

# Climate change impacts and adaptation options for the Murray-Darling Basin

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### **Presentation overview**

- What changes have we seen to date in the Murray-Darling Basin?
- What changes are we likely to see in the future?
- What will be the impact of these changes?
- Can we develop adaptation options to minimise the negative consequences of these changes?



Photo credits: Tanya Doody

### **Observed climate change in the MDB**



#### Observed trend in mean annual rainfall (1950-2020)



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### **Observed impacts on MDB inflows**



## Projected climate change impacts in the MDB



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### **Projected climate change impacts in the MDB**



3-year hydrological drought

> Average frequency of 1 in 20 year (5 times in 100 years of historical data) non-overlapping 3-year low total runoff under climate change



## Assessing vulnerability of assets and values

Catchment wetness Mean annual runoff	Farms Floodplain pasture Irrigation system	Farm owners, graziers and workers generate income Members of irrigation systems rely on reliable system People value transparent and fair water allocation	WRPA	Basins	Vulnerab between th of 1-5 (5 i more va Economic values	ility rating ne WRPAs indicates r lues vulne Social values	; (relative ) on a scale elatively erability) Cultural values
	Food production system	Residents enjoy local healthy food Residents and visitors use for drinking, gardening	Victorian Murray Northern Victoria	Southern Southern			
Runoff for pools and water holes in rivers	River connectivity and flows	Agribusinesses and the support sector rely on healthy environmental assets	Wimmera-Mallee (surface water) South Australian Murray Region Eastern Mount Lofty Ranges	Southern Southern Southern	5		
	Waterbirds	Tourism sector relies on visitors	Lower Darling New South Wales Murray Murrumbidgee	Southern Southern			
Low flow days		Residents' wellbeing and recreational use	Lachlan Macquarie-Castlereagh	Southern Northern		5	5
	Native fish	Residents and visitors benefit from aesthetic, totemic, existence values	Intersecting Streams Namoi	Northern Northern		5	5
Runoff for in-stream habitats	Native vegetation	Stewardship/International treaty obligations	Gwydir New South Wales Border Rivers Queensland Border Rivers-Moonie	Northern Northern Northern			
	Sarrer sites rependent on water	First Nations water values	Condamine-Balonne Warrego-Paroo-Nebine	Northern Northern			
	First nations water interests and rights						

# **Climate change impacts on agriculture**



Higher temperature and more very hot days can increase heat stress.

Reduction in number of cold days may lead to inadequate winter chilling.

Higher temperature will increase crop evapotranspiration.



Higher extreme storm intensity may increase damage to crop and infrastructure.



Higher CO<sub>2</sub> will increase yield but may reduce quality.



Decline in water availability and more severe drought spells will significantly impact agriculture.







### **Original decision-making process**





### **Our vision**





#### **Basin Plan (Enhanced water outcome)**





Enhancing water outcomes through improved knowledge, improved river operations, improved water management, improved water use efficiency, adaptation.

#### **Basin Plan (Now)**



#### Median climate change

- Same irr/env entitlements (some adaptation)



#### One of many scenarios



#### Median climate change

- Change entitlements to get the same environmental outcome



We are developing knowledge, models, and tools to enable the evaluation of different options and scenarios.

