

WENTWORTH GROUP OF CONCERNED SCIENTISTS

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Respond to Productivity Commission 2026, National Water Reform 2026: Preliminary assessment, Interim update

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The Wentworth Group of Concerned Scientists welcomes the opportunity to review and provide feedback on the Productivity Commission 2026, National Water Reform 2026: Preliminary assessment, Interim update.

We recognise the importance of this report in terms of assessing of jurisdictions' progress towards achieving the objectives and outcomes of the 2004 National Water Initiative (NWI).

We will first address PC information requests and then will provide our view on broader issues. The evidence and views that we present here are based on our research on water management in the Murray-Darling Basin. We contend that due to the governmental focus on water management in the Basin, that lessons from this river system may have broader national application.

In many cases the PC interim update makes assertions based on government reports that progress in water reform is satisfactory. As we detail below, this optimistic view does not match the on-ground evidence. We call on the PC to recommend more substantial implementation measures.

1 Response to Information request 1

The Productivity Commission's interim assessment identifies that implementation has continued in several areas since its 2024 review, including adoption of legislative reforms and continued efforts to complete Basin Plan commitments. However, these procedural developments have not yet translated into the nationally compatible, adaptive and outcomes-focused water management framework envisaged by the National Water Initiative.

While governments have continued to implement existing commitments, the fundamental challenges identified in the Commission's previous review remain largely unresolved. Climate change is intensifying pressure on Australia's water resources, environmental outcomes continue to decline in many systems, Aboriginal water rights remain inadequately recognised, and governance arrangements continue to struggle to deliver timely and transparent implementation.

The Wentworth Group considers that the next phase should move beyond implementing existing commitments and ensure that Australia's water governance framework is effective under a changing climate. The focus should shift from compliance with process towards delivery of measurable environmental, social and economic outcomes. These are the key points that PC should consider in the review for more detailed about them please refer to Blueprint for the next Murray-Darling Basin Plan (Wentworth Group, 2026) ¹:

- Climate change is now the dominant risk to Australia's water resources but is still insufficiently embedded in planning frameworks. It is threatening the water security of Australians.

1 Wentworth Group (2026) Blueprint for the next Murray–Darling Basin Plan. Five essential reforms for healthy river Country. Wentworth Group of Concerned Scientists, Sydney. <https://wentworthgroup.org/wp-content/uploads/2026/04/Blueprint-for-the-next-Murray-Darling-Basin-plan-FINAL.pdf>

- Water planning remains largely based on historical hydrology rather than future climatic conditions.
- As an example, in the Basin Plan in 2012, and in the 2026 Basin Plan review discussion paper, the Murray–Darling Basin Authority has proposed no adjustments to Sustainable Diversion Limits to adapt to climate change. This decision risks increasing negative environmental impacts, given the significant declines in runoff and inflows projected in the Basin and disproportionate allocation to entitlement holders, compared with environmental water allocations, during dry years.
- In our view, it is unacceptable for government agencies to repeatedly avoid climate change adaptation measures rather than apply well-developed methods for making adaptation decisions despite uncertainties.
- Environmental outcomes from major water reforms in the Murray–Darling Basin remain poorly defined, inconsistently monitored and have mostly not been achieved (Colloff et al. 2024)².
- Governance arrangements remain fragmented and accountability mechanisms are weak.
- Aboriginal participation has improved but has not yet translated into meaningful water rights or shared decision-making.
- Greater transparency in modelling, accounting and reporting is needed to maintain public confidence

2 Response to Information request 2

2.1 Water access entitlements and planning frameworks (Section 3)

2.1.1 Water plans

The National Water Initiative established adaptive water planning as a core principle. However, current planning frameworks remain largely static despite rapidly changing climatic conditions.

Planning frameworks should become adaptive, evidence-based and responsive to changing environmental conditions. Climate change should no longer be treated as an external uncertainty but as a central planning assumption. Water plans should contain predefined decision triggers that respond transparently to changing inflows, ecological condition and water availability. These adaptive arrangements would provide greater certainty for both water users and environmental managers than ad hoc decision-making during drought.

