

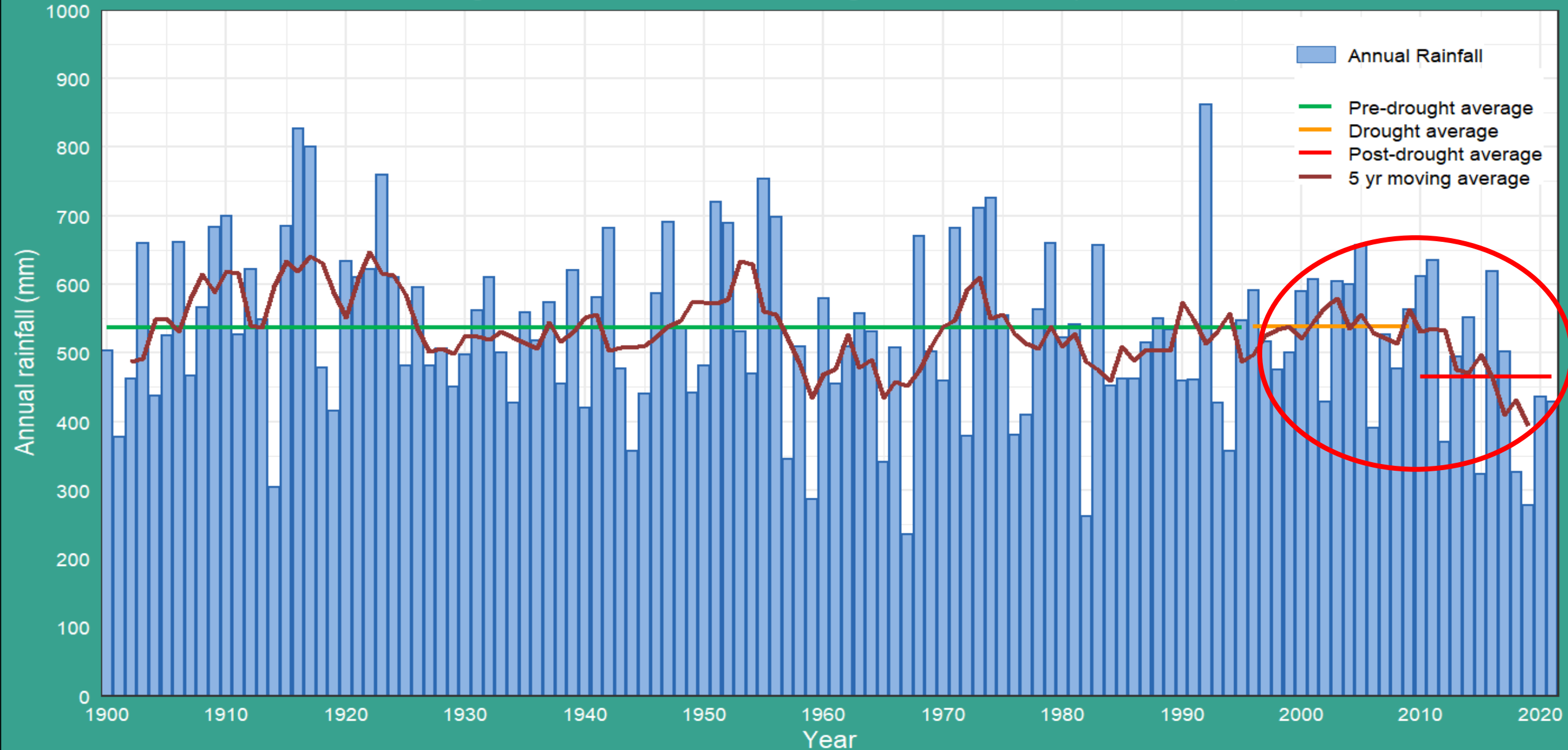
Barossa PWRA: Hydrology & status of the resource

Summary

- Highly variable
- Possible step change since mid 1990's
- On average lower 7% rainfall, 33% streamflow
- More extremely dry years
- Still wet years but likely less often and less wet
- Complexities for management
- Need more time to fully understand implications of changes
- Need flexibility in policies to recognise future variability

