



Department of Climate Change, Energy, the Environment and Water



Northern Basin Connectivity and Minimum Inflows project update

Customer Advisory Groups

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Director Inland Planning

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Barwon River at Mungindi

What we will discuss

1. Northern Basin Connectivity
2. Minimum inflows
3. Project intersection

Northern Basin Connectivity project



Northern Basin Connectivity Program



Project objective

- Improve river connectivity between the Barwon-Darling and its tributary systems and then downstream to provide for human and environmental needs.

Expected project outcomes

- Northern Basin water sharing plans include provisions that aim to improve water flowing across connected catchments and manage resumption of flows. This will
 - increase transparency on how system operates under a range of conditions
 - reduce reliance on temporary water restrictions (s.324)
 - protect environmental water flows from northern to southern basin

The Program will build on previous reforms. Connectivity Expert Panel's report is just one input

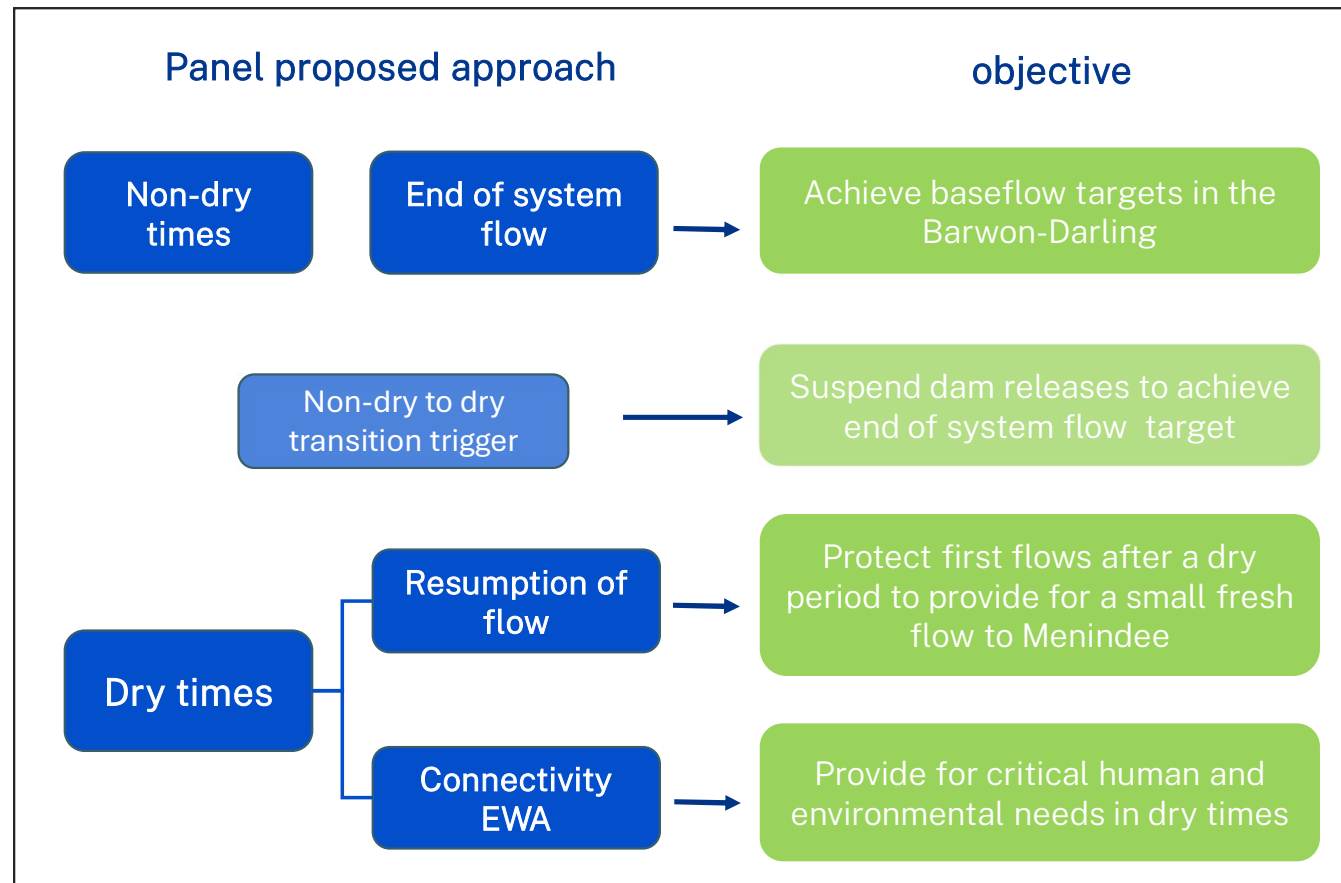
Connectivity Expert Panel recommendations



