

**Joint Submission on proposed amendments to the *Water Sharing Plan for the Barwon-Darling Unregulated River Water Source 2012***

By

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8 July 2022

## Foreword

Please accept our joint submission with respect to the *Water Sharing Plan for the Barwon-Darling Unregulated River Water Source 2012*. This joint submission is in three key parts:

(1) **Critical need for reduced water extractions particularly from various forms of floodplain harvesting** to halt further reductions in stream flows, as measured by flows in the Lower Darling (Baaka) River. Further, it is critical that each of the Water Sharing Plans for the connected tributaries of the Barwon-Darling and Lower Darling rivers be comprehensively integrated in terms of water flow requirements for the whole river system (provided by R. Quentin Grafton and John Williams);

(2) **Need to fully incorporate water quality requirements within the water sharing plan** (provided by Paul Wyrwoll); and

(3) **Seven recommended amendments to the water sharing plan** in relation to: cultural water allocations, low security licensing, trigger targets, and system connectivity (provided by Daniel Schulz).

## 1. Water Extractions and Stream Flows (prepared by R. Quentin Grafton and John Williams)

Water diverted for floodplain harvesting along the Barwon-Darling and its tributaries is currently largely unregulated, poorly documented, and not properly recorded, but the annual average diversions have been estimated at between 632 and 926 billion litres (GL) in NSW (Brown et al., 2022). According to Brown et al. (2022), storage capacity rose from 557 GL in 1993–94; to 1 1,393 GL in 2019–20. By comparison, *recorded* annual water extractions averaged 862 billion litres over the period 2004-5 to 2019-20 in northern NSW MDB (and are in the order of 1,700 billion litres in total from all tributaries (Grafton et al., 2022).

Large water extractions for irrigation along the Darling River, primarily in its upper catchment and its tributaries, contributed to the 1991 blue–green algal bloom that stretched for over 1,000 km (Bowling et al. 1996), and also to declines in abundance and diversity of native fish (Gehrke et al. 1995). The possible effects of water extractions on streamflow were investigated following the 2019 Menindee Fish Kill (Jackson et al. 2020). This investigation highlighted the importance of habitat connectivity for fish spawning and fish movement along the Darling River, including its lower reaches known as the Barka River.

Importantly, Grafton et al. (2022) find that over that past 40 years, increased water extractions have contributed to more than half of the recent decline in annual mean streamflow on the Lower Darling River. In addition, their analyses show there is a declining trend in stream flow as result of increased drying. This means **that to maintain recent stream flows there must be a reduction in overall water extractions and associated water consumption.**

Grafton et al. (2022), and others, show that streamflow declines have reduced waterbird abundance which is strongly associated with breeding frequency. Streamflow decline, which has increased in the past 20 years, has diminished the abundance and resilience of waterbirds in the Lower Darling (Baaka) River. There is an abundant literature that water extractions, including from floodplain harvesting, has contributed to large and on-going losses in ecosystem services in wetlands and riparian environments (Australian Academy of Science, 2019; Kingsford et al., 2017; Thoms and Delong, 2018).

**Thus, in our view, it is critically important that Barwon-Darling Water Sharing Plan:**

- (1) Reduce overall water extractions to the Barwon-Darling and its tributaries and,**
- (2) In particular, reduce water consumption associated with floodplain harvesting.**

While it is a common premise that the Barwon–Darling River has a highly variable hydrology with long periods of zero flow, there is now strong evidence (Mallen-Cooper and Zampatti, 2020) that this premise is incorrect. The evidence is that during long severe droughts, there have always been persistent base flows supporting lotic habitats; and near annual, landscape-scale flow pulses. It is these lotic habitats that support mussels and snails which are fundamental drivers in the food chain for native fish assemblies and crustaceans. This new understanding presents a significant opportunity to improve ecosystem integrity by recovering these key ecohydraulic facets of the natural flow regime through integrated water management, alternative sources of water for consumptive use during low flows, and weir rationalisation. The careful analysis of past data provides insight into a Barwon– Darling River ecosystem that supported lotic biota and people for millennia, even with low inflows in extreme droughts. This context enables an ecohydraulic perspective of the river that helps explain present impacts, provides new directions for river management, and clarifies choices for stakeholders. It is critical that this knowledge be incorporated in the Barwon Darling Water Management plan.

