Blueprint for the next Murray-Darling Basin Plan

Five essential reforms for healthy river Country

April 2026

WENTWORTH GROUP OF CONCERNED SCIENTISTS

Wentworth Group of Concerned Scientists

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Acknowledgement of Aboriginal People and their Country

The Wentworth Group of Concerned Scientists acknowledges and celebrates Aboriginal people, the Traditional Custodians of the lands and waters of the Murray-Darling Basin. We pay our respects to their elders past and present.

Aboriginal people have been stewards of Country for over 60,000 years and have continuing cultural connections to lands and waters. Indigenous ownership was never ceded.

From 1788 to today, the connections and role in stewardship of Country all changed for Aboriginal people following dispossession from their lands and waters.

Leading Indigenous experts have documented major issues affecting Australia's freshwater and saltwater Country.[1] The current state of Country is far from healthy.

Aboriginal people now need to have leading roles in governing and managing water, including to support social, economic, cultural, and spiritual values. Healthy Country means healthy people.[2]

We acknowledge the Aboriginal members of the Wentworth Group who provide expert advice and knowledge to inform our work, as well as Aboriginal custodians of Country in the Murray-Darling Basin who have generously shared their perspectives and helped shape our advice.

Contents

The urgent need for reform in the Murray-Darling Basin

The Murray–Darling Basin (the Basin) covers one seventh of Australia's landmass and includes over 30,000 wetlands supporting unique and diverse biota. The Basin also accounts for 40 percent of Australia's irrigated agricultural production, provides domestic water supplies for over 2.4 million people and its lands and waters cover the country of more than 50 Indigenous nations with a strong connection to the Basin.[3]

Following the *Water Act 2007* (Cth), the newly created Murray–Darling Basin Authority was required to produce a Basin Plan to 'ensure the return to environmentally sustainable levels of extraction for water resources that are over-allocated or overused.' Introduced in 2012, the Basin Plan set limits on the volume of water taken from the Basin's stressed river and groundwater systems.

Over the past decade, successive reports have found the environmental, cultural and social health of our most important river system continues to decline or has not improved as intended.[3–6] This is despite the existence of the Basin Plan and associated instruments, and investment of more than $AU 13billion of taxpayers' dollars over 13 years.

While the Basin Plan may have slowed ecosystem degradation in some areas, there are clear signs that the overall health of the Basin is still in decline. Some rivers are running dry more often and for longer, and flows across the Basin are insufficient for human and ecosystem needs.

Many Basin communities do not have access to adequate safe drinking water, even though this is one of the United Nation's basic human rights. Water reforms continue to entrench colonial injustices for Aboriginal people, with serious inadequacies in measures to increase volumes of Aboriginal-owned water entitlements, restore cultural flows and involve Aboriginal people in decision-making. This has continued to disempower Aboriginal Peoples' control over the management of water, land and Country, with negative knock-on effects for their livelihoods, culture, health, economies and wellbeing.

River flows across the Basin are insufficient and the water that is now being returned to the environment could be used more effectively. Annual waterbird abundance and the number of breeding species have both declined and the number of very large fish-kill events has been increasing. The system for modelling, monitoring, evaluating and reporting on the Basin's health has not been rigorous or transparent.

In the first Basin Plan, biodiversity outcomes were poorly defined, and the impact of climate change was ignored. The plan was not designed to halt biodiversity loss or sustain the Basin under climate change.

Opportunities for the Basin Plan revision

The Basin Plan is undergoing a major review. This review provides a critical opportunity to reverse the decline in the Basin's health. The broad landscape has changed considerably over the past 13 years. Now is not the time for more of the same.

This Blueprint provides a paradigm shift in the approach we take to managing our most productive river system. It is realistic, outcomes-focused, and considers the Basin's environmental, economic, social and cultural characteristics as a whole. It is an approach we believe many stakeholders can support and align with.

The Wentworth Group proposes five integrated, evidence-based reforms for the next Basin Plan. These include embedding ways of addressing the impacts of a more extreme climate so that ecosystems and communities can adapt. It also reframes the Basin Plan's approach to help Australia to meet its commitments to the Convention on Biological Diversity and the Kunming–Montreal Global Biodiversity Framework.

The five reforms outlined in this Blueprint are ultimately about ensuring communities and ecosystems in the Basin can flourish in a changing future. A climate-ready Basin Plan will protect the drinking water supplies of towns and cities, provide greater certainty for irrigators and regional businesses, reduce the risk of future economic shocks, and support Aboriginal Nations to care for Country and strengthen cultural, social and economic wellbeing. By prioritising long-term river health and transparent governance, the next Basin Plan can deliver safer water, more resilient communities, and greater confidence in public institutions for current and future generations.