Overview of how the Panel's recommendations

Connectivity Expert Panel report includes recommendations on objectives and proposed approaches for improving connectivity into the Barwon-Darling River in dry and non-dry times

These recommendations have been made independent of government and are not government policy



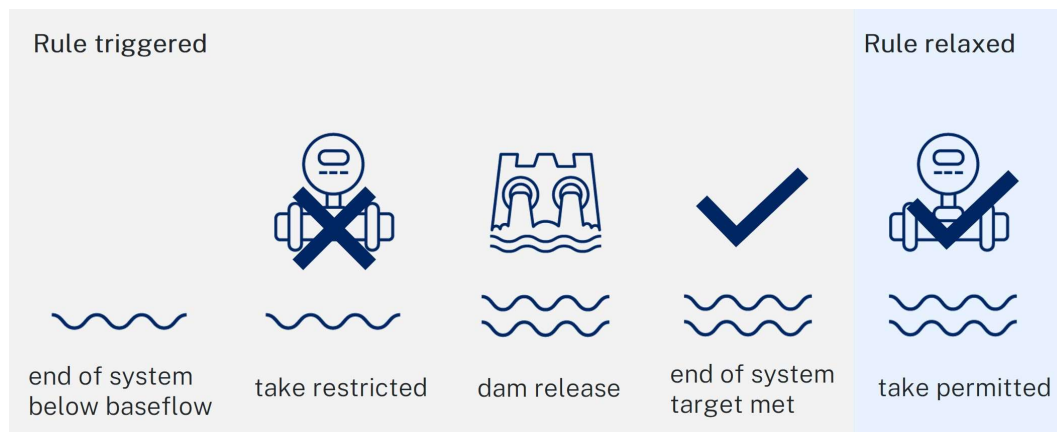
Panel proposal- end of system flow

Aims to achieve improvement Barwon-Darling base-flow targets in non-dry times
Applies to Border Rivers, Gwydir and Namoi regulated and unregulated water sharing plans

Panel's proposed approach:

- water sharing plans should have an end of system flow requirement at bottom of base flow. to enable Barwon-Darling base flow requirements to be met in non-dry times
- achieved through limitations on supplementary and floodplain harvesting access in the first instance, with releases from storages if these flows are not adequate
 - dam releases are suspended when system enters dry phase
 - dry phase transition trigger: inflows into the major dams drop below the 75th percentile on average over 30 days

How the rule would work



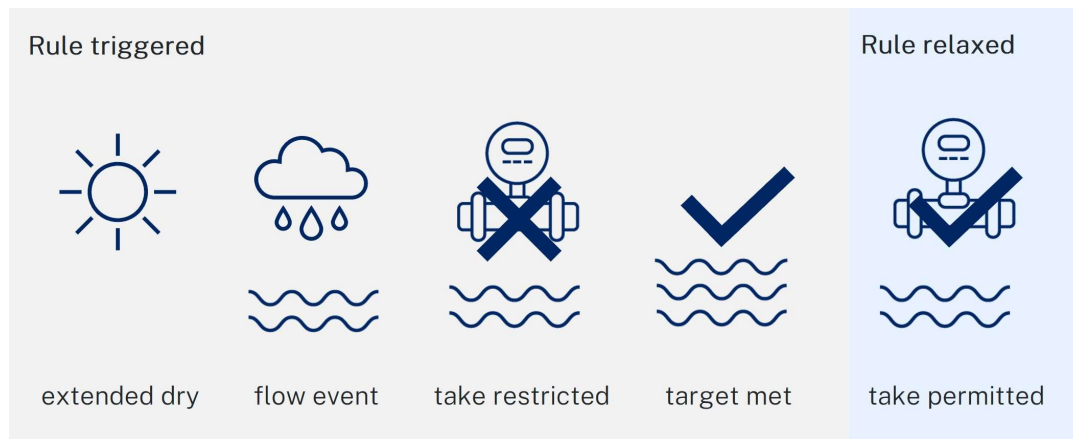
Panel proposal - extended resumption of flow