Currently, catchment specific Water Sharing Plans operate largely independently and have little or no requirement to pass water from upstream storage dams to the Barwon– Darling River (e.g., Water Sharing

Plan for the Gwydir Regulated River Water Source 2016, <https://legislation.nsw.gov.au/#/view/regulation/2015/629>, accessed 3 January 2020). The impacts of this compartmentalised water management are exaggerated in a system like the Barwon–Darling which receives most of its water from tributaries. Consequently, linking operation of storage dams and tributaries so they contribute to low flows in the Barwon– Darling is key to the future health of the river (Mallen-Cooper and Zampatti, 2020).

**Thus, in our view, it is critically important that:**

- (1) The Water Sharing Plans of *all* the tributaries of the Barwon-Darling be connected and integrated to yield the flow requirements of the Barwon-Darling and**
- (2) Stream flow requirements of *all* tributaries be transparently included in the Barwon-Darling Water Sharing Plan.**

## 2. Town Drinking Water Quality Needs and Requirements (prepared by Paul Wyrwoll)

The licensing of floodplain harvesting authorises and formalises one of the key causes of the deteriorating health of the Barwon-Darling/Barka in recent decades. In order to secure the 'social license' for this reform, the NSW Government will need to build trust with downstream communities that any negative impacts will be identified, managed, and addressed.

**One of the key concerns for communities along the river is insecurity and poor quality of town water supplies. Submissions to and the final report of the Natural Resources Commission (2019) review of the Barwon-Darling Water Sharing Plan (WSP) documented the costs to communities and households from purchase of bottled water, higher water treatment costs, water carting, water restrictions, negative physical and mental health outcomes, and unacceptable quality of alternative groundwater supplies.**

The Australian Drinking Water Guidelines (ADWG) are the national framework for describing, managing, and monitoring drinking water quality from catchment to consumer. Health-based and aesthetic guideline values across microbial, chemical, and physical characteristics provide a basis for state/territory regulations across all jurisdictions in Australia. The guideline values are defined to ensure "good quality water – that is, water that is aesthetically pleasing and safe, and that can be used without detriment to fixtures and fittings" (ADWG 2022, p. 79). Numerical guideline values are defined for 6 physical aesthetic characteristics (true colour, turbidity, hardness, total dissolved solids, pH, temperature, and dissolved oxygen), whereas the benchmark for taste and odour is defined as "not offensive to most people" (ADWG 2022, p. 189).

Section 3.10.2 of the ADWG state that water suppliers should produce an annual public report summarising performance against numerical health-based and aesthetic guideline values to support evaluation of service improvements and "ensure that drinking water quality management is open and transparent" (ADWG 2022, p. 57). **New South Wales is the only jurisdiction in Australia where that guideline is not actioned through regulation nor as an industry norm.**

The **ADWG guideline values are specifically referenced in Section 9.05 of the Murray-Darling Basin (MDB) Plan** regarding the following objectives for raw water for treatment for human consumption:

- "(a) to minimise the risk that the quality of raw water taken for treatment for human consumption results in adverse human health effects;**
- (b) to maintain the palatability rating of water taken for treatment for human consumption at the level of good as set out in the ADWG; and**
- (c) to minimise the risk that the quality of raw water taken for treatment for human consumption results in the odour of drinking water being offensive to consumers."**

In contrast to the ADWG and the MDB Plan, **the WSP social and cultural objectives for the quality of water supplied to towns are imprecise. Target ranges for town water supply are mentioned but not specified (Part 12A (2c.)).** The most relevant performance indicators appear to be the changes or trends in social or cultural benefit associated with "the recorded values of water quality measurements including salinity, harmful algal blooms, total nitrogen, total phosphorus, pH, water temperature and dissolved oxygen" (Part 12A (5d.)).

Section 5.1.4 of the draft Water Resource Plan (DPE 2019, p.34) states that specific targets with reference to the ADWG are defined in the Drinking Water Management System for each of the four water providers in the Barwon-Darling Water Resource Plan area: Bourke Shire Council, Brewarrina Shire Council, Central Darling Shire Council, and Walgett Shire Council. Of these four, only the Walgett DWMS is made publicly

available on the council's website (<https://www.walgett.nsw.gov.au/wp-content/uploads/2021/02/Walgett-DWMS-August-2020.pdf>). **It is not clear what specific target values for raw water quality are specified in relation to the seven characteristics mentioned in the WSP nor the broader set of characteristics where guideline values are defined under the ADWG.**

**There are currently no defined water quality targets for raw water for drinking water supplies drawn from the Barwon-Darling/Barka within the water management framework.** The NRC (2019, p. 122) review of the WSP recommended that the plan be revised to clearly state the link between water quality measurements and objectives. It appears that this has not occurred in the context of town water supplies. Such targets could be developed with communities, local businesses, local water utilities, and inform related DPE-Water programs, such as the Town Water Risk Reduction Program.