Acronyms used in this report

ESLT	Environmentally Sustainable Level of Take
GBF	Global Biodiversity Framework
SDL	Sustainable Diversion Limits
EWR	Environmental Water Requirement
SDLAM	Sustainable Diversion Limit Adjustment Mechanism
UNDRIP	UN Declaration on the Rights of Indigenous People
CBD	Convention on Biological Diversity
OECM	Other Effective area-based Conservation Measures

Five essential components of a climate-ready Basin Plan

1. Set Basin Plan targets to protect and restore at least 60 percent of the Basin's wetlands: Align the Basin Plan with the Global Biodiversity Framework (GBF) and other international agreements. Under the GBF framework, the Australian government needs to ensure that at least 30 per cent of areas of terrestrial, inland waters, and coastal and marine ecosystems are under effective restoration and at least 30 per cent the extent of these ecosystems is protected by 2030 (the '30 by 30' target). Sustain wetlands by protecting priority flows in water plans, and restoring river, floodplain and groundwater connectivity. Connectivity is restored through relaxing constraints on river flows, removing redundant water infrastructure and making better use of environmental water.
2. Embed climate change into water planning: Introduce a dynamic, responsive, evidence-based framework that guides how management decisions and operations will unfold in response to specified events and indicators. Update rules in water plans accordingly, address climate risks to shared water resources, prioritise a representative suite of wetlands that can be sustained, and manage trade-offs transparently.
3. Uphold Aboriginal peoples' values of water and their rights: Return water and decision-making authority to Aboriginal Nations through secure entitlements to water, supported by Aboriginal-led governance, including clear cultural targets in water plans, and support Aboriginal ownership and management of wetlands.
4. Support communities to thrive through the transition: Secure safe drinking water, support social and economic diversification, and invest in fair, place-based transition pathways to support communities to adapt to climate change.
5. Improve governance and accountability: Simplify rules, strengthen oversight and report honestly and regularly on outcomes, using transparent modelling and water accounting linked to targets.

These reforms are mutually reinforcing and should be implemented as a package. If adopted, these reforms will deliver:

- improved health for our rivers and wetlands and their communities, where it matters most;
- sustained rural economies in a changing climate, including with greater transparency and fairness for Basin communities;
- better water security and public trust; and
- stronger Aboriginal stewardship of land and water.

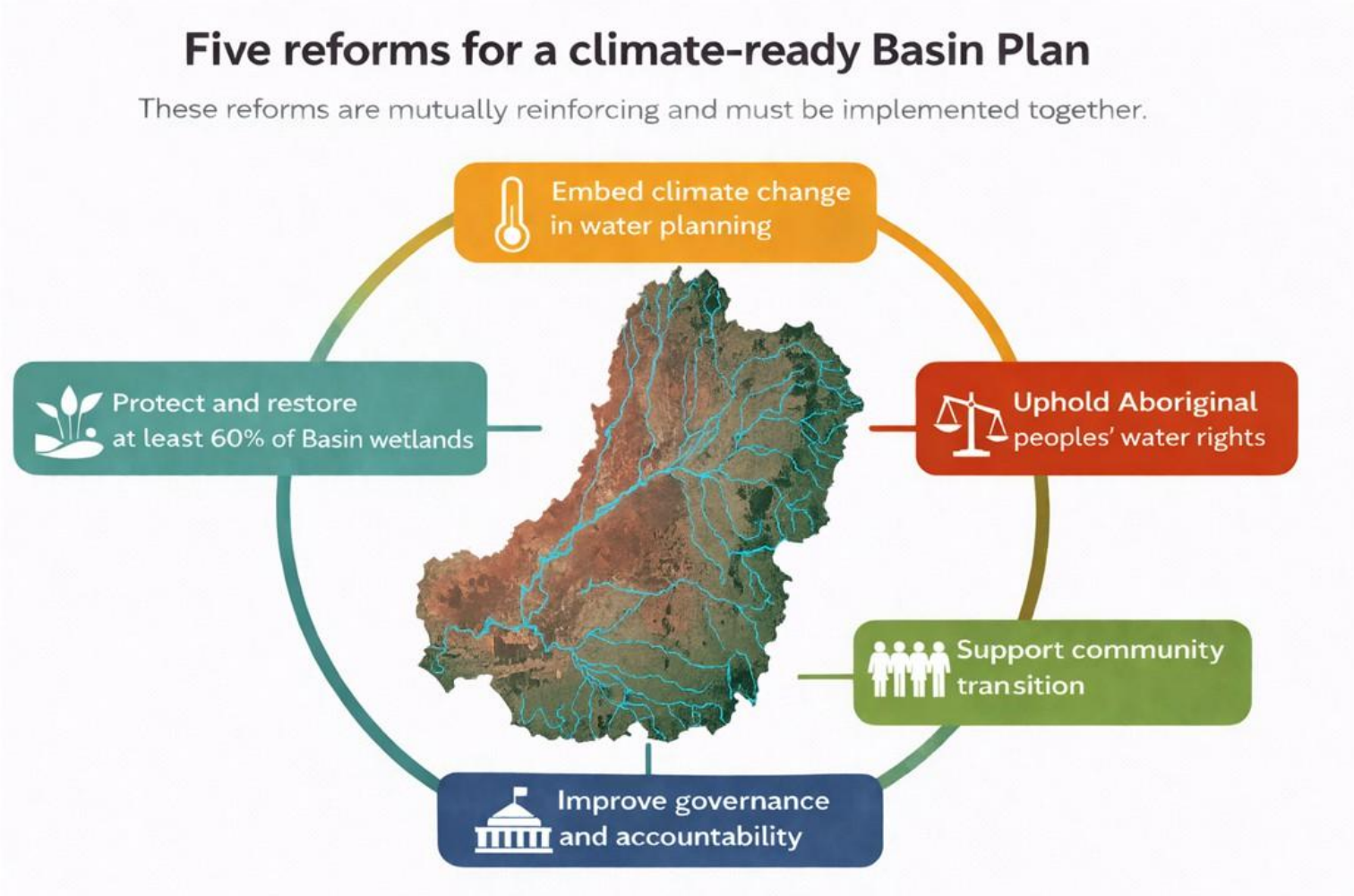

Figure 1. Five essential components of a climate-ready Basin Plan

Reform 1. Set Basin Plan targets to protect and restore at least 60 percent of the Basin's wetlands