Aims to provide for a small fresh flushing flow to Menindee following an extended dry period

Applies to Border Rivers, Gwydir, Namoi, Macquarie and Barwon Darling regulated and unregulated WSP

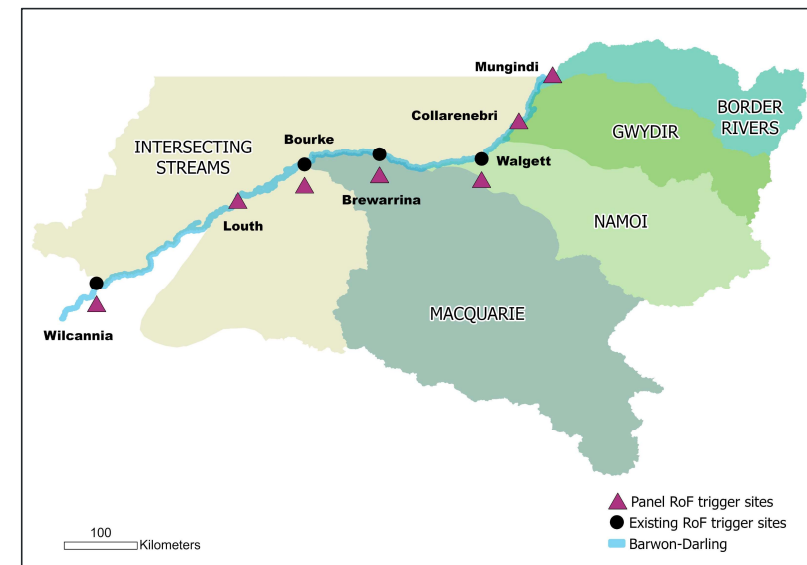
Panel's proposed approach:

- resumption of flow rules should be applied in northern tributaries as well as the Barwon-Darling
- access restricted after non-achievement of base flow for 90 days
- restrictions lifted when small fresh forecast to be met
- applies to supplementary, floodplain harvesting, unregulated river, Barwon-Darling A/B/C class)



How the rule would work

Panel has proposed addition trigger locations to existing RoF rule in Barwon-Darling WSP



Panel proposal - connectivity environmental water allowance

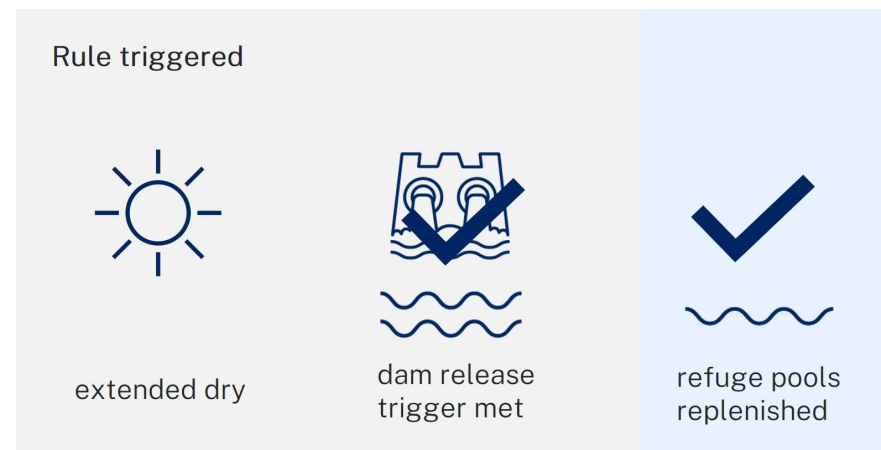
Aims to use replenishment releases from storage dams to at a minimum provide for reconnecting pools for critical human, environmental and water quality needs during dry times.

