



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

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LAND AND WATER  
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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?

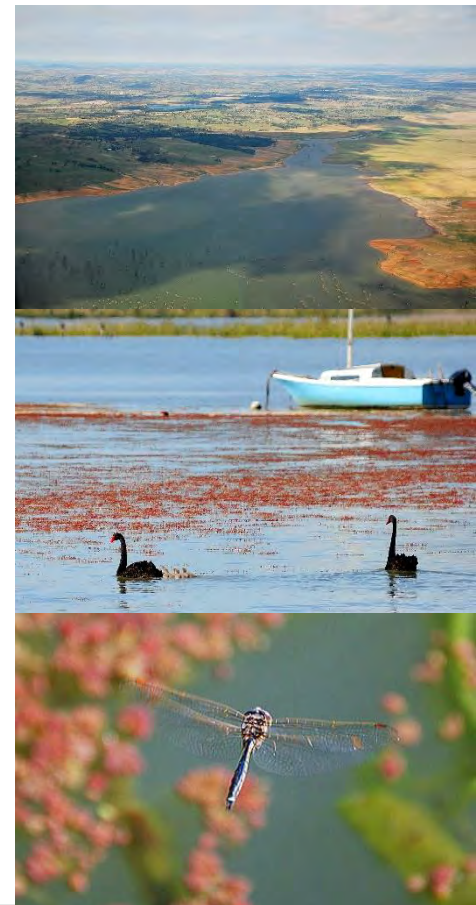
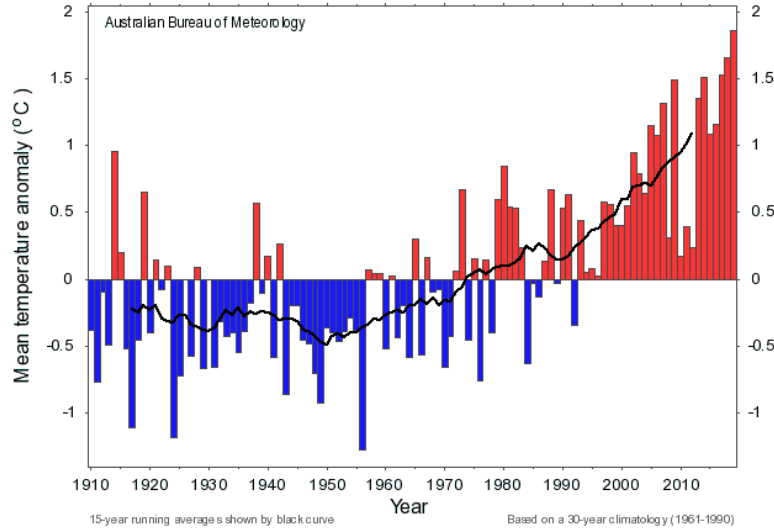