**Even if there were defined targets in the WSP, there is currently no recourse for residents of Barwon-Darling towns to establish whether they were being met nor how poor raw water quality affects their drinking water supplies.** Unlike every other Australian state and territory, drinking water providers in New South Wales are not required by regulation to publicly report drinking water quality monitoring against the guideline values of the ADWG. Drinking water management is not open nor transparent in New South Wales. NSW Health (2022) provides free testing of microbial and other health-related parameters to local utilities, but the results are stored in a database that is not publicly accessible. The Local Water Utility Performance Dashboard (DPE 2022) provides aggregated statistics across microbial and chemical performance for the entire supply system, not individual towns nor parameters (see Table 2.1). No data is provided for aesthetic characteristics. It is unclear how the information in Table 2.1 could support residents of Wilcannia, Bourke, and other towns on the river to understand how their drinking water quality has changed over time for specific contaminants and why.

The lack of transparency on drinking water quality is a broader issue in NSW beyond the immediate scope of the revisions to the Barwon-Darling WSP. However, it is consistent with a pattern where: **(a) drinking water quality is not given a priority in the water resource management process, and (b) the risk of poor raw water quality for town supplies is allocated to, and managed by, local water utilities** and the communities they serve, not state government agencies and upstream water users.

**In sum, we recommend that current revision to the WSP ensures that NSW-DPE work with stakeholders to define water quality targets for town water supplies and other water uses that enable the measurement of performance over time. These enabling actions, combined with greater transparency over drinking water reporting, would inform evidence-based consideration as to whether floodplain harvesting, and other upstream extractions, are harming the health and well-being of downstream communities in terms of drinking water quality.**

	% total population served where ADWG microbiological compliance achieved				% total population served where ADWG chemical compliance achieved				Other sources of information on town drinking water quality
	16-17	17-18	18-19	19- 20	16-17	17-18	18-19	19- 20	
<b>Bourke Shire Council</b>	100	100	100	100	100	100	72.00	100	State of Environment report lists number of times drinking water quality guidelines not met ( <a href="https://bourke.nsw.gov.au/wp-content/uploads/2022/01/2016-21-Bourke-SoE-report.pdf">https://bourke.nsw.gov.au/wp-content/uploads/2022/01/2016-21-Bourke-SoE-report.pdf</a> )
<b>Brewarrina Shire Council</b>	97.39	99.25	100	100	90.00	100	90.00	100	“The water business also reports to NSW Health on matters of drinking water quality” ( <a href="https://www.brewarrina.nsw.gov.au/engineering/water-sewerage.aspx">https://www.brewarrina.nsw.gov.au/engineering/water-sewerage.aspx</a> )
<b>Central Darling Shire Council</b>	100	100	100	98.01	75.00	100	75.00	100	No information provided on drinking water quality ( <a href="https://www.centraldarling.nsw.gov.au/Infrastructure/Water">https://www.centraldarling.nsw.gov.au/Infrastructure/Water</a> )
<b>Walgett Shire Council</b>	100	99.62	100	100	96.67	100	80.00	100	Raw and summary data from 2012-2017 in the Drinking Water Management System report published in 2020 ( <a href="https://www.walgett.nsw.gov.au/wp-content/uploads/2021/02/Walgett-DWMS-August-2020.pdf">https://www.walgett.nsw.gov.au/wp-content/uploads/2021/02/Walgett-DWMS-August-2020.pdf</a> )

**Table 2.1. Drinking water quality data for town water supplied from the Barwon-Darling/Barka River 2016/17-2019/20**

Data self-reported by local water utilities to the NSW Local Water Utilities Performance Monitoring Database (DPE 2022). Note that Walgett’s primary potable water supply is the Namoi River, but Collarenebri in Walgett Shire Council sources potable water from the Barwon River.

### 3. Responses to Proposed Amendments in the Water Sharing Plan (prepared by Daniel Schulz)

Water Sharing Plan rules and management of flows that meet the ongoing needs of the lower Darling community have been and continue to be insufficient. This submission is based on recent reviews of the Barwon Darling Water Sharing Plan (Natural Resources Commission 2019), reports investigating the Menindee fish kills in the lower Darling (Australian Academy of Science 2019, Vertessy et al. 2019, Maloney et al. 2020), as well as the ongoing and consistent community responses to water management that demand more equitable Water Sharing Plan (WSP) Rules, as outlined in various inquiries and local news reporting.