- Environmental flows should be shepherded across jurisdictional boundaries;
- Minimum flows in each river should receive priority ahead of upstream industrial consumptive water extraction;
- Reserves in reservoirs should be calculated based on the fully historical record of minimum inflows (unlike in NSW);
- In NSW, ‘credit’ systems of water allocation in some river valleys should be replaced by ‘debit’ systems (Steinfeld et al. 2020)³;
- Planned environmental water should be clearly defined and legally protected;

² Colloff, M.J., Lanyon, K., Pittock, J., Costanza van-den-Belt, M., Wheeler, S., Grafton, R.Q., Williams, J., Sheldon, F., Kingsford, R.T., Bino, G., Renzullo, L. & Moggridge, B. (2024) Murky waters running clearer? Monitoring, reporting and evaluation of the state of the Murray–Darling Basin after more than three decades of policy reform. *Marine and Freshwater Research* 75, article no. MF24193. <https://doi.org/10.1071/MF24193>

³ Steinfeld, C. M. M., et al. (2020). "The human dimension of water availability: Influence of management rules on water supply for irrigated agriculture and the environment." *Journal of Hydrology* 588: 125009.

- The relative share of water allocated to planned environmental water versus consumptive entitlement should be maintained by indexing to manage reductions of inflows resulting from climate and other environmental changes;
- Groundwater and surface water should also be managed more conjunctively to improve drought resilience and protect groundwater-dependent ecosystems;
- NSW should apply Connectivity Panel recommendations to improve the effective rebalancing of environmental use and consumptive uses in unregulated rivers and better protect both in dry times.

2.1.2 Interception activities

In the Murray-Darling Basin, no effective measures have been adopted to manage interception activities since CSIRO defined the risks to shared waters in 2006. In the most egregious example, Brown et al. (2022)⁴ found floodplain harvesting storage capacity in the NSW northern Basin rose from 557 GL in 1993–94 to 1,067 in 1999–2000, 1,225 in 2008–09 to 1,393 GL in 2019–20, a 2.5-fold increase in 26 years, despite the imposition of the Murray–Darling Basin Cap on diversions in 1995. The annual mean estimated floodplain harvesting take (2004–2020) in the northern NSW Basin was 778 GL (range 632–926 GL), well in excess of Sustainable Diversion Limits under the Basin Plan.

The magnitude of floodplain harvesting on river flows and downstream ecosystems has been drastically underestimated in the northern Murray–Darling Basin. Metering and monitoring remain inadequate. Sustainable Diversion Limits accounting is inaccurate and misleading. New research found mean annual evaporation from on-farm storages and irrigation channels was 1,247 GL; 39% of surface water take from cotton-producing catchments and three times the total volume of water released in the northern Basin as environmental flows (Colloff et al. 2026)⁵. Evaporation is not accounted for in water policy reforms.

We consider the water resources of the northern Murray–Darling Basin remain over-allocated and over-used and the region is nowhere close to achieving sustainable levels of diversions or meeting environmental water requirements (Sheldon et al. 2024)⁶. As part of the review of the Basin Plan, the MDBA is currently re-assessing the limited number of catchments where it found Sustainable Diversion Limits failed to reflect an Ecologically Sustainable Level of Take.

A recent review of risks to shared water in the Basin found that while some had changed since 2006, that the impact on shared water resources remains significant and poorly managed (Pittock et al. 2023)⁷. The PC should recommend the governments take active measures to increase monitoring and regulation of risks to shared water, including from tree planting, on farm water storage and poor management of groundwater.

We agree with the point in the report on the need for greater understanding of groundwater availability and the movement and interaction between surface water and groundwater resources in the MDB. Also, climate adaptation requires conjunctive management of surface water and

⁴ Brown, P., Colloff, M.J., Slaterry, M., Johnson, W. and Guarino, F. (2022) An unsustainable level of take: on-farm storages and floodplain water harvesting in the northern Murray–Darling Basin, Australia. *Australasian Journal of Water Resources*, 26, 43–58. <http://dx.doi.org/10.1080/13241583.2022.2042061>

⁵ Colloff, M.J., Slaterry, M., Pittock, J. and Johnson, W. (2026, published online) Just another form of take: evaporation from irrigation dams in cotton-growing catchments in the northern Murray–Darling Basin, Australia. *Australasian Journal of Water Resources* <https://doi.org/10.1080/13241583.2026.2650962>