Applies to Border Rivers, Gwydir, Namoi regulated valleys

Panel's proposed approach :

- The Gwydir, Namoi and Border Rivers regulated water sharing plans should include a connectivity environmental water allowance to provide pulses as needed for water quality and other environmental outcomes during dry times
- At minimum provide for reconnecting pools for critical human needs, environmental and water quality needs in dry times

How the rule would work



How the Panel's recommendations will be assessed

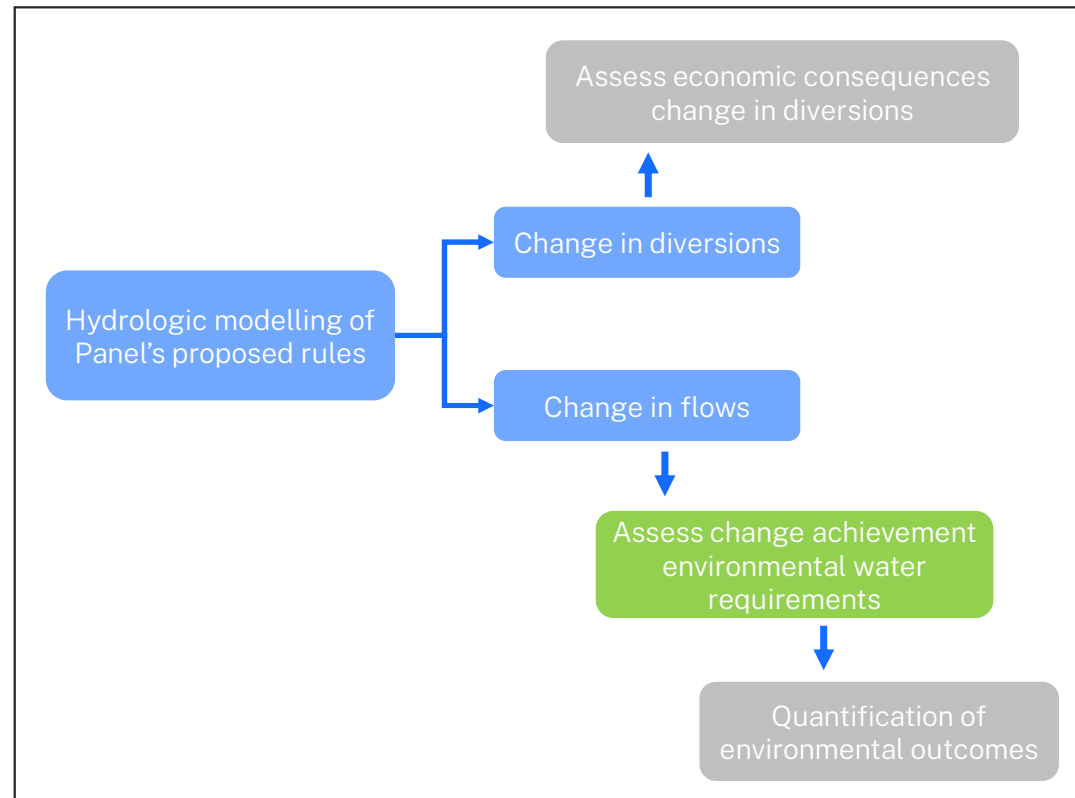


The Panel's recommendations are being modelled using the latest approved version of the hydrologic models

The output from the hydrologic models will be used to assess:

- change in achievement of environmental water requirements in the Barwon–Darling
- economic consequence for irrigators
- quantify the ecological benefits

Overview of how the Panel's recommendations are being assessed



Minimum Inflows

‘Minimum inflows’ – a complex problem



1. Climate variability has resulted in recent and serious instances of insecure water supplies. These affected regional economies, communities and the environment.
2. It is now evident that the former method by which water security was maintained (‘minimum inflows’) requires a review.

