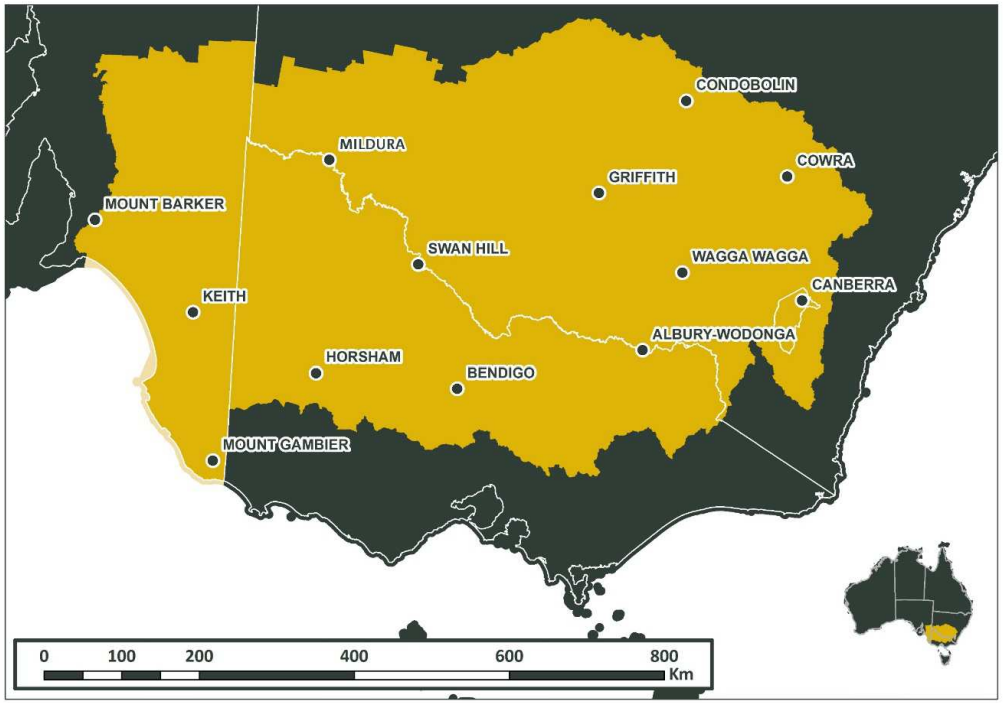
Climate projections for Murray Basin



The following projections are for the Murray Basin cluster, comprising regions across New South Wales, Victoria and South Australia. The cluster extends from the flatlands of inland New South Wales to the Great Dividing Range along the southern and eastern boundaries and includes Australia's highest mountain; Mt Kosciusko, at 2228m.

The cluster is relatively dry and temperate, with a warm and dry grassland climate in the north-west ranging to temperate with hot summers further east.

Some of the content for this Pamphlet drawn from Gerbing, C. Webb, L. and Timbal, B. 2015 Murray Basin Cluster brochure, CSIRO and BoM.

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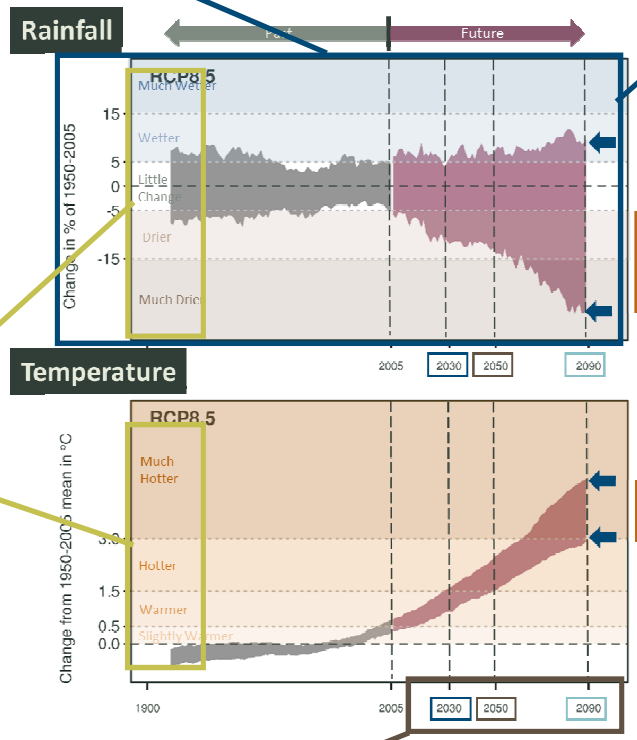
KEY TO THE PROJECTIONS SLIDES

Time series of rainfall (top) and temperature (below) for the historical period (1900 to 2005; grey) and projected period (2005 to 2099; purple) showing the 10th to 90th percentile of the 20-year running mean from 40 CMIP5 models.