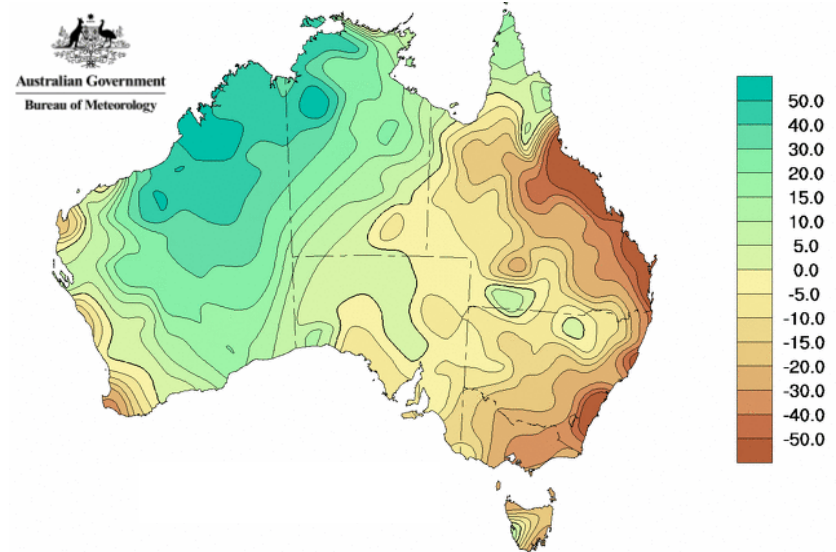
Photo credits: Tanya Doody

# Observed climate change in the MDB

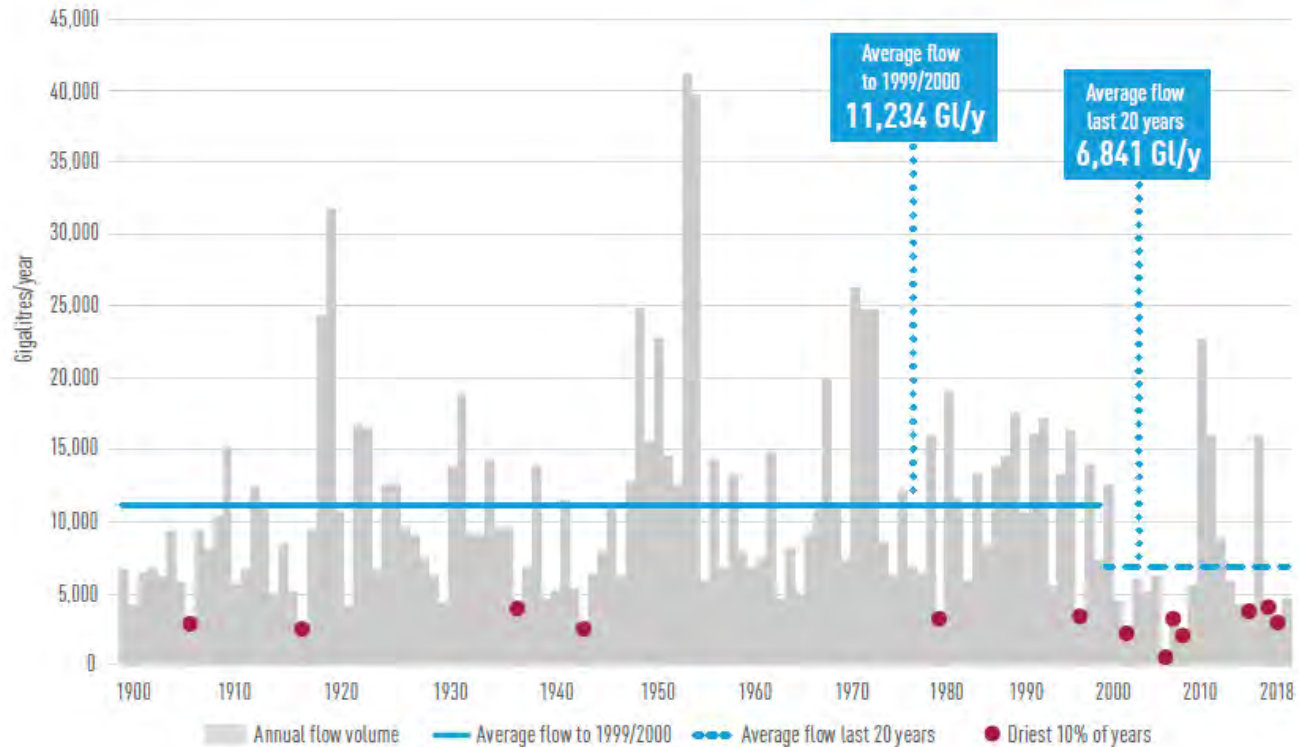
Annual mean temperature anomaly  
Murray Darling Basin (1910 to 2019)