We have better tools at our disposal to better understand risk around water supply

Statutory obligations and social license



Better understanding the likelihood of WSP suspension under current and future conditions



Review of allocations process to secure water for high priority uses



Consider impacts on planned environmental water



Consider the views of stakeholders



Consider climate change and variability (NCC and NSW Water Strategy)

Key outcomes – what we want



Incorporating risk of climate change and variability into water allocations

- Improved capacity to manage water availability under a more variable climate → *more certainty for water users and environment*
 - Establishing an agreed likelihood of the Extreme Events Policy being triggered/WSP suspensions → *agreed level of risk for water users and environment*
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Current approach

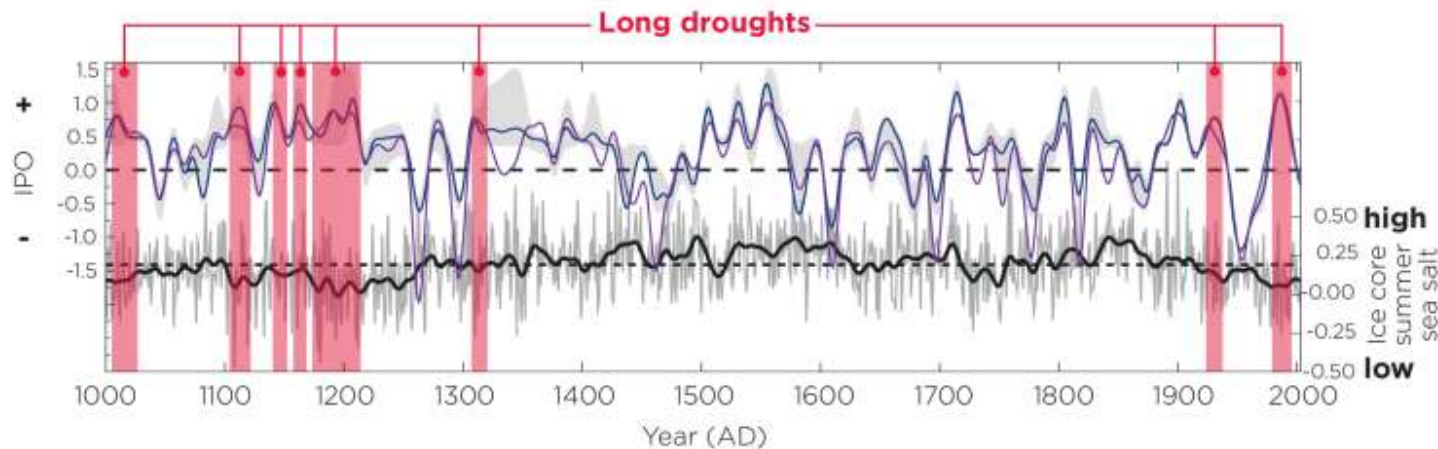


- Developed in 1980s
- Use of observed historical data: 1890s to 2004 (when WSP was first implemented)
- Based on best available information at the time
- Dealt with the level of variability captured within the observed historic record
- The current method does not consider climate change

We now have better tools to estimate long-term climate variability

New options for assessing and managing risk

- Our best information (10,000-year dataset + recorded data + climate change scenarios) means picking a single ‘worst drought on record’ is not representative.
- Our new and improved data allows for more nuance in estimating risk and designing WSPs to manage those risks.