The *Water Act 2007* and Basin Plan, in large part, draw their constitutional mandate from the implementation of the Ramsar Convention, the Convention on Biological Diversity and related international treaties. As the Basin Plan was enacted before Australia committed to the Convention on Biological Diversity's Kunming–Montreal Global Biodiversity Framework (GBF), the Basin Plan review provides a critical opportunity to align water reforms with the GBF to improve biodiversity outcomes while helping Australia meet its international obligations.

The GBF is a science-based, internationally agreed benchmark for reversing ecosystem decline. It allows for the prioritisation of effort to deliver the greatest ecological, cultural and social returns. It provides a practical approach to allocate limited water to where it can achieve greatest benefit for communities, ecosystems and regional economies.

GBF targets for the protection of at least 30 percent, and restoration of at least 30 percent, of freshwater ecosystems offer clear, defensible, outcomes-based, global benchmarks for prioritising wetlands of high biodiversity in a changing climate. Delivering these targets would also support water quality, flood mitigation, productive biodiverse floodplains, tourism, local employment, cultural values and other ecosystems services.

Implementing the GBF targets will help protect wetlands that are most likely to persist under climate change. The revised Basin Plan should prioritise a representative suite of wetlands and rivers with high ecological, cultural and biodiversity values and the strongest likelihood of persistence under a hotter, drier climate.

New research by the Australian National University, commissioned by the Wentworth Group, found only 4 percent of the Basin's wetlands received the water they require between 1988 and 2024. Across the Basin, 56 percent of wetlands received some but not all of the water they needed, either from environmental flows or natural flooding, while 40 percent received no flooding over the 36-year period.[7]

We consider a target of at least 60 percent of wetlands in healthy condition could be achieved by careful, considered, science-based re-design and re-configuration of flows. This would allow an additional 56 percent of the Basin's wetlands to be maintained (Figure 2). Our research also shows that only 8 percent of the Basin wetlands are in protected areas, so 22 percent of representative wetlands will need to be added to the national reserve system to achieve Australia's GBF commitment.[7,8]

Sustaining 60% of the Basin's wetlands in healthy condition will require several integrated measures: adequate flow regimes, relaxation of constraints to achieve overbank watering, and place-based programs for integrated land and water stewardship. This action recognises Aboriginal peoples' cultural values with decision-making processes developed jointly with Aboriginal peoples to acquire land and water, establish cultural flows and care for healthy rivers and wetlands.

To enable these outcomes, wetlands need to be identified and prioritised to achieve at least 30 percent protection and at least 30 percent restoration outcomes. The flow requirements required to sustain GBF outcomes need to be identified and embedded within the "Environmentally Sustainable Level of Take" (ESLT) and "Sustainable Diversion Limits" (SDLs). Sufficient

water needs to be secured and managed effectively to meet Basin Plan targets. Connectivity throughout the river system needs to be restored so that adequate flows can reach priority wetlands (Action 1).

Healthy wetlands require periodic watering at an appropriate frequency and duration, expressed as an 'environmental water requirement' (EWR). There are hundreds of EWRs for Basin ecosystems. They are linked to ecological outcomes such as the flows required for fish breeding or floodplain vegetation flowering. Many EWRs are not being met [9], however, in part because they are not legally enforceable and critical flows required to meet EWRs are vulnerable to extraction.

Rather than trying to manage environmental outcomes for hundreds of EWRs, a better approach would be to identify a smaller subset of water requirements reflecting the essential watering needs of priority wetlands and enforce them as the highest priority in water sharing plans. Allocations and extractions should only be allowed if priority flow requirements to these wetlands have been achieved within the valley and in downstream connected valleys. This will protect important flow events on a temporary basis, allowing them to pass through the system (Action 2).