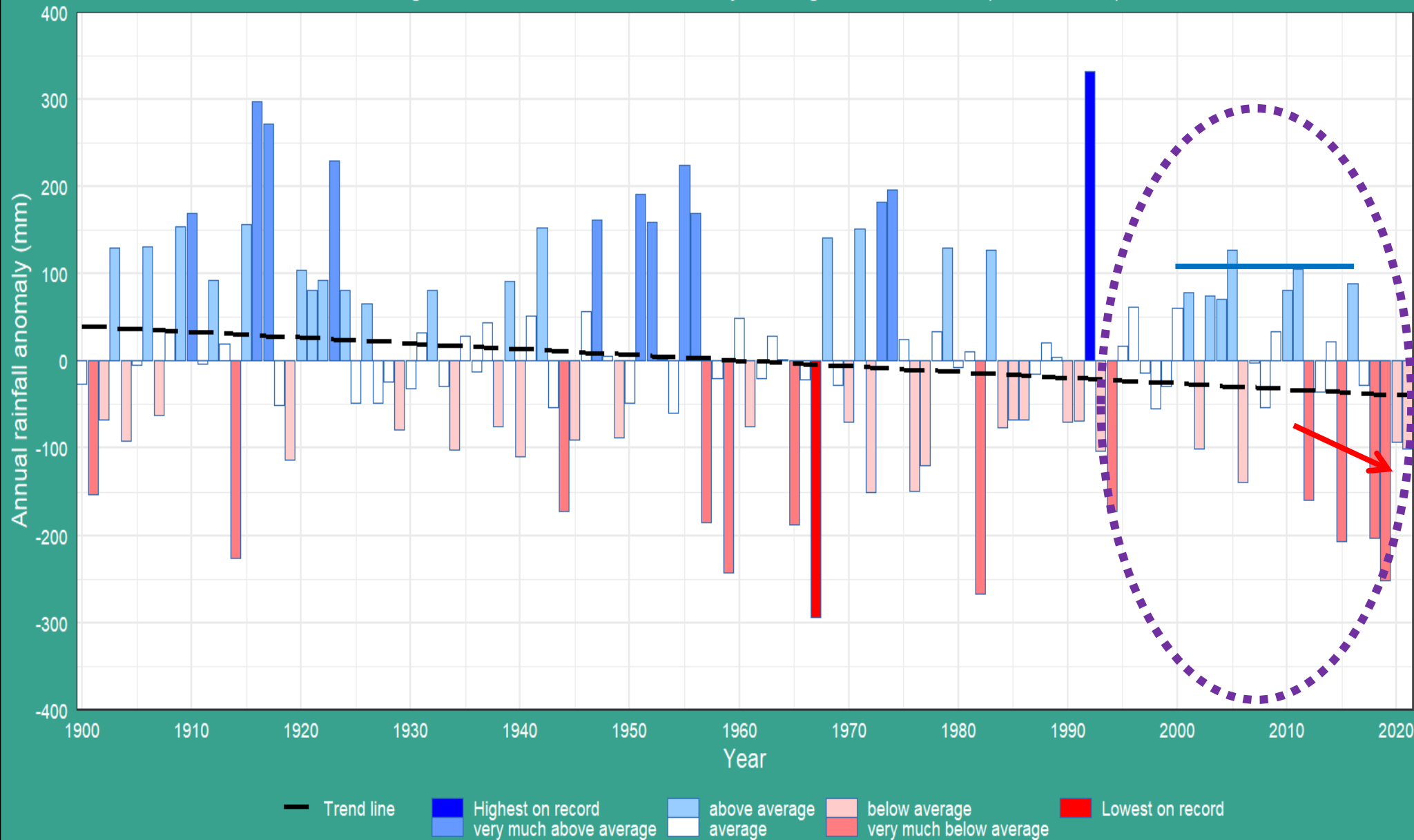
Long-term observed annual rain at Angaston

Long-term annual rainfall at Angaston A23300 (1900-2021)



Annual rainfall anomalies

Long-term annual rainfall anomaly at Angaston A23300 (1900-2021)