Projected period colour code:
Purple: high emissions (RCP8.5)
Blue: intermediate emissions (RCP4.5)
Green: low emissions (RCP2.6)

Categories of warming and rainfall changes are indicated by colour shading on the graph as described in the table:

Rainfall (% change relative to 1950 - 2005)	Temperature (degrees Celsius change from 1950-2005)
Much Wetter (> 15 %)	Much Hotter (> 3.0)
Wetter (5 to 15 %)	Hotter (1.5 to 3.0)
Little change (-5 to +5 %)	Warmer (0.5 to 1.5)
Drier (-5 to -10 %)	Slightly Warmer (0 – 0.5)
Much Drier (> -15%)	



Outlook periods explored are 20 year periods centred on 2030, 2050, 2090.

For adaptation planning, consider top and bottom of the range of plausible change, indicated by the blue arrows.

Descriptions of what could be expected given model representation (40 CMIP5 models) in the various future periods:

2030: Warmer with most models indicating little change with some models indicating drier.

2050: Warmer to hotter with most models indicating little change to drier, and some indicating wetter.

2090: Much hotter with little change in rainfall or a drier or much drier climate.

*Seasonal projections may differ from annual. Seasonal detail shown later. Maximum model consensus by 2090, if it exists, is indicated by orange bar. For adaptation planning, consider top and bottom of the range of plausible change. The 2090 range is indicated by the blue arrows.

Maximum consensus (at least 33% of models) indicated by orange box. In this example, the maximum consensus future by 2090 could be described as 'much hotter and drier to much drier'.

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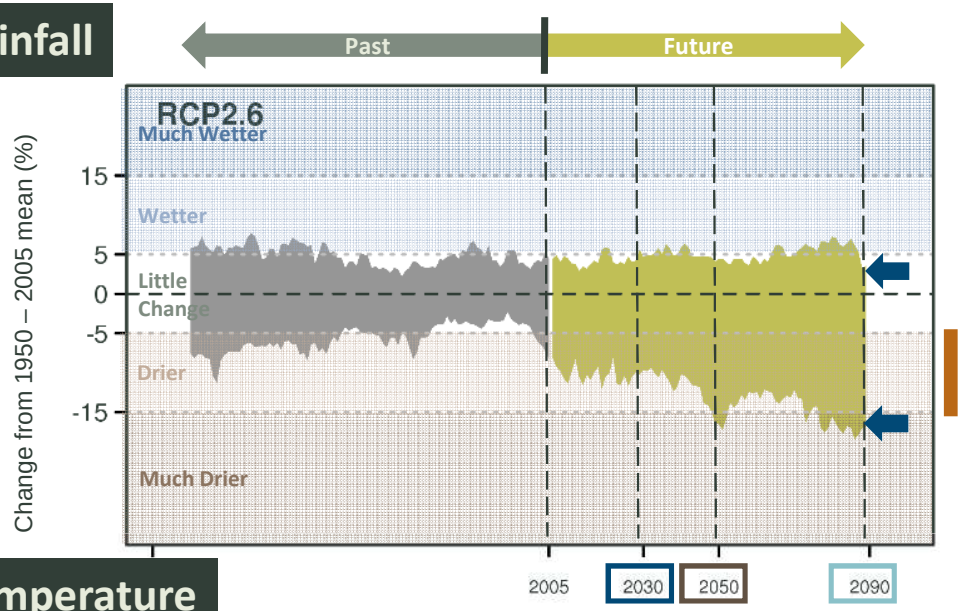
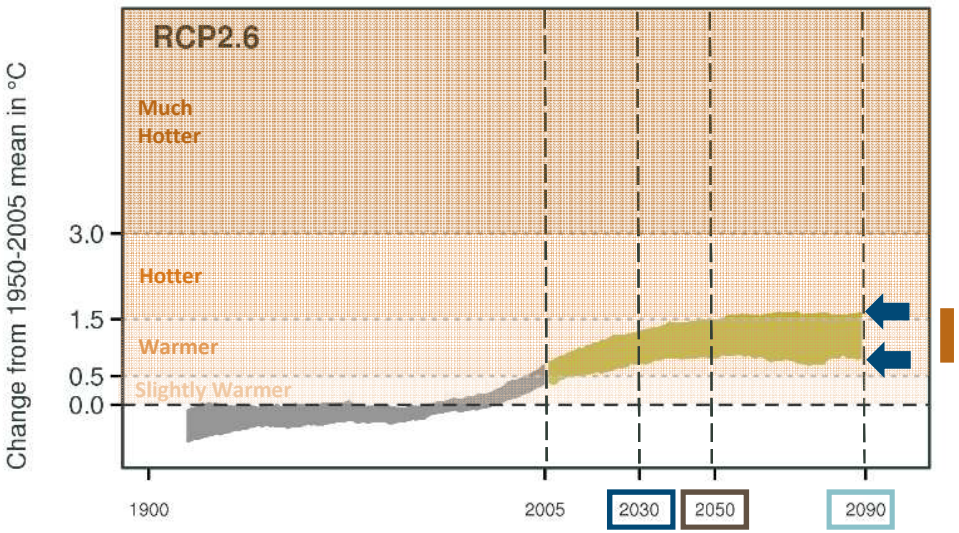
Climate projections for Murray Basin (annual*) : Low emissions