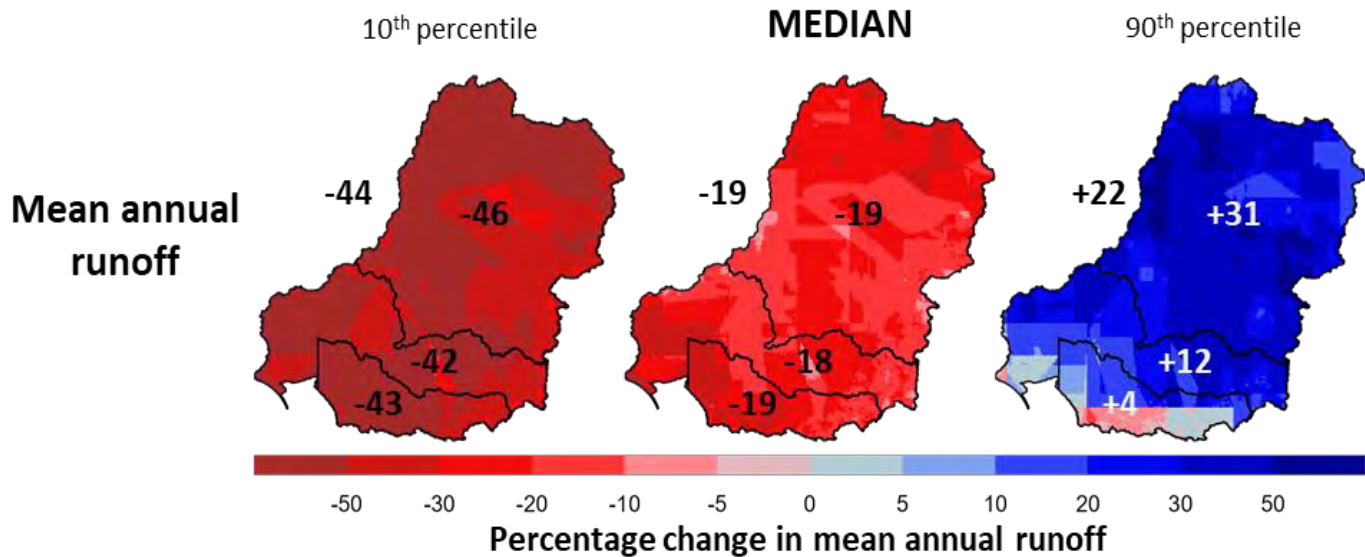
Observed trend in mean annual rainfall (1950-2020)



# Observed impacts on MDB inflows



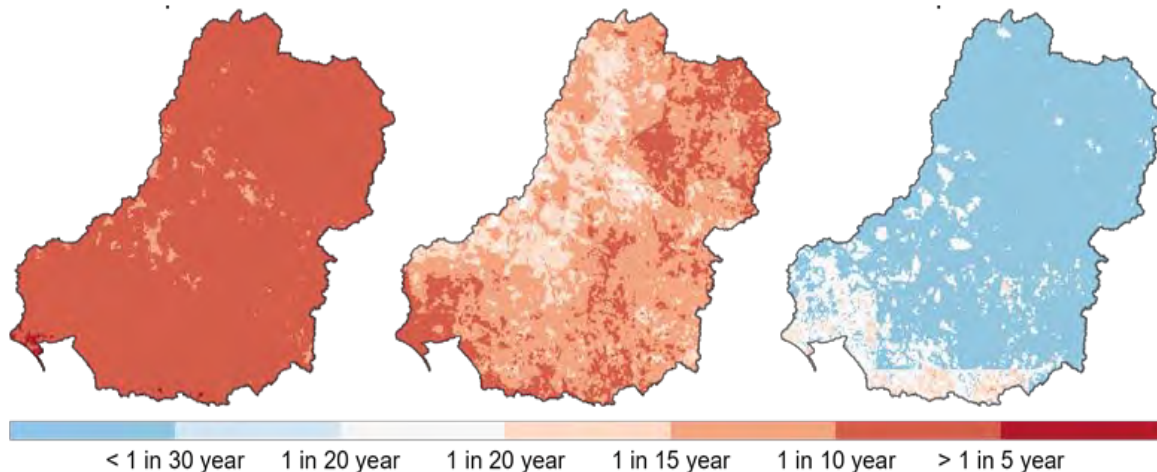
# Projected climate change impacts in the MDB