- **Last 3 decades:**
"Very much above-average 'WET' years - NIL

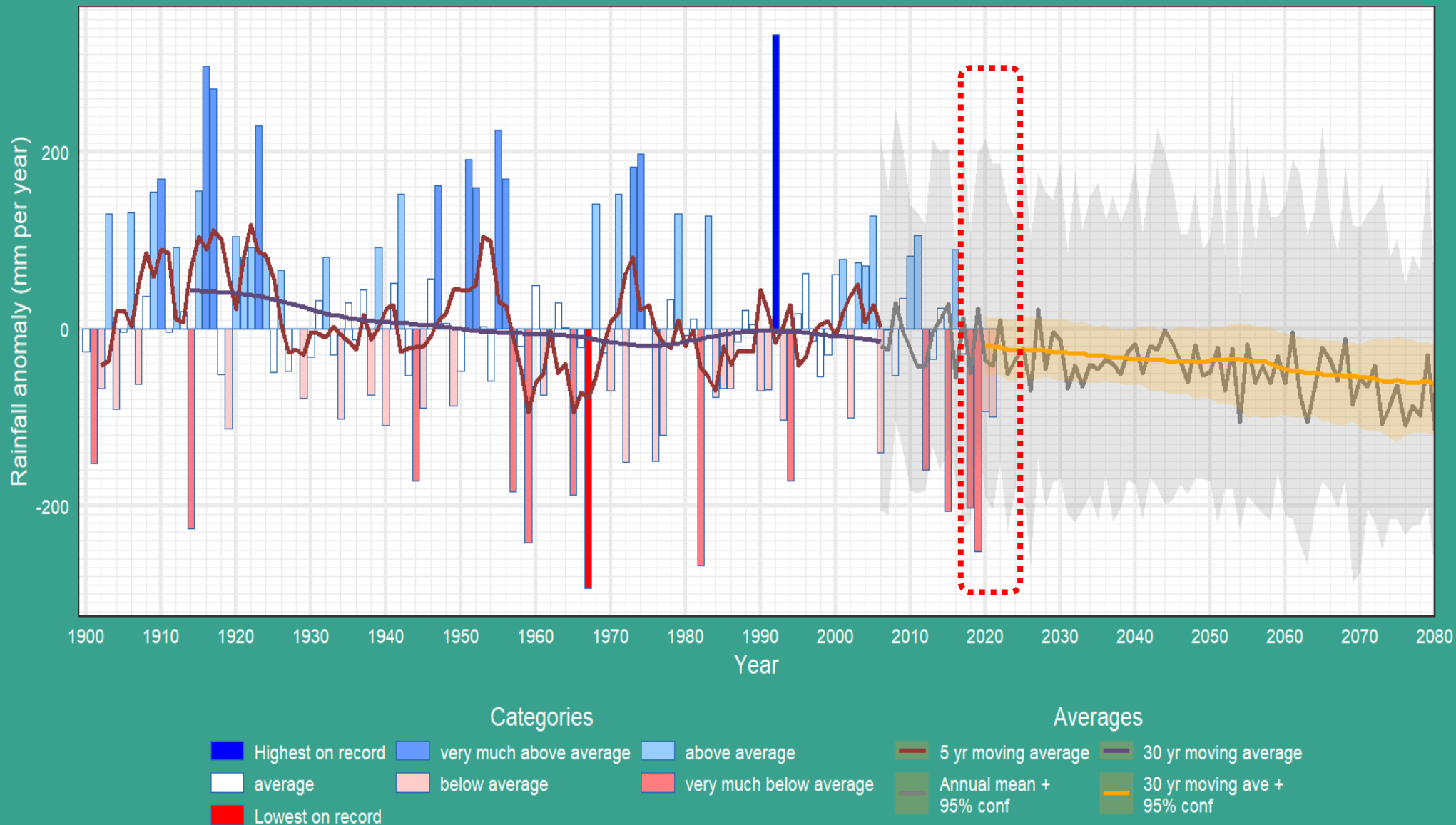
- **Last decade:**
Higher frequency & Consecutive "Very much below average 'VERY DRY' years.

- **Post-drought**
Rainfall not back to Pre-drought conditions ??

- **Step Change**
Permanent change in rainfall pattern?

Climate change projections – Montazeri M., Savadamuthu K. (DEW 2018)