Rainfall



Temperature



2030: Warmer with most models indicating little change in rainfall, but a chance of drier climate indicated by some models.

2050: Warmer with most models indicating little change in rainfall, but a chance of drier or much drier climate exists.

2090: Warmer with a drier climate indicated by most models, with some models indicating little change.

***Seasonal projections may differ from annual. Seasonal detail shown later.**
Maximum model consensus by 2090, if it exists, is indicated by orange bar.
For adaptation planning, consider top and bottom of the range of plausible change. The 2090 range is indicated by the blue arrows.

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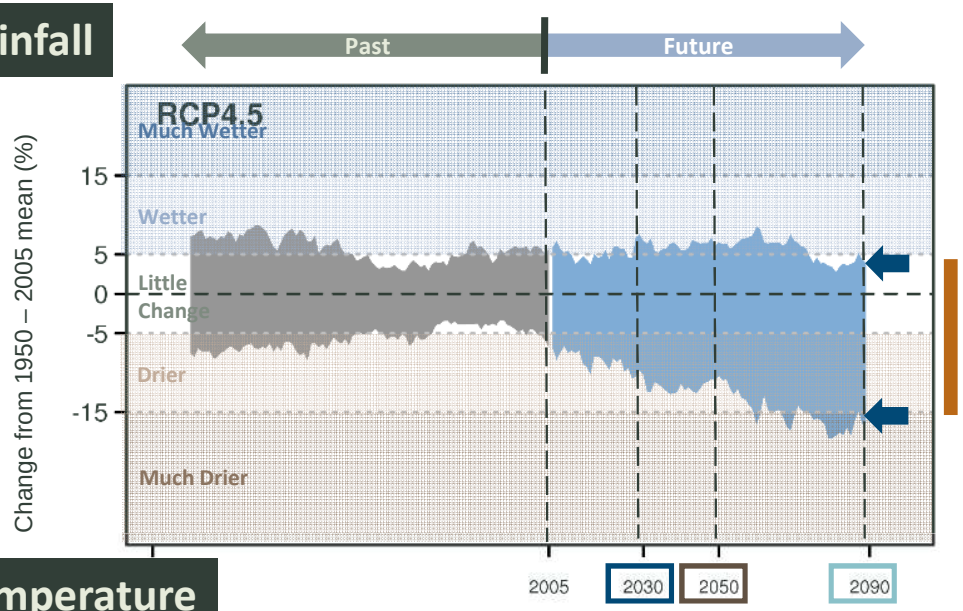
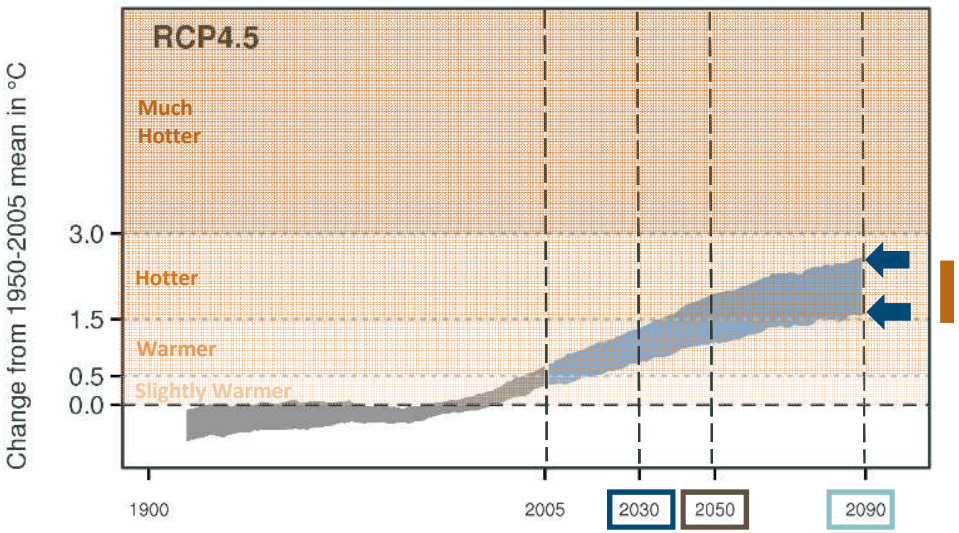
Climate projections for Murray Basin (annual*) : Intermediate emissions