⁶ Sheldon, F., Rocheta, E., Steinfeld, C., Colloff, M.J., Moggridge, B., Carmody, E., Hillman, T., Kingsford, R.T. and Pittock, J. (2024) Are environmental water requirements being met in the Murray–Darling Basin, Australia? *Marine and Freshwater Research* 75, article no. MF23172. <https://doi.org/10.1071/MF23172>

⁷ Pittock, J., Corbett, S., Colloff, M.J., Wyrwoll, P., Alexandra, J., Beavis, S., Chipperfield, K., Croke, B., Lane, P., Ross A. and Williams, J. (2023) A review of the risks to shared water resources in the Murray–Darling Basin. *Australasian Journal of Water Resources* 27, 1–17. <https://doi.org/10.1080/13241583.2023.2190493>

groundwater conservatively and conjunctively, rather than allowing repeated overuse during each drought cycle (Wentworth Group, 2026)

2.1.3 Water for environment and other public benefit outcomes - statutory recognition and afforded the same rights as consumptive uses

The PC Interim Update states (p. 5): ‘In most systems water planning arrangements provide environmental water at least at the same level of security as consumptive users.’ This statement is incorrect and misleading. Environmental water is subject only to the same rules for *allocations* as consumptive water, but it is not afforded the same degree of security or protection. Some basic examples: 1) Planned Environmental Water released from the four major dams in the Australian Capital Territory under the ACT environmental flow guidelines is available for diversions as soon as it crosses the border into New South Wales; 2) all environmental flows from Queensland into New South Wales are available for irrigation diversions, as are all those from the northern New South Wales tributaries as soon as they flow into the Barwon–Darling. Held Environmental Water reaching Menindee Lakes becomes available for irrigation under water sharing rules in the Murray – Darling Basin Agreement; 3) In New South Wales, river operators have repeatedly failed to ensure adequate delivery of Planned Environmental Water to maintain basic river functions of baseflows and prevention of cease-to-flow events, risking adverse environmental impacts such as hypoxic cyanobacterial blooms. Such events led to the series of fish deaths at Menindee during 2018-19, 2023 and 2026. Consequently, Commonwealth Held Environmental Water has had to be deployed to address these shortfalls, as was the case at Menindee in 2023 (CEWH, 2003)⁸. This is water intended to provide benefits to wetlands and biota. This practice is known among river operators and environmental water managers as ‘substitution’. It is deliberate, routine and there are many ways substitution can be achieved. These examples illustrate environmental water is not afforded the same rights in practice as consumptive water.

2.1.4 Integrated management of water for environmental and other public benefit outcomes (Section 6)

The Commission correctly identifies the need to strengthen environmental outcomes. Current environmental objectives remain largely activity-based rather than outcome-based. Environmental water should be managed against measurable ecological objectives that identify which ecosystems should be protected, restored and sustained over the long term.

The Wentworth Group recommends aligning water planning in MDB with Australia's commitments under the Global Biodiversity Framework by protecting and restoring at least 60% of Murray–Darling Basin wetlands. This provides a clear, science-based framework for prioritising environmental water and managing unavoidable trade-offs under climate change. Environmental watering should also improve river and floodplain connectivity through constraints relaxation, better protection of priority flows and more effective use of held environmental water (Wentworth Group, 2026)⁹.

⁸ CEWH (2023) Commonwealth Environmental Water Holder submission to the NSW Chief Scientist and Engineer’s Independent Review into the February–March 2023 fish deaths in the Darling–Baaka River, Menindee. Commonwealth Environmental Water Holder, Canberra. Available at: <https://www.dccew.gov.au/sites/default/files/documents/cewh-submission-nsw-chief-scientist-2023-fish-deaths-menindee.pdf>

⁹ Wentworth Group (2026) Blueprint for the next Murray–Darling Basin Plan. Five essential reforms for healthy river Country. Wentworth Group of Concerned Scientists, Sydney. <https://wentworthgroup.org/wp-content/uploads/2026/04/Blueprint-for-the-next-Murray-Darling-Basin-plan-FINAL.pdf>

We recommend introducing a new groundwater SDL compliance mechanism to protect aquifers under stress and explicitly manage groundwater as a strategic drought reserve. This includes removing settings that encourage increased extraction introduced in the Basin Plan in 2012. A new groundwater SDL compliance mechanism for climate change should be adopted based on acceptable thresholds for drawdown of bores in addition to long-term limits. Strategic purchase of groundwater licences from willing sellers should also be used where necessary to reduce pressure on stressed systems.