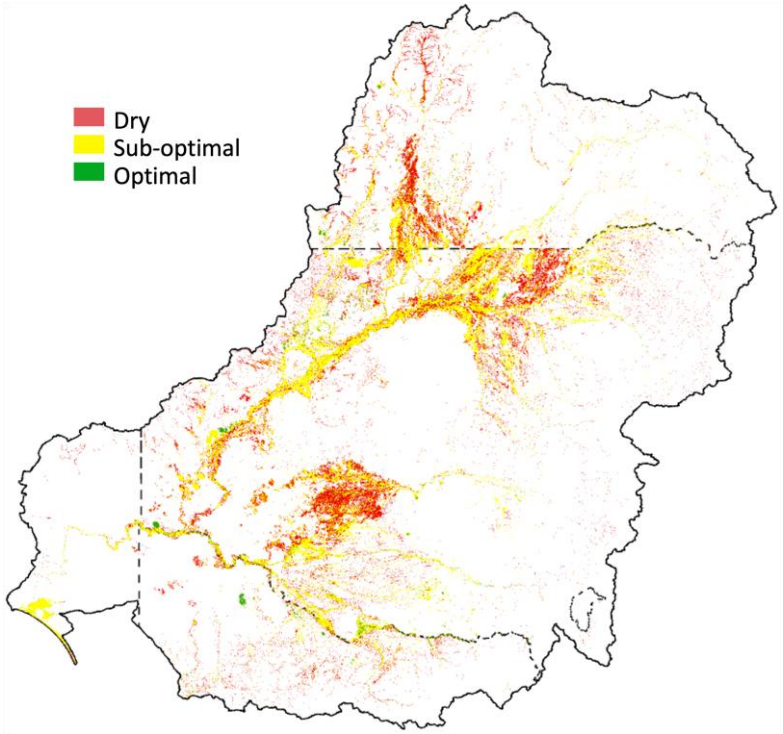

Figure 2. Frequency of inundation of Murray-Darling Basin wetlands over 36 years from 1988 to 2024. Categories of inundation represent optimal or sub-optimal frequency to maintain health of nine different wetland ecosystem classes (classes not shown) [7]

This approach is adaptive and outcomes-focused, where upstream decisions are responsive to downstream conditions and outcomes in near-real time. It allows for event-based water management which is increasingly important during crises (e.g. fish kills) and for managing

impacts of climate change. By agreeing on flow requirements in advance, it reduces uncertainty for water users who would otherwise face temporary discretionary restrictions during low flows. It is a transparent approach which gives greater public confidence in water management decisions.

Much work is already underway through the connectivity review in the northern Basin to prioritise important flow events within valleys and in downstream connected valleys. The 'resumption of flow' rule in the Darling-Baaka is one of many priority flow requirements already established. These measures are increasingly recognised as essential to mitigate ecological risks and help sustain wetlands and rivers and support their ecosystem functions in a changing climate (Action 3).

Programs to accelerate the relaxation of constraints are crucial if we are to sustain floodplain wetlands and optimise the benefits of water for the environment held by government. In the southern Basin and the Gwydir, flow constraints such as infrastructure and cropping on floodplains limit the ability of river operators to make environmental water releases, reducing opportunities for minor flooding of low-lying wetlands and increasing the risk of degradation of floodplain forests. Floodplain engineering projects should be discontinued – they will not deliver the claimed benefits and they risk being maladaptive under climate change (Action 2.b).

Across the Basin there is extensive in-stream and floodplain infrastructure (e.g. weirs, regulators and levees) that impedes the passage of flow, some of which are now redundant. There should be a systematic review of infrastructure, modification or removal of redundant structures, and a process for periodic relicensing infrastructure to ensure that, over time, only infrastructure that is safe, delivers justified and ongoing socio-economic benefits, and applies all practical means to reduce social and environmental impacts is retained (Action 3).

An ecologically representative selection of priority wetlands should be identified, protected and managed through area-based programs supported with stewardship programs. Integrated regional catchment management offers a practical and long-term model for linking the Basin Plan's water reform measures with place-based biodiversity conservation. There are opportunities to work with natural resource management regions to update regional plans in alignment with Basin Plan goals and support landholders to deliver outcomes.

The nature repair market, carbon market and other mechanisms provide ideal opportunities to improve the condition of key wetlands and their capacity to generate ecosystem services. They complement protection mechanisms such as national parks, Indigenous protected areas and conservation covenants (Action 4). Environmental condition accounts in every valley of the Murray-Darling Basin would help track changes and measure progress.

Decisions to de-prioritise or abandon as much as 40 percent of Basin wetlands has significant ecological and socio-economic consequences that must be recognised, reported and managed. For example, loss of riparian vegetation could cause erosion, degrade water quality, reduce ecosystem services and impose costs on communities, water users and governments. Given the important ecosystem services provided by wetland and rivers, decisions on trade-offs should be transparent, accountable and robust, with full consideration of present and future cumulative effects.

Recommended actions:

Action 1. Align Basin Plan objectives and targets with Australia's commitments under the Global Biodiversity Framework using an outcomes focused approach:

a. Identify and prioritise wetlands to achieve at least 30 percent protection and at least 30 percent restoration outcomes, through a transparent, evidence-based process which integrates ecological condition and function, persistence under climate

change, cultural significance, and is informed by the best available science and Aboriginal knowledge.

b. Identify flow requirements required to sustain GBF outcomes using best available scientific evidence, and update the Environmentally Sustainable Level of Take (ESLT) and Sustainable Diversion Limits (SDLs) to reflect these. The ESLT should include the flow requirement variables (e.g. flow volume, duration, frequency), supported by rigorous Basin-wide monitoring and public reporting;

Action 2. Align the use of environmental water requirements (EWRs) with healthy wetland outcomes.

a. Secure sufficient water and manage it effectively to meet Basin Plan targets by:

- Requiring Basin states to update rules in water resource plans to prioritise flow requirements for environmental, cultural and human needs at all times.
- Recovery of cultural water entitlements for Aboriginal Nations, recognising their rights and supporting local leadership in water management.
- Recovering the remaining water required to achieve a revised ESLT or the current Basin Plan target of 3,200 GL/year;

b. Restore system connectivity so that adequate flows can reach priority wetlands. Accelerate programs to deliver connectivity outcomes in the northern Basin and completing constraints relaxation in the southern Basin. The program for relaxing constraints should be separated from the sustainable diversion limit adjustment mechanism (SDLAM), adequately funded and delivered over a realistic timeframe (up to 10 years).