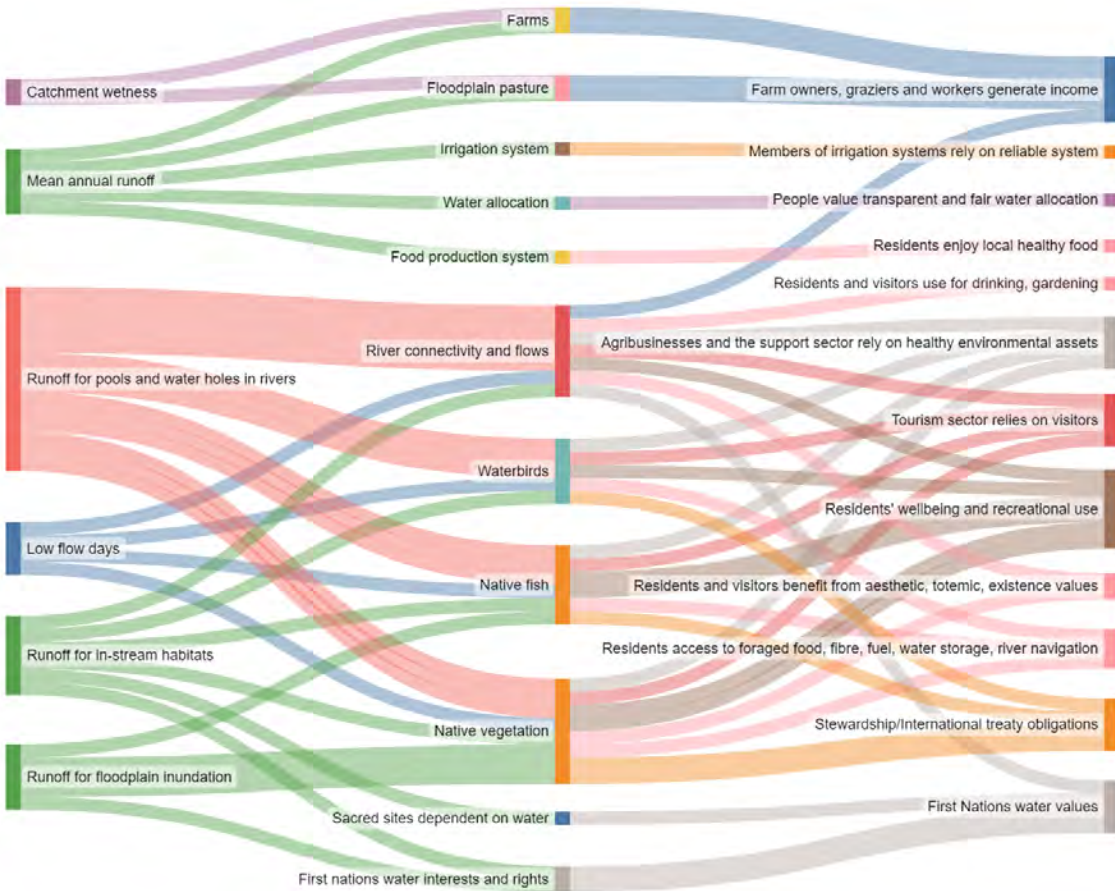
# Projected climate change impacts in the MDB

**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



WRPA	Basins	Vulnerability rating (relative between the WRPAs) on a scale of 1-5 (5 indicates relatively more values vulnerability)		
		Economic values	Social values	Cultural values
Victorian Murray	Southern	4	2	3
Northern Victoria	Southern	4	2	2
Wimmera-Mallee (surface water)	Southern	5	3	3
South Australian Murray Region	Southern	4	3	3
Eastern Mount Lofty Ranges	Southern	1	2	4
Lower Darling	Southern	2	3	3
New South Wales Murray	Southern	2	2	2
Murrumbidgee	Southern	3	2	2
Lachlan	Southern	3	5	5
Macquarie-Castlereagh	Northern	2	3	4
Intersecting Streams	Northern	2	3	3
Namoi	Northern	2	5	5
Gwydir	Northern	2	1	2
New South Wales Border Rivers	Northern	1	2	3
Queensland Border Rivers-Moonie	Northern	1	3	4
Condamine-Balonne	Northern	1	2	2
Warrego-Paroo-Nebine	Northern	1	2	1