Rainfall



Temperature



2030: Warmer with little change in rainfall or drier.

2050: Warmer to hotter with most models indicating little change in rainfall, some models indicating drier, and a chance of wetter also occurs

2090: Warmer to hotter with most models indicating little change or drier.

***Seasonal projections may differ from annual. Seasonal detail shown later.**

Maximum model consensus by 2090, if it exists, is indicated by orange bar.

For adaptation planning, consider top and bottom of the range of plausible change. The 2090 range is indicated by the blue arrows.

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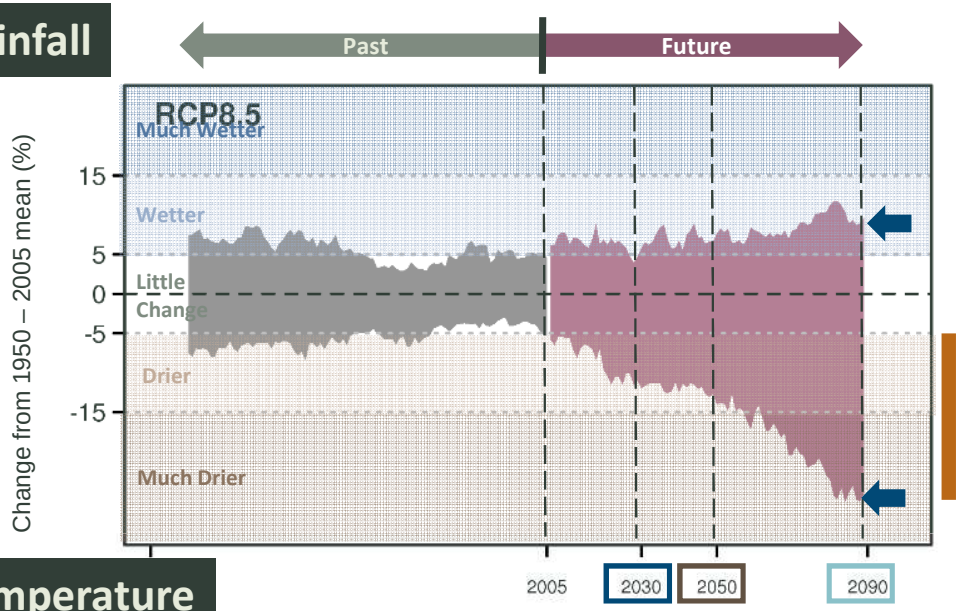
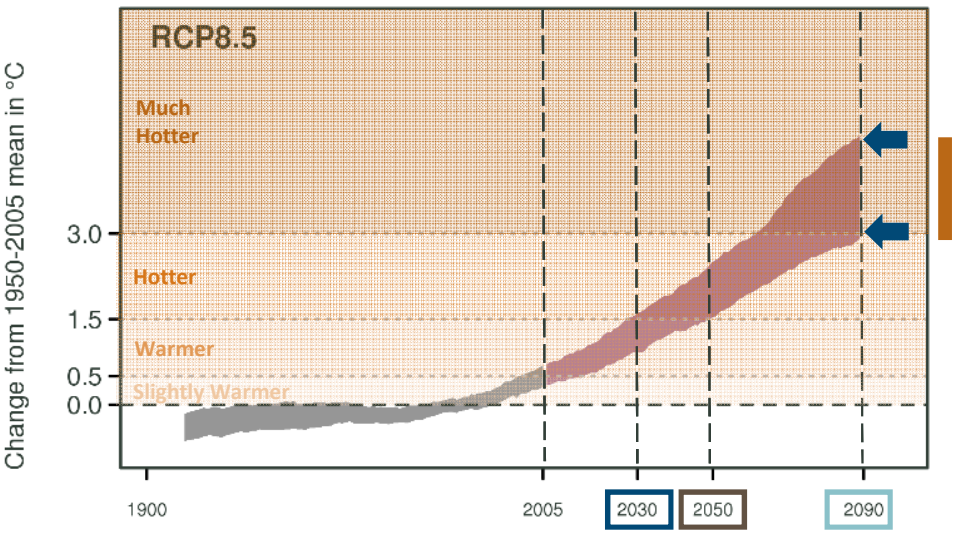
Climate projections for Murray Basin (annual*) : High emissions