Action 3. Review and upgrade outdated in-stream and floodplain infrastructure to reduce risks to people and ecosystems, and support long-term river health. The Basin Plan should require a systematic review and periodic relicensing of in-stream and floodplain water infrastructure (e.g. weirs, regulators and levees) to ensure that, over time, only infrastructure that is safe, delivers justified and ongoing socio-economic benefits, and applies all practical means to reduce social and environmental impacts is retained. Other structures should be progressively rebuilt or removed to minimise negative environmental and social impacts.

Action 4. Maximise ecological, cultural and social benefits through integrated regional planning and community-led landscape stewardship, backed by natural capital accounting. This includes:

- Recognising and protecting Aboriginal peoples' cultural values through decision-making processes developed jointly with Aboriginal peoples;
- Supporting Aboriginal Nations, conservation organisations and state agencies to acquire and manage wetlands for conservation, with environmental flows;
- Working with natural resource management regions to update regional plans in alignment with Basin Plan goals, and support natural resource management bodies to partner with landholders to deliver outcomes.
- Improve the condition of key wetlands and their capacity to generate ecosystem services through the nature repair market, carbon market and other mechanisms;
- Expanding the use of conservation mechanisms such as national parks, Indigenous protected areas and conservation covenants
- Establish environmental condition accounts in every valley of the Murray-Darling Basin to track changes and measure progress.

Action 5. Strengthen accountability of SDLAM projects to ensure they deliver genuine ecological outcomes, by:

- Testing completed SDLAM projects against outcome-based ecological criteria to determine whether they deliver benefits equivalent to water recovery;
- Revising the reconciliation process to assess actual ecological outcomes rather than relying primarily on modelled or assumed benefits;
- Withdrawing projects that do not demonstrate equivalent ecological outcomes and exclude them from contributing to Basin Plan targets; and
- Discontinuing new SDLAM projects and ensure Basin Plan outcomes are achieved through measures that deliver demonstrable ecological results.

Reform 2. Embed climate change into water planning

Climate change poses one of the greatest risks to the Murray–Darling Basin's water resources, environment and long-term viability of industries and communities. The *Water Amendment Act (Restoring Our Rivers)* 2023 (Cth) requires climate change to be considered as a risk to water resources. Basin water management is still largely based on the assumption of historical climate conditions and is maladaptive under climate change. For example, in drier years a smaller proportion of water is available to the environment relative to consumptive use. As water scarcity intensifies, prioritising water for critical needs (e.g. stock and domestic water supply, dilution flows for toxic algal blooms and to avoid fish kills) is paramount. Communities will need support to adapt. Trade-offs among environmental, cultural, social and economic values will need to be carefully and intentionally managed.

The Basin is becoming hotter, drier and more variable, a trend that will continue. Average surface temperature has increased by 1.5°C since 1910 [10], runoff has declined, and droughts are becoming more frequent, longer and more severe. River baseflows, freshes and overbank events will become less frequent in the future. This will reduce connectivity between rivers and wetlands, increase the risk of poor water quality events and accelerate declines in floodplain vegetation and populations of native fishes and waterbirds.[6] Water availability for all users is expected to continue to decline, particularly in the southern Basin. Moderate floods, that sustain wetlands, will become less frequent. Very large floods are projected to be more intense and longer-lasting in parts of the Basin, increasing risks to water quality and infrastructure.[6,11] As climate pressures intensify, it will not be possible to sustain all rivers and wetlands in their current form, and environmental triage will be unavoidable. Climate adaptation under the Basin Plan will require a transparent and rigorous process for environmental triage. This process should be outcomes-based, incorporating Indigenous knowledge and experience not simply a reallocation of shrinking volumes of environmental water across all sites. To improve ecosystem resilience under a climate change future, we must undertake integrated catchment management, and sustain an agreed extent of high priority wetlands and restore them through prioritisation of adequate flows. There will be opportunities to support investment in wetland ownership by Aboriginal nations in this process.

Across the Basin, under current policies, communities downstream of major storages can run out of potable water despite the storage being full only years earlier. This is because water allocation frameworks may prioritise water allocation to entitlement holders over the maintenance of adequate flows in the river. Water held for critical human needs and other basic requirements (e.g. the drought reserve) is not clearly, or systematically defined or adequately managed across the Basin. Priority flows should be clearly defined in the Basin Plan, and Basin states should be required to introduce rules in water resource plans that pause consumptive allocation or diversion unless flow requirements for priority water needs in a particular catchment or connected catchment are met (Action 6.a). These flow requirements should include operational water requirements, critical human and wildlife needs, cultural needs, town water supply, stock and domestic water supply and sufficient water to maintain adequate water quality.

Additionally, full transparency is needed to ensure that communities understand allocation rules and know how long their upstream storage will sustain basic human needs (e.g. drinking water for towns).

In some valleys of the Basin, water is allocated to entitlement holders even before it has arrived in storage ('credit' approach). In periods of record-breaking drought, there have been instances where governments have retracted allocations from water users because the expected inflows didn't arrive, causing serious disruptions for water users. A better system is where only water that is in storage is allocated to entitlement holders (a 'debit' approach), so that water users can manage the full risks of water availability (Action 6.b). This approach would improve certainty for water users, reduce risks of system failure, and align water sharing arrangements with climate risk management and long-term water security objectives.