# 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.

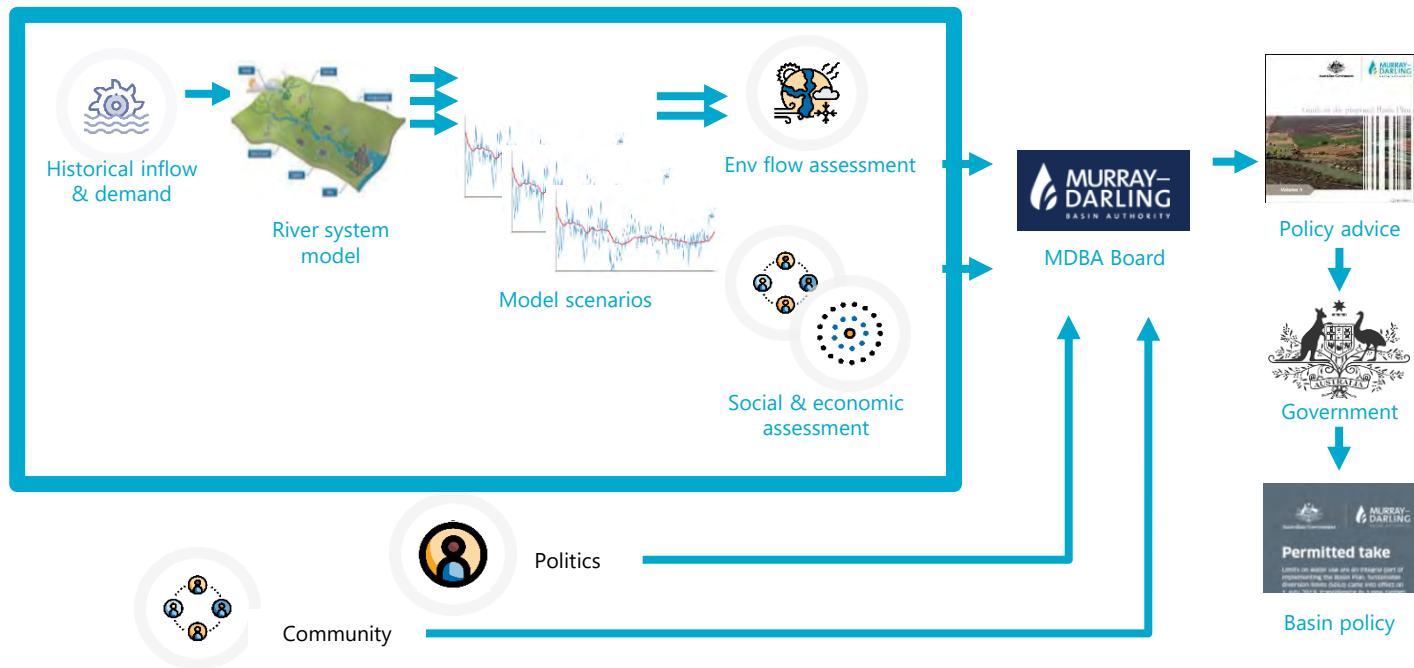


Decline in water availability and more severe drought spells will significantly impact agriculture.