Additionally, this submission is based on the recent consultation held by DPE Water at Menindee on the 15<sup>th</sup> of June, and notes made by Daniel Schulz based on discussions with community and responses of New South Wales Department of Environment staff.

In our view, those sources listed above document that the proposed amendments for the Barwon Darling Water Sharing Plan are insufficient to meet goals and need further review. In particular, they do not meet their obligation to provide “critical human needs over other extractive uses” (Natural Resources Commission 2019) and they do not address the ongoing failure of the WSP to meet its policy goals which are to maintain and improve:

- (a) the **health and enhancement of the water source** and its water-dependent ecosystems;
- (b) the **continuing productive extraction of surface water for economic benefit**;
- (c) the spiritual, social, customary and economic benefits of surface water to Aboriginal communities;
- (d) **social and cultural benefits to urban and rural communities that depend on surface water**.

The **Barwon-Darling Water Sharing Plan and its proposed amendments are inadequate because:**

1. **Aboriginal Cultural Water Allocation has not been legislated in the WSP:** There is still no allocation in the BDWSP for Aboriginal cultural water access licenses and this needs to be addressed in the WSP as it is a policy goal of the WSP to maintain and improve spiritual, social, customary and economic benefits of surface water to Aboriginal communities.
2. **Low security licensing rules have not been sufficiently revised:** Unlimited carryover and 300 percent take rules have increased access to low flows and contributed to the impact of critical dry periods – and as per the Natural Resource Commission’s 2019 review of the BDWSP, any modelling suggesting the carryover provision does not impact the critical dry periods must be revised, and the unlimited carryover and 300 percent take rules must be changed to address the impact of these licensing rules on ongoing water insecurity in the lower Darling.
3. **Trigger targets for Critical Dry Periods are insufficient:** The proposed trigger targets that determine when first flush management arrangements start and when they cease to apply, are *completely inadequate* and do not effectively mitigate risk or reduce the impact of cease-to-flow events on the human and animal communities of the lower Darling
4. **System Connectivity Targets are insufficient:** System Connectivity must include end of catchment flows in the Barwon-Darling catchment which reach the Murray River at Wentworth. Pre-emptively, during and immediately after critical dry periods an end of catchment flow target should be met *before* temporary water restrictions are lifted.
5. **The lower Darling has no Water Sharing Plan:** The lower Darling continues to have no Water Sharing Plan and without adequate in-flow targets to Menindee Lakes (the ‘Menindee Lakes Critical Storage



Triggers' is far from sufficient to being an appropriate in-flow target at Menindee), the lower Darling and its critical human and environmental needs are not provided for in the WSP arrangements.

Community has consistently stated that the Water Sharing Rules in the Barwon-Darling Catchment are skewed toward access rules that benefit the irrigation industry upstream of Bourke, and negatively impact the human and environmental needs of the lower Darling.

### *3.1 Cultural Water Allocation has not been legislated in the WSP*

**There is no allocation within the WSP for Aboriginal uses of water (cultural flows) despite it being one of the four main objectives of the WSP;** to maintain and improve the “the spiritual, social, customary and economic benefits of surface water to Aboriginal communities.” As stated by Barkandji Elder Badger Bates, “...without the Barka - the Darling - we have no culture, no name, because the Barka is our mother... They talk about a ‘water sharing’ plan - where’s our water, where’s our share?” (De Groot 2018)

The NSW Government is failing at basic engagement protocols with First Nations groups. As stated in the Claydon Review, a key recommendation is to “progress conversations with First Nations people in relation to information needs and engagement protocols, as well as values, uses and objectives for water, including those impacted by resumption of flows and active management of flows.” (Claydon 2021) Recommendation 16.

At the consultation at Menindee on the 15<sup>th</sup> of June, there were no First Nations identifying people at this event, and therefore the process for engaging key community members in the lower Darling during the public exhibition period is inadequate and this policy review process has failed the basic requirements to engage Traditional Owners and First Nations people.