Annual rainfall anomaly for site 23300, with forecast to 2080



- **DEW Analysis 2016**, Rainfall anomaly

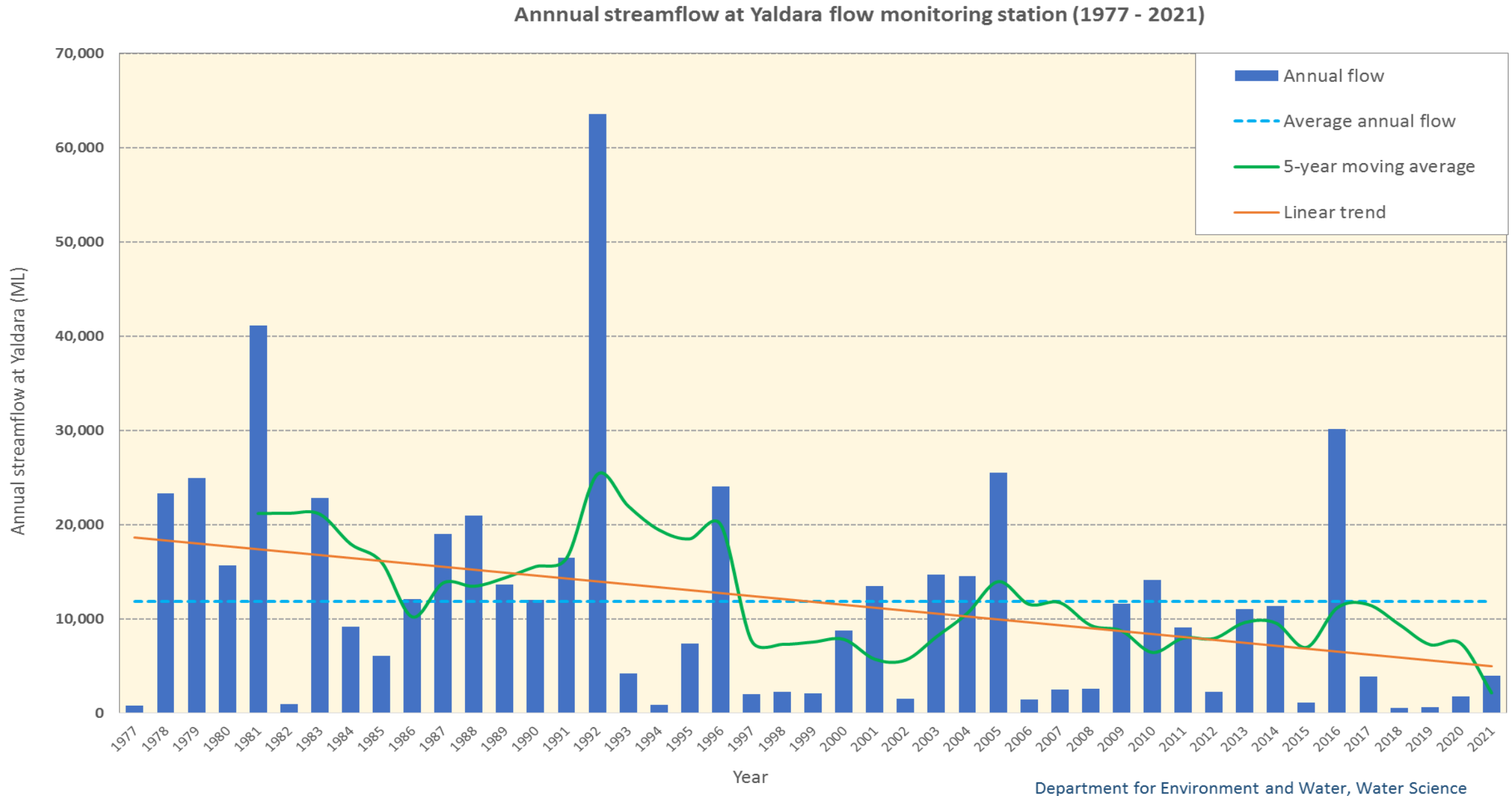
Climate change projections, 30yr moving average

- ~ 2020: +10 to – 40mm
- ~ 2030: +10 to -50mm
- ~ 2050: 0 to -60mm
- ~ 2080: -20 to – 100mm

Observed rainfall data included to verify 2016 projections:

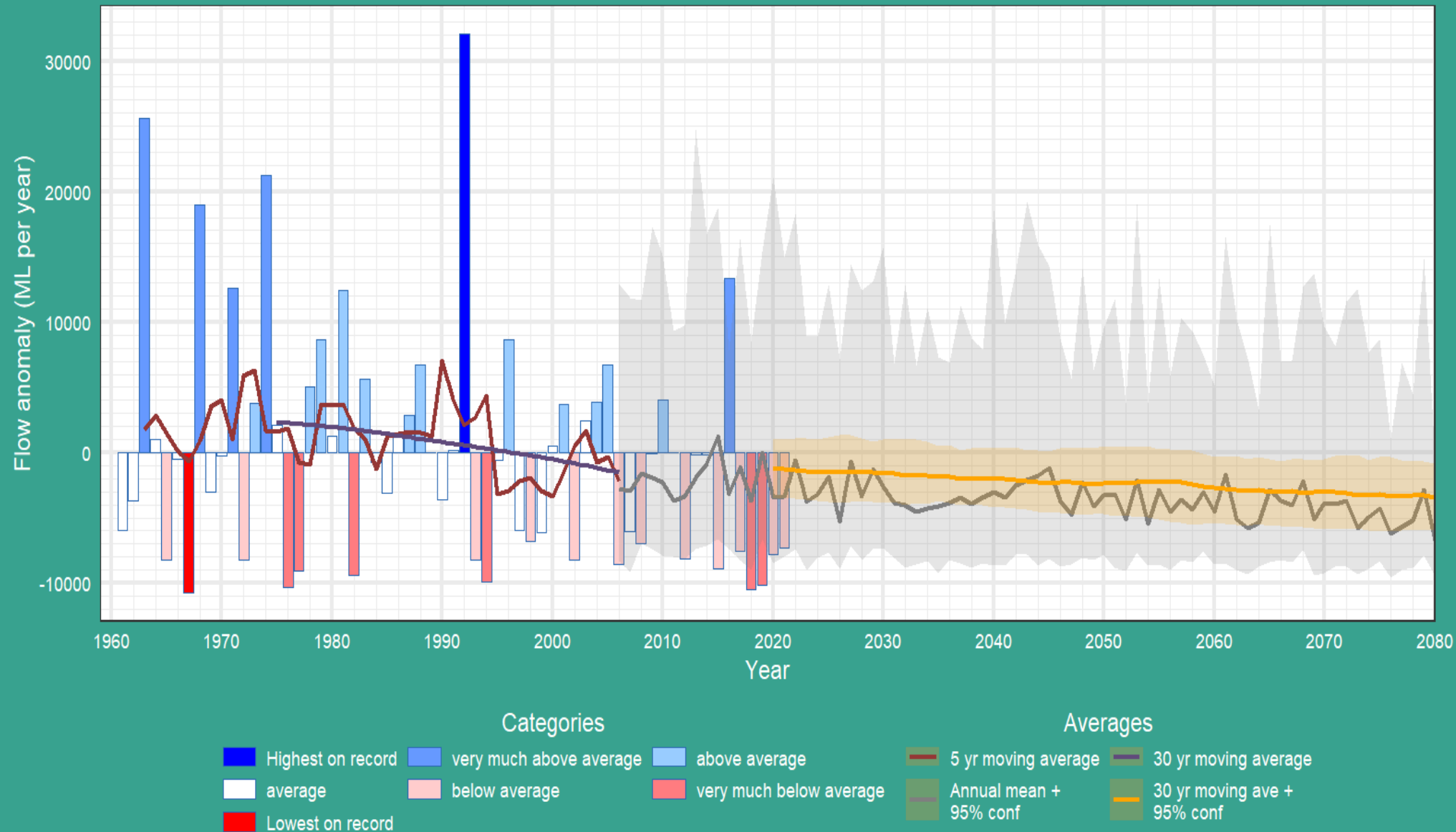
- ~ Recent observed rainfall consistent with C.C projections trajectory
- ~ Drier than projected!

Annual streamflow – Total PWRA



Climate change projections - *Montazeri M., Savadamuthu K. (DEW 2018)*

Annual flow anomaly for site A5050502, with forecast to 2080



- DEW Analysis 2016**, Streamflow anomaly

Climate change projections, 30yr moving average

- ~ 2020: +1 to - 3.5GL
- ~ 2030: +1 to - 4.0GL
- ~ 2050: 0 to -5.0GL
- ~ 2080: -1.0 to - 6.0GL

Observed streamflow data included to verify 2016 projections:

- ~ Recent observed flow consistent with C.C projections trajectory
- ~ Drier than projected!