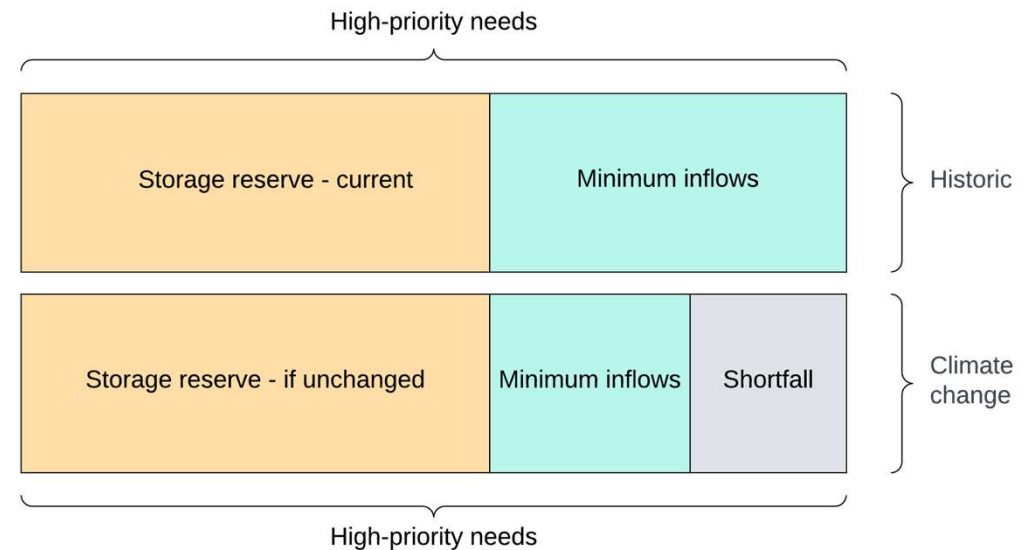
Data sources



Dataset	Rationale
Baseline	
Observed data 1895-2004/2009	Existing water sharing plan rules.
Observed data 1895-2020	To incorporate the most recent drought.
Historical data -10,000-year paleo-stochastic	To show the long-term level of reliability under natural variability and climate change already observed.
Climate change data	
Current Climate Scenario 10,000-year paleo-stochastic factored with medium emissions scenario (SSP2-4.5) at 2035 under NARClIM 2.0	To show the potential impact of projected climate change within the 10-year planning period of a water sharing plan
Future Trajectory scenario 10,000-year paleo-stochastic factored with medium emissions scenario (SSP2-4.5) at 2050 under NARClIM 2.0	A future trajectory scenario to understand the potential continuing impact of climate change by 2050.

Our revised approach

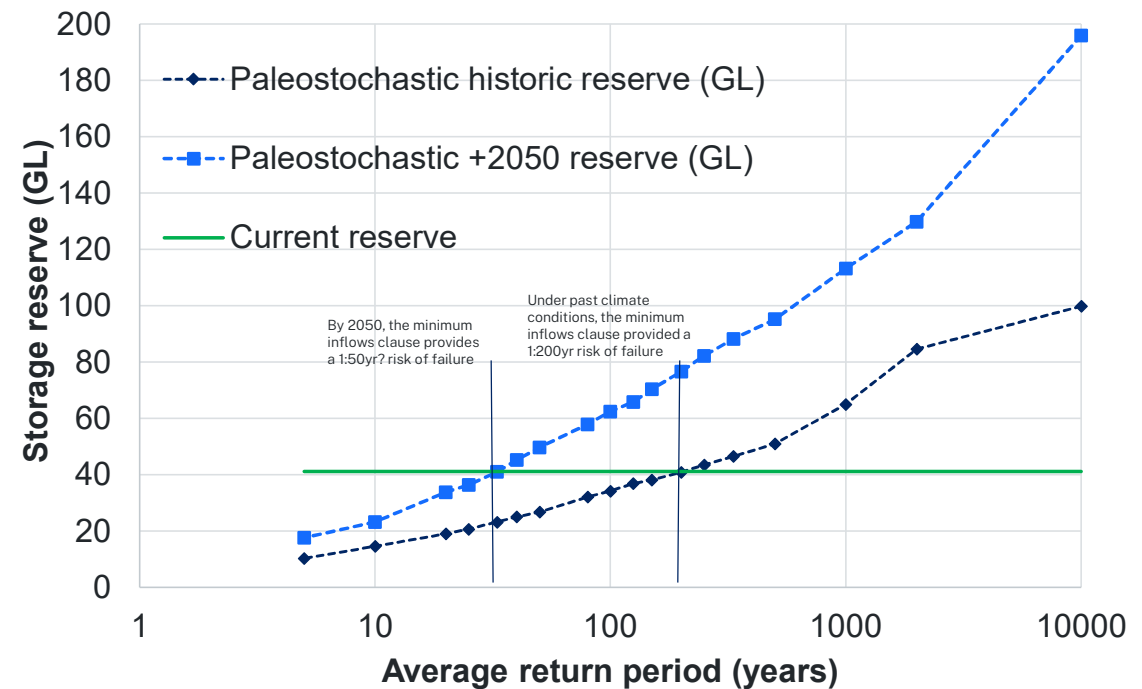
1. A more robust approach is to first assess how much water should be stored under a variable climate.
2. Calculating realistic 'minimum inflows' informs potential storage reserve changes in response to this variability.