Furthermore, **the ongoing failure of water policy to provide for Aboriginal cultural and customary uses in the catchment via the provision of Cultural access licenses is subject to sustained criticism from scholars as well as community members (Natural Resources Commission 2019; Hartwig et al. 2020; Maloney et al. 2019; NSW 2021a). This needs to be addressed in the WSP as it is acknowledged by the NSW Government that “a framework that more clearly outlines how these applications are considered needs to be developed.” (NSW Department of Planning 2020) This should be developed in the WSP Plan and become an integral part of WSP rules.**

### *3.2 Low security licensing rules have not been sufficiently revised*

Access rules that allow low security water licenses to access water during moderate to dry years are untenable. **Supplementary water licenses, floodplain harvesting, and A class licensing rules must be changed to protect river flows and surface water during moderate to dry years.** It has been found by the (Natural Resources Commission 2019) that A Class licenses have contributed to the length and impact of cease-to-flow events by legally extracting low flows. A Class licenses were originally designed to protect permanent plantings during drought years; however, they are being used for cropping purposes.

**These rules must change to protect the lower Darling and mitigate the risk of cease-to-flow and low flow events impacting the human and animal communities of the lower Darling.**

### *3.3 Trigger targets for Critical Dry Periods are insufficient*

**Current triggers that determine when first flush management arrangements start and when they cease to apply are completely inadequate and not based on best available science, historical evidence, or local knowledges.** This is clear when it comes to the 195GL total storage target in Menindee Lakes. During the consultation period at Menindee on the 15<sup>th</sup> of June, staff at DPE Water could not explain how the ‘Menindee

Lakes Critical Storage Triggers' had been determined and why this critical storage trigger was determined as 'total storage' rather than 'active storage' (Personal communication). It is understood that 195GL had come from modelling done by WaterNSW (NSW Department of Planning and environment 2022, p. 14), however there is zero analysis of this modelling by DPE, and there is zero assessment of its adequacy by DPE.

According to the community consultation at Menindee on the 15<sup>th</sup> of June 2022, and a very basic review of the previous critical dry period (2018-2020), 195GL of total storage does not come close to "12 months of water for human needs and minimum water sharing plan releases." (New South Wales Department of Planning and Environment 2022b). There was also no reason or justification for making this figure 'total storage' as opposed to 'active storage.' Given that dead storage volume within the Menindee Lakes system is 125GL (NSW Department of Industry 2018), this trigger point could leave Menindee Lakes with only 70GL of active water than can be used to manage the lower Darling during critical dry periods.

In our view, 195GL of total water storage is inadequate given that the purpose is to reduce the impact of critical dry periods and meet downstream needs. According to the historical data of Menindee Lakes Total Storage Volume provided by the MDBA, during the last critical dry period (late 2017-early 2020) the total storage volume of MLS was recorded to be 195GL in August 2018. By December 2018 the first fish kill in the lower Darling had occurred and another in January 2019. Within this 5-month period, the 195GL of total storage in ML was not effective in any way at providing algal suppression flows for the Lower Darling. Had Menindee Lakes volumes been retained, and releases minimised, it was found by Vertessy et al. (2019) that any additional volumes available to manage water quality would have "enabled more effective mitigation of the recent fish death events by increasing releases to breakdown stratification." **Storage to provide algal suppression flows during critical drought periods should be an objective of the WSP, and 195GL of total storage does not achieve this goal.**

According to *Draft Western Regional Water Strategy: Attachment E: Critical dry condition triggers to reduce risk to environmental and human water needs Discussion Paper*, the Department has "also considered a draft trigger that would provide up to 2 summers, or 18 months, supply in Menindee Lakes under no inflows, but still with required water sharing plan releases which meet town, domestic and stock, and commercial needs. *We did not progress this* because significantly larger volumes of water would be required to be stored in lakes Pamamaroo and Copi Hollow that would also mean that a substantial amount of that water would be lost to evaporation." (Emphasis added)

**By not progressing this necessary option to manage risk in the lower Darling, the Water Sharing Plan is not achieving its intended aims.** As discussed by the *Review of the Water Sharing Plan for the Barwon-Darling Unregulated and Alluvial Water Sources 2012*, "The Plan rules should be designed in line with the Act's principles. That is, to primarily achieve environmental outcomes, with a subsequent objective to protect basic landholder rights, and beyond this to minimise impacts to other extractive users." (Natural Resources Commission, p. 113)

**By not progressing options which achieve the minimum requirements of the WSP to provide critical needs for the lower Darling community and effectively manage risk of critical dry periods, the NSW Government is being negligent.**

Targets that are more appropriate to meet the Plan's obligations have been suggested by community members and documented in *Investigation of the causes of mass fish kills in the Menindee Region NSW over the summer of 2018–2019, by Australian Academy of Science*: "It will be important to continue to regulate water for downstream use and hold water primarily in Lake Pamamaroo, Lake Wetherill and Lake Tandure; based on local advice, we suggest that the system be managed to maintain at least 400 GL of accessible water in these upper lakes." (Australian Academy of Science 2019, p. 34).