Climate change pressures like reduced water availability, higher temperatures and more frequent extreme droughts and floods have and will affect agricultural productivity, town water security and regional economies. These issues will particularly impact smaller and more remote communities with limited resources for adaptation. Dedicated public support for communities in transition, is needed to avoid increasing inequality and exacerbating these issues (Action 7). Communities with a high Indigenous population are already adapting to a changed climate, but their stories are not being listened to and further support is needed. One area of support is to give Indigenous scholars climate specific funding to share their knowledge or stories of adaptation. These communities are not concerned with mitigation, it is too late, but they are continuing to survive, just as their ancestors have (Action 7).

Groundwater plays a critical role during drought, providing essential supplies for towns, agriculture and ecosystems when surface water is scarce. During the Millennium Drought groundwater extraction increased sharply, and with more frequent and prolonged droughts, reliance on groundwater will intensify. Many groundwater systems in the Basin are already over-allocated or approaching unsustainable limits. Unsustainable increases in extraction risk long-term depletion of aquifers, declining water quality, reduced baseflows to rivers, wetlands and groundwater dependent ecosystems, and loss of drought resilience. Climate adaptation requires conjunctive management of surface water and groundwater conservatively and conjunctively, rather than allowing repeated overuse during each drought cycle (Action 8,Action 9 andAction 10).

Recommended actions:

Action 6. Explicitly integrate climate risks into all aspects of water planning and management, by prioritising water security for critical human and environmental needs. This requires:

a. Basin states to introduce rules in water resource plans that pause consumptive allocation or diversion unless flow requirements for critical water needs in a particular catchment or connected catchment are met.

b. Adopt conservative, debit-based allocation frameworks under a drying climate, where allocations are calculated based on water held in storage or realised inflows. These would replace credit-based approaches which allocate inflows that have not yet occurred.

Action 7. Support regional communities to adapt to reduced water availability and climate change through structured and planned pathways. This includes support for regional transition planning, diversification of production systems and livelihoods, investment in water-efficient infrastructure and wetland restoration. Transition strategies should incorporate Aboriginal peoples' knowledge, long-term observations and custodial responsibilities. This can be enabled by ensuring Indigenous knowledge is actively integrated and funded within climate science frameworks, in line with the approach adopted by the Intergovernmental Panel on Climate Change in its Seventh Assessment Report. Promoting high-integrity environmental markets (e.g. carbon and biodiversity) and renewable energy generation will help create new economic opportunities in a hotter, dryer Basin.

Action 8. Introduce new groundwater SDL compliance mechanisms 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.

Action 9. Better integrate surface water–groundwater connectivity. To enable this action surface water–groundwater linkages and groundwater-dependent ecosystems should be identified and mapped to enable their effective management. Environmental watering, floodplain management and groundwater rules should be more explicitly aligned to protect recharge processes and dependent ecological assets.

Action 10. 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.

Reform 3. Uphold Aboriginal peoples' values of water and their rights

Aboriginal people in the Murray–Darling Basin (over 50 distinct Nations) have cultural, spiritual, social, environmental, and economic connections to water and land. Yet, despite representing 5 to 10 percent of the Basin's population and with Native Title granted or claimed on about a third of its land, they control less than 0.2 percent of surface water entitlements and 0.02 percent of groundwater. Few Aboriginal communities manage and own freshwater ecosystems or high priority wetlands.

The 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). While governments have committed modest funding to buy water entitlements for Aboriginal nations, progress has been very slow (Action 11).

The *Water Amendment Act (Restoring Our Rivers)* 2023 (Cth) requires Aboriginal people's interests be considered in the management of Basin water resources. Meaningful water justice requires transferring water entitlements to Aboriginal Nations for cultural, environmental, economic or other self-determined purposes. It also requires investment in Aboriginal-led governance, river ranger programs, and long-term capacity to care for Country. Promotion and assistance to owning wetland areas is essential (Action 12).

For Aboriginal Nations, water is inseparable from Country and from the responsibilities, knowledge and practices that sustain it. Treating water solely as an allocative or tradeable resource has fragmented these relationships and limited cultural and environmental outcomes.

Reconnecting water and Country means recognising Aboriginal Nations as custodians with decision-making authority and supporting integrated, Aboriginal-led water management in ways that reflect cultural, social, ecological and economic priorities.

Further, there are significant opportunities through the return of land and water to Aboriginal Nations to advance the achievement of GBF targets for conservation of inland waters. These include expanding Indigenous protected areas and ranger programs. There are also considerable opportunities to meet GBF 30x30 obligations using Other Effective area-based Conservation Measures (OECMs), with Aboriginal Nations on wetland ecosystems (Action 13).

Recommended actions:

Action 11. Embed cultural values of water into water planning. To enable this action, Basin Governments should adequately consider and embed cultural values of Aboriginal people into water planning. This must happen through culturally appropriate, long-term funded programs with Indigenous scholars, Knowledge Holders and river rangers. Opportunities should be sought for supporting investment in wetland ownership by Aboriginal nations.

Action 12. Set Basin Plan targets for water justice for Aboriginal people. The revised Basin Plan should advance water justice by setting a Basin Plan target for water entitlements and cultural flows that are owned and managed by Traditional Owners on a self-determined basis.

Action 13. Embed explicit legal recognition of Aboriginal people's water rights and interests within Basin legislation. UNDRIP needs to be recognised in water resource plans and environmental watering.