How method could be applied

- We will need to choose an amount of water to store in the dam to meet a particular level of reliability
- For example the current reserve (40 GL) would be *fully emptied* about 1 in 200 years under historic conditions –or, 1 in 50 years under the 2050 climate
- The average stage 4 of the Extreme Events Policy changes from 1 in 10 years to 1 in 3.5 years.

Comparison of Historic and 2050 projection storage reserve requirements



Benefits of the revised approach



Can directly estimate and communicate risk of failure of different storage reserve levels



Provides tangible options for decision makers



Stakeholders can clearly see how much water is being stored in reserves

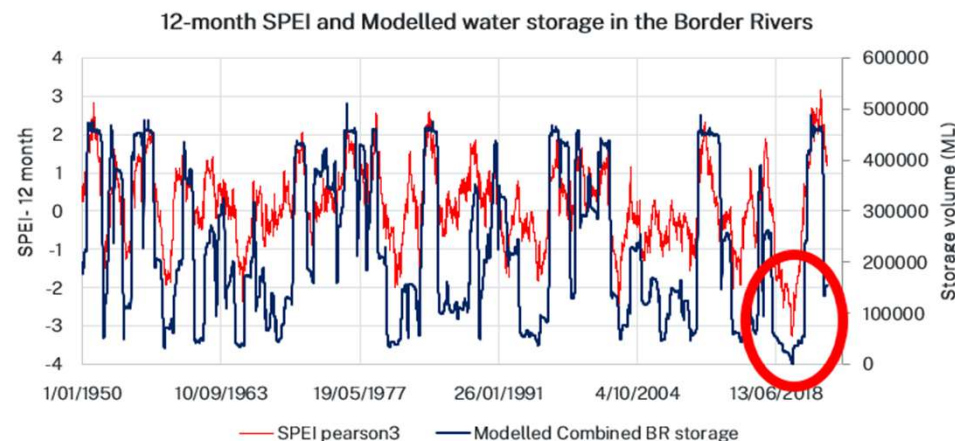


Considers social, economic and environmental requirements

Mitigation measure – Operations trigger

Reduce impacts to GS and EWAs

- Increase storage reserve and allocate more conservatively during dry conditions, and keep the storage reserve lower at other times
- Likely trigger - Standardised Precipitation Evaporation Index



Storage failure when SPEI < -2.6

Expert Panel Review



- 13 recommendations across 3 categories.
- Endorsement of the approach: *“Improves on significant limitations of the current approach for estimating minimum inflow sequences, particularly those related to the use of historical instrumental data and explicitly excluding the Millenium and Tinderbox Droughts.”*
- Represents a strong conceptual framework to estimate the impact of climate change and variability on estimates of minimum inflows.
- Use of paleo-stochastic data adjusted with climate data is transparent and an improvement compared to using historical data
- One of the key recommendations was to ensure adaptive management and continual updates and improvements with new climate data, and to be more explicit with some concepts in the method.

Dr **Darren Saunders**,
Deputy NSW Chief
Scientist & Engineer (Chair)

Associate Professor **Fiona Johnson**, Director of the
Water Research Centre,
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Emeritus Professor **George Kuczera**, School of
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Owen Droop, Director /
Principal Water Resources
Engineer, OD Hydrology.

Dr **Eytan Rocheta**, Natural
Resources Commission.