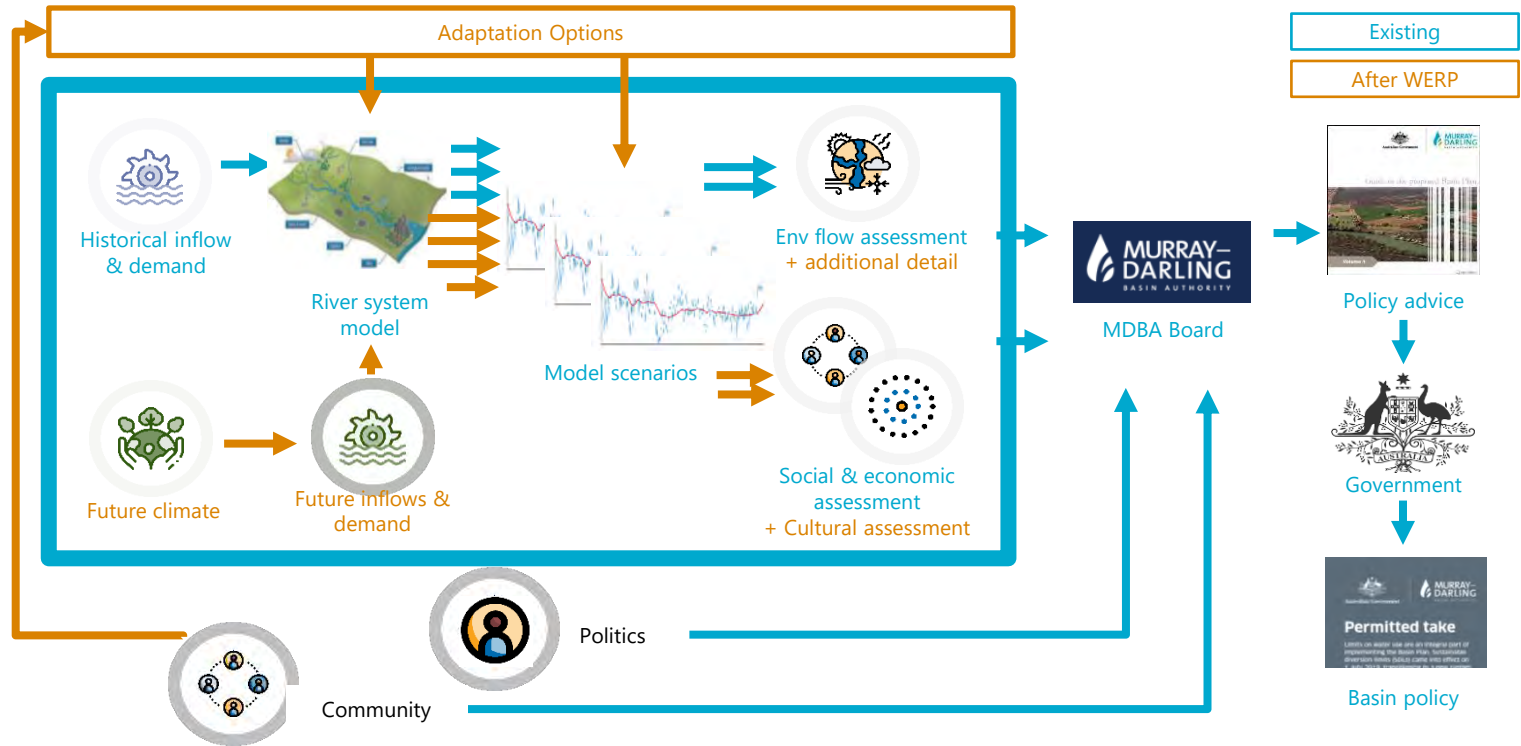




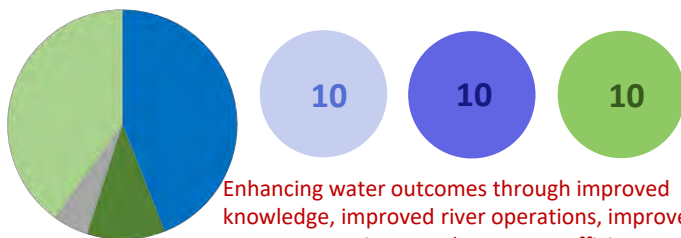
# Original decision-making process



# Our vision

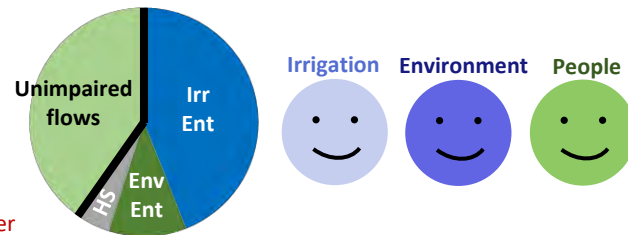


## Basin Plan (Enhanced water outcome)



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)



## Median climate change

– Change entitlements to get the same environmental outcome



## One of many scenarios



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