sample)



We can't predict the weather beyond the next ~7 days

We will still have extended wet and dry periods that last from months to years. We have some indication over whether the next 4 months is likely to be wetter or drier than usual, but not predictive capability beyond that.

We don't know whether the decade ahead will be wetter or drier than average

We know that droughts may last longer than what we've seen in the past 125 years

More intense and more frequent extreme heat days will put increased stress on communities, businesses and environments

There is an increased chance that rainfall and flooding events will be more intense

Due to higher temperatures, drought conditions will commence faster, and it will take more rain to break a drought. Droughts are likely to be more intense

We know that water demand will grow in the decades ahead (due to increased heat), while water availability, on average, will be lower.

Weeks **Months** **Years** **Decades**

AGENDA

Climate change in the Basin 101

Climate change and Basin Policy

Climate risk and sustainability in Agriculture

Discussion