Rainfall



Temperature



2030: Warmer with most models indicating little change with some models indicating drier.

2050: Warmer to hotter with most models indicating little change to drier, and some indicating wetter.

2090: Much hotter with little change in rainfall or a drier or much drier climate.

***Seasonal projections may differ from annual. Seasonal detail shown later.**

Maximum model consensus by 2090, if it exists, is indicated by orange bar.

For adaptation planning, consider top and bottom of the range of plausible change. The 2090 range is indicated by the blue arrows.

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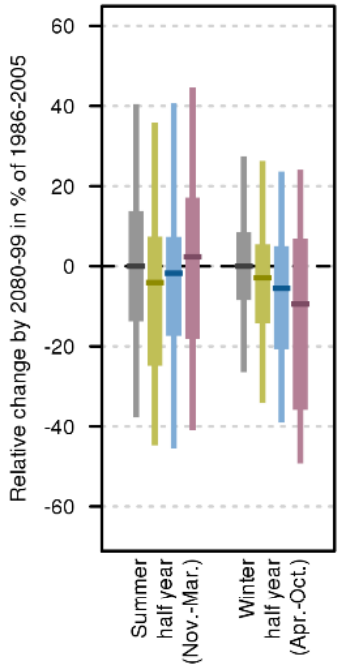
Seasonal Rainfall

Graph shows projected change in seasonal precipitation for 2090 (2080-99) in (from left) summer, autumn, winter and spring. Anomalies are given in % relative to 1995(1986-2005) under RCP2.6 (Green), RCP4.5 (blue) and RCP8.5 (purple). Natural climate variability is represented by the grey bar.



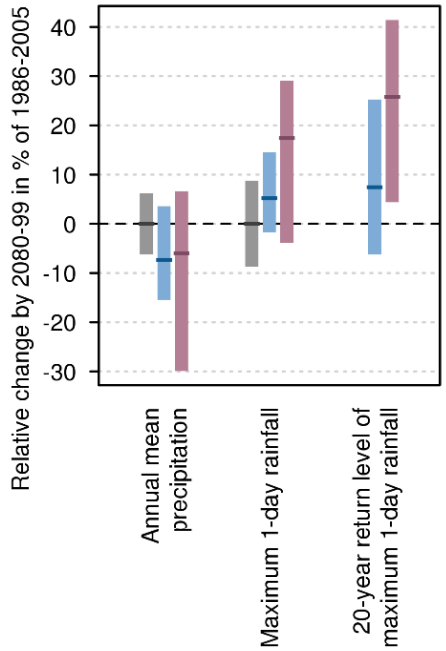
In the near future (2030) natural variability is projected to predominate over trends due to greenhouse gas emissions.

Late in the century (2090) cool season (April to October) rainfall is projected to decline.

In the warm season (November to March), little change, increases and decreases of rainfall are projected by different models.

Extreme Rainfall

Modelled differences (per cent) in annual average rainfall, rainfall on the wettest day of the year, and rainfall on the wettest day in 20 years for 2080-2099 compared to 1986 to 2005 under RCP4.5 (blue) and RCP8.5 (purple). Natural climate variability is represented by the grey bar.



Understanding of the physical processes that cause extreme rainfall, coupled with modelled projections indicate with high confidence a future increase in the intensity of extreme rainfall events, although the magnitude of the changes cannot be confidently projected.

Time spent in drought is projected, with medium confidence, to increase over the course of the century.

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