Reform 4. Support communities through transition

Communities across the Murray–Darling Basin will undergo profound changes in coming decades due to climate change, shifts in economic drivers, commodity markets, demographics and social and technological change. Government should support communities to adapt to climate and other changes.

Irrigation industries have benefited from more than $9 billion of public investment in buybacks, infrastructure and market reforms[12], yet a number of regional towns and small irrigation-dependent communities have struggled to adapt to less water. Only a small proportion of total water reform investment has supported community transition or diversification (Action 14).

The inadequacy of targeted regional adjustment has contributed to social and economic inequities, loss of confidence in reform and resistance to environmental water recovery. Without structured support through a planned and equitable transition, communities may experience economic decline, population loss and reduced capacity to adapt to climate change (Action 14).

Many Basin communities experience highly variable and, at times, unsafe water supplies [3,6]. Droughts, floods, salinity spikes, algal blooms and blackwater events, intensified by climate change, place increasing pressure on drinking water treatment systems. Only South Australia publicly reports town-level water quality and there is no Basin-wide framework for transparent monitoring or reporting (Action 15 & 16).

Recommended actions:

Action 14. Establish a Basin Transition Fund to support regional communities to develop new and sustainable industries, cultural enterprises, environmental innovations and improved local water security.

a. The fund should support adaptation, economic diversification and long-term community wellbeing.

b. It should also provide targeted assistance to communities impacted by Basin Plan reforms, helping to manage and mitigate adverse social and economic impacts.

c. Programs should be co-designed with communities, Traditional Owners and local governments to reflect local priorities and build enduring capability for adaptation.

Action 15. The revised Basin Plan should clearly define and operationalise the critical human water needs provisions of the *Water Act* and Basin Plan, elevating community water security as a core objective. This should include establishing a Basin-wide public monitoring and reporting framework for drinking water quality, consistent with the Australian Drinking Water Guidelines, with state-level data made publicly accessible.

Action 16. Upgrade water supply infrastructure for Basin towns. To enable this action the National Water Grid Authority should co-fund upgraded off-river water supply systems for priority Basin towns to ensure that they have safe and reliable domestic water supplies.

Reform 5. Restore public trust by improving governance and accountability

Transparency, accountability and robust processes are essential to ensure proper governance of the Basin Plan and maintain public confidence in water management. We welcome the establishment of the NSW Natural Resources Access Regulator (2017) and the Inspector-General of Water Compliance (2021) to support compliance and enforcement of water reform. We have identified four actions that would further improve Basin governance.

Some states have stalled progress or failed to deliver on key elements of the Basin Plan, and the Commonwealth has been unable to hold them to account. For example, preparation of Water Resource Plans (WRPs) by the NSW government was subject to considerable delays, and four plans remain unaccredited and unenforceable after more than six years. Under the Subdivision E, Section 68 of the *Water Act* Water Resource Plans could be prepared by the MDBA and adopted by the Commonwealth Water Minister if a state fails to meet its obligations.[13] Yet the Commonwealth has never exercised its right to do so (Action 17).

Further, constraints relaxation measures proposed by states have not met agreed targets in the Constraints Management Strategy, yet the Commonwealth has neither rectified this shortcoming nor addressed the significant, ongoing delay in delivery beyond setting a timeframe under the Constraints Relaxation Implementation Roadmap.[14] For the next Basin Plan, far more effective measures are needed to hold states to account and ensure agreed commitments are delivered (Action 17).

Hydrological models underpin water planning, management and compliance. The Commonwealth program to centralise and uplift these models is an important step forward. However, hydrological models used to inform major planning and management decisions including SDL determination and compliance are not publicly available, nor are they adequately funded or regularly updated, with known limitations such as their inability to model floodplain dynamics or groundwater connectivity. This raises major concerns about the integrity of the models used to inform key decisions, and limits the ability to utilise models to their full potential and capitalise on the expertise and resources outside of government to improve them (Action 18).

Models used each year to determine SDL compliance (known as annual permitted take models) are not validated annually and the known biases and errors are carried into SDL compliance assessment without adjustment. There are particular concerns where there are systemic errors (as is often the case during low flow periods), leading to inaccurate estimation of limits on consumptive take. To account for this issue, we recommend all models are validated using gauge data (including diversions and river flows) and outputs are bias-corrected to ensure they accurately reflect actual river system conditions (Action 18).

We lack a robust, independent and publicly transparent auditing framework for Basin water accounting. Equivalent independent and publicly reported auditing processes are not consistently applied under the current Basin Plan. Without transparent, independently verified water accounting and compliance reporting, confidence in allocation decisions and SDL compliance is weakened. The revised Basin Plan should restore independent, public auditing of water accounting and diversion limits to

ensure that system integrity is maintained and agreed outcomes are delivered (Action 19).

Current assessments of the ecological condition of Basin wetlands and rivers is fragmented between multiple agencies and jurisdictions. Data collection, analysis and reporting for environmental indicators is generally poor.[3] Deficiencies in how monitoring information is collated and presented presents a barrier to community engagement and undermines trust[15] (Action 20).

Recommended actions:

Action 17. Improve accountability of Basin governments to deliver agreed commitments. This action could be enabled by shifting to a performance-based delivery model, for example, through milestone payments, delivery gateways, funding withholding/reallocation, stronger compliance powers, agreed consequences for non-delivery and last-resort options such as backstop powers (e.g. where the Commonwealth assumes responsibility for delivery). Cooperative governance arrangements including joint programs with the State jurisdictions should also be better developed.