Also, we need to elevate protection of groundwater quality as an explicit management objective. Protection of groundwater should not be an indirect outcome of limits on extraction. The Basin Plan should require water resource plans to assess and manage pressure-driven risks to groundwater quality, including vertical connectivity between aquifers and saline formations, and to monitor early warning indicators of groundwater quality decline.

2.1.5 Special requirements for high conservation value assets

This NWI commitment is assessed as achieved. We consider this assessment incorrect. As supporting information, the Interim Update (p. 15) cites the example of ecological communities at Macquarie Marshes listed in 2026 as endangered under the *EPBC Act* 1999 (Cth). The point is that the Macquarie Marshes have declined significantly in ecological condition to the point they needed to be listed as endangered, *not* that they are receiving special attention as a consequence of being listed as endangered. The shortfall in environmental water requirements has meant the Southern Nature Reserve has been subject to environmental triage by default (Schweizer et al. 2022)¹⁰. The same circumstances apply at another Ramsar Wetland, Gunbower Forest. Just because a Ramsar wetland is listed as such does not mean it receives special protection compared with other wetlands, particularly regarding the supply of environmental flows (Sheldon et al. 2024, Table 4 therein)¹¹. The Coorong and Lakes Alexandrina and Albert Wetland Ramsar Site has not received the water it needs (Brookes et al. 2023)¹². For the Narran Lakes Ramsar site, reduced flows due to upstream irrigation diversions means water may not be available to support ecological requirements. For example, the lakes received no major inflows between 2013 and 2020 (Hannam, 2020)¹³ and the Commonwealth Environmental Water Holder was only able to supply environmental flows to the lakes on one occasion between 2014-15 and 2018-19 (Hale et al. 2020, p. 40)¹⁴.

In implementing the Murray–Darling Basin Plan, jurisdictions have defined environmental water requirements (EWRs) for sites along Basin rivers. EWRs are the flows (frequency, magnitude, duration, and timing) required to achieve environmental outcomes; they are derived from flow-ecology relationships by using best available scientific knowledge. We assessed EWR achievement across the Murray–Darling Basin over a 43.5-year period (1 July 1979 – 31 December 2022) that

¹⁰ Schweizer, V., Colloff, M.J. and Pittock, J. (2022) The dammed and the saved: a conservation triage framework for wetlands under climate change in the Murray–Darling Basin, Australia. *Environmental Management* 70, 549–564. <https://doi.org/10.1007/s00267-022-01692-x>

¹¹ Sheldon, F., Rocheta, E., Steinfeld, C., Colloff, M.J., Moggridge, B., Carmody, E., Hillman, T., Kingsford, R.T. and Pittock, J. (2024) Are environmental water requirements being met in the Murray–Darling Basin, Australia? *Marine and Freshwater Research* 75(8), article no. MF23172. <https://doi.org/10.1071/MF23172>

¹² Brookes, J.D., Busch, B., Cassey, P., Chilton, D., Dittmann, S., Dornan, T., Giatas, G., Gillanders, B.M., Hipsey, M., Huang, P., Keneally, C., Jackson, M. V., Mosley, L., Mott, R., Paton, D., Prowse, T., Waycott, M., Ye, Q., Zhai, S. and Gibbs, M. (2023) How well is the Basin Plan meeting its objectives? From the perspective of the Coorong, a sentinel of change in the Murray–Darling Basin. *Australasian Journal of Water Resources* 27, 223–240. <https://doi.org/10.1080/13241583.2023.2241161>

¹³ Hannam, P. (2020) 'Just magic': first big flows in seven years start key wetland revival. *Sydney Morning Herald*, 15 May 2020. Available at: <https://www.smh.com.au/environment/conservation/just-magic-first-big-flows-in-seven-years-start-key-wetland-revival-20200513-p54sqp.html>