### 3.4 System Connectivity Targets are insufficient

**During critical dry periods and cease-to-flow events, trigger targets that determine when first flush management arrangements cease to apply, must include *end of catchment flow targets*.** These targets should be met *before* temporary water restrictions are lifted. This would be conducive to community definitions of river connectivity as outlined in the following inquiries and reports:

*Rationale for, and impacts of, new dams and other water infrastructure in NSW: Part 2, Portfolio Committee No. 7 – Planning and Environment* (NSW Parliament 2021a, pp. 54-55, detailing submissions made by community members to the inquiry about connectivity)

*Report no. 1 - Floodplain harvesting - Select Committee on Floodplain Harvesting* (NSW Parliament 2021b, p. p51 detailing submissions made by community members to the inquiry):

“We need adequate measurement for the whole length of the river systems to know exactly what is going on and where the water is. At the moment we have the biggest problem where the northern Basin and the southern Basin are basically broken in two where they have separated the Darling River at Wilcannia, where we have minimal flow targets at Wilcannia of 10 days, 400 megalitres, which does not actually make it to Menindee at all. We feel that the storage targets at Menindee and flow targets the length of the Barwon-Darling and the northern tributaries should provide critical needs right through to the Murray-Darling junction, not just to Wilcannia, which is not where the Darling River finishes.” Evidence, Ms Rachel Strachan, Vice Chair, South-Western Water Users Association, 22 September 2021, p 22. (NSW Parliament 2021b).

*Review of the Water Sharing Plan for the Barwon-Darling Unregulated and Alluvial Water Sources 2012, Natural Resources Commission, 2019, page 125:*

“The Commission recognises that a continuous end of system flow target is not appropriate or feasible for a highly variable, unregulated system with natural cease to flow periods like the Barwon-Darling. However, to acknowledge system connectivity, a periodic end of system flow target could be implemented in the Plan. This would be consistent with global practice of catchment management, rather than tributary management, and would be in line with NSW current practice in water management in other areas such as the Shoalhaven River system.” (Natural Resources Commission, 2019).

In New South Wales Department of Planning and Environment (2022b) connectivity was discussed, and the community:

- (1) Stressed the need to amend water sharing plans to provide for downstream connectivity
- (2) Stated that connectivity between the northern and southern parts of the region and into the Murray River is very important
- (3) Suggested that trigger points are needed to ensure connectivity can be managed between water systems

**Coming into dry periods, during a cease-to-flow event, and coming out of a cease-to-flow events, connectivity must be measured across the entire catchment and must include an end of catchment flow target i.e., flows reach the Murray River at Wentworth.** To be extracting water while the river is disconnected is not condoned by the Darling River community as detailed in the multiple submissions made by community members over many years, and as outlined in the Natural Resources Commission (2019).

### 3.5 Recommended Amendments to the Barwon-Darling Water Sharing Plan

3.5.1. **Amendments must include cultural flow targets to maintain and improve spiritual, social, customary, and economic benefits of surface water to Aboriginal communities** and become an integral part of the WSP's.

- 3.5.2 **Ensure all drought reserve targets constitute “active water” and do not include “dead storage”** volumes, as “dead storage” volumes are ineffective for managing critical human and environmental needs.
- 3.5.3 **Ensure all drought reserves and cease-to-pump targets for the lower Darling are based on targets that ensure the lower Darling has accessible and manageable water for two summers or 18 months.**
- 3.5.4 **Review the 195GL target of critical drought storage at Menindee Lakes**, as per expert and local advice (Academy of Science 2019), and adjust this target to 400+GL of “active water” (‘active water’ is water stored in Lake Wetherell/Pamamaroo and water that is able to be released back into the Darling via the main weir or block dam).
- 3.5.5 **Develop end of catchment flow targets for the period prior to a critical dry period, during a critical dry period and after a critical dry period.** These end-of-catchment flow targets may be measured at Burtundy gauge, and these end-of-catchment flow targets must be met *before* temporary water restrictions are lifted.
- 3.5.6 **Recommence the process of creating a Lower Darling Water Sharing Plan**, to ensure water sharing planning regions are adequately represented in policy.
- 3.5.7 **Replace the 300 percent take rule with a rule allowing for 450 percent use over three years, as recommended by the 2019 Natural Resource Commission's**, Review of the Water Sharing Plan for the Barwon-Darling Unregulated and Alluvial Water Sources 2012.

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