Action 18. Ensure hydrological modelling and water accounting is transparent and fit for purpose. This action would be enabled by:

a. Providing public access to hydrological models and underpinning datasets, with a governance framework to ensure best practice standards are met, models are regularly updated and adequately funded.

b. Adopting double-entry water accounting that compares modelled and actual river flows and diversions and adjusts results to account for errors. Annual assessments of discrepancies should be published and used to guide improvements in model accuracy.

c. Improving hydrological models to represent system behaviour more accurately, including low flows, floodplain interactions, demand and groundwater–surface water connections.

d. Prohibiting retrospective adjustments to Baseline Diversion Limits that increase allowable take unless supported by independently verified hydrological evidence and subject to full public scrutiny.

Action 19. Set and enforce best-practice standards for information systems. This action could be enabled through:

a. Improved modelling, monitoring, evaluation and reporting standards to ensure that design, data quality, spatial coverage and frequency of datasets can support compliance, evaluation and adaptive management.

b. Increased data sharing between Commonwealth and State regulatory authorities (e.g. Natural Resources Access Regulator, Inspector General) in relation to auditing.

c. Improved standards for measuring consumptive water use and water interception, including surface water, groundwater levels and pressures, and floodplain diversions to a standard suitable for compliance.

Action 20. Strengthen the accountability and independent scrutiny of Basin Plan performance. This action could be enabled through:

a. Improving accountability of Basin governments by shifting to a performance-based delivery and assurance framework for Basin Plan implementation. This should include clear and auditable delivery measures, regular independent auditing of progress and compliance, and transparent public reporting of state performance. The Inspector-General of Water Compliance should play a stronger role in auditing the implementation of Basin Plan commitments and reporting against agreed measures.

b. Commonwealth funding provided to Basin States for water reform should be tied to delivery of agreed commitments. Where states fail to meet agreed milestones, standards or outcomes, the Commonwealth should have the power to impose consequences, including withholding, reducing or reallocating implementation payments until deficiencies are addressed.

c. The Inspector-General of Water Compliance as an independent audit body should report regularly on the performance of the Basin Plan implementation across jurisdictions and provide transparent assessments of progress towards environmental, cultural and governance objectives.

d. Preserve and strengthen the independence of the Commonwealth Environmental Water Holder (CEWH) and its supporting office. The CEWH plays a critical role in managing environmental water as a contested public asset and must remain independent in its decision-making to ensure water is used to achieve legislated environmental outcomes, free from short-term political or operational pressures. This independence should be maintained alongside strong transparency and accountability requirements, including clear public reporting on decisions, outcomes and trade-offs. The operational capability supporting the CEWH should be sufficiently resourced and functionally ring-fenced to ensure its independence is effective in practice, while remaining subject to appropriate oversight and audit.

Benefits for ecosystems, communities and the economy

The health of the Basin underpins the lives and livelihoods of more than 2.4 million people who live within it, including more than 50 Aboriginal nations, and over 3 million others beyond its boundaries who depend on its water for drinking, farming, industry and cultural life.

Adopting the recommendations in this Blueprint will give greater confidence in the ability to sustain healthy river systems in a changing climate. Healthy rivers sustain reliable water quality and supply by diluting salts, nutrients and pollutants, reducing risks to town water supplies and lowering drinking water treatment costs. The river systems support productive and sustainable agriculture by maintaining soil health, recharging groundwater and providing flat, fertile floodplains for growing food and fibre.

Functioning river and wetland systems also support regional economies through amenities, tourism, recreation and fisheries, while providing essential regulating ecosystem services such as habitat for native species, nutrient cycling and natural pest control. For Aboriginal peoples, healthy rivers are central to cultural practice, connection to Country and community wellbeing. Investing in river health reduces long-term public costs by lowering the likelihood and severity of ecosystem collapse, water quality crises and disaster recovery following droughts, floods and blackwater events.

If we continue on the current trajectory, the consequences for people and the environment are significant and cumulative. Degraded ecosystems are less able to maintain water quality, increasing the frequency and severity of events such as algal blooms, hypoxic blackwater and large-scale fish kills, particularly during droughts and low-flow periods. These conditions place town water supplies at risk, raise water treatment costs, and require emergency interventions to maintain safe drinking water supplies. Loss of flow connectivity and wetland ecosystem function also undermines fisheries, tourism and recreation and accelerates declines in populations of native species and ecosystem services that support regional economies. [16,17]

Environmental degradation has direct social and cultural impacts. For Aboriginal peoples, declining river health causes ongoing harm to cultural values and weakens their ability to care for Country, compounding historical injustices in water management.

Over time, failure to maintain wetlands and rivers shifts costs from prevention to crisis response. Governments face higher expenditure on disaster recovery, infrastructure upgrades, water treatment and regional structural adjustment, while the scope for effective and equitable reform narrows. In a hotter, drier and more variable climate, allowing the Basin's wetlands and rivers to deteriorate further will increase long-term public costs and constrain future options for water security and regional adaptation.

By providing an evidence-based, outcome-focused approach, the recommendations in this Blueprint, including the Global Biodiversity Framework, can support a healthier future for the Basin, with more targeted investment, transparent trade-offs and greater certainty for communities.

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