¹⁴ Hale, J., Bond, N., Brookes, S., Capon, S., Grace, M., Guarino, F., James, C., King, A., McPhan, L., Mynott, J., Stewardson, M. & Thurgate, N. (2020) 2018-19 Basin-scale evaluation of Commonwealth environmental water. Synthesis report. La Trobe University, Wodonga. <https://www.agriculture.gov.au/sites/default/files/documents/2018-19-basin-evaluation-synthesis-report.pdf>

included periods of drought as well as widespread flooding (Sheldon et al. 2024)¹⁰. By using a published EWR assessment tool, we analysed the achievement of EWRs for small fresh, large fresh, bankfull and overbank flows for 23 sites. At 65% of stream gauge sites assessed, most EWRs evaluated had not been met. We also compared analyses of different time periods, namely, a 43.5-year period, and a 10-year period since the Basin Plan was legislated. This highlighted some improvement in EWR achievement for the small fresh EWR. Despite some improvements, the continued lack of achievement in meeting EWRs is likely to be a major contributing factor to the ongoing poor health of channel, wetland (including Ramsar wetlands) and floodplain ecosystems across most of the rivers of the Murray–Darling Basin.

The PC needs to recommend that jurisdictions revise management plans and operations to ensure that representative ecosystems and Matters of National Environmental Significance under the EPBC Act receive adequate environmental water allocations. Monitoring, evaluation and reporting should focus on ecological outcomes rather than inputs like water allocations.

2.1.6 Water resource accounting (Section 7)

Transparent water accounting is fundamental to maintaining confidence in Australia's water management system. The Wentworth Group has assessed observed versus expected flows in the Murray–Darling Basin. We compared observed river flows using flow gauges at 27 sites against expected river flows under prevailing climatic conditions from 2012/13 to 2018/19 Wentworth Group (2020)¹⁵. Expected river flows were estimated by sampling the Murray–Darling Basin Authority's (MDBA) hydrological models.

In the seven-year period from 2012/13 to 2018/19, observed flows at 24 of 27 sites were lower than expected, even accounting for the climatic conditions. Of these, 17 received less than three quarters of the expected flows and three received less than half of the expected flows. There are several possible reasons for why river flows may be falling short of expected including:

- Higher than expected conveyance requirements due to dry weather patterns including high temperatures and evaporation combined with potentially higher than average groundwater diversions for several years since 2012 may have resulted in higher than expected rates of evaporation, evapotranspiration and aquifer recharge.
- Environmental water was extracted upstream because management rules agreed under the Basin Plan were not yet operational, effective or adhered to. For example, water resource plans were under development; rules to protect river flows were not in place including pre-requisite policy measures; illegal water diversions occurred.
- Water held for the environment was not available in reality because environmental water entitlements may have yielded less than what was initially estimated (i.e. cap factors may not have reflected actual reliability).
- Water recovery efforts were undermined because flows may have been intercepted by farm dams, plantations, floodplain harvesting etc.; more efficient irrigation infrastructure may have reduced return flows to rivers; and constraints and channel capacity may have affected delivery.
- Changes in demand, water trade and the location of water recovery and associated conveyance requirements which were not incorporated when the Basin Plan was developed.

¹⁵ Wentworth Group (2020) Assessment of river flows in the Murray–Darling Basin: Observed versus expected flows under the Basin Plan 2012–2019. Sydney, Wentworth Group of Concerned Scientists. Available at: <https://wentworthgroup.org/wp-content/uploads/2020/08/MDB-flows.pdf>

Given the serious shortfalls identified in our assessment, governments should take the following steps to ensure that water plans are delivering the expected river flows under global environmental changes:

1. Governments should assess river flows annually using best-available models to account for the expected water and ensure that environmental water allocations are delivered at the expected scale. Reasons for shortfalls should be investigated and rectified.
2. Governments should anticipate and account for more variable conveyance requirements given the variable and changing climate.
3. State governments should ensure river flows reach their intended sites on the river by ensuring agreed rules are operational and effective, including rules to protect environmental flows, relaxation of flow constraints and elimination of illegal water take.
4. In the Basin, the Commonwealth Government should review the reliability of environmental water entitlements to ensure the portfolio delivers held environmental water volumes that match the recovery target on average.
5. The MDBA should ensure that water recovery is not being undermined by reduced return flows to rivers due to infrastructure upgrades, and interception from floodplain harvesting, farm dams and plantations.