Summary of Recommendations



Recommendation	Dept response and action
<p>Recommendation 1: Improvements to the Method and climate datasets, rainfall runoff models and adaptive management</p>	<ul style="list-style-type: none"> - Detail in method increased to include additional analysis - Sources of bias will not be identified, but bias will be addressed through ongoing model improvement - Scale climate change data using monthly factors - aligned with our findings
<p>Recommendation 2: Adaptively manage the method and update with new information</p>	<ul style="list-style-type: none"> - The climate data will be updated when new data is available, the method will be updated as part of the 10 year WSP review process - We will continue to incorporate climate change into other areas of the water management and the AWD process as resourcing permits. - Method updated to include additional sources of information used in the process ie. Water balance models - Will not be convening an expert panel to advise on ongoing improvements to the method and how it is implemented - Confidence intervals will be qualitatively determined. There is no method to define quantitative confidence intervals.
<p>Recommendation 3: Improve transparency on the method and ensure consistent terminology</p>	<ul style="list-style-type: none"> - Additional detail added to method and communications have been developed to the method to address these recommendations

Purpose of Upcoming Consultation



- Consult on method and OCSE response
 - Seek feedback on implementation of the method → what should be considered in decision making?
 - Contextual information about your valley e.g. risks, issues, town water supply needs
 - Expectations of the level of reliability provided by the storage reserve and drought management
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Project intersection

Connectivity/minimum inflow projects intersect

Northern Basin Connectivity -

- improve river connectivity between the Barwon-Darling and its tributary systems and then downstream to provide for human and environmental needs.
- regulated and unregulated WSPs in the northern Basin

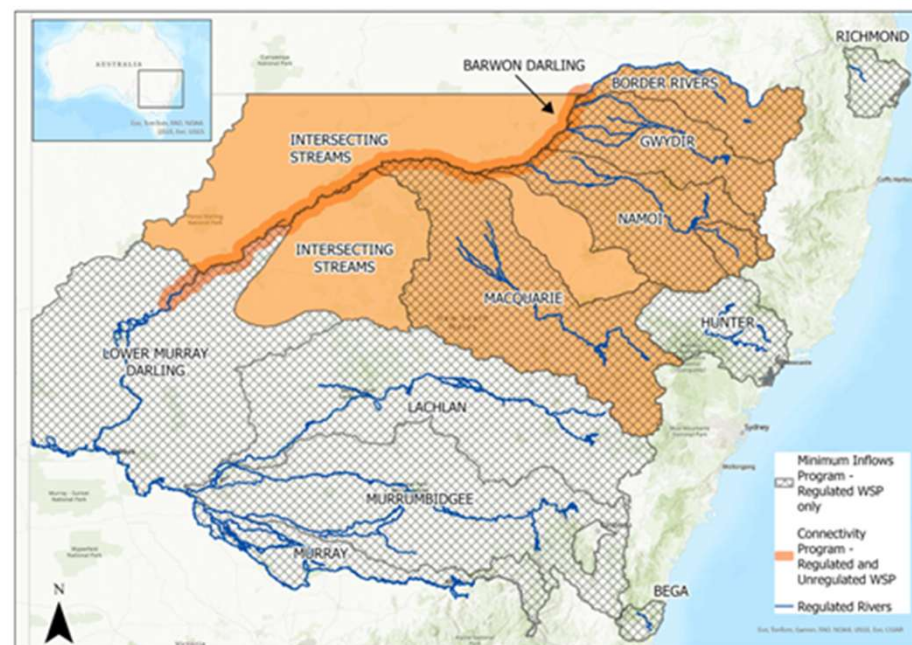
Minimum Inflows -

- proposed method to review minimum inflow sequence to take into consideration climate change
- will affect all NSW regulated WSPs

Key project interdependencies

- impacts to northern Basin regulated river WSP (Border Rivers, Gwydir, Namoi and Macquarie)
- impacts to same licence categories – need to consider cumulative impacts and benefits

Water sharing plan areas impacted by northern basin connectivity and minimum inflows projects





Proposed timeline



Have your say

How to have your say