Climate Change – Gradual change Vs Shift/Step-change

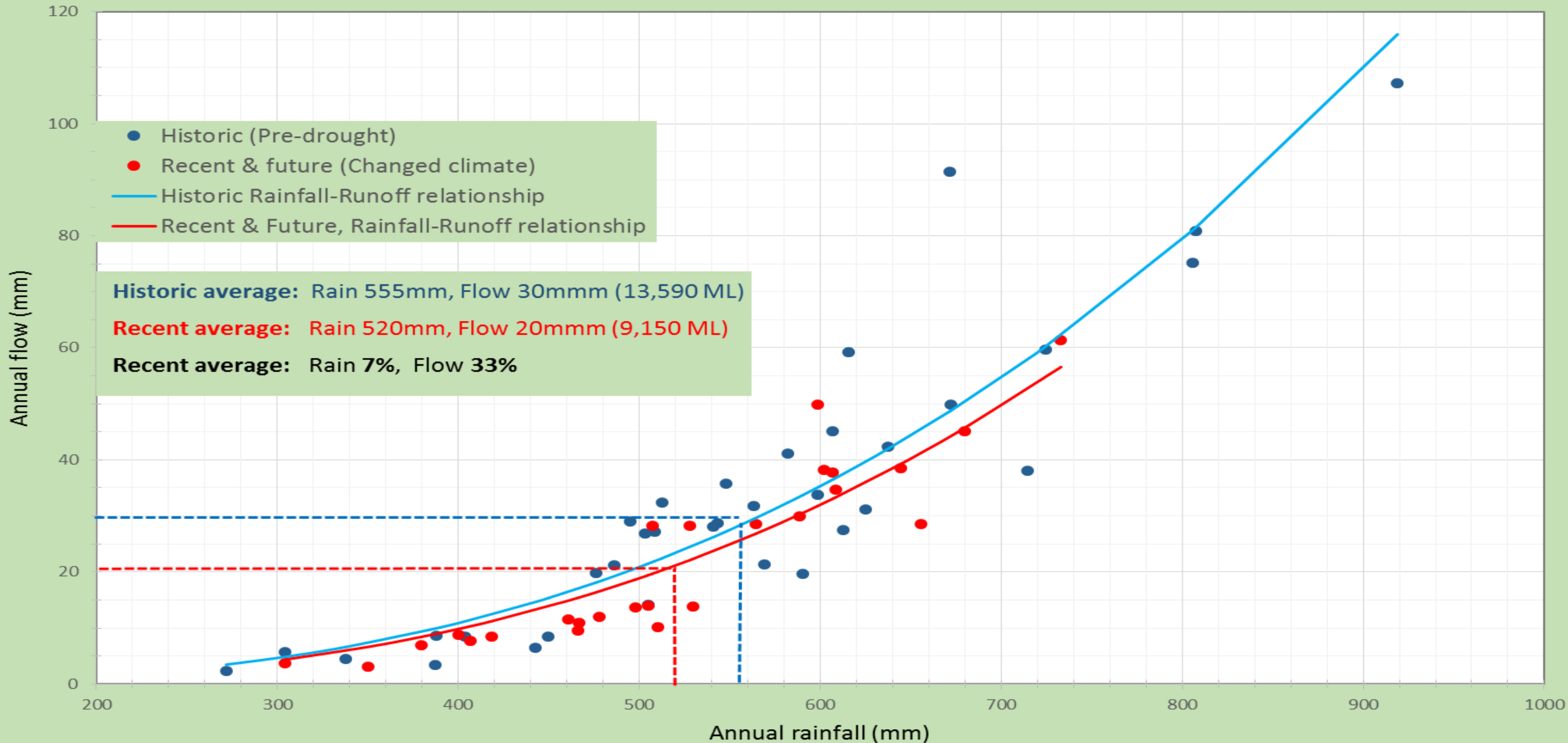
- **Mann-Kendall test**

- Test for monotonic trends in the data i.e. consistently increasing or decreasing
- A negative '**tau**' value suggests a decreasing trend and positive for increasing. A **p-value <0.05** suggests a statistically significant trend.

Mann-Kendall Test		
Period	tau	p-val
Annual	-0.12	0.05
Summer	0.00	0.98
Autumn	-0.08	0.21
Winter	-0.06	0.30
Spring	-0.14	0.02
January	-0.03	0.58
February	-0.03	0.60
March	-0.06	0.35
April	-0.02	0.70
May	-0.05	0.39
June	-0.09	0.14
July	0.03	0.68
August	-0.05	0.45
September	-0.07	0.23
October	-0.11	0.07
November	0.00	0.97
December	0.01	0.93

Catchment Behaviour, Rainfall – Runoff Relation

Annual rainfall VS Annual flow for Barossa PWRA, Observed data, 1961 to 2021



Barossa Hydrology: Summary

- Highly variable
- Possible step change since mid 1990's
- On average lower 7% rainfall, 33% streamflow
- More extremely dry years
- Still wet years but likely less often and less wet
- Complexities for management
- Need more time to fully understand implications of changes
- Need flexibility in policies to recognise future variability