The Inspector-General of Water Compliance should have a role in verifying that state governments are adopting well justified water management models to avoid bias in favour of consumptive users (Hannam 2021)¹⁶, and take of planned environmental water to force use of Commonwealth held environmental water to sustain basic river functions.

Further reform is needed to improve transparency, consistency and independent verification of water accounting. The Wentworth Group supports the following reforms to improve confidence in allocation decisions while supporting adaptive management:

- publicly available hydrological models;
- transparent water accounting;
- independent auditing of diversion limits;
- improved monitoring and reporting;
- accounting that compares modelled and observed outcomes to identify management problems and recalibrate models; and
- better representation of floodplains, groundwater interactions and low-flow processes in modelling.

2.1.7 Knowledge and capacity building (Section 9)

Australia has strong water science capability, but it is being degraded and there remains a significant gap between scientific knowledge and implementation. We note the Commonwealth Government's O'Kane (2025) review: Evaluation of Hydrological Research and Water Science¹⁷ and support adoption of its recommendations. Access to open call funding for public good water research has declined. In our view government agencies are increasingly commissioning water science through narrowly framed terms of reference as consultancy reports. This risks:

¹⁶ Hannam, P. (2021). "NSW sought to beat Basin Plan water limits." Sydney Morning Herald (20 September 2021).

¹⁷ O'Kane (2025) review: Evaluation of Hydrological Research and Water Science
<https://www.dccew.gov.au/water/policy/publications/water-science-research-review>

1. Avoiding research that addresses hard questions and broader contexts;
2. Failing to have the research peer reviewed to test and enhance quality; and
3. Publishing as grey literature where all the underlying data is not publicly available for verification and on organisational websites that are not maintained (unlike academic journals).

Although governments aspire to develop evidence-based policies, in our work we frequently find:

- a. Government agencies that have no library or subscription access to scientific publications; and
- b. Policy documents that fail to cite the most recent and relevant academic research.

Building on the O’Kane recommendations, future reform should prioritise:

- requiring government agencies to access and cite the most recent and relevant academic research in policy documents;
- requiring government commissioned research to be peer reviewed and published as open access;
- long-term ecological monitoring;
- climate science integration;
- improved and more transparent hydrological modelling;
- open access to environmental information;
- incorporation of Indigenous knowledge alongside western science; and
- investment in monitoring systems that support adaptive management.

Better monitoring and reporting are essential if governments are to evaluate whether reforms are achieving intended outcomes.

2.1.8 Water interests of Aboriginal and Torres Strait Islander people (Section 11)

The NWI’s objective of recognising Indigenous interests in water has not yet been fully realised. The Murray-Darling Basin Plan does not adequately account for Aboriginal people’s values, water rights or aspirations. The Aboriginal people of the Basin have distinct rights, connections and cultural obligations relating to water that have been recognised in international agreements to which Australia is a signatory, including the UN Declaration on the Rights of Indigenous People (UNDRIP) and the Convention on Biological Diversity (CBD). Meaningful reform requires moving beyond consultation towards shared decision-making and increased Aboriginal ownership of water. Future reforms should:

- embed cultural objectives in water planning;
- support Aboriginal-led governance;
- increase Aboriginal-held water entitlements;
- recognise cultural flows;
- support Aboriginal ownership and management of wetlands; and
- incorporate Indigenous knowledge throughout planning and management.

These reforms would better align Australia’s water management framework with contemporary legal and policy commitments while delivering improved cultural, environmental and social outcomes

3 Additional reforms required to achieve the objectives of the National Water Initiative

While responding to the Productivity Commission's information requests is important, the Wentworth Group considers several broader reforms are necessary if Australia is to fully achieve the objectives of the National Water Initiative.

3.1.1 Embed climate change throughout water planning

Climate change should become a central design principle for water management rather than an external risk. Planning frameworks should include adaptive triggers, climate-responsive allocation rules, protection of critical human and environmental water needs, and improved management of groundwater and surface water interactions.

3.1.2 Improve governance and accountability

Governments require stronger accountability mechanisms to ensure agreed reforms are delivered. This includes:

- stronger performance reporting;
- independent auditing;
- transparent modelling;
- improved compliance arrangements;
- maintaining the independence of institutions such as the Commonwealth Environmental Water Holder; and
- clearer Commonwealth powers where jurisdictions fail to deliver agreed commitments.